1/355 Manukau Road
Epsom, Auckland 1023

T: 09 638 8414
E: rhys.hegley@acoustics.co.nz

PROPOSED ELECTRIC ARC FURNACE

61 HAMPTON DOWNS ROAD, TE KAUWHATA

ASSESSMENT OF NOISE AND VIBRATION EFFECTS

Report No 25013v2

Prepared for:

Craig Shearer
Shearer Consulting Limited

Prepared by: .....

Rhys Hegley

11 June 2025

CONTENTS

1. INTRODUCTION

Green Steel proposes a metal recycling plant (the Proposal) for the site at 61 Hampton Downs Road, Hampton Downs (the Site). The construction of the Proposal will require an estimated two seasons of earthworks to create the necessary building platforms, followed by the construction of the buildings themselves. The proposed activities will begin with the importation of scrap steel for shredding. Ferrous scrap will then be recycled on Site with an electric arc furnace and the subsequent steel will be exported from Site. Non-ferrous material will be exported from Site for recycling elsewhere. The residual material, floc, consisting largely of fabrics from vehicle upholstery, will be placed into a Monofill on site. Figure 1 below shows the Proposal, other than the Monofill, which is shown in Figure 4.

This report provides predictions of noise that neighbours to the Proposal will experience from its construction and subsequent operation. An assessment of those effects is also provided, along with any mitigation considered appropriate. The report addresses the acoustic related issues of the advice notes that Waikato Council issued on 30 April 2025.

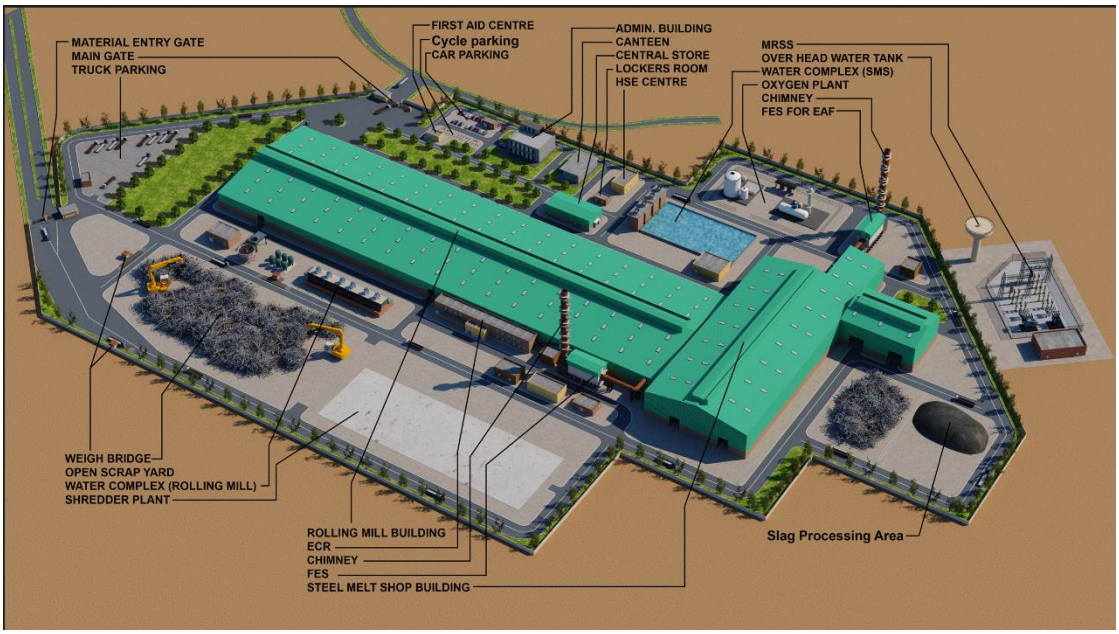

Figure 1. Site Layout

2. WAIKATO DISTRICT PLAN

The Site is within the General Rural Zone of the Waikato District Plan – Operative in Part (WDP). To the north, beyond Hampton Downs Road Loop, land is within the Motorsport and Recreation Zone. The neighbouring site to the west and in part, the south, has dual zoning consisting of the General Rual Zone and the Corrections Zone. All remaining sites are within the General Rural Zone. Figure 2 shows the relevant portion of the WDP planning maps.

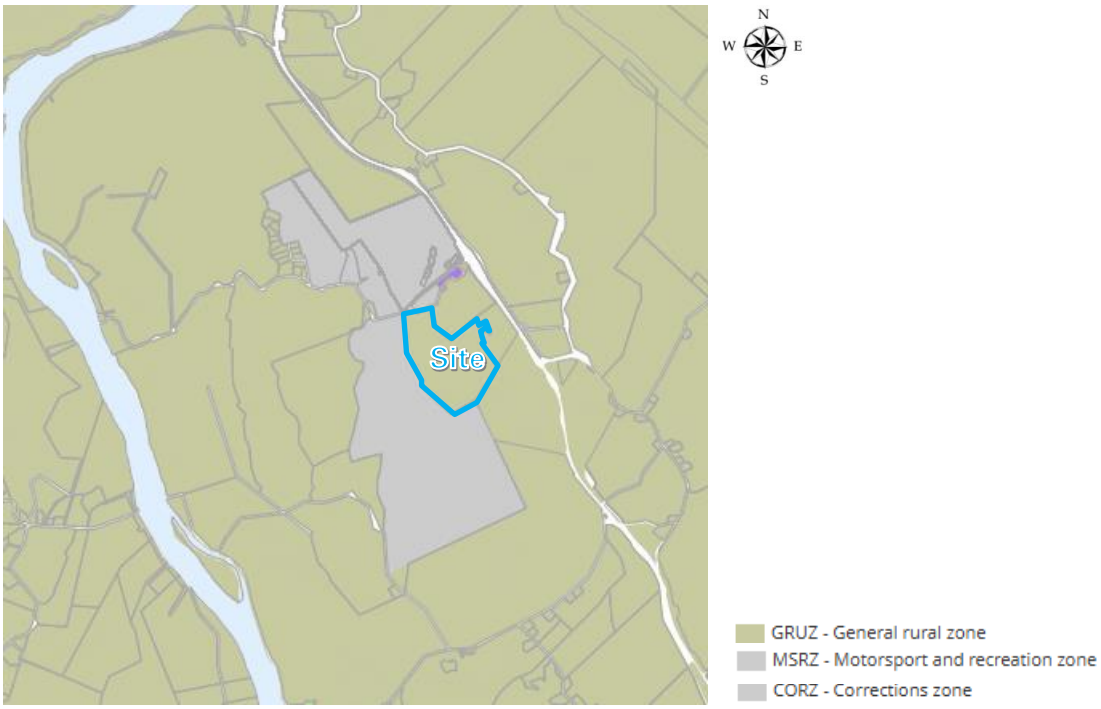

Figure 2. WSP Zoning Map

The WDP provides the following relevant policies relating to noise

NOISE -P3 - Noise and vibration in the GRUZ - General rural zone

(1) Manage the adverse effects of noise and vibration by:

(a) Ensuring that noise and vibration levels do not compromise rural amenity;

(b) Limiting the timing and duration of noise-generating activities to the extent practicable and appropriate;

(c) Maintaining appropriate separation between high noise environments and noise sensitive activities.

The WDP provides rules for the constitution and operation of the Proposal, which are addressed in the following sections.

3. CONSTRUCTION NOISE EFFECTS

This section addresses the effects of construction activities. Given the distance of the Site from its neighbours (approximately 110m to the dwelling), construction vibration is expected to be negligible and is not specifically considered. This section, therefore, addresses construction noise only.

At this resource consent stage of the Proposal when the contractor/s are yet to be appointed, the predictions of construction noise have been based on anticipated construction activities and measurements of similar plant operating at other sites. The intent is to demonstrate that there is a practicable method of constructing the Proposal in a manner that results in reasonable effects.

3.1. Construction Noise Rules

Noise rule R4 requires that:

(a) Noise from any construction, maintenance, or demolition activity that is measured, assessed and managed in accordance with the requirements of NZS6803:1999 'Acoustics - Construction Noise'.

NZS 6803 provides a range of construction noise limits over the 24 hour period that are measured at a point 1m from the most exposed facade of the neighbouring dwellings. Heavy construction activities, such as earthmoving and building fabrication, will be limited to the day time (7.30am to 6.00pm Monday to Saturday) period when NZS 6803 permits limits of 70dB L_{Aeq} and 85dB L_{AFmax}.

These are the long term construction limits which apply to activities exceeding 20 weeks' duration.

Construction is not prohibited outside of the day time but the limits are such that activities would be limited to those producing little noise, such as administrative work or interior fitout, such as painting or carpeting.

3.2. Construction Activities

The Proposal will require significant earthworks to prepare the Site. These will involve a balanced cut and fill (Figure 3), the result of which is that no cleanfill will be moved to or from the Site. The earthworks are expected to take in the order of two earthworks seasons (generally October to April).

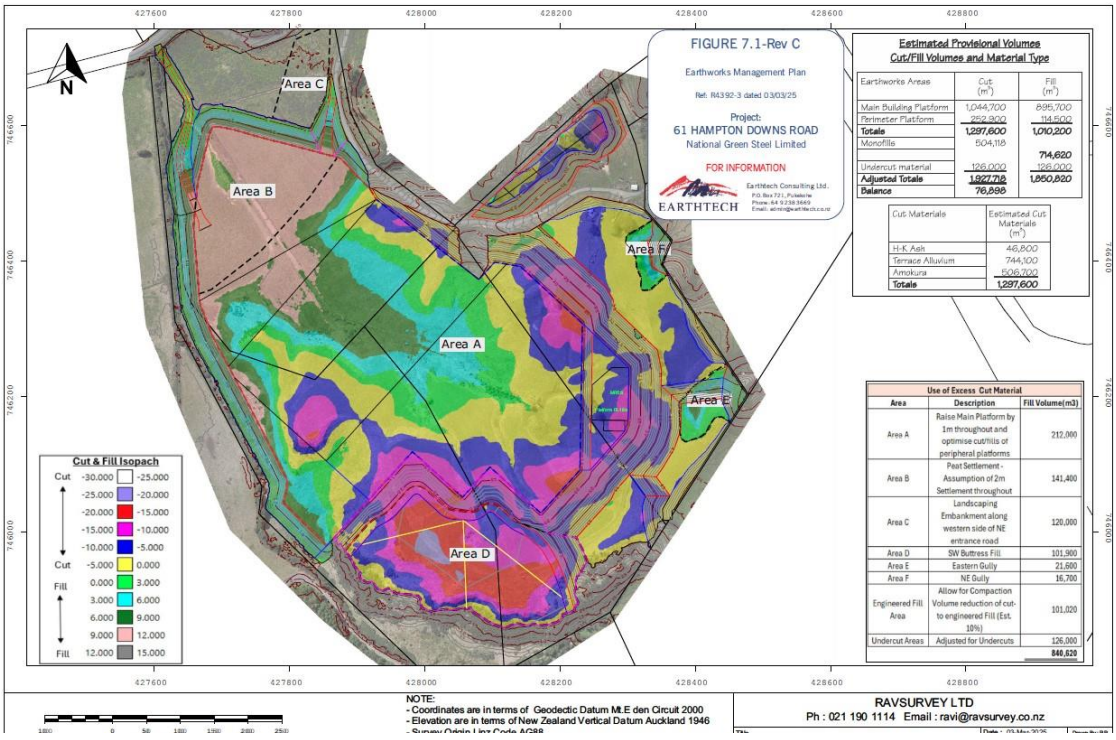

Figure 3. Plan of the Extent of Earthworks Proposed for the Site

The equipment used for this work is detailed in section 3.3.

Once the Site has been prepared, the construction of the buildings will commence. Compared to the earthworks, building construction is generally less intensive and is, therefore, not considered specifically. The one potential exception may be the foundations for some of the load bearing elements of some of the buildings. While the foundation requirements are yet to be determined, analysis has assumed that a conventional piling rig may be required, and it has been assumed to operate over the footprint of the Steel Melt Shop Building and the Rolling Mill Building (Figure 1).

3.3. Construction Noise Prediction

Noise from the proposed activities was calculated to the surrounding sites using the Predictor noise modelling software. Predictor is a three dimensional modelling tool in which a full scale model of the Proposal and surrounding area is developed. Calculations are in accordance with ISO Parts 1 and 2[1]and include all variables that affect the propagation of noise. These include:

1. A plan of the Proposal, allowing the distances between the construction activities and the various receivers to be determined;

2. The ground contours of the existing land to allow topographical screening to be determined;

3. Ground cover, which affects noise propagation. The analysis is based on a soft surface outside of the hard Site;

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[1] ISO 9613-1:1993 "Acoustics -- Attenuation of sound during propagation outdoors - Part 1: Calculation of the absorption of sound by the atmosphere"

ISO 9613-2:1996 "Acoustics -- Attenuation of sound during propagation outdoors -- Part 2: General method of calculation"

4. Meteorological effects. All analysis assumes slightly positive weather effects with a light wind blowing from each source to each receiver at once to provide a worst case scenario; and

5. The noise levels from individual items of plant used, which are discussed in more detail below.

At this resource consent stage of the project when the contractor/s are yet to be appointed, the noise predictions have been based on anticipated construction activities and measurements of similar plant operating at other sites. Table 1 sumamrises the construction plant considered in the analysis and provides the base noise data used for calculations.

Table 1. Construction Plant Base Noise Data

Construction Plant	Sound Power Level (dBA)
3 x 40T excavators	104 (each)
Bulldozer (D9 or equivalent)	114
40T dump trucks	110
Compactor (vibrating)	111
Drill rig	108

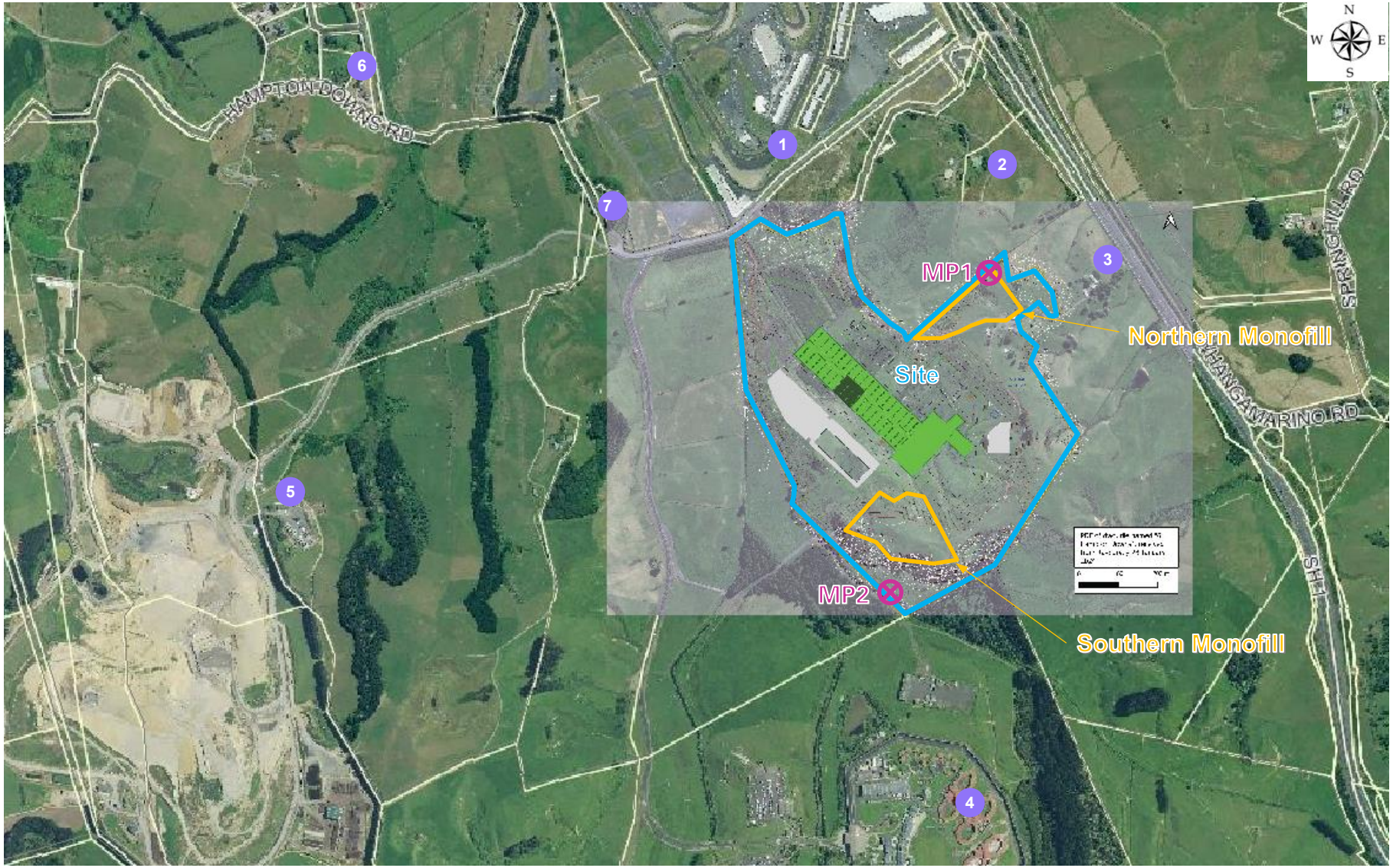
Given the natural variations in different types of plant that could be used on site, a range of noise levels would realistically be expected from the various proposed activities. Therefore, rather than report noise levels to the nearest whole number, it is considered more appropriate to report, and subsequently assess, a range of possible noise levels for each of the activities to each of the surrounding receivers. As a result, noise levels are reported using 5dB bandwidths.

Noise levels from the construction activities (other than the piling) were calculated by grouping all activities together and then placing them at representative locations about the Site, including the closest position to each of the surrounding neighbours. Calculations resulted in a range of noise levels with only the uppermost being used for this assessment. This means that, generally, construction noise levels will be lower than reported.

A similar approach was used for the assessment of piling noise but, in this case, the piling rig was limited to the footprints of the Steel Melt Shop Building and the Rolling Mill Building.

3.4. Assessment Properties

Noise has been predicted from the construction activities to the assessment points of the buildings surrounding the Proposal, which are shown in Figure 4 and described in Table 2. The neighbouring buildings range in height and each has been modelled with the correct number of floors. With the inclusion of the topographical information from Council's GIS system, noise has been predicted to all buildings in accordance with the requirements of NZS 6803. Where noise levels are predicted over multiple floors of the same building, only the uppermost level has been reported.



x - Receivers

⊗ - Ambient measurement position

Figure 4 – Site Plan and Receivers

3.5. Construction Noise Levels

Table 2 below reports the construction noise levels when calculated as described above.

Table 2. Predicted Construction Noise Levels

Receiver, Fig 4	Address	Construction Noise Level, dB L_{Aeq}	
		Earth Moving	Piling
R1	Hampton Downs Raceway Apartments	46 - 50	36 - 40
R2	23 Hampton Downs	46 - 50	31 - 35
R3	61B Hampton Downs	46 - 50	21 - 25
R4	113 Hampton Downs Road (Prison block)	46 - 50	26 - 30
R5	135 Hampton Downs Road (Landfill offices)	31 - 35	21 - 25
R6	5 Chris Amon Drive	31 - 35	21 - 25
R7	136 Hampton Downs Road	46 - 50	36 - 40

3.6. Assessment of Construction Noise Effects

Table 2 reports construction noise levels from the earth work and the piling as being readily complaint with the 70dB L_{Aeq} limit of the WDP construction noise rule. The L_{AFmax} noise levels have not been reported but, being approximately 15dB above the L_{Aeq}, would also readily comply with the 85dB L_{AFmax} limit of the WDP.

For a construction activity, the predicted noise levels are relatively low, to the point that the predicted levels are generally compliant with the 50dB L_{Aeq} operational noise limit of the WDP during the day time (section 4.1 below). The one exception is the 53dB L_{Aeq} predicted for Receiver 4. In this case, it is relevant that 3dB is generally considered to be the smallest change that the average

person can detect. In other words, this level would appear to be marginally louder than the operational noise limit.

Based on the above, it is concluded that there is ample scope to develop the Proposal and that the resulting noise levels will be reasonable.

4. OPERATIONAL NOISE EFFECTS

4.1. Operational Noise Rules

The most common zone of the Receivers is the General Rural Zone, for which the following rules are relevant to the Proposal:

NOISE-R8 – General Rural Zone

(a) Noise measured at the notional boundary on any other site in the GRUZ - General Rural Zone must not exceed:

(i) 50dB L_{Aeq}, 7am to 7pm every day;

(ii) 45dB L_{Aeq}, 7pm to 10pm every day;

(iii) 40dB L_{Aeq} and 65dB L_{Amax}, 10pm to 7am the following day.

(b) Noise measured within any site in any zone, other than the GRUZ - General rural zone, must meet the permitted noise levels for that zone.

(c) Noise levels must be measured in accordance with the requirements of New Zealand Standard NZS 6801:2008 "Acoustics - Measurement of Environmental Sound".

(d) Noise levels must be assessed in accordance with the requirements of New Zealand Standard NZS 6802:2008 "Acoustic - Environmental noise".

The notional boundary is a line 20 metres from any side of a residential unit or other building used for a noise sensitive activity, or the legal boundary where this is closer to such a building.

Rule R26 applies to noise received by the Corrections Zone to the south (Receiver 4, Figure 2). As the noise levels provided by this zone match those of the General Rural Zone noise rule, they are not repeated.

Considering the Motorsport and Recreation Zone to the north, Receiver 1 lies within Precinct 17 for which R35 provides a tiered set of noise rules. These rules start with a relatively high noise limit of 65dB L_{Aeq} for 30 days per year to be permissive of motor racing dropping to 55dB L_{Aeq} for 40 days and then limits similar to the General Rural Zone for the remainder of the year. Given the Proposal will operate continuously over the year, it is these latter levels that have been adopted for the Proposal, and which are summarised in the table below. It is noted that, being adjacent to the racetrack, the occupants of the apartments within this zone are clearly accepting of elevated levels of noise.

Receiver 7 lies within Precinct 15 for which R37 provides specific noise rules. While similar, there are subtle difference to the General Rural Zone noise rule, as summarised in Table 3.

Table 3. Operational Noise Limits of the WDP

Noise Limit	Gen Rual Zone, (R8) and Corrections Zone (R26)	Motorsport and Recreation Zone	
		Precinct 17 (R35)	Precinct 15 (R37)
	Receivers 2 – 7	Receiver 1	Receiver 8
50dB L_{Aeq}	7am – 7pm	7am – 6pm	7am – 7pm[1]
45dB L_{Aeq}	7pm – 10pm	6pm – 10pm	NA
40dB L_{Aeq} / 65dB L_{AFmax}	10pm – 7am	10pm – 7am	All other times[2]

1. Applies Monday to Friday. On Saturdays, 7am – 6pm.
2. In precinct 15, the L_{AFmax} limit increases to 75dB.

4.2. Operational Activities

With reference to Figure 1 above, the proposed activities can be sumamrised as:

1. Trucks will import scrap steel to Site, depositing it in the Open Scrap Yard;

2. Excavators with grapples will organise the scrap. Larger items will be loaded directly into a preshredder that will be located externally in the Open Scrap Yard.

3. The resulting material and the remainder of the scrap will be placed on a conveyor that feeds the enclosed shredder in the Open Scrap Yard.

4. The shredder will feed into the Rolling Mill Building where it will be sorted into ferrous and non-ferrous metals and the remaining floc. The non-ferrous product is loaded onto trucks for backloading from Site. The floc is addressed below.

5. The ferrous metal is then recycled with an electric arc furnace and a ladle furnace in the Steel Melt Shop.

6. From here it passes to the Rolling Mill Building where it is turned into structural steel or reinforcing bars.

7. Forklifts then load the steel onto trucks for export from the Site.

8. The resulting slag by-product will be managed on Site with a loader.

9. The floc, which appears as a downy product, and consists largely of fabric from the shredded vehicles, will be carted to either the northern or southern Monofills to be land filled. These two areas are shown in Figure 4, noting that only one will be used at a time. A bulldozer will be used to manage the Monofill.

The above will be undertaken over three shifts, as described below:

Table 4. Traffic Movements

	Activities Per Shift		
Shift	**8am – 4pm**	**4pm – 12am**	**12am – 8am**
Staff[1]	100	60	40
Trucks	50 trips (50 in + 50 out)		0

1. The relevance of the staff numbers is that the traffic report assumes each staff member arrives at, or departs from, the Site in their own vehicle. For example, at the afternoon shift change, there are expected to the 100 vehicle departures and 60 vehicle arrivals. These have been modelled as occurring over a 30 minute period.

The operational hours of the remaining activities on site will be as follows:

Table 5. Operational Times

Activity	Hours of Operation
Open Scrap Yard (excluding shredders)	7am – 12am
Shredder and Pre-shredder	7am – 7pm
Steel Melt Shop & Rolling Mill	24 hours
Monofill	7am – 7pm[1]
Forklifts and loaders	7am – 7pm

1. Five return truck trips per day are predicted for the Monofill.

4.3. Operational Noise Prediction

The assessment of environmental sound is undertaken using a rating level. This is the predicted level of noise from the Proposal, which is then adjusted for its duration over the day (averaging) and for any special audible characteristics it may contain. This section describes how the rating levels were determined, the mitigation required, and an assessment of the resulting effects.

4.3.1. Method of Calculation

Noise from the operation of the Proposal was predicted with the same Predictor software used for construction noise (section 3.3). The source data has been updated, as follows:

Table 6. Operational Base Noise Data

Construction Plant	Noise Level	
Open Scrap Yard (with pre-shredder)	115 dBA	Sound power[1]
Shredder	96dBA	Reverberant level (L_{Aeq}) in building[1]
Electric Arc Furnace (Steel Melt Shop)	143 dBA	Sound power[2]
Ladle Furnace (Steel Melt Shop)	123 dBA	Sound power[2]
Rolling Mill (General)	75 dBA	Reverberant level (L_{Aeq}) in building[3]
Rolling Mill (Sorting)	89 dBA	Reverberant level (L_{Aeq}) in building[1]
Trucks delivering scrap	104 dBA	Sound power[3]

Construction Plant	Noise Level	
Floc trucks on gravelled accessway	103 dBA	Sound power[3]
Front end loader (manages slag)	100 dBA	Sound power[3]
Bulldozer (manages Monofill)	104 dBA	Sound power[3]
Forklifts load trucks with steel	97dBA	Sound power[3]

1. Measured level of similar activity at one of the applicant's existing sites
2. Information provided by a prospective supplier.
3. Based on measurements of a similar activity.

4.3.2. Receivers

The construction receivers (Figure 4) have been used for the assessment of operational noise. The only change is that the assessment point has moved to the notional boundary.

R7 is within the Hampton Downs Motor Sport Park which, it is understood, is supportive of the Proposal.

4.3.3. Mitigation

Through the analysis, several mitigation methods were identified and developed, as follows:

TONAL REVERSING ALARMS

Tonal reversing alarms are a common source of annoyance for neighbours. The Proposal is that they be replaced on all plant of the Proposal with broadband alarms.

SHREDDER ENCLOSURE

To control noise from the shredder, analysis has been based on it being in an open topped enclosed with walls consisting of 150mm thick concrete. Two openings, nominally 5m x 3m, will be provided. The opening in the wall facing the scrap pile will be to load the shredder while the opening in the wall facing the Rolling Mill will be for processed material to feed the sorter.

STEEL MELT SHOP

To control noise from within the Steel Melt Shop, this building must be fully enclosed without any untreated openings. There are a variety of suitable types of enclosure. 150mm concrete or masonry would provide the reductions necessary. The following analysis is based on the walls and roof of the enclosure being constructed from:

1. Profiled metal cladding;
2. A nominal 200m cavity;
3. Fibreglass or polyester absorption in the cavity;
4. 2 x 13mm Noiseline pasteboard lining.

The above is one option but could be amended provided the performance of the selected buildup achieves R_w52, or better.

ROLLING MILL

The Rolling Mill Building has been assumed to be clad with profiled metal. No specific treatment is required other than doors remaining closed.

4.3.4. Averaging

NZS 6802: 2008 'Acoustics – Environmental Noise' permits the averaging noise that occurs for only part of the day time. The analysis of the Proposal has assumed no averaging.

4.3.5. Special Audible Characteristics

Based on the observations of the existing scrap yard and shredder operation the Steel Melt Shop being in an enclosure and tonal reversing alarms being replaced with broadband ones, the Proposal is not considered to have a Special Audible Characteristic, as defined by NZS 6802.

4.4. Rating Levels

The rating levels for the Proposal are shown in the following Table. They are also shown in the following Figures 5 – 7, which show the noise contour plot for the day, evening and night time respectively. Due to the interpolation method used to produce contours, the contours should be used for information only. The levels reported in Table 7 form the basis of this assessment.

Table 7. Rating Levels

Receiver, Fig 4	Address	Rating Level			
		Day	Evening	Night	
		dB L_{Aeq}	dB L_{Aeq}	dB L_{Aeq}	dB L_{AFmax}
R1	Hampton Downs Raceway Apartments	49	42	40	48
R2	23 Hampton Downs	41	37	38	46
R3	61B Hampton Downs	40	36	36	44
R4	113 Hampton Downs Road (Prison block)	46	41	37	45
R5	135 Hampton Downs Road (Landfill offices)	42	35	31	39
R6	5 Chris Amon Drive	37	33	28	36
R7	136 Hampton Downs Road	50	44	38	46

Full compliance
Partial compliance
Non-compliance

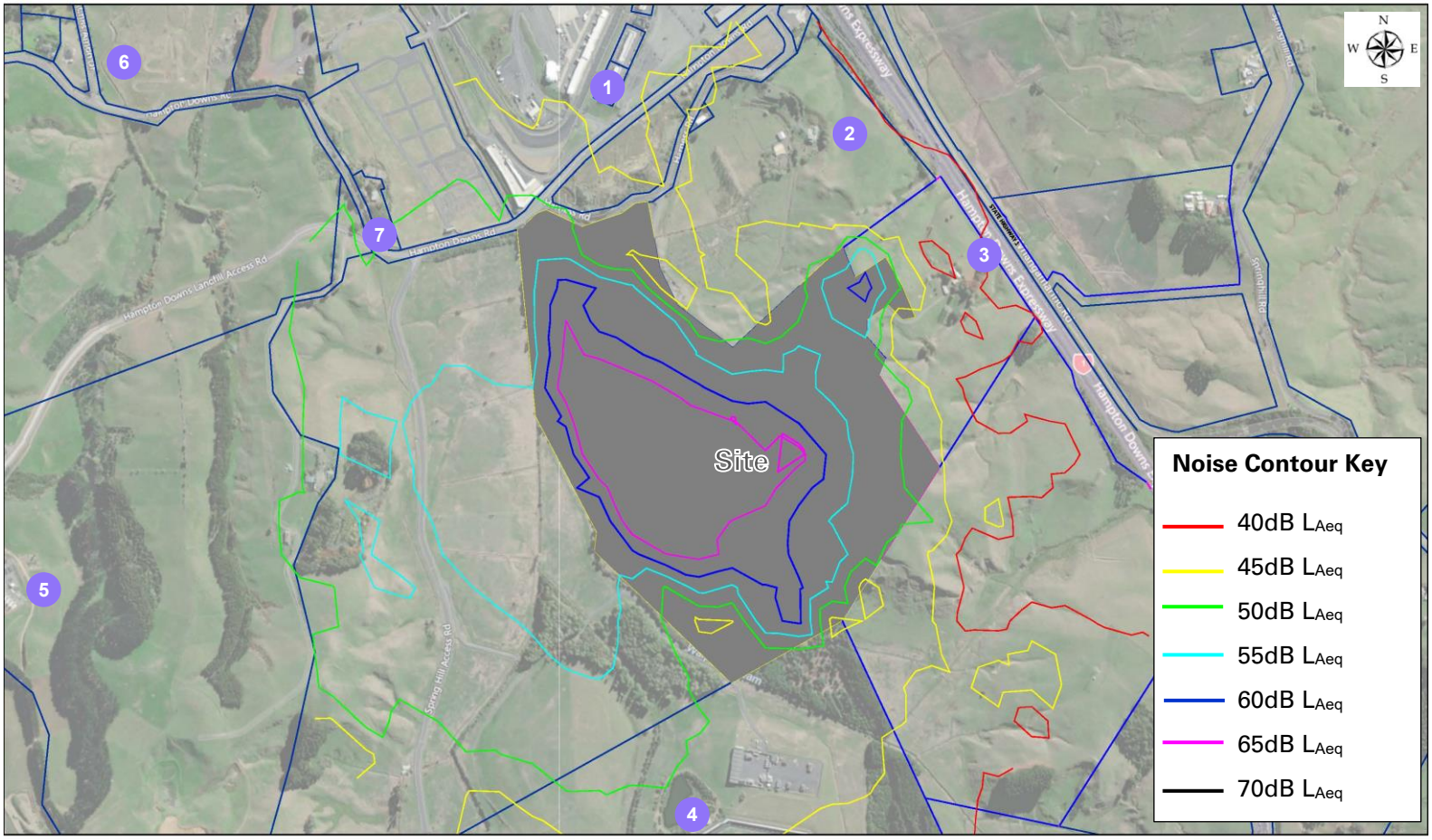


Figure 5. Day Time Noise Contours

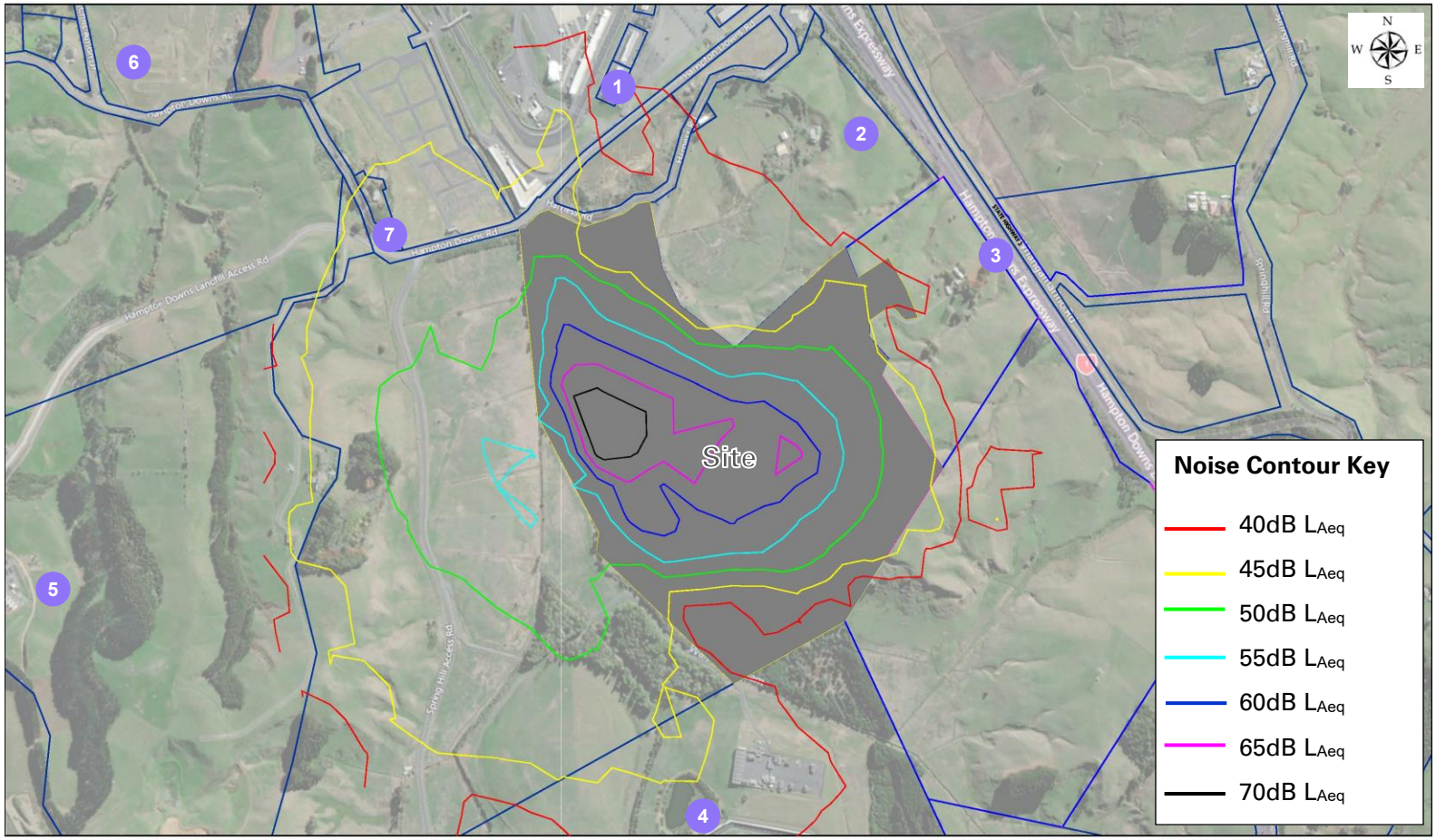


Figure 6. Evening Time Noise Contours

Figure 7. Night Time Noise Contours

4.5. Assessment of Operational Noise Effects

The above levels show that Receivers R2 – R6 fully comply with the General Rural Zone noise rules (50dB L_{Aeq} day time, 45dB L_{Aeq} evening and 40dB L_{Aeq} night time). To these Receivers, levels (and consequently effects are considered reasonable.

RECEIVER R1

To R1 (the apartments at the Hampton Downs racetrack), the day time and night time limits comply with the 50dB L_{Aeq} and 40dB L_{Aeq} criteria of the WDP. Table 7 shows that the evening limit of 45dB L_{Aeq} is complied with which, for the majority of the evening it is. However, the Precinct 17 rule is unusual in that the evening starts at 6pm rather than the 7pm used for the General Rural zone. The effect of this is that the day time level of 49dB L_{Aeq} should be compared to the evening limit of 45dB L_{Aeq}, for a 4dB exceedance between 6pm and 7pm only. A 4dB increase in level would be noticeable. However, the resulting level is consistent with levels considered for residential amenity and the exceedance is for one only, indicating the effects are reasonable.

Table 7 shows no factor of safety in the predicted night time level of 40dB L_{Aeq}. Further investigation shows that this is the uppermost level and only occurs during the nigh time shift change. Outside of this time, the level is 38dB L_{Aeq}.

REIVER R7

Table 7 also shows general compliance with day and night time limits of the WDP rules. The Precinct 15 rule is unique in that there is no evening period. Instead, between 7pm and 10pm Monday to Friday and 6pm – 10pm on Saturdays, the night time level of 40dB L_{Aeq} applies. Table 7 shows this to be exceeded by 4dB.

Further, the night time level applies all day on Sundays meaning the predicted 50dB L_{Aeq} would exceed the limit by 10dB.

4.6. Existing Ambient Sound

To support the assessment of noise effects, measurements of the existing ambient sound were undertaken at two locations that are representative of the noise the assessment receivers are currently exposed to. The first measurement (MP1, Figure 4) was placed as close to the adjacent SH1 as permitted by the Site boundaries so as to be representative of the noise environment experienced by R1, R2 and R3.

The second measurement position (MP2) was placed close to the prison to the south, to be representative of the noise that R4 experiences. This measurement position was selected as it is well removed from the noise sources of the area including SH1 and the Hampton Downs Race Track.

Measurements were undertaken with unattended data loggers that were installed on the afternoon of Thursday, 20 February 2025. MP1 ran for three consecutive 24 hour periods that included a Saturday. The noise at this location was observed to be controlled by SH1. The results of the monitoring are reported in the following Figure showing both the L_{Aeq} metric, used by the WDP, and the L_{A90} metric, which is a measure of the background sound. In each case, the levels are plotted over the 24 hour period and represent the range of levels over the entire measurement period.

MP2 ran for seven 24 hour periods and included a weekend. Weather during the measurement period varied, but was generally fine, warm and humid with light winds. The results are reported below.

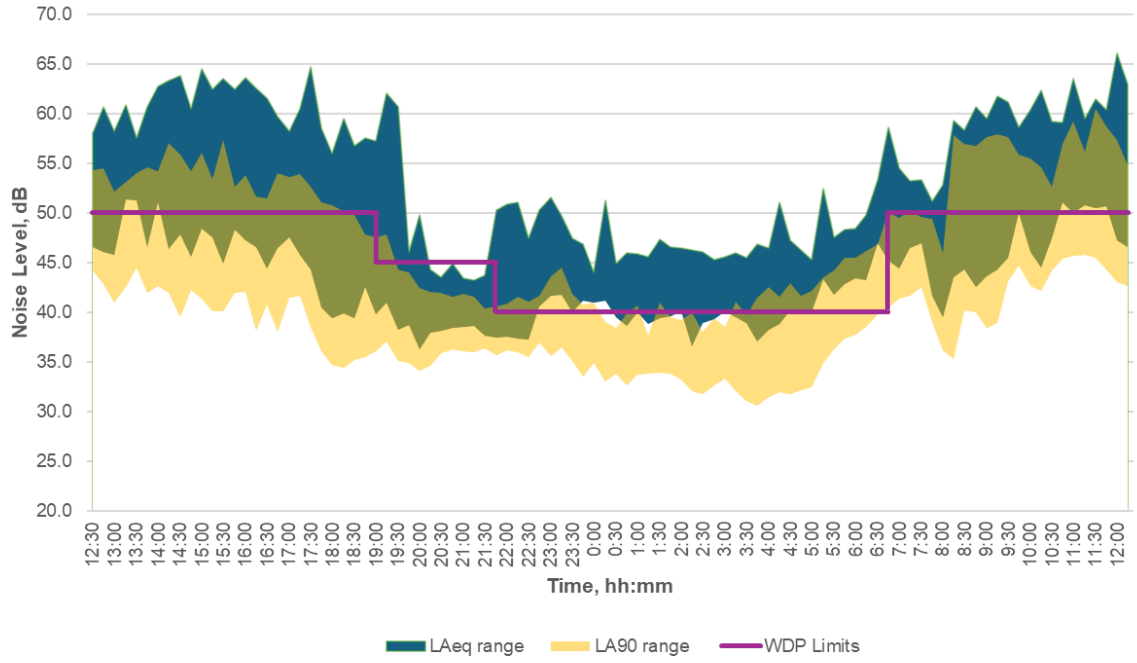


Figure 8. Ambient Sound at MP1

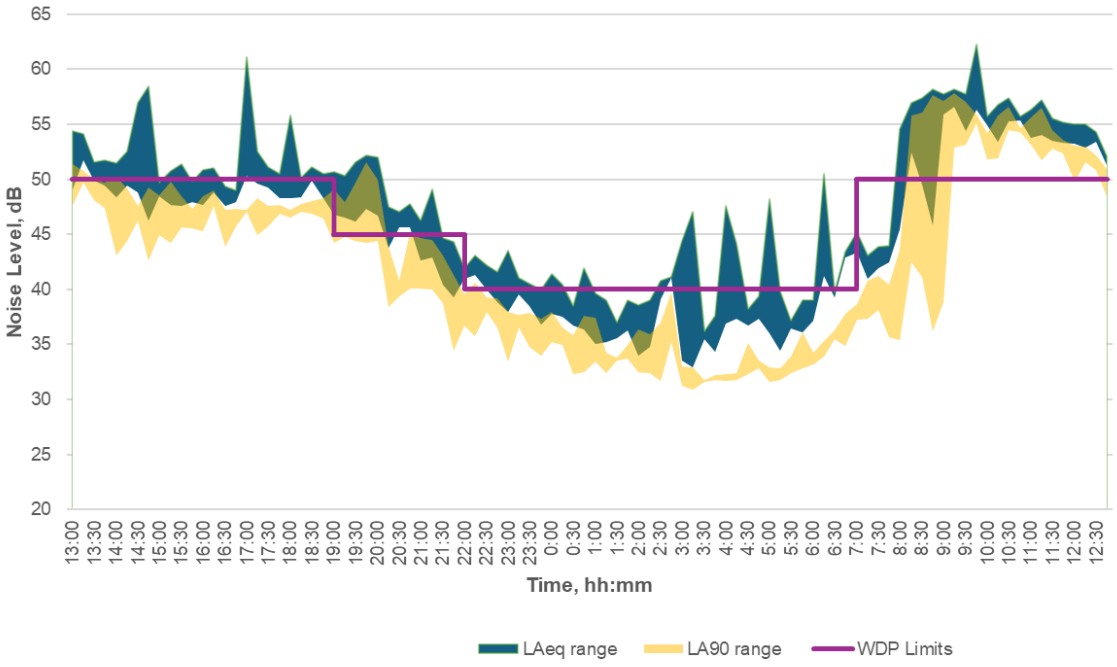


Figure 9. Ambient Sound at MP2

Considering MP1, the WDP limits fall within the bottom of the L_{Aeq} range of the existing ambient sound and are generally within the existing background sound. This is consistent with the observed dominance of traffic noise from SH1. In practical terms this means compliance with the WDP limits would provide a good level of amenity to neighbours. Considering R1 specifically, the predicted level of 42dB L_{Aeq} between 6pm and 7pm is within the background sound range and the lower end of the L_{Aeq} range. As such, noise from the Proposal at this time would be apparent, but at levels similar to the background sound rather than being the dominant source. On this basis, while the predicted levels during this one hour period are non-compliant, it is considered there will be negligible adverse effects.

While MP1 is well removed from R7, it is expected that a similar trend in noise levels would be observed with the predicted noise from the Proposal being consistent with the existing sound environment.

MP 2 relates solely to the prison (R4). During the day and evening times, the predicted levels would be consistent with the background sound and well below the current L_{Aeq}. During the night time, noise from the Proposal would, at times, exceed the background sound but generally be below the ambient sound (L_{Aeq}). As such, while it may be apparent, the noise from the Proposal would be reasonable.

4.7. Cumulative Noise Effects

The above assesses noise from the Proposal in isolation. There are two other activities in the area that also have the potential to generate noise, the Hampton Downs Landfill and the Hampton Downs Motor Sport Park, and as a result, cumulative effects have been considered. Each is treated separately on the basis that the landfill is expected to operate continuously while the Motor Sport Park would do so intermittently.

4.7.1. Hampton Downs Landfill

In 2018, the resource consent for the Hampton Down Landfill included the following condition:

> *4. All outer activities which are the subject of this consent, including transport of refuse on the site, placement of refuse on the site, covering of refuse and stripping or placement of top soil shall be conducted to ensure that noise levels at or within the notional boundary of any dwelling within the Waikato District do not exceed the following limits:*
>
> | | |
> |---|---|
> | *Monday to Friday*
7:00am to 7:00pm | *50dBA (L_{10})* |
> | *Saturday*
7:00am to 6:00pm | *50dBA (L_{10})* |
> | *At all other times*
Including public holidays | *40dBA (L_{10})* |
>
> *Noise shall be measured and assesed …*

At the time, an application was made to vary the night time limits (to allow the Land Fill to receiver trucks at night time). Hegley Acoustics undertook an assessment of the predicted effects[1] (2018 Landfill Assessment). This report provided predicted night time levels of noise to the neighbour of the landfill, which include those to the west of the current Proposal.

Considering the cumulative effect of noise from the landfill, the landfill noise has been taken as the consented day time limit of 50dB L_{Aeq} and the predicted night

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[1] Hampton Down Landfill, Proposed Extended Hours, Assessment of Noise Effects, Report No. 18168, 6 August 2018

time limit of the 2018 assessment. The following Table provides the noise from the Landfill to be considered in a cumulative analysis.

Table 8. Hampton Downs Landfill Noise Levels

Receiver, Fig 4	Address	Rating Level, dB L_{Aeq}	
		Day (7am – 7pm)	Night 7pm – 7am)
R1	Hampton Downs Raceway Apartments	NA[1]	NA[1]
R2	23 Hampton Downs	NA[1]	NA[1]
R3	61B Hampton Downs	NA[1]	NA[1]
R4	113 Hampton Downs Road (Prison block)	50	32
R5	135 Hampton Downs Road (Landfill offices)	NA[2]	NA[2]
R6	5 Chris Amon Drive	50	38
R7	136 Hampton Downs Road	50[3]	48[3]

1. The 2018 Landfill Assessment did not consider these dwellings as they were too far from the landfill. A corollary to this is that Landfill noise levels will be too low to result in a cumulative effect, meaning they are no considered further.

2. R5 represents the offices of the Hampton Downs Landfill, which were not considered in the 2018 Landfill Assessment. Cumulative noise is therefore not considered to R5.

3. At the time of the 2018 Landfill Assessment, R7 was identified as belonging to the landfill meaning that the effects were not considered. As discussed in section 4.3.2 above, R7 is now part of the Hampton Downs Motor Sport Park who, it is understood, are supportive of the current Proposal.

The following Table provides the cumulative levels from the Proposal and the Hampton Down Landfill noting that only receivers R4, R6 and R7 have changed since Table 7.

Table 9. Cumulative Levels of Proposal with Landfill

Receiver, Fig 4	Address	Cumulative Level			
		Day	Evening	Night	
		dB L_{Aeq}	dB L_{Aeq}	dB L_{Aeq}	dB L_{AFmax}
R1	Hampton Downs Raceway Apartments	49	42	40	48
R2	23 Hampton Downs	41	37	38	46
R3	61B Hampton Downs	40	36	36	44
R4	113 Hampton Downs Road (Prison block)	51	44	38	45
R5	135 Hampton Downs Road (Landfill offices)	42	35	31	39
R6	5 Chris Amon Drive	50	41	38	36
R7	136 Hampton Downs Road	53	45	48	46

The cumulative levels to R4 comply with the WDP limits during the evening and the night time. During the day time, there would be a 1dB exceedance provided that the Landfill operated to the limits of its consent which, based on site observations, it does not. Given that a 3dB change is the smallest noticeable to the average person, the effects of a possible 1dB exceedance are considered negligible. As such, the assessment of noise to R4 (provided in sections 4.5 and 4.6 above) remains valid.

The cumulative levels to R6 remain compliant with the WDP noise rules.

The cumulative levels to R7 generally exceed the limits of the WDP. The Landfill is the largest contributor to the cumulative levels and, it is understood, the owner of this property has provided their written consent to the Landfill for elevated levels. With respect to the Proposal, it is understood that the owner of R7 is supportive of the current Proposal. As such, the conclusion is that the cumulative levels are reasonable.

4.7.2. Hampton Motor Sport Park

Noise rule R35 of the WDP provides the levels that the Hampton Sport Motor Park can generate to the surrounding environment. Rather than apply at the notional boundaries of the surrounding receivers, the limits apply beyond the Hampton Downs Noise Control Boundary, as shown in Appendix 12 of the WDP. As this does not provide the actual motor sport levels to the receivers considered in this assessment, it has been necessary to estimate them.

This has been undertaken using the same Predictor noise modelling software as described above for the prediction of construction and operational noise. Essentially, cars were placed on the racetrack (using measurements of Supercars) with the number of cars varied until the predicted level at the Noise Control Boundary matched those of R35 of the WDP. This calibrated model was then used to determine the motor sport noise levels to the receivers used in this assessment.

R35 provides three different noise limits for the Motor Sport Park, depending on activities, as follows:

a. Part (i) of the rule allows a limit of 65dB L_{Aeq} at the Noise Control Boundary between 9.00am and 6.00pm for 27 or 30 days of the year, depending on the type of car.

b. Part (ii) of the rule provides a limit of 55dB L_{Aeq} for a further 40 days of the year. It also applies between 9.0am and 6.00pm.

c. Part (iii) of the rule provides limits for all other times, being 50dB L_{Aeq} day time, 45dB L_{Aeq} evening and 40 dB L_{Aeq} and 65dB L_{AFmax} at night as per the Rural zone rule with the only exception being that, for the

Motor Sport Park rule, the 6.00pm transition between day and evening time is an hour earlier than the Rural zone rule.

Based on the options permitted for the Race Park, the cumulative level of the Proposal, the Land Fill and the Race Park can be summarised as:

a. When the Race Park operates to a level of 65dBA at its Noice Control Boundary, it will control noise to all receivers and there will be no cumulative effects.

b. When the Race Park operates to a level of 55dBA at its Noise Control Boundary and the Land Fill operates as described above:

   i. To R1 – R3 and R6, the cumulative levels would exceed the limits of the Rural zone noise rule. However, the levels would be totally controlled by the Hampton Downs Motor Sport Park and the Proposal, and Land Fill will have no cumulative effect.
   ii. To R4, the cumulative level from all activities would be 53dB L_{Aeq}, which complies with the Race Park limit. The cumulative level is 7dB above that of the Proposal meaning the level is controlled by the other two sources (which, when combined, total of 52dB L_{Aeq} in the absence of the Proposal).
   iii. To R5, the cumulative level would be 50dB L_{Aeq}, which complies with the limits of the Rural zone and the Race Park's consent.
   iv. R7 is on the Motor Sport Park site and, for this reason, cumulative noise from the Motor Sport Park is not considered to R7 which, it is understood, is supportive of the Proposal.

c. When the Race Park operates to a level of 50dBA at its Noise Control Boundary:

i. To R1, R2, R6 and R7, the cumulative levels would exceed the limits of the Rural zone noise rule. However, the levels would be totally controlled by the Motor Sport Park and the Proposal will have no cumulative effect.

ii. To R3 and R5, the cumulative level would be below 50dB L_{Aeq}, which complies with the limits of the Rural zone and the Motor Sport Park's consent.

iii. To R4, the cumulative level from all activities would be 52dB L_{Aeq}, which complies with the Motor Sport Park limit. The cumulative level is 6dB above that of the Proposal meaning the level is controlled by the other two sources (which, when combined, total of 51dB L_{Aeq} in the absence of the Proposal).

iv. Cumulative noise R7 has not been considered, as described above.

Based on the above, it is concluded that any cumulative effects from the neighbouring noise sources will either dominate the noise received by receivers (meaning the Proposal will have a negligible effect) or will contribute a relatively small amount to the combined noise level. Either way, the assessment provided above in sections 4.5 and 4.6 is considered to remain valid for the Proposal.

4.8. Future Receiving Environment

The above assessment addresses the existing noise environment, that is the receivers are limited to the existing dwellings. To investigate compliance at any future dwellings, the noise contour plots of Figures 5 – 7 are useful. These Figures show that 50dB L_{Aeq} day time contour (Figure 5), the 45dB L_{Aeq} evening contour (Figure 6) and the 40dB L_{Aeq} night time contour (Figure 7) are all largely contained within the sites of the Proposal. The exceptions are the vacant land to the north (immediately east of R7) and the corrections land to the west.

With respect to the northern sites, a receiver was added to the Predictor model to calculate noise levels to the closest vacant site to the Proposal. The calculated levels were 48dB L_{Aeq} day time, 43dB L_{Aeq} evening time and 40dB L_{Aeq} night time. These levels comply with the limits of Precinct 15 of the WDP (Table 3). The levels are slightly different than suggested by the contours. The reason for this is attributed to the interpolation method used to develop the contours.

Considering the land to the west, this is subject to a Department of Corrections Designation in the WDP (MCOR-1). This designation requires that:

2.1 The scope of activities and works covered by the designation are limited in respect of the following:

a)

b) No additional self-care units shall be located on the site except within the secure perimeter area or the south western part of the land presently described as Lot 3 DPS 45006. Any additional self-care unit shall have a minimum separation distance of 100 metres from the boundary of any adjacent property and shall be landscape planted to assist with mitigation of views from adjacent properties. The nature and extent of the landscape planting required are to be determined as part of the Outline Plan process for any additional self-care units.

Figure 10 below shows Lot 3 DPS 45006 referenced by the designation. The reference in part b) above to the south west area of this parcel of land has been taken to mean that any future development on site would occur south west of the current buildings on site, where noise from the Proposal would be less than to the current buildings.

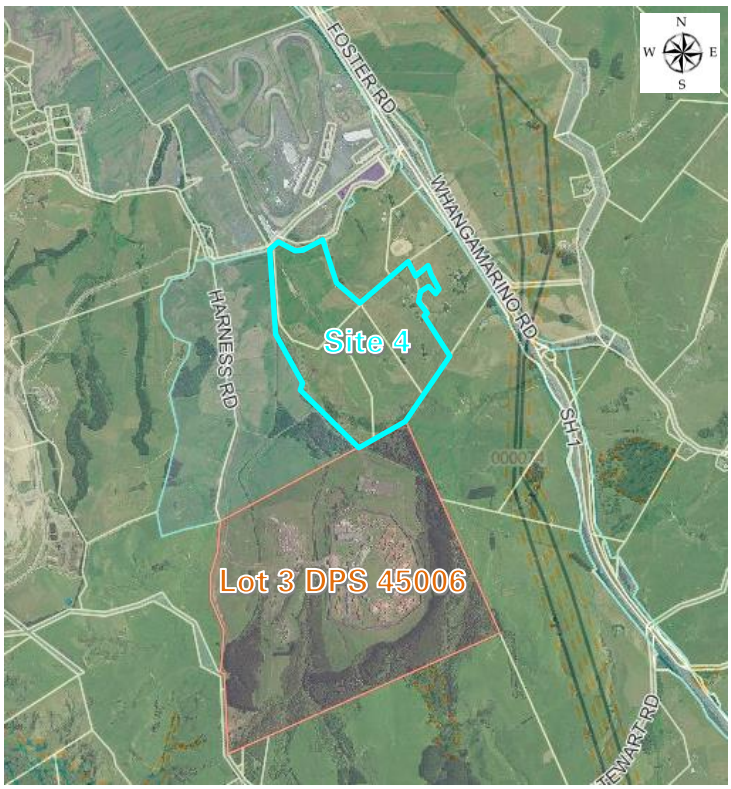

Figure 10. Department of Corrections Land

5. CONCLUSIONS

A metal recycling facility is proposed for 61 Hampton Downs Road. The conclusion of an assessment of the noise and vibration effects are:

1. Vibration effects will be negligible;

2. Operational construction noise will comply with the limits of the WDP with a large factor of safety due to the distance of the Proposal from its neighbours;

3. To control operational noise, mitigation will be required. Tonal warning alarm will not be used, the shredder will be enclosed and the façade of the

Steel Melt Shop and Rolling Mill will be designed to control noise breakout;

4. The resulting noise levels are generally compliant with the limits of the WDP. The exceptions are two receivers within two different Precincts of the Hampton Down Race Track where the noise limits during the evening period and on Sundays are more restrictive than the General Rural zone. To these two receivers, levels are considered reasonable.

5. The predicted noise levels from the Proposal are consistent with the measurements of the existing sound environment.

6. The overall conclusion is that predicted noise levels will be appropriate and that the effects will be reasonable.

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