HERRING STORER ACOUSTICS

PORT HEDLAND GREEN STEEL PROJECT
STAGE 1
BOODARIE STRATEGIC INDUSTRIAL AREA
PORT HEDLAND

ENVIRONMENTAL NOISE ASSESSMENT

JANUARY 2024

OUR REFERENCE: 32120-2-23240

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ENVIRONMENTAL NOISE ASSESSMENT

PORT HEDLAND GREEN STEEL PROJECT

Job No: 23240

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FOR

PORT HEDLAND GREEN STEEL PTY LTD,

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EXECUTIVE SUMMARY

Preston Consulting Pty Ltd, on behalf of Port Hedland Green Steel Pty Ltd commissioned Herring Storer Acoustics to carry out an acoustic study of noise emissions for the proposed Port Hedland Green Steel Project (Stage 1), to be located in the Boodarie Strategic Industrial Area, Port Hedland.

The Project will be developed in stages, within the Boodarie Strategic Industrial Area.

The nearest noise sensitive premise, being the Gateway Accommodation Village (R1) is situated approximately 5.8km to the southeast of the proposed plant. Neighbouring Industrial premises have also been considered in the assessment.

For the most stringent time period (night) the assigned noise level is 35 dB(A) at the nearest highly noise sensitive receiver, The Gateway Accommodation Village. The highest predicted noise emissions for the nearest noise sensitive premise would be 32 dB(A) for the same time period. This includes all noise sources associated with the Green Steel Plant.

The operating scenarios consider all noise sources from the proposed facilities operating at the same time. The calculated noise levels have been assessed under the highest night-time propagation weather conditions. Given this, the noise modelling would be considered conservative, as it is unlikely that all noise sources are operating at the same time under the worst-case propagation conditions.

The acoustic assessment shows that in the worst case, that noise received at a premise is below the assigned noise level. Thus, noise emissions from the Project would be deemed to comply with the requirements of the *Environmental Protection (Noise) Regulations 1997*.

CONTENTS

APPENDICES

1. INTRODUCTION

Preston Consulting, on behalf of Port Hedland Green Steel Pty Ltd commissioned Herring Storer Acoustics to carry out an acoustic study of noise emissions for the proposed Port Hedland Green Steel Project.

Port Hedland Green Steel Pty Ltd (PHGS) is progressing the development of large-scale downstream iron ore processing capability known as the Port Hedland Green Steel Project (the Proposal). The Proposal is located in the Boodarie Strategic Industrial Area approximately 10 km southwest of Port Hedland in the Pilbara region.

The Proposal will consist of a pellet plant and a HBI Plant, consuming approximately 3-3.5 Mtpa of iron ore. The first processing step is to produce iron ore pellets (3-3.5 Mtpa). Most of the pellets will be fed into the HBI plant to produce approximately 2 Mtpa HBI. The remainder of the pellets (~0.7 Mtpa) will be exported from the Port as pellets.

The initial infrastructure to be developed within the Boodarie SIA for the Proposal will include:

- Iron ore processing facility (IOPF) comprising one pellet and one HBI plant producing approximately 2 Mtpa of HBI and 0.7 Mtpa of iron ore pellets;
- Hydrogen production and storage facilities for supply to IOPF;
- Nitrogen plant and
- Supporting infrastructure such as:
- HBI and pellet handling and storage facilities;
- Flux storage;
- Administration and other non-process buildings;
- Workshops;
- Water storage areas;
- Magnetite concentrate handling facilities;
- Power production, management and transmission;
- Carbon capture, storage and transport infrastructure;
- Drainage and sediment control; and
- Access roads.

The HBI and iron ore pellets will be shipped out of the PoPH. The scope of the Proposal does not include any construction works at the PoPH or the export of pellets and HBI.

PHGS plan to seek approval under Part IV of the Environmental Protection Act 1986 (EP Act) to enable the development of the Project, for which this acoustic assessment is provided in support of the application.

The nearest noise sensitive premise, being the Gateway Accommodation Village (R1) is situated approximately 5.8km to the southeast of the proposed plant. Neighbouring Industrial premises have also been considered in the assessment.

The Figure 1.1 shows the overall location plan for the Project.

FIGURE 1.1 – LOCATION PLAN

This report assesses night-time (worst case) noise emissions under maximum propagation conditions for the processing plant for compliance with the requirements of the Western *Australian Environmental Protection (Noise) Regulations 1997* (WA) *(the Noise Regulations)*.

2. ACOUSTIC CRITERIA

The allowable noise level at the surrounding locales is prescribed by the *Environmental Protection (Noise) Regulations 1997*. Regulations 7 & 8 stipulate maximum allowable external noise levels determined by the calculation of an influencing factor, which is then added to the base levels shown below. The influencing factor is calculated for the usage of land within two circles, having radii of 100m and 450m from the premises of concern.

TABLE 2.1 - BASELINE ASSIGNED OUTDOOR NOISE LEVEL

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		$L_{A\ 10}$	$L_{A\ 1}$	$L_{A\ max}$
Noise sensitive premises within 15 metres of a dwelling	0700 - 1900 hours Monday to Saturday (Day)	45 + IF	55 + IF	65 + IF
	0900 - 1900 hours Sunday and Public Holidays (Sunday / Public Holiday Day Period)	40 + IF	50 + IF	65 + IF
	1900 - 2200 hours all days (Evening)	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	35 + IF	45 + IF	55 + IF
Commercial Premise	All Hours	60	75	80
Industrial Premise	All Hours	65	80	90

Note: L_{A10} is the noise level exceeded for 10% of the time.
L_{A1} is the noise level exceeded for 1% of the time.
L_{Amax} is the maximum noise level.
IF is the influencing factor.

It is a requirement that received noise be free of annoying characteristics (tonality, modulation and impulsiveness), defined below as per Regulation 9.

"impulsiveness" means a variation in the emission of a noise where the difference between L_{Apeak} and $L_{Amax\ Slow}$ is more than 15 dB when determined for a single representative event;

"modulation" means a variation in the emission of noise that –

(a) is more than 3dB $L_{A\ Fast}$ or is more than 3 dB $L_{A\ Fast}$ in any one-third octave band;
(b) is present for more at least 10% of the representative assessment period; and
(c) is regular, cyclic and audible;

"tonality" means the presence in the noise emission of tonal characteristics where the difference between –

(a) the A-weighted sound pressure level in any one-third octave band; and
(b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as $L_{A\ Slow}$ levels.

Where the noise emission is not music, if the above characteristics exist and cannot be practicably removed, then any measured level is adjusted according to Table 2.2 below.

TABLE 2.2 - ADJUSTMENTS TO MEASURED LEVELS

Where **tonality** is present	Where **modulation** is present	Where **impulsiveness** is present
+5 dB(A)	+5 dB(A)	+10 dB(A)

Note: These adjustments are cumulative to a maximum of 15 dB.

The nearest potential highly noise sensitive premises, the Gateway Accommodation Village, South Hedland, to the proposed Project have been identified using the Town of Port Hedland TPS No 7 area map. Figure 2.1 details the locations of the receivers in relation to the proposal, with Table 2.3 detailing the coordinates and distance from the project.

Receivers at greater distances (6km) have not been included as if compliance is achieved at the closest location, it is assumed compliance at greater distances would also be achieved.

TABLE 2.3 – RECEIVER REFERENCE DETAILS

Receiver	UTM X Coordinate	UTM Y Coordinate	Distance (Metres) From Development
R1 - Gateway Village	665934	7743052	5930
C1 - Golf Course	664295	7743106	4315
Industry A	660269	7745410	522
Industry B	659395	7743060	840
Industry C	660678	7744055	606

The influencing factor at the closest identified highly Noise sensitive premises (R1), Industrial premises (IndA to IndC) and Commercial premises (C1), has been assessed as 0 therefore the assigned noise levels would be as per those contained in Table 2.1.

FIGURE 2.1 – SURROUNDING NOISE SENSITIVE PREMISES

It is assumed that the operational noise will not have a 'tonal' characteristic applicable, due to the distance and the noise approaching the existing background noise level, hence noise characteristics will be increasingly weak. At noise emission levels around 35 dB(A) it will generally be the case that the noise emission level is low enough that the influence of background noise will result in the noise emission not being 'technically tonal.

Where there is more than one industry that emits noise to a residence and the combined noise levels of all industries results in an exceedance to the assigned noise levels, each industry is required to be at least 5 dB less than these levels as documented below (Regulation 7(2)).

"Noise emitted from any premises or public place when received at other premises –

(a) must not cause, or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind…"

"…a noise emission is taken to ***significantly contribute to*** *a level of noise if the noise emission … exceeds a value which is 5 dB below the assigned level at the point of reception."*

Under the Regulations, noise received at a premise is deemed to be NOT "significantly contributing" to the noise received at a premises if it is at least 5 dB(A) below the assigned noise level. Table 2.4 presents the required outdoor noise levels at each residence to comply with the Regulations.

TABLE 2.4 – NOT "SIGNIFICANTLY CONTRIBUTING" OUTDOOR NOISE LEVELS AT RESIDENCES

Type of premises receiving noise	Time of day	Assigned level (dB)		
		$L_{A\,10}$	$L_{A\,1}$	$L_{A\,max}$
Noise sensitive premises: highly sensitive area (i.e., within 15m of a dwelling)	0700 to 1900 hours Monday to Saturday	40	50	60
	0900 to 1900 hours Sunday and public holidays	35	45	60
	1900 to 2200 hours all days	35	45	50
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	30	40	50
Commercial	All Hours	55	70	75
Industrial	All Hours	60	75	85

3. MONITORED AMBIENT NOISE

As per the "Draft Guidelines on Environmental Noise for Prescribed Premises" (released in May 2016), continuous noise monitoring has been conducted to establish the ambient noise levels.

To quantify the existing noise environment at the development site and surrounding area, an automatic noise data logger was located close to the entrance driveway to the development site (off Boodarie Drive). The monitoring location shown in Figure 3.1, with pictures of the monitor in situ shown in Figure 3.2.

Additionally, short term observed noise level measurement were conducted during the site visit, with the third octave band frequency graph shown in Figure 3.3.

For ease of reporting the summarised noise levels for each regulatory period are shown in Table 3.1, with the graphical noise plot contained in Appendix C.

TABLE 3.1 - BASELINE MONITORED NOISE LEVEL, dB(A)

Date	Time Period L_{Aeq} dB(A)		
	Day (07:00 to 19:00)	Evening (19:00 to 22:00)	Night (22:00 to 07:00)
Monday, 5 September 2022	47	40	42
Tuesday, 6 September 2022	55	42	42
Wednesday, 7 September 2022	61	41	40
Thursday, 8 September 2022	55	43	43
Friday, 9 September 2022	60	42	40
Saturday, 10 September 2022	43	42	39
Sunday, 11 September 2022	59	41	40
Average	54	41	41

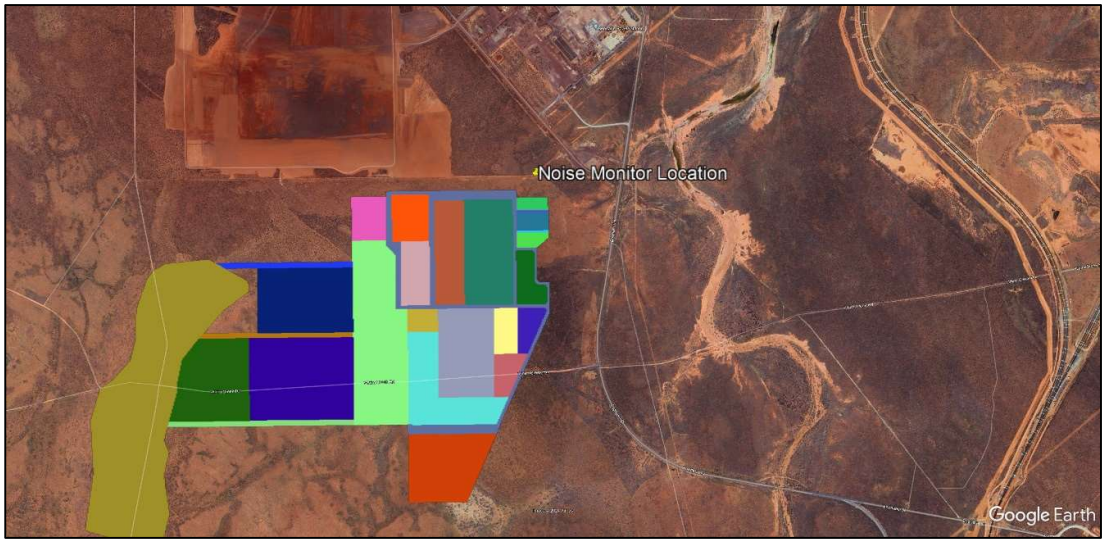


FIGURE 3.1 – MONITORING LOCATION

FIGURE 3.2 – MONITORING IN SITU

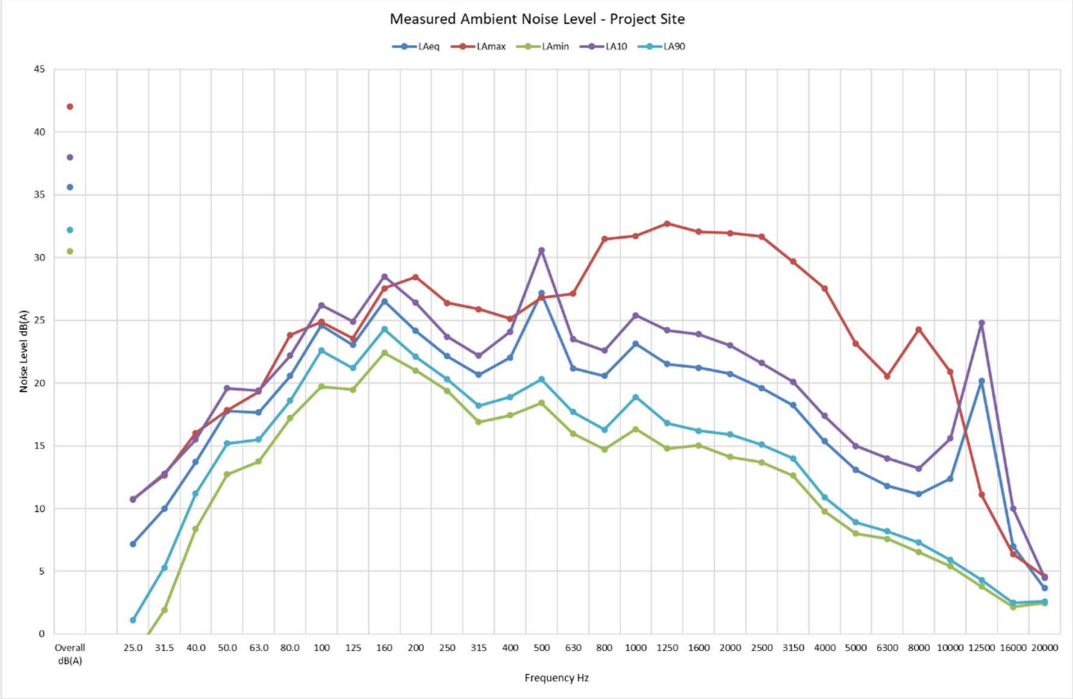


FIGURE 3.3 – THIRD OCTAVE BAND CENTRE FREQUENCY – AMBIENT NOISE LEVEL

Based on the measured noise levels within the Boodarie Strategic Industrial Area, the daytime noise levels were around 54 dB(A), with the evening and night periods being an average of 41 dB(A). Given that the area is an Industrial Estate, this would be considered a low background noise level, with expectation being it would increase with further industrial development.

The observed measured noise levels as per Figure 3.3 showed that the ambient noise contained tonal characteristics which were attributable to neighbouring industry.

4. METHODOLOGY

Noise immissions[1] at the nearest neighbouring residential premises, due to noise associated with the proposed operations, were modelled using the computer programme SoundPlan. Sound power levels used for the noise modelling were based on manufacturer data levels of equipment proposed for use on site.

This acoustic assessment is required for the approval process and is being undertaken prior to the final design of the plant being known. Whilst the plant design is undergoing final consideration, for the purpose of the predictive noise modelling, the current design has been used as a basis for the assessment.

The design configuration for the plant is contained in Appendix A. The sound power levels for individual equipment are shown in Table 4.1.

The modelling of noise levels has been based on noise sources and sound power levels shown in Figure 4.1 and Table 4.1. It is noted that the design includes additional stages (Pellet Plant 2 and HBI Plant 2) which have not been included in this acoustic assessment.

1 Immissions – noise received at a source
2 Emissions – noise emanating from a source and / or location

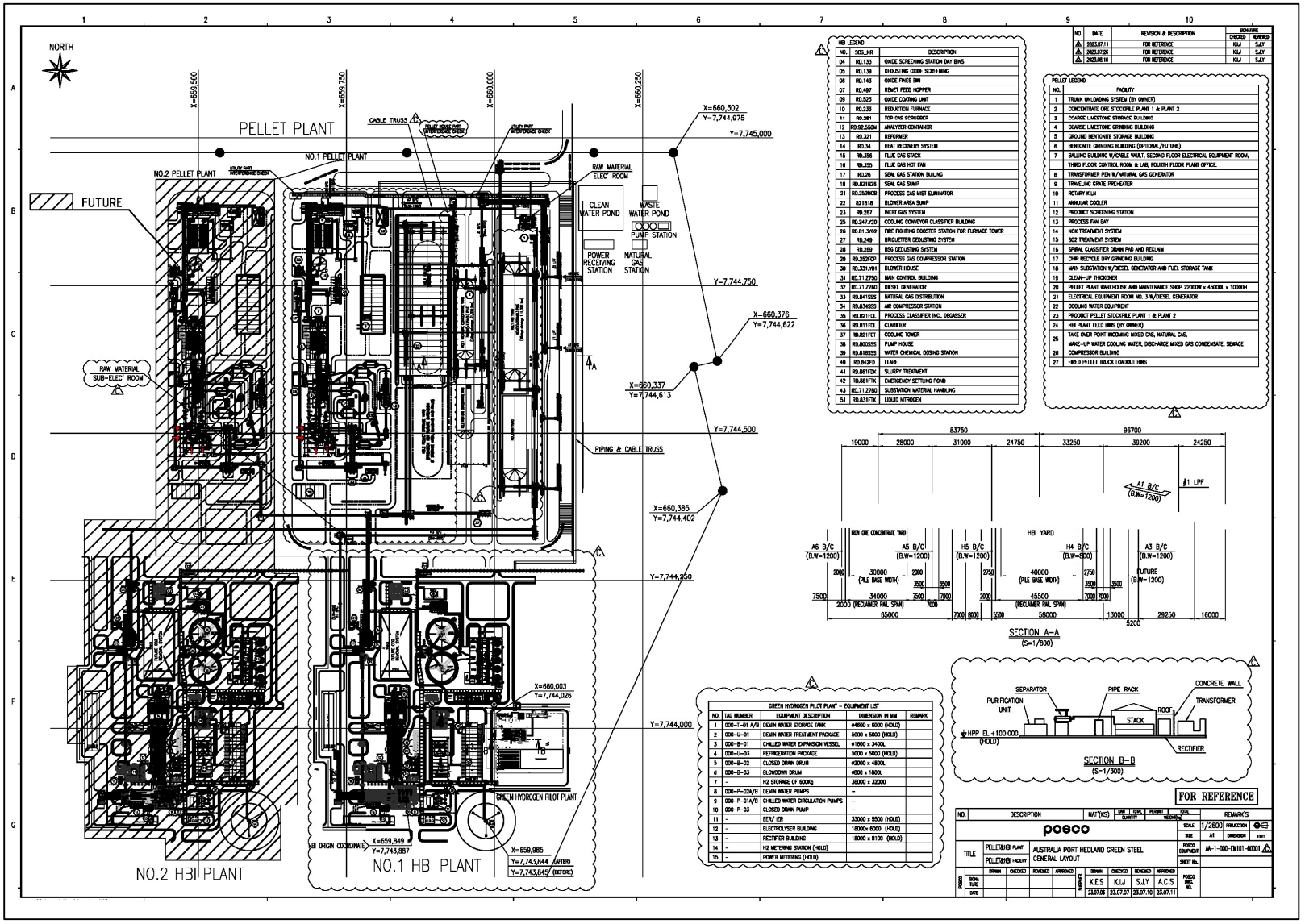


FIGURE 4.1 – GREEN STEEL PLANT LAYOUT

TABLE 4.1 – SOUND POWER LEVEL - NOISE SOURCES dB(A)

Area	Noise Sources	Parameter	Sound Power Level dB(A)
Unit 100: Raw Material Handling	132.F20-BBC-Oxide Transfer Conveyor	LWA/10m	81
	132.U20-BCH-Diverter Chute - Conveyor 132.F20	LWA	89
	133.F01-BBC-Day Bin Distribution Conveyor	LWA/10m	81
	133.U01A/B-BCH-Day Bin Distribution Conveyor	LWA	89
	133.B10A/B-SMB-Oxide Day Bin A-B	LV	85
	133.U10A/B-BCH-Chute - Day Bin Discharge A-B	LWA	89
	133.F10A/B-BVF-Oxide Screen Vibration Feeder A-B	LWA	97
	133.U11A/B-BCH-Chute - Oxide Screen Charging A-B	LWA	88
	133.D20A/B-SMB-Oxide Screen A-B	LWA	93
	133.U21A/B-BCH-Chute - Screen Discharge A-B	LWA	89
	133.U23A/B-BCH-Chute - Oxide Fines A-B	LWA	89
	134.F10-BBC-Oxide Transfer Conveyor	LWA/10m	81
	134.U10-BCH-Chute - Conveyor 134.F10	LWA	89
	134.F20-BBC-Oxide Transfer Conveyor	LWA/10m	81
	134.U20-BCH-Chute - Conveyor 134.F20	LWA	89
	139.C10-FBL-Oxide Dust Collection Fan	LWA	84
	139.L11-MYA-Oxide Dust Collection Stack	LWA	94
	142.F10-BBC-Oxide Fines Conveyor	LWA	81
	142.U10-BCH-Chute - Conveyor 142.F10	LWA	89
	143.B10-SMB-Oxide Fines Bin	LWA	87
	192.F10-BBC-Furnace Feed Conveyor	LWA/10m	81
	192.F10-BBC-Furnace Feed Conveyor - Gearbox	LWA	77
	192.U10-BCH-Chute - Feed Recovery	LWA	89
Unit 200: Reduction Furnace Area	232.B10-SMB-Charge Hopper	LV	85
	236.Q10-FUH-Hydraulic Unit - Recution Furnace	LWA	78
	236.Q60-FUH-Hydraulic Unit - PDC	LWA	78
	244.F20-MCN-Bypass Discharge Feeder	LWA	97
	246.D40A-G-BSG-Briquette screen A-G	LWA	93
	246.F10A-G-MCT-Screw Feeder A-G	LWA	89
	246.M20A-G-MCT-	LWA	96
	246.M30A-G-MCT-Briquette Separator A-G	LWA	101
	246.Q20A-G-MCT-Hydraulic Unit - Briquetting Press AG	LWA	78
	246.U40A-G-BCH-HBI Chute A-G	LWA	97
	246.U60A-D-BCH-Briquette Chute A with Diverter	LWA	97
	246.U70A-H-BCH-Briquette Chute Assembly A-H	LWA	97
	247.C60A/B-FBL-Vapor Removal Fan A/B	LWA	87
	247.F10A/B-BCU-Briquette Cooling Conveyor A/B	LWA/10m	81
	247.U10A/B-BCH-HBI Discharge Chute A/B	LWA	95
	248.F10A-D-MCW-HFR bucket elevator A-D	LWA/10m	81
	248.Q01-MCT-Hydraulic unit - HFR	LWA	78
	249.C10-FBL-Briquette Dust Collection Fan	LWA	89
	249.C10-FBL-Briquette Dust Collection Fan – motor	LWA	102
	249.C11-FBL-Stand-By Dust Collection Fan	LWA	108
	249.C11-FBL-Stand-By Dust Collection Fan – motor	LWA	100
	249.L11-MYA-Briquette Dust Collection Stack	LWA	94
	251.D30-MCB-Top Gas Scrubber	LWA	76

Area	Noise Sources	Parameter	Sound Power Level dB(A)
Unit 200: Reduction Furnace Area	251.L10-MEN-Top Gas Duct	Lv	66
	252.C10-FCP-PG Compressor 1st Stage	LWA	93
	252.C10-FCP-PG Compressor 1st Stage – Motor	LWA	104
	252.C20-FCP-PG Compressor 2nd Stage	LWA	93
	252.C20-FCP-PG Compressor 2nd Stage – Motor	LWA	104
	252.E10A-D-MCB-Process Gas Compressor Mist Eliminator A-D	Lv	75
	254.H30-MCB-Reformed Gas Cooler	Lv	75
	254.L10-MEN-RG/BG Duct to Reduction Furnace	Lv	66
	262.L10-MEN-Seal Gas Duct to Seal Gas Cooler	Lv	66
	263.D10-MCB-Seal Gas Cooler	Lv	76
	263.C20A/B-FCP-Seal Gas Compressor A/B	LWA	95
	263.C20-FCP-Seal Gas Compressor – Motor	LWA	100
	264.E10-FDM-Seal Gas Dryer	Lv	84
	266.C40-FCP-BSG Make Up Compressor	LWA	114
	269.C10.FBL-BSG Dust Collection Fan	LWA	102
	269.C30-BSG Dust Collection Fan – Motor	LWA	99
	269.L11-MYA-BSG Dust Collection Stack	LWA	94
	269.L14-MYA-BSG Dilution Hood	LWA	88
Unit 300: Reformer Facilities	322.Y10-SMB-Reformer Box	LWA	91
	324.J10-MBB-Main Burners Type A	LWA	107
	324.J20-MBB-Main Burners Type B	LWA	107
	324.J30-MBB-Auxiliary Burners	LWA	102
	329.L60-MEN-Auxiliary Air Ducting	Lv	102
	332.C10-FBL-Main Air Blower	LWA	102
	332.C10-FBL-Main Air Blower – Motor	LWA	102
	333.C10-FBL-Auxiliary Air Blower	LWA	124
	333.C10-FBL-Auxiliary Air Blower – Motor	LWA	102
	342.Y10-SMB-Heat Recovery Casing	Lv	102
	RD.355.C10-FBL-Flue Gas Hot Fan	LWA	85
	355.C10-Flue Gas Hot Fan – Motor	LWA	102
	356.L01-MEN-Ducts Fan/Stack	Lv	72
	356.L10-MYA-Flue Gas Stack	LWA	94
Unit 400: Product Handling	422.F10A/B-BBC-HBI Conveyor A/B	LWA/10m	87
Unit 800: Utilities And Water Treatment	81.4P01-FPU-Miscellaneous water pump (1+1)	LWA	78
	81.4P03-FPU-Sump pump - pumphouse (1+1)	LWA	78
	81.7P01-FPU-Seal / gland water pump within WTP	LWA	78
	81.3P03-FPU-Fire fighting booster pump reduction tower (1+0)	LWA	94
	81.3P04-FPU-Fire fighting booster pump reduction tower - Diesel (1+0)	LWA	94
	81.3P05-FPU-Fire fighting pump reduction tower - Jockey (1+0)	LWA	94
	82.11C01-FBL-Fan clarifier cellar (1+0) HVAC	LWA	104
	82.12C03-FBL-Backwash air blower (1+1)	LWA	101
	82.02.H01-FCT-Cooling Tower -fans	LWA	114
	82.02.H01-FCT-Cooling tower - mechanic equipment	LWA	112
	82.11P01-FPU-Contaminated process supply pump (4+1)	LWA	94
	82.11P04-FPU-Scrubber blowdown sump pump (1+1)	LWA	78
	82.11P10-FPU-Top gas scrubber recycle pump (1+1)	LWA	78

Area	Noise Sources	Parameter	Sound Power Level dB(A)
Unit 800: Utilities And Water Treatment	82.11P09-FPU-Scrubber venturi booster pump (1+1)	LWA	78
	82.11P25-FPU-Charge hopper flushing water pump (1+0)	LWA	83
	Clarifier 1 slurry-recirculation pump (1+1)	LWA	83
	82.11C03-FBL-Fan for degasser - weir (1+0)	LWA	102
	82.11C04-FBL-Fan for degasser - cone (1+0)	LWA	104
	82.11P12-FPU-Clarifier 1 slurry disposal pump (1+1)	LWA	78
	82.11P13-FPU-Sump pump clarifier 1 (1+1)	LWA	78
	82.11P14-FPU-Sump pump clarifier 2 (1+1)	LWA	78
	82.11P15-FPU-Process classifier sump pump (1+1)	LWA	78
	82.12P17-FPU-Seal gas pump (1+1)	LWA	78
	82.18P18-FPU-Clarifier 2 slurry recirculation pump (1+1)	LWA	83
	82.12P19-FPU-Blower area sump pump (1+1)	LWA	78
	82.11P20-FPU-Clarifier 2 slurry disposal pump (1+1)	LWA	78
	82.11P22-FPU-Bottom seal gas dust collection slurry pump (1+1)	LWA	78
	82.11P24-FPU-Hot briquette dust collection slurry pump (1+1)	LWA	78
	82.12C01-FBL-Fan for degasser – clean process water system (1+0)	LWA	102
	82.12P21-FPU-Clean process CW supply pump (3+1)	LWA	83
	82.12P03-FPU-Sump pump (1+1)	LWA	78
	82.12P30-FPU-Reformed gas cooler pump (1+1)	LWA	83
	82.13P01-FPU-Supply pump to process area (2+1)	LWA	83
	82.13P02-FPU-MCW Furnace area booster pump (1+1)	LWA	83
	82.11P05-FPU-Cooling conveyor - solid pump (1+1)	LWA	
	82.11P06-FPU-Cooling conveyor - booster pump (2+1)	LWA	78
	82.11P08-FPU-Cooling conveyor - pump (1+1)	LWA	78
	82.13P06-FPU-Burdenfeeder recirculation pump	LWA	78
	82.11P07-FPU-Sump pump (1+1)	LWA	78
	83.4P01-FPU-Sump pump (1+1)	LWA	78
	83.4C01-FCP-Air compressor (2+1)	LWA	78
	84.2Y01-FVS-Hot flare stack (1+0) (tip)	LWA	125
	84.2P01-FPU-Sump pump - flare condensate (1+1)	LWA	78
	86.1P01-FPU-Chamber filter press cloth washing pump	LWA	
	86.1P02-FPU-Slurry feed pump to chamber filter press	LWA	78
	86.1P03-FPU-Sump pump - slurry area (1+1)	LWA	78
	86.1P04-FPU-Sump pump - em. Settling pond (1+1)	LWA	78
	86.2P01-FPU-Industrial waste water collecting	LWA	78
	86.1P03-FPU-Blow down water pump (1+1)	LWA	
	86.2P04-FPU-Backwash waste water pump (1+1)	LWA	78
Unit 900: Automation, Electric, Instrumentation	FV 1B002.2-Control Valve Main Air, DN 600	Lp 1 metre	99
	HV 1D006.2-Control Valve BSG, DN 80	Lp 1 metre	91
	PV 1D015-Control Valve Seal Gas, DN 250	Lp 1 metre	93
	HV 1D021-Control Valve Wet SG, DN 200	Lp 1 metre	101
	HV 1D075-Control Valve Dry SG, DN 200	Lp 1 metre	97
	FV 1E013-Control Valve PCW, DN 150	Lp 1 metre	90
	FV 1E029-Control Valve PCW, DN 200	Lp 1 metre	87
	PV 1E049-Control Valve PCW, DN 200	Lp 1 metre	87

*Normal steady state operations

Based on noise emissions from the above equipment, the following operating scenario was developed:

SCENARIO 1
Night Operations (Most critical 10pm to 7am)
Material handling, Pellet Plant and HBI Plant

It is noted, that for the scenarios considered, all equipment has been assumed to be operating at the same time under normal state operations. Due to the complexity of the plant, the individual noise sources are located in an open field situation, i.e. no barriers included for the structure of the plant. This would be highly conservative assessment of the noise emissions as the inclusion of the built form plant would attenuate a majority of the lower height noise sources. Stacks have been included at the heights provided (15 to 25m) using the sound power levels shown in Table 4.1.

Based on noise emissions from the above equipment, a night time operating scenario has been developed. This scenario represents periods of worst case noise emissions for the operations.

It is noted that as the plant would have some diversity in operations, therefore it is unlikely that all the equipment considered in the predictive noise model would be operating at the same time. However, to provide a conservative assessment, the calculated operating scenario includes all items operating at the same time.

The following input data was used in the calculations:

a) Provided site layouts.
b) Sound Power Levels as listed.
c) Ground contours and receiver points provided by client.
d) Concawe Algorithms

Weather conditions for modelling were as stipulated in the Environmental Protection Authority's "*Draft Guidance for Assessment of Environmental Factors No. 8 - Environmental Noise"* as listed in Table 4.2.

TABLE 4.2 – WEATHER CONDITIONS

Condition	Night	Day
Temperature	15°C	20°C
Relative humidity	50%	50%
Pasquill Stability Class	F	E
Wind speed	3 m/s*	4 m/s*

* From sources, towards receivers.

It is noted that 'worst case' wind conditions refer to conditions where there is a temperature inversion in conjunction with light winds in the direction from noise source to receiver, resulting in the highest sound propagation towards receiver locations.

5. RESULTS

A summary of the calculated noise levels for scenarios are shown in Table 5.1.

TABLE 5.1 – CALCULATED NOISE LEVELS, L_{A10} dB(A)

Receiver Name	Aust Green Steel Plant (Full Operation) Night Period
R1 - Gateway Village	32
C1 - Golf Course	37
Industry A	57
Industry B	60
Industry C	60

Noise contour plots for the above scenario is included in Appendix B.

6. ASSESSMENT

It is assumed that the operational noise will not have a 'tonal' characteristic applicable, due to the distance and the noise approaching the existing background noise level, hence noise characteristics will be increasingly weak. At noise emission levels around 35 dB(A) it will generally be the case that the noise emission level is low enough that the influence of background noise will result in the noise emission not being 'technically tonal', although that does not mean that some characteristics would not be audible.

Based on this, Table 6.1 shows the assessable noise levels.

TABLE 6.1 – ASSESSMENT OF NOISE LEVELS

Scenario	Receiver	Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable L_{A10} Assigned Noise Level (dB)	Exceedance to Assigned Noise Level L_{A01} (dB)
Night Time Full Plant Operations	R1	32	Night (22:00 to 07:00)	35	Complies
	C1	37		60	Complies
	Ind A	57		65	Complies
	Ind B	60			Complies
	Ind C	60			Complies

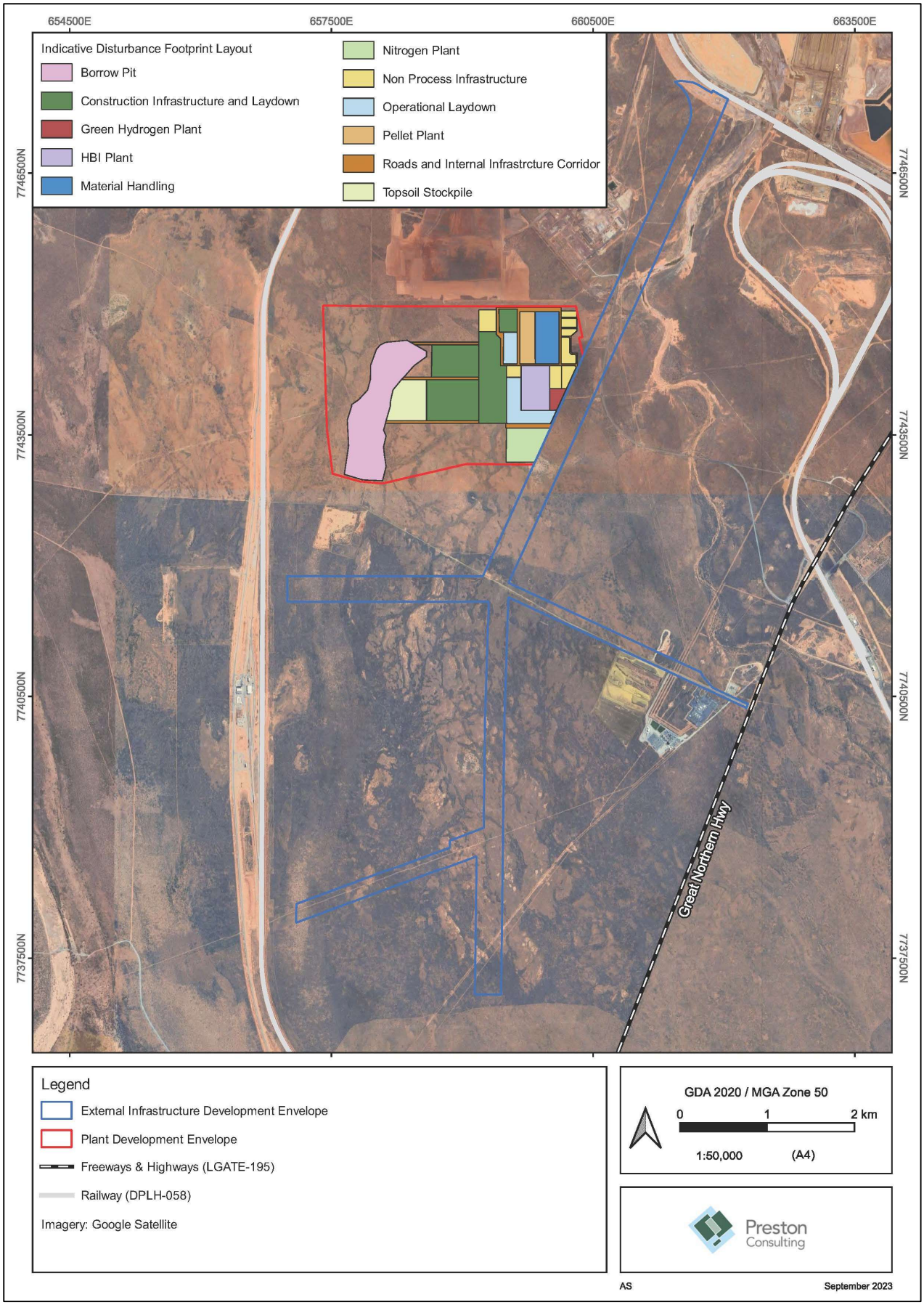
For the most stringent time period (night) the assigned noise level is 35 dB(A) at the nearest highly noise sensitive receiver, The Gateway Accommodation Village. The highest predicted noise emissions for the nearest noise sensitive premise is 32 dB(A) for the same time period. This includes all noise sources associated with the Green Steel Plant.

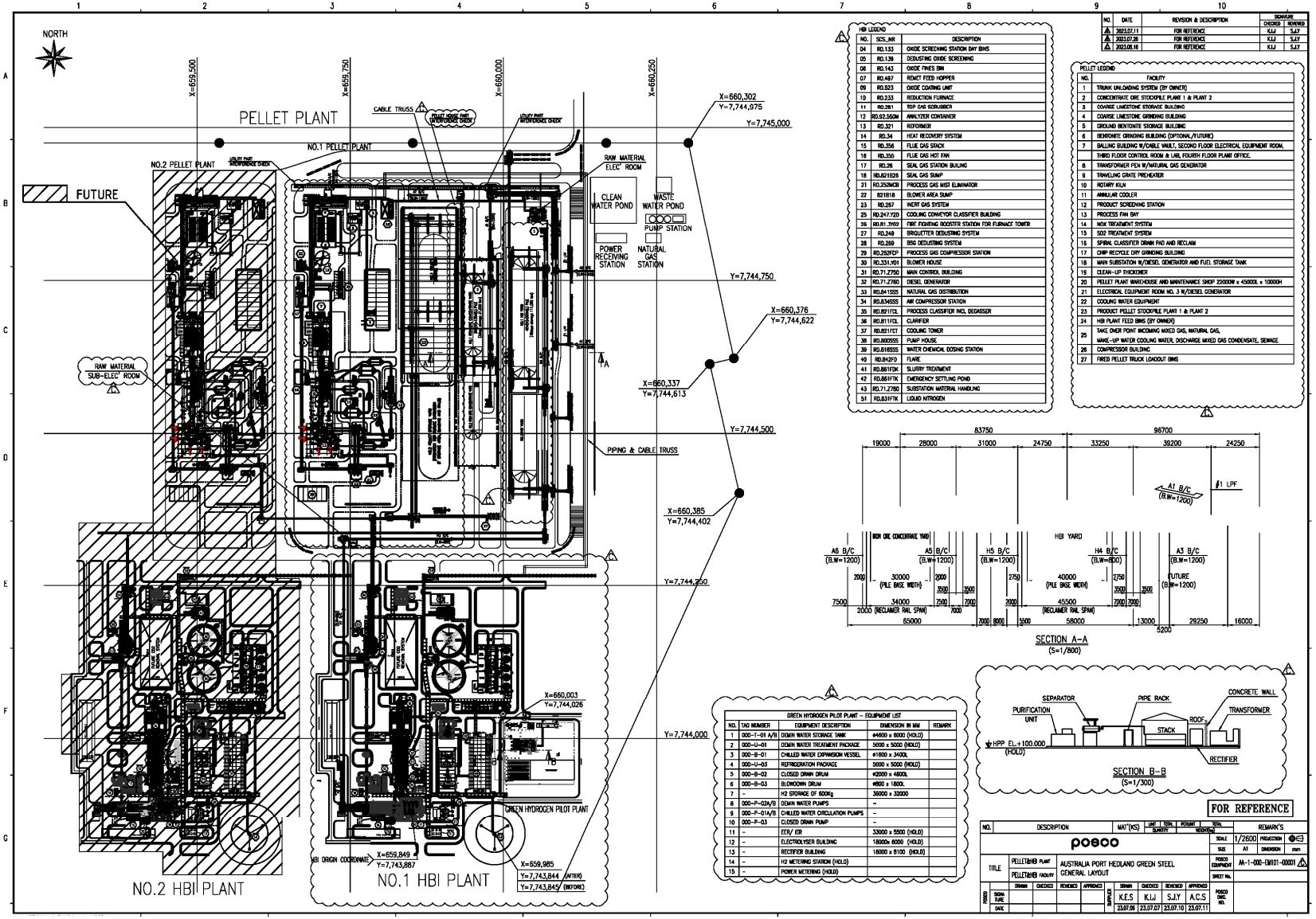
The operating scenarios consider all noise sources from the proposed facilities operating at the same time. The calculated noise levels have been assessed under the highest night-time propagation weather conditions. Given this, the noise modelling would be considered conservative, as it is unlikely that all noise sources are operating at the same time under the worst-case propagation conditions. Given this, the "significantly contributing" criteria would be met, allowing for future industry in the Industrial estate.

The acoustic assessment shows that in the worst case, that noise received at a premise is below the assigned noise level. Thus, noise emissions from the Project would be deemed to comply with the requirements of the *Environmental Protection (Noise) Regulations 1997*.

APPENDIX A

LOCATION PLANS


654500E
657500E
660500E
663500E
7746500N
7743500N
7740500N
7737500N
Indicative Disturbance Footprint Layout
Borrow Pit
Construction Infrastructure and Laydown
Green Hydrogen Plant
HBI Plant
Material Handling
Nitrogen Plant
Non Process Infrastructure
Operational Laydown
Pellet Plant
Roads and Internal Infrastrcture Corridor
Topsoil Stockpile
Great Northern Hwy
Legend
External Infrastructure Development Envelope
Plant Development Envelope
Freeways & Highways (LGATE-195)
Railway (DPLH-058)
Imagery: Google Satellite
GDA 2020 / MGA Zone 50
0
1
2 km
1:50,000
(A4)
Preston Consulting
AS
September 2023



NO.	SCS_NR	DESCRIPTION
04	RD.133	OXIDE SCREENING STATION DAY BINS
05	RD.139	DEDUSTING OXIDE SCREENING
06	RD.143	OXIDE FINES BIN
07	RD.487	REMET FEED HOPPER
09	RD.523	OXIDE COATING UNIT
10	RD.233	REDUCTION FURNACE
11	RD.261	TOP GAS SCRUBBER
12	RD.02.560M	ANALYZER CONTAINER
13	RD.321	REFORMER
14	RD.34	HEAT RECOVERY SYSTEM
15	RD.356	FLUE GAS STACK
16	RD.350	FLUE GAS HOT FAN
17	RD.26	SEAL GAS STATION BUILING
18	RD.821826	SEAL GAS SUMP
21	RD.252MCB	PROCESS GAS MIST ELIMINATOR
22	821818	BLOWER AREA SUMP
23	RD.267	INERT GAS SYSTEM
25	RD.247.Y20	COOLING CONVEYOR CLASSIFIER BUILDING
26	RD.81.3Y02	FIRE FIGHTING BOOSTER STATION FOR FURNACE TOWER
27	RD.249	BRIQUETTER DEDUSTING SYSTEM
28	RD.289	BSG DEDUSTING SYSTEM
29	RD.252FCP	PROCESS GAS COMPRESSOR STATION
30	RD.331.Y01	BLOWER HOUSE
31	RD.71.Z750	MAIN CONTROL BUILDING
32	RD.71.Z760	DIESEL GENERATOR
33	RD.841SSS	NATURAL GAS DISTRIBUTION
34	RD.834SSS	AIR COMPRESSOR STATION
35	RD.811YCL	PROCESS CLASSIFIER INCL DEGASSER
36	RD.811YCL	CLARIFIER
37	RD.821YCT	COOLING TOWER
38	RD.800SSS	PUMP HOUSE
39	RD.816SSS	WATER CHEMICAL DOSING STATION
40	RD.842FD	FLARE
41	RD.861FDK	SLURRY TREATMENT
42	RD.861FTK	EMERGENCY SETTLING POND
43	RD.71.Z780	SUBSTATION MATERIAL HANDLING
51	RD.831FTK	LIQUID NITROGEN

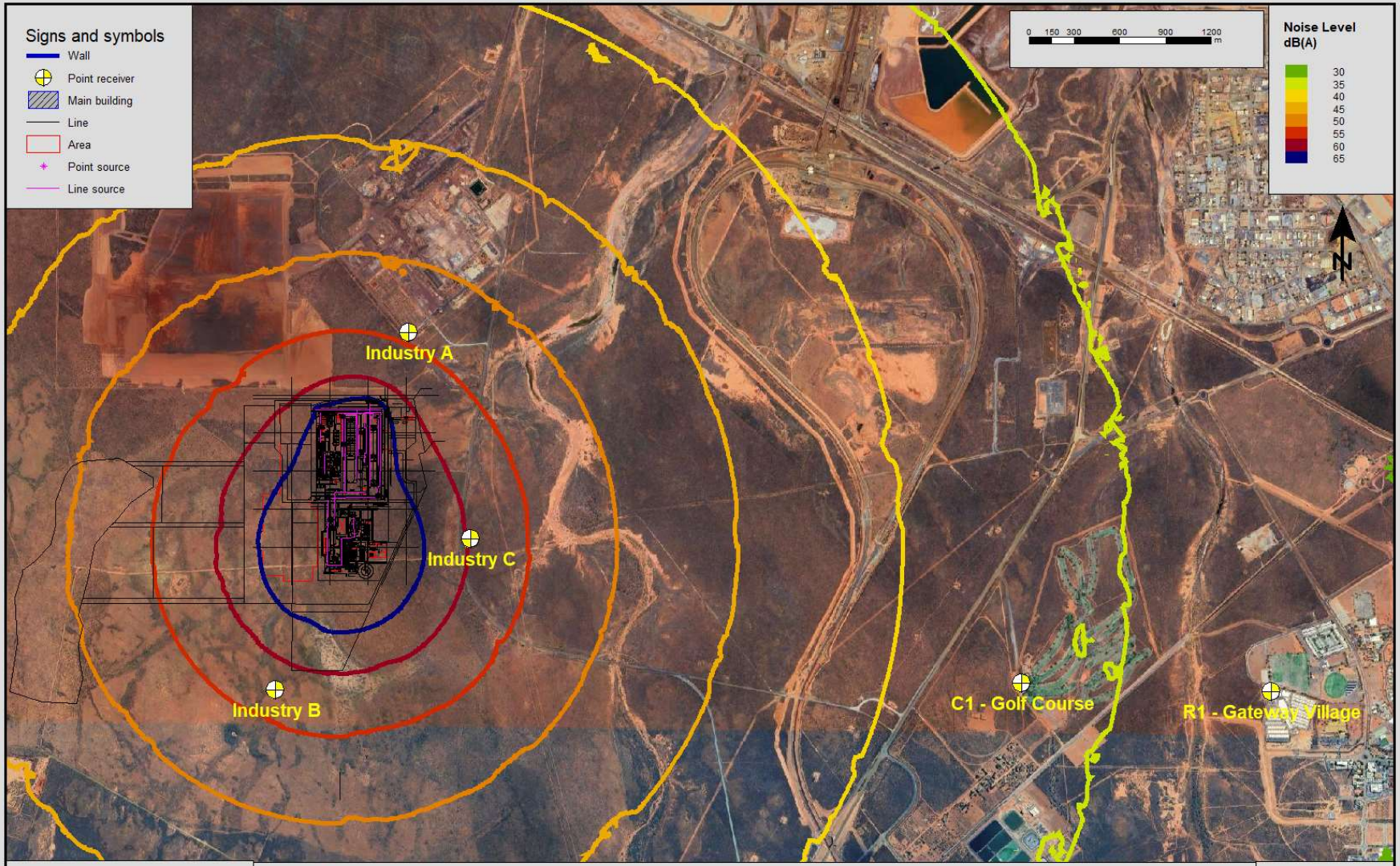
NO.	FACILITY
1	TRUNK UNLOADING SYSTEM (BY OWNER)
2	CONCENTRATE ORE STOCKPILE PLANT 1 & PLANT 2
3	COARSE LIMESTONE STORAGE BUILDING
4	COARSE LIMESTONE GRINDING BUILDING
5	GROUND BENTONITE STORAGE BUILDING
6	BENTONITE GRINDING BUILDING (OPTIONAL/FUTURE)
7	BALLING BUILDING W/CABLE VAULT, SECOND FLOOR ELECTRICAL EQUIPMENT ROOM, THIRD FLOOR CONTROL ROOM & LAB, FOURTH FLOOR PLANT OFFICE.
8	TRANSFORMER PEN W/NATURAL GAS GENERATOR
9	TRAVELING GRATE PREHEATER
10	ROTARY KILN
11	ANNULAR COOLER
12	PRODUCT SCREENING STATION
13	PROCESS FAN BAY
14	NOX TREATMENT SYSTEM
15	SO2 TREATMENT SYSTEM
16	SPIRAL CLASSIFIER DRAIN PAD AND RECLAIM
17	CHIP RECYCLE DRY GRINDING BUILDING
18	MAIN SUBSTATION W/DIESEL GENERATOR AND FUEL STORAGE TANK
19	CLEAN-UP THICKENER
20	PELLET PLANT WAREHOUSE AND MAINTENANCE SHOP 22000W x 45000L x 10000H
21	ELECTRICAL EQUIPMENT ROOM NO. 3 W/DIESEL GENERATOR
22	COOLING WATER EQUIPMENT
23	PRODUCT PELLET STOCKPILE PLANT 1 & PLANT 2
24	HBI PLANT FEED BINS (BY OWNER)
25	TAKE OVER POINT INCOMING MIXED GAS, NATURAL GAS, MAKE-UP WATER COOLING WATER, DISCHARGE MIXED GAS CONDENSATE, SEWAGE.
26	COMPRESSOR BUILDING
27	FIRED PELLET TRUCK LOADOUT BINS

NO.	TAG NUMBER	EQUIPMENT DESCRIPTION	DIMENSION IN MM	REMARK
1	000-T-01 A/B	DEMIN WATER STORAGE TANK	ø4000 x 6000 (HOLD)	
2	000-U-01	DEMIN WATER TREATMENT PACKAGE	5000 x 5000 (HOLD)	
3	000-B-01	CHILLED WATER EXPANSION VESSEL	ø1600 x 3400L	
4	000-U-03	REFRIGERATION PACKAGE	5000 x 5000 (HOLD)	
5	000-B-02	CLOSED DRAIN DRUM	ø2000 x 4800L	
6	000-B-03	BLOWDOWN DRUM	ø800 x 1800L	
7	-	H2 STORAGE OF 600Kg	35000 x 32000	
8	000-P-02A/B	DEMIN WATER PUMPS	-	
9	000-P-01A/B	CHILLED WATER CIRCULATION PUMPS	-	
10	000-P-03	CLOSED DRAIN PUMP	-	
11	-	EER/ IER	33000 x 5500 (HOLD)	
12	-	ELECTROLYSER BUILDING	18000x 6000 (HOLD)	
13	-	RECTIFIER BUILDING	18000 x 8100 (HOLD)	
14	-	H2 METERING STATION (HOLD)		
15	-	POWER METERING (HOLD)		

NO.	DATE	REVISION & DESCRIPTION	SIGNATURE CHECKED	SIGNATURE REVIEWED
1	2023.07.11	FOR REFERENCE	K.I.J	S.J.Y
2	2023.07.26	FOR REFERENCE	K.I.J	S.J.Y
3	2023.08.16	FOR REFERENCE	K.I.J	S.J.Y

APPENDIX B

NOISE CONTOUR PLOTS



Herring Storer Acoustics
Job No - 23240

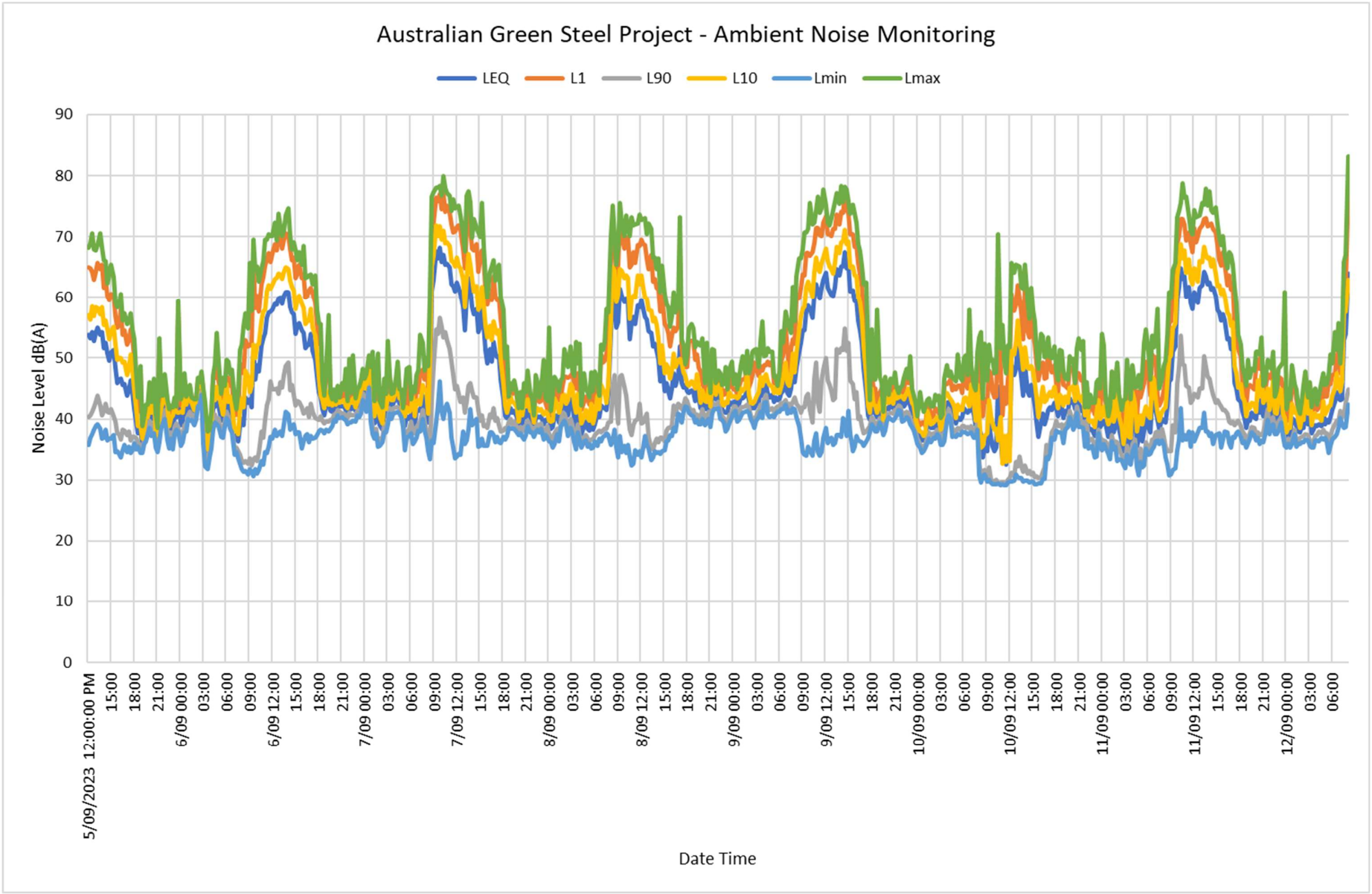
HERRING STORER ACOUSTICS

PORT HEDLAND GREEN STEEL PROJECT
WORST CASE NOISE PROPAGATION
LA10 NIGHT NOISE CONTOUR PLOT

Figure B1
Ref # 003

APPENDIX C

MONITORED DATA


Australian Green Steel Project - Ambient Noise Monitoring
LEQ
L1
L90
L10
Lmin
Lmax
Noise Level dB(A)
90
80
70
60
50
40
30
20
10
0
5/09/2023 12:00:00 PM
15:00
18:00
21:00
6/09 00:00
03:00
06:00
09:00
6/09 12:00
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7/09 00:00
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Date Time