Acoustic Report

Morwell Peaking Generation Project

Morwell FlexGen Pty Ltd

Prepared by:

SLR Consulting Australia Pty Ltd

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Revision Record

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Basis of Report

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Morwell FlexGen Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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Executive Summary

On behalf of Morwell FlexGen Pty Ltd, SLR Consulting Australia Pty Ltd (SLR) has conducted a noise impact assessment of the Morwell Peaking Generation Facility (MPGF, the Project) to be located at 454 Commercial Road, Morwell in south-east Victoria.

MPGF is expected to have 10 generators with an overall nameplate 20.5 megawatts (MW) generation capacity utilising reciprocating engine (diesel) technology. The exhaust stacks for the five west generators and the five east generators are proposed to be manifolded.

This facility will seek to provide prompt and high-reliability standby generation capacity for very limited periods in response to critical wholesale energy market, network and/or adverse weather events. Based on recent historical market data (2017 to 2025), the MPGF is expected to operate on average 200 hours per annum (approximately 2.3% of the year). However actual year-to-year operation may be markedly higher, and in particularly extreme years operation up to at least 1,200 hours per annum, and it is understood and EPA licence limit is sought on this basis.

Six closest noise sensitive receivers were identified. The northern receivers represent clusters of dwellings in the Morwell township. The eastern and south eastern receivers are isolated dwellings. The closest noise sensitive receiver is located 800 m to the north of the site boundary.

Compliance is demonstrated at all noise sensitive receivers with appropriate implementation of enclosures and exhaust silencing. The genset enclosure is to achieve not more than 70 dBA (excluding exhaust noise) at 7 m, and exhaust noise must not exceed 96 dBA at 1 m from the manifolded exhaust tip (east), 97 dBA at 1 m from the manifolded exhaust tip (west). Silencers are to be positioned at the base of the exhaust stacks and all exhaust piping is to be acoustically lagged with minimum 50 mm mineral wool and covered with a metal jacket (surface density no less than 4.5 kg/m^2).

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Table of Contents

Basis of Report i
Executive Summary ii
1.0 Introduction 1
2.0 Site Description 1
3.0 Project Description 2
4.0 Victorian Regulations - Project Criteria 5
4.1 EP Act 2017 5
4.2 General Environmental Duty 5
4.3 Background Noise Levels 6
4.3.1 Unattended Noise Monitoring 6
4.3.2 Attended Noise Measurements 8
4.3.3 Attended Observations 8
4.4 EP Regulations and Noise Protocol 2021 11
4.4.1 Rural Method – Noise Limits 11
4.4.2 Urban Method – Noise Limits 12
4.4.3 Cumulative Noise 12
4.4.4 Project Specific Noise Limits 13
4.5 Low Frequency Noise Guidelines 16
5.0 Noise Modelling 16
5.1 General Modelling Assumptions 16
5.2 Noise Assessment 17
5.2.1 Noise Characteristics 17
5.3 Noise Sources 17
6.0 Results 19
6.1 Low Frequency Noise Assessment 19
7.0 Summary of Recommendations 20

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Tables

Table 1 Closest Noise Sensitive Receivers 1
Table 2 Monitoring Equipment Details 6
Table 3 Measured Noise Levels 7
Table 4 Attended Noise Measurement Results 8
Table 5 Noise Monitoring Notes 9

Table 6 Definitions of Day, Evening and Night (Environmental Protection Regulations 2021) 11
Table 7: Noise Limits for Commercial Industrial and Trade Noise Emissions 15
Table 8 Outdoor Low Frequency Noise Threshold Levels 16
Table 9 Equipment Sound Power Levels 18
Table 10 Noise Assessment Results 19
Table 11 Outdoor Low Frequency Noise Threshold Levels 50 Hz to 160 Hz 20
Table 12 Predicted Octave Band Low Frequency Noise Levels 20

Figures

Figure 1 Noise Sensitive Receivers and Facility Area 2
Figure 2 Concept Layout 4
Figure 3 Locations of Noise Loggers 7
Figure 4 Attended Noise Measurement Location 8
Figure 5 Observations / Listening Locations 10
Figure 6 Zoning Map (Left: 24/30 Princes Dr, Right: 387 Princes Dr) 12
Figure 7 Noise Protocol Limit Zones 14

Appendices

Appendix A Measured Noise Levels
Appendix B Noise Contours

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1.0 Introduction

On behalf of Morwell FlexGen Pty Ltd, SLR Consulting Australia Pty Ltd (SLR) has conducted a noise impact assessment of the Morwell Peaking Generation Facility (MPGF, the Project) to be located at 454 Commercial Road, Morwell in south-east Victoria.

MPGF is expected to have 10 generators with an overall nameplate 20.5 megawatts (MW) generation capacity utilising reciprocating engine (diesel) technology. The exhaust stacks for the five west generators and the five east generators are to have a separate common manifold and exhaust stack.

It is understood that MPGF's primary objective is to provide prompt and high-reliability standby generation capacity for very limited periods in response to critical wholesale energy market, network and/or adverse weather events to ensure ongoing energy supply continuity, affordability, and stability. Based on recent historical market data (2017 to 2025), the MPGF is expected to operate on average 200 hours per annum (approximately 2.3% of the year). However actual year-to-year operation may be markedly higher, and in particularly extreme years operation up to at least 1,200 hours per annum, and it is understood and EPA licence limit is sought on this basis.

While the MPGF may be required to operate at any time of the day, it is usually to be required late afternoon/early evening (typically 4:00 pm to 7:00 pm) during peak summer and winter demand periods, coinciding with extended seasonal and critical demand peaks and/or lulls in renewable generation.

The scope of this report includes:

- Identify nearest noise sensitive receivers to MPGF
- Establish noise limits and outline the legislative requirements
- Conduct noise modelling of the proposal
- Provide recommendations where required
- Assess the predicted noise levels (with recommendations included) against the established noise limits

2.0 Site Description

MPGF is sited approximately 1000 m south east of the Morwell township and covers an area of 27.7 hectares with direct access to major national road transport corridors.

MPGF is located on land zoned as Industrial Zone 1 (IN1Z) land. The surrounding land is generally zoned as IN1Z, except to the west which is zoned as special use zone (SUZ1). Main uses and landmarks surrounding the site are Princes Freeway situated approximately 230 m to the north, the retired Morwell Power Station to the west, industrial facilities to the south and south-east, and a paddock to the east across Monash Way.

The nearest noise sensitive receivers are shown in **Figure 1** and summarised in **Table 1**.

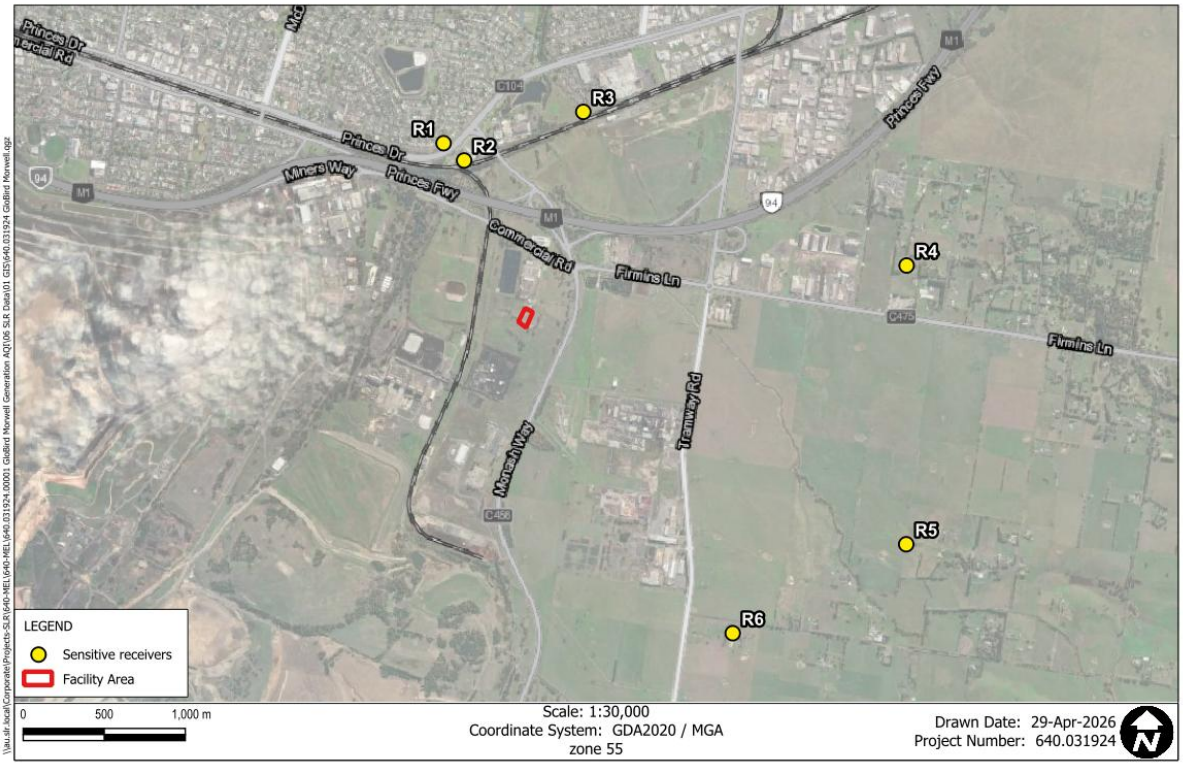
Table 1 Closest Noise Sensitive Receivers

Receiver	Address	Distance from site (m)	Direction
R1	393 Princes Drive	950	NW
R2	24/30 Princes Drive	800	NW
R3	4 Bridge Water Drive	1000	N

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Receiver	Address	Distance from site (m)	Direction
R4	30 Michael Road	2100	E
R5	15-75 Mulga Rd	2600	SE
R6	30 Church Road	2500	SE

Figure 1 Noise Sensitive Receivers and Facility Area



3.0 Project Description

The MPGF details include:

- Nominal 20.5 MW total nameplate generation capacity
- Utilising reciprocating engine (diesel) technology, which is:
  - widely established, reliable with known technical/maintenance characteristics
  - commonly used in sensitive high-density and high-reliability applications including hospitals, data centres, commercial/retail buildings, etc.
  - commonly deployed in the region already with existing local support capability
  - preferred make/model is the Rolls Royce mtu 20V4000 DS2750 diesel generator set.
- connection to the AusNet Morwell Terminal Station directly south of the site via numerous 66 kV / 22 kV feeders
- approximately 200 hours per annum operation expected on average i.e. during peak/extreme wholesale energy events, or approximately 2.3% of a year only.

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The project will have 10 containerised generators of 2 MW notional capacity each. The individual exhausts will be manifolded into two common exhaust stacks as follows (and as shown in **Figure 2**):

- the 5 "west" generator units with a single common exhaust stack
- the 5 "east" generator units with a separate single common exhaust stack

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Figure 2 Concept Layout



CONCEPT LAYOUT PLAN
454 Commercial Road
MORWELL, VIC

DRG NO.	REV	DATE	DES/DOC	AUTH
322820 UD ID 01	15	19/08/2026	AT	TP

spiire

SCALE 1:1000@A3

4.0 Victorian Regulations - Project Criteria

4.1 EP Act 2017

Certain types of noise within Victoria are regulated. The following sections provide an overview of how regulated noise is assessed in Victoria.

The EP Act prescribes that a person must not, from a place or premises that are not residential premises—

- emit an unreasonable noise; or
- permit an unreasonable noise to be emitted

Unreasonable noise means noise that—

- is unreasonable having regard to the following—
  - its volume, intensity, or duration
  - its character
  - the time, place, and other circumstances in which it is emitted
  - how often it is emitted
  - any prescribed factors, or
- is prescribed to be unreasonable noise

For the purposes of the above definition, 'frequency spectrum' is a prescribed factor.

4.2 General Environmental Duty

The general environmental duty (GED) is at the centre of the Environment Protection Act 2017 (EP Act), and it applies to all Victorians. GED states that a person who is engaging in an activity that may give rise to risks of harm to human health or the environment from pollution or waste must minimise those risks, so far as reasonably practicable.

Harm may arise due to the cumulative effect of harm arising from an activity combined with harm arising from other activities or factors.

To determine what is (or was at a particular time) reasonably practicable in relation to the minimisation of risks of harm to human health and the environment, regard must be had to the following matters:

- the likelihood of those risks eventuating,
- the degree of harm that would result if those risks eventuated,
- what the person concerned knows, or ought reasonably to know, about the harm or risks of harm and any ways of eliminating or reducing those risks,
- the availability and suitability of ways to eliminate or reduce those risks,
- the cost of eliminating or reducing those risks.

In the assessment of noise impacts with reference to GED, consideration must first be given to eliminating risks so far as reasonably practicable, and then to reducing those risks so far as reasonably practicable.

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4.3 Background Noise Levels

4.3.1 Unattended Noise Monitoring

Unattended noise monitoring was undertaken between 5 June 2025 and 6 June 2025 at two locations (see **Figure 3**). The loggers were secured on private property for one night, as the property owners did not consent to long term monitoring.

Measurements were undertaken using NATA calibrated noise loggers. Field calibration of the noise loggers were conducted before and after the measurements which showed a drift of less 1 dB. The equipment details are provided in **Table 2**. The weather conditions were generally dry with no rainfall and generally calm winds during the monitoring period (based on the Latrobe Valley Airport weather data). The collected ambient noise levels (L_{eq}), background noise levels (L_{90}) and statistical 10th percentile levels (L_{10}) are presented in **Appendix A**.

The existing acoustic environment within the vicinity of the development site is dominated by traffic noise from Princes Freeway and local road traffic.

The daily statistical levels (based on 60-minute intervals) are provided in **Table 3**. The data has been processed based on EPA time-period definitions for commercial, industrial and trade noise (see **Section 4.4**).

Table 2 Monitoring Equipment Details

Logger Description	Location	Monitoring Period	Equipment	Calibration Status
Logger 1	R2: Farnham Motel	5 June 2025 1:40 pm – 6 June 2025 9:47 am	ARL 316 S/N 16207046	Current
Logger 2	R1: 389 Princes Drive	5 June 2025 2:30 pm – 6 June 2025 9:40 am	ARL NGARA S/N 87801E	Current
			Bruel & Kjaer calibrator, Type 4321 S/N 3007429	Current

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Figure 3 Locations of Noise Loggers

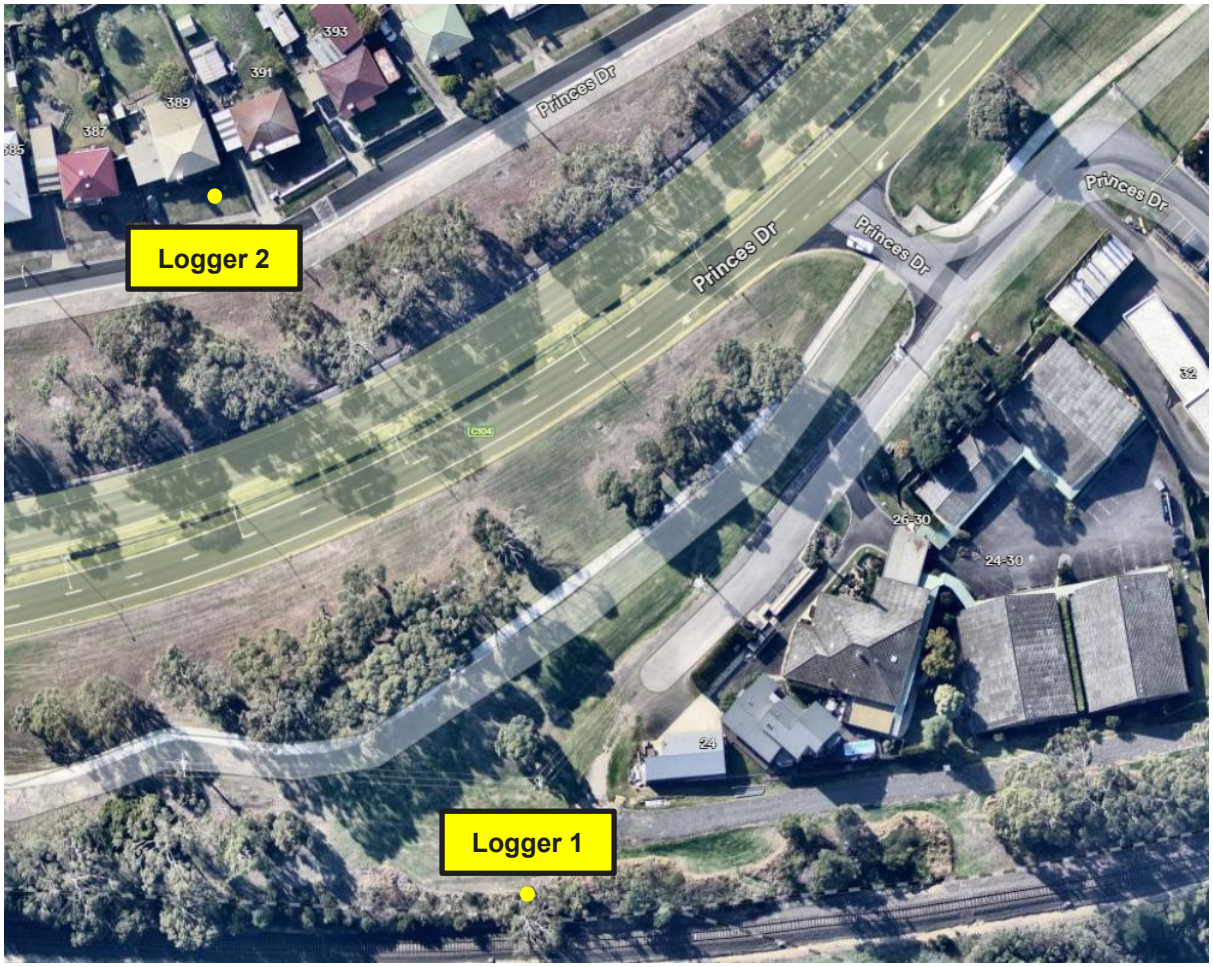


Table 3 Measured Noise Levels

Parameter, dBA	Time Period	Logger 1	Logger 2
L_{90}	Day	**55**	**56**
	Evening	**54**	**53**
	Night	**46**	**45**
L_{eq}	Day	60	61
	Evening	59	56
	Night	55	58
L_{10}	Day	61	62
	Evening	61	60
	Night	56	55

The measured L_{A90} noise levels during the Day, Evening and Night periods for 5 June 2025 are considered when establishing noise limits for receivers to the north of Princes Freeway, as discussed in the following sections.

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4.3.2 Attended Noise Measurements

Attended noise measurements were undertaken on 5 June 2025 during the night period. These tests were conducted at 30 Church Road, Hazelwood North. The location of the attended noise measurement is shown in **Figure 4**. All measurement durations are 10 minutes.

The equipment used for the attended noise measurements was an NTI XL2 S/N 18552. The equipment was NATA calibrated. Field calibration of the equipment before and after the measurements showed a calibration drift of less than 1 dB (Bruel & Kjaer calibrator, Type 4321, S/N 3007429).

The results of these noise measurements are shown in **Table 4.**

Figure 4 Attended Noise Measurement Location

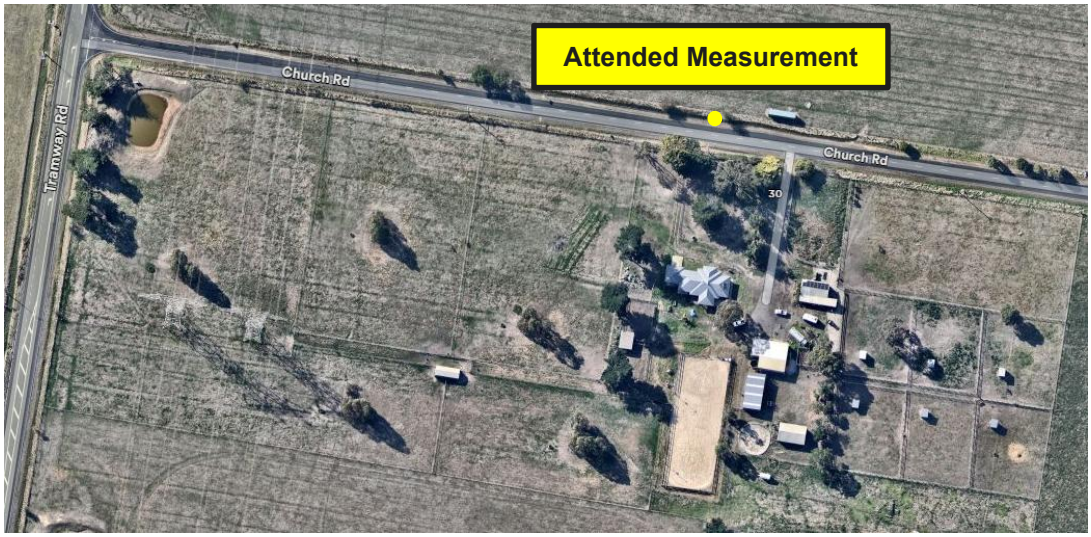


Table 4 Attended Noise Measurement Results

Start Time – End Time	Noise Level, L_{90} dBA	Comment on Noise Sources
10:04 pm – 10:14 pm 10:14 pm – 10:24 pm	36 37	1) Local traffic along Church Road. 2) Distant traffic from Princes Freeway. 3) Audible hum from Omnia Specialities located at approximately 1.3 km northwest of measurement location throughout measurement period.

4.3.3 Attended Observations

As part of the noise survey, listening tests were conducted at various locations on 5 June 2025 in the vicinity of the subject site, as shown in **Figure 5**. These observations were used to justify the cumulative noise assumptions as described in **Section 4.4.3**.

Table 5 highlights that the noise environment at 30 Church Road was influenced by nearby industry (Omina Specialties).

The results are presented in **Table 5**.

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Table 5 Noise Monitoring Notes

Descriptor	Location	Time	Noise Sources
L1	Logger 1 location	1:45 pm	• Train passbys dominant • Surrounding industry noises inaudible • Commercial activities such as McDonalds and UltraShine Car Wash inaudible
L2	Along Commercial Road (section between Ridge Road and Monash Way)	2:50 pm	• Local traffic along Commercial Road and Princes Freeway dominant • Surrounding industry noises inaudible
L3		9:55 pm	
L4	Monash Way (section between Commercial Road and terminal station)	3:00 pm	• Local traffic along Monash Way dominant • No significant industrial noise apart from occasional truck movements with reverse beepers from surrounding industries • Terminal station inaudible
L5		10:00 pm	• Local traffic along Monash Way and Princes Freeway dominant • Faint low frequency hum from Omnia Specialities • Terminal station inaudible
L6	30 Church Road	10:05 pm	• Local traffic along Church Road • Distant traffic from Princes Freeway • Audible low frequency hum from Omnia Specialities

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Figure 5 Observations / Listening Locations



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4.4 EP Regulations and Noise Protocol 2021

The Environmental Protection Regulations 2021 (EP Regulations) support the EP Act by providing clarity and further detail for duty holders on how to fulfil their obligations. Regulations are used to deal with matters in detail and may contain their own penalties for breaches.

In Victoria, noise emissions from commercial, industrial and trade premises are not permitted to be unreasonable or aggravated, and are subject to the provisions of the Regulations, and the *"Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues"*, EPA Publication 1826.4 (the Noise Protocol).

The Noise Protocol presents the methodology for determining the noise limit (maximum allowable level of noise emitted from a premise) when measured in a noise sensitive area. Noise sensitive areas are defined in the Regulations as that part of the land within the boundary of a parcel of land that is within 10 m outside the external walls of a dwelling.

Table 6 presents the assessment periods prescribed by the Regulations.

Table 6 Definitions of Day, Evening and Night (Environmental Protection Regulations 2021)

Period	Day	Time
Day	Monday to Saturday (except public holidays)	7:00 am – 6:00 pm
Evening	Monday to Saturday Sunday and public holidays	6:00 pm – 10:00 pm 7:00 am – 10:00 pm
Night	Monday to Sunday	10:00 pm – 7:00 am

The site sits on the edge of the Victorian urban growth boundary (UGB). The sensitive receivers to the south of Princes Freeway have noise limits calculated under the rural method as they are situated outside the UGB, whilst the remaining sensitive receivers have noise limits calculated under the urban method as they are situated inside the UGB.

4.4.1 Rural Method – Noise Limits

The Noise Protocol noise limits for receivers in a rural environment takes into consideration both influence of the zoning map categories (and changes in zoning categories), the background noise, and the distance between the zoning boundary and receiver (where different zones apply).

The rural area method is based on the highest of the following:

- Distance corrected noise limit based on:
  - the land-use zoning of the noise generating site and the noise sensitive property, and
  - The distance between the edge of the noise generating zone and the noise sensitive receivers
- Background-adjusted noise limit based on the measured background noise levels, and
- The EP Regulations, Regulation 118(2)(a) base noise limits which constrain how low a noise limit can be set.

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4.4.2 Urban Method – Noise Limits

The urban method is based on the land-use zoning of the area surrounding the residence, as defined by the relevant authority and on the measured background noise levels at the residence when those levels are especially high or low. **Figure 6** presents the relevant zoning areas for the two reference receivers north of Princes Freeway which are within the Urban Growth Area.

Figure 6 Zoning Map (Left: 24/30 Princes Dr, Right: 387 Princes Dr)[1]



4.4.3 Cumulative Noise

Where two or more premises contribute to industry noise within the noise sensitive area, the contribution from each individual industry needs to be assessed, and the cumulative noise from all industries needs to comply with the noise limits.

There are a number of existing and future proposed industrial and power generation/storage sites around the nearby receivers to MPGF. These include, but not limited to, Wooreen Battery Energy Storage System (BESS), Jeeralang power station, Latrobe Valley BESS, Morwell Terminal Station and car wash and McDonald's adjacent to 24/30 Princes Drive.

To ensure the MPGF does not push the cumulative noise from all nearby industrial activity over the nominated noise limit at the nearby receivers, a reduction in the noise limit is warranted.

A 3 dB cumulative adjustment is applied for the receivers to the north of Princes Freeway. This is considered appropriate on the basis that nearby industry was not clearly audible during the any of the observations, and future industries are at significant distances.

A 5 dB cumulative adjustment is applied for the rural receivers south of Princes Freeway given that Omnia Specialties was audible during the survey at 30 Church Road, and to allow for the future industries described above.

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[1] Courtesy of *Arcadian, Arup*

4.4.4 Project Specific Noise Limits

Noise limits have been established in three catchment zones. The location of the zones are presented in **Figure 7** with the summary of the noise limit calculations set out in **Table 7**.

For Zone 1 receivers, the adopted noise limits have been conservatively set based on neutral background levels rather than the high backgrounds collected with the logging. This is considered appropriate given only a single night of background data was able to be collected, and to allow for some variability that could occur between different receivers in the area.

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Figure 7 Noise Protocol Limit Zones



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Table 7: Noise Limits for Commercial Industrial and Trade Noise Emissions

Description	Noise Protocol Noise Limits, dBA		
	Day	Evening	Night
Zone 1			
EP Regs Base Noise Limit	45	40	35
Zone Level	53	47	42
Background Noise for Neutral Zoning	41-47	38-44	33-39
Logger 1 Background Noise Level, dBA	55	54	46
Background Noise Condition Assumption	Adopt Neutral	Adopt Neutral	Adopt Neutral
Noise Limit, dBA	53	47	42
Cumulative Noise Adjustment, dB	-3	-3	-3
Project Specific Noise Limit, dBA	**50**	**44**	**39**
Zone 2			
Base Noise Limit	45	40	35
Zone Level	61	55	50
Background Noise for Neutral Zoning	49-55	46-52	41-47
Logger 2 Background Noise Level, dBA	56	53	45
Background Noise Condition Assumption	High	High	Neutral
Noise Limit, dBA	62	56	50
Cumulative Noise Adjustment, dB	-3	-3	-3
Project Specific Noise Limit, dBA	**59**	**53**	**47**
Zone 3 – Rural Receivers			
Base Noise Limit	45	37	32
Zone Level	53	48	43
Distance Adjustment	-8 dB		
Distance Adjusted Noise Level	45	40	35
Cumulative Noise Adjustment, dB	-5	-5	-5
Project Specific Noise Limits, dBA	**40**	**35**	**30**

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4.5 Low Frequency Noise Guidelines

EPA Publication 1996 “Noise guidelines: Assessing low frequency noise” (LFNG) provides guidance for acoustic consultants and other qualified professionals who assess low frequency noise (10Hz – 160Hz).

Frequency spectrum is a prescribed factor under the EP Act and subordinate legislation. The assessment of frequency spectrum applies to noise from commercial, industrial and trade premises only.

Low frequency noise emitted from commercial, industrial and trade premises should be assessed by comparing its frequency spectrum to the relevant threshold levels in the LFNG. Specifically, Z-frequency weighted (unweighted or linear) measurements in one-third octave bands from 10 Hz to 160 Hz are compared with low frequency threshold levels.

The threshold levels are not set limits. Rather, they are levels that indicate a potential risk of problematic low frequency noise. The disturbance from low frequency noise depends on the:

- noise level,
- characteristics that can increase annoyance with the noise, for example, tonality, frequency modulation,
- baseline noise levels in the absence of the noise of concern.

Table 8 details the outdoor noise threshold criterion to be used for outdoor measurements. The noise threshold level for outdoor low frequency is based on the assumed façade noise reductions given in Downey and Parnell (2017).

Table 8 Outdoor Low Frequency Noise Threshold Levels

Outdoor 1/3 Octave Low Frequency Noise Threshold Levels													
Freq, Hz	**10**	**12.5**	**16**	**20**	**25**	**31.5**	**40**	**50**	**63**	**80**	**100**	**125**	**160**
Leq, dB	92	89	86	77	69	61	54	50	50	48	48	46	44

5.0 Noise Modelling

A 3D noise model was constructed within the modelling software SoundPLAN v8.2 to predict noise levels at the nearby sensitive receivers.

Noise modelling was conducted using the ISO 9613-2[2] algorithms incorporated in the noise modelling software. The ISO 9613-2 algorithm predicts the A-weighted sound pressure levels under meteorological conditions favourable to propagation from source to receiver. This enhanced propagation is equivalent to downwind propagation or a moderate ground-based temperature inversion. The model also includes attenuation due to air absorption, ground attenuation and shielding.

5.1 General Modelling Assumptions

The following general assumptions are made based on best-practice modelling method to suit the project:

[2] ISO 9613-2:1996 *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation*

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- The reflection-order was set to three (3).
- Source heights were set according to the source item.
- Receivers were set 1.5 m above ground level.
- All equipment was assumed to be in operation for the entire 30 minute assessment period.
- Ground topography within 2 km of the proposed site was sourced from publicly available 2 metre digital elevation data from Geoscience Australia.
- Ground absorption was modelled by a single number parameter between 0 (hard – reflective) and 1 (soft – absorptive). All ground surfaces were modelled with a ground absorption parameter of 0.6, suitable for rural farmland. The project area and other industrial areas around the site were modelled as hard ground (absorption parameter 0).

5.2 Noise Assessment

5.2.1 Noise Characteristics

The Noise Protocol contains provisions for adjustments for noise characteristics such as tonality, impulsiveness and intermittency. If one or more of these characteristics are present at the receiver, then an adjustment is applied to the overall level.

The following outlines the noise characteristics and discusses whether the adjustments are relevant to this assessment.

Tonality

Diesel gensets generally exhibit tonal characteristics as the engine operates at a consistent RPM.

Given the propagation distances to the receivers (of the order of 800 m – 2.5 km) it is expected that tonal characteristics of the powerplant may be just distinguishable at the closest noise sensitive receivers.

Therefore a 2 dB penalty is applied to all predicted noise levels to account for the possibility of the presence of a just detectable tone.

Impulsiveness

The impulsiveness characteristic refers to a dominant sudden pressure peak, or series of peaks, or a single burst with multiple pressure peaks whose amplitude decays with time or a sequence of bursts. Noise due to the diesel gensets or transformers are not impulsive in nature.

Intermittency

Intermittency is present when the noise increases in level rapidly, and by at least 5 dB, on at least two occasions during a 30 minute period and maintains the higher level for at least one-minute.

When operating, the diesel gensets are a consistent noise source. They are expected to operate for 30 minutes to up to 4 hours at a time. Therefore, no intermittency characteristic adjustments have been applied to the following results.

5.3 Noise Sources

Table 9 presents the sound power levels for the following:

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- Untreated engine overall noise sourced from the preferred generator manufacturers specifications. The spectrum was sourced from a similar Cummins diesel engine and is considered typical for diesel genset engine.
- Unsilenced exhaust noise assumed based on a similar diesel generator set (MTU 20V 4000 G23/G63L/G14F/B34F (TAL), 2.2 kW).
- Treated engine overall noise based on diesel generator contained with an acoustic enclosure with attenuators.
- Each exhaust fitted with a silencer that achieves a minimum 27 dB insertion loss.
- Silencers are assumed to be installed directly at the base of each generator's pipe, meaning one silencer per generator.
- Exhaust breakout noise was modelled based on a 1440 mm diameter circular pipe made of 16 gauge (1.6 mm) steel. The exhaust pipe was assumed to be acoustically lagged with 50 mm mineral wool with a metal cladding of a surface density of 4.5 kg/m^2.
- **Table 9** presents the sound power levels of the modelled equipment with the assumed mitigation measures. The sound power level for the medium voltage transformers were derived from AS 60076-19:2009 – standard maximum / reduced maximum sound levels.

Table 9 Equipment Sound Power Levels

Item	Octave Band Centre Frequency Hz, dB (SWL)								Overall, dBA
	63	125	250	500	1k	2k	4k	8k	
Untreated Engine[1]	138	132	126	119	118	117	111	108	125
Unsilenced Exhaust[2]	126	129	132	118	118	116	101	80	126
Engine within genset container[3]	113	107	101	94	92	91	85	83	99
Engine inlet and outlet[4]	85	83	83	84	87	88	87	79	93
West; row of 5; manifolded exhaust fitted with silencer[5]	101	102	108	101	102	99	84	63	106
East; row of 5; manifolded exhaust fitted with silencer[5]	101	102	108	101	102	99	84	63	106
Manifolded duct breakout[6]	69	83	102	94	90	82	47	19	97
2.5 kVA Transformer	73	75	70	70	64	59	54	47	70

Note 1: Engine includes radiator and fan noise
Note 2: Exhaust is open stack
Note 3: Engine noise was modelled as a point source 0.3 m above the top of the genset container
Note 4: Engine inlet and outlets were modelled as point sources adjacent to the two smallest faces of the container
Note 5: Exhaust noise was modelled as a point source 5.5m above the ground
Note 6: Acoustic energy distributed over a line representing the manifolded pipes

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The genset container, or acoustic enclosure sound power level is equivalent to a sound pressure level of **70 dBA at 7 m** (excluding exhaust).

Each generator exhaust base fitted with a silencer with a 27 dB insertion loss to achieve an equivalent sound pressure level no greater than:

- **95 dBA at 1 m from the manifolded exhaust tip (east)**.
- **95 dBA at 1 m from the manifolded exhaust tip (west)**.

6.0 Results

Table 10 presents the night time assessment results along with **Appendix B** which presents the predicted noise contours unadjusted for noise character. As the generator can operate at any time, and its noise emissions are unvarying when in operation, a night time assessment has been conducted. Compliance with the night time noise limit will therefore ensure compliance at all other times.

Table 10 Noise Assessment Results

Receiver	Predicted Noise Level, dBA	Noise Character Adjustment[1], dB	Effective Noise Level, dBA	Night Time Noise Limit, dBA	Compliance
R1	36	2	38	39	Yes
R2	35	2	37	47	Yes
R3	34	2	36	39	Yes
R4	27	2	29	30	Yes
R5	24	2	26	30	Yes
R6	27	2	29	30	Yes
Note 1: a 2 dB tonality characteristic adjustment was applied at all receivers					

The results above indicate that compliance can be achieved at all receivers provided the modelling assumptions in **Section 5.0** are applicable and the recommendations in **Section 7.0** are satisfied.

6.1 Low Frequency Noise Assessment

The Noise Guidelines: *Assessing Low Frequency Noise* (Publication 1996) adopt a low frequency threshold level as a screening tool to identify the potential risk of problematic low frequency noise. The low frequency threshold range (**Table 8**) is provided from 10 Hz to 160 Hz.

The available data for the diesel engine of the generator does not include spectral data. The octave band levels used by SLR are based on a similar engine from a different manufacturer.

Spectral 1/3rd octave band was provided for the exhaust of the generators. However the performance of the exhaust silencer was based on data from SLR's database. Although this data is available only down to 63 Hz (not down to 10 Hz as per the LFNG), from our experience, the 63 Hz and 125 Hz bands are still likely to be the most critical in the assessment of low frequency noise.

An indicative assessment of the predicted 63 Hz and 125 Hz noise levels at the receivers is provided below to identify the potential risk of problematic low frequency noise.

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The low frequency noise threshold levels between 50 Hz and 160 Hz have been reproduced in **Table 11** for comparison with the predicted low frequency noise levels at each receiver. In order to conduct an indicative comparison between the empirical octave data and 1/3 octave low frequency noise threshold levels, the three relevant 1/3 octave band threshold levels were logarithmically summed to estimate the octave band threshold.

Table 11 Outdoor Low Frequency Noise Threshold Levels 50 Hz to 160 Hz

Outdoor 1/3 Octave Low Frequency Noise Threshold Levels						
Freq, Hz	**50 Hz**	**63 Hz**	**80 Hz**	**100 Hz**	**125 Hz**	**160 Hz**
LFNG thresholds, Leq, dB	50	50	48	48	46	44
Estimated Octave Threshold	-	54	-	-	51	-

Table 12 shows the predicted levels for the 63 Hz and 125 Hz frequency bands at each receiver.

Table 12 Predicted Octave Band Low Frequency Noise Levels

Receiver	Predicted Noise Level, dB					
	50 Hz	**63 Hz**	**80 Hz**	**100 Hz**	**125 Hz**	**160 Hz**
R1	-	52	-	-	40	-
R2		52			41	
R3		53			40	
R4		48			35	
R5	-	44	-	-	32	-
R6	-	47	-	-	34	-
Threshold (octave)	**-**	**54**	**-**	**-**	**51**	**-**

The above indicates that the predicted octave band levels are below estimated octave band low frequency thresholds at 63 Hz and 125 Hz. Considering these findings, the risk of problematic low frequency noise is low, assuming appropriate exhaust silencing and generator enclosure selection.

7.0 Summary of Recommendations

Compliance is demonstrated at all closest noise sensitive receivers provided:

- The genset is enclosed in a container providing a reduction of not less than 25 dB and designed to achieve a sound pressure level of **70 dBA at 7 m** (excluding exhaust noise).
- Each generator exhaust base fitted with a silencer with a minimum **27 dB insertion loss** to achieve an equivalent sound pressure level no greater than:
  - **95 dBA at 1 m from the manifolded exhaust tip (east).**
  - **95 dBA at 1 m from the manifolded exhaust tip (west).**
- All exhaust piping to be acoustically lagged with 50 mm mineral wool with a metal cladding of a surface density of 4.5 kg/m^2

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Appendix A Measured Noise Levels

Acoustic Report

Morwell Peaking Generation Project

Morwell FlexGen Pty Ltd

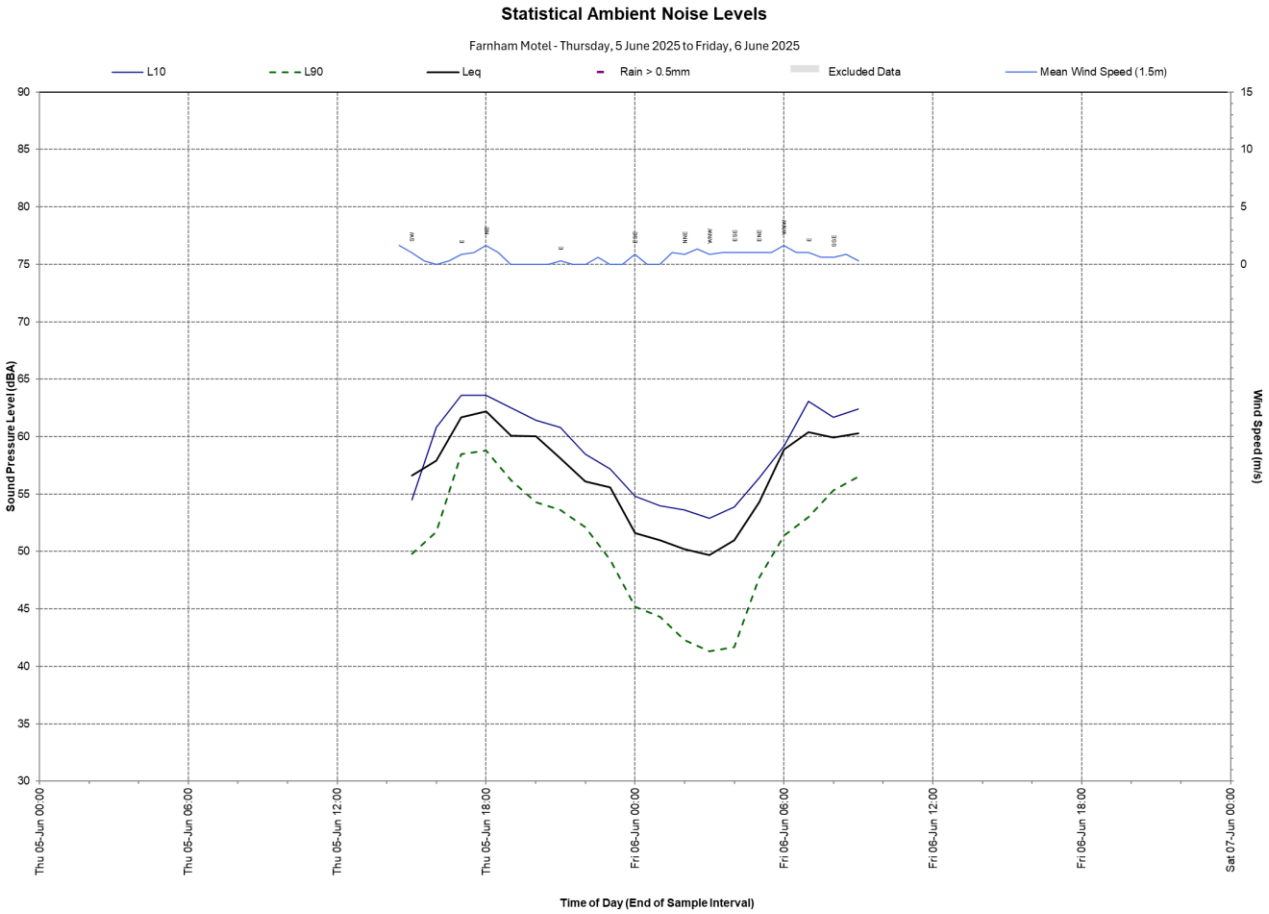
SLR Project No.: 640.031508.0002

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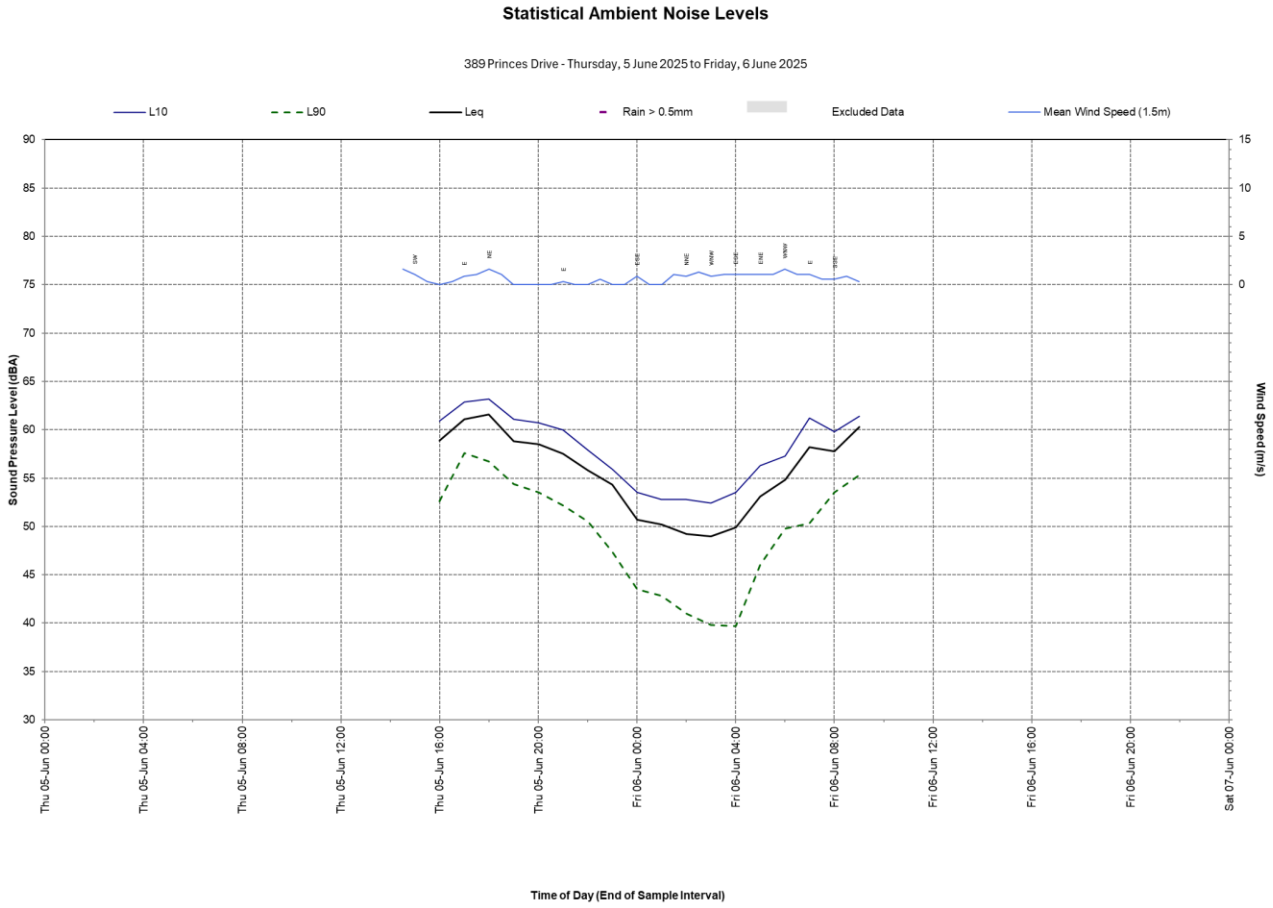
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Logger 1 - Franham Motel



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Logger 2 – 389 Princes Drive



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Appendix B Noise Contours

Acoustic Report

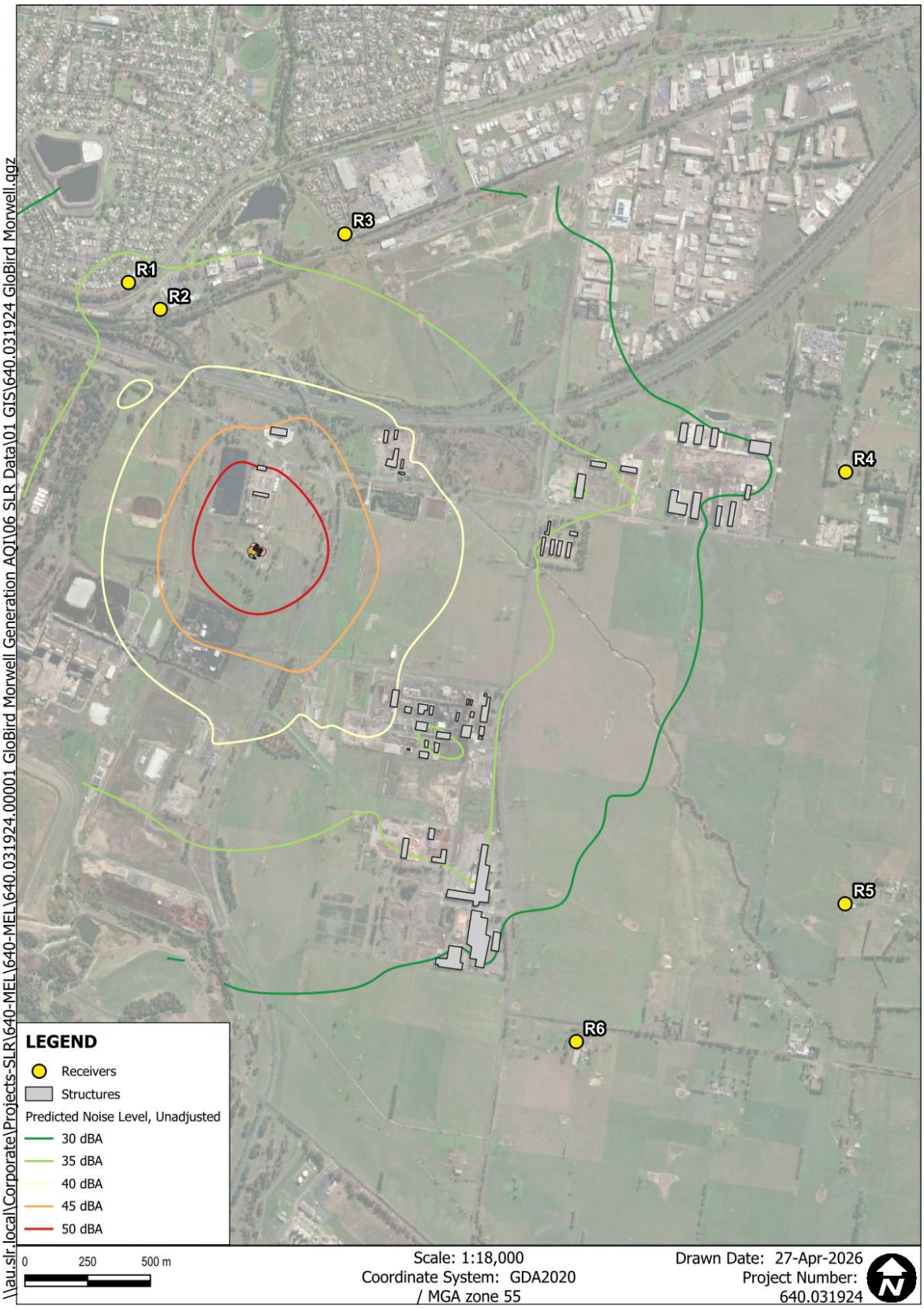
Morwell Peaking Generation Project

Morwell FlexGen Pty Ltd

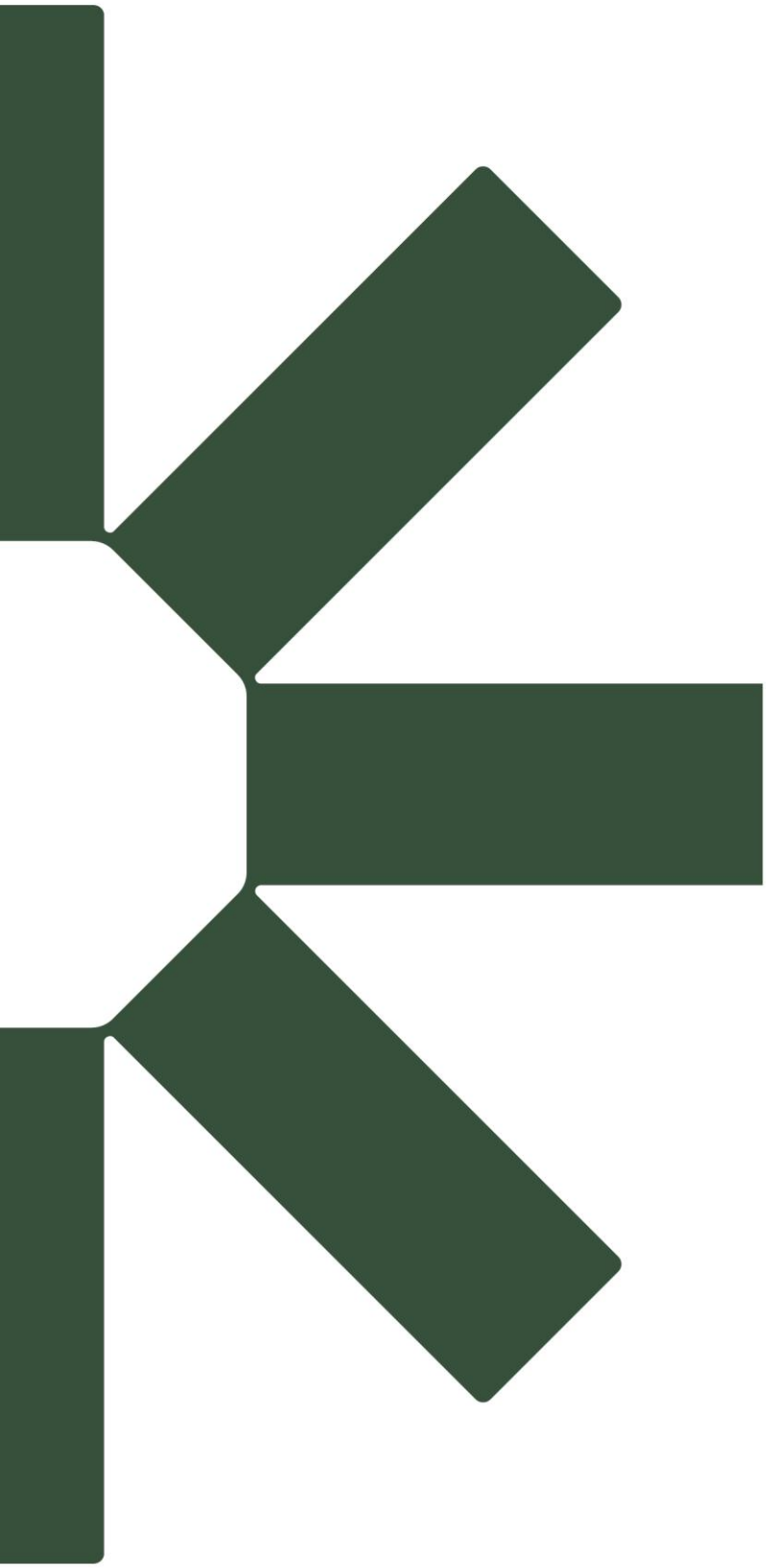
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