ACT MATERIALS RECOVERY FACILITY

ADDENDUM TO APPENDIX O NOISE AND VIBRATION IMPACT ASSESSMENT REPORT

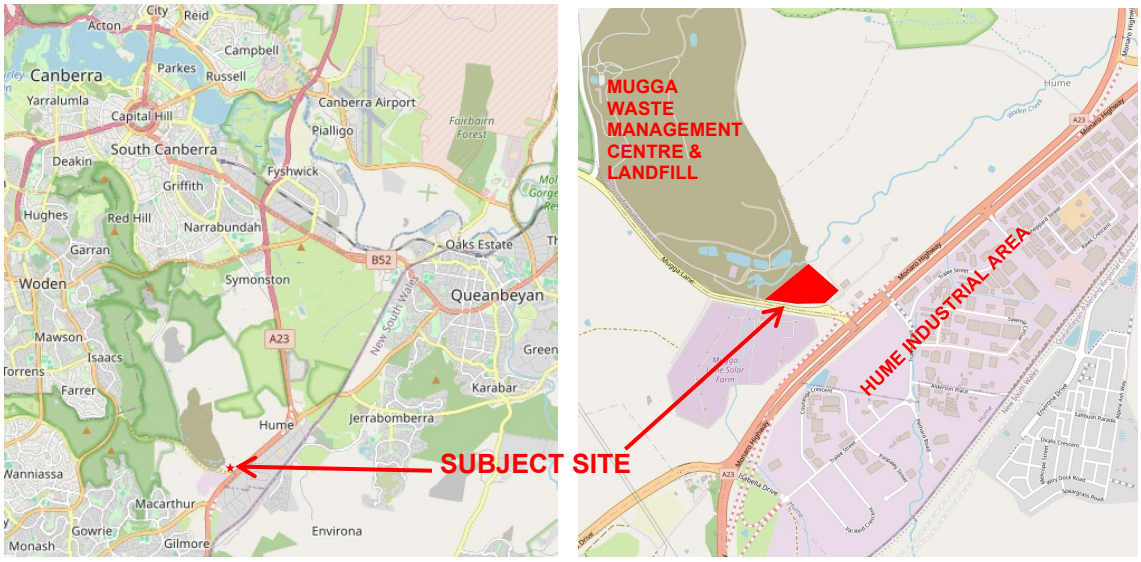
Prepared for Veolia Environmental Services (Australia) Pty Ltd | 2 April 2025

Introduction

This report is prepared as an Addendum to *Appendix O Noise and Vibration Impact Assessment Report* prepared by GHD for ACT NoWaste in 2023 and submitted with a draft EIS for a new Materials Recovery Facility (MRF) on Block 12 Section 25 Hume, refer Figure 1.

Since that time ACT NoWaste has passed the responsibility to finalise the EIS to Veolia. GHD are not in a position to complete the EIS and as such, Veolia has engaged Element Environment to undertake this work.

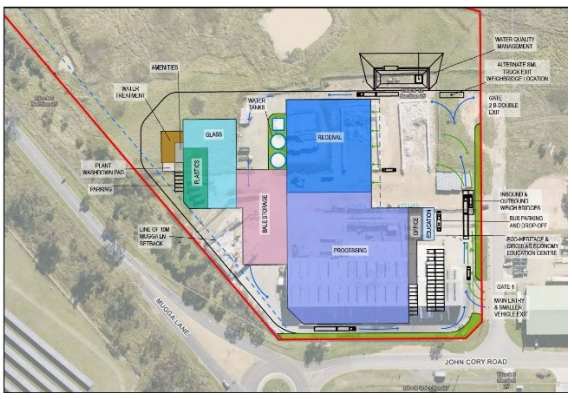
Figure 1: Site Location



Veolia has made changes to the proposed site layout and design of the MRF to achieve operational efficiencies (refer Figure 2 & 3).

Figure 2: Veolia Revised Site Plan

Figure 3: GHD Concept Plan



Additional Investigations

The GHD *Appendix O Noise and Vibration Impact Assessment Report* included noise modelling of the concept design of the MRF to predict operational noise at the boundary of the proposal site assessed against the ACT Noise Standard. This modelling was based on an 18 hour operating day (from 4am to 10pm) and it was concluded that the noise standard could not be achieved during the night period (before 7am). As such a range of mitigation measures were proposed by GHD. Since that time Veolia has confirmed that processing will occur within a 10-hour operating day starting at 7am.

Assessment

Muller Acoustic Consulting undertook further noise modelling based on the changed operating hours plus the revised site layout, with a focus on noise generated from the outside glass receival bunker, which was considered the noisiest site activity.

The results of the noise modelling indicate that noise levels would not exceed the ACT Noise Standard of 65 dBA during the day-time period at the boundaries of the proposal site.

It is expected that some early morning deliveries of recyclable material would occur from 5am. As this is within the night period, the ACT Noise Standard is 55dB(A) at the site boundary. The vehicle noise from early morning deliveries would slightly exceed the night-time noise standard by around 2dB(A) due mainly to vehicles passing through the weighbridge near the boundary adjacent to John Cory Road. As there are no receivers close to the site, the minor exceedance in the noise standard is not considered to have any impact on the amenity of the area.

The changes in site operations, together with the conclusions of the additional noise assessment undertaken by Muller Acoustics, result in some of the mitigation measures proposed in the GHD report no longer being relevant and therefore have been deleted.

As such, the amended mitigation measures, which are repeated in Table 1 below, are considered relevant for the Veolia MRF development proposal.

Table 1: Mitigation measures to be implemented for the proposal

Potential impact	ID	Measures to reduce impact	Timing
Noise disturbance	NV01	Construction hours would comply with Section 9.4 of the Noise Environment Protection Policy (EPA, 2010) which permits noise from building work that exceeds the noise standard, subject to time restrictions and provided the work is carried out in accordance with AS 2436.	Construction

Conclusions

The additional Muller Acoustics investigations concluded that noise emissions from the operation are predicted to satisfy the ACT Noise Standard at all boundaries of the proposal site, during the day period.

The vehicle noise from early morning deliveries is not considered to have any impact on the amenity of the area.

Addendum Noise Impact Assessment

Hume Materials Recovery Facility
Block 12, Section 25, Recycling Road
Hume, ACT

Prepared for: Veolia Environmental Services (Australia) Pty Ltd
C/- Element Environment Pty Ltd
May 2025
MAC252343-01RP1V2

Muller Acoustic Consulting

Document Information

Addendum Noise Impact Assessment

Hume Materials Recovery Facility

Block 12, Section 25, Recycling Road

Hume, ACT

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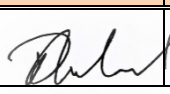
DOCUMENT ID	DATE	PREPARED	SIGNED	REVIEWED	SIGNED
MAC252343-01RP1V2	6 May 2025	Dale Redwood		Oliver Muller	

CONTENTS

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Element Environment Pty Ltd, on behalf of Veolia Environmental Services (Australia) Pty Ltd (Veolia), to prepare an addendum to the Noise and Vibration Impact Assessment (NVIA), prepared by GHD Pty Ltd (GHD. 2023, Ref: 12540460_REP_ACT Hume MRF-NVIA), for the Materials Recovery Facility (MRF) at Block 12, Section 25, Recycling Road, Hume, ACT (the 'project').

The addendum to the NVIA has been prepared to quantify and manage (if required) potential operational noise and vibration impacts associated with the proposed changes to the MRF and will be submitted as part of an Environmental Impact Statement (EIS) for the approval of the project.

This assessment has been undertaken in accordance with the following documents:

- Australian Capital Territory, *Environment Protection Act* (1997);
- Australian Capital Territory, Environment Protection Regulation (EPR), 2005;
- Australian Capital Territory, Environment Protection Authority (EPA), Noise Environment Protection Policy (EPP), 2010; and
- Australian Standard AS 1055:2018 - Acoustics - Description and measurement of environmental noise - General Procedures.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

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2 Project Description

2.1 Project Background

The Australian Capital Territory (ACT) Government has partnered with Veolia to design, build and operate a new recycling facility in the ACT. A draft EIS was prepared by GHD for ACT NoWaste in 2023, which included a Noise and Vibration Impact Assessment prepared by GHD Pty Ltd (GHD. 2023, Ref: 12540460_REP_ACT Hume MRF-NVIA) to consider the potential acoustic impacts from the MRF.

Veolia have made changes to the proposed site layout and design of the MRF to achieve operational efficiencies, together with changes to the proposed hours of operation.

2.2 Project Overview

The proposal is to construct a new Material Recovery Facility (MRF) on Block 12, Section 25, Recycling Road, Hume, ACT (the subject site) to replace the existing facility that was extensively damaged due to fire on 26 December 2022. The main shed remains standing and is currently being used as a waste transfer station to accept, sort and store recyclable materials before being shipped to other processing facilities.

The site is located within the industrial suburb of Hume on the corner of Mugga Lane, John Cory Road and Recycling Road, to the west of the Monaro Highway (refer to **Figure 1**). The subject site is 5.052ha and zoned IZ1 General Industry under the Territory Plan 2023. Approximately 60% of the area of Block 12 (or 30,000m^2) will be used by the new MRF with the remaining area being retained as grassland with an existing dam.

The proposal is designed to process up to 115,000 tonnes per year of mixed recyclables. The capacity provides for population growth and changing consumer behaviours which are expected to contribute to increases in recoverable materials over time.

Key features of the proposal include:

- New MRF building (refer to **Figure 2**) of approximately 11,719m2, including
  - Receival area of 2,073m^2
  - Processing area of 4,990m^2
  - Glass recycling area of 1,254m^2
  - Product storage area of 2,700m^2
  - Workshop and staff amenities of 170m^2

- Education facility of 213m^2
- Pump room of 59m^2
- Covered water treatment area of 260m^2

- Weighbridges
- Site driveways and hardstand area
- Water tanks for roof water capture and on-site re-use
- Bioretention pond for surface water management
- Wastewater leachate treatment system.

The facility will provide technological improvements to enable greater resource recovery by both increasing the quality of recycled materials and by reducing the amount of nonrecyclable residual waste that is currently sent to landfill.

During the construction phase it will create 112 jobs and 24 permanent roles as part of the facility's operations.

The anticipated operating hours when the plant is at full capacity is 6am-6pm for 6 days per week, with trucks arriving at the facility from 5am. Additionally, it is anticipated that maintenance work, which would require part of the plant to be operational for testing, would be undertaken after the 6pm shutdown, with maintenance activities potentially extending beyond 10pm, into the night period. The maintenance works would typically be of a lower intensity to general operations, with no waste receivals, and minimal plant operating.

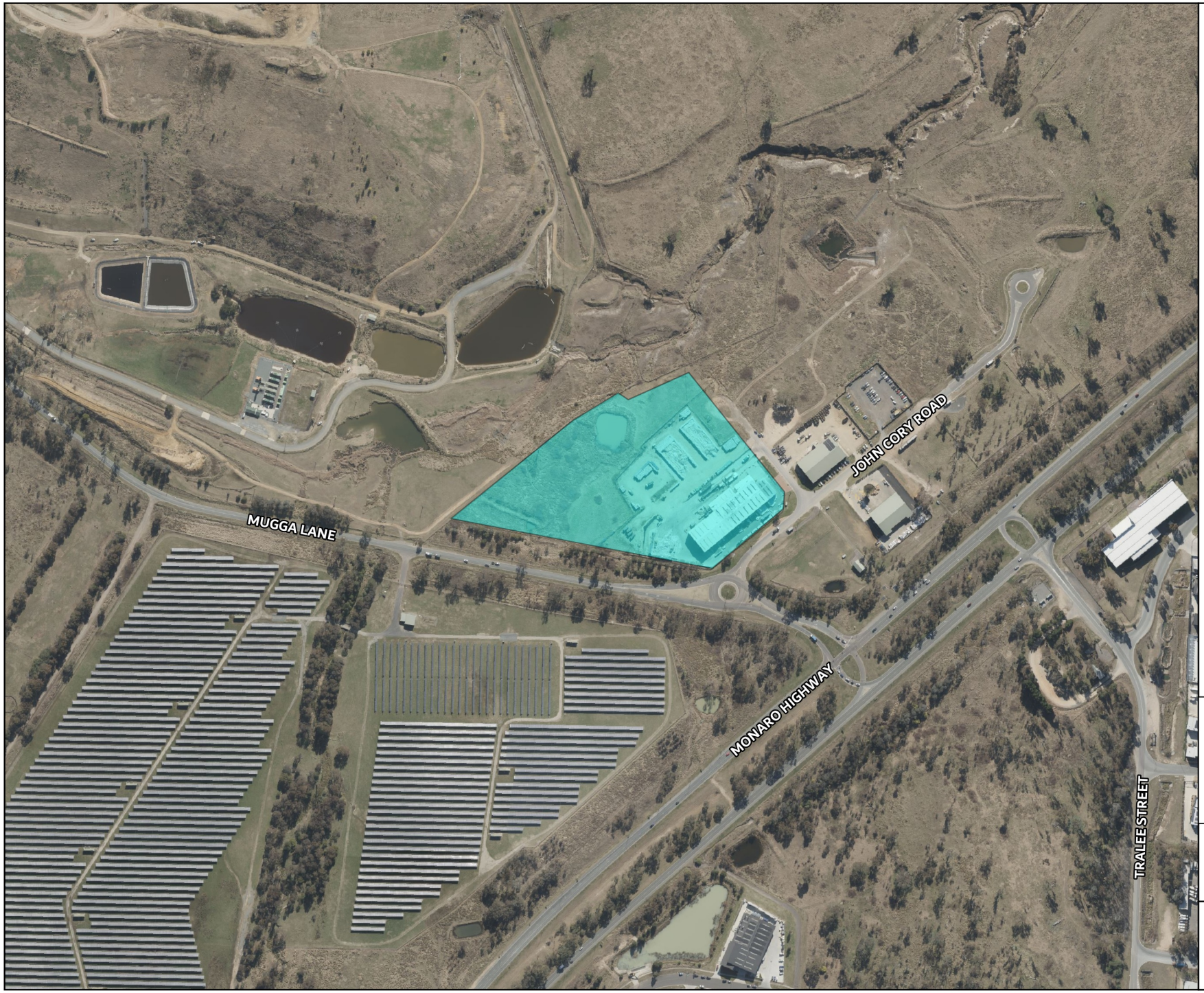


FIGURE 1

Project Site

MAC252343-01

Hume MRF

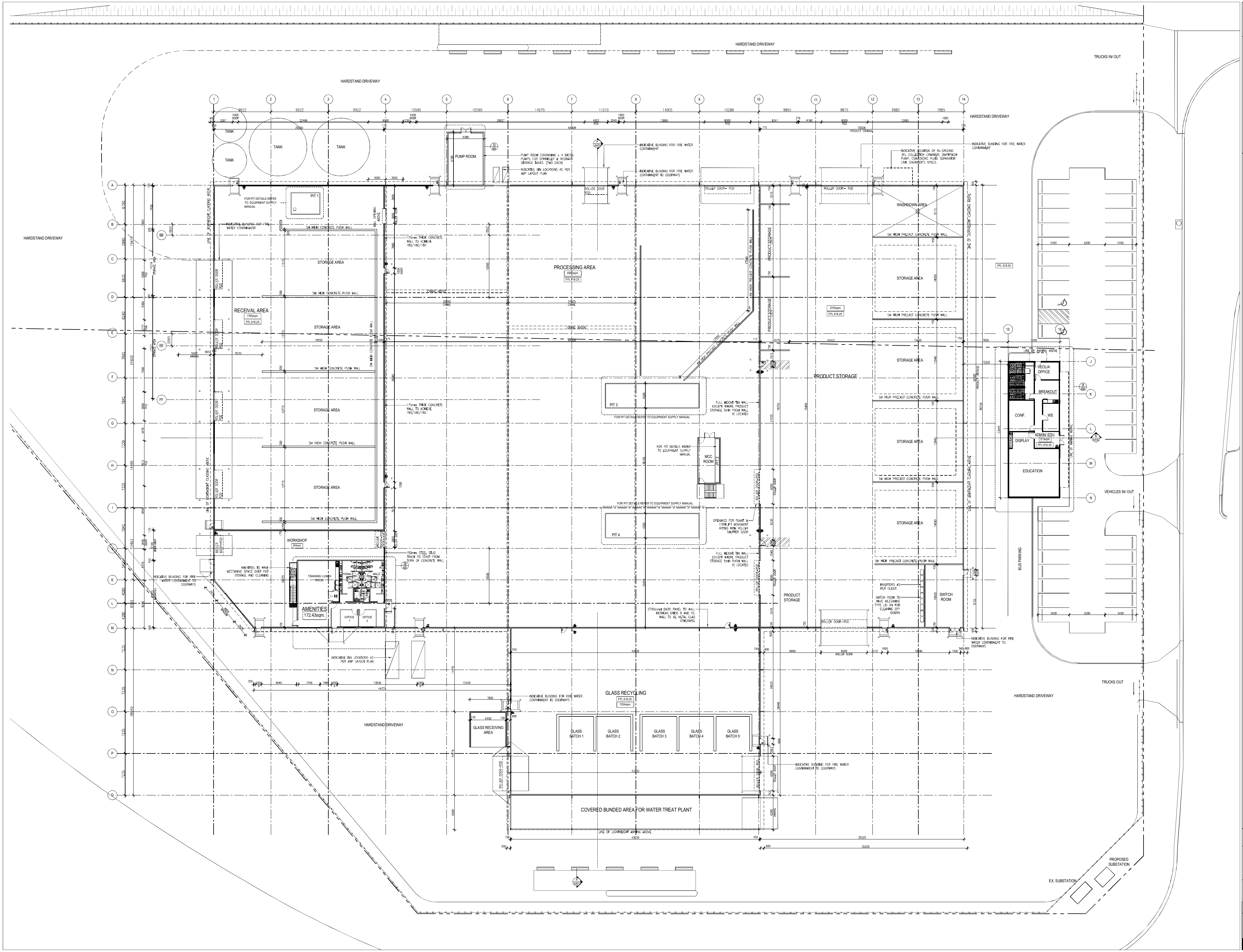
KEY

Project Site

0 60 120 180 240 m

N

MAC
Muller Acoustic Consulting



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GENERAL NOTES:

ALL WORKS ARE TO COMPLY WITH THE RELEVANT AUSTRALIAN STANDARDS & ALL RELEVANT AUTHORITY REQUIREMENTS.
ALL DIMENSIONS DEPENDENT ON EXISTING SITE CONDITIONS SHALL BE VERIFIED BY THE BUILDER ON SITE PRIOR TO THE COMMENCEMENT OF THE WORKS. DO NOT SCALE OFF DRAWING.
A REGISTERED SURVEYOR TO SET OUT STRUCTURE & CONFIRM POSITIONS OF ALL RELEVANT BUILDING ENVELOPE SETBACKS & EASEMENTS PRIOR TO THE COMMENCEMENT OF THE WORKS.
ALL TIMBER FRAMING & CONSTRUCTION MUST COMPLY WITH AS1684 'THE NATIONAL TIMBER FRAMING CODE'. PROVIDE TEMPORARY & PERMANENT BRACING TO ALL FRAMING IN ACCORDANCE WITH THE STANDARD.
ALL CONCRETE SLABS & FOOTINGS ARE SUBJECT TO A SOIL CLASSIFICATION & ARE TO COMPLY WITH ENGINEERS DRAWINGS OR AS2870 'RESIDENTIAL SLABS & FOOTINGS CODE' INCLUDING ALL RELEVANT REGION SPECIFIC SUPPLEMENTS.
ALL STORM WATER DRAINAGE & SEWERAGE TO BE CONNECTED TO EXISTING SERVICES IN ACCORDANCE WITH THE NCC & ALL LOCAL AUTHORITY REQUIREMENTS OR SELECTED RAINWATER TANK OR SEPTIC SYSTEM.
ALL LINTELS, BEAMS, & SUPPORTS TO BE SPECIFIED BY A REGISTERED ENGINEER OR RELEVANT AUSTRALIAN STANDARD.
PROVIDE TERMITE CONTROL TO SUB-FLOOR IN ACCORDANCE WITH THE NCC & ALL RELEVANT LOCAL AUTHORITY REQUIREMENTS OR PROVIDE ANT CAPPING AND TERMITE BARRIER.
THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AT ALL TIMES, & NO ELEMENT SHALL BE OVERSTRESSED, DURING & AFTER CONSTRUCTION.
ALL WET AREA FIXTURES SHALL BE TO CLIENT'S SELECTION OR INCLUSIONS LIST AND SATISFY THE APPROPRIATE WELS RATING.
ALL WINDOWS TO BE CERTIFIED TO MEET THE REQUIRED ENERGY RATING SPECIFICATION AND BE INSTALLED WITH FLASHINGS TO PREVENT WATER INGRESS.

AMENDMENTS

TENDER AMENDMENT
NOT FOR CONSTRUCTION

DRAWING
GROUND FLOOR PLAN

PROJECT	HUME MATERIALS RECOVERY FACILITY
SCALE	1:200 @ A0
PRINT DATE	19.09.2024
CLIENT	VEOLIA
BLOCK	12
SECTION	25
ADDRESS	RECYCLING ROAD
SUBURB	HUME
STATE	ACT

NORTH

PROJECT NO.	**2379**
REVISION	9
REVISION DATE	19.09.2024
DRAWN	GD/PK/ML

DWG NO **A201**

3 Noise Policy and Criteria

3.1 Noise Environment Protection Policy

The Noise Environment Protection Policy (EPP) provides guidance on meeting the legislative requirements of the *Environment Protection Act 1997* (the Act) and Environment Protection Regulation 2005 (the Regulation), as they apply to noise. The EPP is not legally binding, but provides statements of policy, guidelines and explanations of legal requirements.

The EPP has been developed in accordance with the following principals that are derived from, or consistent with, the Objects and provisions of the Act and Regulation:

- Regulatory limits on noise should reflect planning policies under the Territory Plan (promulgated under the Planning and Development act 2007);
- Acoustic environmental values secured through noise standards should project the health and wellbeing of the community and the individual;
- Regulatory controls should enable economically desirable or socially acceptable activities to take place provided that all reasonable steps consistent with the expectations of the overall community will be taken to minimise noise from such activities;
- The Noise EPP should maximum certainty for business and the community;
- The noise Regulation should not unnecessarily impact on regional (ie ACT and surrounding NSW) commerce;
- To the extent that noise generated in the ACT affects persons in NSW, the ACT should be administered so as to deliver equivalent protection to residents in both jurisdictions; and
- Regulatory intervention to control noise from an activity is only warranted where that noise is having an adverse impact on an affected person.

3.1.1 Noise Standards

The ACT has been divided into seven noise zones, which relate to land zones under the Territory Plan. The noise standards set for each noise zone have been based on planning guidelines, Australian Standards, interstate practice and noise monitoring data. The noise standards permit the highest noise levels in industrial areas and are most stringent in residential areas.

Each zone has a “day” standard and a “night” standard. The day standard applies between 7am and 10pm Monday to Saturday (8am and 10pm Sunday and public holidays). The night standard applies between 10pm and 7am Monday to Saturday (10pm and 8am Sunday and public holidays).

The Regulation recognises that occupiers of land which is at the boundary between two noise zones need to make allowances for the differing land use on the other side of the boundary. This is achieved by setting the standard at the boundary to the average, rounded up to the nearest dBA, of standards applying to the two zones. Averaging only applies to the boundary which is common to both zones.

3.2 Environment Protection Regulation 2005

The Environment Protection Regulation 2005 (the Regulation) sets the provisions on emissions to the air, noise, water, controlled waste, sampling and analysis of pollutants and other topics related to environment protection.

Schedule 2 of the Regulation provides the noise zones, noise standards and conditions for areas designated under the Territory Plan.

3.3 Project Noise Standards

GHD (2023, Ref: 12540460_REP_ACT Hume MRF-NVIA) has previously characterised the existing environment surrounding the project, including identification of the noise zones and applicable noise standards. The applicable project noise standards are summarised in **Table 1**.

Table 1 Project Noise Standards

Noise Zone	ACT Land Description	LA10(10min) Noise Standard, dB		Proposal Site Boundary
		Day	Night	
A	Land in an industrial zone	65	55	Eastern Southern Western
Proposal Site Boundary between Zone A and Zone E		58	48	Northern
E	Land (other than land in the city centre, town centres and group centres) in: - A restricted access recreation zone, - A broadacre zone	50	40	n/a

Note 1: Day - the period from 7am to 10pm Monday to Saturday or 8am to 10pm on Sundays and public holidays; Night - the period from 10pm to 7am Monday to Saturday or 10pm to 8am on Sundays and public holidays.

3.4 Noise Compliance Point

The compliance point is the point at which noise from an activity must meet the applicable ACT Noise Standard if it is not to be considered excessive or likely to cause environmental harm. Typically, the compliance point is any point as near as practicably to the boundary of the parcel of land.

Under the Regulation, where a facility cannot meet the ACT Noise Standard, an environmental authorisation of approval may specify an alternative compliance point, which effectively changes the noise levels permitted at the site boundary. In specifying an alternative compliance point, consideration should be given to factors such as typical background noise levels, the nature of the noise emissions and the potential impact on nearby receivers.

In modifying the compliance point, the following general principles are applied:

- The compliance point should make it as easy as possible to measure the noise concerned; and
- In combination with the setting of the noise level permitted, the chouse of compliance point should ensure that the overall noise authorised or approved is consistent with the provisions and Objectives of the ACT and the Noise EPP.

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4 Modelling Methodology

A computer model was developed to quantify project noise emissions to neighbouring receivers using DGMR (iNoise, Version 2024.3) noise modelling software. iNoise is an intuitive and quality assured software for industrial noise calculations in the environment. 3D noise modelling is considered industry best practice for assessing noise emissions from projects.

The model incorporated a three-dimensional digital terrain map giving all relevant topographic information used in the modelling process. Additionally, the model uses relevant noise source data, ground type, attenuation from barrier or buildings and atmospheric information to predict noise levels at the nearest potentially affected receivers. Where relevant, modifying factors in accordance with Fact Sheet C of the NPI have been applied to calculations.

The model calculation method used to predict noise levels was in accordance with ISO 9613:1 and ISO 9613:2 including corrections for meteorological conditions using CONCAWE[1]. The ISO 9613 standards are the most used noise prediction method worldwide. Many countries refer to ISO 9613 in their noise legislation. However, the ISO 9613 standard does not contain guidelines for quality assured software implementation, which leads to differences between applications in calculated results. In 2015 this changed with the release of ISO/TR 17534-3. This quality standard gives clear recommendations for interpreting the ISO 9613 method. iNoise fully supports these recommendations. The models and results for the 19 test cases are included in the software.

4.1 Assessment Scenarios

The modelling assessment was undertaken as generally consistent with the modelling method, scenarios and noise sources completed by GHD (2023), with consideration of the updated project design.

GHD noted the following key noise sources expected to occur at the project site:

- Heavy vehicle movements delivering materials to the site;
- Mobile equipment such as front-end loaders moving around site to load out materials; and
- Breakout noise from the receival and processing buildings, particularly through open doors.

[1] Report no. 4/18, "the propagation of noise from petroleum and petrochemical complexes to neighbouring communities", Prepared by C.J. Manning, M.Sc., M.I.O.A. Acoustic Technology Limited (Ref.AT 931), CONCAWE, Den Haag May 1981

A review of the updated project design identified the following key changes and/or additional noise sources:

- Receivals to occur at the western side of the project site;
- Receival of glass (day period only) will be to an external concrete bunker adjacent to the glass recycling area; and
- Water treatment area would be open.

All other sources, including heavy vehicle volumes, mobile equipment, and internal noise sources remain consistent with the previous GHD (2023) report.

4.2 Sound Power Levels

Table 2 presents the sound power level for each noise source modelled in this assessment. It is noted that sound power levels were generally consistent with the GHD (2023) report. Noise levels associated with heavy vehicles idling at receivals and weigh bridges, and glass dumping at glass receivals were measured by MAC personnel at similar facilities.

Table 2 Acoustically Significant Sources - Sound Power Levels dBA (re 10^{-12} Watts)

Source	Assumptions	Modelled Noise Level, dBA	Source[1]
External Noise Sources			
Delivery Truck Movements	Moving source – 12 heavy vehicles per hour	Lw 102 per vehicle	GHD (2023)
Delivery Trucks Idling	Point source - Truck idling at receivals and weighbridges	Lw 87 per vehicle	MAC Database
Wheeled Loader	Moving source - 2 x loaders	Lw 101 per vehicle	GHD (2023)
Glass Dump to Receivals	Point source - Dumping glass to concrete material bay. Day period only.	Lw 104[2]	MAC Database
Break-out Noise from Buildings			
Receivals Area	Deliveries to receival area. Emitting façade. Doors open 50% of time.	SPLi 85	GHD (2023)
Processing Area	Emitting façade. Doors open 20% of time.	SPLi 85	GHD (2023)
Glass Recycling	Emitting façade. Doors open 20% of time.	SPLi 85	GHD (2023)
Product Storage Area	Emitting façade. Doors open 20% of time.	SPLi 80	GHD (2023)
Water Treatment Area	Emitting façade. Open Sides.	SPLi 85	GHD (2023)

Note 1: Source of modelled noise level.

Note 2: Includes a duration adjustment assuming glass dumping for 33.3% of the time.

The single octave noise source data used in the modelling is presented in **Table 3**.

Table 3 Single Octave Equipment Sound Power Levels, dB $LA_{eq(15min)}$ (re10-12W)

Source	Source Type	Octave Band Centre Frequency, Hz								Total,
		63	125	250	500	1000	2000	4000	8000	dBA
Delivery Trucks	Lw	84	88	88	93	96	96	93	88	102
Trucks Idling	Lw	65	71	73	80	84	80	78	68	87
Wheeled Loader	Lw	83	87	91	94	97	95	90	85	101
Glass Dump	Lw	67	74	79	88	93	97	102	92	104
Receivals Area	SPLi	64	74	76	79	79	78	75	69	85
Processing Area	SPLi	57	65	72	75	75	73	69	62	80
Glass Recycling	SPLi	62	70	77	80	80	78	74	67	85
Product Storage	SPLi	62	66	70	73	76	74	69	64	80
Water Treatment	SPLi	64	67	69	77	81	81	73	64	85

4.2.1 Break-out Noise from Buildings

MAC understands that the proposed buildings would comprise steel frame with precast concrete at the lower levels and metal cladding (0.6mm) at the upper levels. The buildings would have a maximum elevation of 13.5m RL.

Large access doors would provide access for vehicles to the receivals area, processing area, glass recycling area and product storage area. This addendum to the NVIA has assumed that there would be no sound reduction through open vehicle access doors.

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5 Noise Assessment Results

5.1 Operational Noise Levels

This assessment has quantified operational noise levels from the MRF to the vertical plane of the site boundary. The results of the assessment are summarised in **Table 4**, representing the highest predicted noise level for each site boundary. Noise contour maps are provided in **Figure 3** and **Figure 4**, showing the predicted noise levels against the ACT Noise Standard at the site boundary.

Table 4 Noise Predictions – Site Boundary (Vertical Plane)

Boundary	Predicted Noise Level, dBA		ACT Noise Standard, dBA		Compliant	Dominant Source
	Day	Night	Day	Night		
Northeast	56	55	65	55	✓	Delivery Trucks
Southeast	64	57			✓ / X	Glass Receivals – Day Delivery Trucks – Night
South	63	57			✓ / X	Glass Receivals – Day Delivery Trucks – Night
Northwest	47	44			✓	Delivery Trucks

Note: Day period: 7am and 10pm Monday to Saturday (8am and 10pm Sunday and public holidays).

The results of the noise modelling assessment demonstrate that noise levels are anticipated to meet the ACT Noise Standard for the day period (7am to 10pm) of 65dBA along each of the site boundaries, with the highest noise levels, of up to 64dBA, predicted at the southeast boundary, adjacent to the glass receivals area.

During the night period (10pm to 7am), noise levels are expected to marginally exceed the ACT Noise Standard of 55dBA by up to 2dBA on the southern and southeastern boundaries, with truck movements around the site identified as the dominant noise source. It is noted that an increase in noise levels of up to 2dBA is typically considered to be barely perceptible to the average person, and therefore represents a negligible impact. A review of the noise contour map for the night period (refer to **Figure 4**) shows that the predicted extent of the 55dBA noise contour would be up to approximately 5m beyond the site boundary.

Based on aerial imagery of the project site and surrounds, it is identified that there are no immediate neighbours to the south or southeast of the site, with Mugga Lane and John Cory Road providing separation to the nearest industrial lots. Noise levels are predicted to be below the ACT Noise Standard at the boundary of the nearest adjacent receivers during the night period.

5.2 Changing Noise Compliance Point

The project site is bounded by Mugga Lane immediately to the southwest, John Cory Road immediately to the south, and Recycling Road immediately to the east. The nearest receivers are the Mugga Lane Solar Park to the southwest, the Mugga Lane Resource Management Centre to the northwest, ACT Skip Hire to the northeast and Soft Landing Mattress Recycling to the southeast. The nearest residential receivers are located within New South Wales (NSW), approximately 1.25km to the southeast, separated from the project site by the Monaro Highway and the Hume Industrial Estate.

Based on the predicted noise levels and the nature of the locality, changing the compliance point is considered to be an appropriate strategy to achieve compliance with the Noise Standard for the following reasons:

- A 2dBA increase in noise levels is generally imperceptible or barely perceptible to the average person and represents a negligible impact;
- The affected area over which the night period noise contour extends is generally described as a road easement, with noise levels predicted to achieve the ACT Noise Standard at the road shoulder/carriageway and any adjacent premises;
- The road easement is not a noise sensitive receiver, and will not be developed to allow noise sensitive receivers;
- The nearest lot boundaries to the project site for developed or developable land are approximately 35m to the south east (vacant industrial lot) and approximately 80m to the south (Mugga Lane Solar Park), both of which are adjacent to Mugga Lane and the Monaro Highway; and
- The nearest adjacent premises are not considered to be sensitive to noise, particularly during the night period when the facilities generally do not operate.

With consideration of the above listed points, regarding the predicted noise levels, the nature of the locality, and the sensitivity of nearby premises, it is proposed that an alternative compliance point for the night period is set back at any point along the closest adjacent industrial lot to the southeast, approximately 35m from the project boundary.

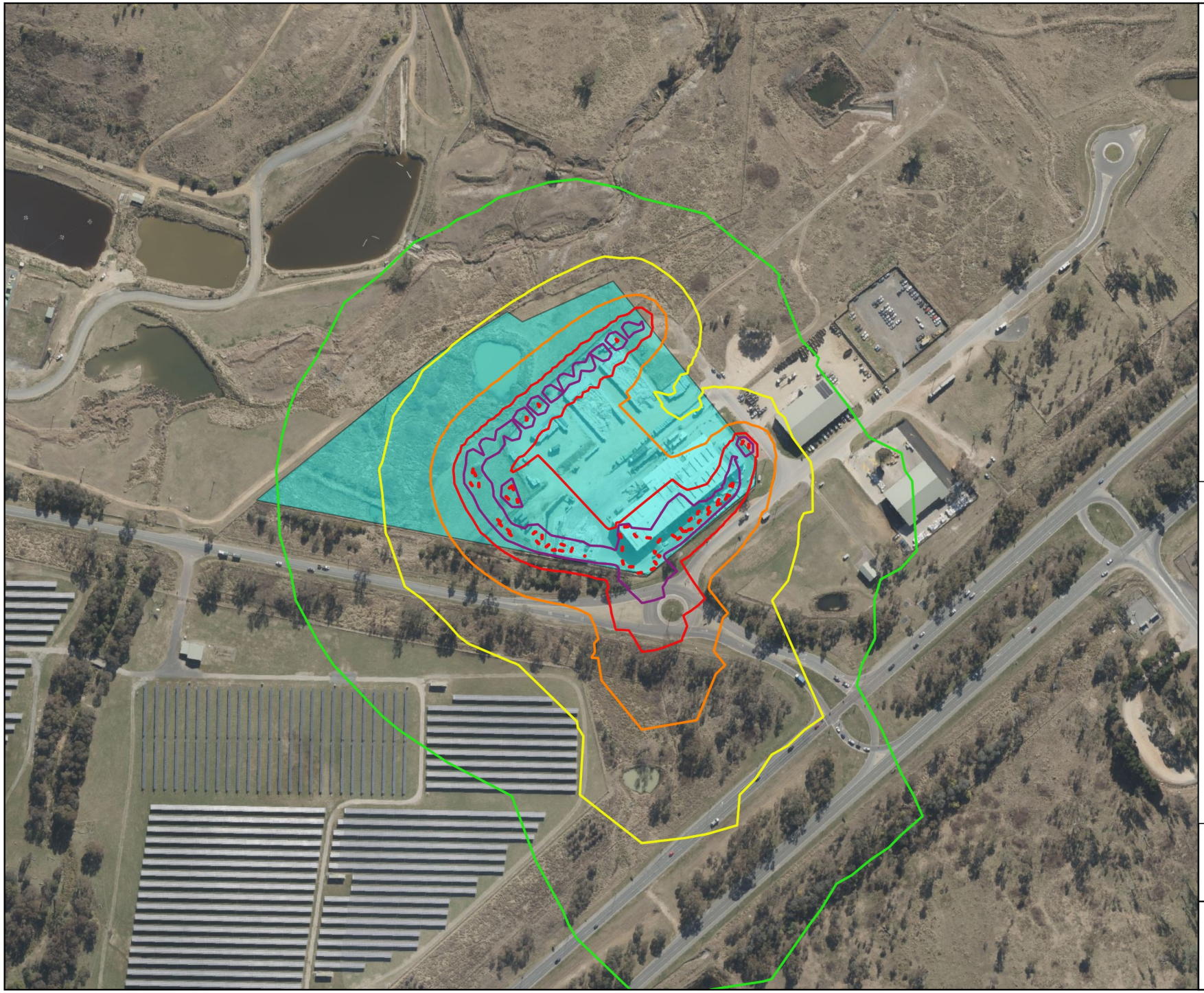

FIGURE 3

Operational Noise Contours

MAC252343-01

Hume MRF

KEY

Project Site

Noise Contours

40dBA

45dBA

50dBA

55dBA

60dBA

65dBA (Noise EPP Criteria)

0 40 80 120 160 m

N

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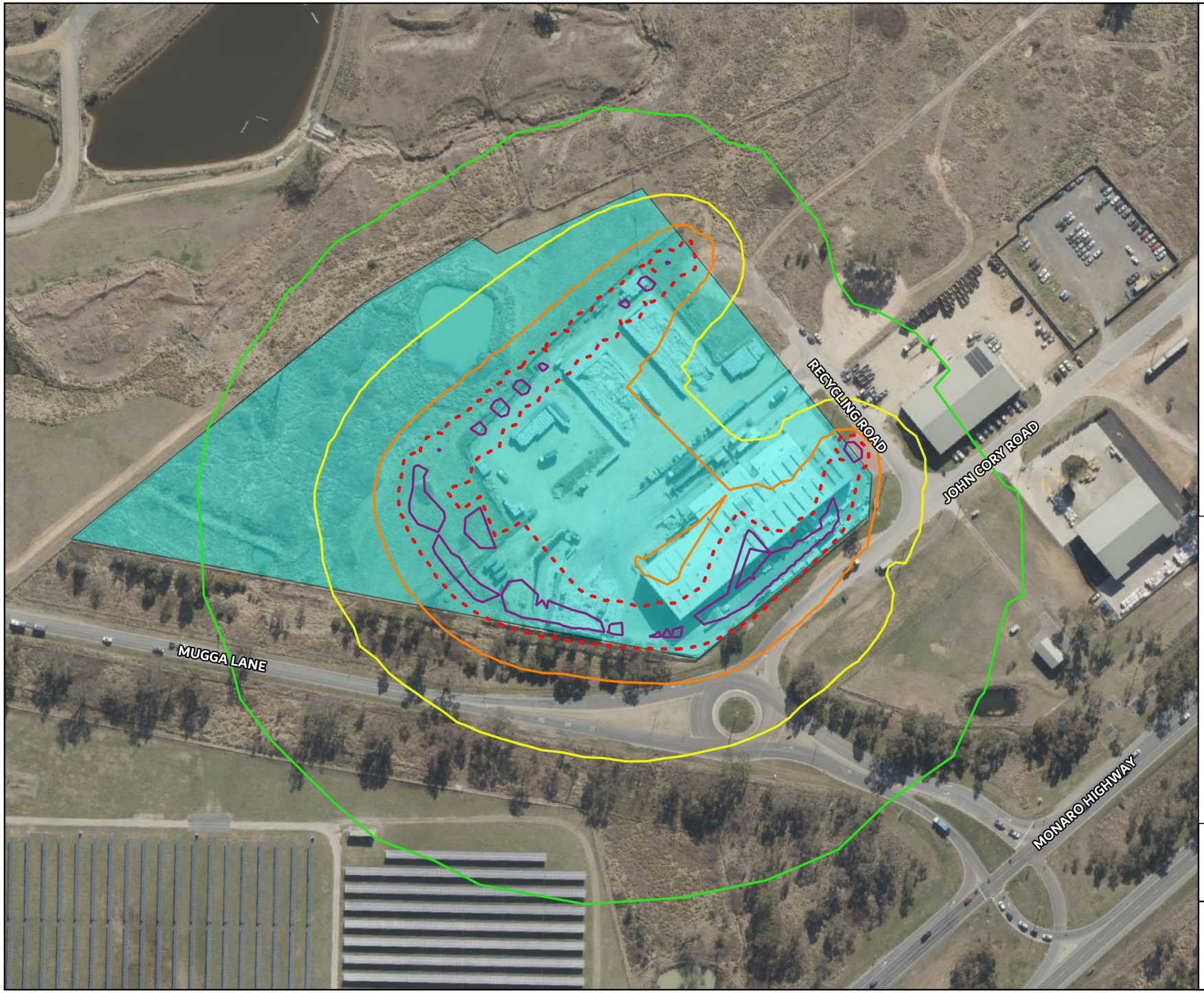

FIGURE 4

Operational Noise Contours

Night Period

MAC252343-01

Hume MRF

KEY

Project Site

Noise Contours

40dBA

45dBA

50dBA

55dBA (Noise EPP Criteria)

60dBA

0 25 50 75 100 m

N

MAC
Muller Acoustic Consulting

6 Discussion and Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed an addendum to the Noise and Vibration Impact Assessment (NVIA), prepared by GHD Pty Ltd (GHD. 2023, Ref: 12540460_REP_ACT Hume MRF-NVIA), for the Materials Recovery Facility (MRF) at Block 12, Section 25, Recycling Road, Hume, ACT.

This assessment has quantified potential operational noise and vibration impacts associated with the proposed changes to the MRF, including the layout and orientation of the facility.

The results of the assessment demonstrate that noise emissions from the operation are predicted to satisfy the ACT Noise Standard at all boundaries of the proposal site, during the day period.

During the night period, operational noise levels are anticipated to exceed the ACT Noise Standard by up to 2dBA at the southern and southeastern boundaries due to trucks travelling around the site. It is noted that the nearest adjacent land uses to the south and southeast of the project site are the road easements of Mugga Lane and John Cory Road, with no sensitive receiver located immediately adjacent to the project site. Furthermore, it is considered that a difference in noise levels of 2dBA is barely perceptible and represents a negligible impact to sensitive receivers. Notwithstanding, it is recommended that an alternative compliance point is established at any point along the closest adjacent industrial lot to the southeast, approximately 35m from the project boundary.

Accordingly, the Addendum Noise Impact Assessment supports the Environmental Impact Statement for the project with the change of compliance point as outlined in this report.

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Appendix A – Glossary of Terms

A number of technical terms have been used in this report and are explained in **Table A1**.

Table A1 Glossary of Acoustical Terms

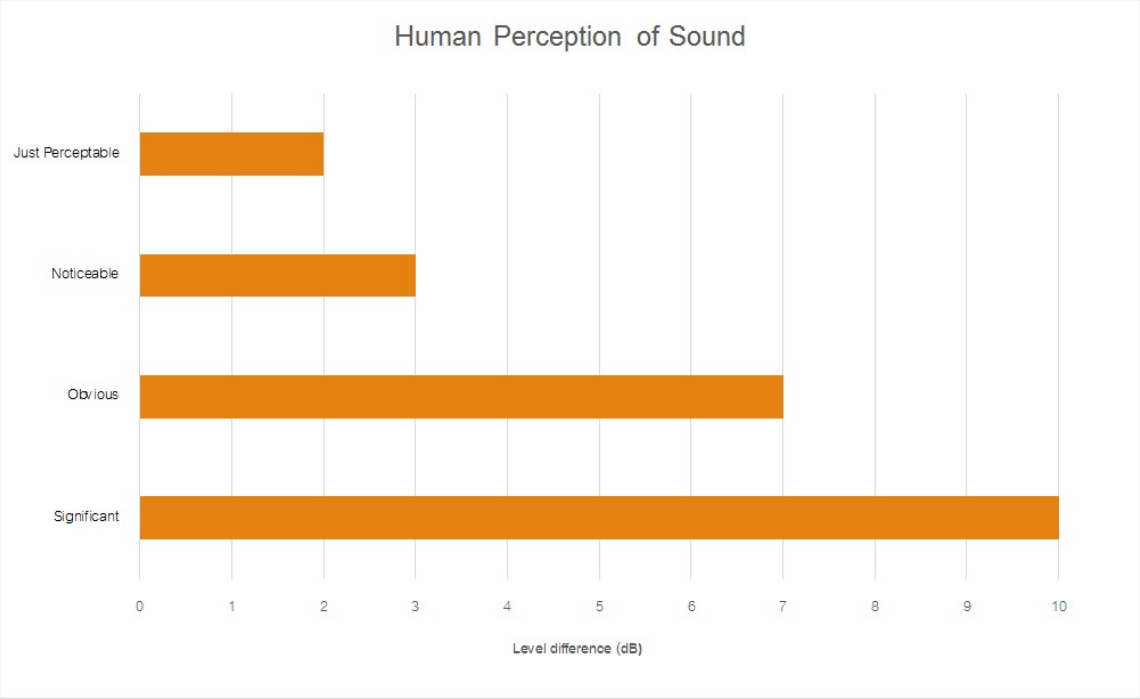
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L90 statistical noise levels.
Ambient Noise	The total noise associated with a given environment. Typically, a composite of sounds from all sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to sound.
Background Noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is usually represented by the LA90 descriptor
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Z-weighted or decibels Linear (unweighted).
Extraneous Noise	Sound resulting from activities that are not typical of the area.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A sound level which is exceeded 10% of the time.
LA90	Commonly referred to as the background noise, this is the level exceeded 90% of the time.
LAeq	Represents the average noise energy or equivalent sound pressure level over a given period.
LAmax	The maximum sound pressure level received at the microphone during a measuring interval.
Masking	The phenomenon of one sound interfering with the perception of another sound. For example, the interference of traffic noise with use of a public telephone on a busy street.
RBL	The Rating Background Level (RBL) as defined in the NPI, is an overall single figure representing the background level for each assessment period over the whole monitoring period. The RBL, as defined is the median of ABL values over the whole monitoring period.
Sound power level (Lw or SWL)	This is a measure of the total power radiated by a source in the form of sound and is given by 10.log10 (W/Wo). Where W is the sound power in watts to the reference level of 10^{-12} watts.
Sound pressure level (Lp or SPL)	the level of sound pressure; as measured at a distance by a standard sound level meter. This differs from Lw in that it is the sound level at a receiver position as opposed to the sound 'intensity' of the source.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA

Source	Typical Sound Pressure Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



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Hume Materials Recovery Facility

Noise and vibration impact assessment

Transport Canberra and City Services

20 April 2023

→ **The Power of Commitment**

Project name		Materials Recovery Facility Hume ACT PMCA					
Document title		Hume Materials Recovery Facility | Noise and vibration impact assessment					
Project number		12540460					
File name		12540460_REP_ACT Hume MRF - NVIA.docx					
Status Code	**Revision**	**Author**	**Reviewer**		**Approved for issue**		
			Name	**Signature**	**Name**	**Signature**	**Date**
S4	0	C Doyle	M Velasco	*on file*	A Montgomery	Record on file	15/08/23

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Executive Summary

The Australian Capital Territory (ACT) Government is seeking approval to replace and upgrade the existing Material Recovery Facility (MRF) on Block 12, Section 25 Hume, ACT (the proposal site). The existing MRF building was extensively damaged as a result of fire on 26 December 2022 and the proposed replacement facility would be designed to process up to 115,000 tonnes per annum of mixed recyclables.

This Noise and Vibration impact assessment is being prepared as an input into the EIS being prepared by GHD Pty Ltd (GHD) on behalf of ACT NoWaste to prepare a report in accordance with the "*Guidelines for the preparation of Noise Management Plans for development applications Environment Protection Authority, March 2021*".

Construction activities would be within the hours prescribed in the *Noise Environment Protection Policy* (Environment Protection Authority, 2010) where exceedances of the ACT Noise Standard are allowed given the proposal site is located within an industrial zone and construction activities are within the standard hours for construction.

No human comfort or cosmetic vibration impacts are anticipated during the construction or operational phases of the proposal.

Noise modelling of the concept design of the MRF was undertaken and noise levels were predicted to the boundary of the proposal site and assessed against the ACT Noise Standard. The results of the operational noise modelling indicate general compliance with the ACT Noise Standard can be achieved during the day period at all boundaries of the proposal site, however mitigation measures would be required to achieve compliance during the night period.

An indicative noise mitigation strategy has been developed considering reasonable and feasible mitigation and management measures with the aim of achieving the ACT Noise Standard. Assuming these mitigation measures are implemented, residual noise levels would are predicted to be compliant at all boundaries of the proposal site, except along the south-eastern and eastern boundaries where the overall noise level would be dominated by the movement of delivery trucks in and out of the proposal site. Given the existing operations at the proposal site include delivery of waste extending into the early morning and the night period (4:00 am to 7:00 am) and the adjacent proposal sites are considered non-sensitive, the residual noise levels at these boundaries can be considered acceptable.

Proposal-specific mitigation measures have been recommended in Section 6 and include limiting the construction hours and the preparation of an operational noise management plan (ONMP) during the detailed design phase of the proposal to consider reasonable and feasible mitigation measures to be included in the design and for inclusion in the management plan of the facility.

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Figure index

Abbreviations and Meanings

Abbreviations	Meaning
A weighting	The human ear responds more to frequencies between 500 Hz and 8 kHz and is less sensitive to very low-pitch or high-pitch noises. The frequency weightings used in sound level measurements are often related to the response of the human ear to ensure that the meter better responds to what you actually hear.
ACT	Australian Capital Territory
ACT EPR	The ACT Environment Protection Regulation is the regulatory document made under the Environmental Protection Act (ACT, 1997)
Compliance point	The process of checking that source noise levels meet with the noise limits in a statutory context. This is considered to be the boundary of the proposal proposal site.
dB	Decibel is the unit used for expressing the sound pressure level (SPL) or power level (SWL) in acoustics.
dBA	Frequency weighting filter used to measure 'A-weighted' sound pressure levels, which conforms approximately to the human ear response, as our hearing is less sensitive at very low and very high frequencies.
dBA	dBA represents the logarithmic A-weighted decibel scale which is used to measure the ratio of the sound pressure level against the relative pressure
EA	Environmental Authority
EIS	Environmental Impact Statement
EPA	The Environment Protection Act (ACT, 1997) is the regulatory framework to help reduce and eliminate the discharge of pollutants into the air, land and water.
EPR	Environmental Protection Regulation 2005
EPSDD	Environment, Planning and Sustainable Development Directorate
FOGO	Food Organics and Garden Organics is a kerbside collection service which collects food waste and processes it into compost and other products
GHD	GHD Pty Ltd
Hertz	The measure of frequency of sound wave oscillations per second. 1 oscillation per second equals 1 hertz.
L_{A10}	The A-weighted sound pressure level that is exceeded for 10% of the measurement period.
$L_{A10(period)}$	The sound pressure level that is exceeded for 10% of the measurement period.
L_{Aeq}	Equivalent sound pressure level. The steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring.
L_w	Sound power level
Mitigation	Reduction in severity.
MRF	Materials Recovery Facility
NMP	Noise Management Plan
Noise EPP	The Noise Environmental Protection Policy is a document designed to help people understand the noise component of the Environment Protection Act (ACT, 1997)
NSW	New South Wales
NVIA	Noise and Vibration Impact Assessment
Octave-band	A division of the frequency range into bands, the upper frequency limit.
ONMP	Operational noise management plan

Abbreviations	Meaning
R_W	Weighted sound reduction index. A single number descriptor facilitating comparison of the performance of different partitions, derived from a curve fitting technique to measured data of calculated 1/3 octave band centre frequency transmission loss (TL) data for the partition between 100 Hz and 3150 Hz. The higher the number the better the insulation performance.
Sound Power Level, L_W	The sound power level of a noise source is the inherent noise of the device. Therefore, sound power level does not vary with distance from the noise source or with a different acoustic environment.
Sound Pressure Level (SPL or L_p)	The level of sound measured on a sound level meter and expressed in decibels (dB). Where LP = 10 log10 (Pa/Po)2 dB (or 20 log10 (Pa/ Po) dB) where Pa is the rms sound pressure in Pascal and Po is a reference sound pressure conventionally chosen is 20 µPa (20 x 10-6 Pa) for airborne sound. SPL varies with distance from a noise source.
SPL_i	The internal average reverberant sound pressure level in a building
Study area	Land in the vicinity of, and including, the proposal proposal site. The 'study area' is the wider area surrounding the proposal proposal site.
tpa	
WFL	Waste Facility Licence

1. Introduction

1.1 Proposal background

The ACT Government is proposing to replace and upgrade the existing Material Recovery Facility (MRF) on Block 12, Section 25 Hume, ACT (the proposal site). The proposal site is located to the north of the Monaro Highway in an industrial and rural area located approximately 12.5 km south of Canberra City (refer to Figure 1.1). The existing MRF was extensively damaged due to fire on 26 December 2022 and the facility is non-operational. The main shed remains standing and is currently being used as a waste transfer station to accept recyclables, sort and store materials before being shipped to other processing facilities.

The proposal would replace the existing MRF and provide technological improvements to facilitate greater resource recovery by both increasing the quality of recycled materials and by reducing the amount of nonrecyclable residual waste generated that is currently sent to landfill. The new Hume MRF would be one of the first advanced facilities in Australia to enable separation mixed plastics. Upgraded technology would also improve the quality and therefore marketability of paper and mixed cardboard, mixed plastics and glass that would be received from the ACT and five regional NSW councils.

The proposal would be designed to process up to 115,000 tonnes per year of mixed recyclables. The proposed capacity would provide for population growth and changing consumer behaviours which are expected to contribute to increases in recoverable materials over time.

Key features of the proposal include:

– Replacement of the existing MRF.
– Additional warehouse style facilities.
– Civil works and piling to support the dynamic loads imposed by rotating and high frequency vibrating equipment.
– Expansion of hardstand space towards the west of the proposal site.
– A trade waste system to capture contaminated stormwater runoff.

Once operating at full capacity, the proposal also seeks to increase operating hours to a two-shift 6 day-week basis, with each shift being of nominal 8 hours duration, with maintenance activities carried out between shifts or on weekends. Staffing levels are expected to increase from approximately 60 staff members to a maximum of 100 staff in total.

The current operations of the proposal site are managed under the Environmental Authorisation (EA) 1218 issued under the *Environment Protection Act 1998* (Block 6, Section 25) and the Waste Facility Licence (WFL) No. L0002 issued under the Waste Management and Resource Recovery Act 2016 (Block 6, Section 25 and part of Block 10, Section 25). It should be noted that neither EA 1218 and WFL L0002 contain numerical noise limits for the control of environmental noise emission.

1.1.1 Approval and assessment requirements

This report has been prepared by GHD Pty Ltd (GHD) as part of the environmental impact assessment (EIS) for the proposal. The EIS supports the application for approval of the proposal and to address the requirements provided by the ACT Department of Environment, Planning and Sustainable Development Directorate dated 21 July 2022.

The proposal is subject to approval by the planning and land authority within the Environment, Planning and Sustainability Development Directorate.

1.2 Purpose of this report

An EIS has been prepared by GHD on behalf of ACT NOWaste to assess environmental (including noise and vibration) and social impacts associated with the proposal and address matters specified within the Environment, Planning and Sustainable Development Directorate (EPSDD) scoping document requirements. The noise and vibration requirements are reproduced below (reference 8.2.11)

> *"Provide a noise and vibration impact assessment regarding the operation of the facility prepared in accordance with the "Guidelines for the preparation of Noise Management Plans for development applications Environment Protection Authority, March 2021"*

It is noted that a more recent guideline has been released in February 2023. The Guideline states that the EPA may require a Noise Management Plan (NMP) where the noise generated by a proposal may exceed the noise standards set in the Environment Protection Regulation 2005 at the boundary of the lease. This primary purpose of this report is to provide an assessment of operational noise based on the concept design for the proposed MRF to demonstrate compliance with the applicable noise standards (Section 5 and Section 6). The potential for construction noise impacts are also qualitatively assessed in Section 4.1.

1.3 Scope of works

This report assesses the potential for noise and vibration impacts on the sensitive receivers surrounding the proposal site during the operation of the MRF and includes mitigation and management measures to reduce impacts, where required. No vibration intensive activities or equipment is proposed during operation and as such, no vibration impacts are anticipated. In view of this, no further assessment of potential vibration impacts is deemed necessary.

The scope of work of this NVIA can be summarised as:

- Identification of the noise sources associated with the operation and construction of the proposal, the noise zones applicable at the boundary of the proposal site and the location of the nearest sensitive receivers to the proposal site.
- Establishment of relevant noise criteria at the boundary of the proposal site based on the requirements of the Environmental Protection Regulation 2005 and the Noise Environment Protection Policy.
- The development of a 3D noise model of the study area the MRF using CadnaA software. Source noise levels of plant and equipment have been estimated based on noise measurements of similar equipment.
- The assessment of operational noise from the proposal with reference to the ACT's *Environmental Protection Regulation* (EPR) 2005 and the *Noise Environmental Protection Policy* (Noise EPP) 2010.

Where required, mitigation and management recommendations have been provided to minimise potential noise impacts as a result of the operation of the facility.

1.4 Limitations

This report: has been prepared by GHD for Transport Canberra and City Services and may only be used and relied on by Transport Canberra and City Services for the purpose agreed between GHD and Transport Canberra and City Services as set out in Section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Transport Canberra and City Services arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

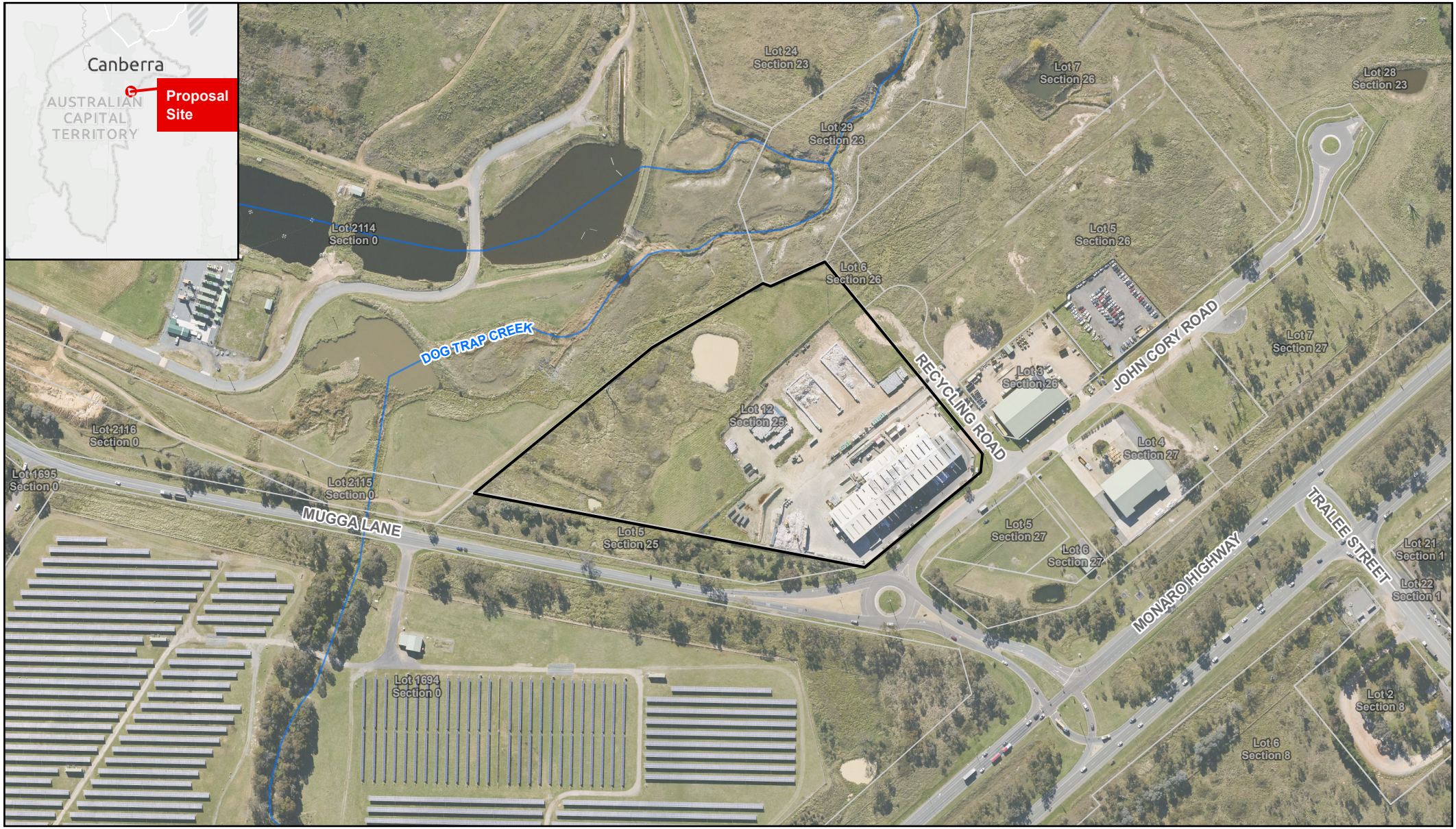
The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer Section(s) 1.5 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

1.5 Assumptions

This assessment report relies on the following key assumptions:

– Operational noise modelling has been conducted based on the noise source assumptions detailed in Section 5.1 and Section 5.2 of this report.
– Operational noise levels are to be predicted and assessed to the vertical plane of the proposal site boundary. The proposal site boundary has been defined as Block 12, Section 25 Hume, Recycling Road (see Figure 1.1).



Legend

- Proposal site
- Cadastre
- Watercourses

Paper Size ISO A4

0 25 50

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

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Transport Canberra and City Services
Hume Materials Recovery Facility
Noise and Vibration Impact Assessment

Project No. **12540460**
Revision No. **0**
Date **16/08/2023**

Proposal location

FIGURE 1.1

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Print date: 16 Aug 2023 - 11:36

2. Proposal description

2.1 Proposal overview

The proposal would be located on Block 12, Section 25 Hume, Recycling Road (see Figure 1.1).

The proposal involves the construction and operation of a new MRF with capacity to receive and process up to 115,000 tpa of comingled recycling and additional technologies for glass and plastics processing.

Glass separated in the processing building would undergo further processing at the proposal site via washing, crushing and screening to produce clean, dry, graded aggregate suitable for beneficial uses.

Separated plastic materials would be sorted by polymer type and washed, chipped/flaked and possibly pelletised, subject to detailed design.

The proposal would involve the following key features, subject to detailed design:

- Receival hall.
- Processing hall.
- Bale storage area (with compliant fire walls).
- Glass washing station.
- Plastic processing area.
- Water treatment area.
- Stormwater capture and processing.
- Ancillary supporting infrastructure including:
    - Administration building.
    - Machinery shed/workshop.
    - Weighbridges.
    - Access roads.
    - Hardstand parking.
    - Fire and water storage tanks.

2.2 Construction noise activities

Subject to final vendor tender submission, construction activities are expected to include:

- Demolition of existing MRF building
- Proposal site preparation and establishment of temporary ancillary construction infrastructure including;
    - proposal site offices and amenities
    - fencing
    - a temporary main switchboard and electrical riser to provide power during construction
- Bulk earthworks for proposal site levelling
- Detailed excavation for lift and stair raft pads
- Pouring concrete foundation slab, footings, hardstand and suspended slabs for the main buildings
- Construction of pavement areas for car park, hardstand and access roads
- Construction of weighbridges and weighbridge office
- Installation of steel truss frameworks for structures
- Erection of pre-cast concrete panels for external and internal partition walls and metal roof for proposal site buildings
- Installation of processing equipment

– Installation of firewater tanks
– Installation of fencing and signage
– Commissioning

Construction is expected to take place in 2024 and take up to 18 months.

2.2.1 Construction hours

Construction working hours would be undertaken during the periods specified in the *Environment Protection Regulation 2005* and abide by noise zones outlined in the *Territory Plan 2008*. This may include hours up to:

– 7 am to 6 pm Monday to Friday,
– 8 am to 6 pm Saturdays,
– 8 am to 6 pm on Sundays or Public Holidays.

2.2.2 Plant and equipment

Typical plant and equipment required for construction of the proposal is expected to include:

– 5 tonne excavator
– 20 tonne excavator
– Dozers
– Trucks
– Compaction equipment
– Graders
– Asphalt mixers
– Paver machine
– Bobcats
– Mobile concrete pump
– Concrete vibrators
– Concrete saw
– Welders
– Boom lifts
– Mobile crane
– Elevated working platform
– Mini loader
– Forklifts

2.3 Vibration generating activities

Vibration impacts (human comfort or cosmetic damage to buildings) are generally limited to an area of 100 metres. No sensitive receivers have been identified within 100 metres of the proposal site boundary and the nearest building is an industrial building located 25 metres east of the proposal site. At this distance, no cosmetic damage vibration impacts are anticipated and has not been considered further in this assessment.

2.4 Operational noise activities

2.4.1 Deliveries

Delivery hours

Subject to detailed design, it is expected that the facility would receive deliveries of recyclable materials from municipal kerbside collections Monday to Friday (during the day) and some loads of commercial recyclables and CDS materials on weekdays and Saturdays.

Vehicle movements

Scaled up to the year 20 design processing capacity of 115,000 tpa, and including operations from the proposed FOGO facility, truck movements would increase proportionately to around 665 inbound and 665 outbound movements per week, of which approximately 45 inbound and 45 outbound would be B-doubles or other large articulated vehicle configurations (e.g. truck and dog or walking floors).

Heavy vehicle traffic is expected to flow in an anticlockwise direction, Vehicles delivering recyclable materials would enter the proposal site via Gate 1 and weigh-in on the inbound weighbridge before travelling to and

manoeuvring on the hardstand apron area in front of the multiple entry doors of the Comingle Receival Area of the MRF. Vehicles would then reverse into a receival compartment within the building, deposit their load and then exit the building. These vehicles would then loop around the facility in an anticlockwise direction to weigh-out on the weighbridge, before exiting through gate 2. Light vehicles would park in the marked bays adjacent to the office, entering and exiting through gate 1.

2.4.2 General operations

Operational hours

Staffing would generally be on a single shift operating basis in initial years of operation, with maintenance activities carried out after production during the day and on weekends. On commencement of operations, it is expected to remain consistent with existing MRF operations. As recyclable material volumes increase, it is envisaged that operating hours would be progressively and incrementally increased. At full design capacity, it is envisaged that the facility would operate on a two-shift 6-day week basis, with each shift being of nominally 8-hours duration, with maintenance activities carried out between shifts and/or on weekends.

Processing – primary sorting and baling

The receival area would be separated into compartments, each no greater than 1,000 m^2 and separated by a masonry wall. Processing would involve progressive separation and singulation of 2-dimensional and 3-dimensional items via pre-sorting, using a combination of manual, mechanical and optical sorting and screening processes, as well as magnetic and eddy current separation equipment, and various quality control and inspection processes. Commodities that would be exported from the facility for further processing off-proposal site would be baled for storage and transport efficiency and temporarily stored in a dedicated baled product storage area outside and adjacent to the processing building.

Baled product storage

Subject to detailed design, baled products would be stacked by forklift in compartments separated by a masonry wall. The bale storage area would be separated from the processing building by a fire-rated wall, unless otherwise designed to comply with the requirements of the AFAC guideline.

The hardstand areas around the MRF would be kept clear for heavy vehicle and maintenance access. These areas would also serve as open-area stockpiling capacity for emergency/contingency storage of baled products in the event of disruptions to scheduled removal of baled products.

Baled product load-out

Baled product (paper, cardboard, some plastics, steel cans, aluminium cans, selected CDS items) stacked in the bale storage area would be loaded via forklift onto articulated curtain-sided vehicles, including B-doubles, for transport to end markets and/or downstream processing facilities.

Value-added processing of plastics and glass

Glass separated in the processing building would undergo further processing at the proposal site via washing, crushing and screening to produce clean, dry, graded aggregate suitable for beneficial uses.

Separated plastic materials would be sorted by polymer type and washed, chipped/flaked and possibly pelletised, depending on final design.

Subject to detailed design, the glass processing building would be located adjacent to the bale storage area, separated by a truck access corridor. As this facility would incorporate a wet circuit for glass washing to remove residual sugars and labels, and there is also a wet circuit proposed for the plastics upgrading facility, it is expected that the plastics processing facility would be located immediately adjacent to the glass processing building.

Cleaned and graded products from both facilities would be temporarily stored in bulk bags, bunkers or silos and either loaded out via forklift or wheel loader, or conveyed directly into bulk transfer vehicles for transport to customers as and when such movements are scheduled.

An on-site water treatment facility would clean water for reuse in the washing circuits of the plastic and glass processing plants, and excess effluent would be disposed to sewer.

An amenities facility and light vehicle parking would be provided adjacent to the glass and plastic processing buildings.

3. Existing environment

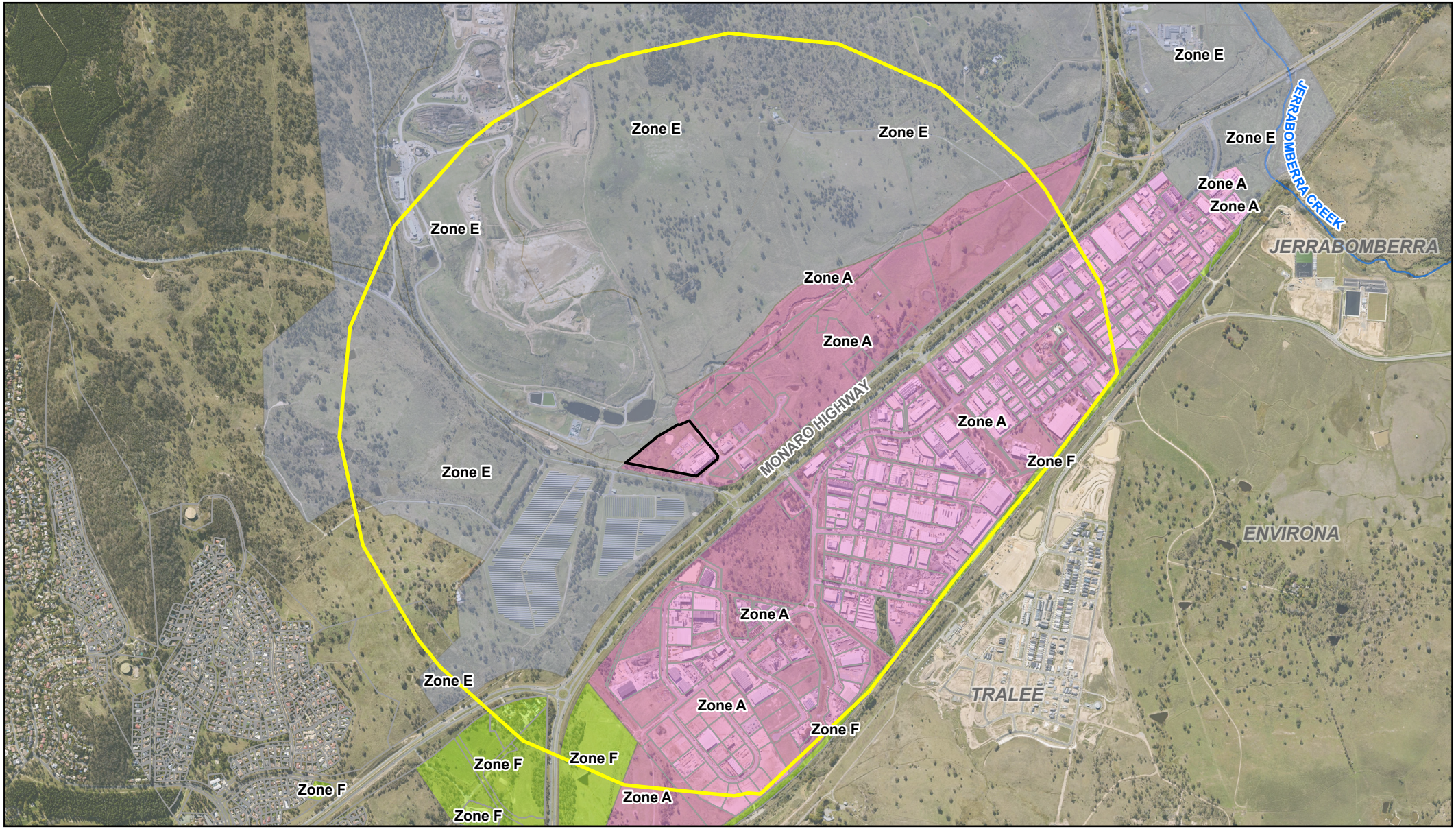
The study area has been selected to be 1.5 kilometres from the proposal boundary as no operational noise impacts are anticipated beyond this distance. Potential noise impacts are assessed based on noise zones defined in the ACT EPR. The noise zones are based on land uses outlined in the ACT Territory Plan.

The noise zones that have been identified within the study area, shown in Figure 3.1 and provided in the EPR are outlined below in Table 3.1. Sensitive receivers that have been identified within each noise zone are presented in Table 3.1. The nearest noise sensitive receivers are located 1.2 km to the south in NSW, 1.2 km to the north-east.

All adjacent lands to the proposal site are designated Zone A, except for the northern boundary which is designated Zone E.

Table 3.1 Noise zone descriptions

Noise zone	ACT land description	Sensitive receivers
A	Land in an industrial zone	– A FOGO facility directly to the north east of the proposal site. – A soft-landing mattress recycling facility directly to the south of the proposal site. – Other commercial and industrial buildings between Monaro Highway and the NSW border.
E	– Land (other than land in the city centre, town centres and group centres) in a restricted access recreation zone – a broadacre zone	– Mugga Lane Solar Park to the west of the proposal site. – Mugga Lane Resource Management Centre to the north of the proposal site. – Wanniassa Hill Special Purpose Reserve to the west of the proposal site. – Two residential rural receivers north-east of the proposal site. – The proposed Southern Memorial Park west of the proposal site.
F	Land (other than land in the city centre, town centres and group centres) in – a commercial CZ5 zone – a TSZ2 services zone – a community facility zone – a leisure and accommodation zone.	– Rose Cottage to the south-west of the proposal site. – Other open areas as shown in Figure 3.1
G	All other land, other than land in the Central National Area (Fairbairn)	– No residential dwellings or other sensitive receivers have been identified within Zone G in the study area.



Legend

- Study area
- Proposal site
- Cadastre
- Watercourses

Noise zone

- Zone A
- Zone E
- Zone F

Paper Size ISO A4

0 250 500

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Noise and Vibration Impact Assessment

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Date **16/08/2023**

Noise zone map

FIGURE 3.1

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Print date: 16 Aug 2023 - 11:37

4. Environmental Protection Regulation

4.1 Construction noise

The *Noise Environment Protection Policy* (Environment Protection Authority, 2010) is a policy designed to help people understand the ACT's EPR, which is made under the EPA. Section 9.4 of the Noise EPP states:

9.4 Building work

> *Some noise during building work is inevitable. Measures can be taken to reduce the noise and these are described in* Australian Standard AS 2436: Guide to Noise Control on Construction Maintenance and Demolition Sites*. Subject to time restrictions outlined below, noise from building work is permitted to exceed the noise standard provided the work is carried out in accordance with AS 2436.*

9.4.1 Building work requiring building approval

> *For building work which requires building approval under the Building Act 2004, division 3.3, the time restrictions which apply depend upon the length and duration of the work.*
>
> – *In industrial areas, city centre and town centres, noise from building work can only exceed the noise standard between 6am and 8pm.*
> – *In other areas:*
> - *Noise from work which takes less than two weeks to finish can exceed the noise standard between 7am and 8pm Monday to Saturday and 8am and 8pm on Sunday and public holidays.*
> - *Noise from work which takes longer than two weeks to finish can only exceed the noise standard between 7am and 6pm Monday to Saturday, excluding public holidays.*

The proposal site is in located in an industrial zone and the construction hours would be limited to:

– 7 am to 6 pm Monday to Friday,
– 8 am to 6 pm Saturdays,
– 8 am to 6 pm on Sundays or Public Holidays.

Given this, exceedances of the noise standard are permitted, and no further assessment of construction noise is required.

4.2 Operational noise

Noise standards under the EPA and the EPR have been set to protect the acoustic environmental of the surrounding area, appropriate for the range of land zones designated under the Territory Plan. Operational noise associated with the facility is assessed towards the EPR, with reference to the Noise EPP. The EPR sets the noise standards which provide the maximum noise limit which may be emitted by an activity as measured at the compliance point.

4.2.1 Compliance point

As a general rule, the compliance point is any point as near as practicable to the boundary of the parcel of land. In a case where compliance to the noise standard is considered excessive, an environmental authorisation or approval may specify an alternative compliance point, and in effect, change the noise level permitted. When such a compliance point is specified, it is done by applying the following principles:

– The compliance point should make it easy as possible to measure the sound concerned.
– In combination with the setting of the noise level permitted, the choice of compliance point should ensure that the overall noise authorised or approved is consistent with the provisions and Objects of the Act (Being the Objectives of the EPA) and the Noise EPP.

4.2.2 Noise zones

The ACT has been divided into seven noise zones which relate to land zones under the Territory Plan. The noise standards permit the highest noise levels in industrial areas and are most stringent in residential areas.

Each zone has a “day” standard and a “night” standard. The day standard applies between 7 am and 10 pm Monday to Saturday (8 am and 10 pm Sunday and public holidays). The night standard applies between 10 pm and 7 am Monday to Saturday (10 pm and 8 am Sunday and public holidays).

The EPR also recognises that occupiers of land which is at the boundary between two noise zones need to make allowances for the differing land use on the other side of the boundary. This is achieved by setting the standard at the boundary to the average of standards applying to the two zones at the time the noise was emitted (rounded to the nearest decibel). The proposal site is located on Hume: Block 6, Section 25 and Block 10, Section 25. All adjacent land to this proposal site are designated Zone A, except for the north western boundary which is designated Zone E.

The ACT noise standards have been applied to the proposal as presented in Table 4.1. Operational noise levels are to be predicted and assessed to the vertical plane of the proposal site boundary.

Table 4.1 ACT noise standards

Noise zone	ACT land description	$L_{10(10minutes)}$ Noise standard, dB(A)		Proposal site boundary
		Day	Night	
A	**Land in an industrial zone**	**65**	**55**	**East** **South** **West**
Proposal site boundary between Noise Zone A and Zone E		**58**	**48**	**North**
E	*Land (other than land in the city centre, town centres and group centres) in* *– a restricted access recreation zone,* *– a broadacre zone.*	*50*	*40*	-

It is recognised that certain activities have the potential to generate noise above the relevant noise standard. Exceedances of the noise standards are permitted for certain activities under the EPR if additional conditions are met. The full list of noise conditions can be found in Schedule 2 of the EPR. The following exemption applies to the proposal:

Table 4.2 Noise conditions

Item	Noise	Conditions
5	Noise emitted in the course of maintaining or repairing something	a) The noise is emitted- i) Between 7 am and 8 pm on Monday to Saturday; or ii) Between 8 am and 8 pm on Sunday or a public holiday; and b) Any noise exceeding a zone noise standard is emitted for periods totalling not more than 40 hours in any 8-week period; and c) The equipment used in maintained and operated in accordance with the manufacturer’s instructions.

5. Operational noise impact assessment

5.1 Modelling methodology

5.1.1 Proposal site layout

Noise modelling of this proposal site has been based on the concept design for the proposed MRF as shown in Figure 5.1 below.

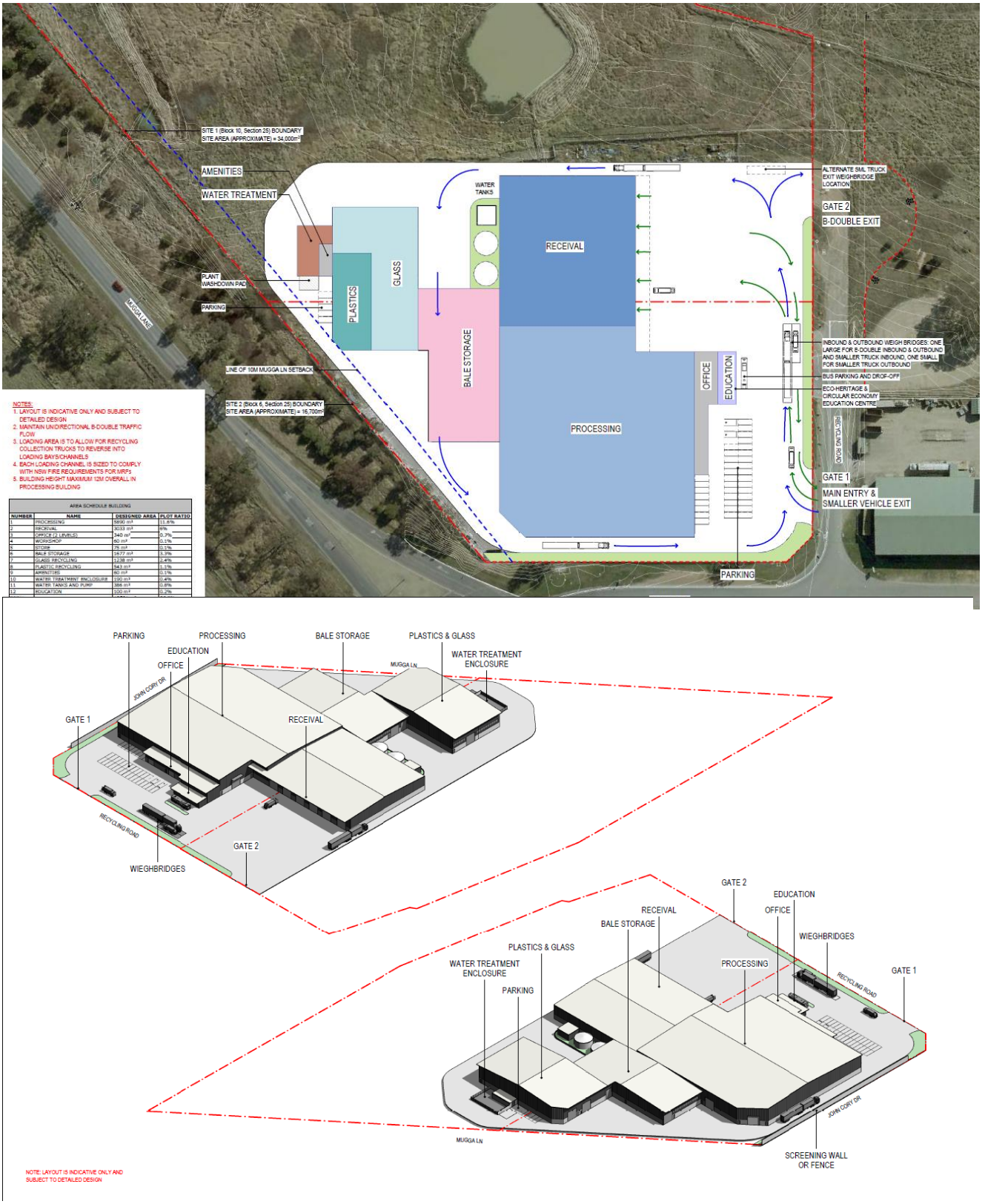


Figure 5.1 Concept design for proposed MRF

5.1.2 Noise model and parameters

Acoustic modelling was undertaken using CadnaA noise modelling software to predict indicative environmental noise levels to the boundary of the proposal site. The general parameters used in the noise model are presented in Table 5.1.

Table 5.1 Noise modelling parameters

Variable	Parameter used
Software	CadnaA
Calculation method	ISO 9613-2: Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation.
Topography	1 metre LiDAR elevation data was sourced from NSW Government – Spatial Services .
Receiver and grid heights	1.5 m above the ground floor.
Ground absorption	0 within the hardstand area and 1.0 beyond. (0 is non-porous ground such as concrete and 1 is porous ground such as grass).
Temperature	10 deg Celsius
Humidity	70%

5.2 Operational equipment

5.2.1 Modelled noise sources

Key sources of noise expected to occur on proposal site include (in general order of their noise contribution to noise levels at the most-affected boundaries of the proposal site):

1. Heavy vehicle movements delivering materials to proposal site.
2. Other mobile plant operating externally within the proposal site such as wheeled loaders loading out bales, glass, plastics, and other materials to the relevant storage areas. In particular to any outdoor storage areas.
3. Break out noise from the receival and various processing buildings. Break out noise includes indoor mobile plant, as well as fixed plant such as glass crushers, screeners, washers, and sorting machinery. Open doors are generally considered the weakest area.

At full design capacity, it is envisaged that the facility would operate on a two-shift 6 day-week basis, with each shift being of nominal 8 hours duration, therefore it is expected that all processes are to be operational during the day and night time periods once the MRF is at full design capacity. As the ACT Noise Standard is expressed as a noise level averaged over a 10-minute period, the modelling is based on a reasonable worst-case scenario.

The key assumptions and source noise levels used in the noise modelling are summarised in Table 5.2. The base-case model assumes the worst-case activities during the day period would be similar to the worst-case activities during the night period.

Table 5.2 MRF modelling sources

Source	Noise source assumptions	Sound Level, dBA	Source / reference
External mobile plant			
Delivery truck movements	Line source – 12 heavy vehicles per hour delivering waste to proposal site (equivalent to 2 per 10 minutes)	L_w 102 per vehicle	Sound power levels of trucks at low speeds (J. Granneman et al, 2009)
Wheeled loader	2 x loaders (1 between glass building and bale storage, 1 between bale storage and processing building)	L_w 101 per loader	Compact wheel Loader WL60 (https://www.jptr.com.au/product/wheel-loader-wl60)
Break-out noise from buildings			

Source	Noise source assumptions	Sound Level, dBA	Source / reference
External mobile plant			
Receival area	Truck deliveries to the receival building. Vehicle access doors assumed to be open 50% of the time	SPLi 85	Energy from Waste Facility, Eastern Creek (SSD 6236) – Noise Impact Assessment for the internal noise level within a receival hall.
Processing area	Break out noise through area sources on all facades. Vehicle access doors assumed to be open 20% of the time.	SPLi 85	Internal noise levels would be based on the selected equipment and exact location of equipment relative to the façade (not yet known at this stage). Selection of equipment, at-source noise controls and the siting of equipment can be optimised to reduce noise levels at the façade of the building. For the purposes of this assessment it has been assumed that noise at the façade would not exceed 85 dBA and would not exceed the WHS Noise Regulation 2011 noise level of 85 dBA for 8 hr exposure.
Glass processing area	Break out noise through area sources on all facades. Vehicle access doors assumed to be open 20% of the time.	SPLi 85	
Bale storage area	Break out noise through area sources on all facades. Vehicle access doors assumed to be open 20% of the time.	SPLi 80	Conservative assumption based on the use of a wheeled loader within a small building
Plastic processing area	Break out noise through area sources on all facades. Vehicle access doors assumed to be open 20% of the time.	SPLi 80	Conservative assumption based on the use of a plastic granulator (SWL 110 dBA) within a medium sized building
Water tank pumps	Enclosed pump hall. Doors assumed to be closed.	SPLi 85	Based on GHD measurements of pump rooms designed to be less than 85 dBA.
Water treatment area	Break out noise through area sources on all facades. Doors assumed to be closed.	SPLI 85	

The octave-band noise source data used in the modelling is presented in Table 5.3.

Table 5.3 Source noise levels used in the noise model

Noise source	Source type	Octave-band noise level, Hz dBA									
		31.5	63	125	250	500	1000	2000	4000	8000	O/A
Truck	Lw	78	84	88	88	93	96	96	93	88	102
Small wheeled loader	Lw	73	83	87	91	94	97	95	90	85	101
Receival and processing area	SPLi	64	64	71	76	79	79	78	75	69	85
Bale storage area	SPLi	50	62	66	70	73	76	74	69	64	80
Glass processing area	SPLi	59	62	70	77	80	80	78	74	67	85
Plastic processing area	SPLi	54	57	65	72	75	75	73	69	62	80
Water treatment area	SPLi	61	64	67	69	77	81	81	73	64	85

5.2.2 Break out noise from buildings

Buildings would be steel framed and metal clad construction (0.6 mm thick) in Colorbond finish, with a maximum height of 12 metres. This material would generally achieve a sound transmission indices performance of R_w 22.

Large access doors would provide vehicle access to the receival area, processing area, bale storage area, and glass and plastics area. These doors have been assumed to be constructed of corrugated steel or similar with a thickness of 0.6 mm. The sound reduction performance of building components used in the noise model are presented in Table 5.4.

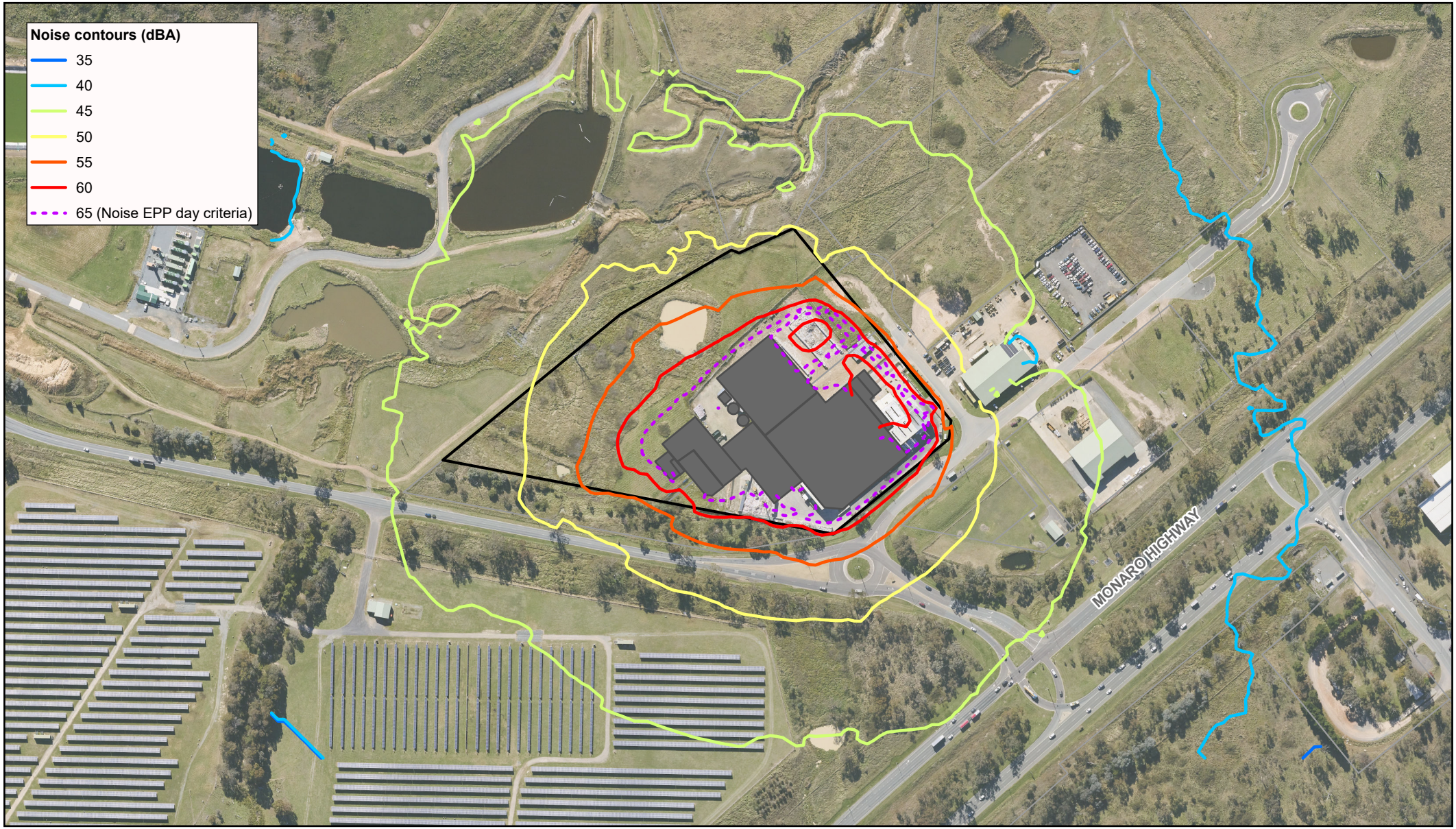
Table 5.4 Sound reduction indices of building components

Building component	Sound reduction indices, Rw									
	31.5	63	125	250	500	1000	2000	4000	8000	Rw
Metal clad wall / roof	0	3	8	14	20	23	26	27	35	22
Vehicle access door (open)	0	0	0	0	0	0	0	0	0	0
Vehicle access door (closed)	0	3	8	14	20	23	26	27	35	22

5.3 Predicted operational noise contours

The results of the noise modelling indicate that noise levels would generally not exceed the ACT noise standard of 65 dBA along the western, southern or eastern boundaries of the proposal site and 58 dBA along the northern boundary of the proposal site. Along the western side of the boundary, the 65 dBA contour extends marginally beyond the proposal site boundary. However, this is considered insignificant. A noise contour map is provided in Figure 5.2 along with the ACT Noise Standard at each boundary.

Assuming similar operations could occur during the night period (such as existing operations between 4:00 am and 7:00 am), the results of the noise modelling indicate compliance with the ACT noise standard would not be achieved along sections of the northern, southern, western and eastern boundaries of the proposal site. A noise contour map is provided in Figure 5.3 with the ACT Noise Standard at each boundary. The land over which this occurs is predominantly the Road corridor of John Cory Lane and Mugga Lane. As well as a small portion of the Mugga Lane Solar Park, Hume FOGO facility, and the empty lot to the south-east.



Legend

- Proposal site
- Proposal buildings
- Cadastre

Paper Size ISO A4

0 50 100

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

GHD

Transport Canberra and City Services
Hume Materials Recovery Facility
Noise and Vibration Impact Assessment

Predicted operational noise contours (day period)

Project No. **12540460**
Revision No. **0**
Date **16/08/2023**

FIGURE 5.2

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Print date: 16 Aug 2023 - 11:37

Legend

- Proposal site
- Proposal buildings
- Cadastre

Paper Size ISO A4

0 50 100

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

GHD

Transport Canberra and City Services
Hume Materials Recovery Facility
Noise and Vibration Impact Assessment

Predicted operational noise contours (night period)

Project No. **12540460**
Revision No. **0**
Date **16/08/2023**

FIGURE 5.3

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Print date: 16 Aug 2023 - 11:36

6. Potential mitigation strategies

6.1 Changing compliance point

Under the Regulation, an environmental authorisation or an approval may specify an alternative compliance point. Changing the compliance point in an environmental authorisation or approval can have the effect of changing the noise level permitted. Where such a compliance point is specified, this will be done by applying the following general principles.

– The compliance point should make it as easy as possible to measure the noise concerned, and
– In combination with the setting of the noise level permitted, the choice of compliance point should ensure that the overall noise authorised or approved is consistent with the provisions and Objects of the Act and the Noise EPP.

Changing the compliance point is considered to be a reasonable and feasible strategy to achieve compliance with the noise standard, for the following reasons:

– The area over which the night criteria noise contour covers consists primarily of John Cory Lane, Mugga Lane, their associated road easements, as well as portions of the Mugga Lane Solar Farm, Hume FOGO Facility, and the empty lot to the south. These land uses are considered to be unsensitive to noise impacts.
– The land over which the noise impacts occur are not particularly sensitive to noise emissions during the night time period as the land is generally only in use / occupied during the day time.

The proposed alternative compliance point for the night time period is any point set back 200 metres from the proposal site boundary. Alternatively, where proposal site access cannot be obtained or source to signal ratio is poor (i.e. from road noise), intermediate measurements may be taken and the actual noise level at the compliance point determined using computer noise modelling.

6.2 Alternative mitigation strategies

In the event that an alternative compliance point is not specified by an environmental authorisation or in the approval, alternative mitigation strategies should be considered.

The mitigation strategy to reduce noise levels during the night period to meet the ACT Noise Standard would be refined during detailed design once equipment has been selected and further information regarding the operations during the night period are known in detail.

A high-level analysis has been undertaken to determine the key noise sources that would require mitigation during design development with the aim of achieving the ACT Noise Standard at the boundary of the proposal site.

Table 6.1 presents an indicative mitigation strategy and a test of whether the mitigation measures is considered reasonable and feasible.

Table 6.1 Mitigation considerations to meet ACT Noise Standard

Noise source	Indicative reduction required, dB	Mitigation consideration to achieve required noise reduction	Reasonable and feasible test
External mobile plant			
Loaders	20	No use of external loaders outside of the day hours	Yes – This could be incorporated into the management plan
Delivery trucks	10	No deliveries during the night period	No – This is not considered reasonable or feasible as the proposal site currently receives waste during the night period (4:00 am to 7:00 am)
	5-10	Construction of a noise barrier from 2 to 3.5 metres in height, shielding noise emissions from mobile plant	This is considered a reasonable mitigation measure, however the feasibility would depend on a range of factors including;

Noise source	Indicative reduction required, dB	Mitigation consideration to achieve required noise reduction	Reasonable and feasible test
		movements around the perimeter of the proposal site	– Whether or not the wall would impede on the functionality of the proposal site
	3	Reduce the number of vehicles during the night period by half (equivalent of 6 in / 6 out per hour)	Yes – This could be incorporated into the management plant
Building break-out noise			
Receival building	3	Reduce the duration of open doors by half	Yes – The use of rapid auto roller doors can be considered to prevent break-out noise from receival area openings
Processing building	10	Architectural treatments to the building façade and vehicle access doors to be kept closed	Yes – the façade of the building could be designed to meet a sound reduction performance greater than R_w 35 (e.g. inclusion of internal stud wall or equivalent)
Glass building	10	Architectural treatments to the building façade (i.e. inclusion of internal stud wall or equivalent) and vehicle access doors to be kept closed	
Plastics building	3	Vehicle access doors to be kept closed	Yes

Assuming these reasonable and feasible measures could be implemented, the residual noise levels at each boundary of the proposal site are presented in Table 6.2 (worst-case location). The results indicate a residual exceedance of the ACT Noise Standard at the south-eastern and north-eastern boundary of the proposal site. The exceedances are due truck movements and it is recommended that the regulatory authority accept this residual exceedance due to the following justification:

– To the south and south east is the Monaro Highway and beyond the highway is an industrial zone that is not considered noise-sensitive during the night period. Given this, a residual noise level 4 dB above the ACT Noise Standard could be considered acceptable given reasonable and feasible measures would be considered to reduce environmental noise emission and the existing operations at the proposal site include delivery of waste during the night period.
– A difference of 1 dB is not considered acoustically significant as the human ear cannot easily discern a noise level difference of 1 dB and directly to the east is an industrial area that is not considered noise-sensitive during the night period. Given this, a residual noise level 1 dB above the ACT Noise Standard could be considered acceptable.

It should be noted due to the proximity of the internal access road to the proposal site boundary to the southeast of the proposal site, any delivery truck movements would likely result in an exceedance of the ACT Noise Standard of $L_{A10(10minute)}$ 55 dBA during the night period.

Table 6.2 Residual noise levels

Proposal site boundary	ACT Noise Standard (night)	Indicative residual noise level, dBA	Residual exceedance above ACT Noise Standard (night)	Dominant noise source	
				Level, dBA	Comment
Western	55	55	0	53 (delivery trucks)	Overall noise level dominated by truck movements
Southern	55	59	4	58 (delivery trucks)	
Eastern	55	56	1	53 (delivery trucks)	
Northern	48	48	0	48 (receival building)	Overall noise level dominated by building break-out noise from the receival building

6.3 Mitigation measures

Based on the outcomes of the assessment, mitigation measures are recommended in Table 6.3 to improve the environmental noise values during the construction and operational phases of the proposal with regard to the *Environmental Protection Act* (EPA) 1997 and the *Environmental Protection Regulation* (EPR) 2005.

Table 6.3 Recommended mitigation and management measures

Measure ID	Mitigation measure	Details
NV1	Proposal indicative construction hours	Construction hours would be limited to: – 7 am to 6 pm Monday to Friday, – 8 am to 6 pm Saturdays, – 8 am to 6 pm on Sundays or Public Holidays.
NV2	Operational Noise Management Plant (ONMP)	During detailed design an ONMP should be prepared including an updated noise model considering the selection and siting of equipment within the proposal site, the developed design and the operations of the facility during the night period up to the maximum capacity of the facility. The ONMP should consider the recommendations and assumptions included in this report, being: – Limiting or reducing the use of mobile plant during the night period. – Limiting the number of truck deliveries during the day period approximately 12 in / 12 out an hour). – Limiting the number of truck deliveries during the night period (approximately 6 in / 6 out an hour). – The use of fast-action roller doors for vehicle access doors to reduce the time doors are open, especially during the night period. – Architectural treatments for the processing and glass buildings to reduce break-out noise from noisy operations within the building. Reasonable and feasible mitigation measures would be refined during design development and would be incorporated into the management plan for the facility. Mitigation measures to be implemented are dependent on whether the compliance point is updated as suggested in Section 6.1.
NV3	Alternative compliance point	If approved by the environmental authority, an alternative compliance point would be specified as the primary mitigation measure. The compliance point is to be any point set back 200 metres from the boundary of the proposal site.

7. Conclusion

Transport Canberra and City Services has engaged GHD to assess the potential operational noise and vibration impacts from the proposed ACT Hume MRF. Construction and operational noise impacts were assessed in accordance with the EPR and the Noise EPP.

The results of the operational noise modelling indicate general compliance with the ACT Noise Standard can be achieved during the day period at all boundaries of the proposal site, however mitigation measures would be required to achieve compliance during the night period.

The preferred mitigation strategy is an alternative compliance point located at any point 200 metres from the property boundary. This mitigation is considered reasonable and feasible as the changing of compliance point is unlikely to generate any noise impacts as the intervening land is not noise sensitive.

In the event an alternative compliance point is not specified for the proposal. An indicative noise mitigation strategy has been developed considering reasonable and feasible mitigation and management measures with the aim of achieving the ACT Noise Standard.

Proposal-specific mitigation measures have been recommended in Section 6 and include limiting the construction hours and the preparation of an operational noise management plan (ONMP) during the detailed design phase of the proposal to consider reasonable and feasible mitigation measures to be included in the design and for inclusion in the management plan of the facility.

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