



MARSHALL DAY
Acoustics 

140 HIGH STREET MANSFIELD
REVISED APPLICATION
ACOUSTIC ASSESSMENT

Rp 001 R01 20250883 | 21 November 2025

Project: **140 HIGH STREET MANSFIELD
REVISED APPLICATION**

Prepared for: **140 High Street Pty Ltd
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Report No.: **Rp 001 R01 20250883**

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1.0 INTRODUCTION

It is proposed to amend a planning permit to allow development of a retail store and laser carwash on land at 140 High Street Mansfield (the subject site). The subject site already has a permit for a service station, which is being constructed presently.

It is also proposed to amend the operating hours of the site to allow for 24-hour operations.

Marshall Day Acoustics (Australia) Pty Ltd (MDA) has been engaged to provide a technical acoustic assessment of the proposal to submit with the planning application.

This report details the relevant regulatory environmental noise requirements, calculated noise levels from existing and proposed site operations and recommended noise mitigation.

MDA has had previous involvement with the subject site in relation to a planning permit amendment application for a fast-flow fuel pump for trucks. While the application was refused at VCAT in 2021, the data collected for the study has been used for the current study where still relevant.

A glossary of acoustic terminology is provided in Appendix A.

2.0 PROJECT DESCRIPTION

2.1 Site location

The subject site is located at 140 High Street, Mansfield and is bound by the following:

- North: High Street, park areas and Mansfield Visitor Information Centre
- East: residential properties (which are proposed to be developed for commercial use as a fast food restaurant), Ultimo Street with residential properties beyond
- South: residential properties with Curia Street beyond
- West: K&M Automotive and Mansfield Veterinary Clinic.

An aerial photograph of the subject site and surrounds is provided in Figure 1. A planning map of the subject site and surrounds is included at Appendix B.

Figure 1: Aerial view of the subject site and surrounds



2.2 Existing site development

Planning permit P164/17 applies to the subject site land and allows for operation of a service station to operate between the hours of 0600 hrs and midnight, 7 days a week.

The following permit conditions relate to noise and timing of activities:

19. The amenity of the area must not be detrimentally affected by the use or development through the:

- a) transport of materials, goods and commodities to or from the land*
- b) appearance of any buildings, works or materials*
- c) emission of noise, artificial light, vibration, smell, fumes, smoke, vapour, steam, soot, ash, wastewater, waste products, grit or oil*
- d) presence of vermin*

to the satisfaction of the Responsible Authority.

22. Loading and deliveries activities must only be undertaken between the hours of 7am – 8pm Monday to Friday inclusive and 9am – 7pm Saturday and Sunday inclusive.

26. No sound shall be emitted from any device or from any source or activity that may become a nuisance to the occupiers of adjoining or nearby properties to the satisfaction of the Responsible Authority.

34. Noise emitted from the premises must not exceed the recommended levels as set out in Noise from Industry in Regional Victoria (NIRV; EPA Publication 1411, 2011) or as amended.

Condition 34 refers to NIRV which has been superseded by the Noise Protocol¹, and other current Victorian environmental legislative documents described in Section 4.2. The previous ‘recommended levels’ that were applicable under NIRV are numerically identical under the Noise Protocol however they are now mandatory limits. The assessment method prescribed by NIRV is very similar to that contained in the Noise Protocol, with no identified changes affecting this assessment.

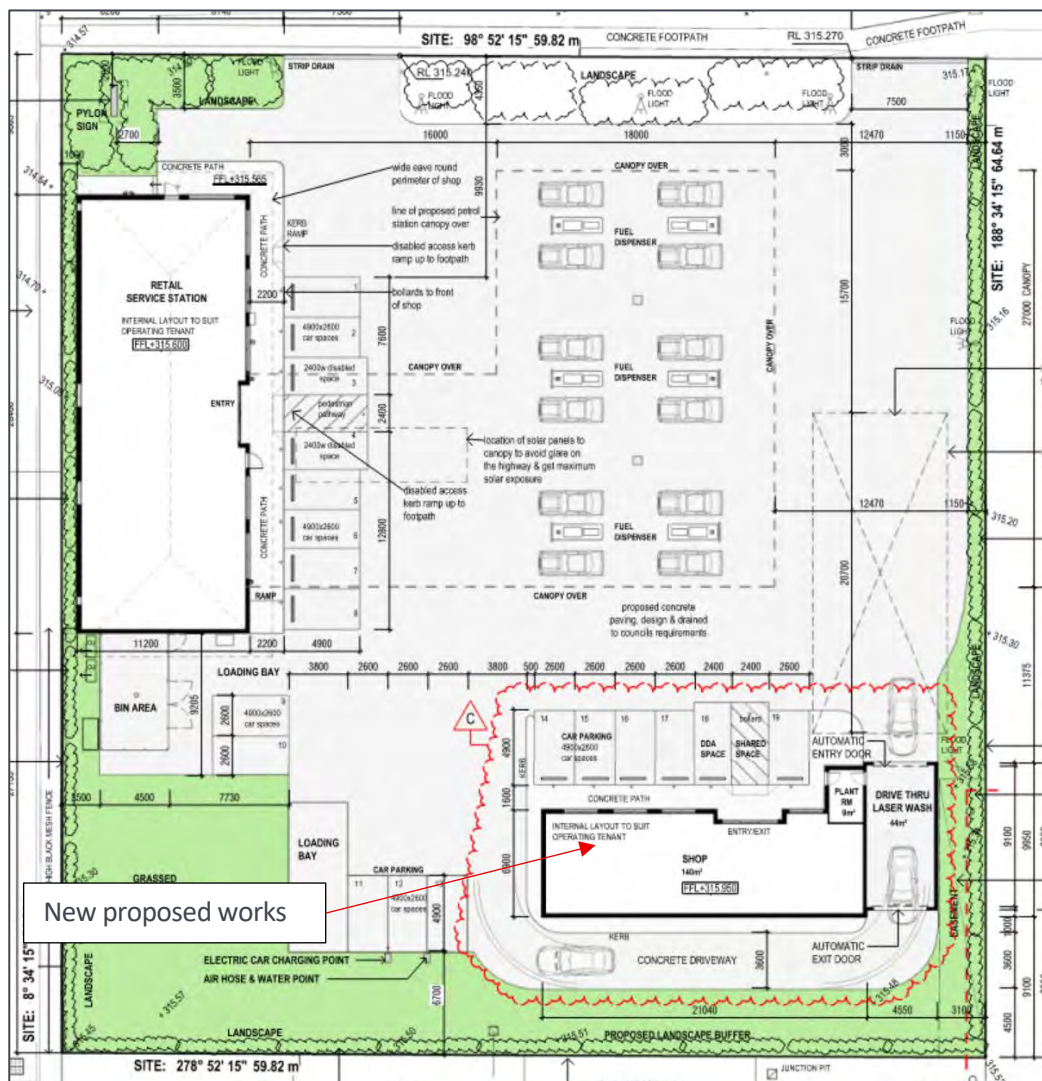
This report adopts the current legislative framework as relevant to this assessment.

2.3 Proposed additional site development

It is proposed to construct a retail store, drive-through laser carwash and associated infrastructure towards the southern boundary of the subject site.

The proposed site plan is contained in Figure 2. The new proposed works are circled in red.

Figure 2: Proposed new works – subject site plan



¹ EPA Publication 1826.5 Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues

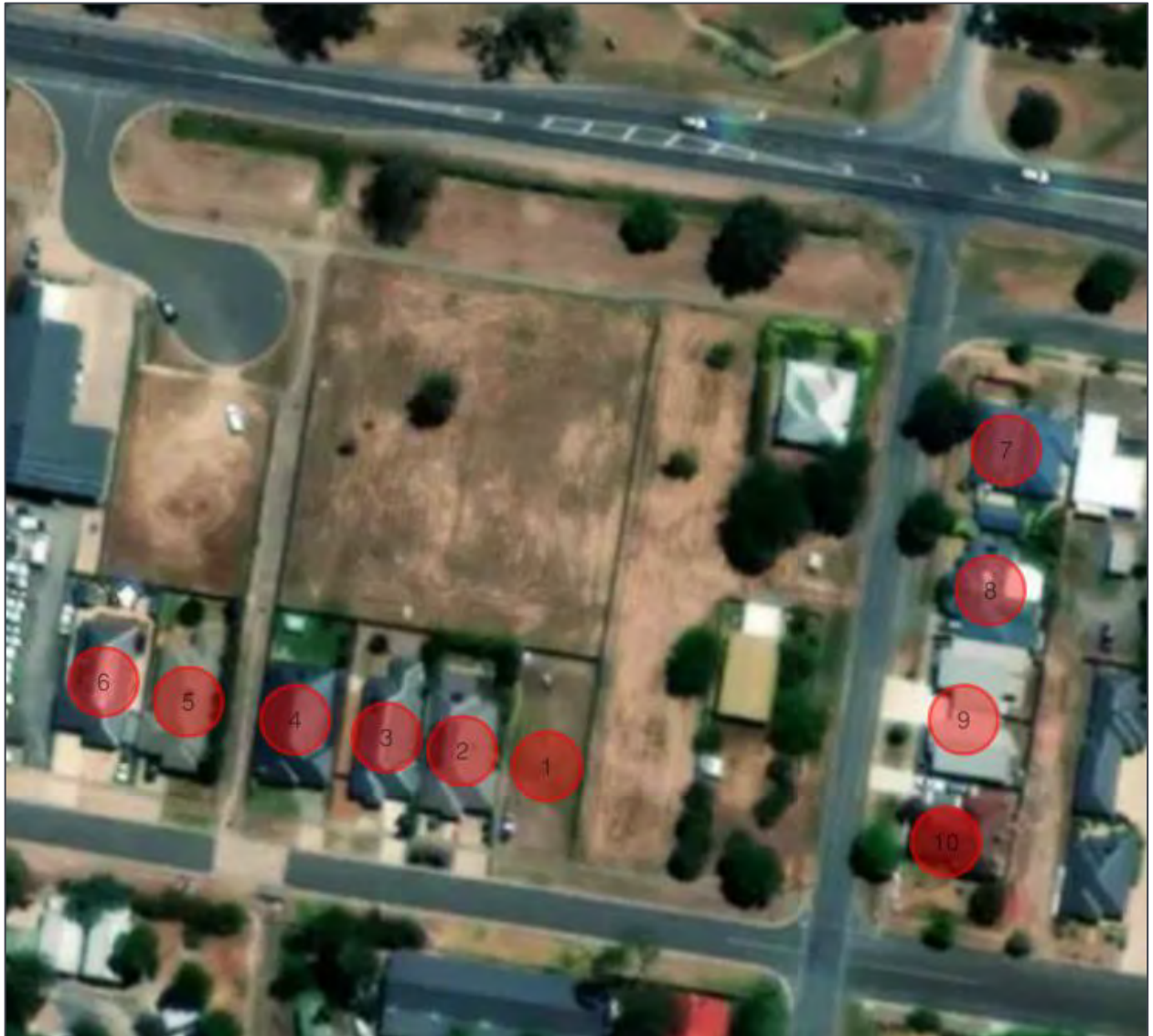
2.4 Noise sensitive receivers

Details of the nearest noise sensitive receivers considered in this assessment are provided in Table 1, with a site map showing the positions of these receivers in relation to the subject site presented in Figure 3.

Table 1: Details of nearest noise sensitive receivers

Receiver ID	Address	Description
1	39 Curia Street, Mansfield	Vacant land directly south of the subject site and sharing a common boundary A receiver location representative of a single-story dwelling has been provided at this location, consistent with other surrounding dwellings
2	41 Curia Street, Mansfield	Single storey dwelling directly south of the subject site and sharing a common boundary
3	43 Curia Street, Mansfield	Single storey dwelling directly south of the subject site and sharing a common boundary
4	45 Curia Street, Mansfield	Single storey dwelling directly south of the subject site and sharing a common boundary
5	47 Curia Street, Mansfield	Single storey dwelling south-west of the subject site, separated from the subject site by an alleyway
6	49 Curia Street, Mansfield	Single storey dwelling south-west of the subject site, separated from the subject site by an alleyway and intervening property
7	134 High Street, Mansfield	Single storey dwelling east of the subject site, separated from the subject site by intervening properties and Ultimo Street
8	2/134 High Street, Mansfield	Single storey dwelling east of the subject site, separated from the subject site by intervening properties and Ultimo Street
9	3/134 High Street, Mansfield	Single storey dwelling east of the subject site, separated from the subject site by intervening properties and Ultimo Street
10	33 Curia Street, Mansfield	Single storey dwelling south-east of the subject site, separated from the subject site by intervening properties and Ultimo Street

Figure 3: Nearest noise sensitive receivers



3.0 VICTORIAN LEGISLATION AND GUIDELINES

3.1 Operational noise

A summary of the key noise legislation and related guidelines and standards commonly referenced in Victorian noise assessments is provided in Table 2, with further details provided in Appendix C.

Table 2: Key Victorian noise legislation/guidelines

Document	Overview
<i>Environment Protection Act 2017</i> (EP Act)	<p>The EP Act provides the overarching legislative framework for the protection of the environment in Victoria. It establishes a general environmental duty to minimise the risks of harm to human health or the environment from pollution or waste, including noise, so far as reasonably practicable.</p> <p>The EP Act does not specify noise limit values but prohibits the emission of unreasonable or aggravated noise from non-residential premises.</p> <p>The EP Act provides general definitions of unreasonable and aggravated noise; definitions that are specific to commercial, industrial and trade premises are provided in supporting publications (see below).</p> <p>Section 93 of the EP Act provides for the creation of an environmental reference standard to be used to assess and report on environmental conditions in the whole or any part of Victoria.</p>
<i>Environment Protection Regulations 2021</i> (EP Regulations)	<p>The objectives of the EP Regulations are to further the purposes of, and give effect to, the EP Act.</p> <p>Part 5.3 of the EP Regulations sets out requirements that are specific to environmental noise. It states that the prediction, measurement, assessment, or analysis of noise within a noise sensitive area for the purposes of the EP Act or the Regulations, must be conducted in accordance with the Noise Protocol (see below).</p> <p>Division 3, Part 5.3 stipulate requirements specific to commercial, industrial and trade premises. Noise from these types of premises is prescribed as unreasonable if it exceeds a noise limit or alternative criterion determined in accordance with the Noise Protocol.</p> <p>Additional matters addressed in this Division include assessment time periods, minimum noise limit values, management of cumulative noise from multiple premises, noise sensitive areas where assessment requirements apply, definition of frequency spectrum as a prescribed factor, and a definition for aggravated noise.</p>
EPA Publication 1826.5 <i>Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues</i> (Noise Protocol)	<p>The Noise Protocol defines the method for setting the noise limits for new and existing commercial, industrial and trade premises and entertainment venues in Victoria. The noise limits for commercial, industrial and trade premises are determined based on land use zoning and background noise levels, and are separately defined for day, evening and night periods.</p> <p>It outlines the steps that must be followed to undertake an assessment (measurement or prediction) of the effective noise level within a noise sensitive area or at an alternative assessment location. A comparison between the effective noise level and the relevant noise limit or the relevant alternative assessment criterion will determine whether the noise that is emitted from the premises is unreasonable under the Regulations.</p>
EPA Publication 1254.2 <i>Noise Control Guidelines</i>	<p>Provides an overview of noise policies and legislation in Victoria for a range of different noise sources and provides supplementary guidance for situations where there is no policy or legislation.</p>

3.2 Sleep disturbance

It is common practice to assess noise during night period activities with specific attention to sleep disturbance, which can occur regardless of compliance with the mandatory noise limits.

We have therefore conducted an analysis of proposed night period operations against sleep disturbance reference levels, developed based on the state of knowledge.

Justification of the adopted sleep disturbance reference levels is provided in Appendix C5.

The GED to minimise the risk of harm applies at all times and locations, irrespective of whether the predicted noise levels are above or below the reference levels. The reference noise levels do not represent:

- a noise level below which no-one will experience sleep disturbance or associated health effects
- a noise level above which sleep disturbance is certain to occur
- a noise level design target, or a noise level that can be ‘polluted up to’.

The following outdoor sleep disturbance reference noise levels have been nominated to provide context to the predicted noise levels:

- < 45 dB $L_{Aeq,8h}$ correlating to an internal noise level of approximately 30 – 35 dB $L_{Aeq,8h}$ in a bedroom with an open window.
- < 55 – 60 dB L_{Amax} correlating to an internal noise level of approximately 45 dB L_{Amax} in a bedroom with an open window.

Short-term noise from vehicles and voices at night is more appropriately represented by the L_{Amax} metric. Accordingly, only the L_{Amax} targets have been adopted for this study.

3.3 Identification of noise sources and applicable noise limits/design targets

Table 3 details the relevant legislation or guideline applicable for the assessment of each of the identified noise sources associated with proposed site operations.

Table 3: Potential noise impacts and assessment criteria

Potential noise impact	Source of assessment criteria	Status
Mechanical services noise	Noise Protocol	Legislation - mandatory
Customer ordering device	Noise Protocol	Legislation - mandatory
Deliveries and waste collection	Noise Protocol	Legislation – mandatory
	EPA Victoria Publication 1254.2	Guidelines – best practice
Late night customer vehicles and carpark activity	Sleep disturbance	Industry accepted guideline

3.3.1 EP Regulations noise limits

The EP Regulations design noise limits for the development are detailed in Table 4, with further details provided in Appendix C.

Table 4: EP Regulations noise limits, dB $L_{Aeq,30min}$

Period	Day of week	Start time	End time	Noise limits, ENL
Day	Monday - Saturday	7 am	6 pm	50
Evening	Monday - Saturday	6 pm	10 pm	45
	Sunday, Public holidays	7 am	10 pm	
Night	Monday - Sunday	10 pm	7 am	40

3.3.2 Sleep disturbance

The sleep disturbance design target is presented in Table 5, applicable outdoors at receiver locations.

Table 5: Sleep disturbance design target

Description	Design target
Short-term maximum noise levels	< 55 – 60 dB L_{Amax}

4.0 EXISTING NOISE ENVIRONMENT

4.1 K&M Automotive

Noise measurements were conducted at the subject site during the daytime on 8 February 2021 in order to determine potential existing noise impacts associated with the adjacent K&M Automotive. Full details regarding equipment and measurement conditions are provided in Appendix D.

4.2 Background noise

Background noise monitoring was also undertaken, using the procedures specified in the Noise Protocol (see Section 3.1), at the rear of 140 High Street, Mansfield between 29 January 2021 and 7 February 2021 to assess whether traffic noise levels from High Street were a significant audible background source. Analysis of the measured background noise levels demonstrated that the subject site was not a background-relevant area, as defined in the Noise Protocol. As such, the noise limits were not adjusted to account for background noise.

A time history of measured background noise levels is presented in Appendix E, for information.

5.0 NOISE ASSESSMENT

5.1 Operational scenarios and assumptions

The procedures of Noise Protocol require that the “typical worst-case noise scenario” over any given 30-minute period is considered for the respective day, evening and night operations.

Accordingly, the assessment assumes the following 30-minute operational scenarios:

- Day period typical worst-case 30-minute operational scenario
 - Either
 - One fuel delivery by a semi-trailer
 - One goods delivery by a van/SRV
 - Or;
 - One waste collection
 - One goods delivery by a van/SRV
 - And;
 - Continuous use of laser car wash
 - Continuous operation of mechanical services
- Evening period typical worst-case 30-minute operational scenario
 - One goods delivery by a van/SRV
 - 2x cycles of laser car wash (approximately 12 minutes use in a 30-minute period)
 - Continuous operation of mechanical services
- Night period typical worst-case 30-minute operational scenario
 - Continuous operation of mechanical services.

The following assumptions have been made with respect to the various activities:

- On site delivery and waste truck movements are assumed to move at 5-10 km/h
- An allowance of 2 minutes for the waste collection operation
- Unloading operations associated with store deliveries utilises electric pallet jack (no motorised forklift).

5.2 Noise source data

The noise source data utilised for the assessment has been based on previous MDA measurements from other similar developments. Details of the source noise data used for this assessment are provided in Appendix F.

Noise from patron vehicles is excluded from the assessment under the Noise Protocol, as they are “non-commercial vehicles” under Regulation 117 of the EP Regulations which lists noise sources that must not be taken into account.

Noise from patron vehicles at night is considered in relation to the risk of sleep disturbance as this aspect of the assessment is not covered by the Noise Protocol and EP Regulations.

5.3 Noise controls

Noise controls and noise-mitigating settings assumed as part of this assessment include the following:

- Existing 2 m high steel fencing to the south of the subject site
- Restriction of southernmost car parking spaces during the night period
- No use of the carwash at night
- No deliveries or waste collection to the site at night
- Trucks to only use the northern petrol pump at night
- Screening at least 3 m high to be provided on parts of the southern and eastern boundary

5.4 Predicted noise levels

Based on the operational scenarios and noise source data, predicted noise levels have been determined at receiver locations and the results are summarised in the following sections.

For operational noise predictions for the day, evening and night periods (contained in Table 6, Table 7 and Table 8), compliance with the noise limits can be achieved without any additional noise screening. Accordingly, the results presented reflect a scenario where only existing noise barriers to the south of the subject site are taken into account.

For night period operations, for noise to be below the with sleep disturbance targets, screening would be required along parts of the south and eastern site boundaries. The screening to the east could take the form of either a solid noise barrier, or built form (for example, a fast-food restaurant building or similar, which may be constructed on the site to the east of the service station in future). Where built form is utilised for screening purposes, additional noise barriers may be required to block line of sight to any dwellings not screened by the building. For this assessment, predicted sleep disturbance noise levels take into account screening as shown in Appendix G

Details regarding the noise modelling method are provided in Appendix H.

Table 6: Predicted daytime noise levels, dB ENL

ID	K&M Automotive ¹	Consented service station ²	Service station mechanical plant (allowance)	Proposed carwash	Character adjustments ³	Cumulative noise level	Noise limit	Complies?
1	35	43	37	42	+2	48	50	✓
2	34	43	37	39	+2	48	50	✓
3	36	44	37	35	+2	48	50	✓
4	37	44	37	31	+2	47	50	✓
5	41	42	37	25	+2	47	50	✓
6	44	40	37	21	+2	48	50	✓
7	21	41	37	36	+2	45	50	✓
8	30	41	37	36	+2	46	50	✓
9	31	41	37	38	+2	46	50	✓
10	30	40	37	36	+2	45	50	✓

¹ In order to account for the inherent variability of noise levels associated with K&M Automotive, a representative worst-case 30-minute period has been determined for noise modelling and therefore the predicted noise levels at some surrounding receivers are higher than those observed at the representative R6 measurement location during the survey

² Highest predicted noise level between the waste collection option and the fuel delivery option

³ +2 dB character adjustment applied for potential impulsiveness associated with use of the impact drill at K&M Automotive

Table 7: Predicted evening noise levels, dB ENL

ID	K&M Automotive ¹	Consented service station	Service station mechanical plant (allowance)	Proposed carwash	Character adjustments	Cumulative noise level	Noise limit	Complies?
1	N/A	31	37	38	N/A	41	45	✓
2	N/A	32	37	35	N/A	40	45	✓
3	N/A	32	37	31	N/A	39	45	✓
4	N/A	31	37	27	N/A	38	45	✓
5	N/A	28	37	21	N/A	38	45	✓
6	N/A	28	37	17	N/A	38	45	✓
7	N/A	30	37	32	N/A	39	45	✓
8	N/A	30	37	32	N/A	39	45	✓
9	N/A	29	37	34	N/A	39	45	✓
10	N/A	29	37	32	N/A	39	45	✓

¹ It is understood that K&M Automotive only operates during the day period only (0800 hrs – 1730 hrs Monday to Friday)

Table 8: Predicted night noise levels, dB ENL

ID	K&M Automotive ¹	Consented service station	Service station mechanical plant (allowance)	Proposed carwash	Character adjustments	Cumulative noise level	Noise limit	Complies?
1	N/A	N/A	37	N/A	N/A	37	40	✓
2	N/A	N/A	37	N/A	N/A	37	40	✓
3	N/A	N/A	37	N/A	N/A	37	40	✓
4	N/A	N/A	37	N/A	N/A	37	40	✓
5	N/A	N/A	37	N/A	N/A	37	40	✓
6	N/A	N/A	37	N/A	N/A	37	40	✓
7	N/A	N/A	37	N/A	N/A	37	40	✓
8	N/A	N/A	37	N/A	N/A	37	40	✓
9	N/A	N/A	37	N/A	N/A	37	40	✓
10	N/A	N/A	37	N/A	N/A	37	40	✓

¹ It is understood that K&M Automotive only operates during the day period only (0800 hrs – 1730 hrs Monday to Friday)

5.5 Sleep disturbance

Noise from night-time activity at the site associated with patron cars, trucks and voices have the potential to cause sleep disturbance at the nearest affected dwellings.

Night-time noise associated with the use of the subject site could include:

- Car movements through the site, car parking and petrol filling areas
- Cars braking, doors closing and accelerating away from a stationary position
- Noise from patrons talking and laughing in car parking areas.
- Truck movements through the site and petrol filling area
- Trucks braking, doors closing and accelerating away from a stationary position.

The activities identified above are expected to be infrequent, however they have been compared to the nominated sleep disturbance targets to present a comprehensive assessment.

MDA has conducted numerous noise surveys involving noise generated by vehicles in car parks including door slams, braking, engine starting and acceleration from a stationary position. Voices of patrons in car parking areas which include general laughter and conversation have also been measured.

Maximum noise level data associated with these activities referenced in this assessment is presented in Appendix I2.

Noise source locations are based on the site layout presented in Appendix J.

Predicted maximum noise levels are summarised in Table 9 for the nearest dwellings, taking into account the proposed noise screening and restriction of certain car parks at night described in Section 5.3.

Table 9: Predicted maximum noise levels, dB L_{Amax}

ID	"Normal" vehicle	"Worst-case" vehicle ¹	Patrons, laughter and conversation	Trucks
1	45	53	48	57
2	48	56	49	54
3	50	57	51	57
4	50	58	51	57
5	48	56	50	56
6	48	55	51	52
7	45	59	48	60
8	44	52	46	60
9	43	52	41	59
10	43	51	41	59

¹ A 'worst-case' car is defined as a V8 or high-powered vehicle being driven in an aggressive manner.

With no additional noise barriers on the site, maximum noise levels from trucks on site are predicted to be higher than the upper range of the nominated sleep disturbance targets of 60 dB L_{Amax} at 6 of the 10 assessed sensitive receivers, by up to 3 dB.

With regard to the predicted margin over the sleep disturbance target, the following should be considered:

- These are related to worst-case cars, and trucks, which are likely to be infrequent during the night period
- The surrounding receivers are located in a Commercial 1 zone and are currently affected by traffic noise along High Street
- During the noise monitoring period, several measurement periods indicated maximum noise levels exceeding the sleep disturbance targets during the relevant hours (2200-0700 hrs), as shown in Appendix E. It is likely that these maximum noise level events are associated with traffic movements along High Street
- Subjectively, it is commonly accepted that an increase in noise level of 3 dB is only just perceptible for most people

On the basis of the above, it is considered that a no-barrier outcome would not appreciably alter the character of the area with regard to sleep disturbance events.

In the event that the noise impact of these events was deemed unacceptable, screening as shown in Appendix G could be implemented.

6.0 SUMMARY

It is proposed to construct a retail store, drive-through laser carwash and associated infrastructure on the site of a consented service station at 140 High Street, Mansfield.

It is also proposed to amend the operating hours of the site to allow for 24-hour operations.

MDA has undertaken an acoustic assessment of the proposal in accordance with the relevant Victorian EPA legislation, guidelines, and accepted industry practice.

This assessment is based on:

- Noise from existing consented uses on site
- Noise from proposed additional sources (including the carwash and plant room)
- Noise measurements taken at the site of nearby off-site commercial premises
- Short-term noise from sources relevant during the night period
- A detailed 3-dimensional acoustic model of the site and surrounding environment, accounting for typical worst-case day, evening and night operational scenarios and atmospheric conditions which favour the propagation of sound.

The development is expected to meet the relevant Victorian EPA legislation at all nearby receivers, and the sleep disturbance targets at most nearby receivers, based on the following recommendations:

- Operations occurring as assumed in this assessment (detailed in Section 5.1)
- Existing 2 m high steel fencing to the south of the subject site remains
- Restriction of southernmost car parking spaces during the night period
- No use of the carwash at night
- No deliveries or waste collection to the site at night
- Trucks to only use the northern petrol pump at night
- Screening (via barrier or built form) at least 3 m high to be provided on parts of the southern and eastern boundary as shown on the mark-up in Appendix G.

Without the described screening shown on the mark up in Appendix G, short-term maximum noise levels are predicted to be higher than the upper range of the sleep disturbance targets by up to 3 dB at 6 dwellings. Should there be concern over graffiti or otherwise regarding noise barriers, it is considered that a no-barrier outcome would not appreciably alter the character of the area with regard to sleep disturbance events.

APPENDIX A GLOSSARY OF TERMINOLOGY

Ambient	The ambient noise level is the noise level measured in the absence of the intrusive noise or the noise requiring control. Ambient noise levels are frequently measured to determine the situation prior to the addition of a new noise source.
A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
dB	Decibel: The unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of $P_r=20 \mu\text{Pa}$ i.e. $\text{dB} = 20 \times \log(P/P_r)$
Frequency	The number of pressure fluctuation cycles per second of a sound wave. Measured in units of Hertz (Hz).
Hertz (Hz)	Hertz is the unit of frequency. One hertz is one cycle per second. One thousand hertz is a kilohertz (kHz).
L_{A90}	The A-weighted noise level exceeded for 90% of the measurement period, measured in dB. This is commonly referred to as the background noise level.
$L_{Aeq}(t)$	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
L_{Amax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
Effective noise level, ENL	The effective noise level of commercial or industrial noise determined in accordance with EPA publication 1826.5 <i>Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues</i> (Noise Protocol). This is the L_{Aeq} noise level over a half-hour period, adjusted for the character of the noise.
L_w	Sound Power Level. A logarithmic ratio of the acoustic power output of a source relative to 10^{-12} watts and expressed in decibels. Sound power level is calculated from measured sound pressure levels and represents the level of total sound power radiated by a sound source.

APPENDIX B PLANNING MAP



APPENDIX C LEGISLATION AND GUIDELINES

C1 Environment Protection Act 2017

The *Environment Protection Act 2017* (EP Act) does not specify noise limit values or technical aspects of environmental noise but sets out legal requirements to comply with the Environment Protection Regulations described below. Clause 166 of the Act essentially places the onus of achieving compliance with noise limits on the commercial premises.

The Regulations and the Noise Protocol set noise limits that must not be exceeded. The noise limits are not intended to be levels one can ‘pollute up to’ and must not to be interpreted as noise levels below which no action is required. This is because the duty holder is required under the general environmental duty to minimise risks so far as reasonably practicable.

The general environmental duty is outlined in Part 3.2 of the *EP Act*, that requires anyone engaging in an activity posing a risk of harm to human health and/or the environment from pollution (including noise) and waste, to minimise those risks to prevent harm as far as reasonably practicable.

C2 Environment Protection Regulations 2021

The EP Act does not specify noise limit values or technical aspects of environmental noise but sets out legal requirements to comply with the *Environment Protection Regulations 2021* (EP Regulations). Clause 166 of the EP Act essentially places the onus of achieving compliance with noise limits on the commercial premises.

The Regulations are made under section 465 of the EP Act and impose obligations in relation to environmental protection, including noise. The Regulations state that a person who conducts a prediction, measurement, assessment or analysis of noise within a noise sensitive area must do so in accordance with the Noise Protocol. Noise from industrial, commercial and trade premises or entertainment venues or events is prescribed as unreasonable if it exceeds a noise limit or alternative criterion determined in accordance with the Noise Protocol.

Key matters addressed in the regulations include:

- Definition of commercial, industrial and trade premises, which is essentially any premises that is not a residential premises, a road or a railway.
- Definition of an indoor music entertainment venue
- Definition of noise sensitive areas where the noise limits are assessed, which broadly include:
 - a residential building
 - temporary accommodation
 - hospital corrective institution
 - retirement or residential village
 - A room for learning in a child care centre, kindergarten or school
 - A tourist establishment, campground or caravan park
- Assessment time periods
- Noise sources that must not be taken into account
- Minimum noise limit values
- Management of cumulative noise from multiple premises.

Table 10 presents a summary of the relevant Divisions and Regulations from Part 5.3 – Noise.

Table 10: Summary of relevant provisions Part 5.3 – Noise

Section	Description
Division 1, Regulation 113	States that <i>a person who conducts a prediction, measurement, assessment or analysis of noise within a noise sensitive area for the purposes of the Act or these Regulations, must conduct the prediction, measurement, assessment or analysis in accordance with the Noise Protocol.</i>
Division 3	Applies to noise from commercial, industrial and trade premises
Regulation 116	Defines the day, evening and night period as follows: <ul style="list-style-type: none"> • Day: 7 am to 6 pm, Monday – Saturday • Evening: 6 pm to 10 pm, Monday – Saturday 7 am to 10 pm, Sunday and Public Holidays • Night: 10 pm to 7 am the next day, Monday – Sunday
Regulation 117	In this Division, when the level of noise emitted from commercial, industrial and trade premises is assessed, the following sources of noise that could be expected at the proposed facility must not be taken into account: <ul style="list-style-type: none"> • Voices • Construction or demolition activity on building sites • Intruder, emergency or safety alarms or sirens • Equipment used in relation to an emergency • Non-commercial vehicles (except for maintenance activities).
Regulation 118	Defines noise as being unreasonable if it exceeds the Noise Protocol limits or the alternative assessment criteria that apply at an alternative assessment location. Defines the lowest base noise limits as follows: <ul style="list-style-type: none"> • Major urban area: Day: 45 dB L_{Aeq} Evening: 40 dB L_{Aeq} Night: 35 dB L_{Aeq} <p>The noise limit for commercial, industrial and trade premises for the night period must not exceed 55 dB L_{Aeq}.</p>
Regulation 119	If multiple existing or proposed premises emit noise that contributes to the effective noise level at a noise sensitive receiver, all reasonable steps must be taken by the premises' management to ensure the combined noise level does not exceed the noise limit.
Regulation 120	This regulation essentially identifies that tonal aspects of noise must be considered when considering unreasonable noise for section 3(1)(a)(v) of the Act. The Noise Protocol provides a method of assessing tonal characteristics of noise from commercial, industrial and trade premises, with additional guidance on low frequency noise available in EPA Victoria Publication 1996 <i>Noise guideline – assessing low frequency noise</i> .
Regulation 121	Noise emitted from commercial, industrial and trade premises is prescribed to be aggravated noise if it exceeds the noise limits by more than 15 dB, or the following if lower: <ul style="list-style-type: none"> • 75 dB L_{Aeq} during the day, • 70 dB L_{Aeq} during the evening, or • 65 dB L_{Aeq} during the night.

C3 EPA Victoria Publication 1826.5 – The Noise Protocol

As per the Division 1, Regulation 113 of the Regulations, assessment of noise within a sensitive area must be conducted in accordance with EPA Victoria Publication 1826.5 *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (Noise Protocol). The Noise Protocol outlines the EPA’s required approach to the determination of noise limits and to the measurement, prediction and analysis of noise.

D3.1 Section A – Determining noise limits for commercial, industrial and trade premises

The Noise Protocol provides two methods for deriving the relevant noise limits, the Urban area method, and the Rural area method. The proposed development is within a major urban area and therefore the Urban area method is applicable.

The noise limits are calculated taking into account land ‘zoning types’ within a 70 m and 200 m radius of a noise sensitive receiver. The Noise Protocol categorises land zones as type 1, 2 or 3.

Zone type designations consider the nature of the permitted land uses and are generally as follows:

- areas such as residential, rural and open space are type 1;
- areas such as commercial, business and light industry are type 2; and
- areas such as general industry and major roads are type 3.

A prescribed formula is used to calculate a corresponding Zoning Level. Greater areas of type 2 and 3 land within a 200 m radius of a noise sensitive site result in higher Zoning Levels than a site with respectively larger areas of type 1 land.

The noise limit is equal to the ‘zoning level’ unless the background level at the noise sensitive site is categorised as low or high according to clause 4 of the Policy. If the background level is low or high, the Noise Limit is calculated from a formula taking into account both the Zoning Level and the Background Level.

The current land use zones around the subject site are shown in the planning map, refer Appendix B. Details on the measured background levels are provided in Section 4.2.

The limits are separately defined for the day, evening and night periods as defined by Regulation 116. The noise limits applicable to this assessment, based on the land use and measured background noise levels are shown in Table 11 and Table 12.

Table 11: EP Regulations noise limits (R1)

Period	Day	Time	Zoning level	Background level, dB LA90	Noise limit, ENL
Day	Monday – Saturday	7 am – 6 pm	58	55	61
Evening	Monday – Saturday	6 pm – 10 pm	51	52	55
	Sunday and Public Holidays	7 am – 10 pm			
Night	Monday – Sunday	10 pm – 7 am	46	44	47

Table 12: EP Regulations noise limits (R2 – R4)

Period	Day	Time	Zoning level	Background level, dB LA90	Noise limit, ENL
Day	Monday – Saturday	7 am – 6 pm	56	55	61
Evening	Monday – Saturday	6 pm – 10 pm	50	52	55
	Sunday and Public Holidays	7 am – 10 pm			
Night	Monday – Sunday	10 pm – 7 am	45	44	47

D3.2 Section B – Assessing noise from commercial, industrial and trade premises

Noise from the facility that exceeds the noise limits is prescribed to be unreasonable by the Regulations. Part 7.6 of the EP Act in conjunction with Regulation 166 places the onus of compliance on industry by prohibiting the emission of unreasonable or aggravated noise.

For the purposes of this report and assessment of predicted noise levels, the noise limits apply up to 10 m from a dwelling, but within the property boundary.

Once a noise limit is established, an equivalent noise level (L_{Aeq}) due to the operation of the commercial premises is measured or predicted for a 30-minute operating period during the day, evening and night period as appropriate. If necessary, the L_{Aeq} noise level is adjusted for duration and noise character (tonality, impulsiveness, and intermittency) to give the effective noise level (ENL).

Consideration must be given to existing and future noise sensitive areas, factors that influence the propagation of sound (including atmospheric effects) and the cumulative contribution of noise from multiple existing and proposed sites.

C4 EPA Victoria Publication 1254.2 Noise Control Guidelines

D4.1 Waste collection

The following recommendations for industrial waste collections are outlined in the guideline:

- *Refuse bins should be located at sites that provide minimal annoyance to residential premises*
- *Compaction should be carried out while the vehicle is moving*
- *Bottles should not be broken up at the collection site*
- *Routes which service predominantly residential areas should be altered regularly to reduce early morning disturbances*
- *Noisy verbal communication between operators should be avoided where possible.*

The guidelines state:

Early-morning collections should be restricted to non-residential areas to minimise early morning disturbances. Where a residential area is impacted by noise from the collection of refuse, then collections should be restricted to the times contained within the schedule.

Schedule: Industrial waste collection

One collection per week

6:30am-8pm Monday to Saturday

9am-8pm Sunday and Public Holidays

Two or more collections per week

7am-8pm Monday to Saturday

9am-8pm Sunday and Public Holidays.

D4.2 Deliveries

The following items regarding deliveries to shops, supermarkets, and service stations are outlined in the guideline:

Where a residential area will be impacted by noise from deliveries, the deliveries should be inaudible in a habitable room of any residential premises (regardless of whether any door or window giving access to the room is open) outside the hours contained in the schedule

Schedule: Deliveries to shops, supermarkets & service stations

7am - 10pm Monday to Saturday

9am - 10pm Sunday and Public Holidays.

C5 Sleep disturbance

Guidance regarding the effects of noise on health is drawn from publications by peak health bodies such as the Australian Government Environmental Health Standing Committee (enHealth) and the World Health Organisation (WHO).

Supplementary guidance relevant to the assessment of the proposal are provided in Table 13.

Table 13: Noise health effect standards and guidelines relating to sleep disturbance

Reference	Overview
enHealth Environmental Health Standing Committee Australia <i>The health effects of environmental noise</i> June 2018	There is sufficient evidence of a causal relationship between environmental noise and both sleep disturbance and cardiovascular disease to warrant health-based limits for residential land uses: - Day period: 60 dB $L_{Aeq,16h}$ outside a façade. - Night period: 55 dB $L_{Aeq,8h}$ outside a façade. <i>While the term 'limits' in the EP Regulations 2021 refers to mandatory noise levels that must not be exceeded under the law, the 'limits' mentioned in this guideline document are advisory and do not carry the same legal obligation.</i>
WHO <i>Environmental Noise Guidelines for the European region</i> 2018	Contains guidance on adverse health impacts and effects on sleep from a number of noise sources but does not specifically include industry noise. The findings from European WHO studies may not be applicable for Australian traffic fleets and circumstances. Noise above these levels is associated with adverse health impacts and effects on sleep. - Road noise: 53 dB L_{den} and 45 dB L_{night} . - Rail noise: 54 dB L_{den} and 44 dB L_{night} .
WHO <i>Guidelines for community noise</i> 1999	Noise levels outside of facades at night should not exceed 45 dB L_{Aeq} and 60 dB L_{Amax} so that people may sleep with bedroom windows open. The 2018 WHO publication provides updated guidance on noise levels at night related to transportation noise. However, the 2018 publication notes that 1999 WHO guidelines remain valid for sources not covered by the 2018 publication (noting that industrial noise and construction noise are not covered by the 2018 publication).

A single external equivalent or maximum noise level for sleep disturbance has not been nominated for this assessment. Rather, the following outdoor sleep disturbance reference noise levels have been nominated based on the guidance presented in Table 13 to provide context to the predicted noise levels:

- 45 dB $L_{Aeq,8h}$ correlating to an internal noise level of approximately 30 – 35 dB $L_{Aeq,8h}$ in a bedroom with an open window.
- 55 – 60 dB L_{Amax} correlating to an internal noise level of approximately 45 dB L_{Amax} in a bedroom with an open window.

Predicted outdoor noise levels above these reference levels indicate an increasing likelihood of people needing to close windows to avoid sleep disturbance.

The reference noise levels do not represent:

- a noise level below which no-one will experience sleep disturbance or associated health effects
- a noise level above which sleep disturbance is certain to occur
- a noise level design target, or a noise level that can be 'polluted up to'.

APPENDIX D NOISE MEASUREMENTS

Attended noise measurements of K&M Automotive were conducted on 8 February 2021.

During the noise measurements, the conditions were dry and calm and suitably conducive to noise measurements.

Noise measurements were conducted using a Brüel and Kjær Type 2250 Sound Level Meter (serial number 3009588) located at a height of approximately 1.5 m in free field conditions and fitted with a proprietary windshield. The equipment was checked with a Casella CEL 110/1 calibrator (serial number 211353) before and after measurements and no significant drift in calibration was observed.

Noise measurements were conducted inside the K&M Automotive workshop and at an external location considered representative of the receiver expected to be most affected by noise levels from K&M Automotive.

The noise measurement location is shown in Figure 4.

Figure 4: Representative receiver noise measurement location



The noise levels measured at the representative receiver location are presented in Table 14.

Table 14: Measured noise levels, dB

Time	L _{Aeq}	L _{A90}	Comment
1317 hrs – 1347 hrs	44	36	The L _{Aeq} noise level was dominated by traffic movements on High Street Audible noise from K&M Automotive included radio noise and occasional brief hand tool noise During breaks in the traffic noise when K&M Automotive was audible the noise level was observed to be approximately 36 dB L _{eff}

Noise levels associated with K&M Automotive were generally masked by traffic noise at the receiver location.

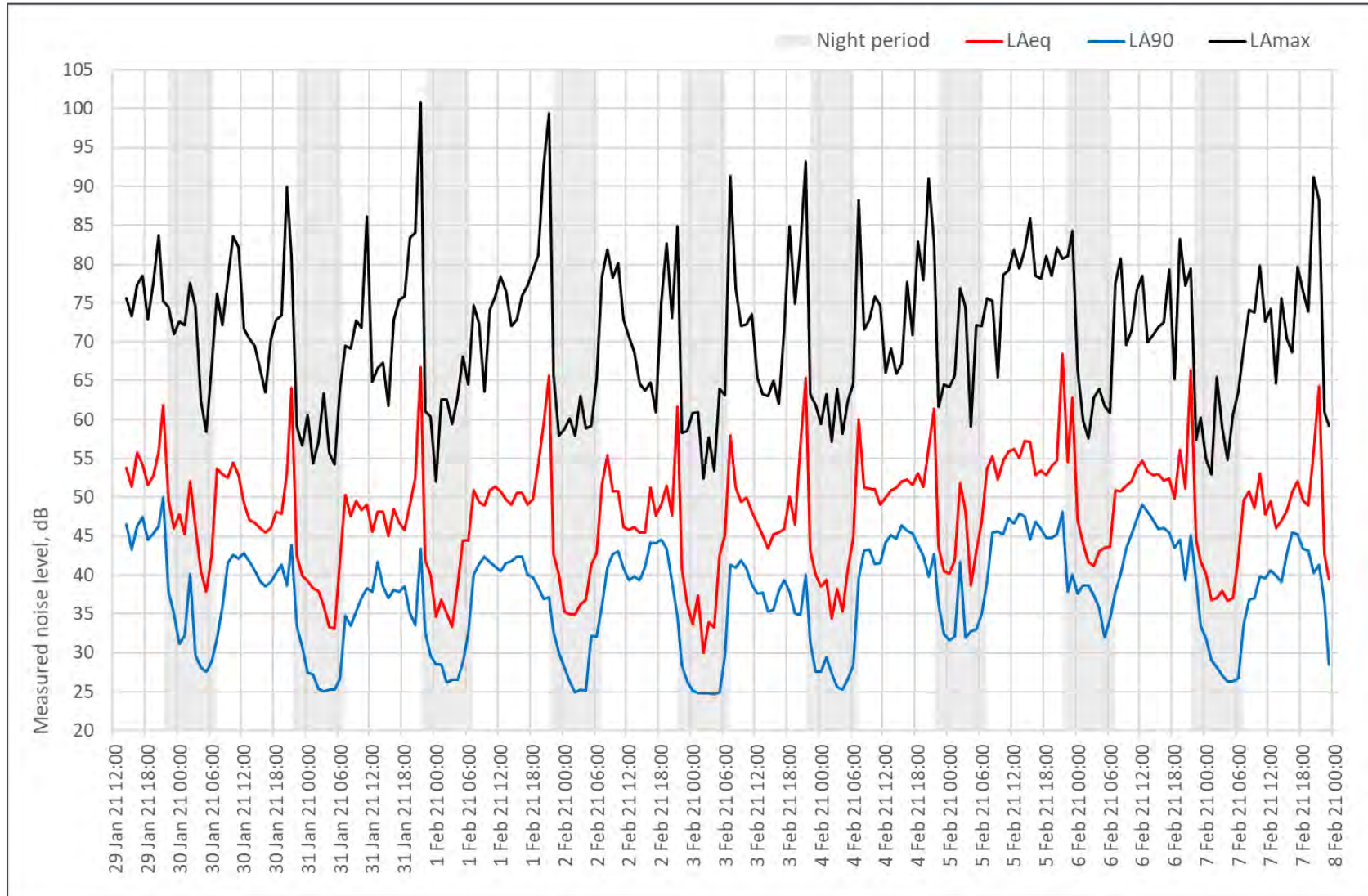
Further attended measurements were conducted of equipment identified by the owner and operator of K&M Automotive as associated with the highest noise emissions.

Table 15 below presents the measured equipment noise levels.

Table 15: Measured equipment noise levels, dB L_{eq}

Description	Octave band centre frequency, Hz							
	A	63	125	250	500	1k	2k	4k
Impact drill measured at 1 m	81	64	65	66	65	71	77	77
Electric hoist measured at 1 m	63	53	61	65	59	57	56	47

APPENDIX E NOISE MONITOR CHART



APPENDIX F NOISE MODELLING DATA AND INPUTS

ISO 9613-2:2024 *Acoustics – Attenuation of sound during propagation outdoors – Part 2: Engineering method for the prediction of sound pressure levels outdoors* (ISO 9613) specifies an engineering method for calculating noise at a known distance from a variety of sources under meteorological conditions that are favourable to sound propagation. The standard defines favourable conditions as downwind propagation where the wind blows from the source to the receiver within an angle of ± 45 degrees from a line connecting the source to the receiver, at wind speeds between approximately 1 m/s and 5 m/s, measured at a height of 3 m to 11 m above the ground. Equivalently, the method accounts for average propagation under a well-developed moderate ground based thermal inversion.

Accordingly, predictions on the basis of ISO 9613 account for the instances when local atmospheric conditions at the site favour the propagation of sound to surrounding receptor locations. Under alternative atmospheric conditions, such as when the wind is blowing from a receiver location to the development site, the noise levels would be lower than calculated.

To calculate far-field noise levels according to the ISO 9613, the noise levels of each source are firstly characterised in the form of octave band frequency levels. A series of octave band attenuation factors are then calculated for a range of effects including:

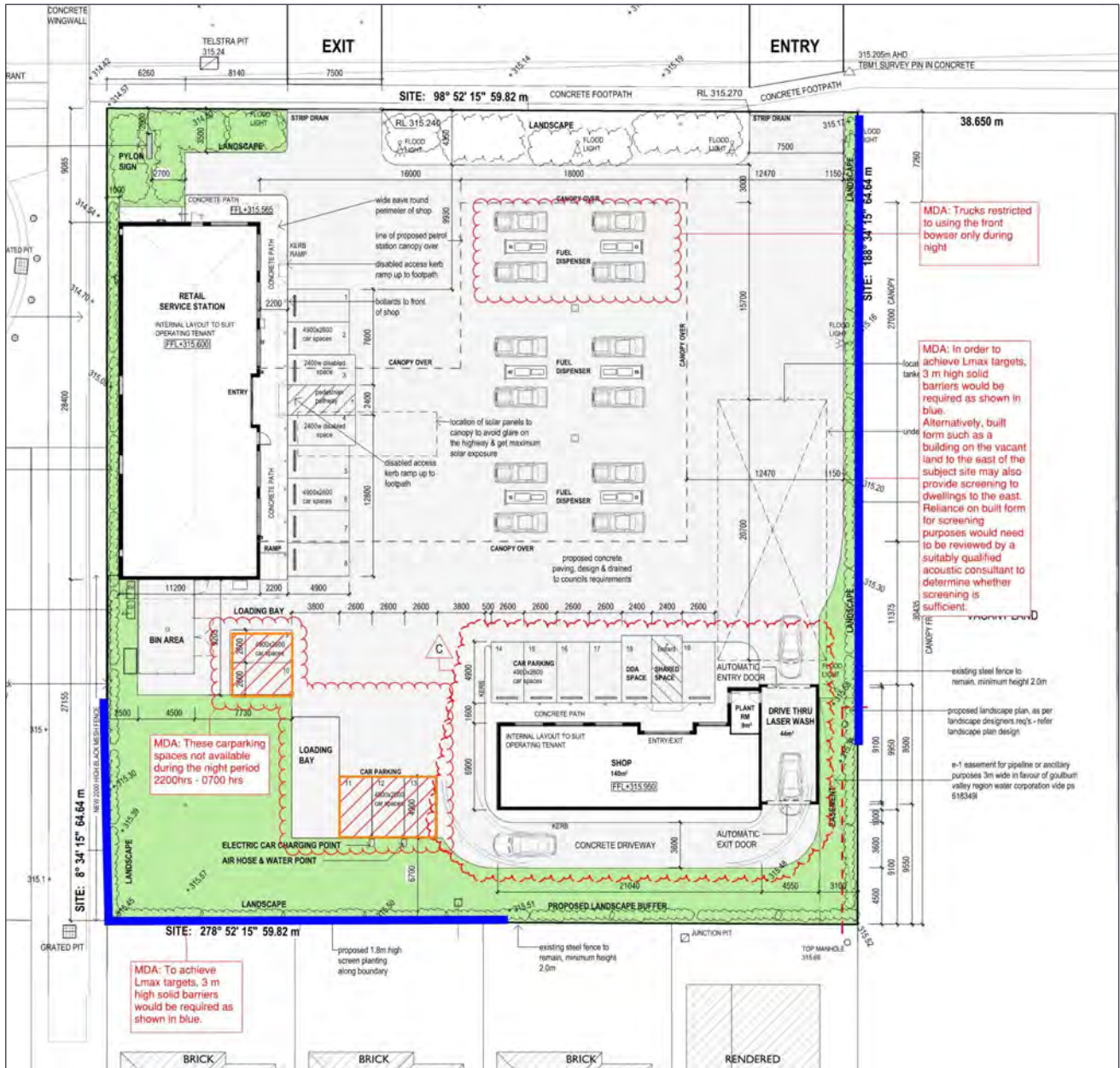
- Geometric divergence
- Air absorption
- Reflecting obstacles
- Screening
- Ground reflections.

The octave band attenuation factors are then applied to the noise data to determine the corresponding octave band and total calculated noise level at relevant receiver locations.

The following inputs have been referenced in the noise model to predict noise levels from onsite activities:

- Receivers at ground floor level 1.5 m above ground level
- Receiver locations positioned according to public aerial imagery (imagery sourced from Google Earth Pro and Nearmap)
- Flat terrain at the subject site and surrounding land
- Noise data for each source at the site as detailed in Appendix I
- Noise levels calculated to the locations expected to be most noise affected. For receiver locations separated from the subject site by an existing barrier, the most affected location is not expected to be directly at the property boundary but recessed slightly. Reflections from the receiver buildings' own facade are not included (i.e. free-field noise levels in accordance with the Noise Protocol).

APPENDIX G NOISE SCREENING AND MANAGERIAL CONTROL MARK-UP



APPENDIX H NOISE MODELLING SCENARIO – K&M AUTOMOTIVE

The following relevant information was provided by the owner and operator of K&M Automotive:

- Noise levels generated by the workshop are typically low on the basis that the workshop principally provides auto-electrician services
- The workshop typically operates 5-days per week and depending on workload will occasionally work on Saturdays (estimated by the owner and operator to be 3 Saturdays per year)
- During times where the workshop operates on a Saturday, the external roller doors tend to be closed
- No revving (“dyno testing”) of vehicles takes place at the premises.

The following noise modelling scenario has been considered in the assessment:

- An impact drill used for a cumulative duration of 5 minutes to remove four car wheels (conservative, it is understood that the impact drill would not be consistently operating for the full 5 minutes)
- Operation of a car hoist to raise a vehicle off the ground for a cumulative duration of 20 seconds (the car hoist does not generate noise during lowering as it is a passive process)
- Noise emitting activities occurring inside the workshop with the three large garage roller doors open to their full extent
- A single air conditioning condenser located at the south of the building at 1.8 m height with noise levels as presented in Table 16.

Table 16: Representative air conditioner noise levels, dB L_w

Description	Octave band centre frequency, Hz							
	A	63	125	250	500	1k	2k	4k
Mitsubishi PUZ-ZM71VHA-AR1	68	72	71	72	63	62	58	52

- A +2 dB character adjustment should be applied to the total cumulative predicted noise level to account for the potential impulsiveness character associated with use of the impact drill at K&M Automotive.

APPENDIX I NOISE LEVELS OF ON-SITE EQUIPMENT AND ACTIVITIES

Manufacturers' noise level data and data from previous noise surveys conducted by MDA have been used to predict noise levels at the subject site.

Noise level data used in our assessment is provided below.

I1 Deliveries, waste collection and customer trucks

MDA has measured noise levels from truck movements and waste collections on numerous occasions and determined the sound power level data for these activities.

The sound power level data provided in Table 17 has been used to predict the noise level at the nearest affected residential receivers from deliveries and waste collection.

Table 17: Sound power level of delivery and waste collection, vehicles and activities, dB L_w

Source	Octave Band Centre Frequency, Hz							
	A	63	125	250	500	1000	2000	4000
Semi-trailer truck (HRV) pass-by (e.g. Fuel delivery)	106	109	111	106	101	100	98	93
Medium Rigid Vehicle (MRV) pass-by (eg. Customer truck)	100	100	98	96	96	96	93	89
Van/Semi Rigid Vehicle (SRV) pass-by (e.g. Goods delivery)	93	93	91	89	89	89	86	79
Garbage truck movement pass-by	102	102	100	98	98	98	95	88
Garbage bin emptying	96	99	99	93	91	90	91	87

I2 Vehicle movements and patron activities

Patron activities on this site will consist of cars using the parking areas, braking, doors closing, start-up and accelerating, as well as conversation and laughter.

MDA have calculated maximum sound power levels based on measurements from numerous noise surveys and provide a summary in Table 18.

Table 18: Maximum sound power level of vehicle movements and patron activities, dB L_{max}

Source	Octave band centre frequency, Hz							
	A	63	125	250	500	1000	2000	4000
'Normal' car (includes door close and vehicle start-up)	95	110	103	96	90	87	85	82
'Worst-case' car ¹ (includes door close and vehicle start-up)	103	111	109	105	99	97	93	93
Truck (includes door close and vehicle start-up)	114	116	111	106	104	103	102	111
Conversation and laughter	98	62	71	87	91	95	91	85

1 A 'worst-case' car is defined as a V8 or high-powered vehicle being driven in an aggressive manner.

