

3 – Environmental Noise Impact Report

Planning Proposal – SP16097 – Apollo Fabrications (June 2023)



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Environmental Noise Impact Report

Planning Proposal – Rezoning Application
Telegraph Road, Young, NSW

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1.0 EXECUTIVE SUMMARY

Apollo Fabrications operates a steel fabrication facility at 10-12 Telegraph Road, Young, NSW. The facility operates under Existing Use Rights on land zoned *R1 – General Residential/RE1 – Public Recreation*.

A summary of Apollo's landholdings and their current zonings under the Young Local Environmental Plan (LEP) 2010 are detailed in Section 3.0 of this report. Apollo's landholdings are bounded by Telegraph Road to the north, rural properties (*RU4 – Primary Production Small Lots*) to the east and south, land zoned *RE1 – Public Recreation* to the south and residential properties zoned *R1 – General Residential* to the west.

Following the acquisition of several parcels of land to the east and west of the existing steel fabrication facility, Apollo Fabrications intend to submit a Planning Proposal to Hilltops Council. *"The Planning Proposal intends to amend planning provisions relating to land holdings, currently owned and controlled by Apollo Fabrications, that will enable the use of the land for industrial purposes, specifically steel fabrication. The Planning Proposal will also help inform the draft Hilltops Local Environmental Plan that has received Gateway approval from NSW Department of Planning Industry & Environment (DPIE) and is currently on public exhibition."*¹

The Young Local Environmental Plan (LEP) 2010 amendment will permit the ongoing use of the existing steel fabrication facility, the use of the acquired parcels of land for industrial developments, and the subsequent construction of a new purpose-built industrial workshop on the acquired parcels of land to the east and west.

The construction of new purpose-built industrial workshops will ensure the acoustic amenity of the local area can be protected, and the status quo improved upon, through the building design and day-to-day use of workshops themselves. Critically, the initial works of the development, which includes a new purpose-built workshop (surface treatment/storage and loading facility) on 20 Telegraph Road, will reduce the need for noisy works to take place outside on the southern side of the existing steel fabrication facility at 10-12 Telegraph Road, including the decommissioning of the existing blasting chamber and paint shop.

The industrial buildings will generally be used for the assembly and the distribution of fabricated steel. The main sources of noise associated with steel fabrication facilities include shot blasting chambers which generally comprise of a shot blasting gun, exhaust fan, compressor and a blast pot, the loading / unloading of fabricated steel onto / off heavy vehicles by forklifts or overhead cranes and light, medium and heavy vehicle movements on the site, entering and exiting the site and on the local roads.

An acoustic report prepared by a suitably qualified acoustic consultant is generally required to accompany a Planning Proposal, where changes to the local acoustic amenity are likely.

This Environmental Noise Impact Report determines the acceptable noise limits for nearby noise sensitive receivers and provides recommendations to ensure the noise limits are met by any future industrial developments.

¹ Statement provided via email correspondence with Michael Esber of Premier National, Wednesday 17 March, 2021.



Acceptable noise limits for this Planning Proposal are derived from the NSW Environment Protection Authority's (EPA) *Noise Policy for Industry (NPI) 2017* and *NSW Road Noise Policy (RNP)* for potential future noise impacts at nearby noise sensitive receivers and are presented in Section 5 of this report.

Recommendations are provided in Section 7 of this report to ensure noise emissions from any future use of the rezoned landholdings are within acceptable limits.

Provided the recommendations in Section 7 of this report are implemented and adhered to, the operation of industrial developments on the rezoned landholdings will meet the EPA's noise limits during the day, evening and night, and therefore be considered acceptable.



2.0 CONSULTING BRIEF

Day Design Pty Ltd was engaged by Apollo Fabrications to provide an environmental noise impact report to accompany the Planning Proposal to rezone their landholdings at 2, 4, 10, 12 and 20 Telegraph Road, Young, NSW.

This commission involves the following:

Scope of Work:

- Inspect the site and environs
- Prepare a site plan identifying the proposal and nearby noise sensitive locations
- Establish acceptable noise level criteria
- Quantify noise emissions from the site
- Calculate the level of noise emission, taking into distance attenuation, screen walls, ground absorption, etc
- Measure the level of noise emission from the site during approved operation
- Provide recommendations for noise controls (if necessary)
- Prepare an Environmental Noise Impact Report.



3.0 SITE & DEVELOPMENT DESCRIPTION

3.1 Site Description

Apollo Steel Fabrication Facility is located at 10-12 Telegraph Road, Young, NSW on land zoned *R1 – General Residential* and *RE1 – Public Recreation* under Young Local Environmental Plan (LEP) 2010 and operates under Existing Use Rights.

Apollo Fabrications has recently acquired several parcels of land in the surrounding area around their existing steel fabrication facility. A summary of Apollo's landholdings and their current zonings under the Young Local Environmental Plan (LEP) 2010 are detailed below:

- Lot 1 DP 736225 2 Telegraph Rd, Young *R1 – General Residential;*
- Lot 2 DP 736225 4 Telegraph Rd, Young *R1 – General Residential; (TBC)*
- Lot 3 DP 845187 10 Telegraph Rd, Young *R1 – General Residential;*
- Lot 12 DP 845187 10 Telegraph Rd, Young *RE1 – Public Recreation; (TBC)*
- Lot 4 DP 845187 12 Telegraph Rd, Young *R1 – General Residential;*
- Lot 1171 DP 754611 20 Telegraph Rd, Young *RU4 – Primary Production Small Lots/
RE1 – Public Recreation;*
- Lot 1154 DP 754611 20 Telegraph Rd, Young *RU4 – Primary Production Small Lots/
RE1 – Public Recreation;*
- Lot 1199 DP 754611 20 Telegraph Rd, Young *RU4 – Primary Production Small Lots/
RE1 – Public Recreation; and*
- Lot 3 DP 374948 20 Telegraph Rd, Young *RU4 – Primary Production Small Lots/
RE1 – Public Recreation.*

Apollo's landholdings are bounded by Telegraph Road to the north, rural properties (*RU4 – Primary Production Small Lots*) to the east and south, land zoned *RE1 – Public Recreation* to the south and residential properties zoned *R1 – General Residential* to the west.



The nearest noise sensitive receivers to the landholdings, to the north, east, south and west, are shown on Figure 2 and as follows in Table 1.

Table 1 Noise Sensitive Receivers

Receiver, Type and Zoning	Address	Direction from site
R1 – Commercial - <i>Young Showground</i> <i>RE2 - Private Recreation</i>	Lot 1895 – DP 754611	North-West
R2 – Residential Dwellings <i>RU4 - Primary Production</i> <i>Small Lots</i>	Lot 1 – DP 1154988, Lot 3 – DP 884044, Lot 2 – DP 240789, Lots 1, 2, 3 – DP 565066, Lots 5, 6 – DP 204789	North to North-East
R3 – Residential Dwellings <i>RU4 - Primary Production</i> <i>Small Lots</i>	Lots 1, 2 – DP 374948, Lot 1 – DP 374004, Lot 1 – DP 373540, Lots 1190, 1191 – DP 754611	East
R4 – Residential Dwellings <i>RU4 - Primary Production</i> <i>Small Lots</i>	Lots 1442, 1497 – DP 754611	South-East
R5 – Residential Dwellings <i>RU4 - Primary Production</i> <i>Small Lots</i>	Lots 1138, 2299 – DP 754611	South
R6 – Residential Dwellings <i>RU4 - Primary Production</i> <i>Small Lots</i>	Lot 1076 – DP 655725	South
R7 – Residential Dwellings <i>RU4 - Primary Production</i> <i>Small Lots</i>	Lot 51 – DP 804598	South
R8 – Residential Dwellings <i>R1 - General Residential</i>	Lots 1726, 1727, 1759, 2411 – DP 754611	South-West
R9 [†] – Commercial* <i>RE1 - Public Recreation/</i> <i>RU4 Primary Production</i> <i>Small Lots</i>	Lots 2133/2120 – DP 754611	North
R10 [†] – Passive Recreation <i>Victoria Creek</i> <i>RE1 - Public Recreation</i>	DP 1165940	South

[†]The NSW Noise Policy for Industry defines the time of day to assess both Commercial and Passive Recreation receiver locations as 'When in Use' (Table 2.2). Receiver locations R9 and R10 are not generally used by people for defined or prolonged periods of time, and are therefore not considered as



critical (noise sensitive) receiver locations in this assessment. No further consideration is given to Receiver locations R9 and R10 in this assessment.

*Day Design has been advised that an application to change the zoning of this receiver location to RE2 - Private Recreation is currently under assessment - 'the intended use of the site is in association with the Young Showground within the Young Equine Precinct'. Day Design has been advised that the site is currently used to house horses.

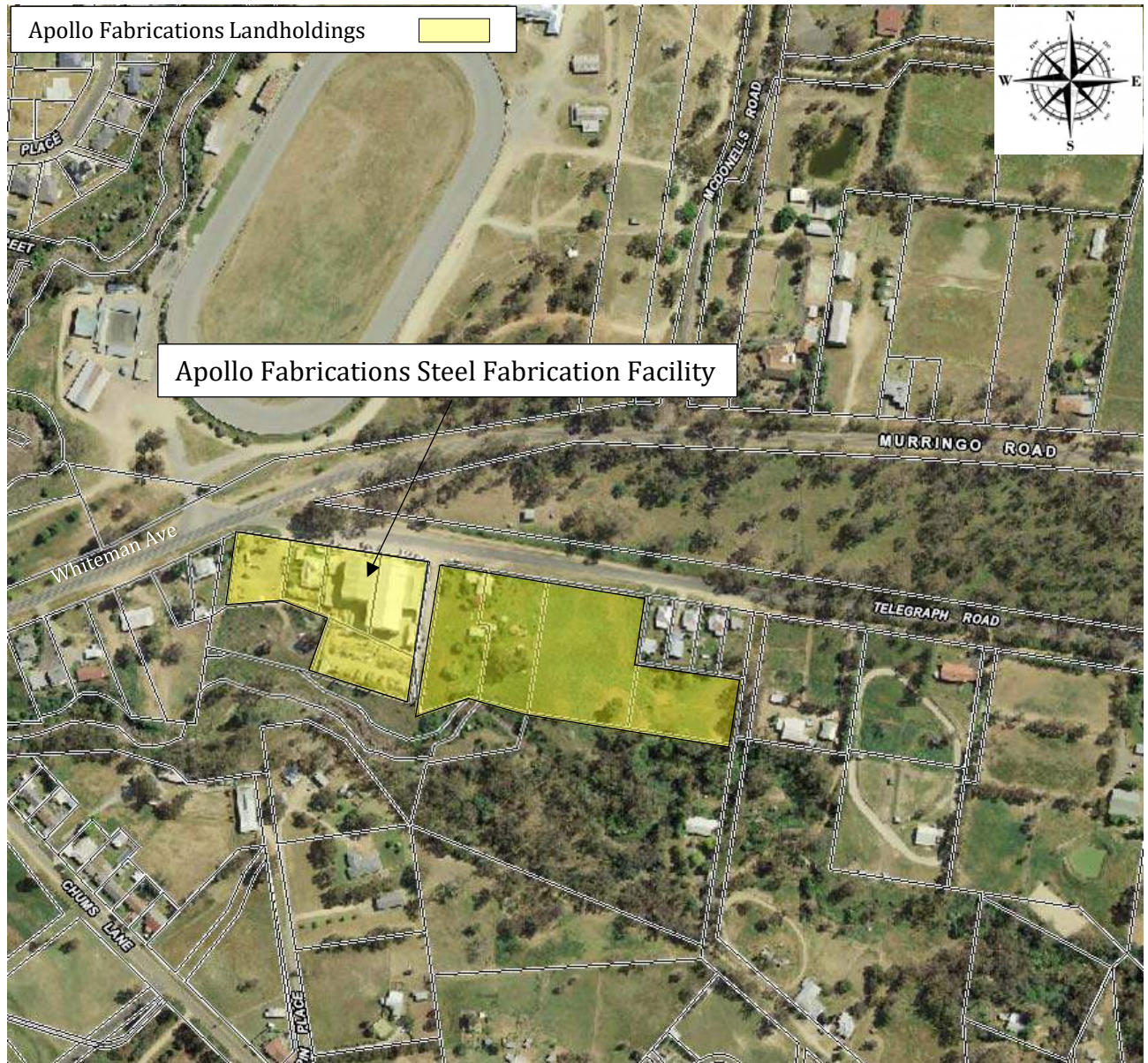


Figure 1 – Site Plan – Apollo Fabrications Landholdings, 2 - 4, 10 - 12 & 20 Telegraph Road, Young, NSW

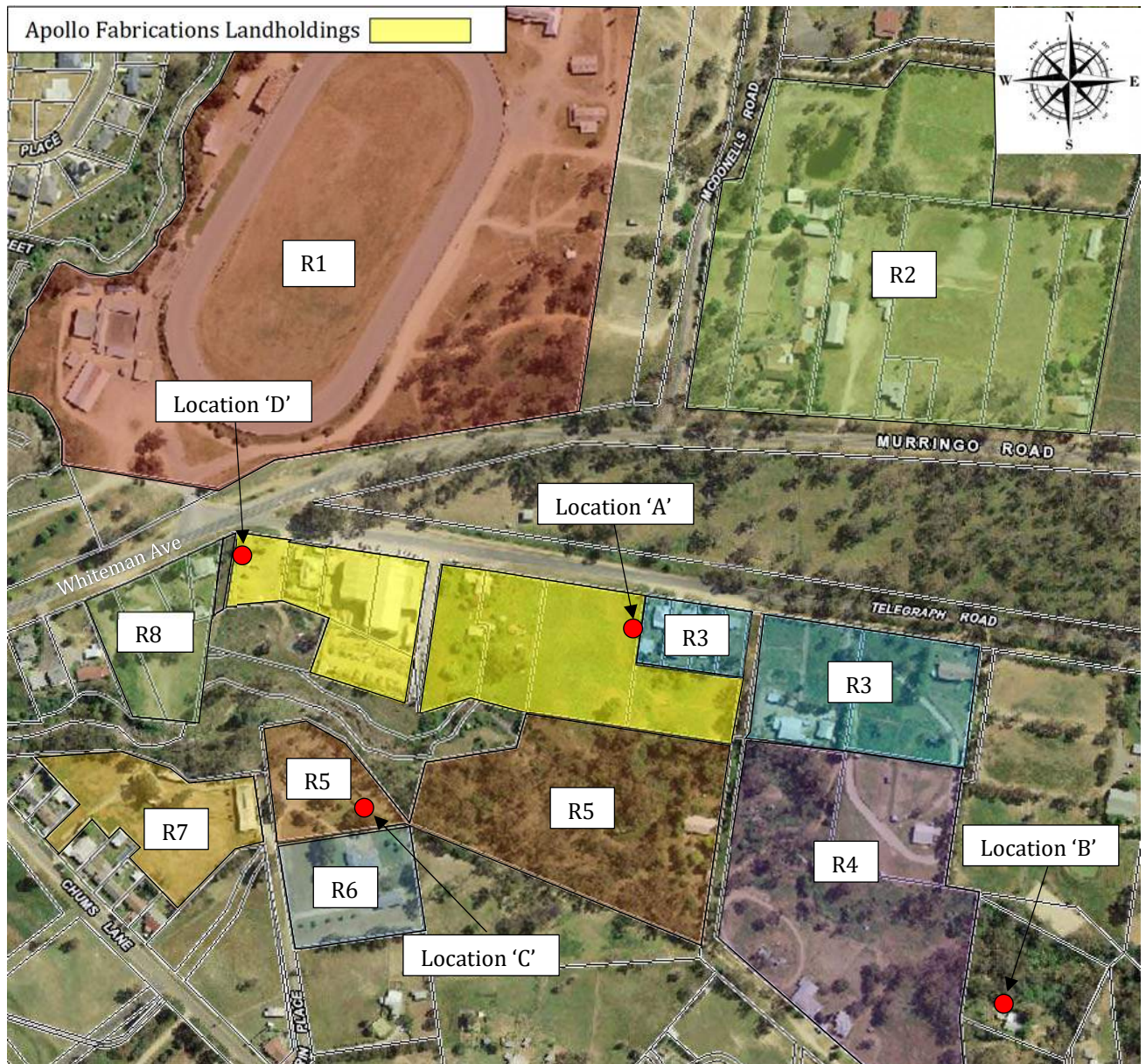


Figure 2 – Site Context – Apollo Fabrications Landholdings & Surrounding Noise Sensitive Receivers

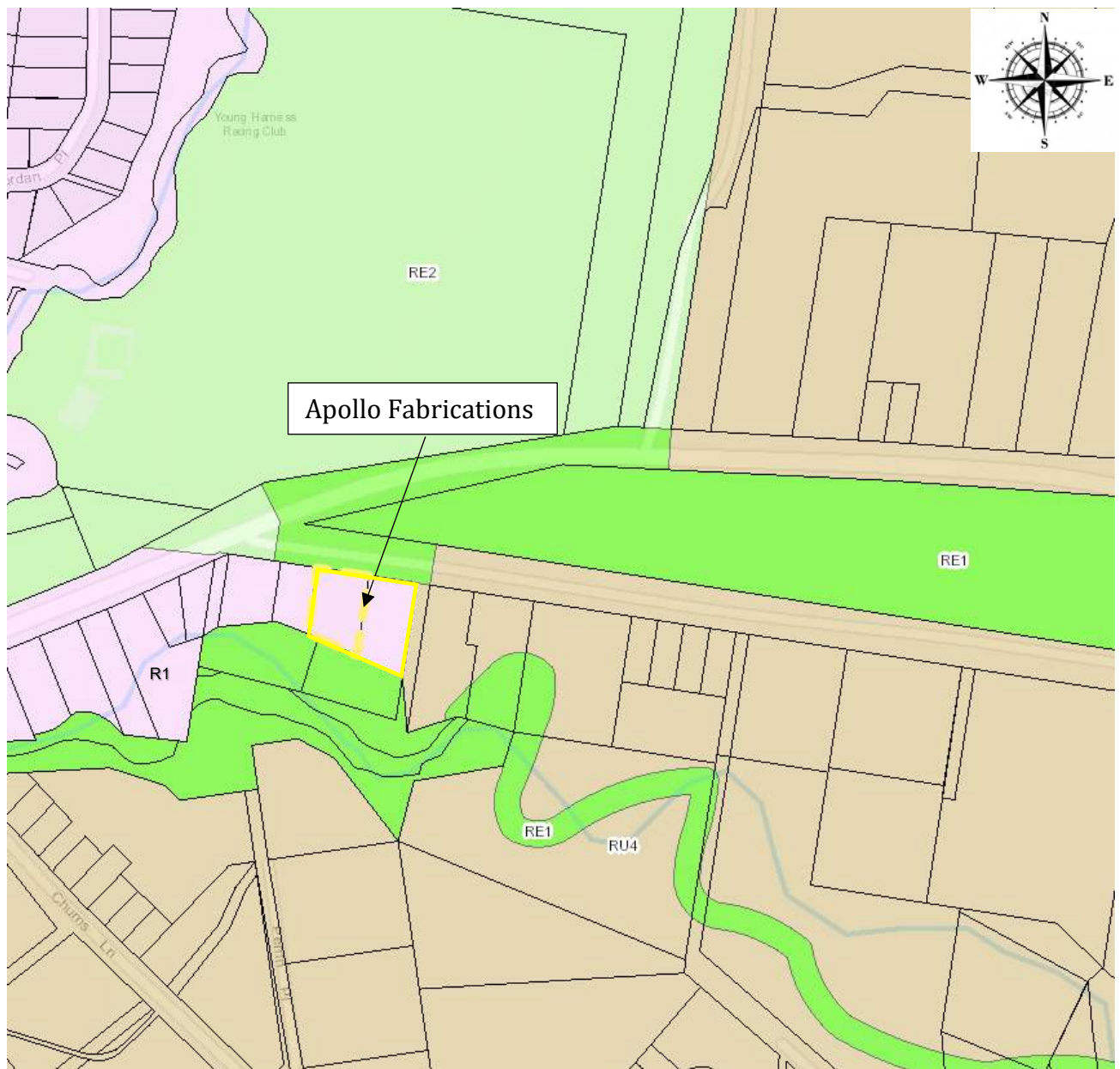


Figure 3 – Surrounding Land Zoning - Young Local Environmental Plan (LEP) 2010



3.2 Development Description

Following the abovementioned acquisition of several parcels of land to the east and west of the existing steel fabrication facility - Apollo Fabrications' Landholdings are shown in Figures 1 and 2 - Apollo Fabrications intend to submit a Planning Proposal to Hilltops Council. *"The Planning Proposal intends to amend planning provisions relating to land holdings, currently owned and controlled by Apollo Fabrications, that will enable the use of the land for industrial purposes, specifically steel fabrication. The Planning Proposal will also help inform the draft Hilltops Local Environmental Plan that has received Gateway approval from NSW Department of Planning Industry & Environment (DPIE) and is currently on public exhibition."*

The Young Local Environmental Plan (LEP) 2010 amendment will permit the ongoing use of the existing steel fabrication facility, the use of the acquired parcels of land for industrial developments, and the subsequent construction of a new purpose-built industrial workshop on the acquired parcels of land to the east and west.

The overall site plan is shown in the attached Appendix B.

The construction of new purpose-built industrial workshops will ensure the acoustic amenity of the local area can be protected, and the status quo improved upon, through the building design and day-to-day use of workshops themselves. Of critical importance, the initial works of the development scheduled for 2023-2025 will include the construction of the new surface treatment/storage and loading facility on 20 Telegraph Road, which will allow all of the main noise generating activities - blasting, painting, handling of material, loading of trucks, movement of forklifts - that currently take place on the southern side of the existing steel fabrication facility at 10-12 Telegraph Road to take place within a new workshop (Note: the existing blasting chamber and paint shop on 10-12 Telegraph Road will be decommissioned as part of the initial works). All additional works will also include the construction of purpose-built workshops to ensure minimal noise transmission to the local surrounding area. The site will also operate under a noise management plan – see Section 7 of this report.

The industrial workshops will generally be used for the assembly and the distribution of fabricated steel.

The Planning Proposal envisages the site to operate as follows:

- **2-4 Telegraph Road – Ancillary light metal and small-scale engineering to support 20 Telegraph Road:**
 - *Manufacturing* *Steel processing, including movement of steel products within the workshop. Storage of material (mainly sheet metal), with the use of metal guillotine and press, rolling equipment, lathes and milling machines.*
 - *Loading/unloading* *Onsite loading and unloading of trucks/trailers for inward bound raw steel product and outward bound finished product, including load strap-down within the workshop.*



- *Delivery off-site* *Loaded trailers/prime-movers exiting site for delivery to customer sites from within the workshop with any afterhours departure from 20 Telegraph Road (only).*
- *Site Maintenance* *Routine setup, clean-up, shutdown activities within the workshop.*
- *Office Administration* *General office administration for management of business and operational activities.*
- **10-12 Telegraph Road – Steel and plate processing centre:**
 - *Manufacturing* *Plate processing, including the movement of plate steel products within the workshop. Plasma plate profiling system to support 20 Telegraph Road, storage of material (mainly plate steel), general maintenance including service of machinery (forklifts, trucks, etc).*
 - *Loading/unloading* *Onsite loading and unloading of trucks/trailers for inward bound raw steel product and outward bound finished product, including load strap-down within the workshop.*
 - *Delivery off-site* *Loaded trailers/prime-movers exiting site for delivery to customer sites from within the workshop, with any afterhours departure from the existing 'after hours delivery vehicle departure area' (see Appendix B) on 10-12 Telegraph Road or 20 Telegraph Road.*
 - *Site Maintenance* *Routine setup, clean-up, shutdown activities within the workshop.*
 - *Office Administration* *General office administration for management of business and operational activities.*
- **20 Telegraph Road – New main steel fabrication workshops:**
 - *Manufacturing* *Steel manufacturing, movement of steel products within the workshops.*
 - *Blasting & Painting* *Blast room and painting within designated areas within the workshops.*
 - *Loading/unloading* *Onsite loading and unloading of trucks/trailers for inward bound raw steel product and outward bound finished product, including load strap-down within the workshops.*
 - *Delivery off-site* *Loaded trailers/prime-movers exiting site for delivery to customer sites from within the workshops.*
 - *Site Maintenance* *Routine setup, clean-up, shutdown activities within the workshops.*



- *Office Administration* *General office administration for management of business and operational activities.*

The proposed operating hours of the industrial site are as follows:

- **2-4 Telegraph Road:**

- Monday – Friday 7.00 am – 6.00 pm;
- Saturdays 7.00 am – 1.00 pm; and
- Sundays and Public Holidays No Works.

- **10-12 Telegraph Road:**

Manufacturing:

- Monday – Friday 7.00 am – 6.00 pm; and
- Saturdays 7.00 am – 1.00 pm.

Loading/unloading:

- Monday – Friday 5.00 am – 10.00 pm; and
- Saturdays 5.00 am – 3.00 pm.

Delivery off - site:

- Monday – Sunday 24 hours.

Site Maintenance:

- Monday – Saturday 7.00 am – 6.00 pm.

Office Administration:

- Monday – Sunday 5.00 am – 10.00 pm.

- **20 Telegraph Road:**

- Monday – Sunday 24 hours.

We have been advised that 90% of all truck movement across the entire site will take place along the front of the buildings, ie the northern side, adjacent to Telegraph Road, with the back access to the buildings for occasional access only and not to be used as a thoroughfare. The overall site plan proposed vehicle movement plan is shown in the attached Appendix C.

The main sources of noise associated with steel fabrication facilities include a shot blasting chamber which generally comprises of a shot blasting gun, exhaust fan, compressor and a blast pot, the loading/unloading of fabricated steel onto/off heavy vehicles by forklifts or overhead cranes and light, medium and heavy vehicle movements on the site, entering and exiting the site and on the local roads.



4.0 NOISE SURVEY INSTRUMENTATION

Noise level measurements and analysis were made with instrumentation as follows in Table 2:

Table 2 Noise Instrumentation

Description	Model No.	Serial No.
Infobyte Noise Logger (Type 1)	iM4	103
Condenser Microphone 0.5" diameter	MK 250	7371
Infobyte Noise Logger (Type 1)	iM4	105
Condenser Microphone 0.5" diameter	MK 250	7112
Infobyte Noise Logger (Type 2)	iM4	112
Condenser Microphone 0.5" diameter	MK 250	112
Infobyte Noise Logger (Type 1)	iM4	122
Condenser Microphone 0.5" diameter	MK 250	5219
Acoustical Calibrator	B&K 4231	272 1949
Acoustical Calibrator	B&K 4231	209 5415
Acoustical Calibrator	B&K 4231	302 1796
Acoustical Calibrator	Svantek	SV30A

An environmental noise logger is used to continuously monitor ambient noise levels and provide information on the statistical distribution of noise during an extended period of time. The Infobyte Noise Monitor iM4s are a Type 1 or Type 2 precision environmental noise monitor meeting all the applicable requirements of AS1259 for an integrating-averaging sound level meter.

All instrument systems had been laboratory calibrated using instrumentation traceable to Australian National Standards and certified within the last two years thus conforming to Australian Standards. The measurement system was also field calibrated prior to and after noise surveys. Calibration drift was found to be less than 1 dB during unattended measurements. No adjustments for instrument drift during the measurement period were warranted.



5.0 NOISE CRITERIA

This section presents the noise guidelines applicable to this Planning Proposal and establishes the Project Noise Trigger Levels for any future industrial developments.

5.1 Existing Ambient Noise Levels

5.1.1 Description of Existing Acoustic Environment

Site inspections of the residential areas surrounding Logger Locations 'A' to 'D' were conducted by the author or Day Design Staff during the placement and retrieval of the noise loggers with the following observations made:

5.1.1.1 Logger Location 'A' – Located in the Free Field

- the area is dominated by 'urban hum', predominantly industrial noise from 10-12 Telegraph Road, with occasional road traffic noise from Telegraph Road and more consistent, distant road traffic noise from Murringo Road during the day;
- the area is dominated by 'natural sounds', predominantly local fauna with occasional road traffic noise from Telegraph Road and slightly more consistent, distant road traffic noise from Murringo Road during the evening and night;
- the area is in close proximity to an existing industrial premises – 10-12 Telegraph Road.

5.1.1.2 Logger Location 'B' – Located in the Free Field

- the area is dominated by 'urban hum', predominantly distant industrial noise from 10-12 Telegraph Road, Ambos Stockfeed at 90 Telegraph Road² and to a lesser extent Complete Auto Detailing at 16 Hintons Road and local agricultural noise from surrounding properties, with occasional distant road traffic noise from Telegraph Road and more consistent, distant road traffic noise from Murringo Road during the day;
- the area is dominated by 'natural sounds', predominantly local fauna with occasional distant road traffic noise from Telegraph Road and slightly more consistent, distant road traffic noise from Murringo Road during the evening and night;
- the area is in relatively close proximity to two industrial premises – 10-12 and 90 Telegraph Road.

² The industrial premises at 90 Telegraph Road is on the opposite side of several residential receiver locations. Industrial premises have a higher project amenity noise level limit/criteria (68 dBA *Leq, 15 minute*) than residential receivers, therefore compliance at the nearby residential receivers located in-between the two industrial premises will ensure compliance at 90 Telegraph Road.



5.1.1.3 *Logger Location 'C' - Located in the Free Field*

- the area is dominated by 'urban hum', predominantly distant industrial noise from 10-12 Telegraph Road and local agricultural noise from surrounding properties, with occasional distant road traffic noise from Telegraph Road and more consistent, distant road traffic noise from Murringo Road and Whiteman Avenue during the day;
- the area is dominated by 'natural sounds', predominantly local fauna with occasional distant road traffic noise from Telegraph Road and slightly more consistent, distant road traffic noise from Murringo Road and Whiteman Avenue during the evening and night;
- the area is in relatively close proximity to an industrial premises – 10-12 Telegraph Road.

5.1.1.4 *Logger Location 'D' - Located in the Free Field*

- the area is dominated by 'urban hum', predominantly industrial noise from 10-12 Telegraph Road, with occasional road traffic noise from Telegraph Road and more consistent, road traffic noise from Murringo Road / Whiteman Avenue during the day;
- the area is dominated by 'natural sounds', predominantly local fauna with occasional road traffic noise from Telegraph Road and slightly more consistent, road traffic noise from Murringo Road/Whiteman Avenue during the evening and night;
- the area is in close proximity to an existing industrial premises – 10-12 Telegraph Road.

5.1.2 **Measure Ambient Noise Levels**

In order to assess the severity of a possible environmental noise problem in a residential area it is necessary to measure the ambient background noise level at the times and locations of worst possible annoyance. The lower the background noise level, the more perceptible the intrusive noise becomes and the more potentially annoying.

The ambient L_{90} background noise level is a statistical measure of the sound pressure level that is exceeded for 90% of the measuring period (typically 15 minutes).

The Rating Background Level (RBL) is defined by the NSW EPA as the median value of the (lower) tenth percentile of L_{90} ambient background noise levels for the day, evening or night time periods, measured over a number of days during the proposed days and times of operation.

The location of the nearby noise sensitive receivers are shown in the Site Plan on Figure 2 as 'R1' to 'R8'. The times of worst possible annoyance will be during the night when ambient noise levels are generally at their lowest and industrial development may be operating.



Ambient noise levels were previously measured with environmental noise loggers over nine (9) days from Wednesday 1 November to Thursday 9 November 2017 and also over 11 days from Tuesday 20 October to Friday 30 October 2020. The locations of the environmental noise loggers are shown as Locations 'A', 'B', 'C' and 'D' in Figure 2.

The ambient noise levels are presented in the attached Appendix A1, A2, A3 and A4, and also in Table 3.

Table 3 Ambient Noise Levels

Noise Measurement Location	Date & Time Period	L ₉₀ Rating Background Level	Existing Leq Noise Level
Location 'A' - Eastern Boundary, 20 Telegraph Road	<i>20/10 – 30/10/2020</i>		
	Day (7 am to 6 pm)	44 dBA	57 dBA
	Evening (6 pm to 10 pm)	33 dBA	52 dBA
	Night (10 pm to 7 am)	26 dBA	44 dBA
Location 'B' - 41 Hintons Road	<i>20/10 – 30/10/2020</i>		
	Day (7 am to 6 pm)	39 dBA	56 dBA
	Evening (6 pm to 10 pm)	37 dBA	56 dBA
	Night (10 pm to 7 am)	33 dBA	53 dBA
Location 'C' - 45 Chums Lane	<i>1/11 – 9/11/2017</i>		
	Day (7 am to 6 pm)	39 dBA	51 dBA
	Evening (6 pm to 10 pm)	32 dBA	45 dBA
	Night (10 pm to 7 am)	25 dBA	43 dBA
Location 'D' - Western Boundary, 2 Telegraph Road	<i>20/10 – 30/10/2020</i>		
	Day (7 am to 6 pm)	45 dBA	58 dBA
	Evening (6 pm to 10 pm)	36 dBA	56 dBA
	Night (10 pm to 7 am)	28 dBA	48 dBA

Meteorological conditions during the testing from Wednesday 1 November to Thursday 9 November 2017 typically consisted of clear skies and temperatures of 3 to 27°C. Weather affected data (rain or wind speeds ≥ 5 m/s) has been removed from the assessment period. Atmospheric conditions were otherwise ideal for noise monitoring, and were therefore considered reliable and typical for the receiver area.

Meteorological conditions during the testing from Tuesday 20 October to Friday 30 October 2020 typically consisted of clear skies and temperatures of 5 to 28°C. Weather affected data (rain or wind speeds ≥ 5 m/s) has been removed from the assessment period. Atmospheric conditions were otherwise ideal for noise monitoring, and were therefore considered reliable and typical for the receiver area.



Fact Sheet A: Determining existing noise levels, Section A1 of the NPI states the following in relation to determining background noise levels:

Background noise levels need to be determined before intrusive noise can be assessed. The background noise levels to be measured are those that are present at the time of the noise assessment and without the subject development operating. For the assessment of modifications to existing premises, the noise from the existing premises should be excluded from background noise measurements. The exception is where the premises has been operating for a significant period of time and is considered a normal part of the acoustic environment; it may be included in the background noise assessment under the following circumstances:

- the development must have been operating for a period in excess of 10 years in the assessment period/s being considered and is considered a normal part of the acoustic environment; and*
- the development must be operating in accordance with noise limits and requirements imposed in a consent or licence and/or be applying best practice.*

Day Design has been advised that the existing industrial premises at 10-12 Telegraph Road has been operating similarly from between 1986 and the mid-1990's, and has been operating under generally all of the same steel fabrication aspects/processes from the mid-1990's to the current day. Day Design has also been advised that the current owners – Apollo Fabrications, 2010 to current day – are applying best practices (eg installation of noise barriers, treating noisy plant equipment with acoustically lined ductwork, etc) for day to day operations.

Therefore, considering the above, any ambient noise measurements must also take into consideration the noise contribution to the surrounding area from the operation of existing industrial premises (10-12 Telegraph Road) and local agriculture within the local area, as it forms part of the existing acoustic environment – the noise from the operation of industrial premises and local agriculture is typical/expected in this area.

Section B1.1 'Instrument requirements and siting', paragraph 2 of the *NPI* requires monitoring to take place at a 'site that is truly representative of the noise environment at the residence'.

Section B1.2 'Measurement procedure', point 2, of the *NPI* specifies that monitoring should take place for 'each day of the week the proposed development will be operating and over the proposed operating hours'.

In accordance with Fact Sheet A and Section B1.1, Day Design is of the opinion the measured ambient noise levels in Locations 'A' to Location 'D' are representative of the noise environment at the most affected residential receivers 'R2' to 'R8'.



5.2 Hilltops Council Development Control Plan

Hilltops Council in their Young Development Control Plan (DCP) 2011, Section 2.9 Industrial Development state the following with relation to noise from new industrial developments:

'Performance Outcomes:

PID5 *To ensure that new industrial developments do not result in unacceptable noise, vibration or overshadowing impacts on adjoining or nearby properties.*

Acceptable Solutions

AID5.6 *Building design and machinery installation effectively minimises any noise emissions. Note: in general, all machinery is to be contained within buildings or other acoustic treatment structures. Openings to the building which are usually open during operations should be directed away from sensitive receivers such as residential housing.*

AID5.7 *Building design and machinery installation prevents significant vibration transmission to adjoining properties or public areas. Note: If the development includes vibration producing machinery, the DA should include confirmation that the transmitted vibration to a sensitive receiver such as a dwelling would not be at a level so as to result in loss of amenity to neighbours. Professional advice would need to be sought in this regard.*

AID5.8 *The operating noise level of plant and equipment does not exceed 5 dBA above the background noise level when measured from the property boundary. Note: for potentially noisy developments, an acoustic study prepared by a qualified and experienced acoustic engineer should be submitted with the development application demonstrating that this threshold would not be exceeded at the nearest sensitive receiver.'*

Note: the provisions of AID5.8 above are generally in accordance with the requirements of the NSW Noise Policy for Industry's Project Intrusiveness Noise Level, see Section 5.3.1.1.



5.3 NSW Environment Protection Authority

5.3.1 NSW Noise Policy for Industry

The NSW Environment Protection Authority (EPA) published the *Noise Policy for Industry* (NPI) in October 2017. The NPI is specifically aimed at assessing noise from industrial noise sources listed in Schedule 1 of the Protection of the Environment Operations Act 1997 (POEO, 1997).

The NPI provides a framework to assess noise emission from a premises, and whether that premises produces intrusive or non-intrusive noise.

Section 2.1 of the NPI states the following:

"Intrusive noise levels are only applied to residential receivers (residences). For other receiver types identified in Table 2.2, only the amenity levels apply."

Also, Fact Sheet A1, Section A1.2, of the NPI states the following:

"Where the rating background noise level is found to be less than 30 dB(A) for the evening and night periods, then it is set to 30 dB(A); where it is found to be less than 35 dB(A) for the daytime period, then it is set to 35 dB(A)."

5.3.1.1 Project Intrusiveness Noise Levels

The EPA states in Section 2.3 of its NPI (October 2017) that the intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the L_{Aeq} descriptor), measured over a 15-minute period, does not exceed the rating background noise level by more than 5 dB when beyond a minimum threshold (EPA NPI, 2017, Section 2.3).

The Rating Background Level at Location 'A', 20 Telegraph Road, Young, was 44 dBA during the day, 33 dBA in the evening and 26 dBA at night (see Table 3). Therefore, the acceptable $L_{eq, 15 \text{ minute}}$ project intrusiveness noise levels at Location 'A' are:

Location 'A'

- $(44 + 5 =) 49 \text{ dBA } L_{eq, 15 \text{ minute}}$ during the day
- $(33 + 5 =) 38 \text{ dBA } L_{eq, 15 \text{ minute}}$ in the evening; and
- $(30^* + 5 =) 35 \text{ dBA } L_{eq, 15 \text{ minute}}$ at night.

**As per Fact Sheet A1, Section A1.2, of the NPI the RBL is set to a minimum of 30 dBA, see Section 5.3.1.*

The Rating Background Level at Location 'B', 41 Hintons Road, Young, was 39 dBA during the day, 37 dBA in the evening and 33 dBA at night (see Table 3). Therefore, the acceptable $L_{eq, 15 \text{ minute}}$ project intrusiveness noise levels at Location 'B' are:

Location 'B'

- $(39 + 5 =) 44 \text{ dBA } L_{eq, 15 \text{ minute}}$ during the day
- $(37 + 5 =) 42 \text{ dBA } L_{eq, 15 \text{ minute}}$ in the evening; and
- $(33 + 5 =) 38 \text{ dBA } L_{eq, 15 \text{ minute}}$ at night.



The Rating Background Level at Location 'C', 45 Chums Lane, Young, was 39 dBA during the day, 32 dBA in the evening and 25 dBA at night (see Table 3). Therefore, the acceptable $L_{eq, 15 \text{ minute}}$ project intrusiveness noise levels at Location 'C' are:

Location 'C'

- $(39 + 5 =) 44 \text{ dBA } L_{eq, 15 \text{ minute}}$ during the day
- $(32 + 5 =) 37 \text{ dBA } L_{eq, 15 \text{ minute}}$ in the evening; and
- $(30^* + 5 =) 35 \text{ dBA } L_{eq, 15 \text{ minute}}$ at night.

**As per Fact Sheet A1, Section A1.2, of the NPI the RBL is set to a minimum of 30 dBA, see Section 5.3.1.*

The Rating Background Level at Location 'D', 2 Telegraph Road, Young, was 45 dBA during the day, 36 dBA in the evening and 28 dBA at night (see Table 3). Therefore, the acceptable $L_{eq, 15 \text{ minute}}$ project intrusiveness noise levels at Location 'D' are:

Location 'D'

- $(45 + 5 =) 50 \text{ dBA } L_{eq, 15 \text{ minute}}$ during the day
- $(36 + 5 =) 41 \text{ dBA } L_{eq, 15 \text{ minute}}$ in the evening; and
- $(30^* + 5 =) 35 \text{ dBA } L_{eq, 15 \text{ minute}}$ at night.

**As per Fact Sheet A1, Section A1.2, of the NPI the RBL is set to a minimum of 30 dBA, see Section 5.3.1.*

5.3.1.2 Project Amenity Noise Levels

Depending on the type of area in which the noise is being made, there is a certain reasonable expectancy for noise amenity. The NSW *NPI* provides a schedule of recommended L_{eq} industrial noise levels that under normal circumstances should not be exceeded. If successive developments occur near a residential area, each one allowing a criterion of background noise level plus 5 dB, the ambient noise level will gradually creep higher.

Section 2.4, Table 2.3 of the *NPI* provides guidance on assigning residential receiver noise categories. Site inspections of the areas surrounding the development site were conducted by the author during the day period with the following observations found:

- the area is dominated by 'urban hum', ie industrial noise and intermittent local agricultural noise during the day only;
- the area is dominated by 'local fauna' during the evening and night;
- through traffic on Telegraph Road, Murringo Road and Whiteman Avenue is at times audible; and
- the area has existing industrial premises at 10-12 and 90 Telegraph Road.

The observations above indicate the residential area adjacent to the development site is considered 'Rural', as per Table 2.3 of the *NPI*.



The recommended L_{eq} noise levels in Table 4 are taken from Section 2.4, Table 2.2 of the NPI.

Table 4 Amenity Noise Levels

Receiver	Noise Amenity Area	Time of Day	L_{eq} , dBA, Recommended Amenity Noise Level
Residential	Rural	Day	50
		Evening	45
		Night	40
Commercial premises	All	When in use	65

The L_{Aeq} is determined over a 15-minute period for the project intrusiveness noise level and over an assessment period (day, evening and night) for the project amenity noise level. This leads to the situation where, because of the different averaging periods, the same numerical value does not necessarily represent the same amount of noise heard by a person for different time periods. To standardise the time periods for the intrusiveness and amenity noise levels, the NPI assumes that the $L_{Aeq,15min}$ will be taken to be equal to the $L_{Aeq, period} + 3 \text{ decibels (dB)}$ (Section 2.2, NPI).

Compliance with the amenity criteria will limit ambient noise creep. **Section 2.4** of the NPI states the following:

*‘To ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a **project amenity noise level** applies for each new source of industrial noise as follows:*

- **Project amenity noise level for industrial developments = recommended amenity noise level (Table 2.2) minus 5 dB (A).**

The following exceptions to the above method to derive the project amenity noise level apply:

3. *Where the resultant project amenity noise level is 10 dB or more lower than the existing industrial noise level. In this case the project amenity noise levels can be set at 10 dB below existing industrial noise levels if it can be demonstrated that existing industrial noise levels are unlikely to reduce over time.’*



The existing L_{eq} noise levels at Location 'A' were 57 dBA during the day, 52 dBA in the evening and 44 dBA at night (see Table 3). Therefore, the acceptable L_{eq} amenity noise levels for residential receivers in close proximity to Location 'A' are:

Location 'A'

- $(57^3 - 10 + 3 =)$ 50 dBA $L_{eq, 15 \text{ minute}}$ during the day;
- $(45 - 5 + 3 =)$ 43 dBA $L_{eq, 15 \text{ minute}}$ in the evening; and
- $(40 - 5 + 3 =)$ 38 dBA $L_{eq, 15 \text{ minute}}$ at night.

The existing L_{eq} noise levels at Location 'B' were 56 dBA during the day, 56 dBA in the evening and 53 at night (see Table 3). Therefore, the acceptable L_{eq} amenity noise levels for residential receivers in close proximity to Location 'B' are:

Location 'B'

- $(56^4 - 10 + 3 =)$ 49 dBA $L_{eq, 15 \text{ minute}}$ during the day;
- $(45 - 5 + 3 =)$ 43 dBA $L_{eq, 15 \text{ minute}}$ in the evening; and
- $(40 - 5 + 3 =)$ 38 dBA $L_{eq, 15 \text{ minute}}$ at night.

The existing L_{eq} noise levels at Location 'C' were 51 dBA during the day, 45 dBA in the evening and 43 dBA at night (see Table 3). Therefore, the acceptable L_{eq} amenity noise levels for residential receivers in close proximity to Location 'C' are:

Location 'C'

- $(50 - 5 + 3 =)$ 48 dBA $L_{eq, 15 \text{ minute}}$ during the day;
- $(45 - 5 + 3 =)$ 43 dBA $L_{eq, 15 \text{ minute}}$ in the evening; and
- $(40 - 5 + 3 =)$ 38 dBA $L_{eq, 15 \text{ minute}}$ at night.

The existing L_{eq} noise levels at Location 'D' were 58 dBA during the day, 56 dBA in the evening and 48 dBA at night (see Table 3). Therefore, the acceptable L_{eq} amenity noise levels for residential receivers in close proximity to Location 'D' are:

Location 'D'

- $(58^3 - 10 + 3 =)$ 51 dBA $L_{eq, 15 \text{ minute}}$ during the day;
- $(45 - 5 + 3 =)$ 43 dBA $L_{eq, 15 \text{ minute}}$ in the evening; and
- $(40 - 5 + 3 =)$ 38 dBA $L_{eq, 15 \text{ minute}}$ at night.

Commercial Premises

- $(65 - 5 + 3 =)$ 63 dBA $L_{eq, 15 \text{ minute}}$ when in use.

³ Ambient L_{eq} noise levels affected by existing industrial noise during the day period.

⁴ Ambient L_{eq} noise levels affected by existing local agriculture and industrial noise during the day period.



5.3.1.3 Sleep Disturbance Criteria

The EPA's *NPI* states in Section 2.5 that the potential for sleep disturbance from maximum noise level events from premises during the night-time period needs to be considered. Sleep disturbance is considered to be both awakenings and disturbance to sleep stages.

Sleep may be disturbed if the subject development night-time noise levels at a residential location exceed the following:

- $L_{Aeq, 15min}$ 40 dBA or the prevailing RBL plus 5 dB, whichever is greater; and/or
- L_{AFmax} 52 dBA or the prevailing RBL plus 15 dB, whichever is greater.

Where either of the above criteria are triggered, a detailed maximum noise level event assessment should be undertaken.

The RBL at Locations 'A', 'C' and 'D' are set to the minimum 30 dBA in the night (see Section 5.3.1 above). Therefore, the acceptable $L_{eq, 15\text{ minute}}$ and L_{AFmax} noise sleep disturbance criteria in these areas are:

Locations 'A', 'C' and 'D'

- 40 dBA $L_{eq, 15\text{ minute}}$ at night; and/or
- 52 dBA L_{AFmax} at night.

The RBL at Location 'B' was 33 dBA in the night (see Table 3). Therefore, the acceptable $L_{eq, 15\text{ minute}}$ and L_{AFmax} noise sleep disturbance criteria in this area is:

Location 'B'

- 40 dBA $L_{eq, 15\text{ minute}}$ at night; and/or
- 52 dBA L_{AFmax} at night.



5.3.2 NSW Road Noise Policy

5.3.2.1 NSW Road Noise Policy Assessment Criteria

We have been advised that the roads surrounding the development are classified as follows:

- Telegraph Road – Local Road; and
- Whiteman Avenue and Murringo Road – Arterial Road.

The road located in-between 10-12 and 20 Telegraph Road is Crown Land and is currently used by the applicant for private use under *Existing Use Rights*, and its use has therefore been assessed against the requirements of the NPI.

The NSW Road Noise Policy (RNP), in Section 2.3.1, sets out road traffic noise assessment criteria for residential land uses in Table 3. The information in that table is extracted below in Table 5.

Table 5 Road Traffic Noise Assessment Criteria - Residential

Road Category	Type of project/land use	Assessment Criteria – dB(A)	
		Day (7 am – 10 pm)	Night (10 pm – 7 am)
Freeway/ arterial/ sub-arterial roads	3. Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	L _{Aeq} , (15 hour) 60 (external)	L _{Aeq} , (9 hour) 55 (external)
Local roads	6. Existing residences affected by additional traffic on existing local roads generated by land use developments	L _{Aeq} , (1 hour) 55 (external)	L _{Aeq} , (1 hour) 50 (external)

Road traffic generated by this proposal will not pass by residential receivers ‘R4’, ‘R5’, ‘R6’ or ‘R7’ at any stage. Road traffic noise generated by the facility at ‘R4’, ‘R5’, ‘R6’ or ‘R7’ is therefore considered to be negligible. No further consideration is given to on road traffic noise at ‘R4’, ‘R5’, ‘R6’ or ‘R7’ in this report.

In addition, Section 2.4, Table 6 of the RNP provides a ‘relative increase criteria for residential land uses’ to protect existing residential premises from increased road traffic on freeways, arterial and sub-arterial roads due to a proposed project or traffic-generating development. The total permissible traffic noise level increase as shown in Table 6 of the RNP is 12 dB for both the 15 hour day period and 9 hour night period.



5.3.2.2 Measured Road Traffic Noise Levels

The existing L_{eq} , 15 hour, L_{eq} , 9 hour, and L_{eq} , 1 hour road traffic noise levels have been measured at Location 'A' and 'D', and are shown below in Table 6. To ensure a conservative assessment the measured road traffic noise levels at Location 'A' have been used to assess the road traffic noise impact at 'R2' – Location 'A' is exposed to less through traffic and therefore less noise than 'R2' on Murringo Road.

Table 6 Measured Existing L_{eq} , 15 hour, L_{eq} , 9 hour, and L_{eq} , 1 hour Road Traffic Noise Levels

Noise Measurement Location	Date & Time Period	Existing L_{eq} Road Traffic Noise Level
Location 'A' - Eastern Boundary, 20 Telegraph Road	20/10 – 30/10/2020	
	Day L_{eq} , 15 hr (7 am to 10 pm)	54.6 dBA
	Night L_{eq} , 9 hr (10 pm to 7 am)	44.8 dBA
	Day L_{eq} , 1 hr (7 am to 10 pm)	54.7 dBA
Location 'D' - Western Boundary, 2 Telegraph Road	20/10 – 30/10/2020	
	Day L_{eq} , 15 hr (7 am to 10 pm)	57.9 dBA
	Night L_{eq} , 9 hr (10 pm to 7 am)	51.0 dBA
	Day L_{eq} , 1 hr (7 am to 10 pm)	58.8 dBA
	Night L_{eq} , 1 hr (10 pm to 7 am)	52.0 dBA



5.4 Project Noise Trigger Levels

The measured background noise levels have been used to establish the most stringent noise criteria at each receiver location as follows:

5.4.1 Residential Receivers

5.4.1.1 Residential Noise Trigger Levels

Noise emissions from the use of the industrial site is assessed against the NSW *NPI* at the residential receivers as follows:

The measured background noise levels at Location 'A' have been used to establish the noise criteria at receiver locations 'R2' and 'R3'.

- **49 dBA** $L_{eq, 15 \text{ minute}}$ during the day
- **38 dBA** $L_{eq, 15 \text{ minute}}$ in the evening;
- **35 dBA** $L_{eq, 15 \text{ minute}}$ at night.

The measured background noise levels at Location 'B' have been used to establish the noise criteria at receiver location 'R4'.

- **44 dBA** $L_{eq, 15 \text{ minute}}$ during the day
- **42 dBA** $L_{eq, 15 \text{ minute}}$ in the evening;
- **38 dBA** $L_{eq, 15 \text{ minute}}$ at night.

The measured background noise levels at Location 'C' have been used to establish the noise criteria at receiver locations 'R5', 'R6' and 'R7'.

- **44 dBA** $L_{eq, 15 \text{ minute}}$ during the day
- **37 dBA** $L_{eq, 15 \text{ minute}}$ in the evening;
- **35 dBA** $L_{eq, 15 \text{ minute}}$ at night.

The measured background noise levels at Location 'D' have been used to establish the noise criteria at receiver location 'R8'.

- **50 dBA** $L_{eq, 15 \text{ minute}}$ during the day
- **41 dBA** $L_{eq, 15 \text{ minute}}$ in the evening;
- **35 dBA** $L_{eq, 15 \text{ minute}}$ at night.

These criteria apply at the most-affected point on or within the residential property boundary – or, if that is more than 30 metres from the residence, at the most-affected point within 30 metres of the residence. For upper floors, the noise is assessed outside the nearest window.



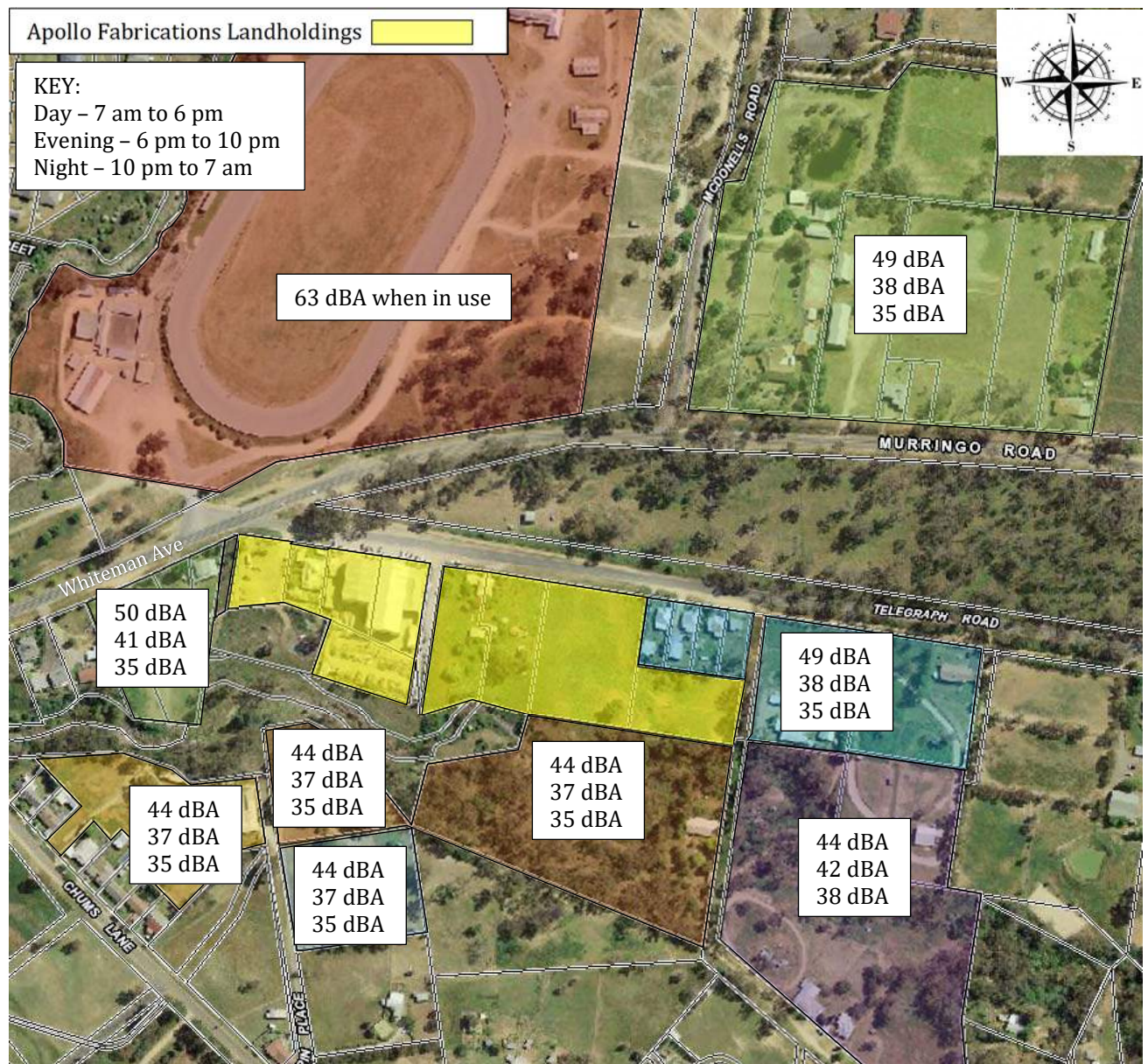


Figure 4 – $L_{eq, 15 \text{ minute}}$ Project Noise Trigger Level Summary – Surrounding Noise Sensitive Receivers

5.4.1.2 Sleep Disturbance Criteria

The following criterion will be applied at 1 metre from the residential façade of 'R2' to 'R8' for potential sleep disturbance caused by the use of industrial developments on the site during the night:

- **40 dBA** $L_{eq, 15 \text{ minute}}$; and/or
- **52 dBA** L_{AFmax} at night time.

5.4.1.3 On-Road Traffic Noise Criteria

The following criteria will be applied at 1 metre from the residential façade of 'R2' and 'R8' for on-road traffic noise caused by the use of industrial developments during the day and night:

- **60 dBA** $L_{eq, 15 \text{ hour}}$ during the day; and
- **55 dBA** $L_{eq, 9 \text{ hour}}$ at night time.

In addition, the 'relative increase criteria for residential land uses' will be assessed at 'R2' and 'R8'.

The following criteria will be applied at 1 metre from the residential façade of 'R3' for on-road traffic noise caused by the use of industrial developments during the day and night:

- **55 dBA** $L_{eq, 1 \text{ hour}}$ during the day; and
- **50 dBA** $L_{eq, 1 \text{ hour}}$ at night time.

5.4.2 Commercial Receivers

Noise emissions from the use of the proposed industrial site are assessed against the NSW *NPI* at the commercial receiver, 'R1', as follows:

- **63 dBA** $L_{eq, 15 \text{ minute}}$ when in use.

This criterion applies at the reasonably most-affected point on or within the property boundary.



6.0 MEASURED & CALCULATED NOISE EMISSIONS - STEEL FABRICATION FACILITY

The main sources of noise associated with the steel fabrication facility are the forklifts and/or overhead cranes used to move fabricated steel within the workshops, the loading of the fabricated steel onto trolleys or heavy vehicles in the workshops by the forklifts and/or overhead cranes, general heavy vehicle movements (door slams/startup/drive away) during the '*manufacturing*', '*loading/unloading*' and '*delivery off-site*' operations, the stand alone blast room including high pressure air, extraction fan and compressor and painting room including extraction fan and constant movement of material by forklift in and out of the room during the '*blasting and painting*' operations, and staff vehicles in the staff car park (door slams/startup/drive away) during the '*office administration*' operations. Noise emissions from noise sources associated with '*site maintenance*' operations are predicted to be negligible, and may include the use of manual tools such as a hammer, screw driver, etc.

6.1 Measured Noise Emissions

Day Design conducted a site investigation at the existing steel fabrication facility at 10-12 Telegraph Road and the surrounding area on Tuesday 20 October, 2020, between 1.30 pm and 4 pm. The steel fabrication facility was operating during the site investigation.

During Day Design's site investigation at the steel fabrication facility, noise emissions from the forklifts and overhead cranes moving fabricated steel, the loading of the fabricated steel onto heavy vehicle and trolleys in the loading area and workshops by the forklifts and overhead cranes, and heavy vehicle movements in the loading area were measured during standard operation. These noise levels will be used to represent the future '*manufacturing*', and '*loading/unloading*' operations at 2-4 Telegraph Road, 10-12 Telegraph Road and 20 Telegraph Road. Noise emissions from the operation of the blasting chamber (including extraction fan and compressor), the operation of the painting room (including extraction fan) were measured and will be used to represent the future '*blasting and painting*' operations at 20 Telegraph Road. Noise emissions from the operation of the plasma cutter were measured and will be used to represent the additional future '*manufacturing*' operations at 10-12 Telegraph Road.

Day Design has previously measured noise emissions from a pneumatic plating machine, grinders, lathes, milling machines, cut-off saws, compressor, grinding wheel, cold saw, hand held drills and a punch and shear at other industrial sites. These noise levels will be used to represent the future '*manufacturing*' operations at 2-4 Telegraph Road, 10-12 Telegraph Road and 20 Telegraph Road.

Day Design has also previously measured noise emissions from the use of passenger vehicles and semi-trailers in various scenarios, including door slams, start up and driving away. These noise levels will be used to represent the use of staff vehicles in the staff car park areas and heavy vehicles for the future '*office administration*' and '*delivery off-site*' operations, respectively, at 2-4 Telegraph Road, 10-12 Telegraph Road and 20 Telegraph Road.

The location of the workshops and staff car park are shown in the site plan attached as Appendix B.



Table 7 provides a schedule of the measured overall 'A' frequency weighted L_{eq} sound power levels of the standard operation, in decibels. The $L_{eq, 15 \text{ minute}}$ sound power levels are representative of an activity taking place non-stop over the entire 15-minute period – in some cases time period corrections are necessary as the activity may not take an entire 15 minutes, ie a staff member entering their vehicle, starting the vehicle and driving away or a heavy vehicle/staff vehicle passing at 50 km/h.

Table 7 $L_{eq, 15 \text{ minute}}$ Sound Power Level – Standard Operation

Description	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dBA	63	125	250	500	1k	2k	4k	8k
<i>Standard Operation Including–</i>									
Blasting chamber	86	88	87	84	80	78	79	80	73
Blasting chamber blow off valve	90	99	90	88	82	73	84	82	73
Pneumatic plating machine	90	90	85	85	84	81	80	84	85
1 x car door slam, ignition and drive away	91	104	96	89	87	86	83	81	75
Staff vehicle passing at 50 km/h ⁵	93	95	93	90	89	91	83	73	66
Forklift unload steel beams to ground	95	98	92	90	92	92	86	76	69
Loading & unloading in workshop	95	83	83	81	85	85	90	90	86
Forklift load beams on truck	96	100	94	97	96	91	86	80	72
Truck idle & reversing (with alarm)	97	103	99	87	88	95	89	81	74
Loaded forklift drive by	100	101	98	96	98	94	92	87	83
Semi-trailer movements on site	100	102	104	96	97	95	93	90	84
Blasting chamber extraction discharge	101	100	101	103	98	94	90	90	84
Plasma cutter	101	88	85	84	87	91	95	94	96
Forklift dropping steel beams on steel trolley	102	97	94	94	97	99	95	87	75
Ambient workshop noise – grinders, hammers, welders	103	88	84	86	88	91	98	98	93



Table 7 L_{eq} , 15 minute Sound Power Level – Standard Operation (continued)

Description	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dBA	63	125	250	500	1k	2k	4k	8k
Forklift moving materials on hardstand	103	94	91	96	99	100	96	89	78
Heavy vehicle passing at 50 km/h - 24 Tonne ⁵	104	104	99	100	101	100	97	92	84
Move trolley of materials with forklift	104	96	100	102	101	100	96	87	76

The L_{max} sound power level and spectrum of the standard operation was also measured and is given below in Table 8. Note, L_{max} noise levels for operations proposed to take place during the night time period only (10 pm to 7 am) are shown in Table 8 for assessment against the sleep disturbance criteria shown in Section 5.4 of this report.

Table 8 L_{max} Sound Power Levels – Standard Operation

Description	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dBA	63	125	250	500	1k	2k	4k	8k
Standard Operation Including–									
1 x car door slam	92	98	92	90	88	88	83	80	76
Blasting chamber blow off valve	94	103	94	92	86	88	89	86	78
Blasting chamber	96	93	92	89	90	89	90	87	79
Truck idle & reversing (with alarm)	101	108	104	91	91	99	93	84	77
Plasma cutter	106	92	90	89	93	96	100	100	101
Loading & unloading in sheds	107	98	91	94	101	102	101	99	95
Loaded forklift drive by	109	112	108	105	106	104	100	96	93
Semi-trailer movements on site	111	112	116	105	109	104	103	102	99
Ambient workshop noise – grinders, hammers, welders	112	101	95	104	104	106	107	105	101

⁵ This descriptor has been used for the assessment of additional on-road traffic noise.



Table 8 **L_{max} Sound Power Levels – Standard Operation - Continued**

Description	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dBA	63	125	250	500	1k	2k	4k	8k
Forklift unload steel beams to ground	112	110	106	106	112	109	100	91	80
Forklift load beams on truck	114	111	112	114	114	107	102	99	91
Move trolley of materials with forklift	114	104	111	111	112	110	107	98	90
Blasting chamber extraction discharge	115	105	105	108	104	102	108	112	105
Forklift dropping steel beams on steel trolley	116	108	105	108	110	113	109	101	86
Forklift moving materials on hardstand	123	104	105	117	120	120	115	108	97



6.2 Steel Fabrication Facility - Calculated Noise Emissions

Knowing the sound power levels of a noise source (see Tables 7 and 8), the sound pressure level (as measured with a sound level meter) can be calculated at a remote location using suitable formulae to account for building envelope transmission, distance losses, sound barriers, ground absorption, atmospheric effects, etc.

Assumptions relating to traffic generation at the site and on the local road network are taken from the information provided in the Traffic Impact Assessment report, prepared by Spotto Consulting, Report No. P0109, dated December 2020, prepared as part of this Planning Proposal.

Calculations for noise emissions from the site have been carried out using Day Design Pty Ltd's proprietary Microsoft Excel calculation spreadsheets which incorporate the methods specified in *ISO 9613.1/2*⁶, designed for noise emissions from an indoor and outdoor spaces to a nearby outdoor receiver location. The noise emissions have been calculated to determine the noise level at each residential and commercial receiver location due to the future use of the steel fabrication facility.

6.2.1 Calculation Scenario - Assumptions / Modelling & Recommendations

The calculated noise levels in Sections 6.2.2, 6.2.3 and 6.2.4 include the following calculation scenarios which incorporate the assumptions/modelling scenarios and recommendations outlined below:

6.2.1.1 Calculation Scenarios - Assumptions / Modelling Scenarios

- Up to five staff members may arrive at 2-4 Telegraph Road in any 15 minute period during the peak usage hour (morning 7 am to 9 am);
- Up to nine staff members may arrive at 10-12 Telegraph Road in any 15 minute period during the peak usage hour (morning 7 am to 9 am);
- Up to 25 staff members may arrive at 20 Telegraph Road in any 15 minute period during the peak usage hour (morning 7 am to 9 am);
- Up to four staff members may depart at 10-12 Telegraph Road in any 15 minute period during evening period (6 pm to 10 pm);
- Up to 10 staff members may depart at 20 Telegraph Road in any 15 minute period during the evening period (6 pm to 10 pm);
- We have assumed that up to 9% of traffic generated by the site during the day and evening (7 am to 10 pm) will be heavy vehicles;

⁶ *ISO9613-1 - Acoustics – Attenuation of sound during propagation outdoors, Parts 1 - Calculation of the absorption of sound by the atmosphere and Part 2 - General method of calculation.*



- We have assumed one heavy vehicle and two staff vehicles may arrive and leave the site each hour of the night period – 10 pm to 7 am – ie a total of nine heavy vehicles and 18 staff vehicles arrive and leave the site over the 9 hour night period, or 18 heavy vehicle trips and 36 staff vehicle trips over the 9 hour night period;
- Barrier reduction for proposed Workshops, where relevant;
- The existing '*after hours delivery vehicle departure area*' on 10-12 Telegraph Road is assumed to operate from the same location (10 pm to 7 am), as shown on Appendix B;
- Assumed main door openings to the workshops to be 12 x 6 metres;
- Time period corrections where required – $L_{eq, 15 \text{ minute}}$ calculations only (see Appendix D1 to D4); and
- CONCAWE method for noise levels reductions due to ground absorption where applicable.

6.2.1.2 Calculation Scenarios – Recommendations

See also Section 7.0 of this report.

- Barrier reduction for recommended 2.1 metre high boundary fence on the eastern boundary of 20 Telegraph Road, see Section 7.2 and the attached Appendix B;
- Barrier reduction for recommended 1.8 metre high boundary fence on the northern side of the outdoor yard of 20 Telegraph Road, see Section 7.2 and the attached Appendix B;
- Barrier reduction for recommended extension of the 6.5 metre high (above FFL 453500) container wall on the southern side of 10-12 Telegraph Road, see Section 7.2 and the attached Appendix B;
- Barrier reduction for recommended 3.4 metre high sound barrier wall on the southern side of 2-4 and 10-12 Telegraph Road, see Section 7.2 and the attached Appendix B;
- Barrier reduction for recommended 2.4 metre high sound barrier wall on the south-western side of 2-4 Telegraph Road, see Section 7.2 and the attached Appendix B;
- It is recommended that parking is not permitted in the parking spaces within 60 metres of the eastern boundary of 20 Telegraph Road between 6 pm and 7 am, ie the parking spaces on the eastern side of the main driveway of 20 Telegraph Road, see Section 7.1 of this report and Appendix B;
- Recommended minimum acoustic performance of R_w 40 for the ceiling/roof construction for 2-4 Telegraph Road consisting of two skins of Spandek with a 200 mm air gap, 50 mm acoustic insulation (min density 14 kg/m³) installed between the skins, or similar, see Section 7.3;



- Recommended minimum acoustic performance of R_w 40 for the ceiling/roof construction for 20 Telegraph Road consisting of two skins of Spandek with a 200 mm air gap, 50 mm acoustic insulation (min density 14 kg/m³) installed between the skins, or similar, see Section 7.3;
- Recommended minimum acoustic performance of R_w 60 for wall construction for 2-4 Telegraph Road consisting of 175 mm thick pre-cast concrete panels, or similar, see Section 7.3;
- Recommended minimum acoustic performance of R_w 60 for wall construction for 20 Telegraph Road consisting of 175 mm thick pre-cast concrete panels, or similar, see Section 7.3;
- Recommended minimum acoustic performance of R_w 34 for the south-western external doors to 20 Telegraph Road consisting of two skins of Spandek with a 200 mm air gap, or similar, see Section 7.3;
- All external doors on the south-western side (see Appendix B) of the new workshops at 20 Telegraph Road are recommended to remain closed at all times during the day period – 7 am to 6 pm, with the exception of entry and exit when necessary, as recommended in Section 7.1 of this report;
- All external doors on all sides of the new workshops at 20 Telegraph Road are recommended to remain closed at all times during the evening and night periods – 6 pm to 7 am, with the exception of entry and exit when necessary, as recommended in Section 7.1 of this report;
- *Loading/unloading* is recommended to take place within the workshops of 10-12 Telegraph Road with all southern doors closed between 6 pm and 10 pm, see Section 7.1 of this report;
- *Loading/unloading* is recommended to take place within the workshops of 10-12 Telegraph Road with all northern and southern doors closed between 5 am and 7 am, see Section 7.1 of this report; and
- No heavy vehicle movements (trucks, forklifts, etc) on the southern side of 2-4 and 10-12 Telegraph Road or on the western side of 20 Telegraph Road between 6 pm and 7 am on any given day, as recommended in Section 7.1 of this report.



6.2.1.3 Calculation Scenarios - Worst-Case Scenario Microsoft Excel Inputs

The Microsoft Excel inputs used to model the worst-case scenario noise emissions from within each of the workshops⁷ are provided in the attached Appendix D1 to D4.

The Appendices show the number of each of the noise sources, the time correction used for the noise sources, the resultant Sound Power Level (L_w) of the noise sources (from those shown in Table 7), the total L_w within the workshop and the resultant reverberant Sound Pressure Levels (L_p) within the workshop.

⁷ Appendix D1 to D4 do not include the modelling scenario inputs for the external areas of the site. The worst case modelling scenarios for the external areas incorporate the vehicle arrival/departure rates shown in Section 6.2.1.1 for staff vehicle and heavy vehicle movements on the site. An example of the Microsoft Excel inputs for the external use of 20 Telegraph Road during the day at 'R2', is shown in Appendix E.



6.2.2 Predicted $L_{eq, 15 \text{ minute}}$ Noise Levels – Approved Operations

Table 9 provides a schedule of the calculated $L_{eq, 15 \text{ minute}}$ noise levels at each receivers during the proposed operating hours.

Table 9 Predicted $L_{eq, 15 \text{ minute}}$ Noise Levels – All Receivers – Approved Operation

Description	Predicted Noise Levels (dBA) at Receiver Location							
	R1	R2	R3	R4	R5	R6	R7	R8
Day – 7 am to 6 pm								
2-4 Telegraph Road								
– External Areas	32	25	25	22	29	23	30	39
– Workshop	45	35	31	15	32	26	31	46
10-12 Telegraph Road								
– External Areas	29	27	30	28	34	26	33	34
– Workshops	41	37	36	33	41	34	40	41
20 Telegraph Road								
– External Areas	32	36	47	23	39	31	29	29
– Workshops	43	45	34	29	31	24	27	28
Cumulative	48	46	48	36	44	37	42	48
Acceptable Noise Limit – Day $L_{eq, 15 \text{ minute}}$ (7 am to 6 pm)	63	49	49	44	44	44	44	50
Complies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Evening – 6 pm to 10 pm								
10-12 Telegraph Road								
– External Areas	33	29	27	<10	18	15	18	21
– Workshops	37	33	31	21	32	25	32	34
20 Telegraph Road								
– External Areas	30	34	34	20	21	17	17	20
– Workshops	23	25	31	29	33	23	26	27
Cumulative	39	37	38	30	36	28	33	35
Acceptable Noise Limit – Evening $L_{eq, 15 \text{ minute}}$ (6 pm to 10 pm)	63	38	38	42	37	37	37	41
Complies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes



Table 9 Predicted $L_{eq, 15 \text{ minute}}$ Noise Levels – All Receivers – Standard Operation (continued)

Description	Predicted Noise Levels (dBA) at Receiver Location							
	R1	R2	R3	R4	R5	R6	R7	R8
<i>Night – 10 pm to 7 pm</i>								
10-12 Telegraph Road								
– External Areas	32	28	24	<10	16	15	16	19
– Workshops	28	22	26	21	32	25	32	34
20 Telegraph Road								
– External Areas	29	33	27	17	18	16	16	18
– Workshops	23	25	31	29	30	25	30	27
Cumulative	35	35	34	30	35	28	34	35
Acceptable Noise Limit – Night $L_{eq, 15 \text{ minute}}$ (10 pm to 7 am)	63	35	35	38	35	35	35	35
Complies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Provided the noise control recommendations shown in Section 7 of this report are implemented and adhered to, the predicted $L_{eq, 15 \text{ minute}}$ noise levels from the steel fabrication facility comply with the day, evening and night criteria at the receivers 'R1' to 'R8', and are therefore considered acceptable.



6.2.3 Predicted Sleep Disturbance $L_{AF, max}$ Noise Levels

Table 10 below shows the assessment of potential for sleep disturbance from maximum noise level events at the residential receivers during standard operation. Note, maximum noise level events are not cumulative.

Table 10 Predicted L_{max} Noise Levels at Residential Receivers - Sleep Disturbance

Description	Predicted Noise Levels (dBA) at Receiver Location						
	R2	R3	R4	R5	R6	R7	R8
<i>Night – 10 pm to 7 am</i>							
10-12 Telegraph Road							
– External Areas	38	26	17	27	21	27	31
– Workshops	38	41	34	41	34	47	50
20 Telegraph Road							
– External Areas	43	37	25	31	24	25	30
– Workshops	34	40	38	39	33	37	37
Acceptable Noise Limit – Night $L_{eq, 15 \text{ minute}}$ (10 pm to 7 am)	52	52	52	52	52	52	52
Complies	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Provided the noise control recommendations shown in Section 7 of this report are implemented and adhered to, the predicted $L_{AF, max}$ noise levels from the steel fabrication facility comply with the night sleep disturbance criteria at the residential receivers 'R2' to 'R8', and are therefore considered acceptable.



6.2.4 Predicted On Road Traffic Noise

Calculations of the on-road traffic noise generated by vehicles associated with the use of the site are based on the information provided within the Traffic Impact Assessment report, prepared by Spotto Consulting, Report No. P0109, dated December 2020.

The traffic distribution from the site has been calculated using the information provided in Section 4.1.1 of the aforementioned Traffic Impact Assessment report, as follows:

- Telegraph Road – 90/10% split to the West/East from the site; and
- Whiteman Avenue/Murringo Road Intersection – 90/10% split to the South/North.

Table 11 shows that calculated relative traffic noise level increase at R2 and R8. It is noted that the relative increase criteria provided in the RNP is not applicable to local roads (see Section 2.4 of the RNP).

Table 11 Predicted $L_{eq, 15 \text{ hour}}$ & $L_{eq, 9 \text{ hour}}$ Relative Traffic Noise Increase

Receiver Location	Predicted Noise Level (dBA)	Existing Traffic Noise Level (dBA)	Total Traffic Noise Level (dBA)	Relative Increase (dB)	Complies
<i>Day – 7 am to 10 pm</i>					
R2:					
- 8 x Heavy Vehicles	41.4	54.6	54.8	0.2	Yes
- 79 x Staff Vehicles					
R8:					
- 68 x Heavy Vehicles	52.5	57.9	59.0	1.1	Yes
- 709 x Staff Vehicles					
<i>Night – 10 pm to 7 am</i>					
R2:					
- 1 x Heavy Vehicle	33.9	44.8	45.1	0.3	Yes
- 5 x Staff Vehicles					
R8:					
- 4 x Heavy Vehicles	42.4	51.0	51.6	0.6	Yes
- 41 x Staff Vehicles					

Table 11 shows that the calculated increase to the relative increase to the existing $L_{Aeq, 15 \text{ hour}}$ and $L_{Aeq, 9 \text{ hour}}$ total traffic noise level at all receiver locations is less than 2 dB, and is therefore considered acceptable.

Table 12 shows the assessment of on-road traffic for the residential receivers, 'R2', 'R3' and 'R8' against the RNP's 'Road Traffic Noise Assessment Criteria'.



Table 12 Predicted L_{eq} , 15 hour, L_{eq} , 9 hour & L_{eq} , 1 hour Noise Levels at Residential Receivers - On Road Traffic

Receiver Location	Predicted Total Noise Level (dBA)	RNP On Road Traffic Noise Criteria (dBA)	Compliance
Day – 7 am to 10 pm			
R2: - 8 x Heavy Vehicle Movements - 79 x Staff Vehicle Movements	54.8 L_{eq} , 15 hour	60 L_{eq} , 15 hour	Yes
R3: - 1 x Heavy Vehicle Movement - 14 x Staff Vehicle Movements	55.3 ⁸ L_{eq} , 1 hour	55 L_{eq} , 1 hour	Yes
R8: - 68 x Heavy Vehicle Movements - 709 x Staff Vehicle Movements	59.0 L_{eq} , 15 hour	60 L_{eq} , 15 hour	Yes
Night – 10 pm to 7 am			
R2: - 1 x Heavy Vehicle Movement - 5 x Staff Vehicle Movements	45.1 L_{eq} , 9 hour	55 L_{eq} , 9 hour	Yes
R3: - 1 x Heavy Vehicle Movement - 1 x Staff Vehicle Movement	48.8 ⁸ L_{eq} , 1 hour	50 L_{eq} , 1 hour	Yes
R8: - 4 x Heavy Vehicle Movements - 41 x Staff Vehicle Movements	51.6 L_{eq} , 9 hour	55 L_{eq} , 9 hour	Yes

Table 12 shows that the calculated L_{Aeq} , 15 hour and L_{Aeq} , 9 hour total traffic noise level at receiver locations R2 and R8 are below the RNP's 'Road Traffic Noise Assessment Criteria', and are therefore acceptable.

Table 12 also shows that the calculated L_{Aeq} , 1 hour total traffic noise level at receiver location R3 is less than 2 dB above the 'Road Traffic Noise Assessment Criteria', and are therefore acceptable. As per Section 3.4, paragraph 3 of the RNP, '*in assessing feasible and reasonable mitigation measures, an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person*' and Section 3.4.1, Step 4, paragraph 2, '*for existing residences and other sensitive land uses affected by **additional traffic on existing roads generated by land use developments**, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'.*

Considering the above, the road traffic noise associated with the development is considered acceptable and is not likely to be perceptible to the average person.

⁸ Existing L_{eq} , 1 hour noise level shown in Table 6 plus the predicted L_{eq} , 1 hour road traffic noise level.



7.0 NOISE CONTROL RECOMMENDATIONS

To ensure that the operation of the steel fabrication facility meets the Project Specific Noise Trigger Levels at all times, we recommend the following noise control recommendations be implemented and adhered to at all times:

7.1 Noise Management Plan

7.1.1 Noise Management Plan - 2-4 Telegraph Road

- Fabricated steel should not be handled/processed in the hardstand area on the southern side of 2-4 Telegraph Road between the hours of 6 pm and 7 am on any given day. All moving and stacking (handling/processing and/or *loading/unloading*) should take place within the workshop during these hours; and
- No heavy vehicle movements (trucks, forklifts, etc) on the southern side of 2-4 Telegraph Road between 6 pm and 7 am on any given day.

7.1.2 Noise Management Plan - 10-12 Telegraph Road

- Fabricated steel should not be handled/processed in the hardstand area on the southern side of 10-12 Telegraph Road between the hours of 6 pm and 7 am on any given day. All moving and stacking (handling/processing and/or *loading/unloading*) should take place within the workshop during these hours;
- No heavy vehicle movements (trucks, forklifts, etc) on the southern side 10-12 Telegraph Road between 6 pm and 7 am on any given day;
- The external doors on the southern side of the workshop (10-12 Telegraph Road) should be closed between the hours of 5 am and 7 am and 6 pm and 10 pm on any given day when the *loading/unloading* process is taking place;
- The existing '*after hours delivery vehicle departure area*' on 10-12 Telegraph Road should continue to operate from the same location (10 pm to 7 am), as shown on Appendix B;
- *Loading/unloading* is recommended to take place within the workshops of 10-12 Telegraph Road with all southern doors closed between 6 pm and 10 pm; and
- *Loading/unloading* is recommended to take place within the workshops of 10-12 Telegraph Road with all northern and southern doors closed between 5 am and 7 am.

7.1.3 Noise Management Plan - 20 Telegraph Road

- No heavy vehicle movements (trucks, forklifts, etc) on the south-western side of 20 Telegraph Road between 6 pm and 7 am on any given day;
- Parking is not permitted in the parking spaces within 60 metres of the eastern boundary of 20 Telegraph Road between 6 pm and 7 am, ie the parking spaces on the eastern side of the main driveway of 20 Telegraph Road, see Appendix B;



- All external doors on the south-western side (see Appendix B) of the new workshops at 20 Telegraph Road should remain closed at all times during the day period – 7 am to 6 pm, with the exception of entry and exit when necessary;
- All external doors on all sides of the new workshops at 20 Telegraph Road should remain closed at all times during the evening and night periods – 6 pm to 7 am, with the exception of entry and exit when necessary; and
- Any new blasting chamber or paint shop are to be located within the building envelope of the new surface treatment/storage and loading facility within a purpose built room – all associated mechanical plant and equipment is to be acoustically treated to ensure the Project Noise Trigger Levels are met.

7.1.4 General Noise Management Plan for Whole Site

- When not needed, machinery and vehicles on the site should be switched off;
- As the acoustic environment is likely to change over the life of the development/construction works, prior to the construction of each of the workshops, an Environmental Noise Impact Assessment should take place;
- At the completion of the construction of the workshops, and to ensure the Project Noise Trigger Levels continue to be met, noise compliance measurements should take place at the most affected receiver location (to the corresponding works) a minimum of two times over the first six months operations commence – the operators of the site should be unaware the measurements are taking place; and
- Proposed mechanical plant and equipment that is required to serve the new workshops is to be assessed against the Project Noise trigger Levels in this report. The cumulative noise from the operation of the steel fabrication facility and mechanical plant must not exceed the Project Noise Trigger Level at any receiver location. A detailed analysis of the predicted cumulative noise emissions should be undertaken by a suitably qualified acoustic consultant.



7.2 Acoustic Barriers

The acoustic barriers recommended below may be constructed with 'Colorbond' or 3 rail 'solid capped and lapped' timber. The construction shall be free of visible air gaps to provide an impervious sound barrier.

- We recommend constructing a 2.1 metre high boundary fence on the eastern boundary of 20 Telegraph Road, extending from the northern boundary approximately 20 metres to the south, as shown on the attached Appendix B; and
- We recommend constructing a 1.8 metre high boundary fence on the northern side of the outdoor yard of 20 Telegraph Road, as shown on the attached Appendix B.

The acoustic barriers recommended below may be constructed with 'DuneWall Custom Height Acoustic Wall', masonry or steel. The construction shall be free of visible air gaps to provide an impervious sound barrier.

- We recommend constructing a 3.4 metre high sound barrier wall on the southern side of 2-4 and 10-12 Telegraph Road, as shown on the attached Appendix B; and
- We recommend extending the existing 6.5 metre high (above FFL 453500) shipping container stack to the western boundary of 10-12 Telegraph Road; and
- We recommend constructing a 2.4 metre high sound barrier wall on the south-western side of 2-4 Telegraph Road, as shown on the attached Appendix B.

7.3 Building Construction

We recommend the new workshops be constructed as follows:

7.3.1 2-4 Telegraph Road Building Construction

- We recommend the minimum acoustic performance for the ceiling/roof construction of 2-4 Telegraph Road be R_w 40, consisting of two skins of Spandek with a 200 mm air gap, 50 mm acoustic insulation (min density 14 kg/m³) installed between the skins, or a similar product that meets or exceeds the aforementioned recommended R_w ; and
- We recommend the minimum acoustic performance for the wall construction of 2-4 Telegraph Road be R_w 60, consisting of 175 mm thick pre-cast concrete panels, or similar.

7.3.2 20 Telegraph Road Building Construction

- We recommend the minimum acoustic performance for the ceiling/roof construction of 20 Telegraph Road be R_w 40, consisting of two skins of Spandek with a 200 mm air gap, 50 mm acoustic insulation (min density 14 kg/m³) installed between the skins, or a similar product that meets or exceeds the aforementioned recommended R_w ;
- We recommend the minimum acoustic performance for the wall construction of 20 Telegraph Road be R_w 60, consisting of 175 mm thick pre-cast concrete panels, or similar.



- Recommended minimum acoustic performance for the south-western external doors to 20 Telegraph Road be R_w 34, consisting of two skins of Spandek with a 200 mm air gap, or a similar product that meets or exceeds the aforementioned recommended R_w .

7.4 Construction Disclaimer

Recommendations made in this report are intended to resolve acoustical problems only. We make no claim of expertise in other areas and draw your attention to the possibility that our recommendations may not meet the structural, fire, thermal or other aspects of building construction.

We encourage clients to check with us before using materials or equipment that are alternative to those specified in our Acoustical Report.

The integrity of acoustic structures is very dependent on installation techniques. Therefore the use of contractors that are experienced in acoustic construction is encouraged. Furthermore, two insulation products may have the same thermal R rating but the sound absorption of one may be entirely deficient, therefore the use of materials and equipment that are supported by acoustic laboratory test data is encouraged.



8.0 NOISE IMPACT STATEMENT

Day Design Pty Ltd was engaged by Apollo Fabrications to provide an environmental noise impact report to accompany the Planning Proposal to rezone their landholdings at 2, 4, 10, 12 and 20 Telegraph Road, Young, NSW.

Measurements and calculations show that, provided the recommendations in Section 7 of this report are adhered to, the operation of the steel fabrication facility at 2-4, 10-12 and 20 Telegraph Road, Young, NSW, will meet the acoustic requirements of the EPA's *Noise Policy for Industry (NPI)* and *NSW Road Noise Policy* as detailed in Section 5 of this report, and be considered acceptable.



Adam Shearer, BCT (Audio), MDesSc (Audio & Acoustics), MAAS
Senior Acoustical Consultant
for and on behalf of Day Design Pty Ltd

AAAC MEMBERSHIP

Day Design Pty Ltd is a member company of the Association of Australasian Acoustical Consultants, and the work herein reported has been performed in accordance with the terms of membership.

APPENDICES

Appendix A1 to A4 – Ambient Noise Surveys

Appendix B – Site Plan

Appendix C – Site Vehicle Movements

Appendix D1 to D4 – Workshop Worst-Case Scenario Microsoft Excel Inputs

Appendix E – Example of External Area Worst-Case Scenario Microsoft Excel Inputs

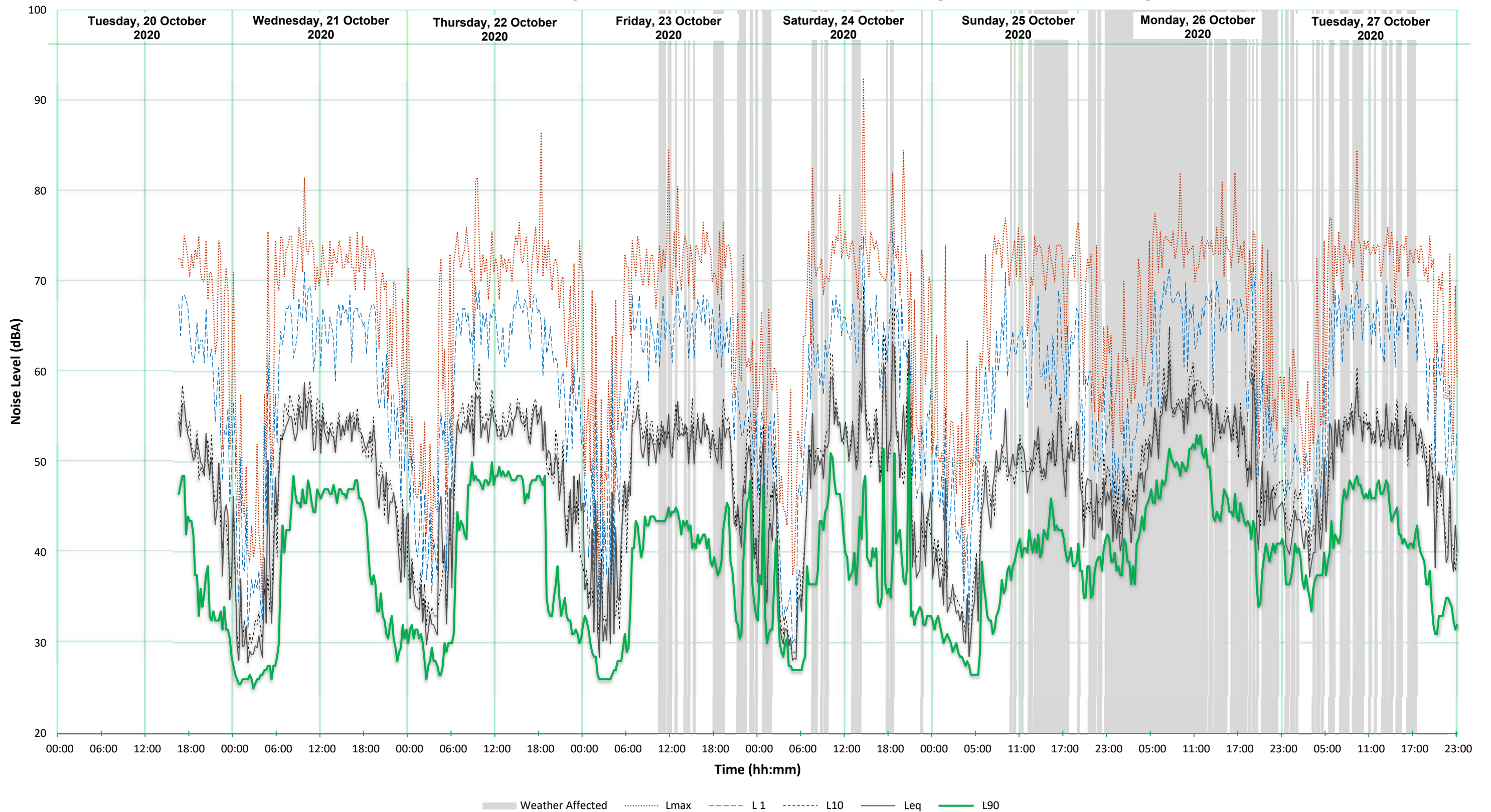
AC108-1 to 4 – Glossary of Acoustical Terms



AMBIENT NOISE SURVEY

6371-3
Appendix A

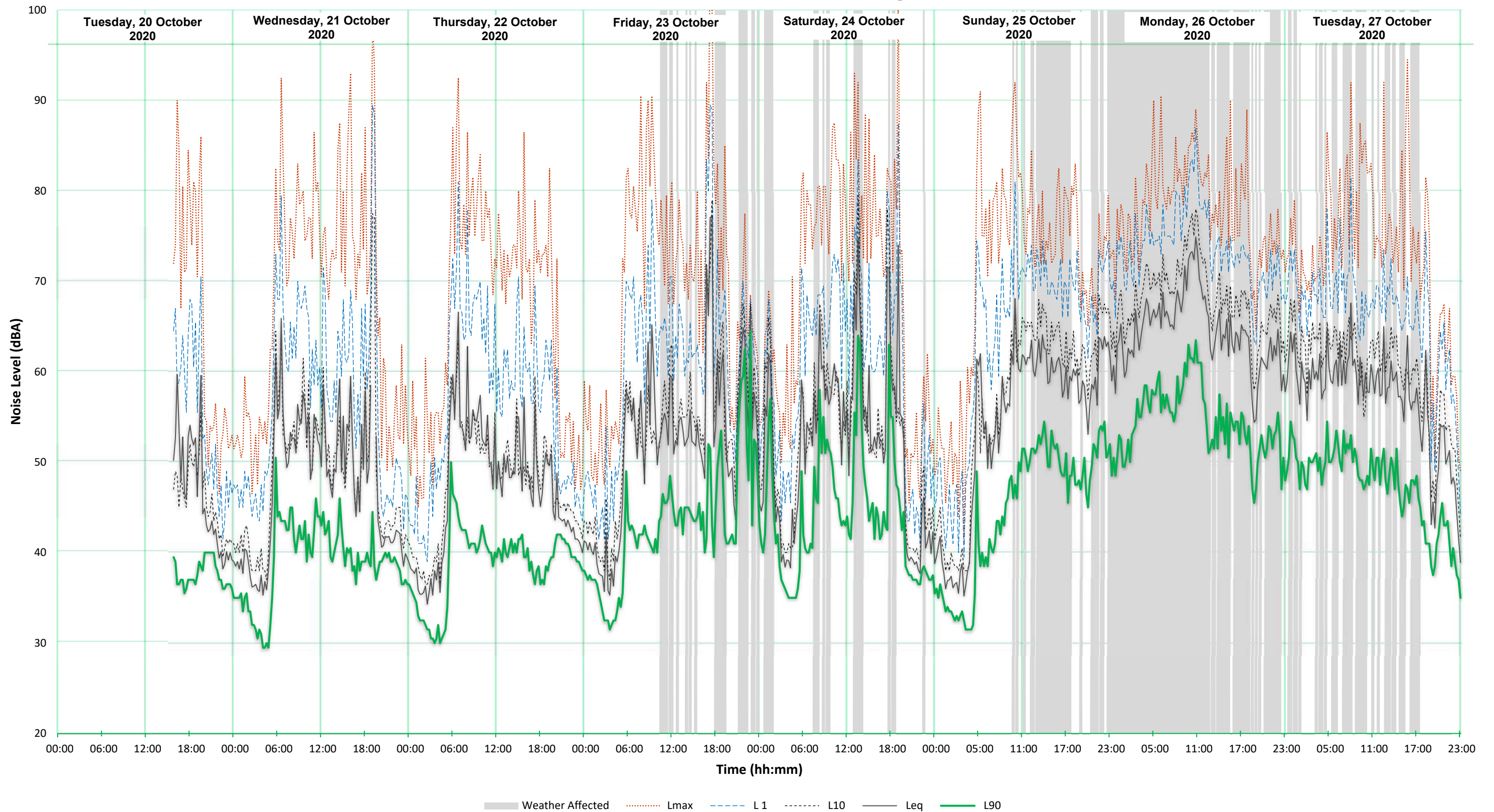
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AMBIENT NOISE SURVEY

6371-3
Appendix A

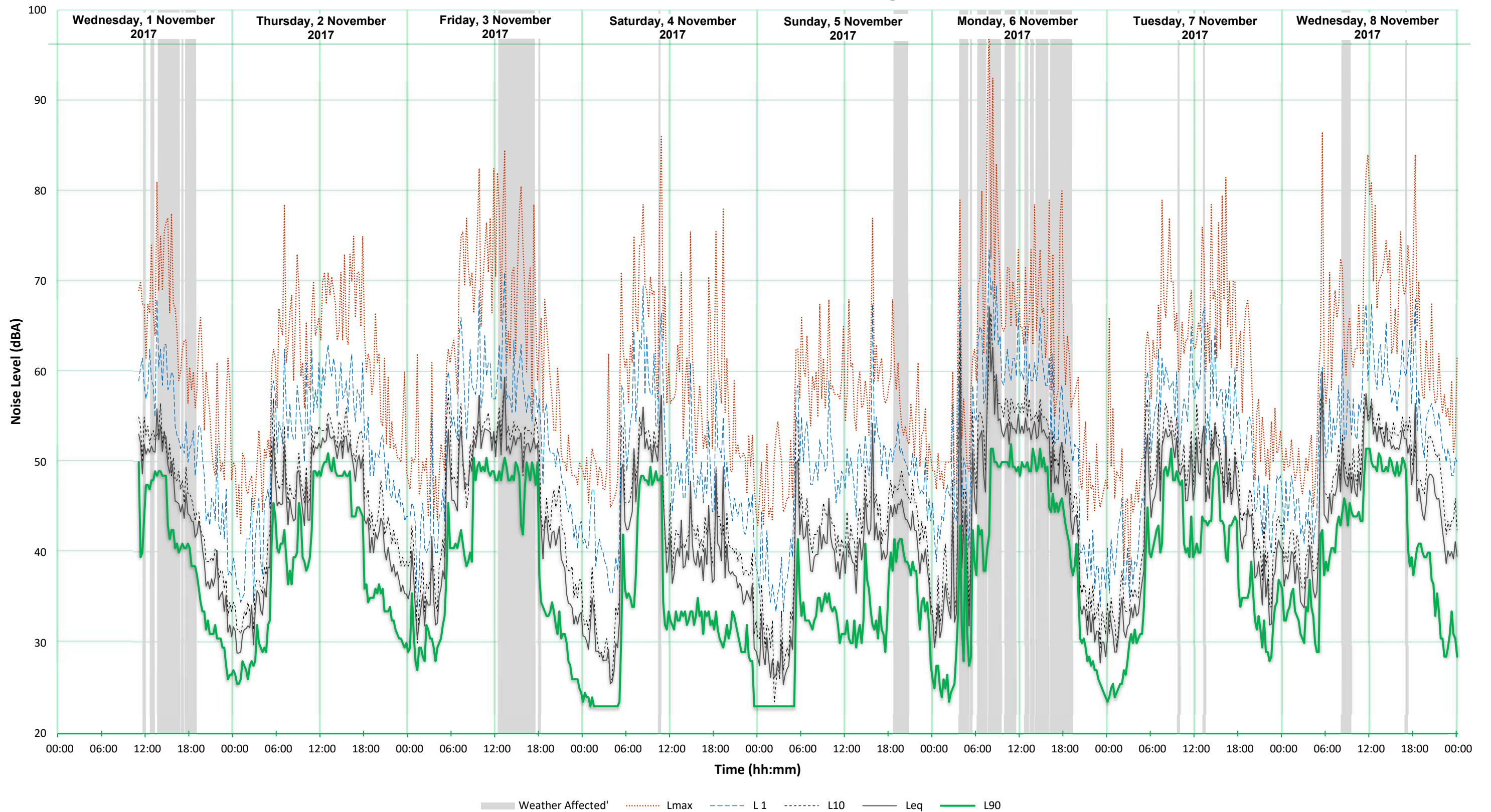
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AMBIENT NOISE SURVEY

6371-3
Appendix A

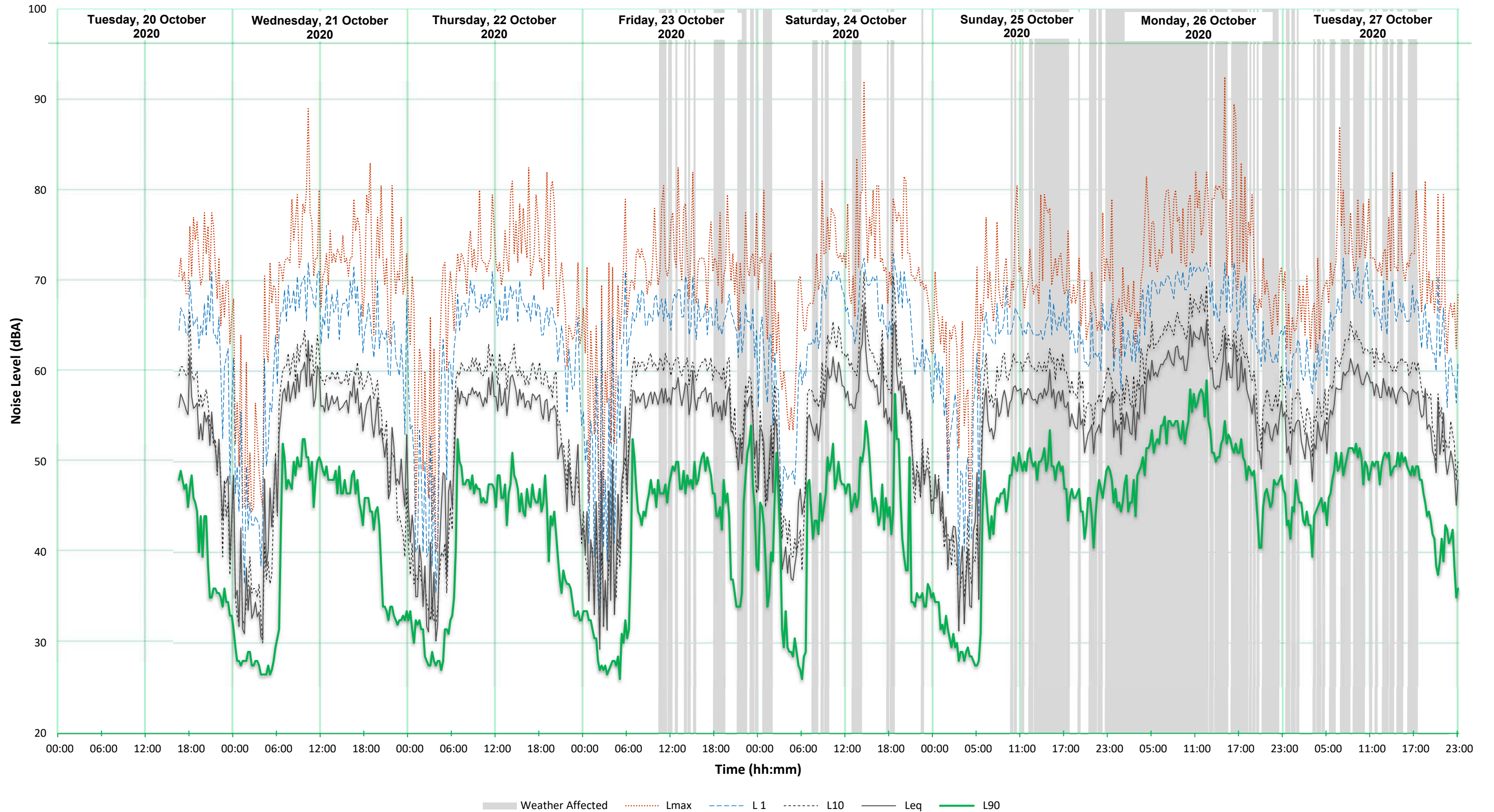
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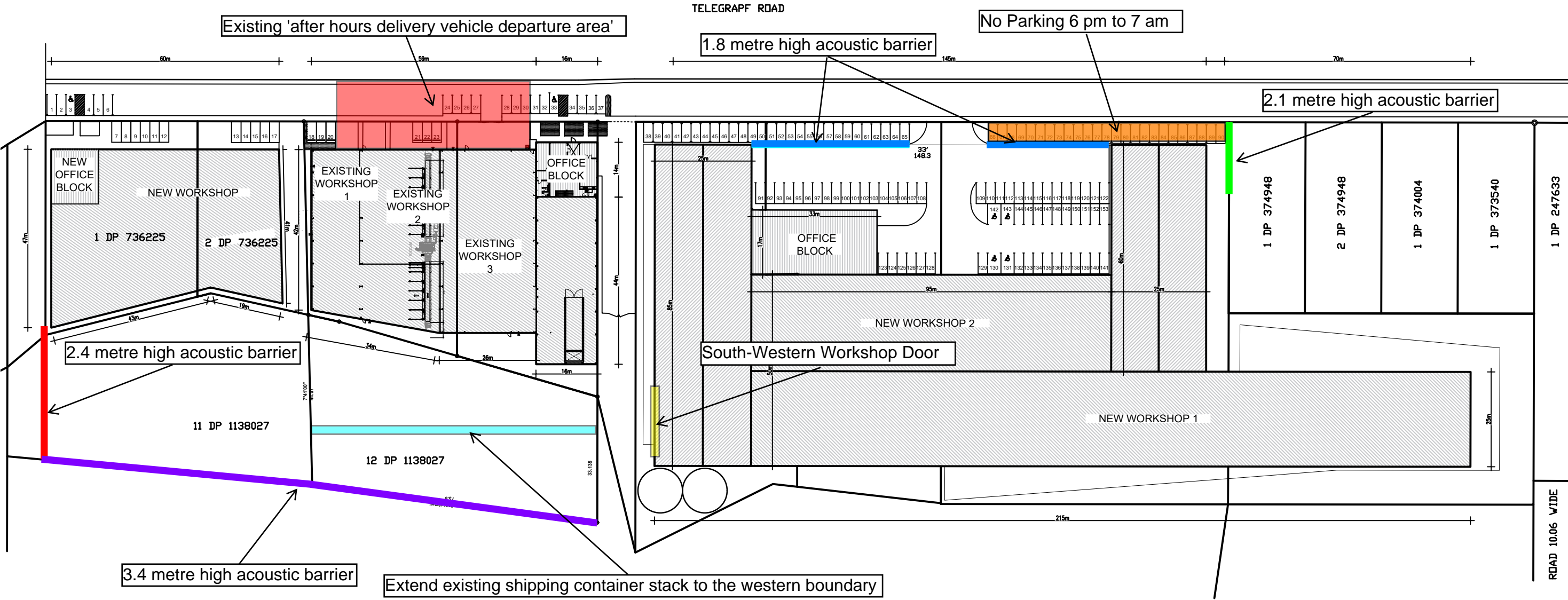


AMBIENT NOISE SURVEY


6371-3
Appendix A

Located at Western Boundary - Lot 1, DP 736225, 2 Telegraph Road, Young, NSW





ISSUE	DATE	REASON FOR REVISION
-	-	-
-	-	-
-	-	-
-	-	-
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-	-	-
-	-	-



UNIQUE CAD EXPERIENCE

Client: APOLLO FABRICATION GROUP Pty Ltd

Project: PROPOSED ADDITION
2 - 20 Telegraph road, Young

Drawing: PROPOSED SITE PLAN

Job Number:

No. in Set: 2

Scale: 1 : 750

Date: 31.03.2021

Drawn: MG

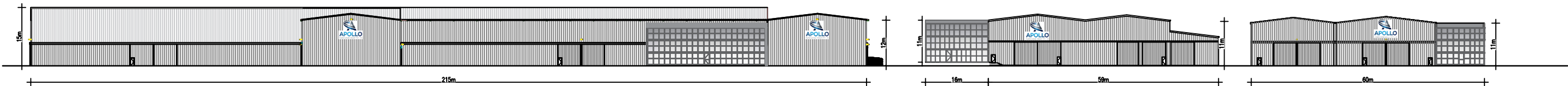
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Revision No.:

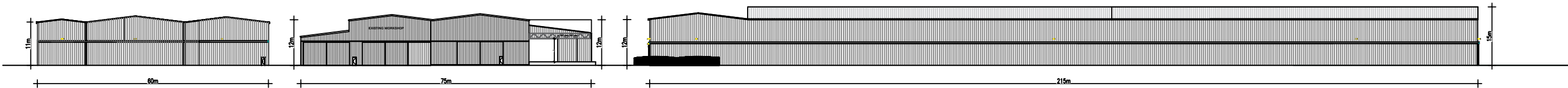
Revision Date:

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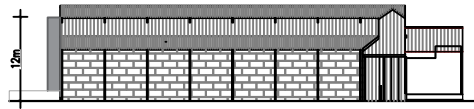
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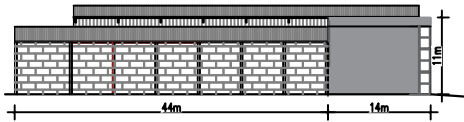
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A 1.2 SCALE= 1:750



2 SOUTH ELEVATION
A 1.2 SCALE= 1:750



3 SIDE ELEVATION
A 1.2 SCALE= 1:750



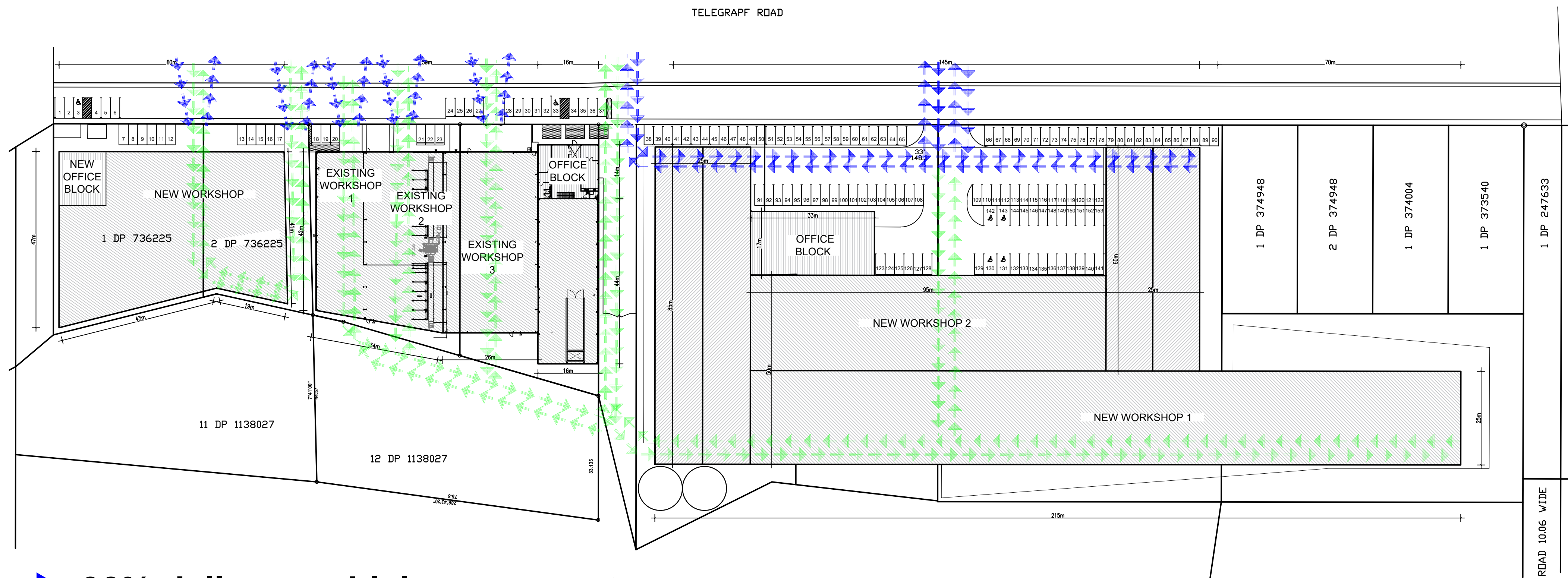
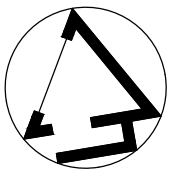
4 SIDE ELEVATION
A 1.2 SCALE= 1:750

ISSUE	DATE	REASON FOR REVISION
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-	-	-
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-	-	-
-	-	-
-	-	-




Client:	APOLLO FABRICATION GROUP Pty Ltd	
Project:	PROPOSED ADDITION 2 - 20 Telegraph road, Young	
Drawing:	PROPOSED ELEVATIONS	

Job Number:		
No. in Set:	3	Sheet No.: A 1.2
Scale:	1 : 750	Revision No.:
Date:	31.03.2021	Revision Date.:
Drawn:	MG	



- ➡ 90% delivery vehicle movement
- ➡ 10% vehicle movement / Access

Vehicle movement Plan

ISSUE	DATE	REASON FOR REVISION	 UNIQUE CAD EXPERIENCE		Client: APOLLO FABRICATION GROUP Pty Ltd	Job Number:	
-	-	-			Project: PROPOSED ADDITION 2 - 20 Telegraph road, Young	No. in Set: 2	Sheet No.: A 1.1
-	-	-	Drawing: PROPOSED SITE PLAN		Scale: 1 : 750	Revision No.:	
-	-	-			Date: 11.03.2021	Revision Date:	
-	-	-			Drawn: MG		

©

A2

Lw of NOISE SOURCES				NOISE LEVELS - dB (re: 1 picowatt)								
INSIDE WAREHOUSE 2 - 4 Telegraph Rd				dBA	63	125	250	500	1000	2000	4000	8000
1.	Ambient Workshop Noise	1	450	100	85	81	83	85	88	95	95	90
2.	Semi Trailer on site	1	300	96	97	99	91	92	90	88	85	79
3.	Truck idle & reverse	1	120	88	94	90	78	79	86	80	72	65
4.	Loading & Unloading in Workshop	1	180	88	76	76	74	78	78	83	83	79
5.	Fork move materials	1	180	96	87	84	89	92	93	89	82	71
6.	Fork move trolley	1	180	97	89	93	95	94	93	89	80	69
7.	Fork drive by	1	180	93	94	91	89	91	87	85	80	76
8.				0	0	0	0	0	0	0	0	0
9.				0	0	0	0	0	0	0	0	0
10.				0	0	0	0	0	0	0	0	0
TOTAL Lw IN ROOM =				104	101	101	98	99	98	98	96	91
Reverberant Lp Inside Room =				86	83	83	82	82	80	80	77	69

Noise Emission Calcs - Day

7/04/2021

Lw of NOISE SOURCES				NOISE LEVELS - dB (re: 1 picowatt)								
INSIDE WAREHOUSE 10 - 12 TELEGRAPH RD				dBA	63	125	250	500	1000	2000	4000	8000
	Number	Duration										
1.	Pneumatic plating machine	1	450	87	87	82	82	81	78	77	81	82
2.	Ambient workshop noise – grinders, hammers, welders	1	450	100	85	81	83	85	88	95	95	90
3.	Move trolley of materials with forklift	1	120	95	87	91	93	92	91	87	78	67
4.	Loaded forklift drive by	1	60	88	89	86	84	86	82	80	75	71
5.	Forklift moving materials on hardstand	1	120	94	85	82	87	90	91	87	80	69
6.	Loading & unloading in sheds – shed door open	1	240	90	77	77	75	79	79	84	84	80
7.	Truck idle & reversing (with alarm)	1	120	88	94	90	78	79	86	80	72	65
8.	Plasma cutter	1	450	98	85	82	81	84	88	92	91	93
9.				0	0	0	0	0	0	0	0	0
10.				0	0	0	0	0	0	0	0	0
TOTAL Lw IN ROOM =				104	97	95	95	96	97	98	97	95
Reverberant Lp Inside Room =				85	79	77	79	80	78	80	78	73

Lw of NOISE SOURCES				NOISE LEVELS - dB (re: 1 picowatt)								
INSIDE WAREHOUSE 1 20 TELEGRAPH RD				dBA	63	125	250	500	1000	2000	4000	8000
1.	Ambient workshop noise – grinders, hammers, welders	1	900	103	88	84	86	88	91	98	98	93
2.	Blasting chamber	1	900	86	88	87	84	80	78	79	80	73
3.	Blasting chamber extraction discharge	1	900	101	100	101	103	98	94	90	90	84
4.	Blasting chamber blow off valve	1	5	66	76	67	65	59	50	61	59	50
5.	Forklift dropping steel beams on steel trolley	1	60	90	85	82	82	85	87	83	75	63
6.	Forklift load beams on truck	1	120	88	91	85	88	87	82	77	71	63
7.	Forklift unload steel beams to ground	1	120	86	89	83	81	83	83	77	67	60
8.	Move trolley of materials with forklift	1	300	99	91	95	97	96	95	91	82	71
9.	Loaded forklift drive by	1	300	95	96	93	91	93	89	87	82	78
10.	Semi-trailer movements on site	1	120	92	93	95	87	88	86	84	81	75
TOTAL Lw IN ROOM =				107	103	104	105	102	100	100	99	94
Reverberant Lp Inside Room =				89	86	86	89	86	82	82	80	72

Lw of NOISE SOURCES				NOISE LEVELS - dB (re: 1 picowatt)								
INSIDE WAREHOUSE 2&3 20 TELEGRAPH RD				dBA	63	125	250	500	1000	2000	4000	8000
	Number	Duration										
1.	Ambient workshop noise – grinders, hammers, welders	1	900	103	88	84	86	88	91	98	98	93
2.	Loading & unloading in sheds – shed door open	1	300	91	78	78	76	80	80	85	85	81
3.	Truck idle & reversing (with alarm)	1	120	88	94	90	78	79	86	80	72	65
4.		0	5	0	0	0	0	0	0	0	0	0
5.	Forklift dropping steel beams on steel trolley	1	60	90	85	82	82	85	87	83	75	63
6.	Forklift load beams on truck	1	120	88	91	85	88	87	82	77	71	63
7.	Forklift unload steel beams to ground	1	120	86	89	83	81	83	83	77	67	60
8.	Move trolley of materials with forklift	1	300	99	91	95	97	96	95	91	82	71
9.	Loaded forklift drive by	1	300	95	96	93	91	93	89	87	82	78
10.	Semi-trailer movements on site	1	120	92	93	95	87	88	86	84	81	75
TOTAL Lw IN ROOM =			9.0	106	101	100	99	99	99	100	99	94
Reverberant Lp Inside Room =				81	76	76	76	76	74	75	72	65

6371-3 Appendix E

1.	Description	Comments	Input	Noise Levels - dB							
				dBA	63	125	250	500	1000	2000	4000 8000
Vehicles in Car Park											
20 Telegraph Rd, Day Time											
Sound Power Level...		Leq	91	104	96	89	87	86	83	81	75
Energy Distribution	Q	2		0	0	0	0	0	0	0	0
Multiple Units	Number	25		14	14	14	14	14	14	14	14
Distance Loss	Dist (m)	200		54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0
Air Absorption =								0.2	0.7	3.0	11.9
Wall / Roof Directivity	from normal										
Duct Directivity Loss	Angle										
	Equiv Diam (m)										
True Height of Barrier	Actual (m)	0	-0.5	2.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Time Correction		30.0		14.7712	14.77	14.771	14.77	14.77	14.771	14.771	14.77
Ground Absorption				-3	0	5	7.5	3	1	-1.5	0
Lp Contribution at Receptor:				34	49.9	40.6	29.2	24.7	28.0	26.4	24.7 8.3
				dBA	23.7	24.5	20.6	21.5	28.0	27.6	25.7 7.2
2.	Description	Comments	Input	Noise Levels - dB							
				dBA	63	125	250	500	1000	2000	4000 8000
Truck on Western side of Workshop											
20 Telegraph Rd, Day Time											
Sound Power Level...		Leq	100.4	102	104	96	97	95	93	90	84
Energy Distribution	Q	2		0	0	0	0	0	0	0	0
Multiple Units	Number	1		0	0	0	0	0	0	0	0
Distance Loss	Dist (m)	270		56.6	56.6	56.6	56.6	56.6	56.6	56.6	56.6
Air Absorption =								0.3	1.0	4.0	16.0
Wall / Roof Directivity	from normal										
Duct Directivity Loss	Angle										
	Equiv Diam (m)										
True Height of Barrier	Actual (m)	13.5	10.6	15.4	18.4	21.4	24.0	24.0	24.0	24.0	24.0
Time Correction		60.0		11.7609	11.76	11.761	11.76	11.76	11.761	11.761	11.76
Ground Absorption				-3	0	5	7.5	3	1	-1.5	0
Lp Contribution at Receptor:				6.3	21.2	17.2	1.2	0.0	0.0	0.0	0.0 0.0
				dBA	-5.0	1.1	-7.4	-3.2	0.0	1.2	1.0 -1.1
3.	Description	Comments	Input	Noise Levels - dB							
				dBA	63	125	250	500	1000	2000	4000 8000
Truck on Northern side of Workshop											
20 Telegraph Rd, Day Time											
Sound Power Level...		Leq	100.4	102	104	96	97	95	93	90	84
Energy Distribution	Q	2		0	0	0	0	0	0	0	0
Multiple Units	Number	1		0	0	0	0	0	0	0	0
Distance Loss	Dist (m)	210		54.4	54.4	54.4	54.4	54.4	54.4	54.4	54.4
Air Absorption =								0.2	0.8	3.1	12.4
Wall / Roof Directivity	from normal										
Duct Directivity Loss	Angle										
	Equiv Diam (m)										
True Height of Barrier	Actual (m)	1.8	-1.1	4.8	4.6	4.2	3.5	2.4	0.6	0.0	0.0
Time Correction		120.0		8.75061	8.751	8.7506	8.751	8.751	8.7506	8.7506	8.751
Ground Absorption				-3	0	5	7.5	3	1	-1.5	0
Lp Contribution at Receptor:				32.6	37.0	36.2	23.6	22.8	26.2	27.4	25.2 8.4
				dBA	10.8	20.1	15.0	19.6	26.2	28.6	26.2 7.3
Total Sound Power Level			Lw =	101	106	105	97	97	96	93	91 85
				dBA	63	125	250	500	1000	2000	4000 8000
Total Lp at Receptor				36	50	42	30	27	30	30	28 12

ACOUSTICAL – Pertaining to the science of sound, including the generation, propagation, effects and control of both noise and vibration.

AMBIENT NOISE – The ambient noise level at a particular location is the overall environmental noise level caused by all noise sources in the area, both near and far, including road traffic, factories, wind in the trees, birds, insects, animals, etc.

AUDIBLE – means that a sound can be heard. However, there are a wide range of audibility grades, varying from “barely audible” to “just audible”, “clearly audible” and “prominent”. Chapter 83 of the NSW Environment Protection Authority – Environmental Noise Control Manual (1985) states:

“noise from a particular source might be offensive if it is clearly audible, distinct from the prevailing background noise and of a volume or character that a reasonable person would be conscious of the intrusion and find it annoying or disruptive”.

It follows that the word “audible” in an environmental noise context means “clearly audible”.

BACKGROUND NOISE LEVEL – Silence does not exist in the natural or the built-environment, only varying degrees of noise. The Background Noise Level is the average minimum dBA level of noise measured in the absence of the noise under investigation and any other short-term noises such as those caused by cicadas, lawnmowers, etc. It is quantified by the L_{A90} or the dBA noise level that is exceeded for 90 % of the measurement period (usually 15 minutes).

- **Assessment Background Level (ABL)** is the single figure background level representing each assessment period – day, evening and night (ie three assessment background levels are determined for each 24hr period of the monitoring period). Determination of the assessment background level is by calculating the tenth percentile (the lowest tenth percent value) of the background levels (L_{A90}) for each period (refer: NSW Industrial Noise Policy, 2000).
- **Rating Background Level (RBL)** as specified by the Environment Protection Authority is the overall single figure (L_{A90}) background noise level representing an assessment period (day, evening or night) over a monitoring period of (normally) three to seven days.

The RBL for an assessment period is the median of the daily lowest tenth percentile of L_{90} background noise levels.

If the measured background noise level is less than 30 dBA, then the Rating Background Level (RBL) is considered to be 30 dBA.

DECIBEL – The human ear has a vast sound-sensitivity range of over a thousand billion to one. The decibel is a logarithmic unit that allows this same range to be compressed into a somewhat more comprehensible range of 0 to 120 dB. The decibel is ten times the logarithm of the ratio of a sound level to a reference sound level. See also Sound Pressure Level and Sound Power Level.

Decibel noise levels cannot be added arithmetically since they are logarithmic numbers. If one machine is generating a noise level of 50 dBA, and another similar machine is placed beside it, the level will increase to 53 dBA, not 100 dBA. Ten similar machines placed side by side increase the sound level by 10 dBA, and one hundred machines increase the sound level by 20 dBA.

dBA – The human ear is less sensitive to low frequency sound than high frequency sound. We are most sensitive to high frequency sounds, such as a child’s scream. Sound level meters have an inbuilt weighting network, termed the dBA scale, that approximates the human loudness response at quiet sound levels (roughly approximates the 40 phon equal loudness contour).



However, the dBA sound level provides a poor indication of loudness for sounds that are dominated by low frequency components (below 250 Hz). If the difference between the “C” weighted and the “A” weighted sound level is 15 dB or more, then the NSW Industrial Noise Policy recommends a 5 dBA penalty be applied to the measured dBA level.

dbc – The dbc scale of a sound level meter is similar to the dBA scale defined above, except that at high sound intensity levels, the human ear frequency response is more linear. The dbc scale approximates the 100 phon equal loudness contour.

EQUIVALENT CONTINUOUS NOISE LEVEL, L_{Aeq} – Many noises, such as road traffic or construction noise, vary continually in level over a period of time. More sophisticated sound level meters have an integrating electronic device inbuilt, which average the A weighted sound pressure levels over a period of time and then display the energy average or L_{Aeq} sound level. Because the decibel scale is a logarithmic ratio the higher noise levels have far more sound energy, and therefore the L_{Aeq} level tends to indicate an average which is strongly influenced by short term, high level noise events. Many studies show that human reaction to level-varying sounds tends to relate closely to the L_{Aeq} noise level.

FREE FIELD – This is a sound field not subject to significant reflection of acoustical energy. A free field over a reflecting plane is usually outdoors with the noise source resting on hard flat ground, and not closer than 6 metres to any large flat object such as a fence or wall; or inside an anechoic chamber.

FREQUENCY – The number of oscillations or cycles of a wave motion per unit time, the SI unit being the Hertz, or one cycle per second.

IMPACT ISOLATION CLASS (IIC) – The American Society for Testing and Materials (ASTM) has specified that the IIC of a floor/ceiling system shall be determined by operating an ISO 140 Standard Tapping Machine on the floor and measuring the noise generated in the room below. The IIC is a number found by fitting a reference curve to the measured octave band levels and then deducting the sound pressure level at 500 Hz from 110 decibels. Thus the higher the IIC, the better the impact sound isolation.

IMPACT SOUND INSULATION ($L_{nT,w}$) – Australian Standard AS ISO 717.2 – 2004 has specified that the Impact Sound Insulation of a floor/ceiling system be quantified by operating an ISO 140 Standard Tapping Machine on the floor and measuring the noise generated in the room below. The Weighted Standardised Impact Sound Pressure Level ($L_{nT,w}$) is the sound pressure level at 500 Hz for a reference curve fitted to the measured octave band levels. Thus the lower $L_{nT,w}$ the better the impact sound insulation.

IMPULSE NOISE – An impulse noise is typified by a sudden rise time and a rapid sound decay, such as a hammer blow, rifle shot or balloon burst.

INTRUSIVE NOISE LEVEL, L_{Aeq} – The level of noise from a factory, place of entertainment, etc. in NSW is assessed on the basis of the average maximum noise level, or the L_{Aeq} (15 min). This is the energy average A weighted noise level measured over any 15 minute period.

LOUDNESS – The degree to which a sound is audible to a listener is termed the loudness. The human ear perceives a 10 dBA noise level increase as a doubling of loudness and a 20 dBA noise increase as a quadrupling of the loudness.



MAXIMUM NOISE LEVEL, L_{Amax} – The rms maximum sound pressure level measured on the "A" scale of a sound level meter during a noise survey is the L_{Amax} noise level. It may be measured using either the Fast or Slow response time of the meter. This should be stated.

NOISE RATING NUMBERS – A set of empirically developed equal loudness curves has been adopted as Australian Standard AS1469-1983. These curves allow the loudness of a noise to be described with a single NR number. The Noise Rating number is that curve which touches the highest level on the measured spectrum of the subject noise. For broadband noise such as fans and engines, the NR number often equals the dBA level minus five.

NOISE – Noise is unwanted sound. Sound is wave motion within matter, be it gaseous, liquid or solid. "Noise includes sound and vibration".

NOISE REDUCTION COEFFICIENT – See: "Sound Absorption Coefficient".

OFFENSIVE NOISE - (Reference: Dictionary of the Protection of the Environment Operations Act 1997). *"Offensive Noise means noise:*

- (a) that, by reason of its level, nature, character or quality, or the time at which it is made, or any other circumstances:*
 - (i) is harmful to (or likely to be harmful to) a person who is outside the premise from which it is emitted, or*
 - (ii) interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted, or*
- (b) that is of a level, nature, character or quality prescribed by the regulations or that is made at a time, or in other circumstances prescribed by the regulations."*

PINK NOISE – Pink noise is a broadband noise with an equal amount of energy in each octave or third octave band width. Because of this, Pink Noise has more energy at the lower frequencies than White Noise and is used widely for Sound Transmission Loss testing.

REVERBERATION TIME, T_{60} – The time in seconds, after a sound signal has ceased, for the sound level inside a room to decay by 60 dB. The first 5 dB decay is often ignored, because of fluctuations that occur while reverberant sound conditions are being established in the room. The decay time for the next 30 dB is measured and the result doubled to determine the T_{60} . The Early Decay Time (EDT) is the slope of the decay curve in the first 10 dB normalised to 60 dB.

SOUND ABSORPTION COEFFICIENT, α – α Sound is absorbed in porous materials by the viscous conversion of sound energy to heat energy as the sound waves pass through it. Sound is similarly absorbed by the flexural bending of internally damped panels. The fraction of incident energy that is absorbed is termed the Sound Absorption Coefficient, α . An absorption coefficient of 0.9 indicates that 90 % of the incident sound energy is absorbed. The average α from 250 to 2000 Hz is termed the Noise Reduction Coefficient (NRC).

SOUND ATTENUATION – If an enclosure is placed around a machine, or a silencer is fitted to a duct, the noise emission is reduced or attenuated. An enclosure that attenuates the noise level by 30 dBA, reduces the sound energy by one thousand times.

SOUND EXPOSURE LEVEL (SEL) – The total sound energy of a single noise event condensed into a one second duration or in other words it is an L_{eq} (1 sec).



SOUND PRESSURE LEVEL, L_p – The level of sound measured on a sound level meter and expressed in decibels, dB, dBA, dBC, etc. $L_p = 20 \times \log (P/P_0) \dots \text{dB}$

where P is the rms sound pressure in Pascal and P_0 is a reference sound pressure of 20 μPa .
 L_p varies with distance from a noise source.

SOUND POWER LEVEL, L_w – The Sound Power Level of a noise source is an absolute that does not vary with distance or with a different acoustic environment.

$$L_w = L_p + 10 \log A \dots \text{dB, re: } 1\text{pW},$$

where A is the measurement noise-emission area in square metres in a free field.

SOUND TRANSMISSION CLASS (STC) – An internationally standardised method of rating the sound transmission loss of partition walls to indicate the decibels of noise reduction of a human voice from one side to the other. (Refer: Australian Standard AS1276 – 1979)

SOUND TRANSMISSION LOSS – The amount in decibels by which a random sound is reduced as it passes through a sound barrier. A method for the measurement of airborne Sound Transmission Loss of a building partition is given in Australian Standard AS1191 - 2002.

STATISTICAL EXCEEDENCE SOUND LEVELS, L_{A90} , L_{A10} , L_{A1} , etc – Noise which varies in level over a specific period of time (usually 15 minutes) may be quantified in terms of various statistical descriptors:

The L_{A90} is the dBA level exceeded for 90 % of the time. In NSW the L_{A90} is measured over periods of 15 minutes, and is used to describe the average minimum or background noise level.

The L_{A10} is the dBA level that is exceeded for 10 % of the time. In NSW the L_{A10} measured over a period of 10 to 15 minutes. It was until recently used to describe the average maximum noise level, but has largely been replaced by the L_{Aeq} for describing level-varying noise.

The L_{A1} is the dBA level that is exceeded for 1 % of the time. In NSW the L_{A1} may be used for describing short-term noise levels such as could cause sleep arousal during the night.

STEADY NOISE – Noise, which varies in level by 6 dBA or less, over the period of interest with the time-weighting set to “Fast”, is considered to be “steady”. (Refer AS 1055.1 1997)

WEIGHTED SOUND REDUCTION INDEX, R_w – This is a single number rating of the airborne sound insulation of a wall, partition or ceiling. The sound reduction is normally measured over a frequency range of 100 to 3,150 Hertz and averaged in accordance with ISO standard weighting curves (Refer AS/NZS 1276.1:1999).

Internal partition wall $R_w + C$ ratings are frequency weighted to simulate insulation from human voice noise. The $R_w + C$ is always similar in value to the STC rating value. External walls, doors and windows may be $R_w + C_{tr}$ rated to simulate insulation from road traffic noise. This is normally a lower number than the STC rating value.

WHITE NOISE – White noise is broadband random noise whose spectral density is constant across its entire frequency range. The sound power is the same for equal bandwidths from low to high frequencies. Because the higher frequency octave bands cover a wider spectrum, white noise has more energy at the higher frequencies and sounds like a hiss.

