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Environmental Noise Assessment - McDonald's Two Rocks

Lot 703 Lisford Avenue, Two Rocks WA

Reference: 24018673-01

Prepared for:
McDonald's Australia Ltd

Reference: 24018673-01

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Date	Rev	Description	Author	Verified
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EXECUTIVE SUMMARY

Lloyd George Acoustics was engaged by McDonald's Australia Ltd to undertake an environmental noise assessment for a Proposed McDonald's to be located at Lot 703 Lisford Avenue, Two Rocks WA. With regard to noise emissions, consideration was given to noise from mechanical services, vehicles idling in the drive-through, speaker noise in the drive-through, and closing car doors at neighbouring properties, against the prescribed standards of the *Environmental Protection (Noise) Regulations 1997*.

The assessment has demonstrated compliance with the assigned levels as determined in accordance with the Environmental Protection (Noise) Regulations 1997 noting that single storey receivers have been used within the model for the future residences.

The mechanical plant sources were based on file data and manufacturer specifications provided from previous McDonald's Restaurants. Once the mechanical plant has been designed and selected, the noise levels should be reviewed prior to Building Permit to ensure compliance is achieved.

1. INTRODUCTION

Lloyd George Acoustics was engaged by McDonald's Australia Ltd to undertake an environmental noise assessment for a proposed development to be located at Lot 703 Lisford Avenue, Two Rocks WA - refer *Figure* 1-1.

Figure 1-1: Subject Site Location (Source: DPLH PlanWA)

With regard to noise emissions, consideration is given to noise from mechanical services, vehicles idling in the drive-through, speaker noise in the drive-through, and closing car doors at neighbouring properties, against the prescribed standards of the *Environmental Protection (Noise) Regulations 1997*.

Appendix C contains a description of some of the terminology used throughout this report.

2. CRITERIA

Environmental noise in Western Australia is governed by the *Environmental Protection Act 1986*, through the *Environmental Protection (Noise) Regulations 1997* (the Regulations).

2.1. Regulations 7, 8 & 9

This group of regulations provide the prescribed standard for noise as follows:

"7. Prescribed standard for noise emissions

(1) Noise emitted from any premises or public place when received at other premises –

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

(b) must be free of –

(i) tonality; and

(ii) impulsiveness; and

(iii) modulation,

when assessed under regulation 9.

(2) For the purposes of subregulation (1)(a), a noise emission is taken to significantly contribute to a level of noise if the noise emission … exceeds a value which is 5 dB below the assigned level at the point of reception."

Tonality, impulsiveness and modulation are defined in regulation 9 (refer *Appendix C*). Under regulation 9(3), *"Noise is taken to be free of the characteristics of tonality, impulsiveness and modulation if -*

(a) the characteristics cannot be reasonably and practicably removed by techniques other than attenuating the overall level of noise emission; and

(b) the noise emission complies with the standard prescribed under regulation 7(1)(a) after the adjustments in the table [Table 2-1] … are made to the noise emission as measured at the point of reception."

Table 2-1 Adjustments Where Characteristics Cannot Be Removed

Where Noise Emission is Not Music*			Where Noise Emission is Music	
Tonality	Modulation	Impulsiveness	No Impulsiveness	Impulsiveness
+ 5 dB	+ 5 dB	+ 10 dB	+ 10 dB	+ 15 dB

* These adjustments are cumulative to a maximum of 15 dB.

The assigned levels (prescribed standards) for all premises are specified in regulation 8(3) and are shown in *Table 2-2*. The L_{A10} assigned level is applicable to noises present for more than 10% of a representative assessment period, generally applicable to "steady-state" noise sources. The L_{A1} is for short-term noise sources present for less than 10% and more than 1% of the time. The L_{Amax} assigned level is applicable for incidental noise sources, present for less than 1% of the time.

Table 2-2 Baseline Assigned Levels

Premises Receiving Noise	Time Of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises: highly sensitive area[1]	0700 to 1900 hours Monday to Saturday (Day)	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays (Sunday)	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days (Evening)	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	35 + influencing factor	45 + influencing factor	55 + influencing factor
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80
Commercial Premises	All hours	60	75	80
Industrial and Utility Premises	All hours	65	80	90

1. ***highly sensitive area*** means that area (if any) of noise sensitive premises comprising —
   (a) a building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
   (b) any other part of the premises within 15 metres of that building or that part of the building.

The influencing factor (IF), in relation to noise received at noise sensitive premises, has been calculated as between 2-4 dB as determined in *Appendix B*. *Table 2-3* shows the assigned levels including the influencing factor and transport factor at the receiving locations.

Table 2-3 Assigned Levels

Premises Receiving Noise	Time Of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
+2 dB IF (2 Charnwood Av) Noise sensitive premises: highly sensitive area[1]	0700 to 1900 hours Monday to Saturday (Day)	47	57	67
	0900 to 1900 hours Sunday and public holidays (Sunday)	42	52	67
	1900 to 2200 hours all days (Evening)	42	52	57
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	37	47	57
+4 dB IF (Future West Residences) Noise sensitive premises: highly sensitive area[1]	0700 to 1900 hours Monday to Saturday (Day)	49	59	69
	0900 to 1900 hours Sunday and public holidays (Sunday)	44	54	69
	1900 to 2200 hours all days (Evening)	44	54	59
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	39	49	59
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80
Commercial Premises	All hours	60	75	80

It must be noted the assigned levels above apply outside the receiving premises and at a point at least 3 metres away from any substantial reflecting surfaces.

The assigned levels are statistical levels and therefore the period over which they are determined is important. The Regulations define the Representative Assessment Period (RAP) as "*a period of time of not less than 15 minutes, and not exceeding 4 hours*, *determined by* an *inspector* or *authorised person to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission"*. An inspector or authorised person is a person appointed under Sections 87 & 88 of the *Environmental Protection Act 1986* and include Local Government Environmental Health Officers and Officers from the Department of Water Environmental Regulation. Acoustic consultants or other environmental consultants are not appointed as an inspector or authorised person. Therefore, whilst this assessment is based on a 4-hour RAP, which is assumed to be appropriate given the nature of the operations, this is to be used for guidance only.

2.2. Regulation 3

"3. Regulations do not apply to certain noise emissions

(1) Nothing in these regulations applies to the following noise emissions –

(a) Noise emissions from the propulsion and braking systems of motor vehicles operating on a road;"

The car park is considered a road and therefore vehicle noise (propulsion and braking) is not assessed in this area. However, vehicle noise in the drive-through area has been considered assessable in this report due to the lanes being solely for ordering purposes and not road access. Vehicle door closing noise also requires assessment, as it does not form part of the propulsion or braking systems. Noise from delivery truck condensing units is also considered assessable.

2.3. Regulation 14A

"14A. Waste Collection and Other Works

(2) Regulation 7 does not apply to noise emitted in the course of carrying out class 1 works if –

(a) The works are carried out in the quietest reasonable and practicable manner; and

(b) The equipment used to carry out the works is the quietest reasonably available;

class 1 works means specified works carried out between -

(a) 0700 hours and 1900 hours on any day that is not a Sunday or a public holiday; or

(b) 0900 hours and 1900 hours on a Sunday or public holiday.

specified works means -

(a) The collection of waste; or

(b) The cleaning of a road or the drains for a road; or

(c) The cleaning of public places, including footpaths, cycle paths, car parks and beaches;"

In the case where specified works are to be carried out outside of class 1, a noise management plan is to be prepared and approved by the CEO.

3. METHODOLOGY

3.1. Noise Modelling

Computer modelling has been used to predict the noise emissions from the development to all nearby receivers. The software used was *SoundPLAN 9.0* with the ISO 9613 algorithms (ISO 17534-3 improved method) selected, as they include the influence of meteorological conditions. Input data required in the model are listed below and discussed in *Section 3.1.1* to *Section 3.1.5*:

- Meteorological Information;
- Topographical data;
- Ground Absorption; and
- Source sound power levels.

3.1.1. Meteorological Conditions

Meteorological information utilised is provided in *Table 3-1* and is considered to represent worst-case conditions for noise propagation. At wind speeds greater than those shown, sound propagation may be further enhanced, however background noise from the wind itself and from local vegetation is likely to be elevated and dominate the ambient noise levels.

Table 3-1: Modelling Meteorological Conditions

Parameter	Day (7.00am to 7.00pm)	Night (7.00pm to 7.00am)
Temperature (°C)	20	15
Humidity (%)	50	50
Wind Speed (m/s)	Up to 5	Up to 5
Wind Direction*	All	All

* The modelling package allows for all wind directions to be modelled simultaneously.

Alternatives to the above default conditions can be used where one year of weather data is available and the analysis considers the worst 2% of the day and night for the month of the year in which the worst-case weather conditions prevail (source: *Draft Guideline on Environmental Noise for Prescribed Premises*, May 2016). In most cases, the default conditions occur for more than 2% of the time and therefore must be satisfied.

3.1.2. Topographical Data

Topographical data was adapted from publicly available information (e.g. *Google*) in the form of spot heights and combined with the site plan.

Surrounding existing buildings were also incorporated in the noise model, as these can provide noise shielding as well as reflection paths. Single storey buildings are modelled with a height of 3.5 metres and any double storey buildings identified (2 Charnwood Avenue) assumed to be 7.0 metres in height with receivers 1.4 metres above ground.

Single storey buildings and receivers on the future residential lots to the west have been incorporated in the noise model.

3.1.3. Fencing and Walls

A solid fence at a minimum height of 2.0 metres high to the east of the proposed McDonald's drive-through has been included in the model as shown on the DA plans in *Appendix A*. The model also included a 1.25-metre retaining wall with a 1.8-metre masonry wall on top on the west side of the proposed McDonald's site.

Colorbond at 1.8 metres high has been used on the boundary of Lot 53. Whilst *Colorbond* fencing is 1.8 metres high, it is modelled as 1.6 metres high to take into account the lightweight nature of the product and potential lesser acoustic performance of a denser product.

Figure 3-1 shows a 2D overview of the noise model with the location of all relevant receivers identified.

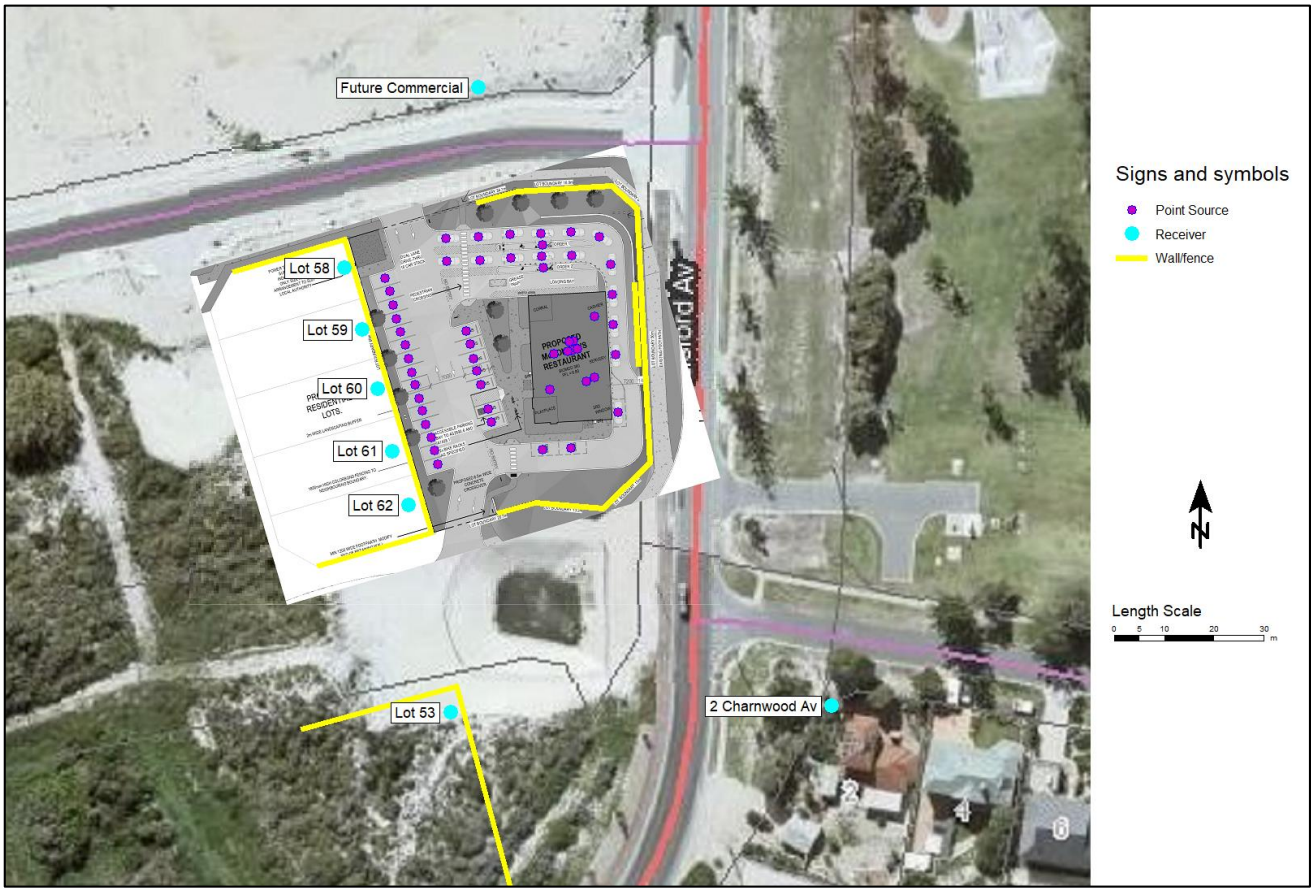


Figure 3-1: Overview of Noise Model

3.1.4. Ground Absorption

The ground absorption has been assumed to be 0.1 (10%) for the roads, 1.0 (100%) for the grassed areas and 0.5 (50%) elsewhere, noting that 0.0 represents hard reflective surfaces such as water and 1.0 represents absorptive surfaces such as grass.

3.1.5. Source Sound Levels

The source sound power levels used in the modelling are provided in *Table 3-2*.

Table 3-2: Source Sound Power Levels, dB

Description	Octave Band Centre Frequency (Hz)								Overall dB(A)
	63	125	250	500	1k	2k	4k	8k	
Condenser Package MAC90RP – L_{A10}	88	87	85	81	76	70	64	59	**82**
AC-1 Actron PKY960T Low Speed – L_{A10}	-	84	78	75	73	69	60	54	**78**
AC-1 Actron PKY960T High Speed – L_{A10}	-	89	83	80	78	74	64	60	**83**
AC-2 and AC-3 Actron PCG340 Package Low Speed – L_{A10}	-	75	74	73	71	67	65	60	**76**
AC-2 and AC-3 Actron PCG340 Package Unit High Speed – L_{A10}	-	78	78	77	75	71	69	64	**80**
AC-4 Actron PCA233U Package Unit Low Speed – L_{A10}	-	71	71	70	67	62	61	56	**69**
AC-4 Actron PCA233U Package Unit High Speed – L_{A10}	-	76	75	74	71	66	65	60	**71**
Fan 1 Fantech TCE354, Toilet – L_{A10}	80	78	74	71	62	64	63	53	**73**
Fan 2 Fantech CGD354, Fry EF – L_{A10}	80	78	74	71	62	64	63	53	**73**
Fan 3 Fantech CGD354, Fillet EF – L_{A10}	80	78	74	71	62	64	63	53	**73**
Fan 4 Fantech CGD404, Grille EF – L_{A10}	83	81	77	74	65	67	66	56	**76**
Fan 5 Fantech CE192V, Wash-up EF – L_{A10}	78	77	68	65	60	58	56	52	**68**
Fan 6 Fantech CE406D, IT Room EF – L_{A10}	78	77	68	65	60	58	56	52	**68**
Car Idling/moving slowly, L_{A10}	81	78	74	72	74	74	67	64	**79**
Closing Car Door, L_{Amax}	71	74	77	81	80	78	72	61	**84**
Small Refrigerated Truck delivery – L_{A1}	100	91	87	88	83	81	79	75	**90**
Drive-Through Speaker – L_{A1}	62	64	66	77	80	73	57	42	**82**

The following is noted in relation to *Table 3-2*:

- Mechanical plant noise sources were based on file data and manufacturer specifications provided from previous McDonald's Restaurants. Mechanical plant is modelled at 1.0 metres above roof level. Low speed noise levels were used during the night period as per *Table 3-2*;
- 9 to 18 cars idling in the drive-through were modelled as point sources located 0.5 metres above ground, depending on the calculation scenario;

- Closing car doors were modelled as point sources located 1.0 metre above ground. A small refrigerated delivery truck was modelled as a point source located 1.5 metres above ground in the loading bay.

4. RESULTS

4.1. Noise Modelling

The noise levels were predicted for various scenarios:

- Night L_{A10} Noise – Includes nine cars idling in the drive-through and mechanical plant operating on low speed mode.
- Night L_{A1} Noise – Includes eighteen cars idling in the drive-through, speaker noise and a small delivery truck in the loading bay.
- Sunday Day L_{A10} Noise – Includes eighteen cars idling in the drive-through and mechanical plant operating at high speeds.
- Night L_{Amax} Noise – Includes noise from car doors.

4.2. Night L_{A10} Noise

The results for the Night L_{A10} Noise Scenario are provided in *Table 4-1*. A noise contour plot is also provided in *Figure 4-1* showing noise levels at ground floor. The noise from vehicles alone would not be considered tonal due to the number of vehicles and variation in engine sounds over a representative period, or when combined with mechanical plant noise, therefore no adjustments have been applied.

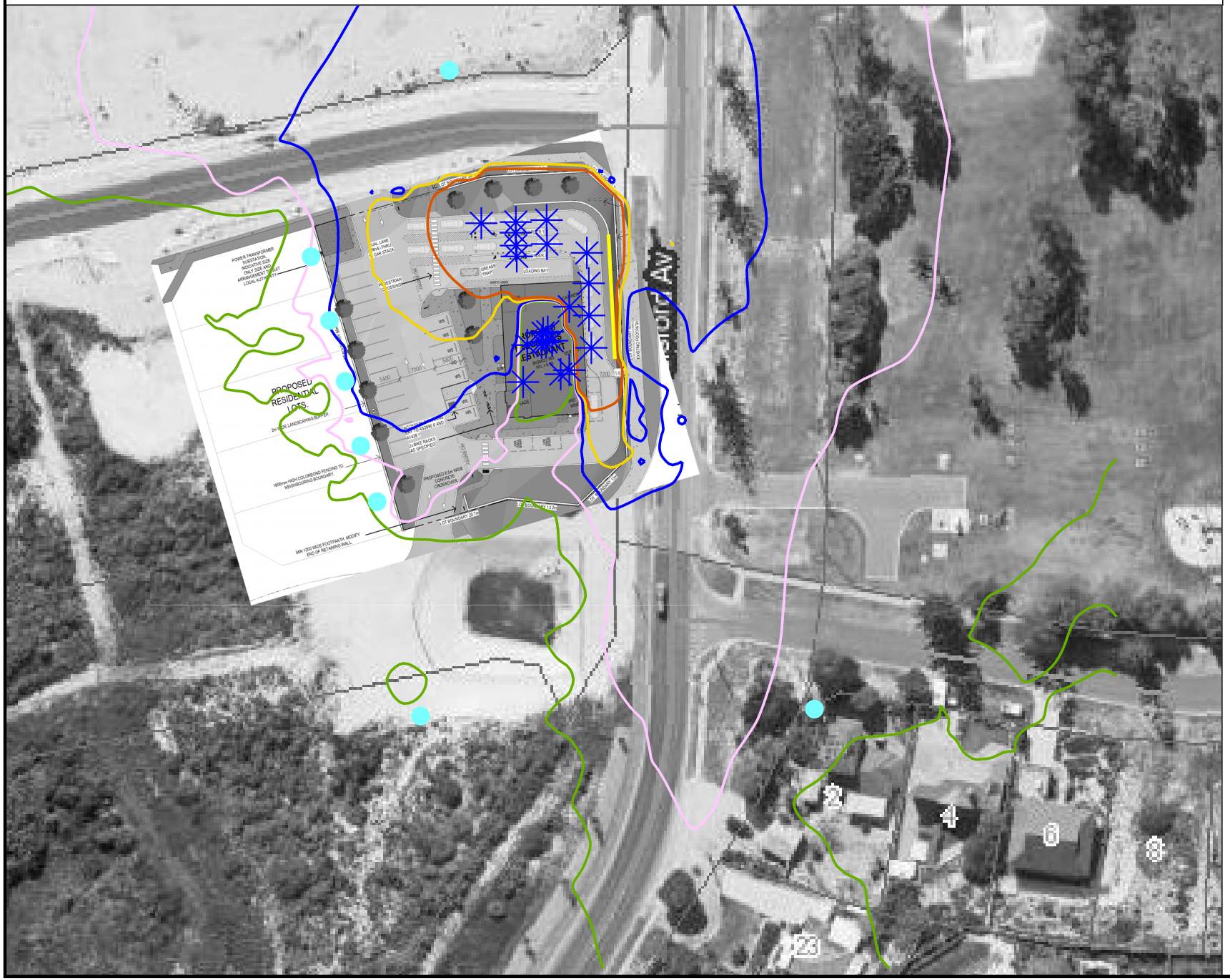
Table 4-1: Night L_{A10} Noise Predicted Levels, dB(A)

Receiver	Cars Idling	Mechanical Plant	Combined	Night-Time Assigned Level	Assessment
2 Charnwood Av Ground Floor	37	25	**37**	**37**	*Complies*
2 Charnwood Av Level 1	37	27	**37**	**37**	*Complies*
Lot 53*	26	27	**29**	**39**	*Complies*
Lot 58*	39	29	**39**	**39**	*Complies*
Lot 59*	39	31	**39**	**39**	*Complies*
Lot 60*	38	33	**39**	**39**	*Complies*
Lot 61*	36	33	**37**	**39**	*Complies*
Lot 62*	34	33	**36**	**39**	*Complies*
Future Commercial	47	29	**47**	**60**	*Complies*

*Single storey future residence

Noise from nine idling cars and mechanical plant operating at low speeds is predicted to comply at all nearest receivers during the critical night period.

Figure 4-1 Night Noise Contour Plot (1.4m AGL), dB L_{A10}



Predicted Noise level

=	34
=	39
=	44
=	49
=	54

Legend

- Receiver
- Point Source
- Fence/Wall

N

Scale 1:800

0 5 10 20 30 m

Project No: 24018673
Consultant: MN
Date: 25/02/2024
Algorithm: ISO 9613
SoundPLAN Version: 9.0

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4.3. Night L_{A1} Noise

The results for the Night L_{A1} Noise Scenario are provided in *Table 4-2* which includes noise from idling cars, speaker noise and a small delivery truck in the loading bay. It is assessed against the night-time L_{A1} assigned level due to the shorter duration of this noise source. A noise contour plot is also provided in *Figure 4-2* showing noise levels at ground floor.

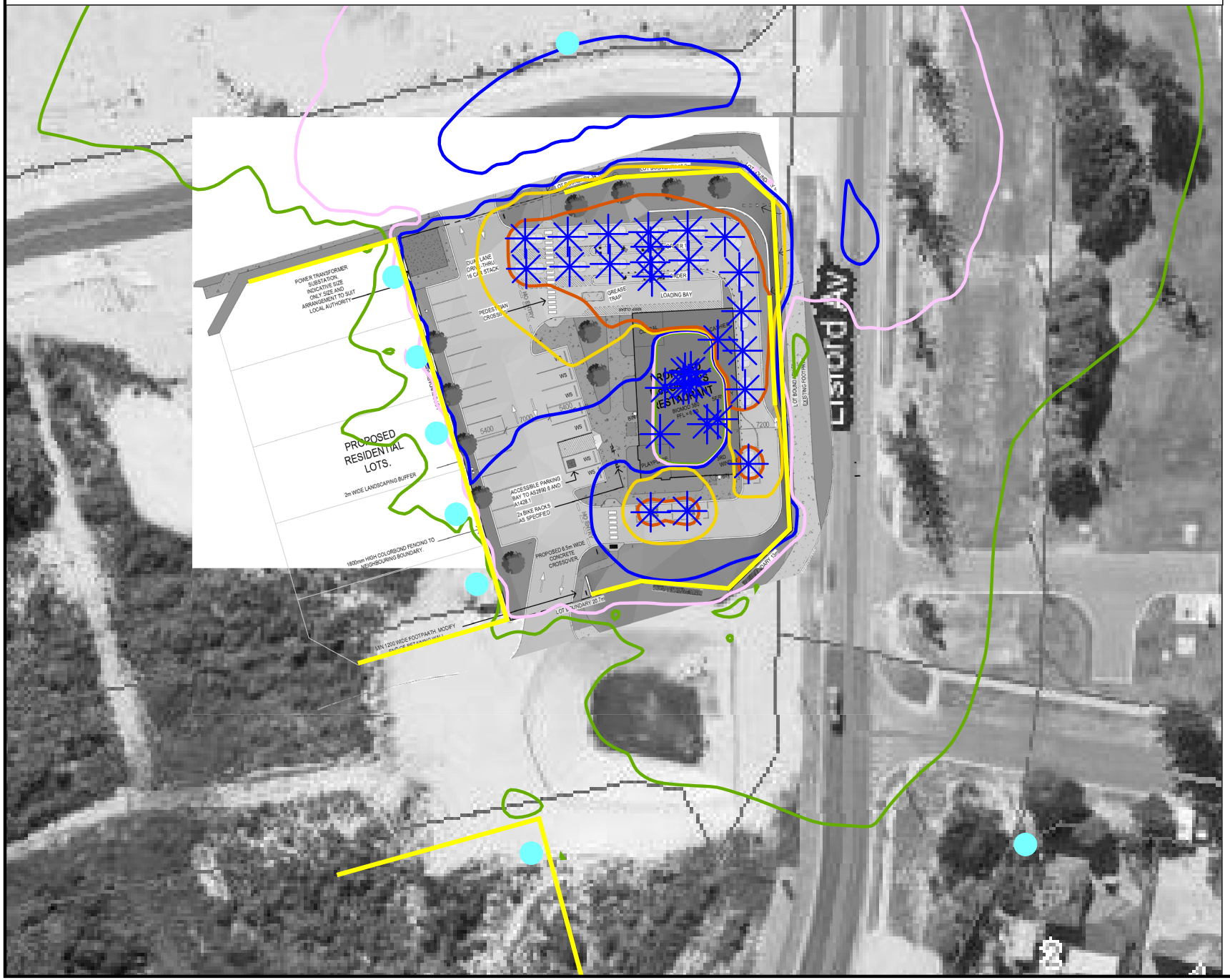
Table 4-2: Night L_{A1} Noise Predicted Levels, dB(A)

Receiver	Small Delivery Truck	Idling Cars	Speaker Noise	Total	Night-Time Assigned Level	Assessment
2 Charnwood Av Ground Floor	21	41	6	**41**	**47**	*Complies*
2 Charnwood Av Level 1	22	41	6	**41**	**47**	*Complies*
Lot 53*	20	37	4	**37**	**49**	*Complies*
Lot 58*	43	44	33	**47**	**49**	*Complies*
Lot 59*	43	44	32	**47**	**49**	*Complies*
Lot 60*	43	43	30	**46**	**49**	*Complies*
Lot 61*	29	42	28	**42**	**49**	*Complies*
Lot 62*	27	41	27	**41**	**49**	*Complies*
Future Commercial	50	50	44	**54**	**75**	*Complies*

*Single storey future residence

Noise from the L_{A1} sources during the night period is predicted to comply at all nearest receivers during the critical night period. Although compliance is shown during the night period, it is recommended that deliveries are completed during daytime hours.

Figure 4-2 Night Noise Contour Plot (1.4m AGL), dB L_{A1}



Predicted Noise level

	= 44
	= 49
	= 54
	= 59
	= 64

Legend

- Receiver
- Point Source
- Fence/Wall

N

Scale 1:800

0 5 10 20 30 m

Project No: 24018673
Consultant: MN
Date: 25/02/2024
Algorithm: ISO 9613
SoundPLAN Version: 9.0

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4.4. Sunday Day L_{A10} Noise

The results for the Sunday Day L_{A10} Noise Scenario are provided in *Table 4-3* which includes noise from eighteen idling cars and the mechanical plant operating at high speeds. A noise contour plot is also provided in *Figure 4-3* showing noise levels at ground floor.

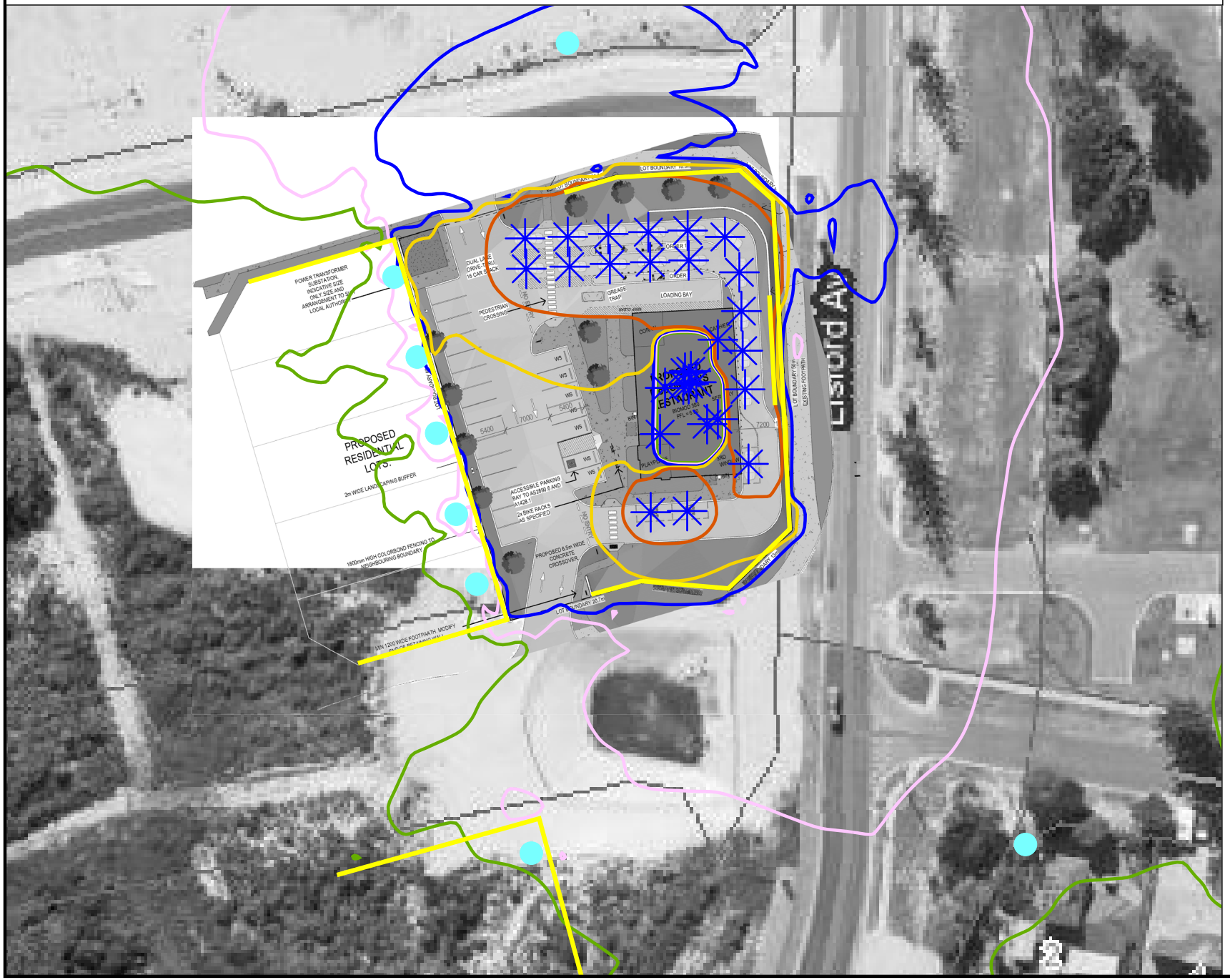
Table 4-3: Sunday Day L_{A10} Noise Predicted Levels, dB(A)

Receiver	Cars Idling	Mechanical Plant	Combined	Night-Time Assigned Level	Assessment
2 Charnwood Av Ground Floor	41	28	**41**	**42**	*Complies*
2 Charnwood Av Level 1	41	29	**41**	**42**	*Complies*
Lot 53*	37	29	**38**	**44**	*Complies*
Lot 58*	44	31	**44**	**44**	*Complies*
Lot 59*	44	33	**44**	**44**	*Complies*
Lot 60*	43	35	**44**	**44**	*Complies*
Lot 61*	42	35	**43**	**44**	*Complies*
Lot 62*	41	35	**42**	**44**	*Complies*
Future Commercial	50	32	**50**	**60**	*Complies*

*Single storey future residence

Noise from eighteen idling cars and mechanical plant operating at high speeds is predicted to comply between 9.00am and 7.00pm on a Sunday.

Figure 4-3 Day Noise Contour Plot (1.4m AGL), dB L_{A10}



Predicted Noise level

	= 39
	= 44
	= 49
	= 54
	= 59

Legend

- Receiver
- Point Source
- Fence/Wall

N

Scale 1:800

0 5 10 20 30 m

Project No: 24018673
Consultant: MN
Date: 25/02/2024
Algorithm: ISO 9613
SoundPLAN Version: 9.0

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4.5. Night L_{Amax} Noise

The results for the Night L_{Amax} Noise Scenario are provided in *Table 4-4.* A noise contour plot is also provided in *Figure 4-4* showing noise levels at ground floor.

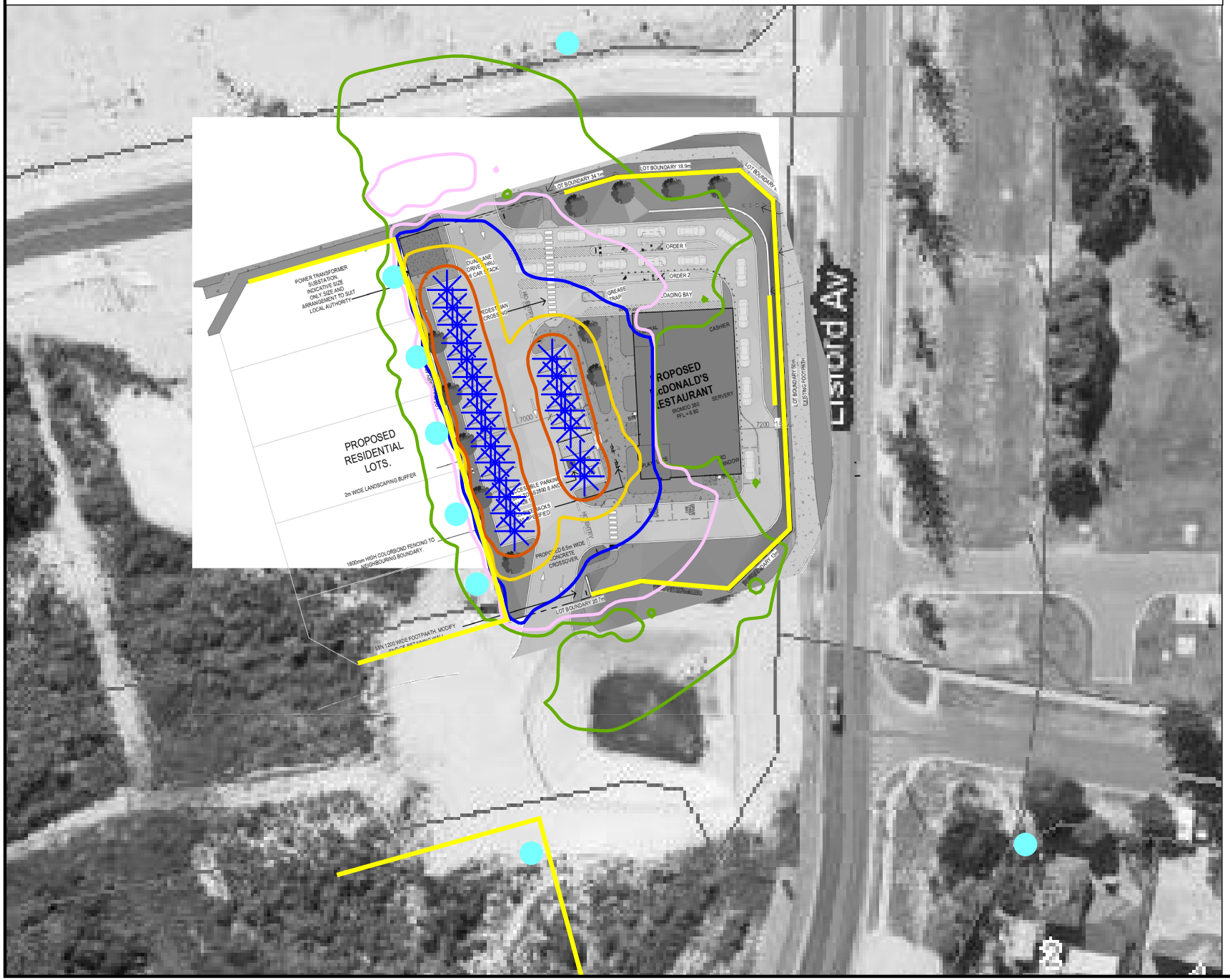
Table 4-4: Night L_{Amax} Noise Predicted Levels, dB(A)

Receiver	Car Door	Total Adjusted[#]	Night-Time Assigned Level	Assessment
2 Charnwood Av Ground Floor	36	**46**	**57**	*Complies*
2 Charnwood Av Level 1	37	**47**	**57**	*Complies*
Lot 53*	35	**45**	**59**	*Complies*
Lot 58*	47	**57**	**59**	*Complies*
Lot 59*	48	**58**	**59**	*Complies*
Lot 60*	47	**57**	**59**	*Complies*
Lot 61*	46	**56**	**59**	*Complies*
Lot 62*	45	**55**	**59**	*Complies*
Future Commercial	43	**53**	**80**	*Complies*

[#]Includes + 10 dB adjustment for impulsiveness
*Single storey future residence

Noise from car doors are predicted to comply at all nearest receivers during the critical night period.

Figure 4-4 Night Noise Contour Plot (1.4m AGL), dB L_{Amax}



Predicted Noise level

=	44
=	49
=	54
=	59
=	64

Legend

- Receiver
- Point Source
- Fence/Wall

Scale 1:800

0 5 10 20 30 m

Project No: 24018673
Consultant: MN
Date: 25/02/2024
Algorithm: ISO 9613
SoundPLAN Version: 9.0

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5. CONCLUSION

The assessment has demonstrated compliance with the assigned levels as determined in accordance with the Environmental Protection (Noise) Regulations 1997 noting that single storey receivers have been used within the model for the future residences.

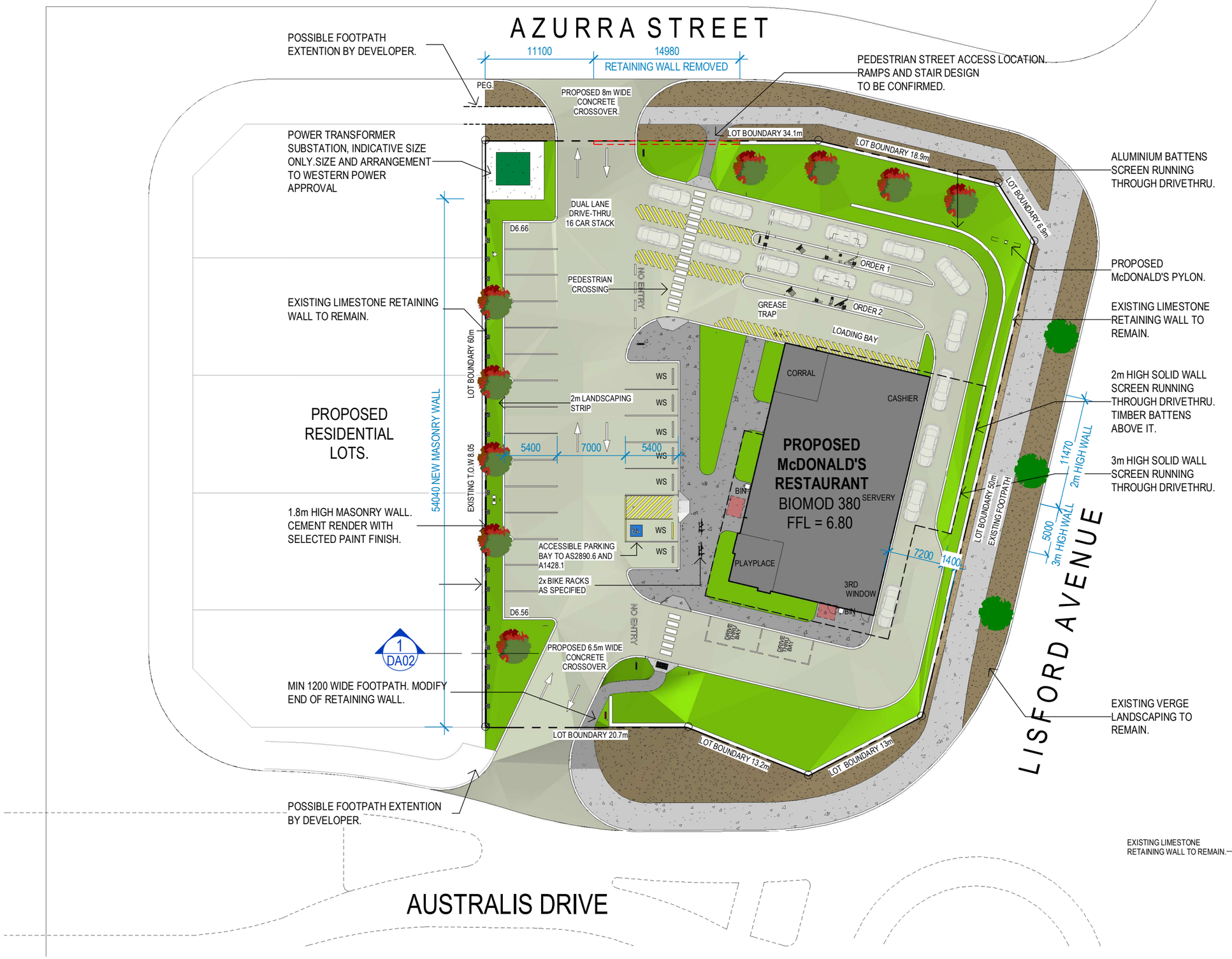
The mechanical plant sources were based on file data and manufacturer specifications provided from previous McDonald's Restaurants. Once the mechanical plant has been designed and selected, the noise levels should be reviewed prior to Building Permit to ensure compliance is achieved.

Regulation 14A provides requirements for the collection of waste, stating that this activity can be exempt from having to comply with *Regulation 7* prescribed standards, provided it is undertaken between 7am and 7pm Mondays to Saturdays and undertaken in the quietest reasonable manner. Collection outside of these hours will require a separate noise management plan.

To further minimise noise impacts, the following are provided for best practice:

- Deliveries:
  - All delivery vehicles are to be encouraged to have broadband type reversing alarms rather than standard tonal alarms;
  - Engines shall be turned off during delivery;
  - Deliveries are to be encouraged during the daytime rather than night-time;
- Car park drainage grates or similar to be plastic or metal with rubber gasket and secured to avoid excess banging.

Appendix A – Development Plans



SITE AREA SCHEDULE

IDENTITY	AREA
LOT AREA	3,066m2

BUILDING GFA SCHEDULE

DESCRIPTOR	AREA m2
BUILDING GFA	380m2

SEATING SCHEDULE

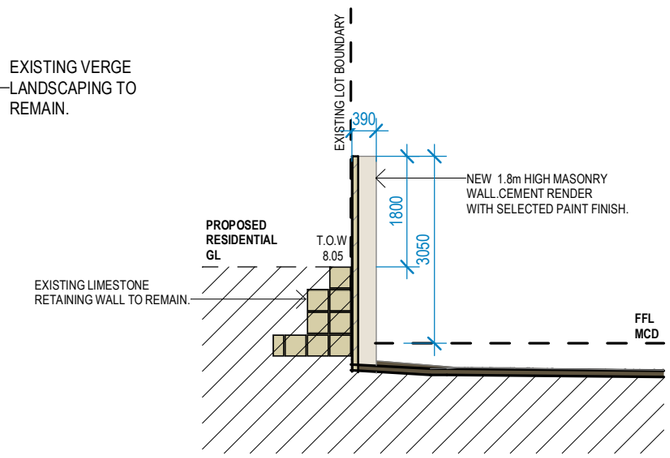
ROOM	SEATS
DINING ROOM	50

PARKING SUMMARY

TYPE	NO
ACCESSIBLE BAY	1
STANDARD BAY	21
WAITING BAY	2

LANDSCAPING LEGEND

COLOUR	DESCRIPTION
	NEW PROPOSED LANDSCAPING BY McDONALD'S 775m2 OR 25% OF OVERALL SITE
	EXISTING/PROPOSED LANDSCAPING BY DEVELOPER 535m2



1 DA02 DETAIL 1 : 100

DEVELOPMENT APPLICATION

Revisions

Issue	Description	Date	Chk	Int
0	DA AS CLOUDED	06.02.2024	AJJ	NR

General Notes

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Drawing Notes

North

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Project
PROPOSED McDONALD'S RESTAURANT
TWO ROCKS

Location
LOT 703,LISFORD AVENUE TWO ROCKS W.A.

Scale: As indicated @ A3
Series: BIO MOD 380
Drawing: SITE PLAN
Project Number: 0868
Drawing Number: DA02
Issue: 0

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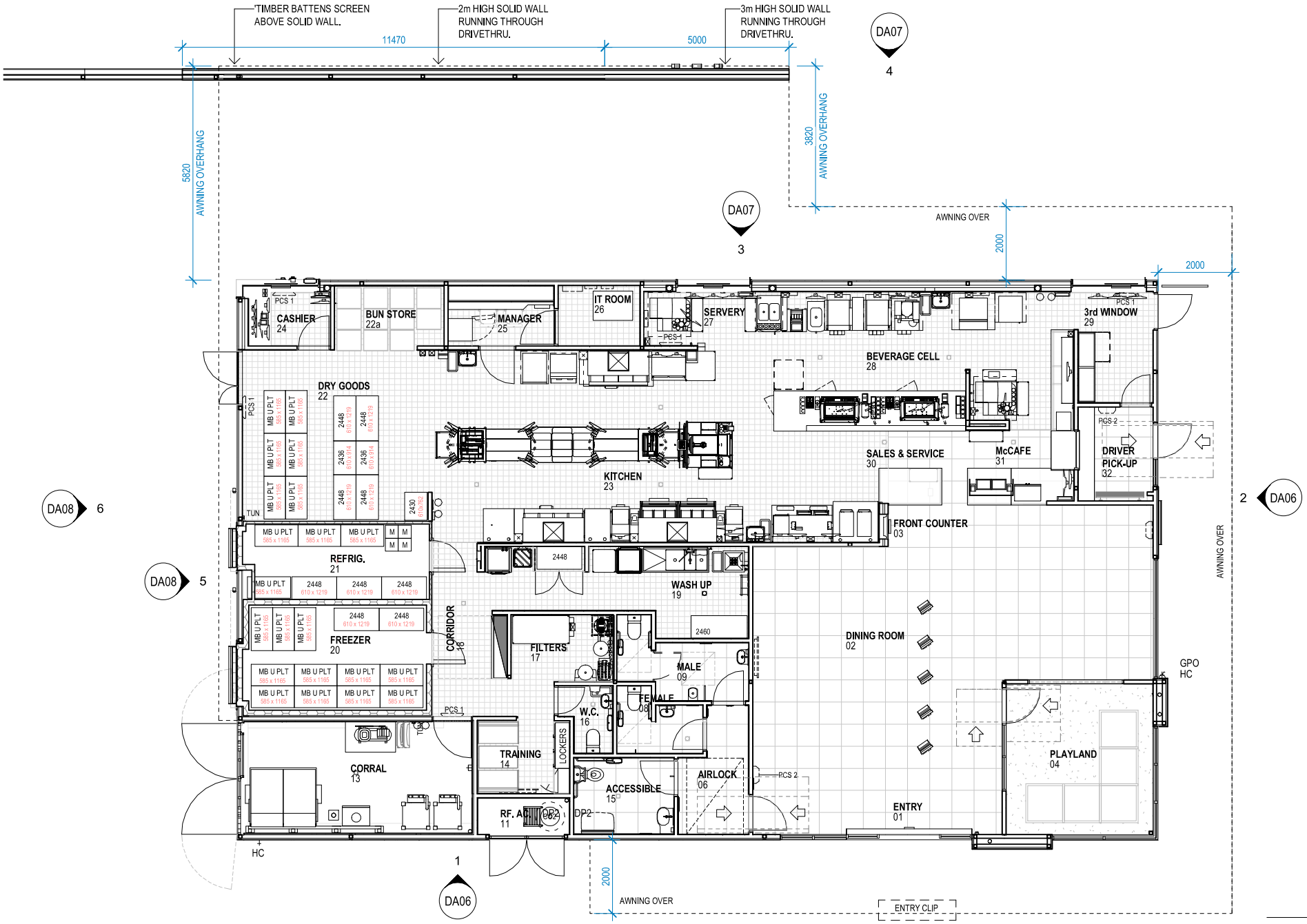

DEVELOPMENT APPLICATION

Revisions

Issue	Description	Date	Chk	Int
0	DA AS CLOUDED	06.02.2024	AJJ	NR

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Project
PROPOSED McDONALD'S RESTAURANT
TWO ROCKS

Location
LOT 703,LISFORD AVENUE TWO ROCKS W.A.

Scale	Series
1 : 100 @ A3	BIO MOD 380

Drawing
FLOORPLAN

Project Number	Drawing Number	Issue
0868	DA04	0

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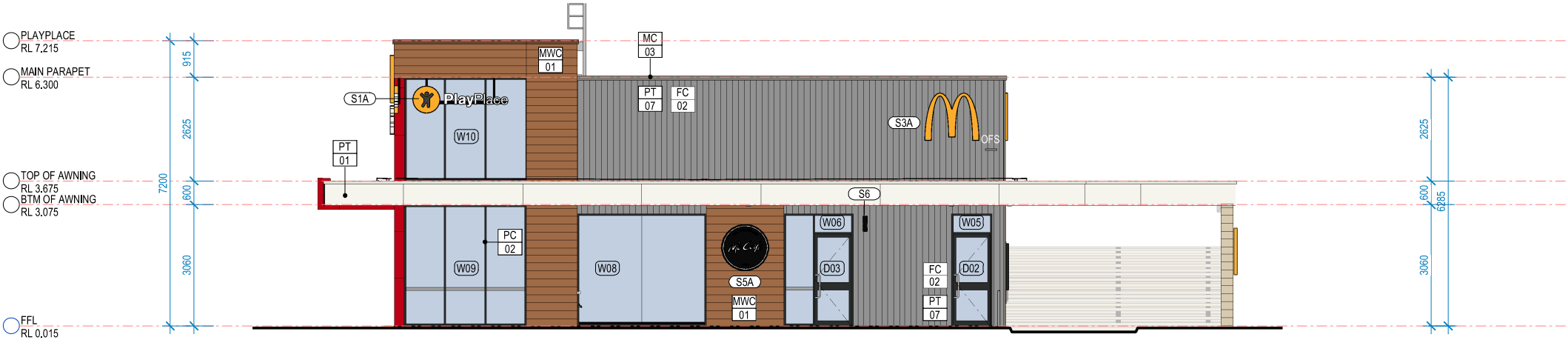

FRONT ELEVATION
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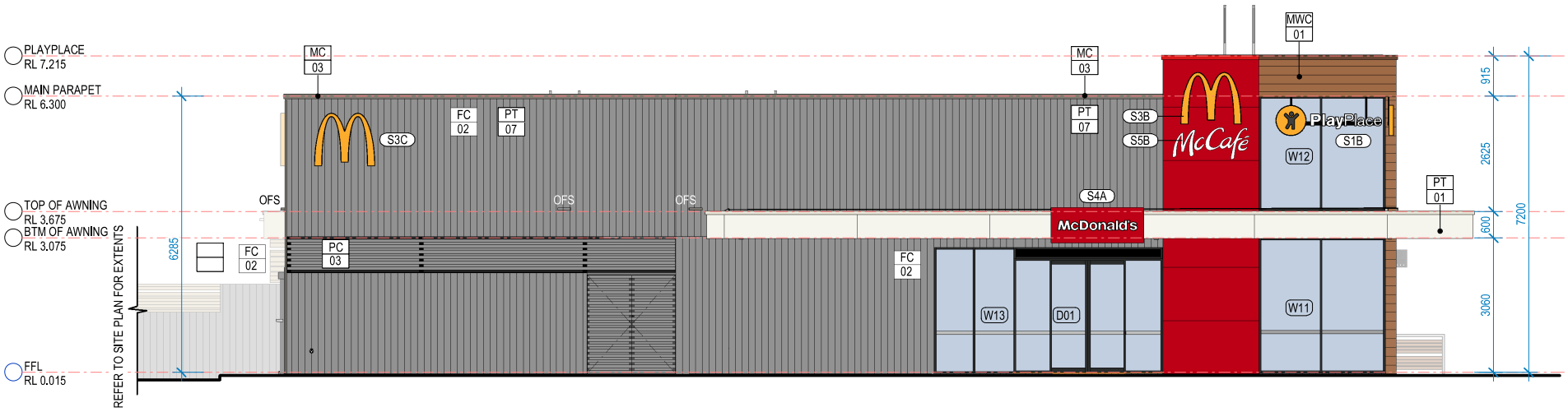

SIDE ELEVATION
1 : 100

DEVELOPMENT APPLICATION

Revisions

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Project
PROPOSED McDONALD'S RESTAURANT
TWO ROCKS

Location
LOT 703,LISFORD AVENUE TWO ROCKS W.A.

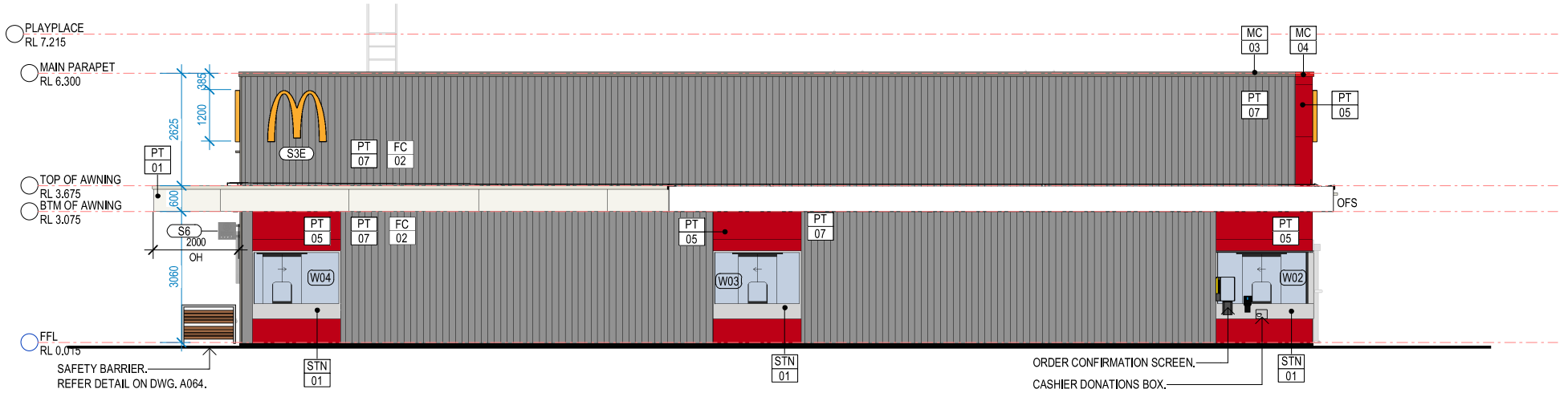
Scale
1 : 100 @ A3

Series
BIO MOD 380

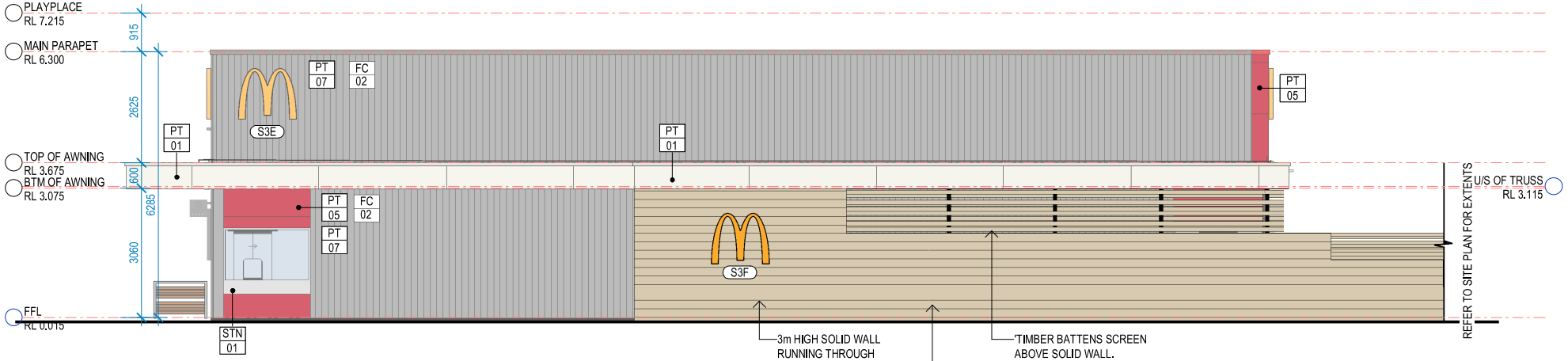
Drawing
FRONT & SIDE BUILDING ELEVATIONS

Project Number	Drawing Number	Issue
0868	DA06	0

File Name D:\Documents\0868_McDONALDS-BIOMOD-380_ Two Rocks_nicole\MET6.rvt



DRIVETHRU ELEVATION
1 : 100



DRIVETHRU ELEVATION
1 : 100

DEVELOPMENT APPLICATION

Revisions

Issue	Description	Date	Chk	Int
0	DA AS CLOUDED	06.02.2024	AJJ	NR

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Project
PROPOSED McDONALD'S RESTAURANT
TWO ROCKS

Location
LOT 703,LISFORD AVENUE TWO ROCKS W.A.

Scale
1 : 100 @ A3

Series
BIO MOD 380

Drawing
DRIVETHRU BUILDING ELEVATIONS

Project Number	Drawing Number	Issue
0868	DA07	0

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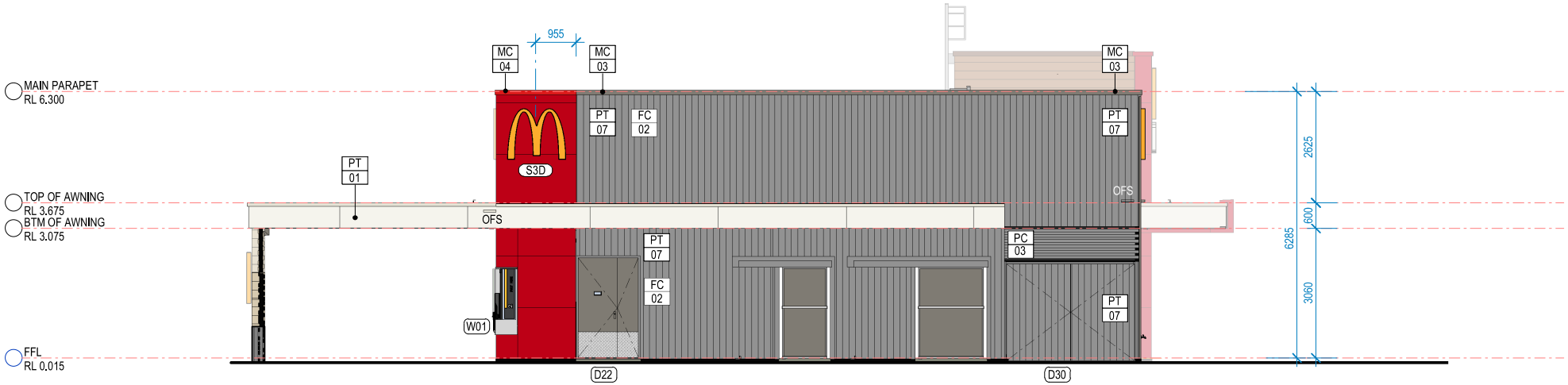
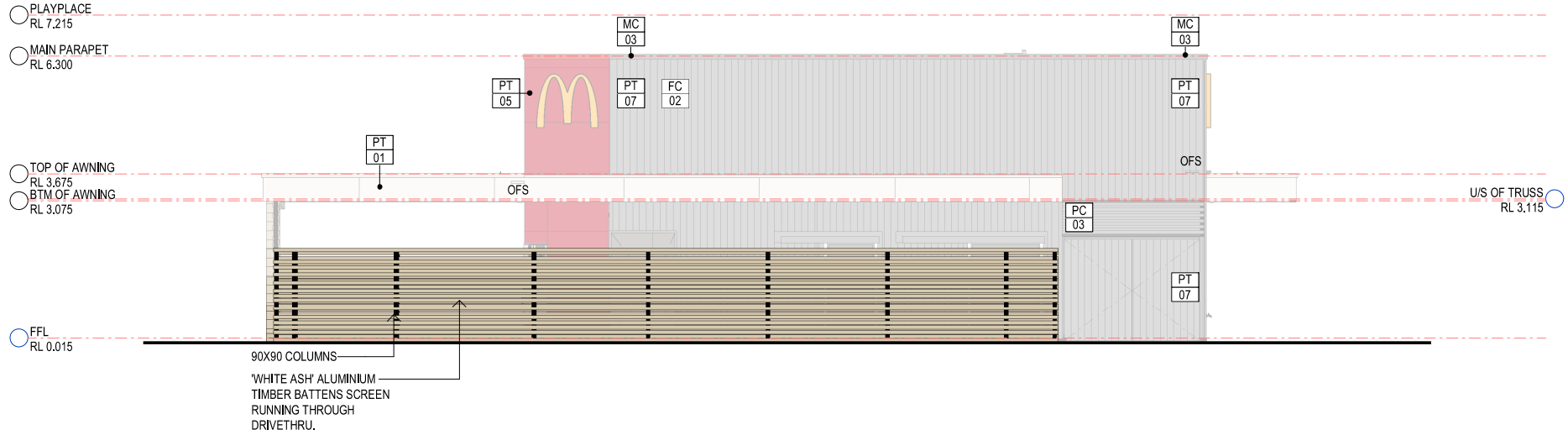


REAR ELEVATION
1 : 100



REAR ELEVATION
1 : 100

DEVELOPMENT APPLICATION

Revisions

Issue	Description	Date	Chk	Int
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Project
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TWO ROCKS

Location
LOT 703,LISFORD AVENUE TWO ROCKS W.A.

Scale	Series
1 : 100 @ A3	BIO MOD 380

Drawing
REAR BUILDING ELEVATIONS

Project Number	Drawing Number	Issue
0868	DA08	0

File Name D:\Documents\0868_McDONALDS-BIOMOD-380_ Two Rocks_nicole\MET6.rvt

Appendix B – Influencing Factor Calculation

The assigned levels combine a baseline assigned level with an influencing factor, with the latter increasing the assigned level on the basis of the existence of significant roads and commercial or industrial zoned land within an inner circle (100 metre radius) and an outer circle (450 metre radius) of the noise sensitive premises. The calculation for the influencing factor is:

$$= \frac{1}{10}(\%\ \text{Type A}_{100} + \%\ \text{Type A}_{450}) + \frac{1}{20}(\%\ \text{Type B}_{100} + \%\ \text{Type B}_{450})$$

where:

$\%\ \text{Type A}_{100}$ = the percentage of industrial land within a100m radius of the premises receiving the noise

$\%\text{TypeA}_{450}$ = the percentage of industrial land within a 450m radius of the premises receiving the noise

$\%\ \text{Type B}_{100}$ = the percentage of commercial land within a100m radius of the premises receiving the noise

$\%\text{TypeB}_{450}$ = the percentage of commercial land within a 450m radius of the premises receiving the noise

+ Transport Factor (maximum of 6 dB)

= 2 for each secondary road (6,000 to 15,000 vpd) within 100m

= 2 for a major road (> 15,000 vpd) within 450m

= 6 for a major road within 100m

The nearest noise sensitive premises are grouped as follows:

- Future Residences (Lots 53-62)
- 2 Charnwood Avenue

Table B-1 shows the percentage of industrial and commercial land within the inner (100 metre radius) and outer (450 metre radius) circles of the noise sensitive premises.

Table B-1: Percentage of Land Types within 100m and 450m Radii

Receiver	Land Type	Within 100m	Within 450m
Future Residences	Type A - Industrial and Utility	0	0
	Type B – Commercial	28	3
2 Charnwood Avenue	Type A - Industrial and Utility	0	0
	Type B – Commercial	3	3

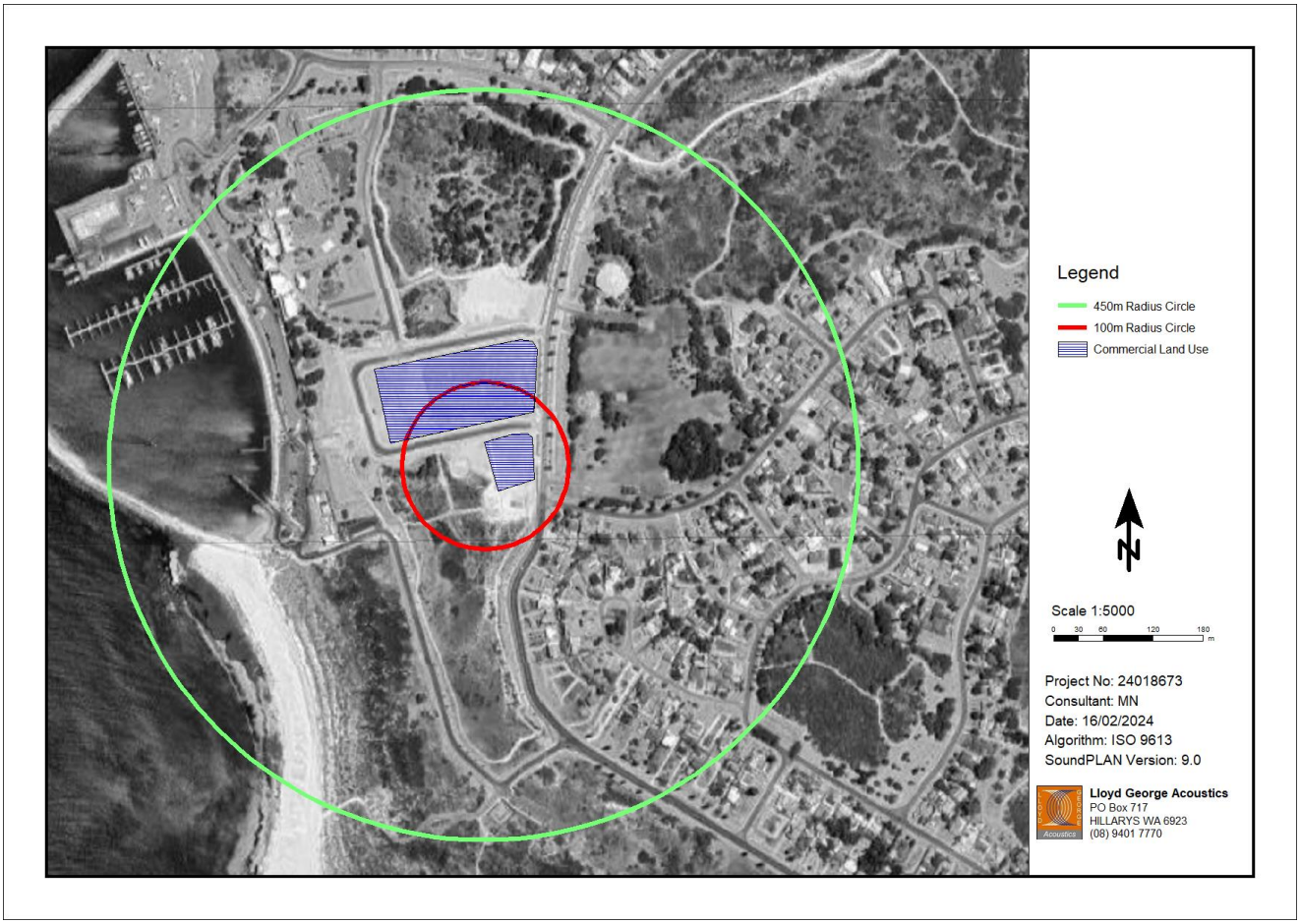


Figure B-1: Land Types within 100m and 450m Radii

From the Main Roads WA Traffic Map (refer *Figure B-2*), *Table B-2* shows the relevant roads and their traffic counts within the inner (100 metre radius) and outer (450 metre radius) circles.

Table B-2: Relevant Roads within 100m and 450m Radii

Receiver	Within 100m		Within 450m
	Major Road (+ 6 dB)	Secondary Road (+ 2 dB)	Major Road Not Within 100m (+ 2 dB)
Future Residences and 2 Charnwood Avenue	-	Two Rocks Road (6,471 2021/22 #52959)	-

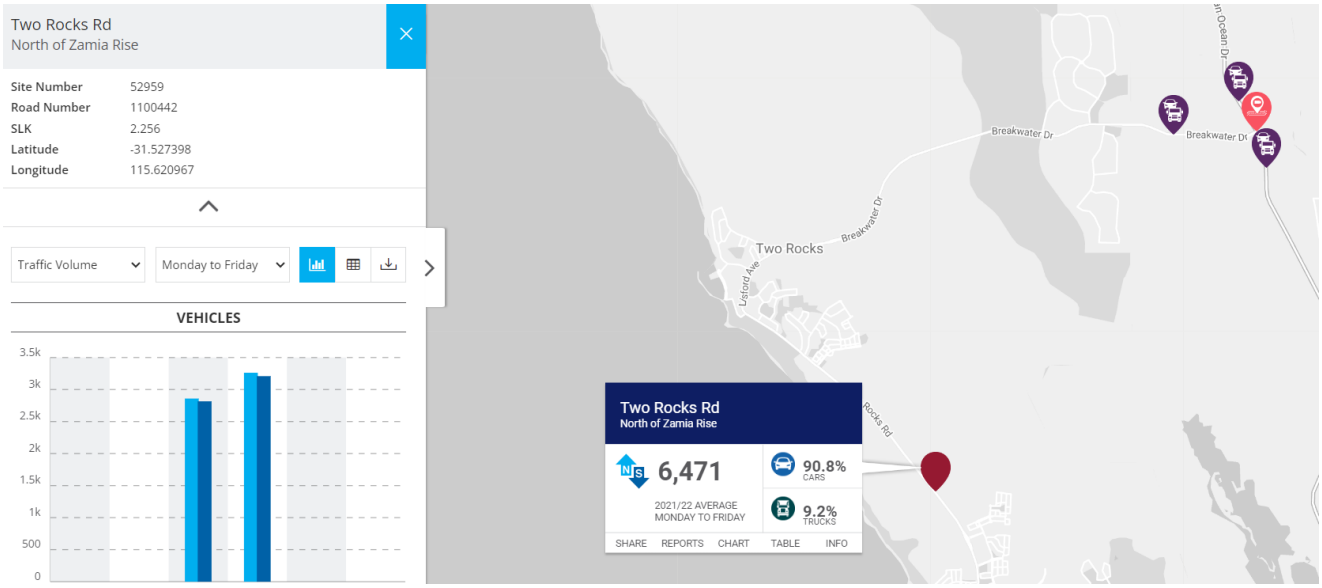


Figure B-2: MRWA Published Traffic Data

Table B-3 combines the percentage land types and Transport Factor to calculate the influencing factor.

Table B-3: Influencing Factor Calculation, dB

Receiver	Industrial Land	Commercial Land	Transport Factor	Total
Future Residences	0	1.6	2.0	**4**
2 Charnwood Avenue	0	0.3	2.0	**2**

The influencing factor calculated in *Table B-3* is combined with those baseline assigned levels of *Table 2-2*, resulting in the project assigned levels provided in *Table 2-3*.

Appendix C – Terminology

The following is an explanation of the terminology used throughout this report:

- **Decibel (dB)**

The decibel is the unit that describes the sound pressure levels of a noise source. It is a logarithmic scale referenced to the threshold of hearing.

- **A-Weighting**

An A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. This weighting reflects the fact that the human ear is not as sensitive to lower frequencies as it is to higher frequencies. An A-weighted sound level is described as L_A, dB.

- **Sound Power Level (L_w)**

Under normal conditions, a given sound source will radiate the same amount of energy, irrespective of its surroundings, being the sound power level. This is similar to a 1kW electric heater always radiating 1kW of heat. The sound power level of a noise source cannot be directly measured using a sound level meter but is calculated based on measured sound pressure level at known distances. Noise modelling incorporates source sound power levels as part of the input data.

- **Sound Pressure Level (L_p)**

The sound pressure level of a noise source is dependent upon its surroundings, being influenced by distance, ground absorption, topography, meteorological conditions etc. and is what the human ear actually hears. Using the electric heater analogy above, the heat will vary depending upon where the heater is located, just as the sound pressure level will vary depending on the surroundings. Noise modelling predicts the sound pressure level from the sound power levels taking into account ground absorption, barrier effects, distance etc.

- **L_{ASlow}**

This is the noise level in decibels, obtained using the A-frequency weighting and the S (slow) time weighting. Unless assessing modulation, all measurements use the slow time weighting characteristic.

- **L_{AFast}**

This is the noise level in decibels, obtained using the A-frequency weighting and the F (fast) time weighting. This is used when assessing the presence of modulation.

- **L_{APeak}**

This is the greatest absolute instantaneous sound pressure level in decibels using the A-frequency weighting.

- **L_{Amax}**

An L_{Amax} level is the maximum A-weighted noise level during a particular measurement.

- **L_{A1}**

The L_{A1} level is the A-weighted noise level exceeded for 1 percent of the measurement period and is considered to represent the average of the maximum noise levels measured.

- **L_{A10}**

The L_{A10} level is the A-weighted noise level exceeded for 10 percent of the measurement period and is considered to represent the "intrusive" noise level.

- **L_{A90}**

The L_{A90} level is the A-weighted noise level exceeded for 90 percent of the measurement period and is considered to represent the "background" noise level.

- **L_{Aeq}**

The equivalent steady state A-weighted sound level ("equal energy") in decibels which, in a specified time period, contains the same acoustic energy as the time-varying level during the same period. It is considered to represent the "average" noise level.

- **One-Third-Octave Band**

Means a band of frequencies spanning one-third of an octave and having a centre frequency between 25 Hz and 20000 Hz inclusive.

- **Representative Assessment Period**

Means a period of time not less than 15 minutes, and not exceeding four hours, determined by an inspector or authorised person to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission.

- **L_{Amax} assigned level**

Means an assigned level, which, measured as a L_{ASlow} value, is not to be exceeded at any time.

- **L_{A1} assigned level**

Means an assigned level, which, measured as a L_{ASlow} value, is not to be exceeded for more than 1 percent of the representative assessment period.

- **L_{A10} assigned level**

Means an assigned level, which, measured as a L_{ASlow} value, is not to be exceeded for more than 10 percent of the representative assessment period.

- **Tonal Noise**

A tonal noise source can be described as a source that has a distinctive noise emission in one or more frequencies. An example would be whining or droning. The quantitative definition of tonality is:

– the presence in the noise emission of tonal characteristics where the difference between -

(a) the A-weighted sound pressure level in any one-third octave band; and

(b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

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

This is relatively common in most noise sources.

- **Modulating Noise**

A modulating source is regular, cyclic and audible and is present for at least 10% of the measurement period. The quantitative definition of modulation is:

– a variation in the emission of noise that —

(a) is more than 3 dB $L_{A\ Fast}$ or is more than 3 dB $L_{A\ Fast}$ in any one-third octave band; and

(b) is present for at least 10% of the representative assessment period; and

(c) is regular, cyclic and audible.

- **Impulsive Noise**

An impulsive noise source has a short-term banging, clunking or explosive sound. The quantitative definition of impulsiveness means:

– a variation in the emission of a noise where the difference between L_{Apeak} and L_{Amax} is more than 15 dB when determined for a single representative event.

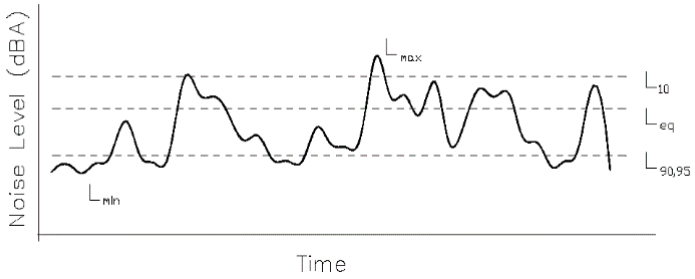
- **Major Road**

Is a road with an estimated average daily traffic count of more than 15,000 vehicles.

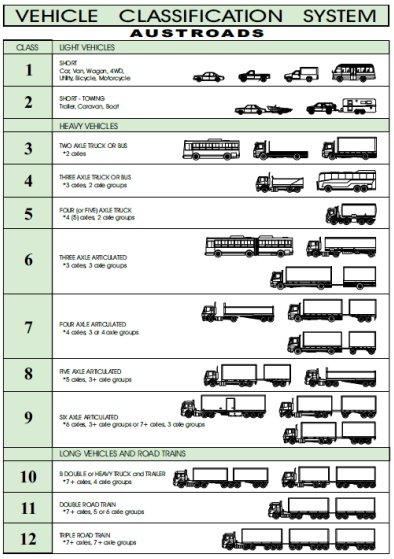
- **Secondary / Minor Road**

Is a road with an estimated average daily traffic count of between 6,000 and 15,000 vehicles.

- **Chart of Noise Level Descriptors**



- **Austroads Vehicle Class**



- **Typical Noise Levels**