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Environmental Noise Assessment

Swimming School and Gym
Lots 29-33 Mead Street, Byford

Reference: 21026091-01

Prepared for:
Moon Jewel Pty Ltd

Report: 21026091-01

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Date:	Rev	Description	Prepared By	Verified
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1 INTRODUCTION

A commercial development comprising a swimming pool and gym is proposed at Lots 29-33 (#141-149) Mead Street, Byford (Refer *Figure 1-1*). Due to the nature of the development and the proximity to noise sensitive premises, a noise impact assessment is required. The nearest future noise sensitive premises are located to the east and south of the subject site.

Noise sources considered were those associated with mechanical plant, vehicles in the car park and filters/pumps in the nominated plant room. Noise from these items was assessed against the prescribed standards of the *Environmental Protection (Noise) Regulations 1997* by way of noise modelling.

Figure 1-1 Site Locality

The site operational hours are not known at this time but it is assumed to operate prior to 7.00am, 7-days a week being within the most stringent night time period (prior to 7.00am and after 10.00pm). The site layout of the development is depicted in *Figure 1-2*.

Site drawings used in this assessment are included in *Appendix A*.

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

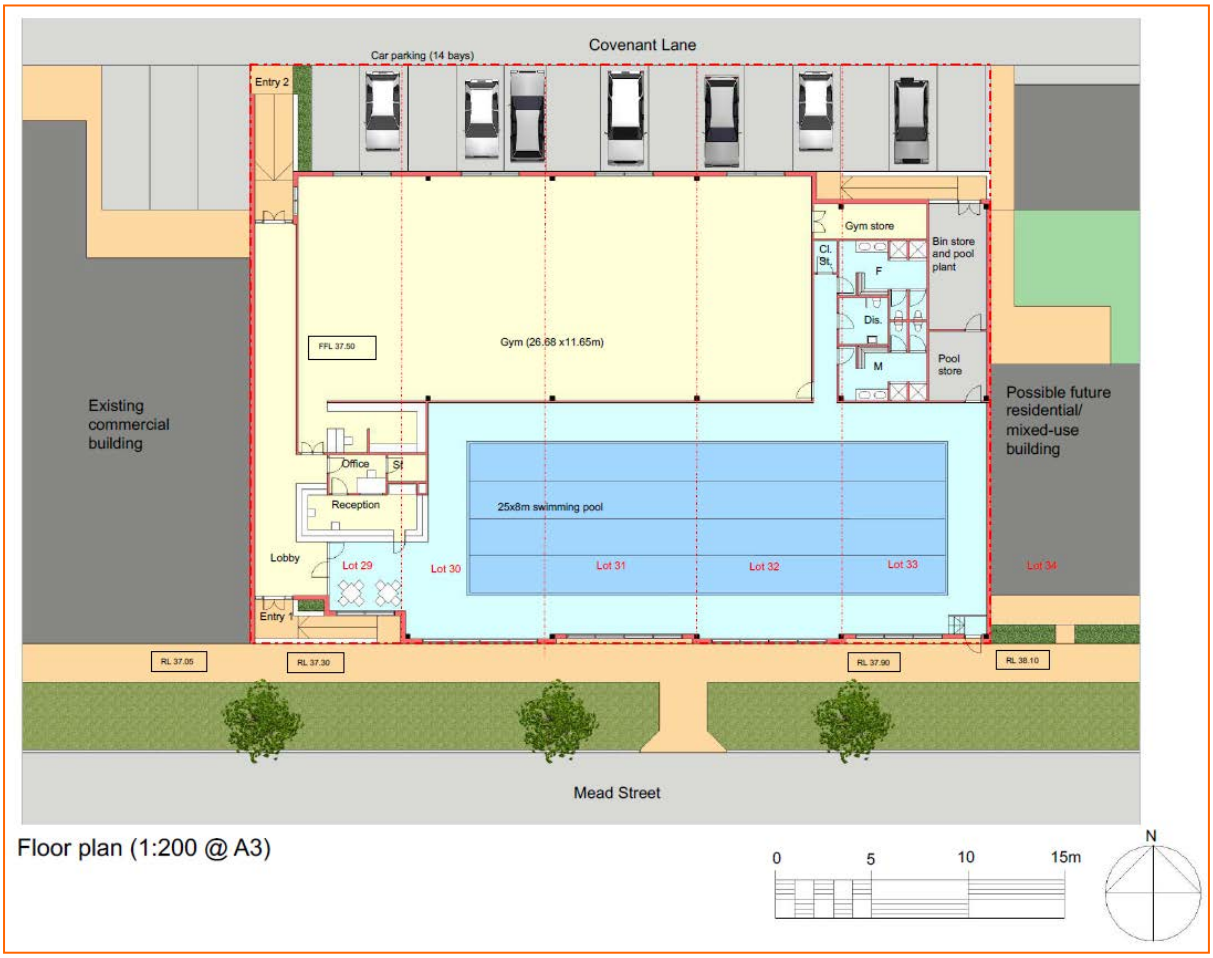

Figure 1-2 Development Site Layout (Mackay Urban Design)

2 CRITERIA

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

Regulation 7 defines the prescribed standard for noise emissions as follows:

"7. (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;

ii. Impulsiveness; and

iii. Modulation".

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…"

Tonality, impulsiveness and modulation are defined in Regulation 9. Noise is to be taken to be free of these characteristics 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 after the adjustments of *Table 2-1* are made to the noise emission as measured at the point of reception.

Table 2-1 Adjustments for Intrusive Characteristics

Tonality	Modulation	Impulsiveness
+ 5 dB	+ 5 dB	+ 10 dB

Note: The above are cumulative to a maximum of 15dB.

The baseline assigned levels (prescribed standards) are specified in Regulation 8 and are shown in *Table 2-2*.

The influencing factor was calculated for the nearest noise sensitive premises based on land use and transport factors. As per the relevant Planning Scheme map (refer *Appendix B*), the subject site is amongst "urban development" zoning with commercial and residential land uses identified as shown in *Figure 2-1*. Note that some lots are vacant currently and therefore where these are zoned for potential residential development, this has been conservatively assumed.

Table 2-2 Baseline Assigned Noise Levels

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises: highly sensitive area	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
Commercial	All hours	60	75	80
Industrial	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 combined traffic and land use influencing factors for all residences has been calculated as shown in *Table 2-3.* It was determined that all residences nearest to the development have the same influencing factor when rounding to the nearest whole number.

Table 2-3 Influencing Factor Calculation – Nearest Residences

Description	Within 100 metre Radius	Within 450 metre Radius	Total
Commercial Land	28-44% / 1.3- 2.2 dB	4% / 0.2 dB	1.5-2.4 dB
Secondary Road	-	-	0 dB
Major Road	-	-	0 dB
Total			**2 dB**

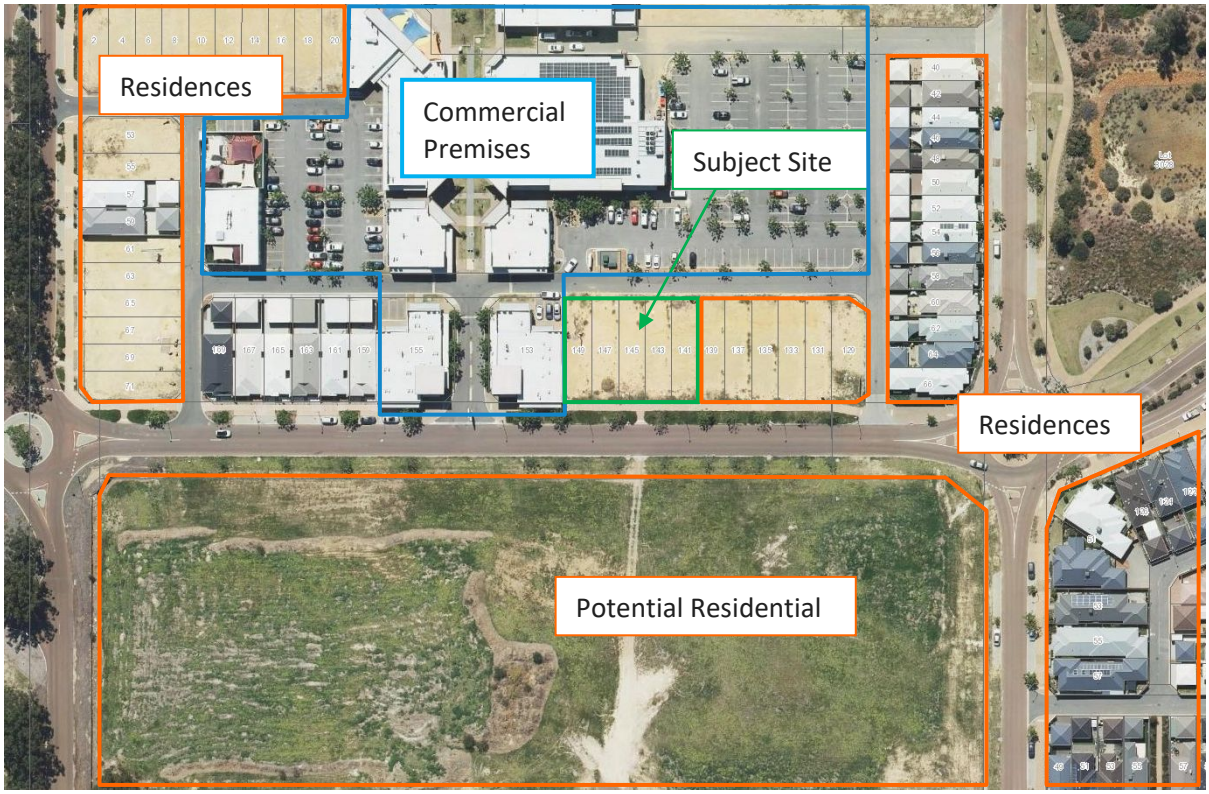

Figure 2-1 Locality of Subject Site and Nearby Receivers (DPLH Maps)

Table 2-4 shows the relevant $L_{A10,}$ and L_{Amax} assigned levels (including the influencing factors). The L_{A10} assigned level is applicable to the mechanical plant noise, while the L_{Amax} is applicable to car door closing noise.

Table 2-4 Assigned Noise Levels

Premises Receiving Noise	Time of Day	Assigned Level (dB)	
		L_{A10}	L_{Amax}
Nearest Residences	0700 to 1900 hours Monday to Saturday (Day)	47	67
	0900 to 1900 hours Sunday and public holidays (Sunday)	42	67
	1900 to 2200 hours all days (Evening)	42	57
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	37	57
Commercial	All hours	60	80

It is noted the assigned noise 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*, which is 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 Environment 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 hours RAP, which is assumed to be appropriate given the nature of the operations, this is to be used for guidance only.

Regulation 3 states the following with regards to vehicles:

> *(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 to be a road and therefore vehicle noise (propulsion and braking) is not strictly assessed. Noise from vehicle doors still require assessment, as they do not form part of the propulsion or braking systems.

For the proposed development operations, the following comments are provided:

- Mechanical plant such as air-conditioning, exhaust fans and plant room equipment are to comply with the L_{A10} assigned noise level.
- Car door noise is a short term event and is to comply with the L_{Amax} assigned noise level.

2.1 Waste Collection and Site Cleaning (Specified Works)

Regulation 14A provides requirements for such activities as the collection of waste, landscaped area maintenance and car park cleaning. Such activities can also be exempt from having to comply with regulation 7, provided they are undertaken in accordance with regulation 14A (2) as follows:

- during daytime hours, defined as:
  - 07:00 to 19:00 Monday to Saturday (excluding public holiday), or
  - 09:00 to 19:00 on a Sunday or public holiday.
- in the quietest reasonable and practicable manner and using the quietest equipment reasonably available.

In the case where specified works are to be carried outside daytime hours and their noise emissions are likely not to comply with regulation 7, the works also need to be carried out according to a Noise Management Plan which has been approved by the local government authority CEO.

3 METHODOLOGY

Computer modelling was undertaken, using the software *SoundPLAN 8.2* with the ISO 9613 algorithms (ISO 17354 compliant) selected. These algorithms have been selected as they include the influence of wind. Input data required in the model are:

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

3.1 Meteorological Information

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 (0700-1900)	Night (1900-0700)
Temperature (°C)	20	15
Humidity (%)	50	50
Wind Speed (m/s)	Up to 5m/s	Up to 5m/s
Wind Direction*	All	All

* Note that the modelling package used allows for all wind directions to be modelled simultaneously.

It is generally considered that compliance with the assigned noise levels needs to be demonstrated for 98% of the time, during the day and night periods, for the month of the year in which the worst-case weather conditions prevail. In most cases, the above conditions occur for more than 2% of the time and therefore must be satisfied.

3.2 Topographical Data

Topographical data was adapted from *Google Earth*, site photographs and proposed plans. Existing buildings have also been included as these can provide barrier attenuation when located between a source and receiver, much the same as a hill as well as reflection paths.

3.3 Ground Absorption

Ground absorption varies from a value of 0 to 1, with 0 being for an acoustically reflective ground (e.g. water or bitumen) and 1 for acoustically absorbent ground (e.g. grass). A value of 0.1 has been used for road and car park areas, and 0.6 has been used for the remaining areas.

3.4 Source Sound Levels

Note that as the development is at DA stage, the various plant selections are of a generic nature based on similar projects. A detailed review of these elements should be carried out at building permit stage when final selection of plant is known. The 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	
General/Toilet Exhaust Fan (x2 on roof)	71	64	61	64	62	60	57	51	**73**
AC Package Unit x4 on roof, (L_{A10})	-	89	83	80	78	74	64	60	**83**
1x Large Pool Pump System (L_{A10})	95	94	80	74	74	73	68	66	**81**
Car Door Closings (L_{Amax})	71	74	77	81	80	78	72	61	**84**

With regard to the above noise sources, please note the following:

- Sound levels have been sourced from file data for previous similar projects;
- The pool pump system is modelled within a plant room with an assumed open louvre panel on the north facade;
- The AC Packaged Units, were modelled at 1.2m above roof level, nominally positioned on the indicated plant deck area, no acoustic screening was assumed initially;
- Exhaust Fans were modelled at 0.5m above roof level;
- Car door sources were modelled at 1m above ground;
- The majority of noise sources are assumed to be present for more than 10% of the time and are therefore assessed against the L_{A10} parameter. The exception is noise from car door closings, which are assessed against the L_{Amax} level.

Two assessment scenarios are considered as follows:

1. L_{A10} Noise – All plant running simultaneously.
2. L_{Amax} Noise – Car door noise sources.

An image of the noise model overview is shown in *Figure 3-1*. Receivers have been identified and noise sensitive premises labelled with a yellow box.

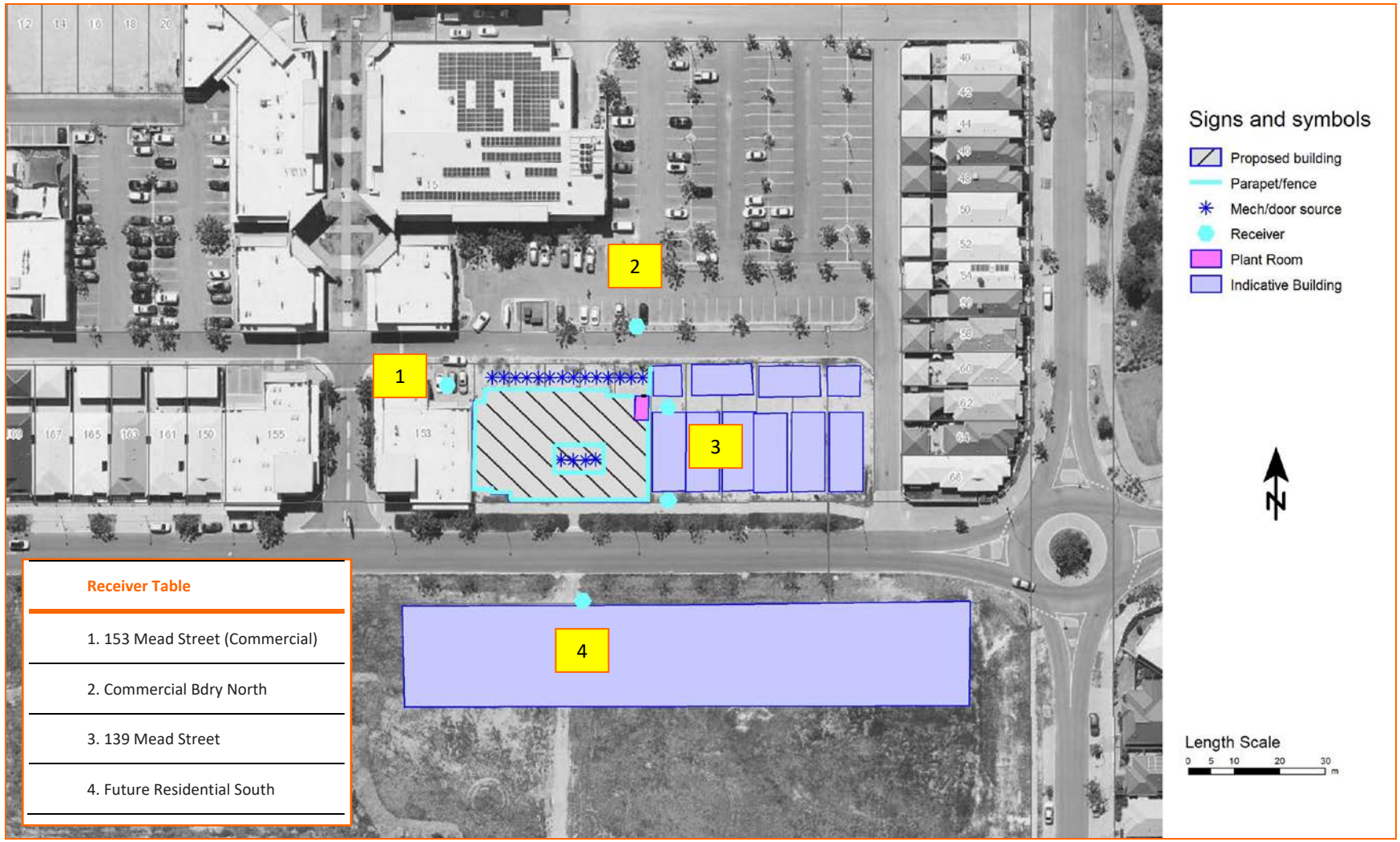

Figure 3-1 2D Image of Noise Model

4 RESULTS AND ASSESSMENT

4.1 Scenario 1 – Night L_{A10}

Table 4-1 provides the results for the night time L_{A10} scenario with all mechanical plant on the rooftop running and noise from the pool plant room via a standard louvre on the north facade. *Figure 4-1 and 4-1A* provide the noise contour plots for the Night L_{A10} Scenario at ground and upper floors. It should be noted that the assessment has assumed all plant will be used simultaneously during the night, which is conservative as in reality, they will be used more intermittently than during the day.

Table 4-1 Predicted Noise Levels, Scenario 1: Night, L_{A10} dB

Location	Predicted Noise Level Worst-Case Downwind			Critical Assigned Level	Calculated Exceedence
	Rooftop Plant	Pool Plant Room	Combined[1]		
1. 153 Mead Street (Commercial)	37	38	39 + 5 = 44	60	*Complies*
2. Commercial Bdry North	36	42	43 + 5 = 48	60	*Complies*
3. 139 Mead Street North facade Ground Floor	35	35	38 + 5 = 43	37	*+6*
3. 139 Mead Street North facade Upper Floor	39	36	41 + 5 = 46	37	*+9*
3. 139 Mead Street South facade Ground Floor	41	19	41 + 5 = 46	37	*+9*
3. 139 Mead Street South facade Upper Floor	46	20	46 + 5 = 51	37	*+14*
4. Future Residential South Ground Floor	40	14	40 + 5 = 45	37	*+8*
4. Future Residential South Upper Floor	43	14	43 + 5 = 48	37	*+11*

1. Includes + 5 dB adjustment for tonality.

The most critical receivers are upper floor residential premises to the south and east, with a predicted level of up to 46 dB L_{A10}. The mechanical plant noise during the night period, when background noise is lowest, may be considered to have tonal characteristics, attracting a +5 dB adjustment. Therefore, the assigned level is exceeded by up to 14 dB. Commercial receivers are expected to comply at all times.

Note that these results assumed no solid barriers for the rooftop plant, It is recommended that a follow up verification of mechanical plant selections be carried out at detailed design by a suitably qualified acoustical consultant. Screening of rooftop HVAC and pool plant room using solid barriers or acoustic louvres should also be allowed for in the final design.

Figure 4-1

Predicted Noise level L_{A10} dB

- = 30
- = 35
- = 40
- = 45
- = 50

N

Signs and symbols

- Proposed building
- Parapet/fence
- Mech Plant source
- Receiver
- Plant Room
- Indicative Building

Lots 29-33, Mead Street, Byford - Swimming Pool and Gym - Predicted Noise Levels

L_{A10} Ground Floor Noise Level Contours - Mechanical Plant Noise

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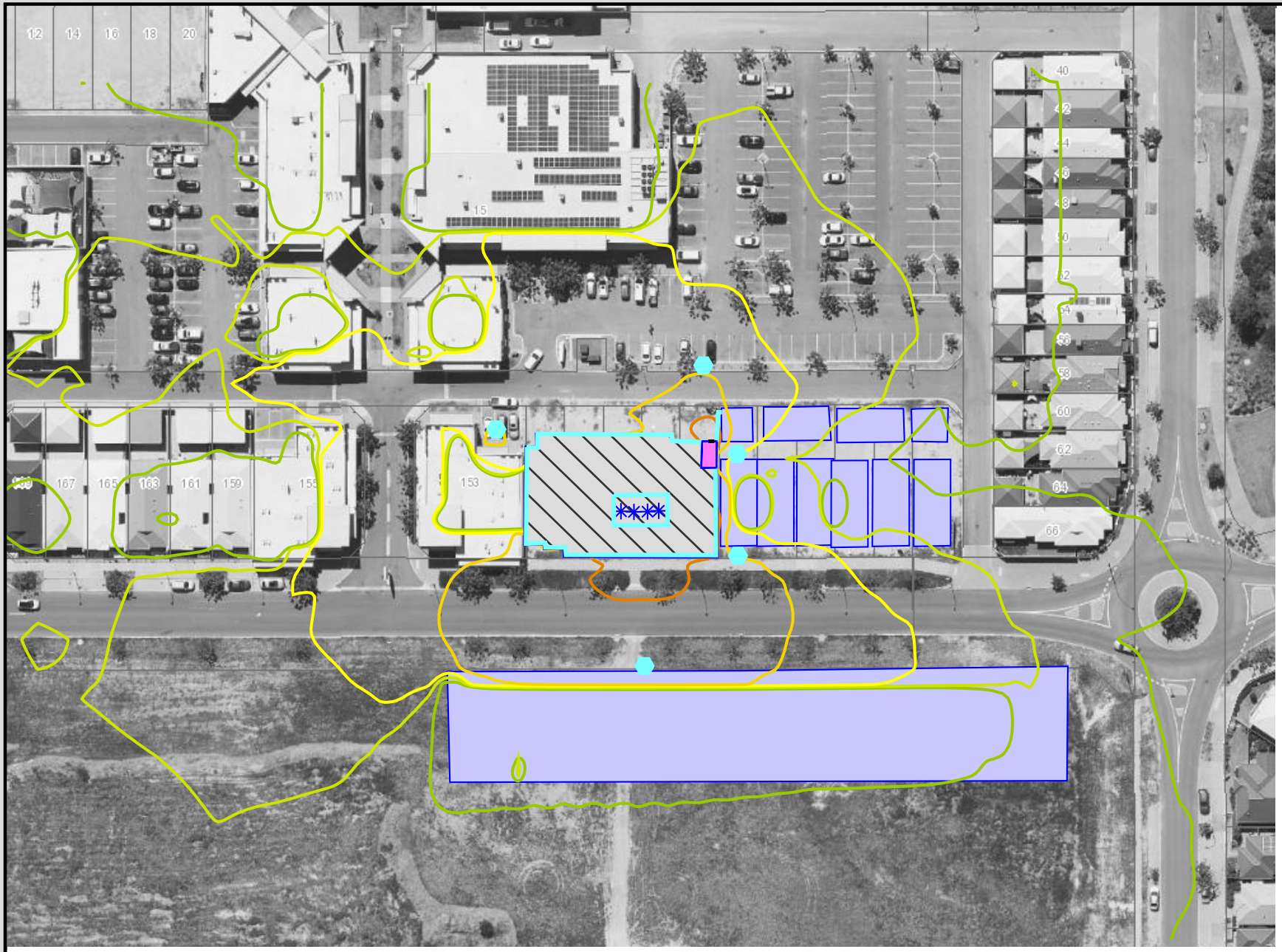
Figure 4-1A



Predicted Noise level
L_{A10} dB

- = 30
- = 35
- = 40
- = 45
- = 50

N

Signs and symbols

- Proposed building
- Parapet/fence
- Mech Plant source
- Receiver
- Plant Room
- Indicative Building

Lots 29-33, Mead Street, Byford - Swimming Pool and Gym - Predicted Noise Levels

L_{A10} Upper Floor Noise Level Contours - Mechanical Plant Noise

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4.2 Scenario 2 – Car Park Noise L_{A1}

Table 4-2 provides the results for the car door L_{Amax} scenario. *Figure 4-2 and 4-2A* present the predicted noise levels from this scenario as noise contours (non-cumulative) for ground and upper floor, respectively. The most critical time period is considered to be the night-time, noting this period extends to 9am on Sundays and public holidays. As these noise sources are intermittent in nature, they are assessable against the night L_{Amax} criteria

Table 4-2 Predicted Noise Levels, Scenario 2: L_{A1} dB

Location	Car Door Noise[1]	Night Assigned Level	Evening Assigned Level	Sunday/Day Assigned Level	Calculated Exceedence Night/Evening/Day
1. 153 Mead Street (Commercial)	58 + 10 = 68	80	80	80	*Complies*
2. Commercial Bdry North	56 + 10 = 66	80	80	80	*Complies*
3. 139 Mead Street North facade Ground Floor	47 + 10 = 57	57	57	67	*Complies*
3. 139 Mead Street North facade Upper Floor	53 + 10 = 63	57	57	67	*+6/+6/Complies*
3. 139 Mead Street South facade Ground Floor	27 + 10 = 37	57	57	67	*Complies*
3. 139 Mead Street South facade Upper Floor	27 + 10 = 37	57	57	67	*Complies*
4. Future Residential South Ground Floor	25 + 10 = 35	57	57	67	*Complies*
4. Future Residential South Upper Floor	26 + 10 = 36	57	55	67	*Complies*

1. Includes + 10 dB adjustment for impulsiveness.

The worst case noise sensitive receiver is at 139 Mead Street on the upper floor, with a predicted level of 53 dB(A). Including the +10 dB adjustment for impulsiveness, results in an assessable level of 63 dB(A). This receptor has line of sight to the easternmost car parking bay, so this may be avoidable by reserving this space for staff and restricting use to between 7am and 7pm Monday to Saturday. Alternatively, this space could be converted to motorcycle or bicycle parking only.

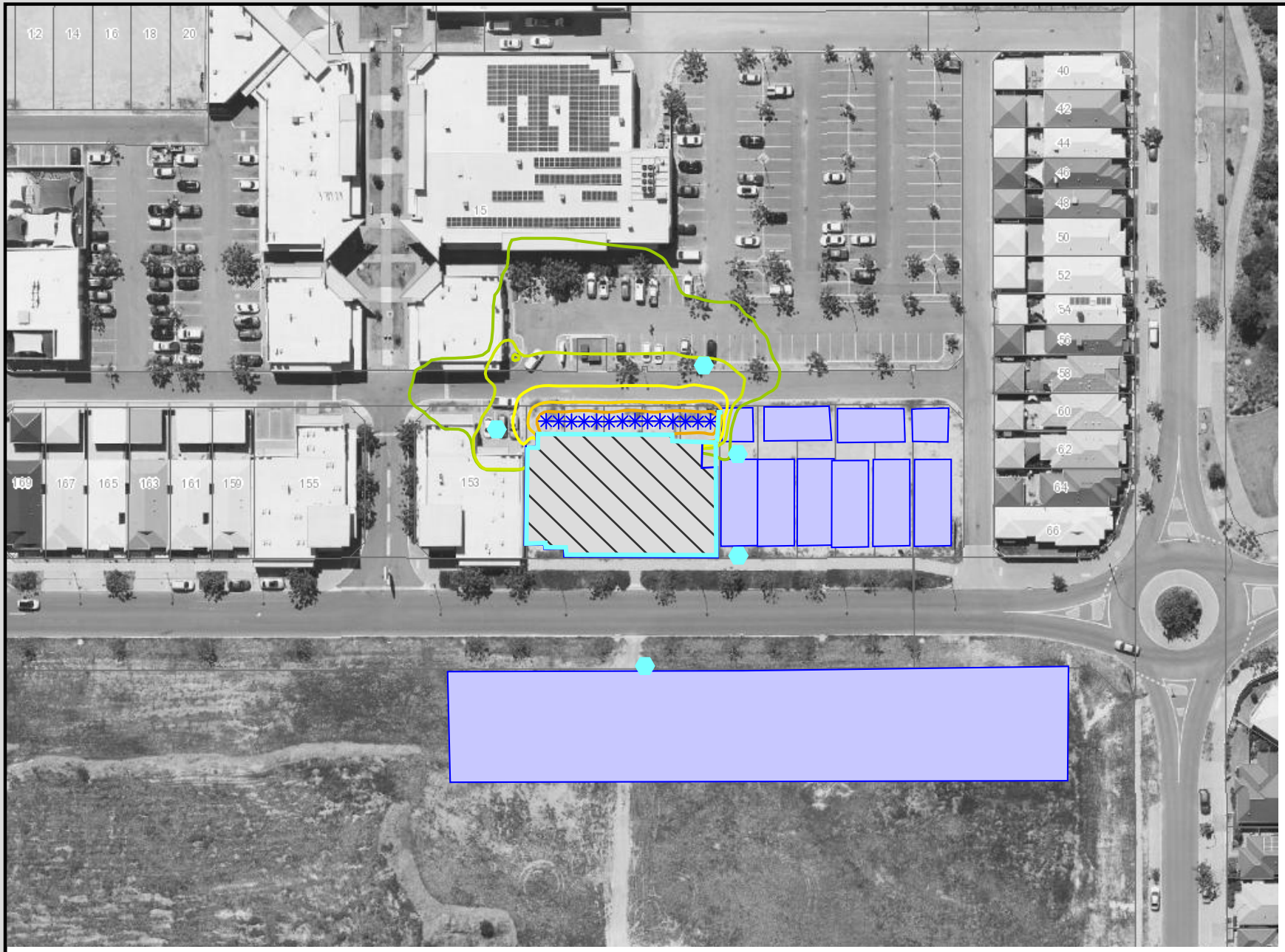

Figure 4-2

Predicted Noise level
L_{Amax} dB

- = 50
- = 55
- = 60
- = 65
- = 70

N

Signs and symbols

- Proposed building
- Parapet/fence
- Car Door source
- Receiver
- Indicative Building

Lots 29-33, Mead Street, Byford - Swimming Pool and Gym - Predicted Noise Levels

L_{Amax} Ground Floor Noise Level Contours - Car Door Noise

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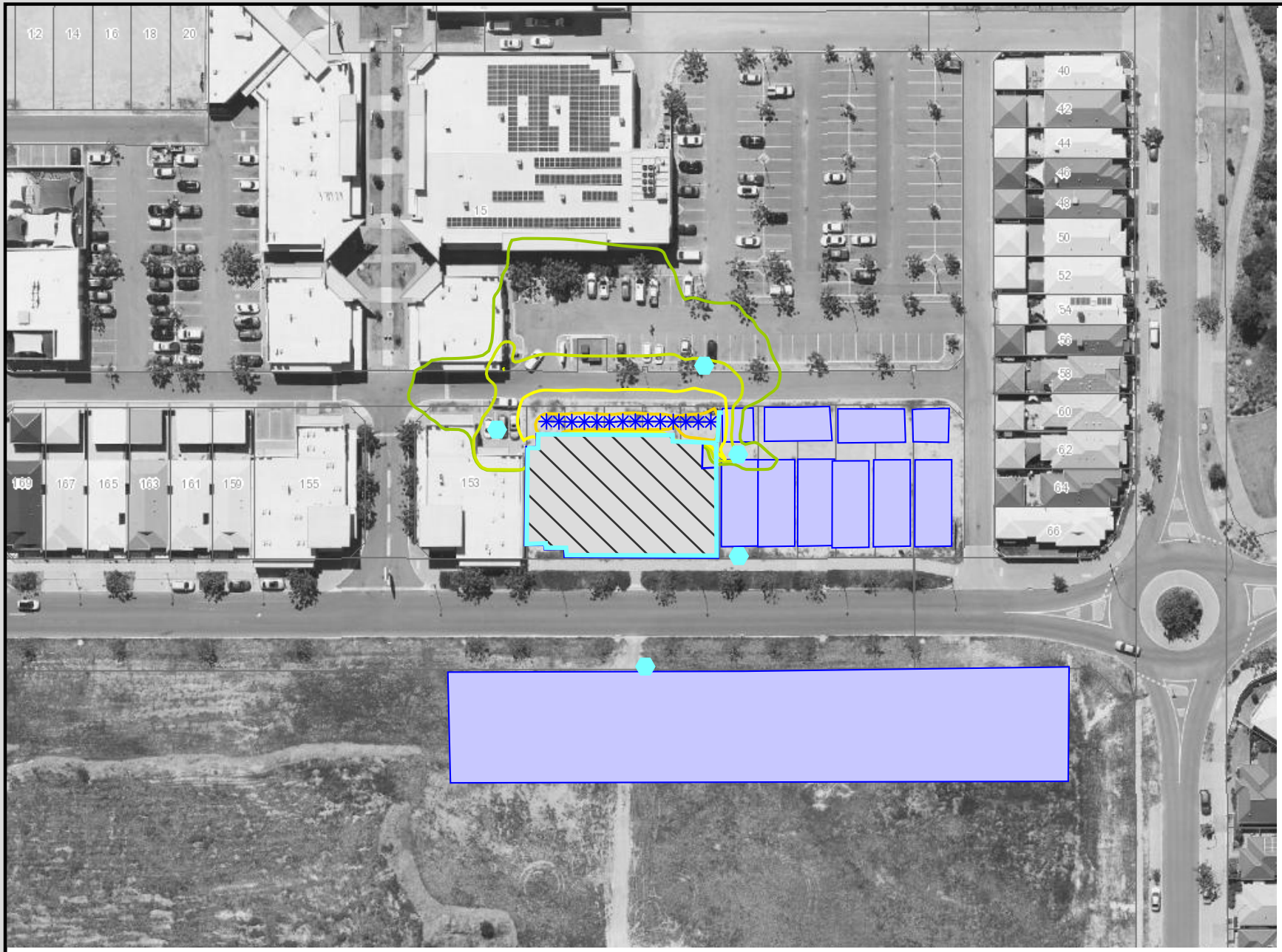
Figure 4-2A



Predicted Noise level
L_{Amax} dB

- = 50
- = 55
- = 60
- = 65
- = 70

N

Signs and symbols

- Proposed building
- Parapet/fence
- Car Door source
- Receiver
- Indicative Building

Lots 29-33, Mead Street, Byford - Swimming Pool and Gym - Predicted Noise Levels

L_{Amax} Upper Floor Noise Level Contours - Car Door Noise

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5 RECOMMENDATIONS

To comply with the *Environmental Protection (Noise) Regulations 1997,* noise controls are required to the following:

- Mechanical plant noise is predicted to potentially exceed based on file data. This should be verified at detailed design stage once plant locations and selections are known. Acoustic screening may be required for some rooftop plant items.
- Plant room to be modelled in detail at design stage and acoustically rated louvres on the north side entry to be allowed for, subject to acoustic consultant advice.
- Car park at far eastern end of lot to be restricted to 7am to 7pm Monday to Saturday, or remove this car park bay and/or convert to motorcycle/bicycle parking.
- Bin servicing shall occur between 7am and 7pm Mondays to Saturdays. The servicing of bins would fall under Regulation 14A and provided it is carried out within the stipulated hours and undertaken as quietly as reasonably practicable, the 'normal' assigned levels do not apply. Where possible, bins shall be located in areas away from and/or screened from residences. Where this activity also includes truck reversing alarm noise, this would be considered exempt under Regulation 14A within the stipulated hours.

Some best practice recommendations have been included below – to be implemented in the design and operation where practicable:

- All delivery vehicles are to be encouraged to have broadband type reversing alarms fitted rather than standard tonal alarms.
- Glazing on the south side of the building to be fixed (non-openable) and to be minimum 6mm thick to ensure noise from internal swimming activities does not adversely impact residential development to the south.
- Mechanical plant to be maintained to ensure noise levels do not increase over time;
- Mechanical plant to be installed using vibration isolation mounts;
- Gym floor to incorporate impact isolation such that noise from dropping of weights is compliant at adjoining properties. This is to be the responsibility of the gym operator;
- Car park access grates shall be firmly seated in position and fitted with rubber gaskets to avoid excess banging.

6 CONCLUSION

The potential noise impacts resulting from the proposed swimming pool and gym at lots 29-33 Mead Street, Byford have been assessed in accordance with the *Environmental Protection (Noise) Regulations 1997*.

Compliance with the assigned levels is considered practicably achievable incorporating the *Section 5* noise control recommendations.

Appendix A

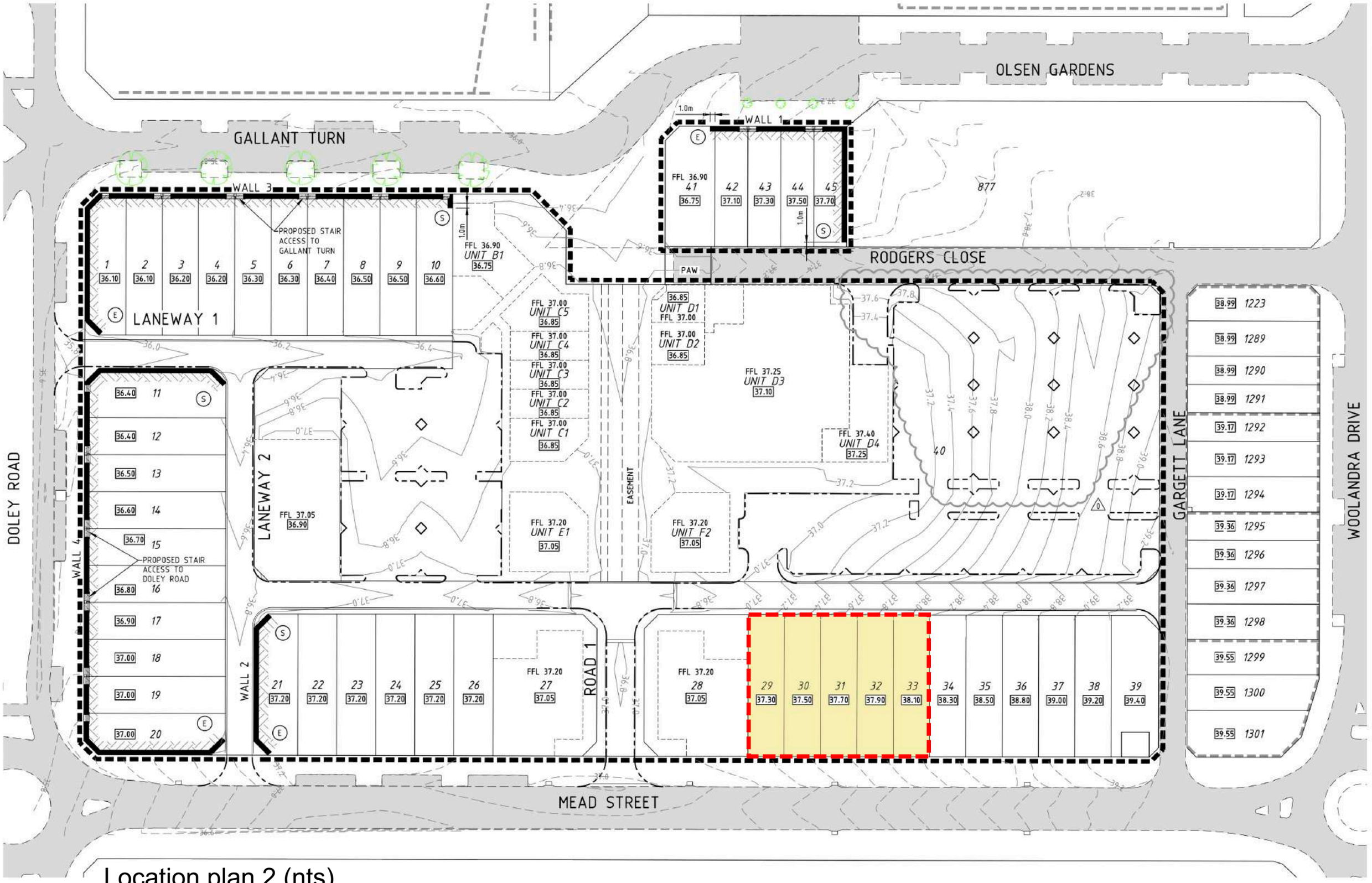
Site Plans

Location plan 1 (nts)

Proposed swimming pool and gym, Lots 29-33, Mead Street, Byford

Drawing No. DA 001 November 2020

mackay urbandesign

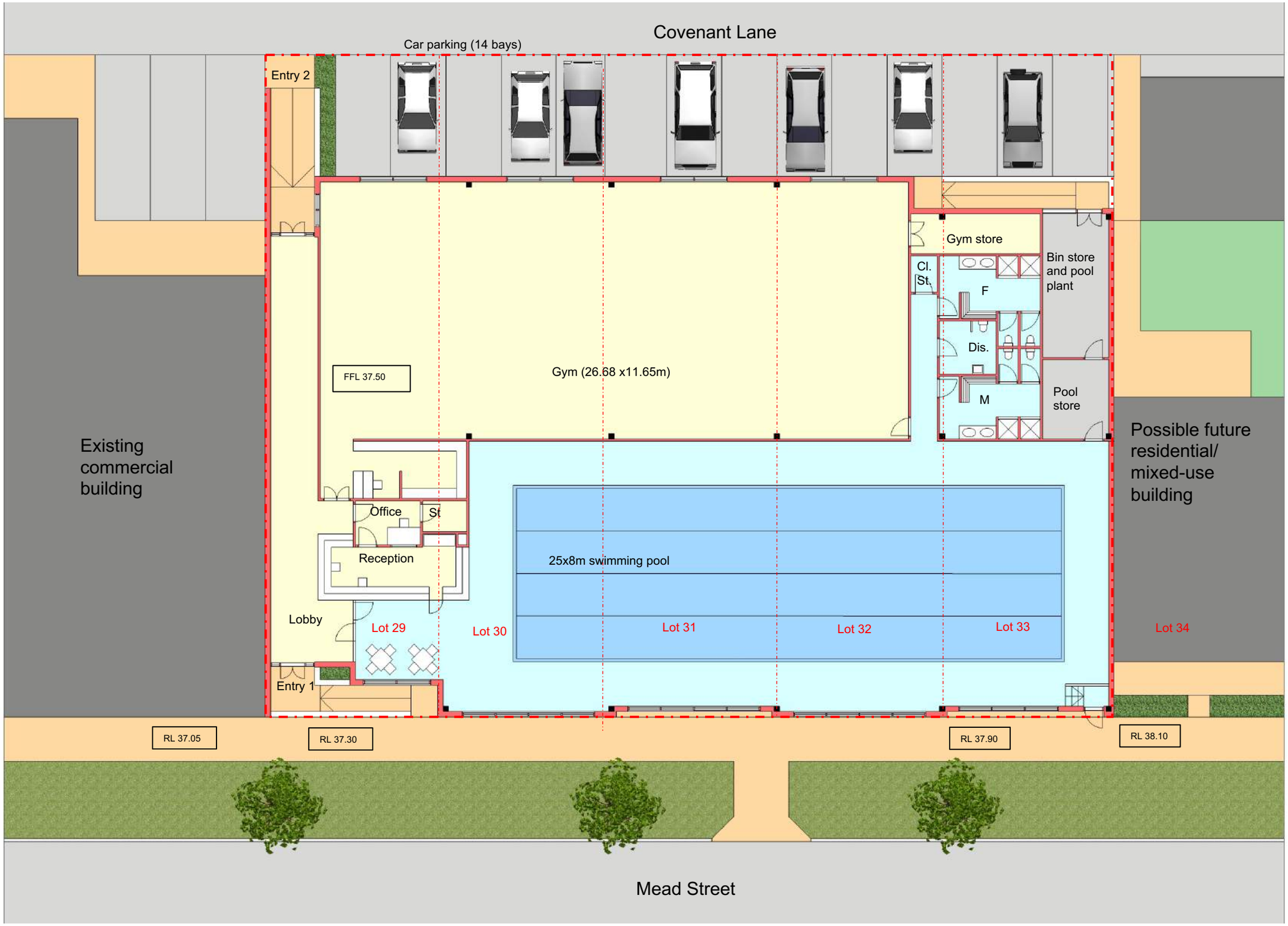


Location plan 2 (nts)

Proposed swimming pool and gym, Lots 29-33, Mead Street, Byford

Drawing No. DA 002 November 2020

mackay urbandesign



Floor plan (1:200 @ A3)

0 5 10 15m

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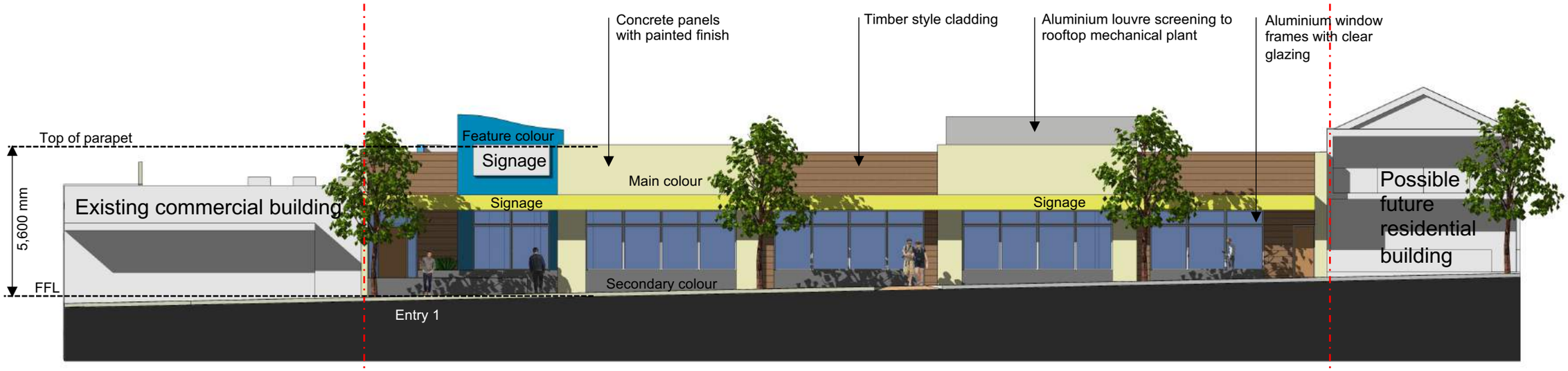
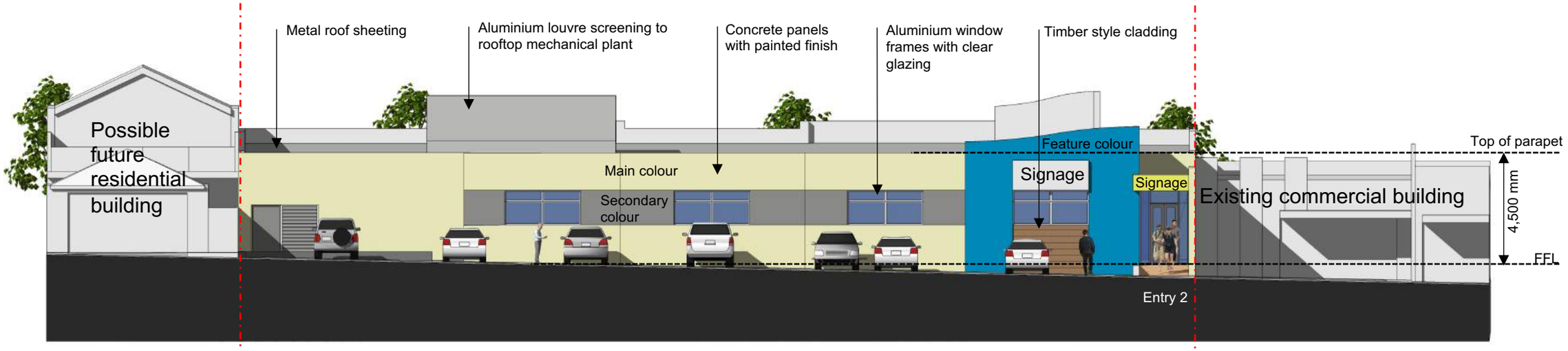
Drawing No. DA 003 November 2020

Proposed swimming pool and gym, Lots 29-33, Mead Street, Byford

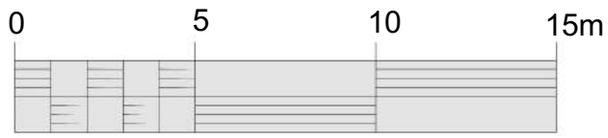
mackay urbandesign



South elevation (Mead Street)



North elevation (Covenant Lane



Proposed swimming pool and gym, Lots 29-33, Mead Street, Byford

Drawing No. DA 004 November 2020

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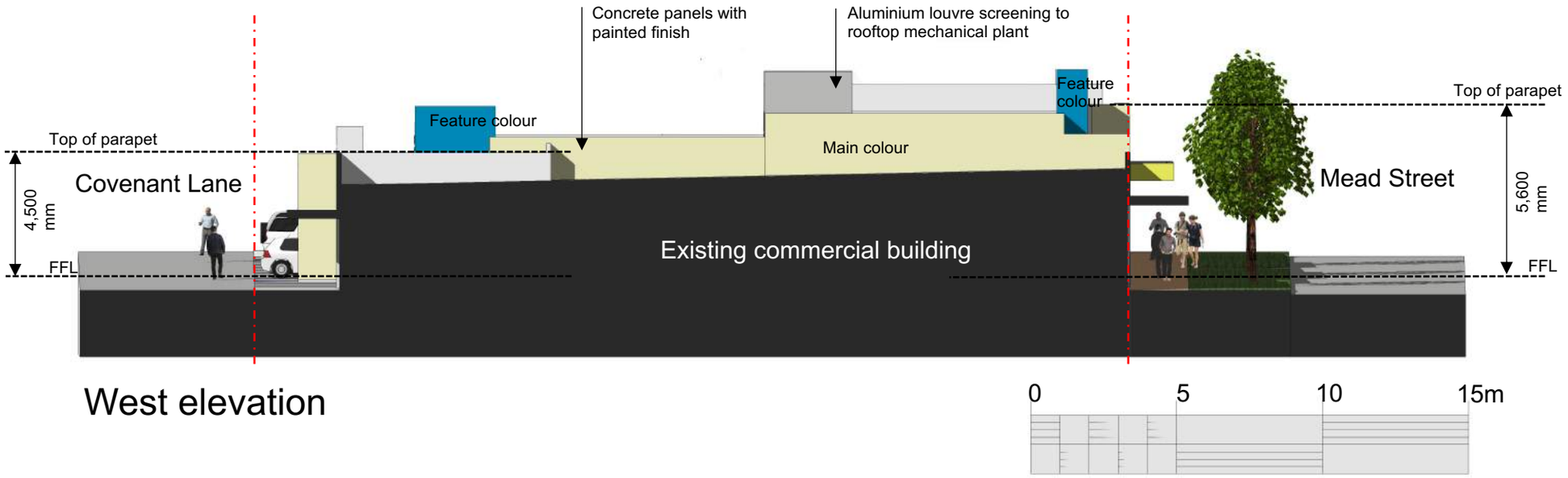
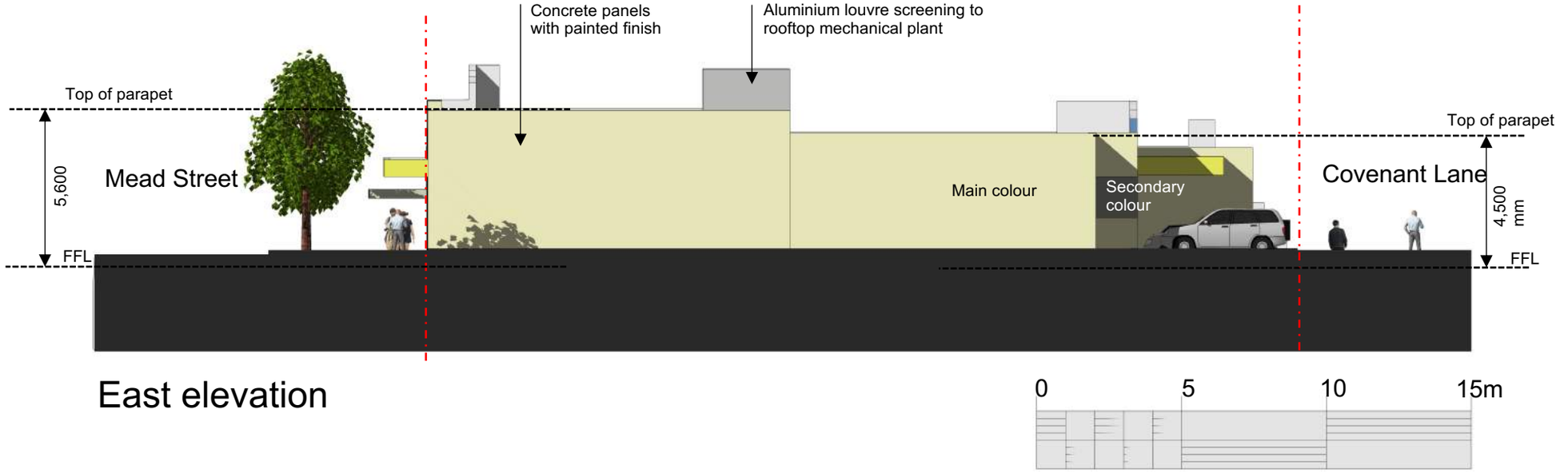


West elevation



East elevation

Proposed swimming pool and gym, Lots 29-33, Mead Street, Byford

Drawing No. DA 005 November 2020

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Elevated view of Mead Street
frontage looking northeast

Elevated view of Mead Street
frontage looking northwest

Proposed swimming pool and gym, Lots 29-33, Mead Street, Byford

Drawing No. DA 006 November 2020

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Elevated view of Covenant Lane
frontage looking southeast

Elevated view of Covenant Lane
frontage looking southwest

Proposed swimming pool and gym, Lots 29-33, Mead Street, Byford

Drawing No. DA 007 November 2020

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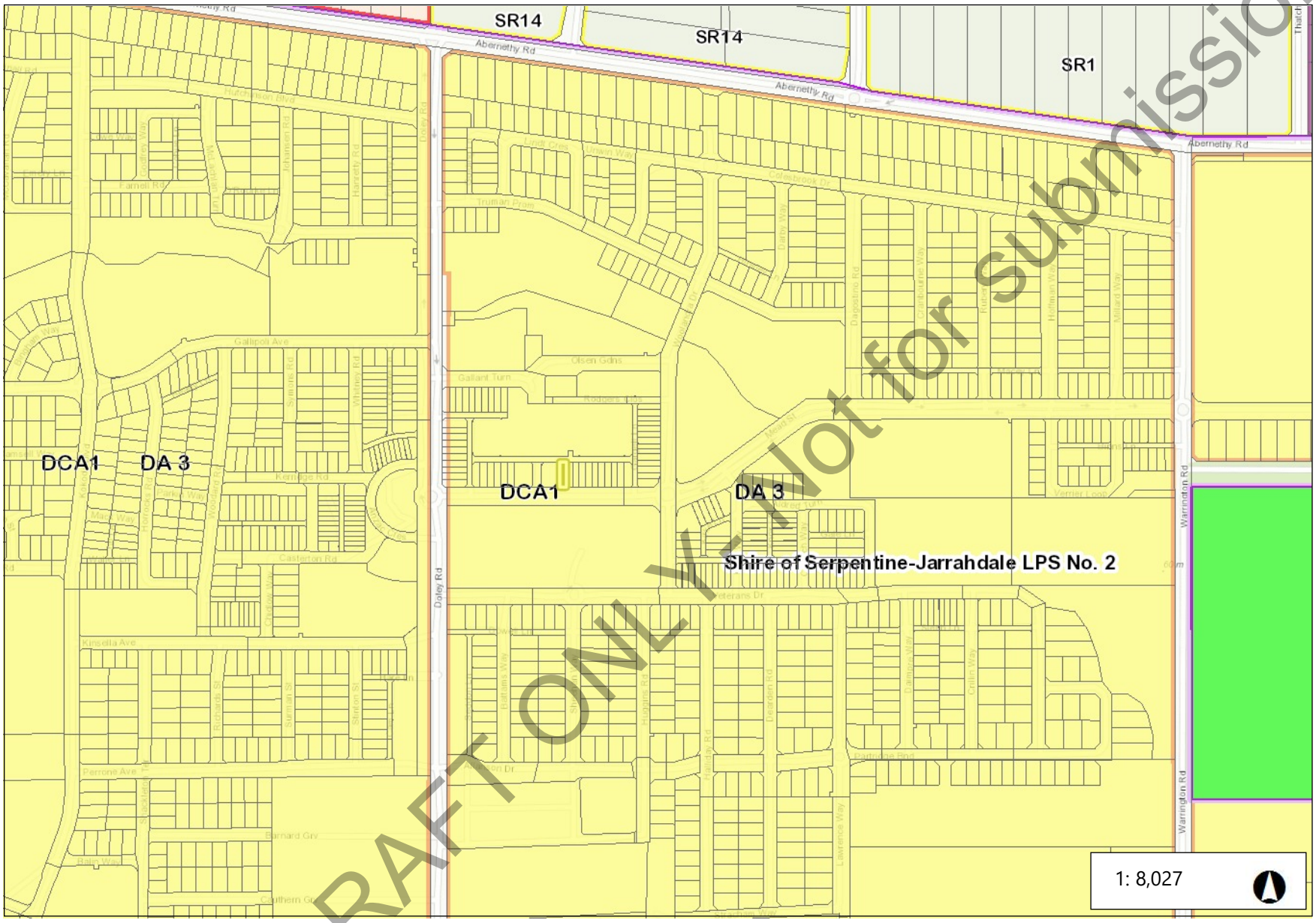
Appendix B

Zoning Map

Department of **Planning, Lands and Heritage**

Local Planning Scheme



DRAFT ONLY - Not for Submission

1: 8,027

0.4 0 0.20 0.4 Kilometers

Date produced: 10-Feb-2021

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.
THIS MAP IS NOT TO BE USED FOR NAVIGATION

Legend

- Cadastre
- Local Planning Scheme Boundary
- Other Categories - Areas (SCA, DCA, DA etc)

Local Planning Scheme Zones

- Rural living A
- Special residential
- Special rural
- Urban development

Region Scheme Reserves

- Parks and recreation

Notes

141-149 Mead Street, Byford

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 and sound power 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 levels 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 time weighting as specified in AS1259.1-1990. 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 time weighting as specified in AS1259.1-1990. This is used when assessing the presence of modulation only.

L_{APeak}
This is the maximum reading in decibels using the A frequency weighting and P time weighting AS1259.1-1990.

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

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

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

L_{A90}
An L_{A90} level is the A-weighted noise level which is exceeded for 90 percent of the measurement period and is considered to represent the "*background*" 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 20 000 Hz inclusive.

L_{Amax} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded at any time.

L_{A1} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 1% of the representative assessment period.

L_{A10} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 10% 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;

(b) is present for at least 10% of the representative.

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

a variation in the emission of a noise where the difference between $L_{A\ peak}$ and $L_{A\ Max\ slow}$ 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.

Influencing Factor (IF)

$$= \frac{1}{10}(\%\ \text{Type}\ A_{100} + \%\ \text{Type}\ A_{450}) + \frac{1}{20}(\%\ \text{Type}\ B_{100} + \%\ \text{Type}\ B_{450})$$

where:

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

$\%\text{Type}A_{450}$ = 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

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

+ Traffic Factor (maximum of 6 dB)

= 2 for each secondary road within 100m

= 2 for each major road within 450m

= 6 for each major road within 100m

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.

Background Noise
Background noise or residual noise is the noise level from sources other than the source of concern. When measuring environmental noise, residual sound is often a problem. One reason is that regulations often require that the noise from different types of sources be dealt with separately. This separation, e.g. of traffic noise from industrial noise, is often difficult to accomplish in practice. Another reason is that the measurements are normally carried out outdoors. Wind-induced noise, directly on the microphone and indirectly on trees, buildings, etc., may also affect the result. The character of these noise sources can make it difficult or even impossible to carry out any corrections.

Ambient Noise
Means the level of noise from all sources, including background noise from near and far and the source of interest.

Specific Noise
Relates to the component of the ambient noise that is of interest. This can be referred to as the noise of concern or the noise of interest.

Peak Component Particle Velocity (PCPV)

The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and in one of the three orthogonal directions (x, y or z) measured as a peak response. Peak velocity is normally used for the assessment of structural damage from vibration.

Peak Particle Velocity (PPV)

The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and is the vector sum of the PCPV for the x, y and z directions measured as a peak response. Peak velocity is normally used for the assessment of structural damage from vibration.

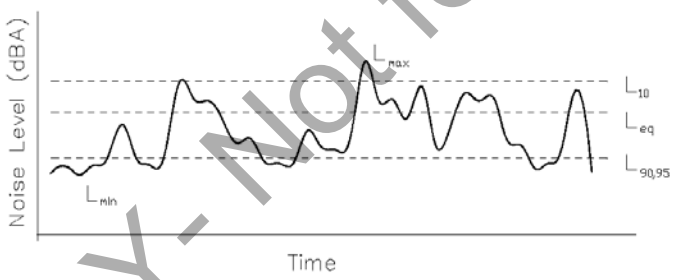
RMS Component Particle Velocity (PCPV)

The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and in one of the three orthogonal directions (x, y or z) measured as a root mean square (rms) response. RMS velocity is normally used for the assessment of human annoyance from vibration.

Peak Particle Velocity (PPV)

The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and is the vector sum of the PCPV for the x, y and z directions measured as a root mean square (rms) response. RMS velocity is normally used for the assessment of human annoyance from vibration.

Chart of Noise Level Descriptors



Typical Noise Levels