

Transportation Noise Assessment

Lot 2 (#10) Bayley Street, Coolgardie WA

Reference: 24048860-01

Prepared for:
Too Perfect Two Gift Pty Ltd

Reference: 24048860-01

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Date	Rev	Description	Author	Verified
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1. INTRODUCTION

Too Perfect Two Gift Pty Ltd is proposing to construct a motel at Lot 2 (#10) Bayley Street, Coolgardie WA - refer *Figure 1-1*. The proposed motel is double storey and includes 40 units, with the plans provided in *Appendix A*.

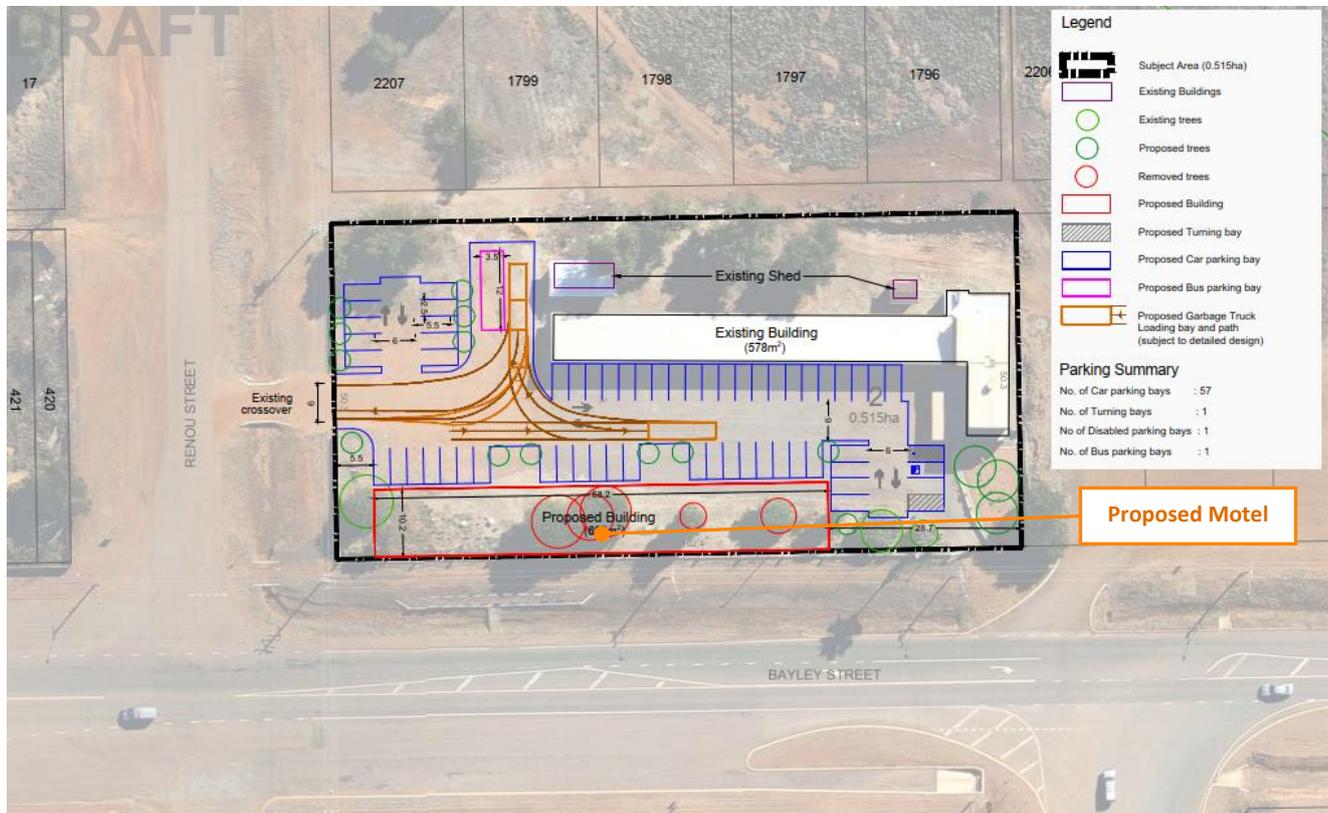
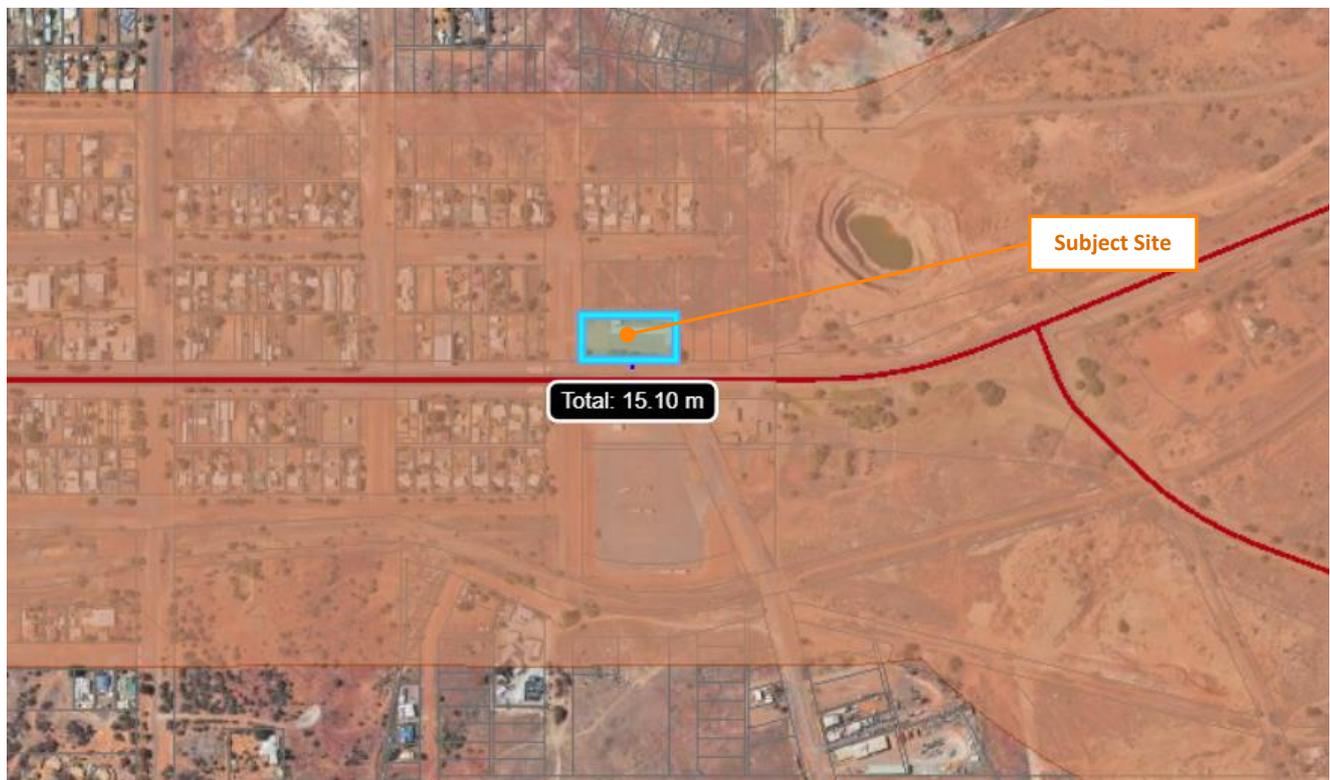


Figure 1-1: Subject Site Location (Source: DPLH PlanWA)

The proposed motel is approximately 15 metres from Bayley Street. This road is considered a 'Strategic Freight/Major Traffic Route' as shown on the PlanWA Maps and the subject site is within the trigger distance (refer *Table 1-1* and *Figure 1-2*), such that a noise assessment is required in accordance with *State Planning Policy No. 5.4 Road and Rail Noise*, being the subject of this report.

Table 1-1: Transport Corridor Classification and Trigger Distances

Transport Road Classification	Trigger Distance	Distance Measured From
Strategic Freight and Major Traffic Routes Roads as defined by Perth and Peel Planning Frameworks and/or roads with either 500 or more Class 7 to 12 Austroads vehicles per day, and/or 50,000 per day traffic volume	300 metres	Road carriageway edge
Other Significant Freight/Traffic Routes These are generally any State administered road and/or local government road identified as being a future State administered road (red road) and other roads that meets the criteria of either ≥ 100 Class 7 to 12 Austroads vehicles daily or $\geq 23,000$ daily traffic count (averaged equivalent to 25,000 vehicles passenger car units under region schemes)	200 metres	Road carriageway edge

**Figure 1-2: Subject Site Locality in Relation to Road (Source: DPLH PlanWA)**

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

2. CRITERIA

The criteria relevant to this project is provided in *State Planning Policy No. 5.4 Road and Rail Noise* (hereafter referred to as SPP 5.4) produced by the Western Australian Planning Commission (WAPC). SPP 5.4 is supported by the *Road and Rail Noise Guidelines* (the Guidelines) and the Department of Planning, Lands and Heritage mapping. The objectives of SPP 5.4 are to:

- Protect the community from unreasonable levels of transport noise;
- Protect strategic and other significant freight transport corridors from incompatible urban encroachment;
- Ensure transport infrastructure and land-use can mutually exist within urban corridors;
- Ensure that noise impacts are addressed as early as possible in the planning process; and
- Encourage best practice noise mitigation design and construction standards.

Table 2-1 sets out noise targets that are to be achieved by proposals under which SPP 5.4 applies. Where the targets are exceeded, an assessment is required to determine the likely level of transport noise and management/mitigation required.

Table 2-1: Noise Targets for Noise Sensitive Land-Use

Scenario	Outdoor Noise Target		Indoor Noise Target	
	Noise-sensitive land-use and/or development	55 dB L _{Aeq} (Day)	50 dB L _{Aeq} (Night)	40 dB L _{Aeq} (Day) (Living and Work Areas)

Notes:

- Day period is from 6am to 10pm and night period from 10pm to 6am.
- The outdoor noise target is to be measured at 1-metre from the most exposed, habitable¹ facade of a noise sensitive building.
- For all noise-sensitive land-use and/or development, indoor noise targets for other room usages may be reasonably drawn from Table 1 of Australian Standard/New Zealand Standard AS/NZS 2107:2016 *Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors* (as amended) for each relevant time period.
- Outdoor targets are to be met at all outdoor areas as far as is reasonable and practicable to do so using the various noise mitigation measures outlined in the Guidelines.

The application of SPP 5.4 is to consider anticipated traffic volumes for the next 20 years from when the noise assessment has been undertaken.

In the application of the noise targets, the objective is to achieve:

- Indoor noise levels as specified in *Table 2-1* in noise-sensitive areas (e.g. bedrooms and living rooms of houses); and
- A reasonable degree of acoustic amenity for outdoor living areas on each residential lot.

¹ A habitable room is defined in *State Planning Policy 3.1* as a room used for normal domestic activities that includes a bedroom, living room, lounge room, music room, sitting room, television room, kitchen, dining room, sewing room, study, playroom, sunroom, gymnasium, fully enclosed swimming pool or patio.

3. METHODOLOGY

Noise measurements and modelling have been undertaken in accordance with the requirements of SPP 5.4 and associated Guidelines, as described in *Section 3.1* and *Section 3.2*.

3.1. Site Measurements

Noise monitoring was undertaken on site using a Brüel & Kjær 2250 (S/N: 3024760) sound level meter (refer *Figure 3-1*). This meter complies with the instrumentation requirements of *Australian Standard 2702-1984 Acoustics – Methods for the Measurement of Road Traffic Noise*. The meter was field calibrated before and after the measurement session and found to be accurate to within ± 1 dB. Lloyd George Acoustics holds a current laboratory calibration certificate for the meter.

The microphone was approximately 1.4 metres above existing ground level and approximately 12 metres from the edge of the Bayley Street main carriageway. The measurements were recorded on 14 May 2024, between 9.00am and 11.30am.



Figure 3-1: Photograph of Sound Level Meter on Site

As the period between 9.00am and 10.00am had the highest measured noise levels, this one-hour measurement has been used within the assessment. From this one-hour measurement, a relationship between noise levels and the hourly traffic volumes can then be derived to determine the existing $L_{Aeq(Day)}$ and $L_{Aeq(Night)}$ at the measurement location.

3.2. Noise Modelling

The computer program *SoundPLAN 9.0* was utilised incorporating the *Calculation of Road Traffic Noise (CoRTN)* algorithms, modified to reflect Australian conditions. The modifications included the following:

- Vehicles were separated into heavy (Austroads Class 3 upwards) and non-heavy (Austroads Class 1 and 2) with non-heavy vehicles having a source height of 0.5 metres above road level and heavy vehicles having two source heights at 1.5 metres and 3.6 metres above road level;
- A -0.8 dB correction has been applied to the lower level heavy vehicle noise source and -8.0 dB to the higher level noise source based on the *Transportation Noise Reference Book*; Paul Nelson (1987), so as to provide consistent results with the CoRTN algorithms.

Predictions are made at heights of 1.4 metres above floor level and at 1-metre from various rooms of the proposed dwelling, resulting in a + 2.5 dB correction due to reflected noise.

Various input data are included in the modelling and these are discussed in *Section 3.2.1* to *Section 3.2.5*.

3.2.1. Ground Topography

Topographical data was taken from publicly available sources (e.g. *Google*) in the form of spot heights. This was combined with the proposed dwelling and existing neighbouring dwellings to create a 3D noise model.

3.2.2. Road Surface

The corrections applied for different road surface finishes are provided in *Table 3-1*.

Table 3-1: Noise Relationship Between Different Road Surfaces

Chip Seal				Asphalt			
14mm	10mm	5mm	Slurry	Dense Graded	Novachip	Stone Mastic	Open Graded
+3.5 dB	+2.5 dB	+1.5 dB	+1.0 dB	0.0 dB	-0.2 dB	-1.5 dB	-2.5 dB

Main Roads WA has indicated that the existing road surface in front on the proposed motel is dense graded asphalt. This has been assumed to remain unchanged into the future.

3.2.3. Vehicle Speed

The existing posted speed is 60 km/hr and assumed to remain unchanged into the future.

3.2.4. Traffic Volumes

Existing traffic volumes were obtained from Main Roads WA Traffic Map. A 1.0 % per annum growth rate has been used to calculate the Forecast 2046 traffic volumes as provided by Main Roads WA (Scott Hazebroek, Traffic Modelling Analyst). Note that the percentage heavy vehicles are assumed to be the same in the future as existing.

Table 3-2: Traffic Information Used in Noise Modelling

Parameter	Scenario			
	Existing – 2022/23		Future – 2046	
	Eastbound	Westbound	Eastbound	Westbound
24-hour Volume	765	711	971	903
% Heavy	46	44	46	44

3.2.5. Ground Attenuation

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

4. RESULTS

4.1. Noise Monitoring

The results of the hourly noise level measurements, in free-field conditions, were:

- 14 May 2024: 9.00am and 10.00am – 61.5 dB $L_{Aeq,1hour}$.

Combining the measured noise level with the corresponding hourly traffic volume, as shown in *Figure 4-1*, results in 61.0 $L_{Aeq(Day)}$ and 55.9 $L_{Aeq(Night)}$. Based on these results, the $L_{Aeq(Day)}$ is marginally more critical than the $L_{Aeq(Night)}$ since their difference is greater than 5 dB (refer *Section 2*).



Figure 4-1: Noise Level Relationship to Hourly Traffic Volumes

4.2. Noise Modelling

The noise model was initially set-up for existing conditions and calibrated to the noise measurement location. The model is then updated to include the proposed building and future traffic volumes, maintaining the same model calibration. The unit numbers used within the assessment are shown in *Figure 4-2*. It is noted that the ground floor (GF) and Level 1 (L1) Units have the same design, therefore one number has been used for both. *Table 4-1* provides the predicted outdoor $L_{Aeq(Day)}$ noise levels to the façade of each habitable room.

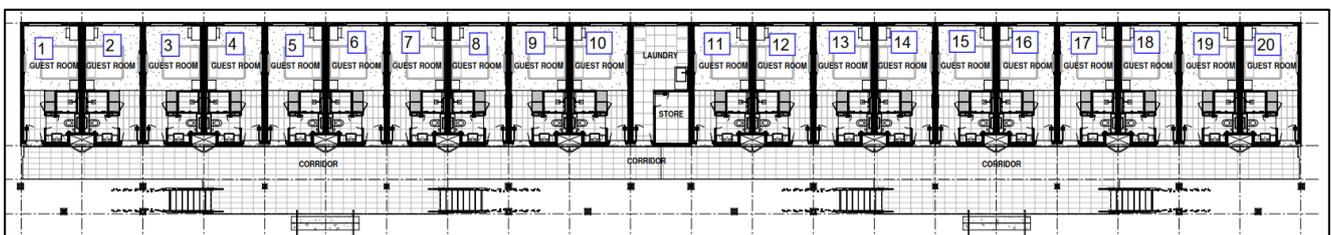


Figure 4-2: Units Numbered (Road on Bottom of Image Side)

Table 4-1: Predicted Future (2046) $L_{Aeq(Day)}$ Outdoor Noise Levels

Unit	Room	$L_{Aeq(Day)}$, dB
All	External Doors	64-65
1	Guest	57
20	Guest	57
2-19	Guest	43-52

5. ASSESSMENT

Where the outdoor noise targets of *Table 2-1* are achieved, no further controls are necessary. As such, *Table 5-1* provides the minimum construction recommended for those areas requiring upgrades.

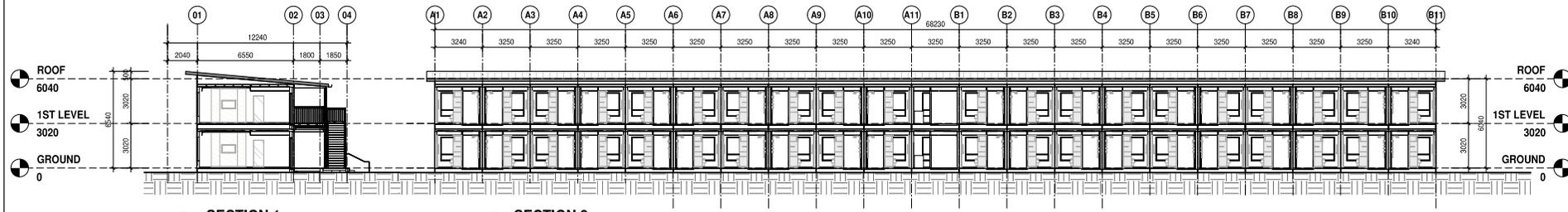
Table 5-1: Minimum Construction Requirements

Element	Room	Minimum Construction
External Glazing	Unit 1 Guest, Unit 20 Guest	Window approximately 26% of floor area, thereby requiring $R_w + C_{tr} \geq 25$, likely achievable using 5mm thick glass in fixed/awning style frame with acoustic seals.
External Doors	All Units Entry	Door to be minimum 40mm thick solid, timber core door with full perimeter acoustic seals. Any small glass inserts to be minimum 6.38mm thick laminated. Alternative door to be $R_w + C_{tr} \geq 31$.
External Walls	Unit 1, Unit 20, All Other Units south facing side	Cladding (9.5mm Weathertex) to stud with 90mm thick, 14kg/m ³ fibrous insulation and 2x13mm thick sound-rated plasterboard on resilient mounts and furring channels.
Roof / Ceiling	All Upper Floor Units	Metal roof with <i>Anticon 60</i> . Ceiling to be 13mm thick sound-rated plasterboard on furring channels (or 2x13mm thick sound-rated plasterboard direct fixed) with min. R4 fibrous insulation above.
Outdoor Living	Alfresco	Areas are available on the lot that are below the outdoor noise target and therefore considered compliant.
Ventilation	Rooms Requiring Upgraded Glazing	Fresh air requirements to be satisfied on the basis of windows closed to affected rooms when occupied. Builder to confirm how this will be achieved. Any ducted fresh air intakes are to be on the side of the house opposite the corridor.
Notification	Lot	As per SPP 5.4 requirements.

By implementing the *Table 5-1* construction recommendations, noise levels are calculated to comply with the indoor noise target of SPP 5.4. Alternative constructions can be accepted provided these are supported by a laboratory certificate.

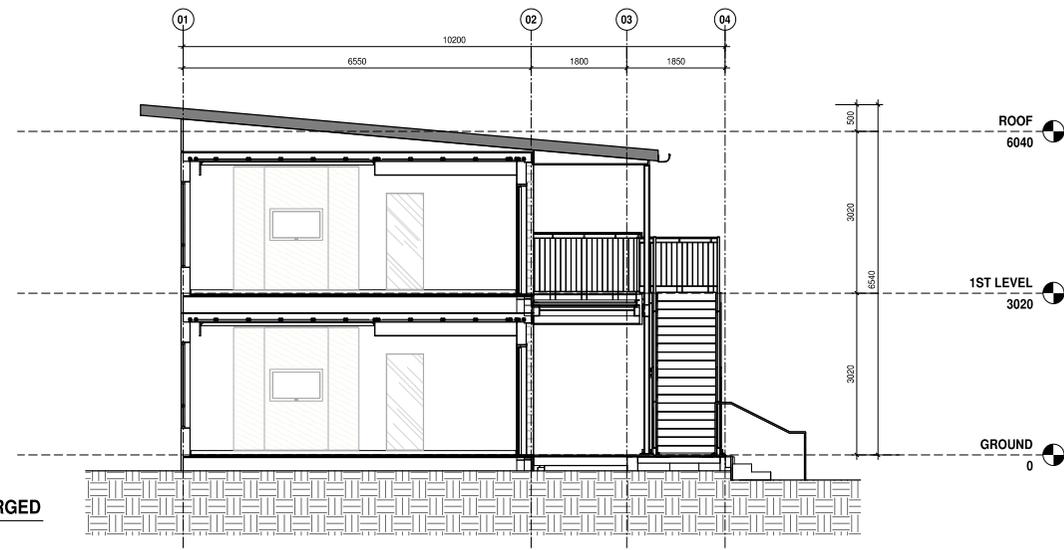
It should be noted that the recommendations are to comply with the minimum standard of SPP 5.4. Compliance with the indoor noise target does not result in all residents considering the noise level as acceptable, since this is a subjective response. Where a resident is particularly sensitive to noise, they may wish to consider additional upgrades.

Appendix A – Proposed House Plans



SECTION 1
1 : 150

SECTION 2
1 : 150



SECTION 1 - ENLARGED
1 : 50

WALL CLADDING TYPES

PM50 0.4MM BMT COLORSTEEL ENDURA METALCRAFT MC760 PROFILED ROOFING ON THERMAKRAFT COVERTEK 407 ROOF UNDERLAY OVER THERMAKRAFT AUSMESH 300 SAFETY MESH

CWB37 9.5MM THICK WEATHERTEX WEATHER-GROOVE SMOOTH 1200MM PAINT FINISHED ON CAVIBAT BATTENS OVER FASTWRAP BUILDING WRAP

CWB16 9.5mm THICK WEATHERTEX SELFLOK ECO-GROOVE SMOOTH 150MM PAINT FINISHED ON CAVIBAT CAVITY BATTENS OVER FASTWRAP BUILDING WRAP

REVISIONS		
NO	DESCRIPTION	DATE

For Information (IF)	For BC (BC)
For Review (R)	For Manufacturing (M)
For Approval (A)	For Construction (C)
For Tender (T)	For Final Approval (AS)
For RC (RC)	

REFERENCE		
Rev.	Drawing no.	Remark

CONSULTANTS:	
Architecture	TLC Modular Construction
Architecture of Record	TLC Modular Construction
Structural Engineering	
Electrical Engineering	
Mechanical Engineering	
Fire Engineering	
Passive fire Engineering	
Civil Engineering	

CLIENT: **Colin Bickere**

PROJECT/PROJECT ADDRESS:
40 KEY MOTEL COOLGARDIE
 Coolgardie - Western Australia

LOCAL AUTHORITY: ---

DRAWING NAME:
SECTIONS

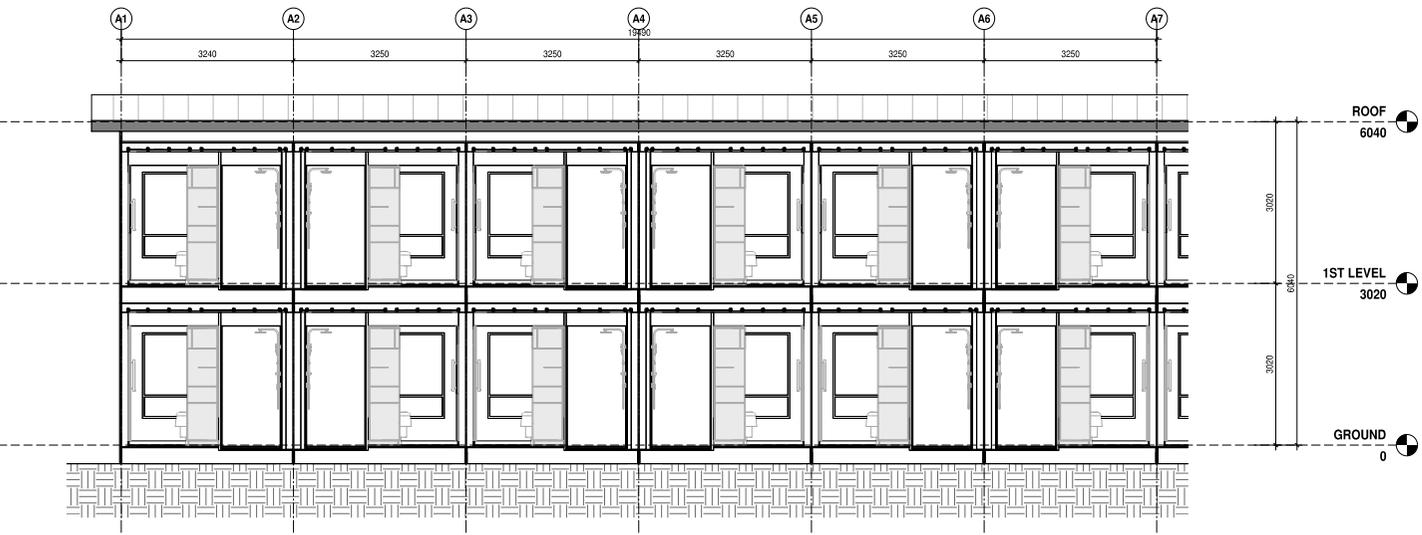
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Author	Checker	Approver

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CONTROLLED CODE:	MODEL TYPE:



SECTION 2 - ENLARGED
1 : 50

NOTE:
 ALL EXPOSED SURFACES OF EXPOSED STEEL STRUCTURE TO WALKWAYS INCLUDING STAIR STRUCTURE AND UNDERSIDE OF STAIRS TO BE INTUMESCENT PAINTED TO ACHIEVE A FIRE RATING OF 60 MINUTES REFER TO SPECIFICATIONS DOCUMENT FOR INTUMESCENT PAINT SPECIFICATIONS

DRAWING NO.: **C2000** REV: ---



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DESIGN / DEVELOP / DELIVER
PROJECT PLANNING / DEVELOPMENT

ARCHITECTURE / STRUCTURAL / MECHANICAL / ELECTRICAL / PLUMBING
MODULAR DESIGN AND FABRICATION

REVISIONS		
NO	DESCRIPTION	DATE

For Information (PI)	For BC (IBC)
For Review (PR)	For Manufacturing (PM)
For Approval (PA)	For Construction (PC)
For Tender (PT)	For Final Approval (ASB)
For BC (IBC)	

REFERENCE		
Rev.	Drawing no.	Remark

CONSULTANTS:	
Architecture	TLC Modular Construction
Architecture of Record	TLC Modular Construction
Structural Engineering	
Electrical Engineering	
Mechanical Engineering	
Fire Engineering	
Passive fire Engineering	
Civil Engineering	

CLIENT: **Colin Bickere**

PROJECT/PROJECT ADDRESS:
**40 KEY MOTEL COOLGARDIE
Coolgardie - Western Australia**

LOCAL AUTHORITY: **---**

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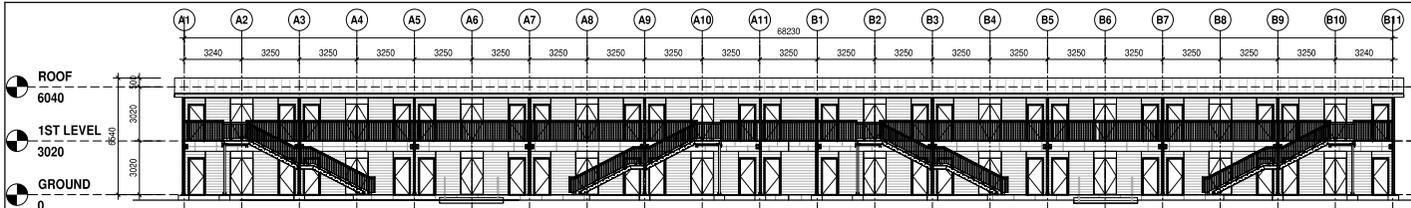
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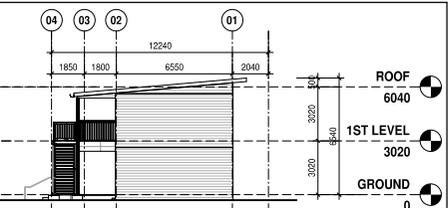
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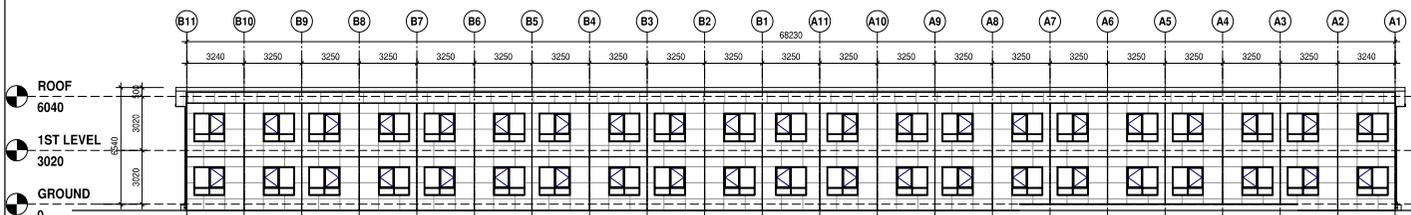
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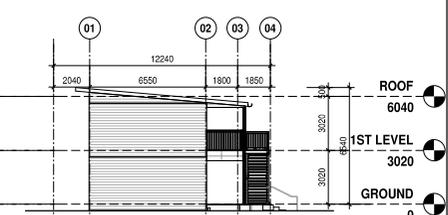
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1:150



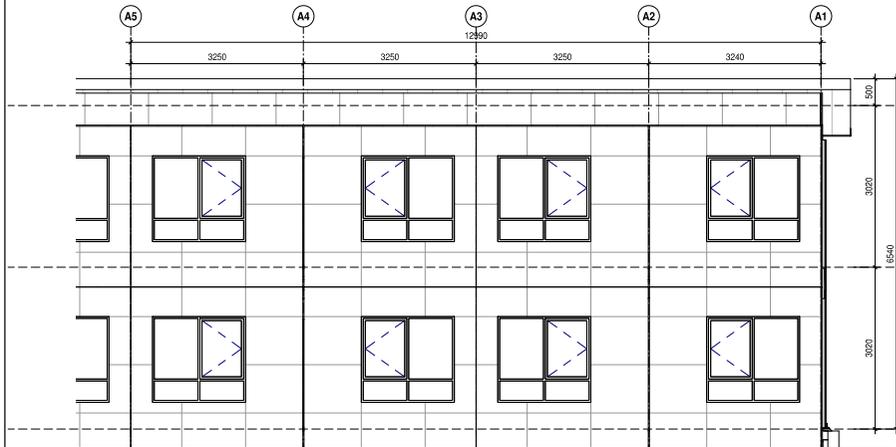
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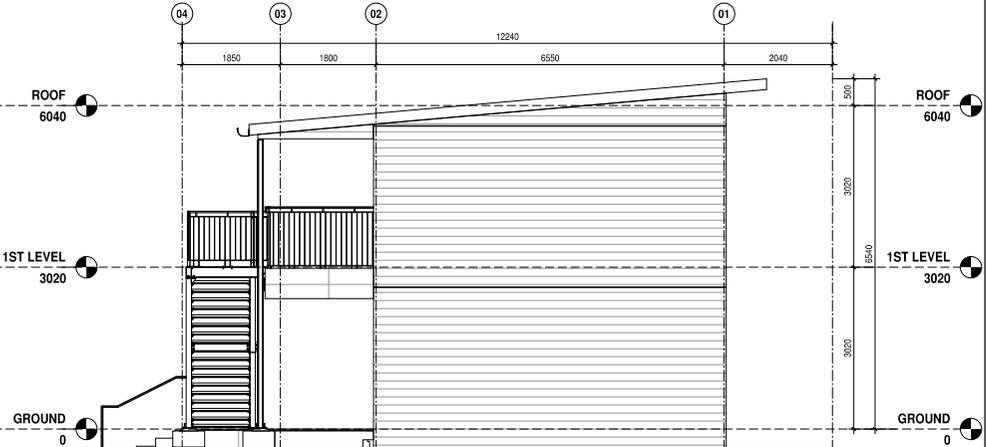
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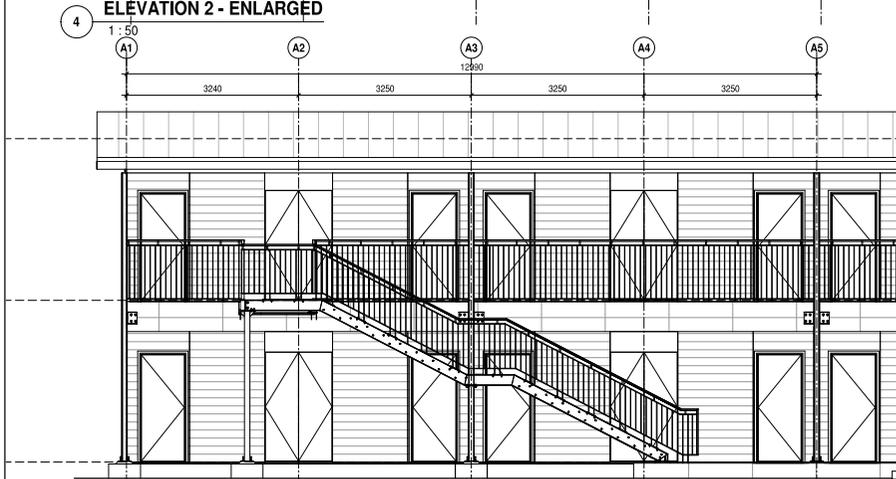
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1:150



ELEVATION 2 - ENLARGED
1:50



ELEVATION 3 - ENLARGED
1:50



ELEVATION 1 - ENLARGED
1:50

WALL CLADDING TYPES

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Appendix B – 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.

- **L_{eq}**

The L_{eq} level represents the average noise energy during a measurement period.

- **$L_{Aeq(Day)}$**

The $L_{Aeq(Day)}$ level is the logarithmic average of the L_{Aeq} levels from 6.00am to 10.00pm.

- **$L_{Aeq(Night)}$**

The $L_{Aeq(Night)}$ level is the logarithmic average of the L_{Aeq} levels from 10.00pm to 6.00am.

- **Noise-sensitive land use and/or development**

Land-uses or development occupied or designed for occupation or use for residential purposes (including dwellings, residential buildings or short-stay accommodation), caravan park, camping ground, educational establishment, child care premises, hospital, nursing home, corrective institution or place of worship.

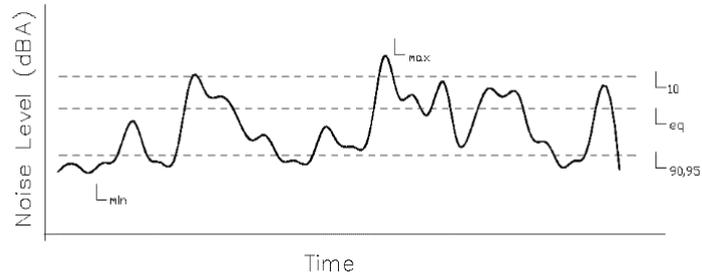
- **R_w**

This is the weighted sound reduction index. It is a single number rating determined by moving a grading curve in integral steps against the laboratory measured transmission loss until the sum of the deficiencies at each one-third-octave band, between 100 Hz and 3.15 kHz, does not exceed 32 dB. The higher the R_w value, the better the acoustic performance.

- **C_{tr}**

This is a spectrum adaptation term for airborne noise and provides a correction to the R_w value to suit source sounds with significant low frequency content such as road traffic or home theatre systems. A wall that provides a relatively high level of low frequency attenuation (i.e. masonry) may have a value in the order of – 4 dB, whilst a wall with relatively poor attenuation at low frequencies (i.e. stud wall) may have a value in the order of -12 dB.

• **Chart of Noise Level Descriptors**



• **Austrroads Vehicle Class**

VEHICLE CLASSIFICATION SYSTEM	
AUSTRROADS	
LIGHT VEHICLES	
1	BIKE Car, Van, Wagon, 4WD, UTV, Bicycle, Motorcycle
2	BIKE + TOWNS Trailer, Caravan, Boat
HEAVY VEHICLES	
3	TWO AXLE TRUCK OR BUS *2 axle
4	THREE AXLE TRUCK OR BUS *3 axle, 2 axle groups
5	FOUR (or FIVE) AXLE TRUCK *4 (or 5) axle, 2 axle groups
6	THREE AXLE ARTICULATED *3 axle, 3 axle groups
7	FOUR AXLE ARTICULATED *4 axle, 3 or 4 axle groups
8	FIVE AXLE ARTICULATED *5 axle, 3 or 4 axle groups
9	SIX AXLE ARTICULATED *6 axle, 3 or 4 axle groups or 7+ axle, 3 axle groups
LONG VEHICLES AND ROAD TRAINS	
10	8 DOUBLE E or HEAVY TRUCK and TRAILER *7+ axle, 4 axle groups
11	DOUBLE ROAD TRAIN *7+ axle, 5 or 6 axle groups
12	SINGLE ROAD TRAIN *7+ axle, 7+ axle groups

• **Typical Noise Levels**

