



Appendix 3

SPP 5.4 Noise Assessment

SATTERLEY

**CATALINA GROVE SUBDIVISION
TAMALA PARK**

SPP 5.4 NOISE ASSESSMENT

MARCH 2018

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NOISE ASSESSMENT
CATALINA GROVE SUBDIVISION
TAMALA PARK

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FOR

SATTERLEY

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1. INTRODUCTION

Herring Storer Acoustics was commissioned by the Tamala Park Regional Council to undertake a road traffic noise assessment for the proposed development of Catalina Grove, Clarkson.

The purpose of this assessment was to assess noise received within the development from vehicles travelling along both Connolly Drive and the Mitchell Freeway for the future. Neerabup Road has not been included in the assessment as it is not considered as a major road under the policy.

The traffic noise assessment has been carried out in accordance with the WAPC State Planning Policy 5.4 *“Road and Rail Transportation Noise and Freight Consideration in Land Use Planning”*.

For information, the development plan is attached in Appendix A.

2. SUMMARY

Under the Western Australian Planning Commission (WAPC) Planning Policy 5.4 *“Road and Rail Transport Noise and Freight Considerations in Land Use Planning”* (SPP5.4), we believe that the appropriate criteria for assessment for this development are as listed below for “Noise Limits”.

EXTERNAL

$L_{Aeq(Day)}$ of 60 dB(A); and
 $L_{Aeq(Night)}$ of 55 dB(A).

INTERNAL

$L_{Aeq(Day)}$ of 40 dB(A) in living and work areas; and
 $L_{Aeq(Night)}$ of 35 dB(A) in bedrooms.

Noise received at an outdoor area should also be reduced as far as practicable, with the aim of achieving an L_{Aeq} of 50 dB(A) during the night period.

From the modelling undertaken for the future projected road traffic Connolly Drive, noise received at the development would exceed the above criteria. As the inclusion of a noise wall for the entire length of the development is not practical as future residential lots face the roadway, to comply with the requirements of SPP 5.4 “Quiet House” design is required. For side facing lots a solid fence (colour bond) has been included at 1.8m high, hence provide amelioration to the outdoor living areas.

For the future projected road traffic Mitchell Freeway, noise received at the development would be below the above criteria, hence there are no acoustical requirements for residential premises on this side of the development.

Appendix C details the Quiet House Design Packages required for each individual Lot with Appendix D containing the deemed to satisfy construction methods.

Due to the orientation of the lots, the outdoor living area is situated behind the house, away from the Connolly Drive, therefore providing a barrier to noise level, hence compliance is achieved with the L_{Aeq} (night) of 50 dB(A).

3. ACOUSTIC CRITERIA

3.1 WAPC PLANNING POLICY

The Western Australian Planning Commission (WAPC) released on 22 September 2009 State Planning Policy 5.4 “Road and Rail Transport Noise and Freight Considerations In Land Use Planning”. Section 5.3 – Noise Criteria, which outlines the acoustic criteria, states:

“5.3 - NOISE CRITERIA

Table 1 sets out the outdoor noise criteria that apply to proposals for new noise-sensitive development or new major roads and railways assessed under this policy.

These criteria do not apply to –

- proposals for redevelopment of existing major roads or railways, which are dealt with by a separate approach as described in section 5.4.1; and*
- proposals for new freight handling facilities, for which a separate approach is described in section 5.4.2.*

The outdoor noise criteria set out in Table 1 apply to the emission of road and rail transport noise as received at a noise-sensitive land use. These noise levels apply at the following locations—

- for new road or rail infrastructure proposals, at 1 m from the most exposed, habitable façade of the building receiving the noise, at ground floor level only; and*
- for new noise-sensitive development proposals, at 1 m from the most exposed, habitable façade of the proposed building, at each floor level, and within at least one outdoor living area on each residential lot.*

Further information is provided in the guidelines.

TABLE 1 - OUTDOOR NOISE CRITERIA

Time of day	Noise Target	Noise Limit
<i>Day (6 am–10 pm)</i>	$L_{Aeq(Day)} = 55 \text{ dB(A)}$	$L_{Aeq(Day)} = 60 \text{ dB(A)}$
<i>Night (10 pm–6 am)</i>	$L_{Aeq(Night)} = 50 \text{ dB(A)}$	$L_{Aeq(Night)} = 55 \text{ dB(A)}$

The 5 dB difference between the outdoor noise target and the outdoor noise limit, as prescribed in Table 1, represents an acceptable margin for compliance. In most situations in which either the noise-sensitive land use or the major road or railway already exists, it should be practicable to achieve outdoor noise levels within this acceptable margin. In relation to greenfield sites, however, there is an expectation that the design of the proposal will be consistent with the target ultimately being achieved.

Because the range of noise amelioration measures available for implementation is dependent upon the type of proposal being considered, the application of the noise criteria will vary slightly for each different type. Policy interpretation of the criteria for each type of proposal is outlined in sections 5.3.1 and 5.3.2.

The noise criteria were developed after consideration of road and rail transport noise criteria in Australia and overseas, and after a series of case studies to assess whether the levels were practicable. The noise criteria take into account the considerable body of research into the effects of noise on humans, particularly community annoyance, sleep disturbance, long-term effects on cardiovascular health, effects on children's learning performance, and impacts on vulnerable groups such as children and the elderly. Reference is made to the World Health Organization (WHO) recommendations for noise policies in their publications on community noise and the Night Noise Guidelines for Europe. See the policy guidelines for suggested further reading.

5.3.1 Interpretation and application for noise-sensitive development proposals

In the application of these outdoor noise criteria to new noise-sensitive developments, the objective of this policy is to achieve –

- acceptable indoor noise levels in noise-sensitive areas (for example, bedrooms and living rooms of houses, and school classrooms); and*
- a reasonable degree of acoustic amenity in at least one outdoor living area on each residential lot¹.*

If a noise-sensitive development takes place in an area where outdoor noise levels will meet the noise target, no further measures are required under this policy.

In areas where the noise target is likely to be exceeded, but noise levels are likely to be within the 5dB margin, mitigation measures should be implemented by the developer with a view to achieving the target levels in at least one outdoor living area on each residential lot¹. Where indoor spaces are planned to be facing any outdoor area in the margin, noise mitigation measures should be implemented to achieve acceptable indoor noise levels in those spaces. In this case, compliance with this policy can be achieved for residential buildings through implementation of the deemed-to-comply measures detailed in the guidelines.

In areas where the outdoor noise limit is likely to be exceeded (i.e. above $L_{Aeq(Day)}$ of 60 dB(A) or $L_{Aeq(Night)}$ of 55 dB(A)), a detailed noise assessment in accordance with the guidelines should be undertaken by the developer. Customised noise mitigation measures should be implemented with a view to achieving the noise target in at least one outdoor living or recreation area on each noise-sensitive lot or, if this is not practicable, within the margin. Where indoor spaces will face outdoor areas that are above the noise limit, mitigation measures should be implemented to achieve acceptable indoor noise levels in those spaces, as specified in the following paragraphs.

For residential buildings, acceptable indoor noise levels are $L_{Aeq(Day)}$ of 40 dB(A) in living and work areas and $L_{Aeq(Night)}$ of 35 dB(A) in bedrooms². For all other noise-sensitive buildings, acceptable indoor noise levels under this policy comprise noise levels that meet the recommended design sound levels in Table 1 of Australian Standard AS 2107:2000 Acoustics—Recommended design sound levels and reverberation times for building interiors.

1 For non residential noise-sensitive developments, (e.g. schools and child care centres) consideration should be given to providing a suitable outdoor area that achieves the noise target, where this is appropriate to the type of use.

2 For residential buildings, indoor noise levels are not set for utility spaces such as bathrooms. This policy encourages effective “quiet house” design, which positions these non-sensitive spaces to shield the more sensitive spaces from transport noise (see guidelines for further information).

These requirements also apply in the case of new noise-sensitive developments in the vicinity of a major transport corridor where there is no existing railway or major road (bearing in mind the policy's 15-20 year planning horizon). In these instances, the developer should engage in dialogue with the relevant infrastructure provider to develop a noise management plan to ascertain individual responsibilities, cost sharing arrangements and construction time frame.

If the policy objectives for noise-sensitive developments are not achievable, best practicable measures should be implemented, having regard to section 5.8 and the guidelines."

The Policy, under Section 5.7, also provides information regarding "Notifications on Titles".

4. NOISE MONITORING

Noise monitoring was undertaken at two locations on the boundary of the proposed development between the 31st January and the 8th February 2018. From these measurements, the noise received at the development from vehicles travelling along both the Mitchell Freeway and Connolly Drive was determined. Neerabup Road has not been included in the assessment as it is not considered as a major road under the policy.

The results of the noise data logging are summarised in Table 3.1 with pictures of the monitors and graphical data contained in Appendix E.

TABLE 3.1 – DETERMINATION OF TRANSPORTATION NOISE AT LOGGERS, dB(A)

Location	Road Source	L _{A10 18hr}	L _{Aeq(day)}	L _{Aeq(night)}
Western Boundary of Development (15 metres from the road edge)	Connolly Drive	60.2	59.5	49.6
Eastern Boundary of Development (55 metres from the road edge)	Mitchell Freeway	52.4	51.0	47.5

Analysis of the current monitored noise levels for the Mitchell Freeway shows a decline from previous studies conducted further south. It is suspected that the current traffic volumes are not yet at the expected VPD total, hence the lower noise levels. Additionally, as the development would have been considered under SPP 5.4 during the construction of the freeway, noise control in the form of the existing eastern bund is further reducing the current noise levels. Therefore, whilst the current data has been used for calibration purposes, the difference between the day and night period would be greater than 5 dB(A) (based on previous studies), hence the day period is the critical period for compliance.

5. MODELLING

Modelling of noise received within the development from the Mitchell Freeway and Connolly Drive was carried out using SoundPlan, using the Calculation of Road Traffic Noise (CoRTN) algorithms. The input data for the model included:

- Increased traffic volume, assuming 2% growth over 20 years.
- Other traffic data as listed in Table 4.1.
- A +2.5 dB adjustment to allow for façade reflection.

The traffic data is as listed in Table 4.1.

TABLE 4.1 - SUMMARY OF TRAFFIC DATA

Parameter	Connolly Drive	Mitchell Freeway
Current Traffic Flow (vpd)	16,700	58,000
Future Traffic Flow (vpd)	24,850	86,200
Percentage Heavy Vehicles (%)	5%	10%
Speed (km/hr)	70	100

Note: We note that with the difference between the $L_{Aeq,8hr}$ and the $L_{Aeq,16hr}$ being greater than 5 dB(A), achieving compliance with the day period criteria will also achieve compliance with the night period criteria. Therefore, noise modelling was only undertaken for the day period and the results are shown graphically in Appendix B.

Noise modelling for road noise was undertaken for the following scenarios:

- S1 Noise emissions from Connolly Drive and Mitchell Freeway (Future) without noise amelioration for front facing lots and a 1.8m wall for side facing lots, but with future residential buildings.

The 1.8m wall for the side facing lots has been assumed to be a minimum of 15kg/m² in density.

For the noise modelling of future traffic, it has been assumed that the percentage of future heavy vehicles remains the same as for the current traffic flows. In this case, we believe that this is a conservative approach, as we believe that the percentage of heavy vehicles would fall over time.

6. ASSESSMENT

In accordance with the WAPC Planning Policy 5.4, an assessment of the noise that would be received within the development located at Precinct 1 from vehicles travelling on the Marmion Avenue has been undertaken.

In accordance with the Policy, the following would be the acoustic criteria applicable to this project:

External

Day	Maximum of 60 dB(A) L_{Aeq}
Night	Maximum of 55 dB(A) L_{Aeq}
Outdoor Living Areas (Night)	Maximum of 50 dB(A) L_{Aeq}

Internal

Sleeping Areas	35 dB(A) $L_{Aeq(night)}$
Living Areas	40 dB(A) $L_{Aeq(day)}$

Noise received at an outdoor area should also be reduced as far as practicable, with the aim of achieving an L_{Aeq} of 50 dB(A) during the night period.

From the modelling undertaken for the future projected road traffic Connolly Drive, noise received at the development would exceed the above criteria. As the inclusion of a noise wall for the entire length of the development is not practical as future residential lots face the roadway, to comply with the requirements of SPP 5.4 "Quiet House" design is required. For side facing lots a solid fence (colour bond) has been included at 1.8m high, hence provide amelioration to the outdoor living areas.

For the future projected road traffic Mitchell Freeway, noise received at the development would be below the above criteria, hence there are no acoustical requirements for residential premises on this side of the development.

Appendix C details the Quiet House Design Packages required for each individual Lot with Appendix D containing the deemed to satisfy construction methods.

Due to the orientation of the lots, the outdoor living area is situated behind the house, away from the Connolly Drive, therefore providing a barrier to noise level, hence compliance is achieved with the L_{Aeq} (night) of 50 dB(A).

APPENDIX A

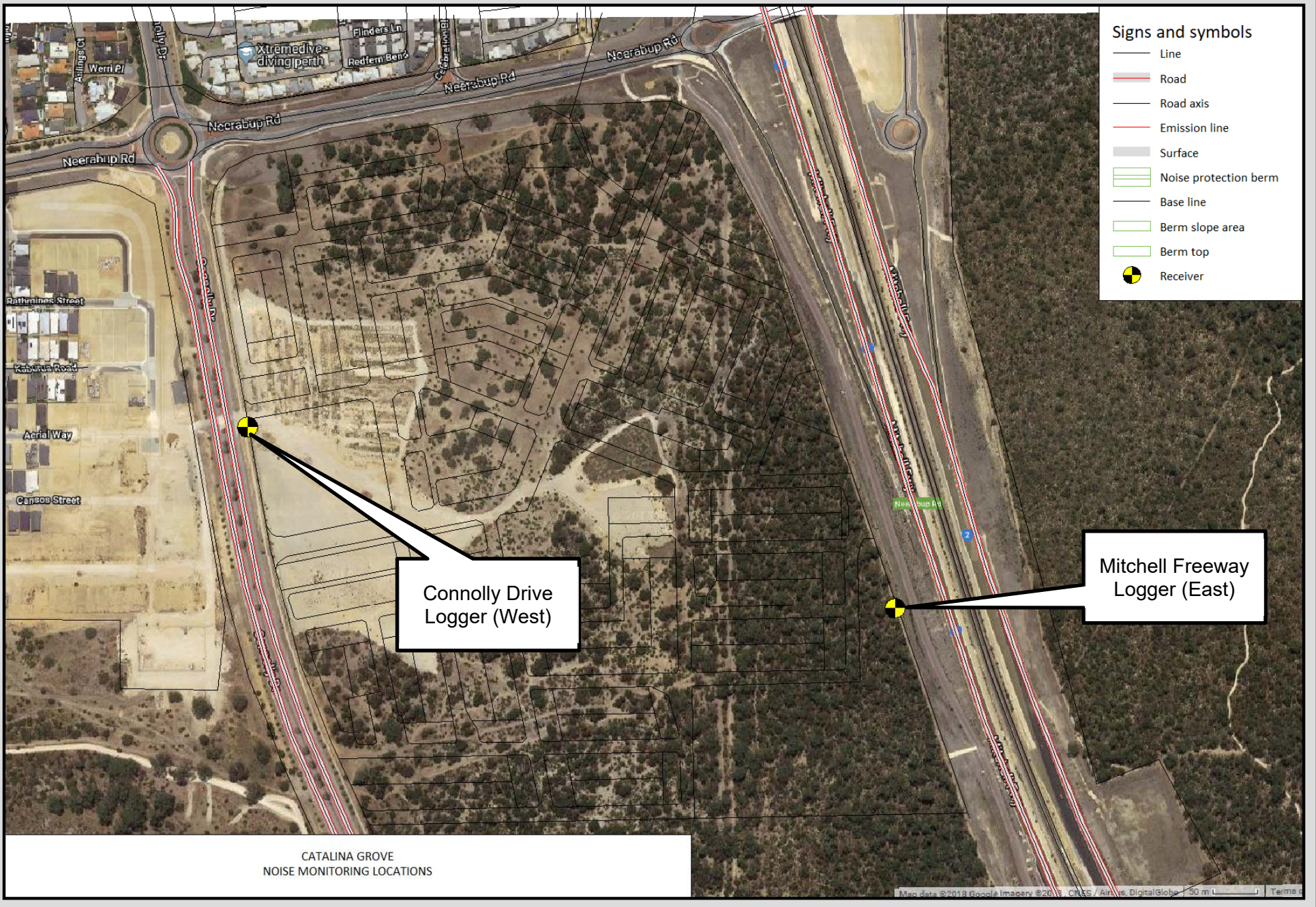
DEVELOPMENT PLAN
And
MONITORING LOCATION PLAN

The plan has no formal approval status and has been prepared by CLE to demonstrate one possible kind of use scenario for the land which could be investigated further by the Client. Implementation in any form would be subject to the receipt of all appropriate approvals. The plan may be changed without notice and should not be relied upon. The plan remains the property of CLE.



Signs and symbols

- Line
- Road
- Road axis
- Emission line
- Surface
- Noise protection berm
- Base line
- Berm slope area
- Berm top
- ⦿ Receiver



CATALINA GROVE
NOISE MONITORING LOCATIONS

APPENDIX B

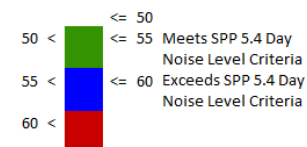
NOISE CONTOUR PLOT

Catalina Grove, Tamala Park - Map1

1

Job Number: 17291
Client: Satterley
19/03/2018

Connolly Drive and
Mitchell Freeway
Current (2017) Traffic Volumes
Calibrated Noise Contour Plot
Based on Monitored Noise Levels
L1018hr dB(A) Noise levels



Signs and symbols

- Main building
- Road
- Point receiver
- Emission line

Scale



Catalina Grove, Tamala Park

2

Job Number: 17291
Client: Satterley
19/03/2018

Connolly Drive and
Mitchell Freeway
Future (2031) Traffic Volumes
Calibrated Noise Contour Plot
Based on Monitored Noise Levels
Leq16hr Day Noise levels dB(A)

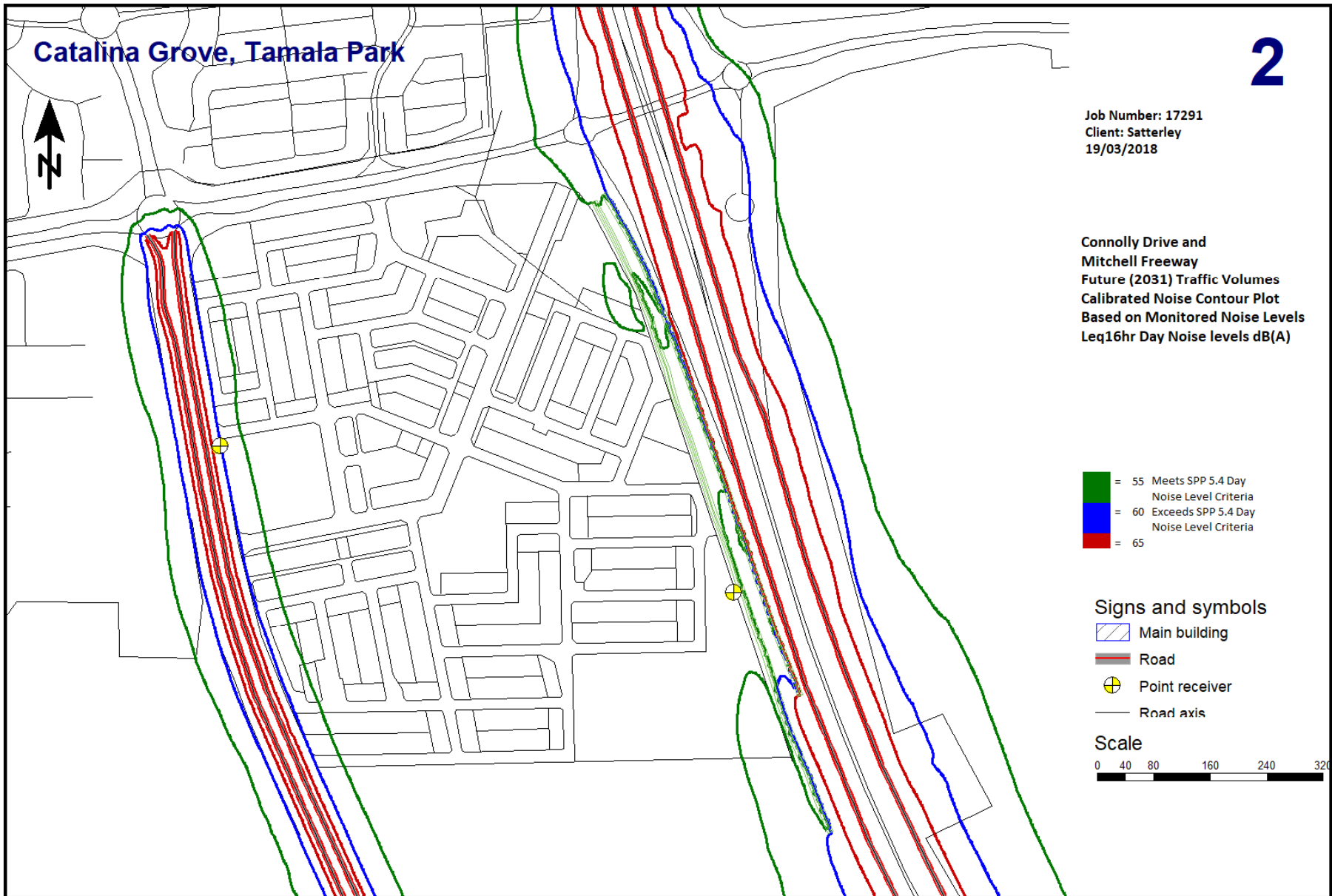
- = 55 Meets SPP 5,4 Day
Noise Level Criteria
- = 60 Exceeds SPP 5,4 Day
Noise Level Criteria
- = 65

Signs and symbols

- Main building
- Road
- + Point receiver
- Road axis

Scale

0 40 80 160 240 320



APPENDIX C

Quiet House Design – Individual Lot Requirements

Note: Alternative constructions to those listed for are acceptable, provided they are assessed and a report is submitted by a suitably qualified acoustic consultant.

Mitchell Freeway

Connolly Drive

No Acoustic Requirement

Requires Notification on Titles

Requires "Package A" Quiet House Design and Notification on Titles

Requires "Package B" Quiet House Design and Notification on Titles

Requires "Package C" Quiet House Design and Notification on Titles

APPENDIX D

QUIET HOUSE DESIGN GUIDELINES

SPP 5.4 TABLE 6.3 – ACCEPTABLE TREATMENT PACKAGES

Area	Orientation to road or rail corridor	Package A	Package B	Package C
		L _{Aeq} , Day up to 60dB L _{Aeq} , Night up to 55dB	L _{Aeq} , Day up to 63dB L _{Aeq} , Night up to 58dB	L _{Aeq} , Day up to 65dB L _{Aeq} , Night up to 60dB
Bedrooms	Facing	<ul style="list-style-type: none"> Walls to R_w+C_{tr} 45dB Windows and external door systems: Minimum R_w+C_{tr} 28dB (Table 6.4), total glazing area up to 40% of room floor area. [if R_w+C_{tr} 31dB: 60%] [if R_w+C_{tr} 34dB: 80%] Roof and ceiling to R_w+C_{tr} 35dB (1 layer 10mm plasterboard) Mechanical ventilation as per Section 6.3.1 	<ul style="list-style-type: none"> Walls to R_w+C_{tr} 50dB Windows and external door systems: Minimum R_w+C_{tr} 31dB (Table 6.4), total glazing area up to 40% of room floor area. [if R_w+C_{tr} 34dB: 60%] Roof and ceiling to R_w+C_{tr} 35dB (1 layer 10mm plasterboard) Mechanical ventilation as per Section 6.3.1 	<ul style="list-style-type: none"> Walls to R_w+C_{tr} 50dB Windows and external door systems: Minimum R_w+C_{tr} 34dB (Table 6.4), total glazing area limited to 40% of room floor area [if 20% of floor area or less, R_w+C_{tr} 31dB] Roof and ceiling to R_w+C_{tr} 40dB (2 layers 10mm plasterboard) Mechanical ventilation as per Section 6.3.1
	Side-on	•As above, except glazing R _w +C _{tr} values for each package may be 3dB less, or max % area increased by 20%		
	Opposite	<ul style="list-style-type: none"> No requirements As per Package A ‘Side On’ As per Package A ‘Facing’ 	<ul style="list-style-type: none"> No requirements As per Package A ‘Side On’ As per Package A ‘Facing’ 	<ul style="list-style-type: none"> No requirements As per Package A ‘Side On’ As per Package A ‘Facing’
Indoor living and work Areas	Facing	<ul style="list-style-type: none"> Walls to R_w+C_{tr} 45dB Windows and external door systems: Minimum R_w+C_{tr} 25dB (Table 6.4), total glazing area limited to 40% of room floor area. [if R_w+C_{tr} 28dB: 60%] [if R_w+C_{tr} 31dB: 80%] External doors other than glass doors to R_w+C_{tr} 26dB (Table 6.4) Mechanical ventilation as per Section 6.3.1 	<ul style="list-style-type: none"> Walls to R_w+C_{tr} 50dB Windows and external door systems: Minimum R_w+C_{tr} 28dB (Table 6.4), total glazing area up to 40% of room floor area. [if R_w+C_{tr} 31dB: 60%] [if R_w+C_{tr} 34dB: 80%] External doors other than glass doors to R_w+C_{tr} 26dB (Table 6.4) Mechanical ventilation as per Section 6.3.1 	<ul style="list-style-type: none"> Walls to R_w+C_{tr} 50dB Windows and external door systems: Minimum R_w+C_{tr} 31dB (Table 6.4), total glazing area up to 40% of room floor area. [if R_w+C_{tr} 34dB: 60%] External doors other than glass doors to R_w+C_{tr} 30dB (Table 6.4) Mechanical ventilation as per Section 6.3.1
	Side-on	• As above, except the glazing R _w +C _{tr} values for each package may be 3dB less, or max % area increased by 20%		
	Opposite	<ul style="list-style-type: none"> No requirements 	<ul style="list-style-type: none"> As per Package A ‘Side On’ 	<ul style="list-style-type: none"> As per Package A ‘Facing’
Other indoor areas	Any	<ul style="list-style-type: none"> No requirements 	<ul style="list-style-type: none"> No requirements 	<ul style="list-style-type: none"> No requirements
Outdoor living areas	Any (Section 6.2.3)	<ul style="list-style-type: none"> As per Package C, and/or At least one ground level outdoor living area screened using a solid continuous fence or other structure of minimum 2 metres height above ground level 	<ul style="list-style-type: none"> As per Package C, and/or At least one ground level outdoor living area screened using a solid continuous fence or other structure of minimum 2.4 metres height above ground level 	<ul style="list-style-type: none"> At least one outdoor living area located on the opposite side of the building from the transport corridor

Note: The above treatments are a deemed to satisfy construction. Alternative designs are acceptable, provided they are certified by a suitable qualified acoustic consultant.

APPENDIX E

MONITORED NOISE LEVELS

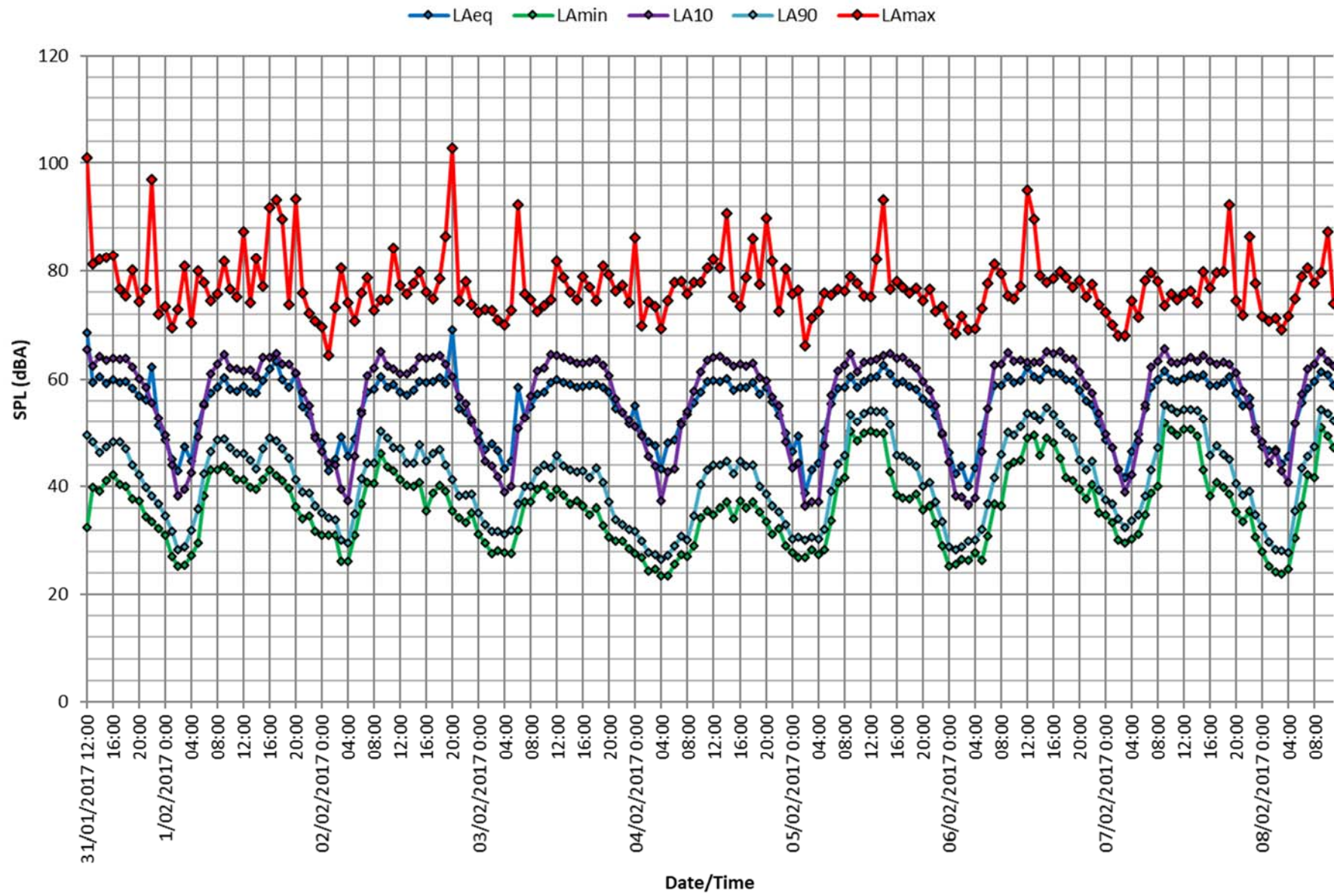


FIGURE 1 – MITCHELL FREEWAY MONITORING LOCATIONS



FIGURE 2 – CONNOLLY DRIVE MONITORING LOCATIONS

Noise Logging - Connolly Drive



Noise Logging - Mitchell Freeway

