

TAREE POLICE STATION



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CONTENTS

1	INTRO	DUCTION	4
2	DESCR	RIPTION OF PROPOSAL	5
3	RELEV	ANT NOISE STANDARDS AND GUIDELINES	8
	3.1 Mid	-Coast Council Legislation	8
	3.2 Aust	tralian Standard AS 1055.3:1997	9
	3.3 NSV	V EPA Noise Policy for Industry	9
	3.3.1	Intrusiveness Criteria	9
	3.3.2	Amenity Criteria	10
	3.3.3	Project Noise Trigger Levels	11
	3.4 NSV	V Road Noise Policy	11
	3.5 Slee	p Disturbance	11
	3.6 NSV	V Police Building Code	12
4	NOISE	IMPACT ASSESSMENT	13
	4.1 Exte	ernal Mechanical Plant Room	13
	4.2 Car-	-Park Noise Emissions	14
	4.2.1	Vehicle Movements	14
	4.2.2	Sleep Disturbance	15
	4.2.3	Traffic Noise Due to the Proposal	15
	4.2.4	Wash Bay	16
	4.3 Exte	ernal Terrace	16
	4.4 Nois	se Emissions from Building Activity	17
5	EXTER	NAL NOISE IMPACT ASSESSMENT	18
	5.1 Nois	se Intrusion from Road Traffic	18
	5.2 Inter	rnal Design Sound Levels	18
6	SUMN	IARY AND CONCLUSIONS	19



1 INTRODUCTION

JHA Consulting Engineers has been engaged by GroupGSA Pty Ltd to provide acoustic services for a proposed redevelopment of the NSW Police Station in Taree.

The proposal involves demolition of existing buildings and construction of a new two-stories building, including offices, open plan offices, meeting rooms, stores, charge room, etc. It is proposed a terrace in Level 1 on the eastern elevation and external plant area to the south-west of the building. The proposed development includes a car parking area with a wash bay at the northern of the building. The proposed Police Station is adjacent to the existing Court House and they will be linked.

An acoustic assessment has been undertaken and it is detailed in this report along with the findings and recommendations. It has been prepared as part of the Development Application to be submitted to the Mid-Coast Council.

The objectives of this acoustic assessment are:

- Identify the external noise and vibration sources that will potentially affect the proposed development.
- Establish the appropriate noise level and vibration criteria in accordance with the relevant standards, guidelines and legislation for the following issues:
 - Noise emissions from mechanical plant from the development to the surrounding receivers.
 - Noise emissions from traffic generated by the proposed development.
 - Noise emissions from Level 1 terrace on the eastern elevation.
 - Noise emissions from building operations.
 - Noise intrusion from road traffic along Albert Street.
- Carry out an acoustic assessment to determine whether the relevant criteria can be achieved and, where applicable, comment on noise control measures required to achieve compliance with the relevant noise level criteria.

This report provides:

- A statement of compliance with the relevant statutory criteria for the proposed use development within the vicinity of the nearest potentially affected receivers.
- Recommendations for noise mitigation measures for the proposed development in order to meet the relevant criteria when compliance is not achieved.

The following documentation has been used for the preparation of this report:

Architectural drawings of the proposed development.

This document complies with JHA Consulting Engineers accreditations ISO 9001 Quality Management System and ISO 14001 Environmental Management System.



2 DESCRIPTION OF PROPOSAL

Taree is part of the Local Government Area of Mid-Coast Council in the Mid North Coast region of NSW. The site is approximately 300 kilometres north of Sydney.

The proposed Police Station site is located at 83 Albert Street, being the site located within an urban environment characterised by medium levels of activity during the day.

The noise sensitive receivers surrounding the site are residential receivers, commercial receivers, educational receiver and a place of worship. Figure 1 shows the proposed site location (red shadow), Taree Court House (brown shadow) the residential receivers (green shadow), the commercial receivers (yellow shadow), educational receiver (purple shadow) and the worship place (blue shadow).



Figure 1: Aerial view of site showing the location of the proposed development and sensitive receivers.

The proposed Police Station will operate 24 hours per day, 7 days per week.

It is noted that if noise impacts associated with the proposed development are controlled at the nearest noise sensitive receivers, then compliance with the recommended criteria at all noise sensitive receivers will be achieved.

A summary of the nearest sensitive receivers surrounding the site location is shown in Table 1, including the approximate distances.



Sensitive Receiver	Receiver Type	Distance (m)
17 Commerce Street	Residential	20
89 Albert Street	Commercial	<5
80 Wynter Street	Educational	< 5
75 Albert Street	Worship	< 5

Table 1: Nearest sensitive receivers surrounding the site location plus distances.

The proposed development involves the construction of a Police Station comprising:

- New offices areas including training / meeting rooms, stores, charge room, lockers, toilets, etc.
- Level 1 terrace on the northern elevation of the Police Station.
- Car-park in the western side of the lot.
- External mechanical plantroom located at the south-west of the building.

Figures 2 to 4 show the proposed layout of the Police Station.

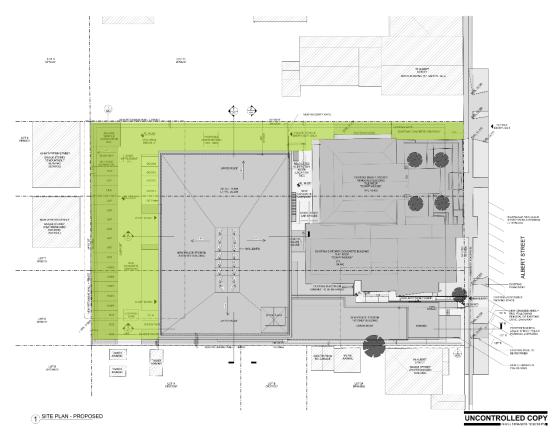


Figure 2: Site plan of the proposed development. Car-park and driveway highlighted.



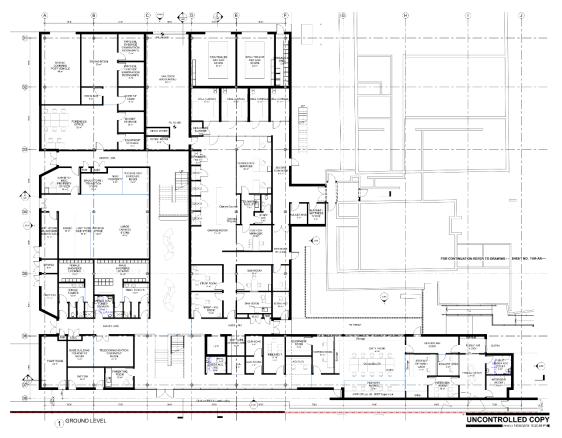


Figure 3: Ground floor plan of the proposed development.



Figure 4: Level 1 plan of the proposed development. External terrace (yellow shadow) and plant room (blue shadow) highlighted.



3 RELEVANT NOISE STANDARDS AND GUIDELINES

The following standards and guidelines are considered relevant to the project and have been referenced in developing the project noise level criteria.

- Environmental Planning and Assessment (EP&A) Act 1979.
- Protection of the Environmental Operations (POEO) Act 1997.
- Protection of the Environmental Operations. Noise Regulation Controls (NRC) 2008.
- Mid-Coast Council Planning Legislation.
- Australian Standard AS 1055.3:1997 'Description and measurement of environmental noise, Part 3: Acquisition of data pertinent to land use'.
- NSW EPA Noise Policy for Industry (NPI) 2017.
- DECCW NSW Road Noise Policy (RNP) 2011.
- NSW Police Building Code.
- Australian Standard AS 2107:2016 'Recommended design sound levels and reverberation times for building interiors'.

3.1 MID-COAST COUNCIL LEGISLATION

Relevant Planning Documents of Mid-Coast Council Legislation have been reviewed for any noise requirement or criteria. These do not include any specific requirements for noise management related to the proposed development.

The Mid-Coast Council Local Environmental Plan (MC-LEP 2010) sets the Landing Zone as shown in Figure 5. The site and surroundings are categorized as General Residential (R1).



Figure 5: Landing Zone of the site and surroundings.



3.2 AUSTRALIAN STANDARD AS 1055.3:1997

Australian Standard AS 1055.3:1997 provides a guide of estimated average background noise levels for different areas containing residences.

The recommended background noise levels from AS 1055.3:1997 have been used as the basis for this noise assessment. Table 2 shows the estimated background noise levels for the site area.

	Average Background A-weighted noise level ($L_{A90,T}$)					
Description of the neighbourhood	Monday to Saturday			Sundays and public holidays		
	07.00 – 18.00	18.00 – 22.00	22.00 - 07.00	09.00 – 18.00	18.00 – 22.00	22.00 - 09.00
Areas with medium density transportation or some commerce of industry	50	45	40	50	45	40

Table 2: Average background noise levels as per AS 1055.3:1997.

3.3 NSW EPA NOISE POLICY FOR INDUSTRY

The NSW EPA Noise Policy for Industry 2017 assesses noise from industrial noise sources - scheduled under the POEO. Mechanical noise from the development shall be addressed following the recommendations in the NSW NPI.

The assessment is carried out based on the existing ambient and background noise levels addressing the following:

- Intrusiveness Criteria, to control intrusive noise into nearby sensitive receivers.
- Amenity Criteria, to maintain the noise level amenity for particular land uses.

These criteria are established for each assessment period (day, evening and night) and the more stringent sets the Project Noise Trigger Level (PNTL's).

3.3.1 INTRUSIVENESS CRITERIA

The NSW NPI defines the intrusiveness criteria as follows:

"The intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the L_{Aeq} descriptor), measured over a 15 minute period, does not exceed the background noise level by more than 5 dB when beyond a minimum threshold."



Indicative Noise Amenity Area	Period	Estimated Rating Background Level (L _{A90}), dB(A)	Intrusiveness Criterion, dB(A)
	Day	50	55
Residential urban (R1)	Evening	45	50
	Night	40	45
Commercial	When in use	45	50
Educational	Noisiest 1- hour period when in use	50	55
Place of Worship	When in use	45	50

 Table 3: Determination of the intrusiveness criterion for noise sensitive receivers.

3.3.2 AMENITY CRITERIA

The NSW NPI states the following to define the amenity criteria:

"To limit continuing increases in noise levels from application of the intrusiveness level alone, the ambient noise level within an area from all industrial noise sources combined should remain below the recommended amenity noise levels specified in Table 2.2 where feasible and reasonable. The recommended amenity noise levels will protect against noise impacts such as speech interference, community annoyance and some sleep disturbance."

Indicative Noise Amenity Area	Period	Recommended Amenity Noise Level (L _{Aeq}), dB(A)	Amenity Criterion, dB(A)
	Day	60	58 L _{Aeq,15min} (60-5+3)
Residential urban (R1)	Evening	50	48 L _{Aeq,15min} (50-5+3)
	Night	45	43 L _{Aeq,15min} (45-5+3)
Commercial	When in use	65	63 L _{Aeq,15min} (65-5+3)
Educational	Noisiest 1- hour period when in use	35*	58 L _{Aeq,15min} (60-5+3)
Place of Worship	When in use	40*	63 L _{Aeq,15min} (65-5+3)

 Table 4: Determination of the amenity criterion for noise sensitive receivers. * Internal noise levels. Amenity Criteria have been adjusted considering a minimum sound transmission loss of 25 dB for fixed windows.



3.3.3 PROJECT NOISE TRIGGER LEVELS

The PNTL's are shown in Table 5 and have been obtained in accordance with the requirements of the NSW NPI. These shall be assessed to the most affected point on or within the noise sensitive receiver boundary.

Indicative Noise Amenity Area	Period	Intrusiveness Criterion	Amenity Criterion
	Day	55	58
Residential urban (R1)	Evening	50	48
	Night	45	43
Commercial	When in use	50	63
Educational	Noisiest 1- hour period when in use	55	58
Place of Worship	When in use	50	63

 Table 5: Determination of PNTL's for the nearest noise sensitive receivers.

3.4 NSW ROAD NOISE POLICY

The NSW Road Noise Policy (RNP) establishes criteria for traffic noise from:

- Existing roads
- New road projects
- Road development projects
- New traffic generated by developments

For existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB above the existing noise levels. An increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person.

3.5 SLEEP DISTURBANCE

The potential of sleep disturbance from short-duration noise events from the proposed development during the night-time period needs to be considered. Sleep disturbance occurs through changes in sleep state and awakenings. For continuous traffic flow, L_{Aeq} appears to be acceptably correlated with sleep disturbance. However, for intermittent traffic flow, which often occurs at night-time ($L_{AFmax} - L_{Aeq}$) or ($L_{AFmax} - L_{A90}$) are better correlated with sleep disturbance.

NSW EPA NPI recommends the following criteria:

"Where the subject development night-time noise levels at a residential location exceed:

- L_{Aeq,15min} 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- LAFmax 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,

A detailed maximum noise level event assessment should be undertaken.



The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period."

These values apply shall be achieved external to the bedroom window of the noise residential sensitive receivers, as opposed to the receiver boundary – which is applied for most other criteria.

On the other hand, the Environmental Criteria for Road Traffic Noise (NSW EPA 1999) discussed a guideline aimed at limiting the level of sleep disturbance due to environmental noise – that the $L_{AF1,1min}$ level of any noise should not exceed the L_{AF90} noise level by more than 15 dB. This noise criteria is similar to NSW EPA NPI for L_{AFmax} as these values along a minute are equal to $L_{AF1,1min}$.

Table 6 summarises the noise level criteria for sleep disturbance based on the NSW EPA NPI recommendations and highlight the stringer criteria to apply.

Sleep Disturbance Noise Criteria			
Condition 1	Laeq,15min 40 dB(A) RBL + 5 = 45 dB(A)		
Condition 2	L_{AFmax} 52 dB(A) RBL + 15 = 55 dB(A)		

Table 6: Sleep disturbance noise criteria.

3.6 NSW POLICE BUILDING CODE

Section 4.12 of the NSW Police Building Code provides acoustic criteria for internal noise levels, reverberation times plus sound insulation performances that should be achieved within the Police Station spaces. Internal noise levels have been sourced from the Australian Standard AS 2107:2000¹ and incorporated into the Police Building Code Room Data Sheets.

The internal noise levels within the spaces will be determined by noise from the air-conditioning and ventilation systems plus traffic noise break-in through the building envelope.

Therefore, the criteria outlined in the NSW Police Building Code shall be adopted for this project.

¹ Current version is AS 2107:2016. The revision updates and expands guidance on design sound levels and provides more extensive recommendations regarding reverberation times.



4 NOISE IMPACT ASSESSMENT

Noise break-out from the proposed development has the potential to impact on existing noise sensitive receivers. For the purpose of this noise impact assessment, the noise sources are assumed as follows:

- Noise emissions from mechanical plant from the development to the surrounding receivers.
- Noise emissions from traffic generated by the proposed development.
- Noise emissions from Level 1 terrace on the northern elevation.
- Noise emissions from building operations.

Each of these noise sources has been considered in the noise impact assessment.

The acoustic assessment has considered the following:

- Noise levels have been considered as continuous over assessment time period to provide the worstcase scenario.
- Distance attenuation, building reflections and directivity.
- Lowest estimated background noise levels at the nearest noise sensitive receiver have been used to provide a worst-case scenario.

4.1 EXTERNAL MECHANICAL PLANT ROOM

Noise from proposed development plant rooms should be controlled to ensure external noise emissions are not intrusive and do not impact on the amenity of the sensitive receivers.

Mechanical plant will operate continuously during all day periods. At this stage, final mechanical plant selections have not been made; therefore, it is not possible to undertake a detailed assessment of the mechanical plant noise emissions. A preliminary review has been undertaken for the building services / plant room.

Based on the plant room location (refer to Figure 4), the most restrictive criteria at the nearest sensitive receivers as per Section 3.3.3 plus distance from the plant room to the receiver; noise emissions from the plant room shall be limited to L_{Aeq} 69 dB(A) at 1 metre from plant room boundary to meet the noise levels criteria.

Noise controls will need to be incorporated with the design of the mechanical plant rooms to ensure that the cumulative noise levels from plant to the nearest sensitive receivers meets the noise level criteria.

Usual design noise controls that may need to be implemented will typically include, but are not limited to:

- Strategic location and selection of plant to ensure the cumulative noise levels at the receiver boundaries is met.
- Selection of appropriate quiet plant.
- Acoustic noise control measures to be put in place to minimise noise impacts such as:
 - In-duct attenuation
 - Noise enclosures as required
 - Sound absorptive panels
 - Acoustic louvres as required
 - Noise barriers as required



Acoustic assessment of all mechanical plant shall continue during the detailed design phase of the project in order to confirm any noise control measures.

4.2 CAR-PARK NOISE EMISSIONS

The potential noise sources associated with the proposed carpark operations will be:

- Noise generated by vehicles movements within the carpark and access.
- Other vehicle operational noises (i.e. engines starting, opening and closing doors).
- Traffic Noise due to the proposal.
- Use of the wash bay.

For the assessment of the operational noise from the car-park, a sound power level for a general car use – i.e. slow car movement and engine noise – of 75 dB(A) is used. To assess the transient noise events such engine starting and opening and closing doors, a sound power level of 85 dB(A) is used.

4.2.1 VEHICLE MOVEMENTS

The noise assessment has considered the most affected sensitive receivers near the car-park, being the educational receiver during day-time and residential receiver during night-time. It has been assumed that there will be a 2.1 meter high wall boundary between the Police Station car-park and the noise sensitive receivers.

Calculation	Overall A-weighted noise level, in dB(A)
L _{A10,1min} of car event at 1 m	63
$L_{Aeq,14min}$ of background noise level at educational receiver	50
Distance (10 m) attenuation, dB	-20
Building attenuation / reflections / directivity, dB	-12
L _{Aeq,15min} resulting at the educational receiver	31
NPI Day-time Criteria educational receiver / Complies?	55 / Yes

 Table 7: Noise assessment at educational receiver from car-park vehicle movement during day-time at educational receiver.

Calculation	Overall A-weighted noise level, in dB(A)
L _{A10,1min} of car event at 1 m	63
$L_{Aeq,14min}$ of background noise level at residential receiver	40
Distance (20 m) attenuation, dB	-26
Building attenuation / reflections / directivity, dB	-12
$L_{Aeq,15min}$ resulting at residential receiver	25
NPI Night-time Criteria residential receiver / Complies?	43 / Yes

 Table 8: Noise assessment at residential receiver from car-park vehicle movement during night-time at residential receiver.



4.2.2 SLEEP DISTURBANCE

The noise assessment has considered the nearest residential receivers near the car-park, during night-time. It has been assumed that there will be a 2.1 meter high wall boundary between the Police Station car-park and the residential sensitive receivers.

Calculation	Overall A-weighted noise level, in dB(A)
$L_{\text{A1,1min}}$ of car event at 1 m	73
Distance (20 m) attenuation, dB	-26
Building attenuation / reflections / directivity, dB	-12
L _{A1,1min} resulting at residential receiver	35
NPI Sleep Disturbance L _{AFmax} Criteria / Complies?	52 / Yes

Table 9: Sleep disturbance noise assessment at residential receiver from car-park during night-time. Condition 1.

Calculation	Overall A-weighted noise level, in dB(A)
$L_{\rm A1,1min}$ of car event at 1 m $$	73
L _{Aeq,14min} Background noise	40
Distance (20 m) attenuation, dB	-26
Building attenuation / reflections / directivity, dB	-12
L _{Aeq,15min} resulting at residential receiver	35
NPI Sleep Disturbance L _{Aeq,15min} Criteria / Complies?	40 / Yes

Table 10: Sleep disturbance noise assessment at residential receiver from car-park during night-time. Condition 2.

Based on the predictions detailed above plus assumptions, the sleep disturbance noise assessment at the nearest residential receiver during night time is expected to comply the NSW EPA NPI Sleep Disturbance Criteria.

4.2.3 TRAFFIC NOISE DUE TO THE PROPOSAL

The noise sources associated with vehicle movements will be the noise generated by vehicle movements through the carpark to the Police Station entrance (i.e. vehicles moving slowly) via Albert Street.

It has been assumed that the normal operation activity of the police station will only result in a relative minor level of traffic activity (around 10 / 20 vph), being higher during a peak hour – occurring during shift change times. A low number of vehicle movements, indicates that there will be no significant increase in road traffic as a result of the proposed development.

As noted in Section 3.4, when considering land use redevelopment and the impact on sensitive land uses (residential / schools / hospitals / recreational) the NSW Road Noise Policy (RNP) states that an increase up to 2 dB in relation to existing noise levels is anticipated to be insignificant. Therefore, the low number of traffic movements will not result in any noticeable change in traffic noise levels and is expected to meet the NSW Road Noise Policy recommendations.



4.2.4 WASH BAY

It is noted that a wash-bay for cleaning the patrol cars it will be located in the car-park. It is expected that a pressure washer will be used and will not operate continuously.

NSW POEO Noise Control Regulations 2008 establishes that noise from power tools (i.e. pressure washer) shall not be audible within a habitable room in any residential premises outside the following operation time periods:

- 7am to 8pm Monday to Saturday.
- 8am to 8pm on Sundays.

Therefore, it is recommended, whenever possible, the pressure washer shall only be used during these hours.

4.3 EXTERNAL TERRACE

The Level 1 terrace (refer to Figure 4) faces to the place of worship lot to the north-east of the proposed development. As per terrace surface (69 m²), there will be a limited number of persons in the terrace at any given time (140 persons) and it is assumed that activities will not produce excessive noise levels.

It is assumed that the vocal effort of people communicating in the terrace will generally be 'normal' speech. The noise assessment has considered the following:

- Persons talking 'normal' speech to provide worst-case scenario.
- For every two persons only one will be speaking at any given time with a 'normal' voice.

The L_{A10} noise level (at 1 m) of 60 persons talking simultaneously is approximately 75 dB(A). The L_{AFmax} sound level for persons is assumed to be approximately 5 dB higher that the L_{A10} level – i.e the L_{AFmax} from 60 persons talking with a 'normal' speech would be approximately 80 dB(A).

The noise assessment has considered the impact to the place of worship during evening time, and the impact to the nearest residential receiver during night-time – sleep disturbance.

Calculation	Overall A-weighted noise level, in dB(A)
L_{A10} of 60 persons talking with 'normal' speech at 1 m $$	75
Distance (33 m) attenuation, dB	-30
Building attenuation / reflections / directivity, dB	3
$L_{\mbox{\scriptsize Aeq}}$ resulting at the façade	48
NPI Criteria Evening time / Complies?	50 / Yes

Table 11: Noise assessment at place of worship receiver from Level 1 terrace persons with 'normal' speech.



Calculation	Overall A-weighted noise level, in dB(A)
$L_{\mbox{\scriptsize AFmax}}$ of 60 persons talking with 'normal' speech at 1 m	80
Distance (56 m) attenuation, dB	-35
Building attenuation / reflections / directivity, dB	3
L _{AFmax} resulting at the façade	48
NPI Sleep Disturbance Criteria / Complies?	52 / Yes

 Table 12: Sleep disturbance noise assessment at nearest residential receiver from Level 1 terrace persons with 'normal' speech.

The predicted L_{Aeq} noise level from the use of the Level 1 terrace to the place of worship is 48 dB(A), being met the noise level criterion. The predicted L_{AFmax} noise level to the nearest residential receiver is 48 dB(A), meeting the noise level criterion.

Therefore, it can be stated that the noise emissions from the Level 1 terrace to the nearest noise sensitive receivers will meet the noise level criteria.

4.4 NOISE EMISSIONS FROM BUILDING ACTIVITY

Other noise sources associated with the building activity could have a noise impact at the nearest noise sensitive receivers. In order to limiting the noise nuisance, following strategies should be considered:

- Waste / recycling disposal should be limited to the least sensitive periods (i.e. day time period) where possible.
- Use of the external terrace must be managed to control noise emissions.
- It is recommended to minimise at all times of the day and night, whenever possible, the use of patrolcar sirens within the car-park and driveway.



5 EXTERNAL NOISE IMPACT ASSESSMENT

5.1 NOISE INTRUSION FROM ROAD TRAFFIC

Noise from Albert Street will be the key traffic noise source affecting to the proposed development. There are no traffic data for Albert Street and we assume that traffic flow along Albert Street is intermittent and low. Therefore, traffic noise break-in will not be an issue if a typical façade design is proposed for the building façade.

During the detail design phase of the project, the acoustic performance of the building façade shall be reviewed as cumulative noise from mechanical services plus noise from road traffic could exceed the internal design sound levels.

5.2 INTERNAL DESIGN SOUND LEVELS

Noise generated by building services, particularly the air-conditioning and ventilation systems, needs to be considered to ensure that the internal noise levels for each space of the Police Station meet the ambient noise levels as per NSW Police Building Code Room Data Sheets.

In order to achieve the internal noise levels for each space, noise control treatments will need to be incorporated into the mechanical systems as required.



6 SUMMARY AND CONCLUSIONS

A noise assessment has been carried out for the proposed development at 83 Albert Street, Taree. This report forms part of the documentation package to be submitted to local authorities as part of the DA process.

This report establishes relevant noise level criteria, details the acoustic assessment and provides comments and recommendations for the proposed development.

The noise assessment has adopted methodology from relevant guidelines, standards and legislation to assess noise impact. The noise impacts have been predicted at the nearest noise sensitive receiver boundaries, taking in account distance attenuation, building reflections and directivity.

At this stage, mechanical plant selections have not been made. Therefore, a detailed assessment has not been able to be carried out. A preliminary review has been carried out for the plant room, and based on the most restrictive criteria, noise emissions form the plant room shall be limited to 69 dB(A) at 1 meter of the plant room boundaries. Recommendations have been provided to minimise the impact of external noise emissions associated with the mechanical plant of the proposed development to the nearest sensitive receivers.

The car-park noise impact due to vehicle movements (including sleep disturbance assessment) associated with the Police Station is anticipated to meet the noise criteria. This extends to traffic noise impact due to traffic generated by the proposed development.

Based on the NSW POEO NCR, recommended use hours have been detailed to minimise the noise impact of the pressure washer to the nearest noise sensitive receivers.

External noise impact from traffic noise is expected to be insignificant. Therefore, traffic noise break-in levels are not expected to exceed the established noise criteria within the premises.

Even though no assessment can be considered as being thorough enough to preclude all potential environmental impacts, having given regard to the above listed conclusions, it is the finding of this assessment that the development application should not be refused on the grounds of excessive noise generation.

The information presented in this report shall be reviewed if any modifications to the features of the development specified in this report occur, including and not restricted to selection of mechanical plant, modifications to the building and introduction of any additional noise sources.

