



Wilcannia Weir Replacement
Noise and Vibration Impact Assessment

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Water Infrastructure NSW



Wilcannia Weir Replacement

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Executive summary

Background

Water Infrastructure NSW proposes to replace the existing Wilcannia Weir on the Darling River (Baaka) at Wilcannia, with a new weir located about five river kilometres downstream of the existing weir (the proposal). The existing weir would also be removed as part of the proposal. The Secretary's Environmental Assessment Requirements (SEARs) for the proposal identified noise and vibration as a key matter requiring assessment. Consistent with the SEARs, an assessment was completed in accordance with the *Interim Construction Noise Guideline* (ICNG) (Department of Environment and Climate Change, 2009), *Construction Noise and Vibration Guideline* (Roads and Maritime Services, 2016) and *Assessing Vibration: a technical guideline* (Department of Environment and Conservation, 2006) to identify and evaluate the potential for noise and vibration-related impacts during the construction of the proposal.

Key features of the existing environment

A review of available information was completed to characterise key features of the existing environment. Aerial imagery was reviewed to identify sensitive receivers around the proposal. Nearby heritage structures that can be more sensitive to vibration were identified by reviewing the Aboriginal Cultural Heritage Assessment Report and Statement of Heritage Impact (non-Aboriginal) prepared for the proposal. In lieu of monitored background noise levels, minimum rating background levels from the *Noise Policy for Industry* (Environment Protection Authority, 2017) were used for the purpose of the assessment.

Estimation of emissions

Construction staging and equipment information provided by Water Infrastructure NSW were used to develop noise emissions inventories. Based on the inventories, reference sound power levels from various standards and guidelines were used to estimate overall sound power levels for different phases of construction. These inventories were also used as the basis for safe setback guidance for avoiding vibration-related building cosmetic structural and human health impacts.

Assessment of impacts

Noise impacts during construction were quantitatively evaluated by developing a site noise model using the SoundPLAN acoustic software package. Predicted noise levels at surrounding sensitive receivers were compared against noise management levels developed using guidance from the ICNG (Department of Environment and Climate Change, 2009) and *Assessing Vibration: a technical guideline* (Department of Environment and Conservation, 2006), as well as other relevant standards to evaluate the potential for impacts. The assessment indicated that additional mitigation measures would be required during the following construction stages:

- The installation and removal of cofferdams at the existing weir during standard hour (7:00am to 6:00pm Monday to Friday, 8:00am to 1:00pm Saturday) works, due to the proposed operation of the vibrating hammer
- The partial removal and decommissioning of the existing weir during standard hour and night-time construction (5:00am to 7:00am), due to the operation of excavator mounted rock breakers
- Piling works at the new weir site due to the operation of the piling rig during night-time works (5:00am to 7:00am)
- The operation of high noise generating equipment at the new weir site, including a tub grinder, pile rigs, vibrating hammers, rock crushing plant, and the operation of dump trucks.

Noise impacts from additional traffic from construction were assessed using Transport for NSW's Construction Noise Estimator tool. It was determined that an increase in traffic noise from additional construction vehicles would not exceed the criterion of 2 decibels above normal traffic. That is, additional noise generated as a result of construction traffic would not be significantly noticeable to the community.

Finally, considering relevant safe setback distance guidance and the location of surrounding receivers, it was determined that the proposal is unlikely to cause vibration impacts to nearby heritage items, as these are predominantly scattered artefacts at a safe setback distance from proposed construction work.

Conclusion and recommendations

Based on the modelling and assessment undertaken in accordance with regulatory guidelines and to meet the requirements of the SEARs, this noise assessment indicated that additional mitigation measures to be considered for the proposal include the application of temporary noise barriers, respite periods and respite offers to residents, and using high noise generating equipment only during standard construction hours (8am to 6pm) wherever possible.

Noise levels from additional traffic generated during construction was determined using Transport for NSW's Construction Noise Estimator. It was determined that additional traffic noise from construction traffic would be low (i.e., 0.2 to 1.5 dB(A)), and within the criterion of 2.1 dB(A). That is, additional traffic generated from construction works would not be significantly noticeable to the community.

Vibration impacts are predicted to be negligible during construction, with the closest sensitive receivers and identified heritage and archaeological items to be at least 100 metres away from either construction site.

Glossary of terms and abbreviations

Term	Definition
AHD	Australian Height Datum
CNVG	<i>Construction Noise and Vibration Guideline</i> (Roads and Maritime Services 2016)
Construction contractor	The entity appointed by Water Infrastructure NSW to undertake the construction of the proposal.
dB	Decibel, the unit used to measure sound level
dB(A)	Unit used to measure 'A-weighted' sound pressure levels. It applies a frequency weighting filter that approximates the human ear response, as our hearing is less sensitive at very low and very high frequencies
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
ICNG	<i>Interim Construction Noise Guideline</i> (Department of Environment and Climate Change, 2009)
LA90	The sound level that is exceeded for 90 per cent of a measurement period. It is recognised as the 'background noise level' in the absence of the noise generating activity being assessed
LAeq(15 min)	The A-weighted continuous sound level in decibels of an activity over a 15-minute period that has the same energy equivalence as the fluctuating sound level occurring
LAFmax	The A-weighted maximum sound level from an activity, measured using the fast time weighting on a sound level meter
Left and right	Reference to the left and right riverbank is with respect to the view in the downstream direction, in accordance with industry practice
NML	Noise management level
NSW	New South Wales
POEO Act	<i>Protection of the Environment Operation Act 1997</i> (NSW)
RBL	Rating background level
River kilometre	Distance along the centreline of a river (i.e., not in a straight line), measured in kilometres
SEARs	Secretary's environmental assessment requirements
The proposal	The Wilcannia Weir Replacement project
VDV	Vibration dose values

1. Introduction

Water Infrastructure NSW proposes to replace the existing Wilcannia Weir on the Darling River (Baaka) at Wilcannia, with a new weir located about five river kilometres downstream of the existing weir (the proposal) (refer to **Figure 1.1**). The existing weir would also be partially removed and decommissioned as part of the proposal. The proposal is located in the Central Darling local government area and would provide a more reliable long-term town water supply for Wilcannia to meet community needs. The proposal is funded by a \$30 million commitment from both the NSW and Commonwealth governments.

1.1 Approval and assessment requirements

The proposal involves the construction and operation of a new weir and the partial removal and decommissioning of the existing weir at Wilcannia and is declared State significant infrastructure under section 2.13 and Schedule 3 of the State Environmental Planning Policy (Planning Systems) 2021. The proposal is subject to assessment in accordance with Part 5 Division 5.2 of the *Environmental Planning and Assessment Act 1979* and the environmental assessment requirements of the Secretary of the NSW Department of Planning and Environment (the SEARs) (SSI-10050), dated 28 August 2020.

The Minister for Planning approves State Significant Infrastructure projects in accordance with section 5.14 of the *Environmental Planning and Assessment Act 1979*.

During planning for the proposal, approval as critical State Significant Infrastructure in accordance with Schedule 3 of the *Water Supply (Critical Needs) Act 2019* was proposed, however the scheduled expiry of this Act on 21 November 2021 means that this is no longer a viable planning approval pathway. Water Infrastructure NSW has advised the Department of Planning and Environment of this change to the planning approval pathway for the proposal and its intention to submit a State Significant Infrastructure application.

The proposal is also determined to be a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and requires approval from the Australian Minister for the Environment.

This report has been prepared by Jacobs Group (Australia) Pty Ltd (Jacobs) as part of the environmental impact statement for the proposal. The environmental impact statement has been prepared to support the application for approval of the proposal and address the SEARs. This noise and vibration impact assessment addresses SEAR number 14 (refer to **Table 1-1**).

The proposal was originally proposed by WaterNSW as the proponent. The proponent changed to Water Infrastructure NSW as of 1 September 2021. This report includes investigations and stakeholder engagement undertaken for the proposal prior to this change.

1.2 Proposal description

The proposed new weir would be located about two kilometres south of the Wilcannia township, and about five river kilometres downstream of the existing weir. The key design features of the proposal are shown in **Figure 1.2** and include:

- A new weir with storage capacity of about 7,832 megalitres of water when the weir gates and fishway gates are closed
- A fixed crest portion of the weir of about five metres high and 21.5 metres wide, next to the left bank (southern side) of the river
- A fishway about 120 metres long and 10.5 metres wide, next to the right bank (northern side) of the river to provide fish passage past the weir

- Remotely operated weir gates (with a manual function) to manage the storage, release and quality of water within the weir pool
- A small recreation area, known as a community river place, at Union Bend
- An upgraded unsealed access track about three kilometres long, between the Barrier Highway and the left side of the new weir (southern side)
- A new unsealed access track about 270 metres long, between Union Bend Road and the right side of the new weir (northern side)
- A permanent maintenance access track about 120 metres long, from the top of the right riverbank extending along the length of the fishway
- An electricity easement about 360 metres long and 20 metres wide, from the existing overhead powerlines on Union Bend Road to a new substation on the right side of the new weir. The substation would connect to a main switchboard installed within a prefabricated concrete switch room at the top of the right riverbank near the weir gates
- Conversion of an existing flow gauging station, located between the new and existing weirs, into a weir pool height gauging station
- Partial removal and decommissioning of the existing weir on the Darling River (Baaka) in the Wilcannia township, situated between Victory Park Caravan Park (left riverbank) and Field Street (right riverbank).

The existing weir pool extends about 61.79 river kilometres along the Darling River (Baaka) upstream from the existing weir. Construction of the new weir would create a new section of weir pool of about 4.92 river kilometres between the new and existing weirs, to extend the total weir pool to about 66.71 river kilometres when the new weir is at the existing full supply level of 65.71 metres Australian Height Datum (AHD).

The new weir would have dual modes of operation: a normal operation mode when the weir would operate at the existing full supply level (65.71 metres AHD), and a drought security operation mode, when it would operate at a new full supply level of 66.71 metres AHD. This temporary increase in the full supply level of one metre would result in the weir pool being one metre deeper and extending about 18.81 river kilometres further upstream than the existing weir pool, to create a weir pool that is about 85.52 river kilometres long (refer to **Figure 1.1**).

In addition to the proposal features described above, the following temporary construction features would be required:

- Construction compounds and materials laydown areas on both sides of the river near the new weir
- A staging area on the left side of the river near the existing weir
- Access tracks down to the bed of the river from both sides of the river at the new weir
- An access track down to the bed of the river from the southern side of the river at the existing weir site (within the Victory Park Caravan Park)
- Cofferdams to create dry work areas within the river channel at both the new and existing weir sites.

The key construction features proposed at the new weir and existing weir are shown in **Figure 1.3** and **Figure 1.4** respectively.

Construction would commence once all necessary approvals are obtained, and the detailed design is complete. It is anticipated that construction would start in early 2023 and take about 12 to 18 months to complete, weather permitting. Partial removal and decommissioning of the existing weir would take about 10 weeks and would occur after construction of the new weir is completed.

1.3 Purpose and scope of this report

The purpose of this report is to assess the potential noise and vibration impacts from constructing and operating the proposal. The report:

- Addresses SEAR number 14 as shown in **Table 1-1**
- Describes the existing environment with respect to noise and vibration
- Assesses the potential impacts of constructing the proposal on sensitive receivers
- Recommends measures to mitigate and manage the impacts identified.

The methodology for the assessment is described in **Section 3**.

Table 1-1 How this assessment addresses SEAR number 14

Requirements	Where addressed in this report
14. Noise and vibration	
Provide a quantitative assessment of the main noise and vibration generating sources during demolition, site preparation, bulk excavation, and construction. Outline measures to minimise and mitigate the potential noise impacts on surrounding occupiers of land.	<p>Section 5 provides a quantitative assessment of construction impacts</p> <p>Section 6 outlines the proposed management and mitigation measures</p>
<p>Relevant policies and guidelines:</p> <ul style="list-style-type: none"> ▪ <i>Noise Policy for Industry</i> (Environment Protection Authority (EPA), 2017) (NPI) ▪ <i>Interim Construction Noise Guideline</i> (Department of Environment and Climate Change, 2009) (ICNG) ▪ <i>Assessing Vibration: a technical guideline</i> (Department of Environment and Conservation, 2006). 	<p>Section 2.2.2 addresses the NPI</p> <p>Section 2.2.1 addresses the ICNG</p> <p>Section 2.2.4 addresses <i>Assessing Vibration: a technical guideline</i>.</p>

1.4 Report structure

The structure of this report is outlined below:

- **Section 1** provides an introduction to the report
- **Section 2** provides an overview of legislation, policies and guidelines applicable to this assessment
- **Section 3** describes the methodology and approach for the assessment and estimates the noise emissions and vibration generated by the proposal
- **Section 4** describes the existing acoustic environment and identifies sensitive receivers near the proposal
- **Section 5** assesses the potential for noise and vibration-related impacts at nearby receivers
- **Section 6** evaluates the significance of the predictions and recommends management and mitigation measures
- **Section 7** provides a conclusion to the assessment.

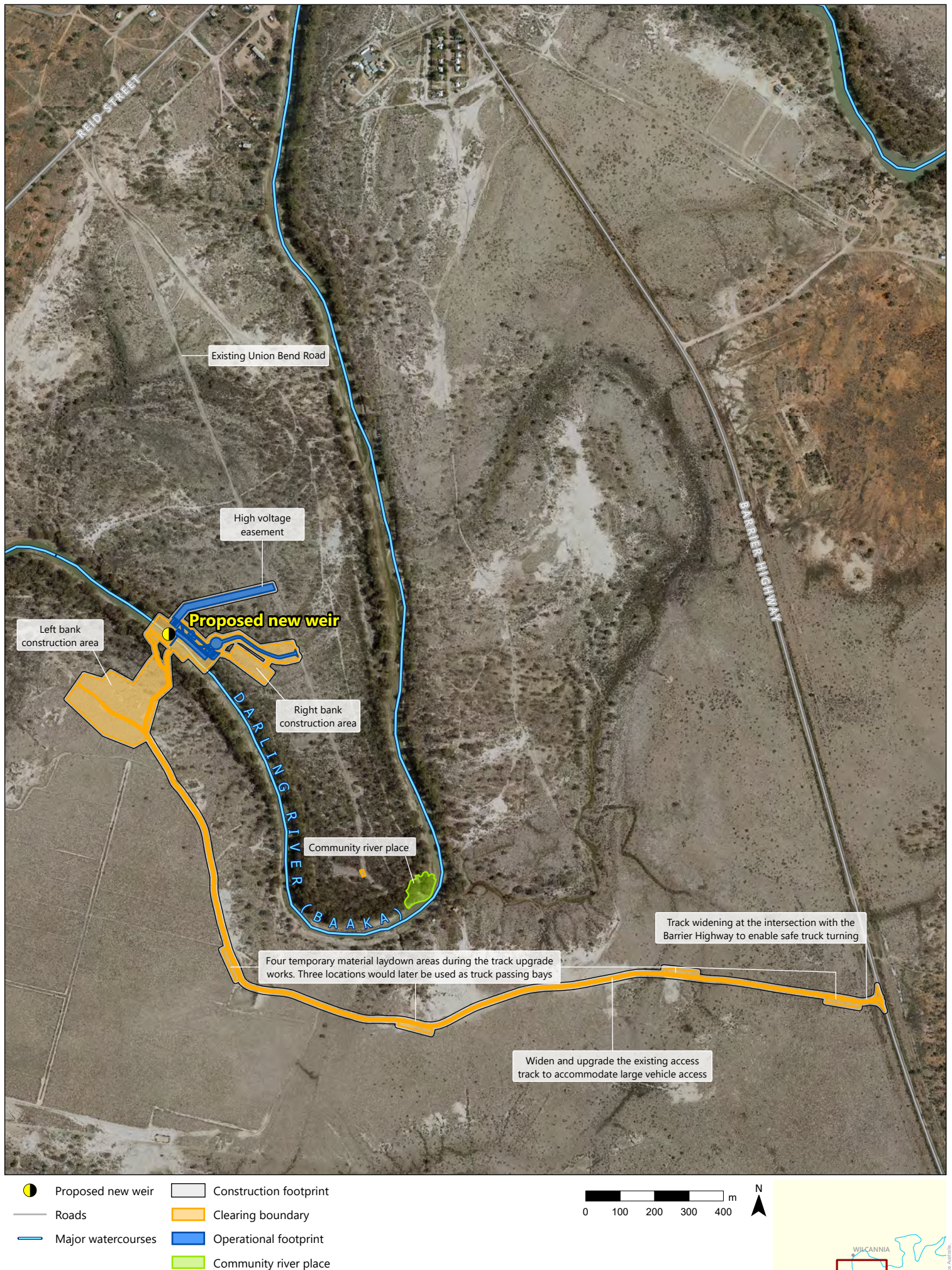
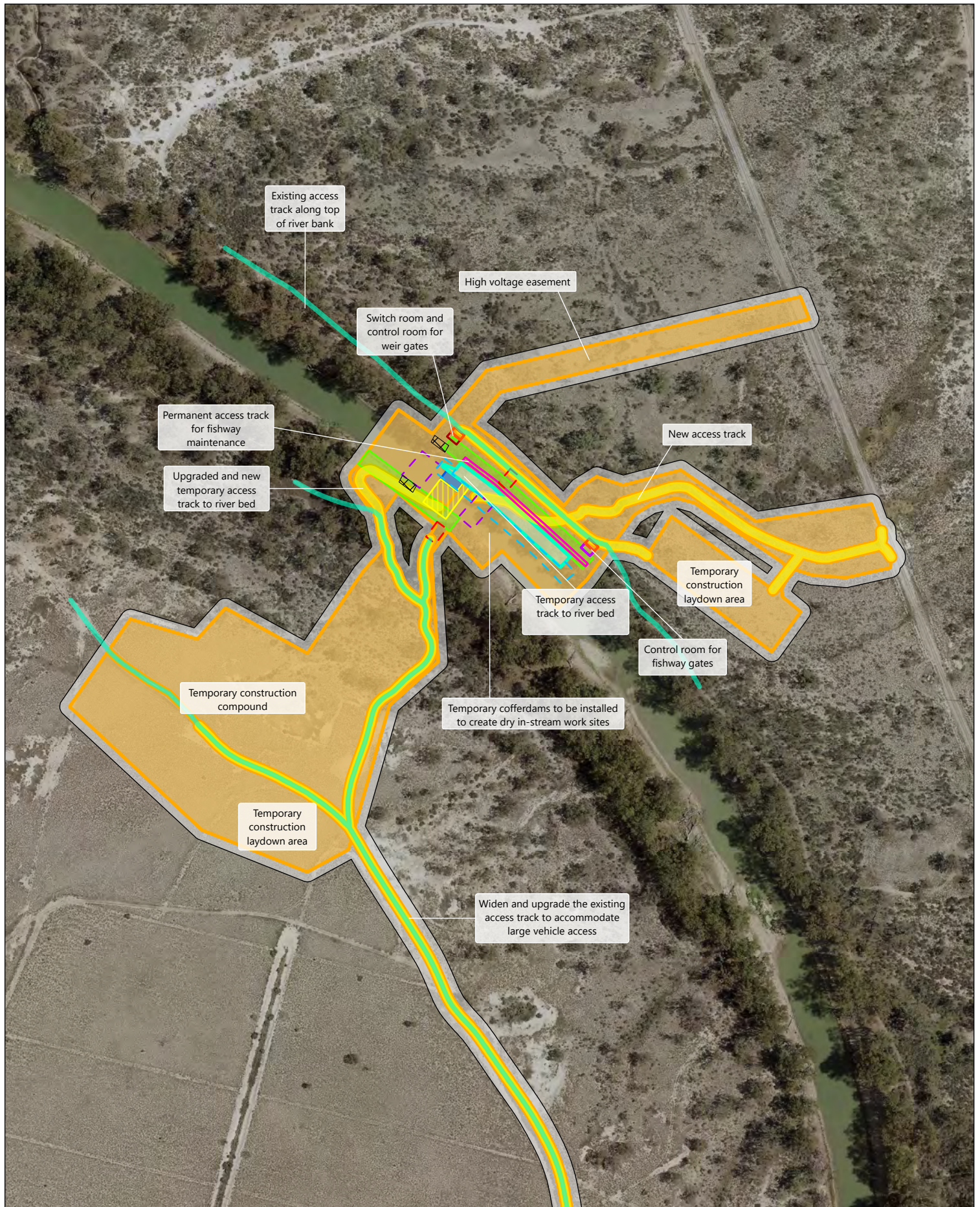


Figure 1-2: Key design features of the proposal – new weir site (overview)



- | | | |
|-----------------------------|--|--|
| Construction footprint | New weir and downstream embankment footprint | Temporary bank reshaping for construction and access |
| Clearing boundary | Parking area | Temporary cofferdam for construction of fishway and right side of weir |
| Temporary crane staging pad | Permanent access track for fishway maintenance | Temporary cofferdams for construction of left side of weir |
| Construction access tracks | Plunge pool | Temporary wharves |
| Existing access tracks | Switch room | Weir crest |
| Crane staging pad | | |
| Fishway gate control room | | |

0 25 50 75 100 m

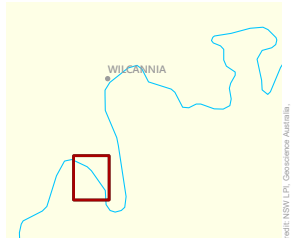


Figure 1-3: Key construction features – new weir site (detail)

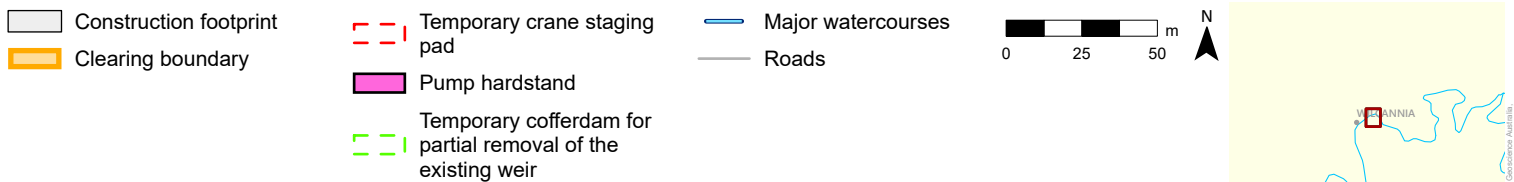


Figure 1-4: Key construction features - existing weir site

2. Legislative and policy context

2.1 NSW legislation

2.1.1 Environmental Planning and Assessment Act 1979

As noted in **Section 1**, the proposal is State significant infrastructure and subject to the provisions of Part 5 Division 5.2 of the *Environmental Planning and Assessment Act 1979*. As State significant infrastructure, the proposal needs to be approved by the Minister for Planning and the application for approval needs to be supported by an environmental impact statement. SEARs have been provided to Water Infrastructure NSW by the Department of Planning and Environment. SEAR number 14 is relevant to noise and vibration and is provided in **Table 1-1**.

2.1.2 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) is administered by the Environment Protection Authority. The POEO Act regulates air and water pollution, noise control and waste management. The Act contains pollution controls and requirements for granting environment protection licences. Schedule 1 of the Act lists activities that require an environment protection licence. The proposal is not of a kind listed in Schedule 1 of the POEO Act and would not require an environment protection licence under this schedule. In accordance with section 43(d) of the POEO Act, an environment protection licence may also be issued to control the carrying out of a non-scheduled activity for the purpose of regulating water pollution.

Construction activities must comply with the requirements of the POEO Act. Section 139 of the Act relates to the operation of plant and noise pollution and requires that plant be operated in a proper and efficient manner and maintained in an efficient condition.

2.2 Regulatory policies and guidelines

2.2.1 Interim Construction Noise Guideline

The ICNG (Department of Environment and Climate Change, 2009) was developed by a number of NSW state agencies along with extensive public consultation. The guideline was developed to apply a range of work practices suited to minimise the impacts of construction noise. The guideline covers the construction, maintenance or renewal activities carried out by a public authority (section 6 of the POEO Act), including public roads, rail and other urban infrastructure. The methodology provided by the guideline which has been applied to this assessment includes:

- Identifying sensitive land uses
- Identifying the hours of works for proposed construction works
- Identifying noise impacts at sensitive land uses
- Selecting and applying the best work practices to minimise noise impacts.

The guideline also sets out the method to determine noise management levels for each sensitive land use types, including residential, commercial, educational, medical and others. This is detailed further in **Section 3.3.1**.

The *Draft Construction Noise Guideline* (Environment Protection Authority, 2020) is currently being developed and is in the process of public review and feedback. A review of this document indicates that the derivation of noise management levels (NMLs), or the application and quantitative methodology for this proposal has not changed from the ICNG, except for the addition of an out of hours 'highly noise affected' noise level of 65 dB(A). As this updated Construction Noise Guideline is yet to be released, it has not been included in this assessment.

2.2.2 Noise Policy for Industry

The *Noise Policy for Industry* (Environment Protection Authority, 2017) provides guidance in minimising intrusive sound from operational industrial noise sources. The *Noise Policy for Industry* is non statutory and sets assessment noise levels and thresholds through consistent methods and best practice measures. The *Noise Policy for Industry* also sets out minimum rating background levels (RBLs), especially for rural areas where measured noise levels can be inconsistent (i.e. night-time background noise levels higher than daytime measured levels). These minimum RBLs are based on best practice measures, community consultation and research and have been adopted for this assessment, as detailed in **Section 4.1.3**.

2.2.3 Construction Noise and Vibration Guideline

The *Construction Noise and Vibration Guideline* (Roads and Maritime Services, 2016) (CNVG) outlines guidance for assessing and mitigating construction noise and vibration for some types of projects, particularly for road transport construction projects. The CNVG is non-statutory and can be used as an additional reference in the assessment of construction projects State-wide to manage and mitigate noise and vibration impacts from construction projects.

The CNVG presents additional mitigation measures for cases where predicted noise levels are over NMLs by certain value bands. This approach provides a transparent and equitable basis for noise management, and although this is not a road transport construction project, has been considered in the absence of other equivalent guidance on this basis. These mitigation measures are detailed in **Section 6** and the CNVG approach to additional mitigation has been used as a guidance for this assessment.

It is important to note that the assessment methodology and the noise mitigation measures described in the CNVG are not mandatorily applicable for this project, consequently the recommendations in this report based on the CNVG should be regarded as optional and implemented when considered to be appropriate, reasonable and feasible for the proposal.

2.2.4 Assessing Vibration: a technical guideline

Assessing Vibration: a technical guideline (Department of Environment and Conservation, 2006) is based on guidelines contained in British Standard BS 6472–1992 *Evaluation of human exposure to vibration in buildings (1–80 Hz)*. This guideline presents preferred and maximum vibration values for use in assessing human responses to vibration and provides recommendations for measurement and evaluation techniques. The vibration criteria set out in this guideline have been adopted for this assessment, as further detailed in **Section 3.3.4**, although this assessment references the latest version of BS6472 which was published in 2008, after publication of *Assessing Vibration: a technical guideline* (2006).

2.2.5 Australian Standard AS2187.2 – 2006 Explosives – Storage and use Part 2: Use of explosives

Australian Standard AS2187.2 – 2006 *Explosives – Storage and use Part 2: Use of explosives* provides frequency-dependent guide levels for cosmetic damage to structures arising from vibration. These levels are adopted from British Standard BS7385:1990 *Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from groundborne vibration* and are detailed further in **Section 3.3.4**.

3. Methodology

3.1 Proposal setting

The proposal is to be undertaken across two construction sites as presented in **Table 3-1** and **Figure 3.1**. The existing weir site is located within the Wilcannia township, with the nearest sensitive receivers located 100 metres to the east of the site, on Ross Street, Wilcannia. The new weir construction site is proposed to be about five river kilometres downstream of the existing weir, and about two kilometres south of the Wilcannia township. **Figure 3.1** shows the location of the proposal relative to the closest sensitive receivers.

Table 3-1 Proposal setting

Site	Description	Location	Distance to nearest sensitive receivers in Wilcannia
Site 1	New weir construction area	Located on a reach of the Darling River (Baaka) downstream of Union Bend, about five river kilometres downstream of the existing weir, and about two kilometres south of the Wilcannia township	1.5 kilometres
Site 2	Existing weir partial removal and decommissioning area	The Darling River (Baaka), about 400 metres north-east of the Wilcannia Bridge crossing into Wilcannia. The site is about 120 metres south-west of Ross Street	100 metres

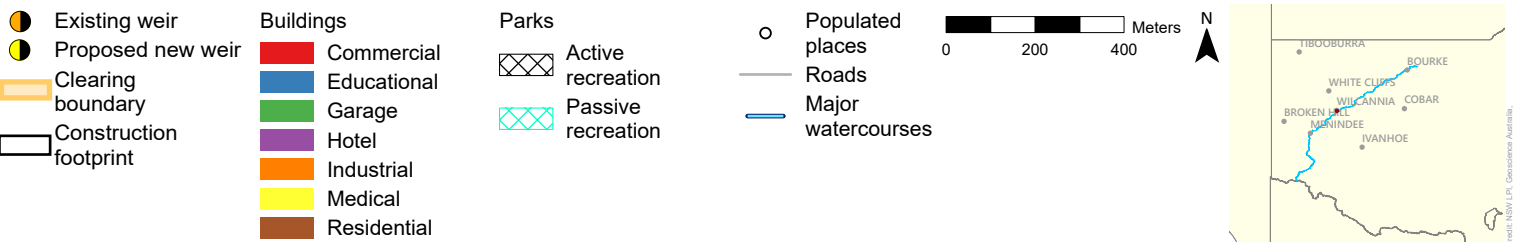
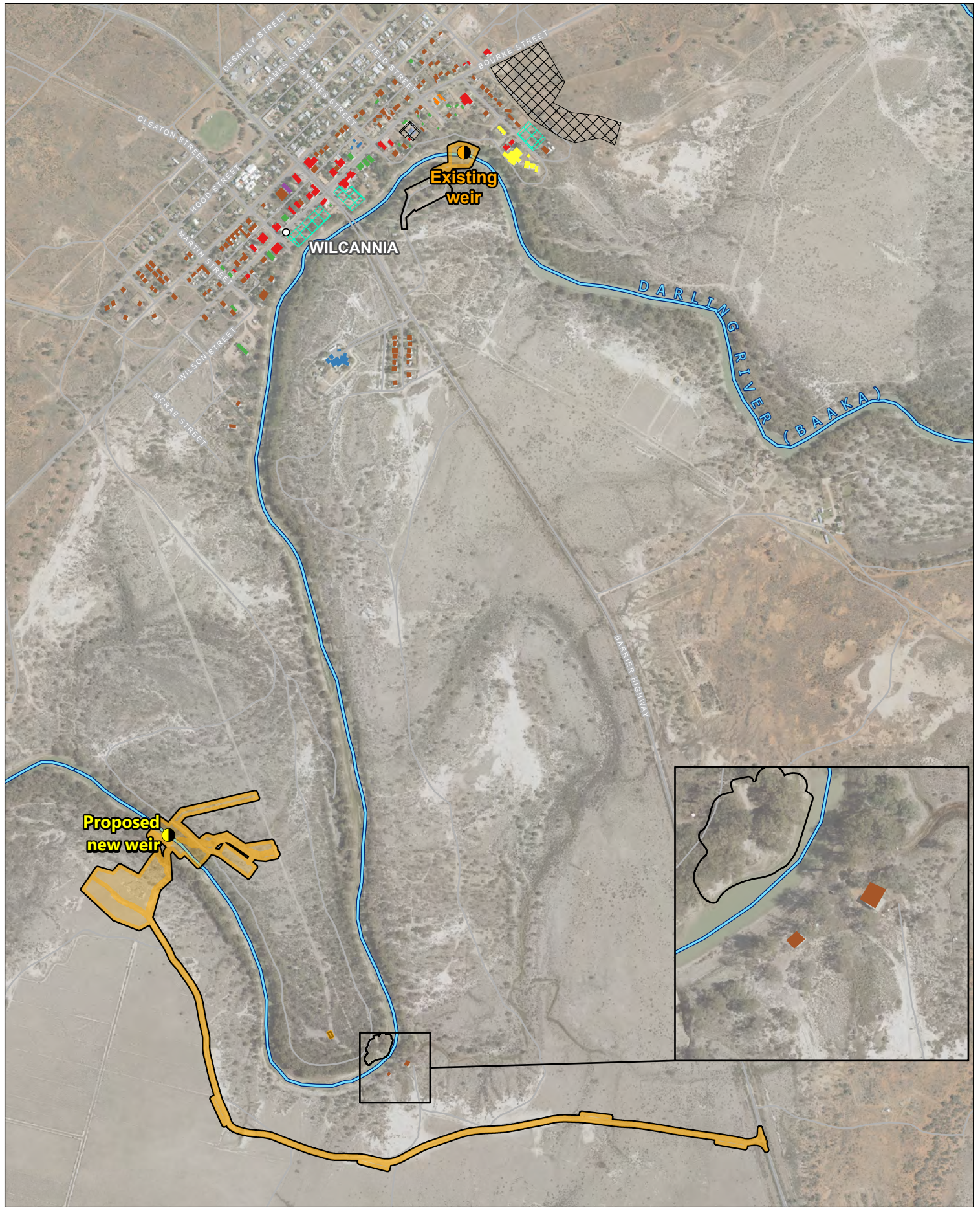


Figure 3-1 Proposal location and sensitive receivers

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3.2 Assessment approach

The construction noise and vibration assessment involved the following tasks:

- Identifying and classifying sensitive receivers
- Characterising the existing noise environment based on RBLs
- Determining noise and vibration management levels in accordance with relevant guidelines
- Identifying potential noise sources during construction, including a list of likely construction activities and equipment/plant
- Defining construction scenarios and developing representative 'realistic worst-case' scenarios with indicative durations of impact, based on the assumption that several items of construction equipment would be used at the same time within individual construction scenarios
- Undertaking noise modelling using SoundPLAN software for the identified construction scenarios and likely equipment that would be operating
- Assessing the potential for traffic noise impacts from construction traffic
- Assessing the potential for vibration from construction plant and equipment
- Identifying any structures within the minimum vibration distances
- Assessing the significance of predicted noise levels by comparing the modelling results to the management levels/criteria
- Identifying measures to mitigate predicted exceedances of noise or vibration management levels/criteria.

3.3 Noise and vibration management levels

3.3.1 Noise management levels

The ICNG (Department of Environment and Climate Change, 2009) provides guidance for assessing noise from construction activities in NSW. It establishes noise management levels (NMLs) according to the hours in which construction may take place. Construction is considered to have the potential to cause a noise impact if the predicted noise levels are above the noise management levels. **Table 3-2** lists ICNG guidance for establishing construction NMLs at residential receivers.

Table 3-2 ICNG guidance for establishing construction NMLs at residential receivers

Time of day	Management level $L_{Aeq}(15 \text{ min})$	How to apply
Recommended standard hours: <ul style="list-style-type: none"> ▪ Monday to Friday 7am to 6pm ▪ Saturday 8am to 1pm ▪ No work on Sundays or public holidays 	Noise affected RBL + 10 dB(A)	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured $L_{Aeq}(15 \text{ min})$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise.

Time of day	Management level $L_{Aeq}(15 \text{ min})$	How to apply
		Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours – All other times including public holidays	Noise affected $RBL + 5 \text{ dB(A)}$	<p>A strong justification would typically be required for works outside the recommended standard hours.</p> <p>The proponent should apply all feasible and reasonable work practices to meet the noise affected level.</p> <p>Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community.</p> <p>For guidance on negotiating agreements see section 7.2.2 of the ICNG.</p>

Source: ICNG (Department of Environment and Climate Change, 2009)

Table 3-3 presents the rating background levels (RBLs) adopted for this assessment and the consequent NMLs. The NMLs presented were established to assess potential construction noise impacts at the identified surrounding residential receiver locations.

The method for determining the RBLs for this assessment is detailed in **Section 4**.

Table 3-3 ICNG NMLs for residential receivers

Day (during standard hours)		Day (outside standard hours)		Evening		Night	
L_{A90} (RBL) dB(A)	NML $L_{Aeq} 15 \text{ min}$ dB(A)	L_{A90} (RBL) dB(A)	NML $L_{Aeq} 15 \text{ min}$ dB(A)	L_{A90} (RBL) dB(A)	NML $L_{Aeq} 15 \text{ min}$ dB(A)	L_{A90} (RBL) dB(A)	NML $L_{Aeq} 15 \text{ min}$ dB(A)
35	45	35	40	30	35	30	35

Source: ICNG (Department of Environment and Climate Change, 2009)

The ICNG also provides construction NMLs for non-residential land uses. This guidance is presented in **Table 3-4** for the relevant non-residential receivers identified within the study area.

Table 3-4 ICNG NMLs for non-residential receivers

Non-residential receiver type	Noise management level, $L_{Aeq}(15 \text{ min})$ (applies when properties are being used)
Offices, retail outlets	External noise level – 70 dB(A)
Industrial premises	External noise level – 75 dB(A)
Classrooms at schools and other educational institutions	Internal noise level – 45 dB(A)

Non-residential receiver type	Noise management level, $L_{Aeq}(15min)$ (applies when properties are being used)
Hospital wards and operating theatres	Internal noise level – 45 dB(A)
Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	External noise level – 65 dB(A)
Passive recreation areas (characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External noise level – 60 dB(A)

Source: ICNG (Department of Environment and Climate Change, 2009)

Windows often allow the greatest amount of sound transmission from outside to inside across a building façade. Noting guidance presented in Australian Standard AS2436-2010 *Guide to noise and vibration control on construction, demolition and maintenance sites*:

Where rooms are ventilated by an opened window a transmission loss of 10 dB(A) would apply.

Considering this, an external (free-field) NML of 55 dB(A) was conservatively applied at the identified surrounding educational and medical receivers.

For temporary accommodation type receivers (e.g., hotels) the ICNG refers to guidance presented in Australian / New Zealand Standard AS/NZS 2107:2016 *Acoustics: Recommended design sound levels and reverberation times for building interiors*. For sleeping areas within temporary accommodation facilities AS/NZS 2107:2016 provides a maximum design target value of 35 dB(A). Therefore, a night-time NML of 35 dB(A) was applied for Graham's Motel, located at 2 Myers St, Wilcannia.

3.3.2 Construction traffic noise impacts

Section 9 of the CNVG (Roads and Maritime Services, 2016) provides guidance for the assessment of noise associated with additional traffic generated during construction. This guidance was adopted for this assessment as presented below:

For Roads and Maritime Services projects an initial screening test should first be applied by evaluating whether noise levels will increase by more than 2dB(A) due to construction traffic or a temporary reroute due to a road closure. Where increases are 2dBA or less no further assessment is required.

Where noise levels increase by more than 2dB(A) [i.e., 2.1 dBA] further assessment is required using Roads and Maritimes Criteria Guideline. This documents Roads and Maritime Services' approach to implementing the Road Noise Policy. Consideration should be given under the Noise Criteria Guideline as to whether construction traffic or temporary reroute triggers new road criteria due to changes in road category.

This guidance was considered appropriate for the purpose of reviewing potential noise associated with additional traffic generated as a result of the proposal during the construction phase.

3.3.3 Sleep disturbance

Section 4.3 of the ICNG discusses the method for assessing and managing sleep disturbance. This guidance references further information in the *NSW Road Noise Policy* (Department of Environment, Climate Change and Water, 2011) that discusses criteria for the assessment of sleep disturbance.

Where noise levels from a construction (or industrial) source at a residential receptor at night exceeds the following, a maximum noise level event assessment should be undertaken:

- $L_{Aeq,15min}$ 40 dB(A) or the RBL + 5 dB(A), whichever is greater, and/or;
- L_{AFmax} 52 dB(A) or the RBL + 15 dB(A), whichever is greater.

Based on this guidance, a sleep disturbance screening criterion of $L_{Aeq,15min}$ 40 dB(A) was applied.

3.3.4 Vibration

Vibration arising from construction activities can result in impacts on human comfort or the damage of physical structures such as dwellings. These two outcomes have different criteria levels, and are assessed using different measurement parameters.

Human comfort

With respect to human comfort, vibration arising from construction activities can be assessed against criteria presented in *Assessing Vibration: a technical guideline* (Department of Environment and Conservation, 2006) and British Standard BS6472-1: 2008 *Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration sources other than blasting*. The technical guideline identifies three different forms of vibration associated with construction activities:

- Continuous: uninterrupted vibration occurring over a defined period
- Impulsive: short-term (typically less than two seconds) bursts of vibration which occurs up to three times over an assessment period
- Intermittent: interrupted periods of continuous or repeated impulsive vibration, or continuous vibration that varies significantly in magnitude.

Continuous vibration may result from steady road traffic or steady use of construction equipment (e.g. a generator). Impulsive vibration may arise during the loading or unloading of heavy equipment or materials or infrequent use of hammering equipment. Intermittent vibration may arise from the varied use of construction equipment (i.e. a dump truck moving around a site, idling while being loaded with materials, and then dumping the materials) or repeated high-noise activities such as hammering, piling or cutting. Preferred and maximum values of human exposure for continuous and impulsive vibrations are provided in **Table 3-5**.

Table 3-5 Preferred and maximum weighted root mean square values for continuous and impulsive vibration acceleration (m/s^2) 1-80 Hertz (Hz)

Location	Assessment period ¹	Preferred values		Maximum values	
		z-axis	x and y axis	z-axis	x and y axis
Continuous vibration					
Critical areas ²	Day or night	0.0050	0.0036	0.010	0.0072
Residences	Day	0.010	0.0071	0.020	0.014
	Night	0.007	0.005	0.014	0.010
Offices, schools, educational institutions and places of worship	Day or night	0.020	0.014	0.040	0.028
Impulsive vibration					
Critical areas ²	Day or night	0.0050	0.0036	0.010	0.0072
Residences	Day	0.30	0.21	0.60	0.42
	Night	0.10	0.071	0.20	0.14

Location	Assessment period ¹	Preferred values		Maximum values	
		z-axis	x and y axis	z-axis	x and y axis
Offices, schools, educational institutions and places of worship	Day or night	0.64	0.46	1.28	0.92
Workshops	Day or night	0.64	0.46	1.28	0.92

Notes:

¹ Daytime is 7am to 10pm. Night-time is 10pm to 7am

² Includes hospital operating theatres or precision laboratories.

Source: *Assessing Vibration: a technical guideline* (Department of Environment and Conservation, 2006)

Intermittent vibration is assessed differently using vibration dose values (VDV). Preferred and maximum VDV for different types of receivers are presented in **Table 3-6**.

Table 3-6 Preferred and maximum VDV for intermittent vibration ($\text{ms}^{-1.75}$)

Location	Day time (7 am to 10 pm)		Night-time (10 pm to 7 am)	
	Preferred VDV	Maximum VDV	Preferred VDV	Maximum VDV
Critical areas ¹	0.10	0.20	0.10	0.2
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

Notes:

¹ Includes operating theatres, precision laboratories and other areas where vibration-sensitive activities may occur.

Source: *Assessing Vibration: a technical guideline* (Department of Environment and Conservation, 2006)

Buildings and structures

Section J4.4.3 of Australian Standard AS2187.2 – 2006 *Explosives – Storage and use Part 2: Use of explosives* provides frequency-dependent guide levels for cosmetic damage to structures arising from vibration. These levels are adopted from British Standard BS7385 1990 *Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from groundborne vibration* and are presented in **Table 3-7**.

Table 3-7 Transient vibration guideline values for cosmetic damage

Type of building	Peak particle velocity (ppv) mm/s		
	4 to 15 Hz	15 to 40 Hz	40 Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50		
Un-reinforced or light-framed structures Residential or light commercial type buildings	15 to 20	20 to 50	50

Source: Australian Standard AS2187.2 – 2006 *Explosives – Storage and use Part 2: Use of explosives*

Guidance for more sensitive structures is presented in the German standard DIN 4150-3:2016 *Vibrations in buildings – Part 3: Effects on structures*. Vibration velocities not exceeding 3 mm/s at frequencies between 1 to 10 Hz are recommended in this standard.

Construction noise and vibration guideline

Section 7 of the CNVG provides guidance for safe working distances to achieve human comfort (*Assessing Vibration: a technical guideline* (Department of Environment and Conservation, 2006)) and cosmetic damage (BS7385-2:1993) criteria for a range of different plant and equipment. These have been reproduced for the relevant vibration-generating plant intended to be used during the proposal in **Table 3-8**.

Table 3-8 Recommended safe setback distances

Plant	Rating / description	Safe working distance (metres)	
		Cosmetic damage (BS7385-2: 1993)	Human response (Department of Environment and Conservation, 2006)
Vibratory pile driver	Sheet piles	2 to 20 metres	20 metres
Large hydraulic hammer	(1600 kg – 18t to 34t excavator)	22 metres	73 metres
Jackhammer	Hand held	1 metre (nominal)	2 metres

Source: CNVG (Roads and Maritime Services, 2016)

3.4 Noise assessment inputs

3.4.1 Construction staging and plant

Overall sound power levels were predicted for each phase of construction. Each construction stage is assumed to operate at independent times from other stages, and operations within construction compounds are assumed to be active throughout all construction stages after preconstruction works. Construction stages were determined based on sequencing and plant and equipment provided by Water Infrastructure NSW. The overall sound power levels were estimated with reference to individual plant and equipment levels presented in national and international standards and guidelines, as well as from Jacobs' sound power level database. **Table 3-9** summarises estimated overall noise emissions for each construction stage.

3.4.2 Construction timings

Construction works at the new and existing weir sites would mostly occur during standard hours where possible. However, at the new weir site, it is expected that the construction contractor may shift construction hours during the summer months (November to February) to work between 5:00am and 4:00pm to reduce work during the hotter parts of the day.

The period between 5:00am and 7:00am is considered as night-time works for this assessment as per the ICNG definition of 'night-time' construction works. Therefore, this assessment has considered the following two assessment periods for construction:

- Standard hours (defined as weekdays 7am to 6pm and Saturdays 8am to 1pm)
- Night-time (defined as all days, 10pm to 7am).

Table 3-9 Estimated noise emissions during construction

Construction stage	Task(s)	Plant/equipment	No. of plant/equipment	Sound power level dB(A)
New weir site				
1. Site preparation	Establish proposed construction compound and material laydown areas	<ul style="list-style-type: none"> Excavators Excavator with tree shear attachment Tub grinder* A-double truck Bulldozer Grader Mechanical roller Watercart 	2 1 1 1 1 1 1 1	118
2. Early works	Upgrade access roads – entire access length from Barrier Highway to proposed work area	<ul style="list-style-type: none"> Transporter to delivery heavy plant (low loader) Excavators Grader Mechanical roller Watercart A-double truck Utes and other site vehicles 	1 2 1 1 1 1 3	120
	Install cofferdam for fishway on the right side of the new weir	<ul style="list-style-type: none"> Excavator with sheet pile driver (piling rig)* 50 to 70 tonne crane Excavators Water pumps Generators 	1 1 2 2 2	123
3a. Fishway construction – sheet piling	Sheet piling for the fishway side wall	<ul style="list-style-type: none"> 160 to 200-tonne crawler crane with vibrating hammer and hydraulic power pack* Excavator with a vibratory attachment Flat-bed truck (sheet piling delivery) Franna crane (unloading sheet piling) 	1 1 1 1	127
3b. Fishway construction – excluding sheet piling	Construction of fishway on the right side of the new weir	<ul style="list-style-type: none"> Excavators Flat-bed trucks for crane delivery and removal 250 to 300-tonne crane Franna crane A-double trucks Utes and other site vehicles Generator 6-inch pump for dewatering 	2 2 1 1 2 2 1 1	116
4. Remove fishway cofferdams, reinstate the right embankment	Remove cofferdams	<ul style="list-style-type: none"> Dump trucks Excavators 	2 2	116
	Reinstate the right embankment	<ul style="list-style-type: none"> Rigid trucks Rock crushing screening plant* Tip trucks Front end loader Excavator 	2 1 2 1 1	122

Construction stage	Task(s)	Plant/equipment	No. of plant/equipment	Sound power level dB(A)
5a. Install cofferdam downstream of the new weir	Install cofferdam	<ul style="list-style-type: none"> Excavator Dump trucks Water pumps Generators 	1 2 2 2	120
5b. Install cofferdam upstream of the new weir	Install cofferdam	<ul style="list-style-type: none"> Excavator Dump trucks Water pumps Generators 	1 2 2 2	120
6. Piling works for the new weir	Sheet piling for the weir wall	<ul style="list-style-type: none"> 160 to 200-tonne crawler crane with vibrating hammer and hydraulic power pack* Excavator with a vibratory attachment Flat-bed truck (sheet piling delivery) Franna crane (unloading sheet piling) 	1 1 1 1	127
7. Concreting works for the new weir	Concreting work	<ul style="list-style-type: none"> Mobile concrete plant A-double truck Cement delivery truck Front end loader Flat-bed delivery truck Franna crane Forklift Concrete agitator trucks Mobile concrete pump Utes and other site vehicles such as tipper trucks Generator 6-inch pump for dewatering Hammer drills (hand tool) Jackhammers* (hand tool) Scabbing guns (hand tool) 	1 1 1 1 1 1 1 2 1 3 1 1 3 3 3	120
8. Weir gates and fishway gates installation	Install the weir gates and the fishway gates	<ul style="list-style-type: none"> Flat-bed truck Franna crane 120 to 150-tonne crane Elevated work platforms Utes and other site vehicles 3-inch pumps for dewatering 	1 1 1 2 2 6	118
9. Install overhead powerlines, remove cofferdams, reinstate left embankment – new weir site	Install overhead powerlines from Union Bend Road	<ul style="list-style-type: none"> Flat-bed truck Transporter to deliver prefabricated components Excavator with auger attachment/piling rig* Pole holding truck Elevated work platform Franna crane 120 to 150-tonne crane Concrete agitator truck 	1 1 1 1 1 1 1 1	116

Construction stage	Task(s)	Plant/equipment	No. of plant/equipment	Sound power level dB(A)
	Remove cofferdams	<ul style="list-style-type: none">▪ Dump trucks▪ Excavator	2 1	121
	Reinstate left embankment	<ul style="list-style-type: none">▪ Rigid trucks▪ Rock crushing and screening plant*▪ Front end loader▪ Excavator	2 1 1 1	121
10. Site rehabilitation	Finishing works and site rehabilitation	<ul style="list-style-type: none">▪ Excavator with rock grab▪ A-double truck	1 1	119
Existing weir site				
11. Site preparation	Establish temporary access track, and install crane pad and pump hardstand areas	<ul style="list-style-type: none">▪ Transporter to delivery heavy machinery	1	120
		<ul style="list-style-type: none">▪ Excavator	1	
		<ul style="list-style-type: none">▪ Articulated dump truck	1	
	Install cofferdam	<ul style="list-style-type: none">▪ 160 to 200-tonne crawler crane with vibrating hammer and hydraulic power pack*▪ Small aluminium boat with outboard motor	1 1	128
	Dewatering	<ul style="list-style-type: none">▪ Skid-mounted pump (daytime use)	1	102
		<ul style="list-style-type: none">▪ Electric pump (night-time use)	1	
		<ul style="list-style-type: none">▪ Generator	1	
12. Partial removal and decommissioning	Partial removal and decommissioning of the existing weir	<ul style="list-style-type: none">▪ Excavators with rock breaking or vibrator attachments*▪ Dump truck▪ A-double trucks▪ Skid-mounted pump (daytime use)▪ Electric pump (night-time use)▪ Generator▪ Concrete saw (hand tool)*	2 1 2 1 1 1 1	130
13. Site rehabilitation	Remove cofferdam	<ul style="list-style-type: none">▪ 160 to 200-tonne crawler crane with vibrating hammer and hydraulic power pack*▪ Small aluminium boat with outboard motor	1 1	128
	Finishing works and site rehabilitation	<ul style="list-style-type: none">▪ Excavator with rock grab▪ A-double truck	1 1	121
Operations in construction compounds	Operations in construction compounds (assumed to operate between stage 2 and stage 8 and during stage 10)	<ul style="list-style-type: none">▪ Flatbed trucks▪ Franna crane▪ Generator	2 1 1	109

*5 dB(A) annoyance penalty included

3.5 Noise model

To evaluate potential noise impacts during construction, a computer noise model was developed using a proprietary environmental acoustics software package. Construction noise was modelled using the SoundPLAN 8.2 acoustic modelling software. Within the noise modelling software, the CONCAWE noise propagation

calculation was applied for dB(A) noise calculations. The CONCAWE calculation was selected due to its reliability in assessing industrial noise impacts. CONCAWE considers noise propagation and attenuation by:

- Geometrical spreading
- Atmospheric absorption
- Ground effects
- Shielding of intervening structures
- Topography and distance between the source and receptor.

Noise level predictions were compared against the NMLs established in **Section 3.3**. Setup details for the site noise model are provided in **Table 3-10**.

Table 3-10 Noise model setup details

Model input	Details
Topography	1 metre resolution contour lines derived from SRTM LiDAR data.
Buildings	Footprints for receiver and other ancillary buildings were determined from aerial photography. Heights were estimated from Google Street view, or otherwise, assuming a building floor height of three metres per level.
Non-building receivers	Set at a height of 1.5 metres around the worst affected areas of these locations.
Ground absorption	Water and barren areas – 0.0 Residential areas – 0.5 Open grassland and vegetation areas – 0.75
Noise sound power levels	As listed in Table 3-9
Meteorology	Standard (construction)
Prediction method	CONCAWE algorithm

3.6 Vibration-generating plant and equipment

Of the plant and equipment expected to be used during construction listed in **Table 3-9**, the piling rig, rock hammer and jackhammer to be used during various stages have the potential for vibration impacts at nearby sensitive receivers and heritage items.

3.7 Primary noise and vibration-related risks

Noise and vibration-related impacts can arise when industry or construction activities result in unacceptable noise and vibration levels at surrounding sensitive receivers. The key activities with the potential to generate noise and vibration during the construction phase of the proposal include:

- Installation of the cofferdam and removal of the cofferdam using a vibrating hammer at the existing weir site
- Rock breaking and concrete sawing works associated with the partial removal of the existing weir
- All piling and concreting works at the new weir site.

Noise and vibration impacts may also arise during the operation of the proposal, such as opening the weir gates. However, given the expected low noise levels of operational activities and the setback distances to the nearest sensitive receivers, operational noise has not been considered further in this assessment. This is consistent with the requirement of the SEARs which focused on the assessment of potential for noise and vibration impacts during construction.

4. Existing environment

4.1.1 Surrounding land uses and receivers

The proposed new weir site is surrounded by bushland in all directions. Land on the left riverbank at the new weir site is occupied by Wilcannia Local Aboriginal Land Council and land on the right riverbank is Crown land. Development that has occurred on this land includes vehicle access tracks and, on the Crown land only, town emergency water supply boreholes at the south-eastern end of Union Bend Road and powerlines alongside this road that connect to these boreholes. The nearest sensitive receivers to the new weir site are located on the land occupied by Wilcannia Local Aboriginal and are about one kilometre to the south-east of the new weir site, on the southern (left) riverbank where the river starts bending to head north. The next nearest sensitive receivers are on the southern edge of the town on Reid Street.

The existing weir is located on the north-eastern side of the town. The nearest sensitive receiver to the proposal work areas is Wilcannia Hospital, located on the right riverbank about 100 metres east of the existing weir site. The nearest residential receivers are located on Field Street on the right riverbank and are about 100 metres north of the existing weir site. Other residential receivers are located on Reid Street and Ross Street to the west, north and east. There are also industrial, commercial and recreational receiver locations near the proposal on the right riverbank including Wilcannia Golf Club and Reconciliation Park, both on Ross Street.

Victory Park Caravan Park is located on the left riverbank to the south of the existing weir. Water Infrastructure NSW proposes to lease the caravan park during the works required to partially remove and decommission the existing weir. As a result, there would be no sensitive receivers at the caravan park during the works to partially remove and decommission the existing weir. Therefore, the caravan park has not been considered as a sensitive receiver for this assessment.

In addition to the above sensitive receivers that are nearest to the works, other sensitive receivers potentially impacted by the works are occupants of buildings along the routes used by construction traffic.

Appendix A lists individual receiver identifiers for each receiver shown in **Figure 3.1**.

4.1.2 Vibration-sensitive receivers

Whilst all receivers and surrounding structures are sensitive to vibration impacts, heritage items and precision industries¹ are typically more susceptible and are subject to more stringent criteria. A review of the Aboriginal Cultural Heritage Assessment Report (refer to **Technical Report 4**) and Statement of Heritage Impact (non-Aboriginal) (refer to **Technical Report 5**) prepared for the proposal identified that there are several heritage items nearby to the existing weir site and proposed new weir site. The Aboriginal Cultural Heritage Assessment Report found that most Aboriginal heritage items identified were scattered artefacts, which are not vibration sensitive items.

The closest non-Aboriginal heritage item is Wilcannia Hospital, which is about 100 metres east of the existing weir site, on Ross Street. Other nearby non-Aboriginal heritage items are Wilcannia Golf Club and Reconciliation Park, also both on Ross Street, about 150 metres from the existing weir site. Beyond these items, the next nearest heritage items are all more than 240 metres away and mostly towards the centre of Wilcannia, to the south-west of the existing weir.

¹ Precision industries are those that use equipment that is sensitive to vibration, such as some medical laboratories and scientific measurement laboratories.

4.1.3 Background noise levels

The estimation of background noise levels is necessary to determine the noise sensitivity of an area. In the absence of monitored background noise levels in the area, minimum background noise level guidance based on the *Noise Policy for Industry* (Environment Protection Authority, 2017) was adopted for this assessment as a conservative measure. It is assumed that the study area would only be influenced by intermittent road traffic, with otherwise a low 'urban hum', given the regional setting. The minimum background noise levels specified by the *Noise Policy for Industry* and adopted for this assessment is shown in **Table 4-1**.

Table 4-1 Adopted background noise levels

Day (7am to 6pm)	Evening (6pm to 10pm)	Night (10pm to 7am)
35	30	30

Source: *Noise Policy for Industry* (Environment Protection Authority, 2017)

5. Assessment of impacts

5.1 Construction noise

5.1.1 Existing weir site

- Noise levels were predicted to be above the standard hours NML of 45 dB(A) and the night-time NML of 35 dB(A) at a number of residential receivers during each construction stage at the existing weir site
- Noise levels from the construction stage involving the partial removal and decommissioning of the existing weir were predicted to be above the standard hour and night-time NMLs at most residential receivers, due to the proposed operation of two excavator mounted rock breakers and dump trucks
- Noise levels from the installation and removal of the cofferdam at the existing weir site were also predicted to be above the standard hours and night-time NMLs at a number of surrounding residential receivers, primarily due to the use of a large crane mounted vibrating hammer
- Noise levels from site preparation and site rehabilitation works were also predicted to be above the standard hours and night-time NMLs at some nearby residential receivers, mostly due to dump trucks and A-double trucks on site
- Noise levels at Wilcannia Hospital were predicted to be above the standard hour NML of 55 dB(A) during all construction stages at the existing weir, except for dewatering. Noise levels were predicted to be up to 25 dB(A) above the NML during the partial removal and decommissioning stage, due to the operation of two excavator mounted rock breakers
- Noise levels at Wilcannia Hospital were predicted to be above the night-time NML of 35 dB(A) during night-time works (works before 7am). Noise levels were predicted to be up to 45 dB(A) above the NML, particularly during the operation of two excavator mounted rock breakers, and other heavy vehicles such as dump trucks
- Noise levels at commercial receivers at 9-11 Ross Street, the Central Darling Shire Council Chambers and the Wilcannia Golf Club were predicted to be above the NML of 70 dB(A) during the installation and removal of the cofferdam and the partial removal and decommissioning stage. However, noise levels were predicted to be up to 10 dB(A) above the NML which can be managed through standard mitigation practices on site
- Noise levels at educational receivers TAFE NSW – Wilcannia and St Therese's Community School were predicted to be above the NML of 55 dB(A) during the partial removal and decommissioning stage. However, noise levels were predicted to be only 0 to 5 dB(A) above the NML and therefore can be managed through standard on-site mitigation measures.

5.1.2 New weir site

- Noise levels from all construction stages at the new weir site except for fishway construction, cofferdam removal (for fishway construction), installation of downstream cofferdam and installation of weir and fishway are predicted to be above the standard hour NML at nearby sensitive receivers. All construction stages at the new weir site are predicted to produce noise levels at sensitive receivers, which are above the night-time NML, representing the work period between 5:00am and 7:00am
- During standard hours, only the construction stages involving the preparation of the laydown areas and access road from Barrier Highway result in noise levels over 10 dB(A) above the standard hours NML at sensitive receivers. Only two receivers are impacted by these works, located on the south bank of the river bend, about 280 metres north of the access road from Barrier Highway
- During night-time works, noise levels from site preparation, upgrading site access roads, piling works, reinstating the right bank, concreting and site rehabilitation works were predicted to be above the night-time NML, representing the period between 5:00am and 7:00am. Noise levels were predicted to be up to 15 dB(A) over the night-time NML at most receivers. Only two receivers were predicted to experience noise

levels over 15 dB(A) above the night-time NML, which were those two receivers located on the south bank of the river bend

- Noise levels were not predicted to be above the NML at any non-residential receiver during any construction stage at the new weir site.

Appendix C of the CNVG provides guidance for evaluating the significance of noise levels above the NML from construction. Predicted noise levels less than 10 dB(A) above the NML during standard hours are considered 'clearly audible' but have no recommended additional mitigation measures beyond standard best-practice controls. Predicted noise levels more than 10 dB(A) and less than 20 dB(A) above the standard hours NML are considered 'moderately intrusive' and predicted noise levels over 20 dB(A) above the standard hours NML are considered 'highly intrusive'. For both moderately and highly intrusive noise levels, the CNVG recommends additional mitigation measures, which are further discussed in **Section 6**.

As per Appendix C of the CNVG guideline, noise levels less than 5 dB(A) above the NML during night-time are classified as 'noticeable', and those between 5 dB(A) and 15 dB(A) above the NML are considered to be clearly audible. Noise levels between 15 dB(A) and 25 dB(A) are considered 'moderately intrusive'. In each of these cases, if the noise level exceeds the NML then, reasonable and feasible additional measures beyond standard practice controls are recommended to be implemented. These measures, as well as the standard noise controls for the proposal are presented in **Section 6**.

Table 5-1 and **Table 5-2** presents a summary of predicted noise levels and the at residential receivers during each proposed standard hour construction stage at the existing and new weir sites respectively. Also presented is the number of residential receivers in in each standard hour NML exceedance band as described above.

Table 5-3 and **Table 5-4** present a summary of predicted noise levels and exceedances at residential receivers during each proposed night-time construction stage at the existing and new weir sites respectively. Also presented is the number of residential receivers in in each night-time NML exceedance band as described above.

Figure 5.1 and **Figure 5.2** present the receivers at which noise levels are predicted to be above the NML during the partial removal and decommissioning of the existing weir during standard hours and night-time hours respectively.

Figure 5.3 presents the receivers at which noise levels are predicted to be above the NML during sheet piling works at the new weir site during night-time works (5:00am to 7:00am), as this stage was determined to have the impact to the most receivers of all stages of construction at the new weir site, due to the piling rig.

Appendix A presents the predicted noise levels at each residential receiver considered in this assessment. Those residential receivers where noise levels are predicted to be above the NML are highlighted by which noise band level above the NML they fall within.

Table 5-1 Summary of predicted noise levels at residential receivers during standard hours at the existing weir site

NML daytime standard hours	No. of Residential Receivers	Predicted noise level range and bands above the NML at residential receivers	Construction Stages – existing weir site					
			Establish temporary access track and install crane pad and pump hardstand areas	Install cofferdam	Dewatering	Partial removal and decomm of weir	Remove cofferdam	Finishing works and site rehab
45	116	Range of predicted noise levels	27-63	28-72	-3-47	36-78	28-72	28-64
		Total no. of receivers above the NML	59	90	1	106	90	70
		0-10 dB(A) above the NML	38	66	1	45	66	48
		10-20 dB(A) above the NML	21	13	-	37	13	22
		>20 dB(A) above the NML	-	11	-	24	11	-
		Highly affected (>75 dBA)	-	-	-	3	-	-

Table 5-2 Summary of predicted noise levels at residential receivers during standard hours at the new weir site

NML daytime standard hours	No. of Residential Receivers	Predicted noise level range and bands above the NML at residential receivers	Construction Stages – new weir site													
			Site preparation	Upgrade site access road	Install cofferdam	Sheet piling - fishway	Fishway construction	Remove cofferdam	Reinstate right embankment	Install cofferdam downstream	Install cofferdam upstream	Piling	Concreting	Install weir and fishway gates	Install powerlines, remove cofferdams, reinstate left bank	Site rehab
45	116	Range of predicted noise levels	23-54	25-57	10-48	27-50	2-41	3-41	22-46	6-45	6-45	21-46	23-48	11-44	20-46	24-55
		Total no. of receivers above the NML	2	2	2	5	-	-	2	-	1	2	2	-	2	2
		0-10 dB(A) above the NML	2	-	2	5	-	-	2	-	1	2	2	-	2	1
		10-20 dB(A) above the NML	-	2	-	-	-	-	-	-	-	-	-	-	-	1
		>20 dB(A) above the NML	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Highly affected (>75 dBA)	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5-3 Summary of predicted noise levels at residential receivers during night-time hours at the existing weir site

NML night-time hours	No. of Residential Receivers	Predicted noise level range and bands above the NML at residential receivers	Construction Stages – existing weir site					
			Establish temporary access track and install crane pad and pump hardstand areas	Install cofferdam	Dewatering	Partial removal and decomm of weir	Remove cofferdam	Finishing works and site rehab
35	116	Range of predicted noise levels	27-63	28-72	-3-47	36-78	28-72	28-64
		Total no. of receivers above the NML	107	110	15	116	110	109
		0-5 dB(A) above the NML	8	10	10	4	10	7
		5-15 dB(A) above the NML	57	49	5	16	49	59
		15-25 dB(A) above the NML	38	29	0	65	29	36
		>25 dB(A) above the NML	4	22	0	31	22	7
		Highly affected (>75 dBA)	-	-	-	3	-	-

Table 5-4 Summary of predicted noise levels at residential receivers during night-time hours at the new weir site

NML night-time hours	No. of Residential Receivers	Predicted noise level range and bands above the NML at residential receivers	Construction Stages – existing weir site													
			Site preparation	Upgrade site access road	Install cofferdam	Sheet piling - fishway	Fishway construction	Remove cofferdam	Reinstate right embankment	Install cofferdam downstream	Install cofferdam upstream	Piling	Concreting	Install weir and fishway gates	Install powerlines, remove cofferdams, reinstate left bank	Site rehab
35	116	Range of predicted noise levels	23-54	25-57	10-48	27-50	2-41	3-41	22-46	6-45	6-45	21-46	23-48	11-44	20-46	24-55
		Total no. of receivers above the NML	23	60	2	102	2	2	73	2	2	67	78	2	65	46
		0-5 dB(A) above the NML	21	57	-	31	-	-	67	-	-	63	56	-	61	44
		5-15 dB(A) above the NML	-	1	2	69	2	2	6	2	2	4	22	2	4	-
		15-25 dB(A) above the NML	2	2	-	2	-	-	-	-	-	-	-	-	-	2
		>25 dB(A) above the NML	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Highly affected (>75 dBA)	-	-	-	-	-	-	-	-	-	-	-	-	-	-



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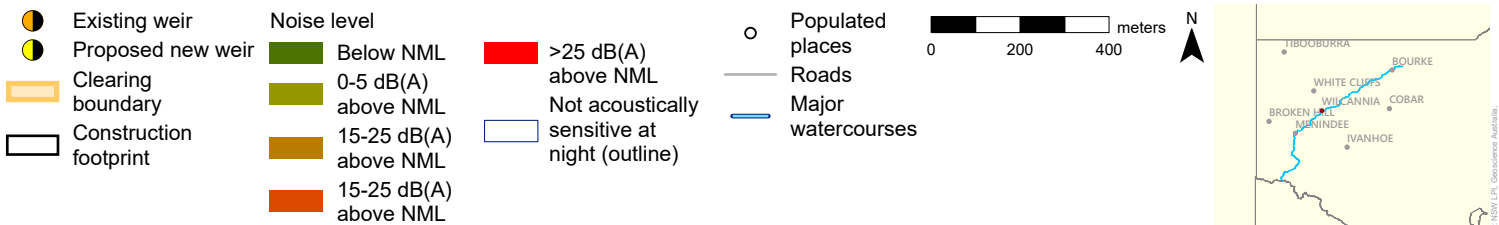
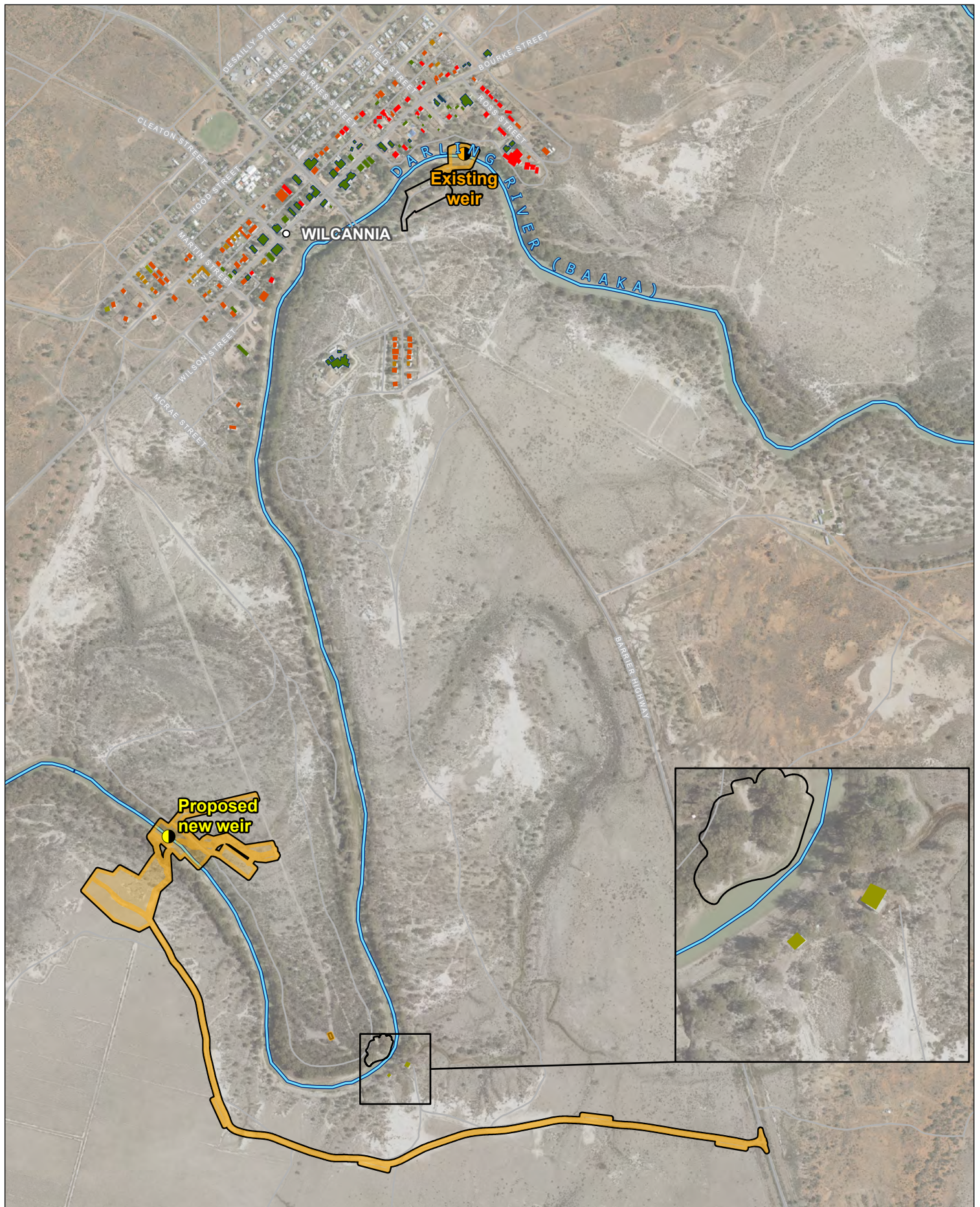


Figure 5-2 Predicted construction night-time noise levels above the NML - Partial removal and decommissioning works at the existing weir site

5.2 Noise resulting from traffic generated during construction

Access to the existing weir site during construction would be via the Barrier Highway and through Victory Park Caravan Park, which would be closed during the construction period and parts of it used as a compound.

Traffic volumes on the Barrier Highway were obtained from the nearest Transport for NSW permanent count station (ID T0236) located to the west of the proposal, 3.26 kilometres east of Silver Peak Road, Broken Hill. The average annual weekday traffic volumes identified that very low volumes of traffic travel on the Barrier Highway between Broken Hill and Wilcannia.

During construction, peak light vehicle generation is expected to be 20 two-way movements per day to facilitate the transportation of a peak workforce of 20 personnel. The workforce is anticipated to travel from the local area and light vehicle movements would occur in the hour prior to shift commencement and after shift end.

Heavy vehicle construction traffic would mostly comprise delivery of quarry materials (e.g., rock and concrete batching inputs for the new weir) and graded rock to upgrade the tracks to the new weir site. These heavy vehicles would travel to and from the proposal site via the Barrier Highway, from either the direction of Broken Hill to the west or Cobar to the east. Other deliveries may include the weir and fishway gates, sheet piles for cofferdams (if used), power poles and other power supply equipment and construction plant and equipment. There would also be some local heavy vehicle traffic movements between the new weir site and the local waste management facility, to dispose of surplus spoil and other waste, and between the existing weir and the local council depot, to store about 50 of the larger rocks removed from the partial removal and decommissioning of the existing weir. During construction, peak heavy vehicle generation is expected to be up to 10 two-way movements per day, or about one truck per hour.

Considering worst-case estimate of 40 additional light and 20 additional heavy vehicle movements per day generated as a result of construction, using Transport for NSW's Construction Noise Estimator it was determined that noise from road traffic would increase by about 0.4 dB(A) during standard hours and by 1.5 dB(A) during night-time works.

This predicted increase in traffic noise is less than the 2 dB(A) used in the CNVG to determine whether further noise assessment is required (refer to **Section 3.3.2**). Consequently, the additional construction traffic is estimated to not cause a noticeable increase in road traffic noise.

5.3 Vibration

As identified in **Section 3.6** a piling rig, rock hammer and jackhammers would be used during construction, which are considered to be vibration-generating items of plant and equipment. The distance of the nearest sensitive receiver to the construction sites (including the nearest heritage structures) is greater than the recommended safe setback distances, and therefore it is expected that vibration impacts in terms of human comfort or structural damage would be unlikely.

6. Management and mitigation measures

Consistent with the requirements of the SEARs, this section presents management and mitigation measures to address the potential construction noise impacts.

A construction environmental management plan and construction noise and vibration management plan will be prepared by the construction contractor, in accordance with Water Infrastructure NSW guidelines and policies. The construction noise and vibration management plan would include measures, processes and responsibilities to manage noise and vibration and minimise the potential for impacts during construction.

The construction noise and vibration management plan will:

- Identify nearby sensitive receivers
- Include a description of the construction activities equipment and working hours
- Identify relevant noise and vibration performance criteria for the proposal and license and approval conditions
- Outline standard and additional mitigation measures from the CNVG and information about when each will be applied
- Outline requirements for the development and implementation of an Out-of-hours Work Protocol
- Describe community consultation and complaints handling procedures in accordance with the Community Communication Strategy to be developed for the proposal.

Standard techniques for controlling noise impacts during construction are presented in the ICNG. Controls relevant to the proposal have been reproduced below in **Table 6-1**. These measures, or similar, would be included in the construction noise and vibration management plan.

Table 6-1 Standard measures, noise during construction

Measure	Details	Timing
Time constraints and scheduling	<ul style="list-style-type: none"> • Wherever possible and safe, limit works to standard hours of construction • If out of hours works occur, where possible, perform noisy work after 7am • Limit the completion of out of hours works over consecutive nights. 	During construction
Equipment restrictions	<ul style="list-style-type: none"> • Select low-noise plant and equipment. Ensure equipment mufflers operate in a proper and efficient manner. 	Prior to and during construction
Substitute methods	<ul style="list-style-type: none"> • Where possible, use quieter and less vibration emitting construction methods. 	During construction
Limit equipment use	<ul style="list-style-type: none"> • Only have necessary equipment on-site and turn off when not in use. 	During construction
Limit activity duration	<ul style="list-style-type: none"> • Where possible, concentrate noisy activities at one location and move to another as quickly as possible. 	During construction
Site access	<ul style="list-style-type: none"> • Vehicle movements, including deliveries outside standard hours should be minimised and avoided where possible. 	During construction
Equipment maintenance	<ul style="list-style-type: none"> • Ensure all plant and equipment is well maintained and where possible, fitted with silencing devices. 	Prior to and during construction

Measure	Details	Timing
Reduce equipment power	<ul style="list-style-type: none"> Use only the necessary size and powered equipment for tasks. 	During construction
Quieter working practices	<ul style="list-style-type: none"> Include in the work site induction training on noise sensitivities, such as switching off equipment that is not in use, minimising talking and radio use when near sensitive receivers and configuring work sites to minimise the need for reversing. 	Prior to and during construction
Reversing alarms	<ul style="list-style-type: none"> Where possible, consider the application of less intrusive alternatives to reverse beepers such as 'squawker' or 'broadband' alarms. 	During construction
Noise barriers	<ul style="list-style-type: none"> Consider the installation of temporary construction noise barriers for concentrated, noise-intensive activities. 	During construction
Enclosures	<ul style="list-style-type: none"> Where practicable, install enclosures around noisy mobile and stationary equipment as necessary. 	During construction
Use and siting of plant	<ul style="list-style-type: none"> Where possible, avoid simultaneous operation of two or more noisy plant close to receivers The offset distance between noisy plant and sensitive receivers should be maximised Switch off equipment that is not in use; avoid idling. 	During construction
Plan work sites and activities to minimise noise and vibration	<ul style="list-style-type: none"> Plan traffic flow, parking and loading/unloading areas to minimise reversing movements. 	Prior to and during construction
Minimise disturbance arising from delivery of goods to construction sites	<ul style="list-style-type: none"> Delivery and loading / unloading of materials should occur as far as possible from sensitive receivers Select site access points and roads as far as possible from sensitive receivers. 	During construction
Monitoring	<ul style="list-style-type: none"> Complete routine monitoring to evaluate construction noise levels and evaluate whether the mitigation measures in place are adequate or require revision. 	During construction

6.1 Additional mitigation measures for noise

This noise and vibration assessment indicated that additional mitigation may be considered for several residential receivers during proposed daytime standard construction hours, and night-time works. However, this assessment is based on the worst case $L_{Aeq}(15 \text{ mins})$ noise levels at each sensitive receiver and can be considered conservative.

Further additional mitigation measures for receivers where noise levels are above the NML are provided in Table C.1 in the CNVG, presented in **Table 6-1** and their recommended implementation for this proposal is detailed further in this section. It is important to note that the assessment methodology and the noise mitigation measures described in the CNVG are not mandatorily applicable; consequently, the recommendations in this report based on the CNVG should be regarded as optional and implemented when considered by the project team as appropriate.

Figure 6.1 CNVG additional mitigation measures for airborne noise levels above the NML

Table C.1: Triggers for Additional Mitigation Measures - Airborne Noise

Predicted airborne $L_{Aeq(15min)}$ noise level at receiver			Additional mitigation measures	
Perception	dB(A) above RBL	dB(A) above NML	type ¹ :	Mitigation Levels ² :
All hours				
75dBA or greater			N, V, PC, RO	HA
Standard Hours: Mon - Fri (7am – 6pm), Sat (8am – 1pm), Sun/Pub Hol (Nil)				
Noticeable	5 to 10	0	-	NML
Clearly Audible	10 to 20	< 10	-	NML
Moderately intrusive	20 to 30	10 to 20	N, V	NML+10
Highly intrusive	> 30	> 20	N, V	NML+20
OOHW Period 1: Mon – Fri (6pm – 10pm), Sat (7am – 8am & 1pm – 10pm), Sun/Pub Hol (8am – 6pm)				
Noticeable	5 to 10	< 5	-	NML
Clearly Audible	10 to 20	5 to 15	N, R1, DR	NML+5
Moderately intrusive	20 to 30	15 to 25	V, N, R1, DR	NML+15
Highly intrusive	> 30	> 25	V, IB, N, R1, DR, PC, SN	NML+25
OOHW Period 2: Mon – Fri (10pm – 7am), Sat (10pm – 8am), Sun/Pub Hol (6pm – 7am)				
Noticeable	5 to 10	< 5	N	NML
Clearly Audible	10 to 20	5 to 15	V, N, R2, DR	NML+5
Moderately intrusive	20 to 30	15 to 25	V, IB, N, PC, SN, R2, DR	NML+15
Highly intrusive	> 30	> 25	AA, V, IB, N, PC, SN, R2, DR	NML+25

Notes (refer to detailed descriptions):

- 1 AA = Alternative Accommodation
V = Verification
IB = Individual briefings
N = Notification
R2 = Respite Period 2
DR = Duration Respite

- R1 = Respite Period 1
PC = Phone calls
SN = Specific notifications
Perception = relates to level above RBL

- 2 NML = Noise Management Level (see Appendix D)
HA = Highly Affected (> 75 dB(A) - applies to residences only)

For this proposal, the following additional mitigation measures from **Figure 6.1** could be considered:

- Notification - Notifying the affected residents (through letterbox drops or equivalent) of works and potential disruptions. The notification should detail work activities, time periods over which the works will occur, impacts and mitigation measures. Notifications should be given a minimum of five days prior to works commencing
- Verification – Where specific noise impacting works are to be undertaken for more than three weeks, attended noise measurements could be undertaken within a period of 14 days from the commencement of construction activities. The purpose of these measurements is to verify the noise levels predicted in this noise assessment are accurate and whether mitigation measures are appropriate. Attended noise measurements could also be undertaken to address any noise complaints raised as a result of the proposed works
- Respite offers - Respite offers should be considered where there are high noise generating activities near receivers, such as rock breaking. Work should be carried out in continuous blocks that do not exceed three hours each, with a minimum respite period of one hour in between. The actual duration of each block of work and respite should be flexible to accommodate the usage of and amenity at nearby receivers and should be considered in consultation with affected receivers. The purpose of such an offer is to provide residents with respite from an ongoing impact
- Respite Period 2 (night-time affected residents only) – Night-time construction should be limited to two consecutive nights only, except where there is a Duration Respite (see below). The health and safety of construction workers should be considered if respite period 2 measures are adopted, as two night shifts on and one night off can result in adverse impacts to sleep patterns if crews are on this pattern for an extended period. Appropriate programming to avoid these adverse impacts should be considered
- Duration Respite – Respite offers and 'Respite Period 2' may be counterproductive in reducing the impact on the community for longer duration projects. Where it can be strongly justified, it may be beneficial to increase work duration or the number of nights (or in this case, early mornings), so that the proposal can be completed quickly. The community should be consulted where Duration Respite mitigation is considered to prepare an appropriate construction programme.

Further additional mitigation measures recommended for the proposal, based on the outcomes of this assessment are as follows:

- Temporary acoustic barriers should be considered during all construction works, particularly for high noise generating equipment including:
 - sheet pile drivers and piling rigs
 - vibrating hammers
 - tub grinders
 - rock hammers
 - concrete saws
 - rock crushing plant

Options include installing temporary barriers and/or curtain screens from Flexshield and Echobarrier, with a preference of using higher noise attenuating barriers. Barriers should be installed directly adjacent to noise generating equipment to attenuate noise from construction works

- Where reasonable and feasible, noise intensive equipment should only be used during standard hours. However, it is acknowledged that working conditions for this proposal will be affected due to extreme heat over the summer months. Health and safety for construction working crews should therefore be considered when determining which construction activities require to be shifted to the 5:00am to 7:00am period.

6.2 Additional mitigation measures for vibration

Assessing Vibration: a technical guideline (Department of Environment and Conservation, 2006) provides general guidance for limiting vibration impacts during construction. Relevant recommendations have been reproduced below in **Table 6-2** and should be considered as appropriate in the construction noise and vibration management plan.

Table 6-2 Vibration management measures

Control measure	Details
Controlling vibration levels from the source	<ul style="list-style-type: none"> • Choosing alternative, lower-impact equipment or methods wherever possible • Scheduling the use of vibration-causing equipment at the least sensitive times of the day (wherever possible) • Locating high vibration sources as far away from sensitive receiver areas as possible • Sequencing operations so that vibration-causing activities do not occur simultaneously • Keeping equipment well maintained • Do not conduct vibration intensive works within the recommended safe setback distances • Avoid the use of vibration intensive plant within the nominated human comfort distances • Monitor any Aboriginal heritage items near to vibration intensive works.
Consultation	<ul style="list-style-type: none"> • Informing nearby receivers about the nature of construction stages and the vibration-generating activities.

Source: *Assessing Vibration: a technical guideline* (Department of Environment and Conservation, 2006)

7. Conclusion

A noise and vibration assessment has been completed to evaluate potential noise and vibration impacts associated with the decommissioning of an existing weir, and the construction of a new weir on the Darling River (Baaka), near the town of Wilcannia, NSW.

Noise from construction activities was quantitatively assessed using SoundPLAN modelling software. Noise levels were evaluated by comparing model predictions at surrounding sensitive receivers against noise management levels from the ICNG. Guidance from the CNVG has been adopted to recommend additional mitigation measures. All construction stages should be managed with standard noise and vibration management measures, which will be detailed in a construction noise and vibration management plan, required as part of the construction environmental management plan.

Noise levels from high noise generating equipment and plant at both the new and existing weir sites such as rock hammers, vibratory hammers, piling rigs and pile drivers, tub grinders, concrete saws and the rock crushing plant contribute to predicted noise levels at sensitive receivers being above the noise management levels for this assessment.

The noise assessment indicated that additional mitigation measures to be considered for the proposal include the consideration of temporary noise barriers, respite periods and respite offers to residents, and using high noise generating equipment only during standard hours (8am to 6pm).

Noise levels from additional traffic generated during construction was determined using the Construction Noise Estimator. It was determined that additional traffic noise from construction traffic would be low (i.e., 0.2 to 1.5 dB(A)), and within the criterion of 2.1 dB(A). That is, additional traffic generated from construction works would not be significantly noticeable to the community.

Vibration impacts are predicted to be negligible during construction, with the closest sensitive receivers and identified heritage and archaeological items at least 100 metres away from either construction site.

8. References

British Standards Group, (1993), *British Standard BS 7385-2:1993 Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from groundborne vibration*

British Standards Group, (2008), *British Standard 6472-1: 2008 Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration sources other than blasting*

Department of Environment and Climate Change, (2009), *Interim Construction Noise Guideline*. NSW Department of Environment and Climate Change, Sydney, July 2009; <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/noise/09265cng.pdf?la=en&hash=EF4576FD79DBB25D5AC22DFA1A883A2BADA1F77B>

Department of Environment and Conservation, (2006), *Assessing Vibration: a technical guideline*. NSW Department of Environment and Conservation, Sydney, February 2006; <https://www.environment.nsw.gov.au/resources/noise/vibrationguide0643.pdf>

Department of Environment, Climate Change and Water (2011), *NSW Road Noise Policy*. NSW Department of Environment, Climate Change and Water, Sydney, March 2011; <https://www.epa.nsw.gov.au/~media/EPA/Corporate%20Site/resources/noise/2011236nswroadnoisepolicy.aspx>

Environment Protection Authority (2017), *Noise Policy for Industry*. NSW Environment Protection Authority, Sydney, October 2017; <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/noise/17p0524-noise-policy-for-industry.pdf>

Environment Protection Authority (2020), *Draft Noise Construction Guideline*. NSW Environment Protection Authority, Parramatta, November 2020; <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/noise/20p2281-draft-construction-noise-guideline.pdf?la=en&hash=08B7AFCA1EABA290F78D720722E14F1F239FE6F8>

German Standards (DIN-Normen), (2016), *DIN 4150-3 Vibrations in buildings – Part 3: Effects on structures*

Roads and Maritime Service, (2016), *Construction Noise and Vibration Guideline*. Roads and Maritime Services, North Sydney, August 2016; <https://roads-waterways.transport.nsw.gov.au/business-industry/partners-suppliers/documents/guides-manuals/construction-noise-and-vibration-guideline.pdf>

Standards Australia, (2006), *Australian Standard AS2187.2 – 2006 Explosives – Storage and use Part 2: Use of explosives*. Australia

Standards Australia, (2010), *Australian Standard 2436-2010: Guide to noise and vibration control on construction, demolition and maintenance sites*. Australia

Standards Australia, (2016), *Australian / New Zealand Standard AS/NZS 2107:2016 Acoustics: Recommended design sound levels and reverberation times for building interiors*. Australia

Appendix A. Predicted noise levels at sensitive receivers from construction

Table A-1: Predicted noise levels during daytime standard hours – existing weir

Monday to Friday 7am-6pm

Saturday 8am-1pm

This sheet presents the noise assessment results for when works are carried out at the existing weir during the above times

Key:	
	Noise level is within the NML, or does not trigger additional mitigation requirements
	Noticeable to clearly audible (0 to 10 dBA above the NML) - standard mitigation measures recommended only
	Moderately intrusive (10 to 20 dBA above the NML)
	Highly intrusive (>20 dBA above the NML)
	Highly intrusive and highly noise affected (>75 dBA)
	Non-residential receivers where predicted noise levels are above the NML

ID (note: GF=ground floor, F1=floor 1)	Address	Usage	Daytime standard hours NML	Existing weir stages					
				Establish temporary access track and install crane pad and pump hardstand areas	Install cofferdam	Dewatering	Partial removal and decomm of weir	Remove cofferdam	Finishing works and site rehab
RES001_GF	30 Ross St	Residential	45	54	53	26	58	53	55
RES002_GF	26 Ross St	Residential	45	56	63	40	67	63	57
RES003_GF	24 Ross St	Residential	45	56	64	36	68	64	57
RES004_GF	22 Ross St	Residential	45	56	54	36	66	54	57
RES005_GF	20 Ross St	Residential	45	57	63	27	68	63	58
RES006_GF	18 Ross St	Residential	45	59	64	38	68	64	60
RES007_GF	16 Ross St	Residential	45	57	63	36	67	63	58
RES008_GF	14 Ross St	Residential	45	60	65	37	69	65	61
RES009_GF	12 Ross St	Residential	45	58	54	27	59	54	59
RES010_GF	2 Ross St	Residential	45	43	52	25	56	52	44
RES011_GF	21 Ross St	Residential	45	60	71	41	76	71	61
RES012_GF	28 Bourke St	Residential	45	53	64	26	69	64	54
RES013_GF	30 Bourke St	Residential	45	54	54	31	58	54	55
RES014_GF	32 Bourke St	Residential	45	54	65	28	70	65	55
RES015_GF	34 Bourke St	Residential	45	49	54	28	58	54	50
RES016_GF	36 Bourke St	Residential	45	52	53	26	58	53	53
RES017_GF	40 Bourke St	Residential	45	54	64	29	67	64	55
RES018_GF	42 Bourke St	Residential	45	54	65	25	65	65	55
RES019_GF	2-4 Reid St	Residential	45	55	54	27	66	54	56
RES020_GF	6-8 Reid St	Residential	45	56	66	34	68	66	57
RES021_GF	10 Reid St	Residential	45	56	53	27	58	53	57
RES022_GF	12 Reid St	Residential	45	56	66	36	70	66	57
RES023_GF	14-16 Reid St	Residential	45	57	67	36	71	67	58
RES024_GF	14-16 Reid St	Residential	45	57	67	34	71	67	58
RES025_GF	14-16 Reid St	Residential	45	56	65	27	70	65	57
RES026_GF	38 Reid St	Residential	45	53	52	25	58	52	54
RES027_GF	5 Reid St	Residential	45	62	72	45	76	72	63
RES028_GF	13-15 Reid St	Residential	45	62	71	47	75	71	63
RES029_GF	3 Reid St	Residential	45	60	71	38	74	71	61
RES030_GF	1 Reid St	Residential	45	59	67	37	70	67	60
RES031_GF	2-10 Field St	Residential	45	63	72	44	78	72	64
RES032_GF	2-6 Byrnes St	Residential	45	62	69	45	74	69	63
RES033_GF	69 Reid St	Residential	45	49	51	21	60	51	50
RES034_GF	77 Reid St	Residential	45	49	54	22	61	54	50
RES035_GF	83 Reid St	Residential	45	47	51	20	58	51	48
RES036_GF	89 Reid St	Residential	45	45	48	18	58	48	46
RES037_GF	93-99 Reid St	Residential	45	44	46	17	56	46	45
RES038_GF	92 Reid St	Residential	45	45	49	7	55	49	46
RES039_GF	90 Reid St	Residential	45	34	37	5	44	37	35
RES040_GF	86-88 Reid St	Residential	45	46	50	18	57	50	47
RES041_GF	76 Reid St	Residential	45	48	53	21	60	53	49

ID (note: GF=ground floor, F1=floor 1)	Address	Usage	Daytime standard hours NML	Existing weir stages					
				Establish temporary access track and install crane pad and pump hardstand areas	Install cofferdam	Dewatering	Partial removal and decomm of weir	Remove cofferdam	Finishing works and site rehab
RES042_GF	74 Reid St	Residential	45	45	49	19	59	49	46
RES043_GF	65-67 Reid St	Residential	45	36	39	8	46	39	37
RES044_GF	52 Reid St	Residential	45	41	49	17	63	49	42
RES045_GF	6 Wilson St	Residential	45	41	45	16	51	45	42
RES046_GF	2-8 Martin St	Residential	45	46	48	18	58	48	47
RES047_GF	1-3 Palmer St	Residential	45	42	41	13	54	41	43
RES048_GF	5-7 Palmer St	Residential	45	41	40	12	53	40	42
RES049_GF	139-143 Woore St	Residential	45	42	47	14	54	47	43
RES050_GF	131-133 Woore St	Residential	45	43	48	16	55	48	44
RES051_GF	125 Woore St	Residential	45	36	39	8	47	39	37
RES052_GF	123 Woore St	Residential	45	35	39	8	46	39	36
RES053_GF	119-121 Woore St	Residential	45	36	39	8	46	39	37
RES054_GF	18 Martin St	Residential	45	44	50	18	57	50	45
RES055_GF	111 Woore St	Residential	45	45	38	6	44	38	46
RES056_GF	113 Woore St	Residential	45	45	50	19	57	50	46
RES057_GF	109 Woore St	Residential	45	42	50	19	58	50	43
RES058_GF	107 Woore St	Residential	45	36	41	10	50	41	37
RES059_GF	105 Woore St	Residential	45	35	40	9	48	40	36
RES060_GF	103 Woore St	Residential	45	38	44	12	57	44	39
RES061_GF	13 Cleaton St	Residential	45	43	50	16	53	50	44
RES062_GF	11 Cleaton St	Residential	45	45	50	21	53	50	46
RES063_GF	95 Woore St	Residential	45	45	51	19	55	51	46
RES064_GF	87-89 Woore St	Residential	45	41	48	22	54	48	42
RES065_GF	16 Myers St	Residential	45	42	50	24	55	50	43
RES066_GF	73 Woore St	Residential	45	42	51	24	55	51	43
RES067_GF	71 Woore St	Residential	45	44	50	24	55	50	45
RES068_GF	69 Woore St	Residential	45	51	52	23	56	52	52
RES069_GF	63 Woore St	Residential	45	45	51	19	56	51	46
RES070_GF	61 Woore St	Residential	45	52	53	24	65	53	53
RES071_GF	59 Woore St	Residential	45	53	52	24	66	52	54
RES072_GF	57 Woore St	Residential	45	53	52	35	55	52	54
RES073_GF	51-55 Woore St	Residential	45	53	51	25	65	51	54
RES074_GF	47-49 Woore St	Residential	45	52	44	25	55	44	53
RES075_GF	45 Woore St	Residential	45	53	52	25	57	52	54
RES076_GF	43 Woore St	Residential	45	53	51	25	55	51	54
RES077_GF	31-33 Woore St	Residential	45	54	57	27	62	57	55
RES078_GF	27-29 Woore St	Residential	45	51	55	21	57	55	52
RES079_GF	23-25 Woore St	Residential	45	45	43	15	46	43	46
RES080_GF	19-21 Woore St	Residential	45	45	52	22	55	52	46
RES081_GF	32A Bourke St	Residential	45	51	45	19	49	45	52
RES082_GF	34A Bourke St	Residential	45	52	55	27	60	55	53
RES083_GF	148 Woore St	Residential	45	41	46	14	53	46	42
RES084_GF	140-142 Woore St	Residential	45	42	46	15	53	46	43
RES085_GF	40 Adams St	Residential	45	30	34	3	41	34	31
RES086_GF	38 Adams St	Residential	45	42	47	15	54	47	43
RES087_GF	44 Adams St	Residential	45	31	40	5	42	40	32
RES088_GF	46 Adams St	Residential	45	30	37	4	42	37	31
RES089_GF	48 Adams St	Residential	45	29	35	4	42	35	30
RES090_GF	137 Hood St	Residential	45	41	46	15	53	46	42
RES091_GF	143-145 Hood St	Residential	45	40	46	14	53	46	41
RES092_GF	143-145 Hood St	Residential	45	40	32	2	39	32	41
RES093_GF	134A Woore St	Residential	45	42	47	16	54	47	43
RES094_GF	134B Woore St	Residential	45	41	46	15	53	46	42
RES095_GF	132A Woore St	Residential	45	43	48	16	55	48	44
RES096_GF	132B Woore St	Residential	45	43	48	16	55	48	44
RES097_GF	131 Hood St	Residential	45	40	33	3	40	33	41
RES098_GF	129 Hood St	Residential	45	42	47	16	54	47	43
RES099_GF	122 Wore St	Residential	45	44	48	17	56	48	45
RES100_GF	120 Woore St	Residential	45	44	49	18	56	49	45
RES101_GF	5 Warrali Ave	Residential	45	48	47	20	54	47	49
RES102_GF	7 Warrali Ave	Residential	45	48	47	17	53	47	49
RES103_GF	9 Warrali Ave	Residential	45	42	47	16	53	47	43
RES104_GF	11 Warrali Ave	Residential	45	42	47	7	52	47	43
RES105_F 1	13 Warrali Ave	Residential	45	44	45	14	50	45	45

ID (note: GF=ground floor, F1=floor 1)	Address	Usage	Daytime standard hours NML	Existing weir stages					
				Establish temporary access track and install crane pad and pump hardstand areas	Install cofferdam	Dewatering	Partial removal and decomm of weir	Remove cofferdam	Finishing works and site rehab
RES106_GF	17 Warrali Ave	Residential	45	46	46	15	51	46	47
RES107_GF	4 Warrali Ave	Residential	45	48	47	17	55	47	49
RES108_GF	6 Warrali Ave	Residential	45	50	49	19	59	49	51
RES109_GF	8 Warrali Ave	Residential	45	47	46	17	53	46	48
RES110_GF	10 Warrali Ave	Residential	45	46	46	16	53	46	47
RES111_GF	12 Warrali Ave	Residential	45	46	43	13	49	43	47
RES112_GF	14 Warrali Ave	Residential	45	46	46	16	57	46	47
RES113_GF	16 Warrali Ave	Residential	45	45	45	15	57	45	46
RES114_GF	1 South of river bend	Residential	45	27	28	-3	36	28	28
RES115_GF	2 South of river bend	Residential	45	27	28	-3	37	28	28
Wilcannia sports grounds	Wilcannia sports grounds	Active rec	65	55	66	39	70	66	56
Wilcannia Swimming Pool	Wilcannia Swimming Pool	Active rec	65	63	71	46	76	71	64
COM001_GF	9-11 Ross St	Commercial	70	61	71	43	75	71	62
COM002_GF	9-11 Ross St	Commercial	70	66	76	46	80	76	67
COM003_GF	Ross St	Commercial	70	62	72	46	77	72	63
COM004_GF	18-22 Bourke St	Commercial	70	54	59	37	61	59	55
COM005_F 1	24-26 Bourke St	Commercial	70	52	52	25	56	52	53
COM005_F 2	24-26 Bourke St	Commercial	70	52	55	27	59	55	53
COM006_GF	24-26 Bourke St	Commercial	70	53	52	25	56	52	54
COM007_GF	34-36 Reid St	Commercial	70	55	52	26	57	52	56
COM008_GF	40 Reid St	Commercial	70	43	50	24	55	50	44
COM009_GF	35-39 Reid St	Commercial	70	58	65	38	69	65	59
COM010_F 1	21 Reid St	Commercial	70	61	58	28	71	58	62
COM010_F 2	21 Reid St	Commercial	70	61	63	38	72	63	62
COM011_GF	19 Reid St	Commercial	70	61	59	29	71	59	62
COM012_GF	7 Reid St	Commercial	70	62	71	46	76	71	63
COM013_F 1	45 Reid St	Commercial	70	53	57	28	65	57	54
COM013_F 2	45 Reid St	Commercial	70	53	57	29	65	57	54
COM014_GF	65-67 Reid St	Commercial	70	49	53	21	60	53	50
COM015_GF	79 Reid St	Commercial	70	48	52	20	61	52	49
COM016_GF	82 Reid St	Commercial	70	45	50	19	57	50	46
COM017_F 1	89 Reid St	Commercial	70	46	51	20	59	51	47
COM017_F 2	89 Reid St	Commercial	70	47	51	21	59	51	48
COM018_GF	64 Reid St	Commercial	70	49	53	23	61	53	50
COM019_GF	56 Reid St	Commercial	70	51	53	22	60	53	52
COM020_GF	54 Reid St	Commercial	70	47	46	17	54	46	48
COM021_GF	48 Reid St	Commercial	70	52	57	28	63	57	53
COM022_F 1	46 Reid St	Commercial	70	52	50	24	55	50	53
COM022_F 2	46 Reid St	Commercial	70	52	59	30	64	59	53
COM023_GF	18-20 Myers St	Commercial	70	41	48	22	55	48	42
COM024_GF	2 Myers St	Commercial	70	47	53	25	57	53	48
IND001_F 1	39-41 Bourke St	Industrial	75	59	69	35	72	69	60
IND001_F 2	39-41 Bourke St	Industrial	75	60	69	39	75	69	61
IND002_GF	39-41 Bourke St	Industrial	75	60	57	35	62	57	61
IND003_GF	39-41 Bourke St	Industrial	75	57	52	26	58	52	58
OCT001_F 1	89 Reid St	Commercial	70	48	52	21	59	52	49
OCT001_F 2	89 Reid St	Commercial	70	48	52	21	60	52	49
OED001_GF	26 Reid St	Educational	55	55	53	26	57	53	56
OED002_GF	26 Reid St	Educational	55	44	52	26	56	52	45
OED003_GF	26 Reid St	Educational	55	54	55	28	59	55	55
OED004_GF	Lot 3711 Warrali Ave	Educational	55	48	46	18	58	46	49
OED005_GF	Lot 3711, Warrali Ave	Educational	55	46	43	16	57	43	47
OED005_GF	Lot 3711, Warrali Ave	Educational	55	46	43	16	57	43	47
OHO001_GF	2 Myers St	Residential	45	48	56	25	61	56	49
OME001_GF	Wilcannia Hospital	Medical	55	57	65	38	68	65	58
OME002_GF	Wilcannia Hospital	Medical	55	59	67	37	72	67	60
OME003_GF	Wilcannia Hospital	Medical	55	47	57	29	60	57	48
OME004_GF	Wilcannia Hospital	Medical	55	66	77	49	80	77	67
OME005_GF	Wilcannia Hospital	Medical	55	61	71	42	75	71	62
Reconciliation Park	Reconciliation Park	Passive rec	60	59	69	41	74	69	60
Baker Park	Baker Park	Passive rec	60	49	60	33	64	60	50
Ray Hunter Memorial Park	Ray Hunter Memorial Park	Passive rec	60	55	63	38	68	53	56

Table A-2: Predicted noise levels during night-time working hours (5:00am to 7:00am) – existing weir

All days between 10pm and 7am

This sheet presents the noise assessment results for when works are carried out at the existing weir during the above times

Key:	
	Noise level is within NML, or does not trigger additional mitigation requirements
	Noticeable (0 to 5 dBA above the NML)
	Clearly audible (5 to 15 dBA above the NML)
	Moderately intrusive (15 to 25 dBA above the NML)
	Highly intrusive (>25 dB above the NML)

ID (note: GF=ground floor, F1=floor 1)	Address	Usage	Night-time hours NML	Existing weir stages					
				Establish temporary access track and install crane pad and pump hardstand areas	Install cofferdam	Dewatering	Partial removal and decomm of weir	Remove cofferdam	Finishing works and site rehab
RES001_GF	30 Ross St	Residential	35	54	53	26	58	53	55
RES002_GF	26 Ross St	Residential	35	56	63	40	67	63	57
RES003_GF	24 Ross St	Residential	35	56	64	36	68	64	57
RES004_GF	22 Ross St	Residential	35	56	54	36	66	54	57
RES005_GF	20 Ross St	Residential	35	57	63	27	68	63	58
RES006_GF	18 Ross St	Residential	35	59	64	38	68	64	60
RES007_GF	16 Ross St	Residential	35	57	63	36	67	63	58
RES008_GF	14 Ross St	Residential	35	60	65	37	69	65	61
RES009_GF	12 Ross St	Residential	35	58	54	27	59	54	59
RES010_GF	2 Ross St	Residential	35	43	52	25	56	52	44
RES011_GF	21 Ross St	Residential	35	60	71	41	76	71	61
RES012_GF	28 Bourke St	Residential	35	53	64	26	69	64	54
RES013_GF	30 Bourke St	Residential	35	54	54	31	58	54	55
RES014_GF	32 Bourke St	Residential	35	54	65	28	70	65	55
RES015_GF	34 Bourke St	Residential	35	49	54	28	58	54	50
RES016_GF	36 Bourke St	Residential	35	52	53	26	58	53	53
RES017_GF	40 Bourke St	Residential	35	54	64	29	67	64	55
RES018_GF	42 Bourke St	Residential	35	54	65	25	65	65	55
RES019_GF	2-4 Reid St	Residential	35	55	54	27	66	54	56
RES020_GF	6-8 Reid St	Residential	35	56	66	34	68	66	57
RES021_GF	10 Reid St	Residential	35	56	53	27	58	53	57
RES022_GF	12 Reid St	Residential	35	56	66	36	70	66	57
RES023_GF	14-16 Reid St	Residential	35	57	67	36	71	67	58
RES024_GF	14-16 Reid St	Residential	35	57	67	34	71	67	58
RES025_GF	14-16 Reid St	Residential	35	56	65	27	70	65	57
RES026_GF	38 Reid St	Residential	35	53	52	25	58	52	54
RES027_GF	5 Reid St	Residential	35	62	72	45	76	72	63
RES028_GF	13-15 Reid St	Residential	35	62	71	47	75	71	63
RES029_GF	3 Reid St	Residential	35	60	71	38	74	71	61
RES030_GF	1 Reid St	Residential	35	59	67	37	70	67	60
RES031_GF	2-10 Field St	Residential	35	63	72	44	78	72	64
RES032_GF	2-6 Byrnes St	Residential	35	62	69	45	74	69	63
RES033_GF	69 Reid St	Residential	35	49	51	21	60	51	50
RES034_GF	77 Reid St	Residential	35	49	54	22	61	54	50
RES035_GF	83 Reid St	Residential	35	47	51	20	58	51	48
RES036_GF	89 Reid St	Residential	35	45	48	18	58	48	46
RES037_GF	93-99 Reid St	Residential	35	44	46	17	56	46	45
RES038_GF	92 Reid St	Residential	35	45	49	7	55	49	46
RES039_GF	90 Reid St	Residential	35	34	37	5	44	37	35
RES040_GF	86-88 Reid St	Residential	35	46	50	18	57	50	47
RES041_GF	76 Reid St	Residential	35	48	53	21	60	53	49
RES042_GF	74 Reid St	Residential	35	45	49	19	59	49	46
RES043_GF	65-67 Reid St	Residential	35	36	39	8	46	39	37
RES044_GF	52 Reid St	Residential	35	41	49	17	63	49	42
RES045_GF	6 Wilson St	Residential	35	41	45	16	51	45	42

ID (note: GF=ground floor, F1=floor 1)	Address	Usage	Night-time hours NML	Existing weir stages					
				Establish temporary access track and install crane pad and pump hardstand areas	Install cofferdam	Dewatering	Partial removal and decomm of weir	Remove cofferdam	Finishing works and site rehab
RES046_GF	2-8 Martin St	Residential	35	46	48	18	58	48	47
RES047_GF	1-3 Palmer St	Residential	35	42	41	13	54	41	43
RES048_GF	5-7 Palmer St	Residential	35	41	40	12	53	40	42
RES049_GF	139-143 Woore St	Residential	35	42	47	14	54	47	43
RES050_GF	131-133 Woore St	Residential	35	43	48	16	55	48	44
RES051_GF	125 Woore St	Residential	35	36	39	8	47	39	37
RES052_GF	123 Woore St	Residential	35	35	39	8	46	39	36
RES053_GF	119-121 Woore St	Residential	35	36	39	8	46	39	37
RES054_GF	18 Martin St	Residential	35	44	50	18	57	50	45
RES055_GF	111 Woore St	Residential	35	45	38	6	44	38	46
RES056_GF	113 Woore St	Residential	35	45	50	19	57	50	46
RES057_GF	109 Woore St	Residential	35	42	50	19	58	50	43
RES058_GF	107 Woore St	Residential	35	36	41	10	50	41	37
RES059_GF	105 Woore St	Residential	35	35	40	9	48	40	36
RES060_GF	103 Woore St	Residential	35	38	44	12	57	44	39
RES061_GF	13 Cleaton St	Residential	35	43	50	16	53	50	44
RES062_GF	11 Cleaton St	Residential	35	45	50	21	53	50	46
RES063_GF	95 Woore St	Residential	35	45	51	19	55	51	46
RES064_GF	87-89 Woore St	Residential	35	41	48	22	54	48	42
RES065_GF	16 Myers St	Residential	35	42	50	24	55	50	43
RES066_GF	73 Woore St	Residential	35	42	51	24	55	51	43
RES067_GF	71 Woore St	Residential	35	44	50	24	55	50	45
RES068_GF	69 Woore St	Residential	35	51	52	23	56	52	52
RES069_GF	63 Woore St	Residential	35	45	51	19	56	51	46
RES070_GF	61 Woore St	Residential	35	52	53	24	65	53	53
RES071_GF	59 Woore St	Residential	35	53	52	24	66	52	54
RES072_GF	57 Woore St	Residential	35	53	52	35	55	52	54
RES073_GF	51-55 Woore St	Residential	35	53	51	25	65	51	54
RES074_GF	47-49 Woore St	Residential	35	52	44	25	55	44	53
RES075_GF	45 Woore St	Residential	35	53	52	25	57	52	54
RES076_GF	43 Woore St	Residential	35	53	51	25	55	51	54
RES077_GF	31-33 Woore St	Residential	35	54	57	27	62	57	55
RES078_GF	27-29 Woore St	Residential	35	51	55	21	57	55	52
RES079_GF	23-25 Woore St	Residential	35	45	43	15	46	43	46
RES080_GF	19-21 Woore St	Residential	35	45	52	22	55	52	46
RES081_GF	32A Bourke St	Residential	35	51	45	19	49	45	52
RES082_GF	34A Bourke St	Residential	35	52	55	27	60	55	53
RES083_GF	148 Woore St	Residential	35	41	46	14	53	46	42
RES084_GF	140-142 Woore St	Residential	35	42	46	15	53	46	43
RES085_GF	40 Adams St	Residential	35	30	34	3	41	34	31
RES086_GF	38 Adams St	Residential	35	42	47	15	54	47	43
RES087_GF	44 Adams St	Residential	35	31	40	5	42	40	32
RES088_GF	46 Adams St	Residential	35	30	37	4	42	37	31
RES089_GF	48 Adams St	Residential	35	29	35	4	42	35	30
RES090_GF	137 Hood St	Residential	35	41	46	15	53	46	42
RES091_GF	143-145 Hood St	Residential	35	40	46	14	53	46	41
RES092_GF	143-145 Hood St	Residential	35	40	32	2	39	32	41
RES093_GF	134A Woore St	Residential	35	42	47	16	54	47	43
RES094_GF	134B Woore St	Residential	35	41	46	15	53	46	42
RES095_GF	132A Woore St	Residential	35	43	48	16	55	48	44
RES096_GF	132B Woore St	Residential	35	43	48	16	55	48	44
RES097_GF	131 Hood St	Residential	35	40	33	3	40	33	41
RES098_GF	129 Hood St	Residential	35	42	47	16	54	47	43
RES099_GF	122 Wore St	Residential	35	44	48	17	56	48	45
RES100_GF	120 Woore St	Residential	35	44	49	18	56	49	45
RES101_GF	5 Warrali Ave	Residential	35	48	47	20	54	47	49
RES102_GF	7 Warrali Ave	Residential	35	48	47	17	53	47	49
RES103_GF	9 Warrali Ave	Residential	35	42	47	16	53	47	43
RES104_GF	11 Warrali Ave	Residential	35	42	47	7	52	47	43
RES105_F 1	13 Warrali Ave	Residential	35	44	45	14	50	45	45
RES106_GF	17 Warrali Ave	Residential	35	46	46	15	51	46	47
RES107_GF	4 Warrali Ave	Residential	35	48	47	17	55	47	49
RES108_GF	6 Warrali Ave	Residential	35	50	49	19	59	49	51

ID (note: GF=ground floor, F1=floor 1)	Address	Usage	Night-time hours NML	Existing weir stages					
				Establish temporary access track and install crane pad and pump hardstand areas	Install cofferdam	Dewatering	Partial removal and decomm of weir	Remove cofferdam	Finishing works and site rehab
RES109_GF	8 Warrali Ave	Residential	35	47	46	17	53	46	48
RES110_GF	10 Warrali Ave	Residential	35	46	46	16	53	46	47
RES111_GF	12 Warrali Ave	Residential	35	46	43	13	49	43	47
RES112_GF	14 Warrali Ave	Residential	35	46	46	16	57	46	47
RES113_GF	16 Warrali Ave	Residential	35	45	45	15	57	45	46
RES114_GF	1 South of river bend	Residential	35	27	28	-3	36	28	28
RES115_GF	2 South of river bend	Residential	35	27	28	-3	37	28	28
OHO001_GF	2 Myers St	Residential	35	48	56	25	61	56	49
OME001_GF	Wilcannia Hospital	Medical	35	57	65	38	68	65	58
OME002_GF	Wilcannia Hospital	Medical	35	59	67	37	72	67	60
OME003_GF	Wilcannia Hospital	Medical	35	47	57	29	60	57	48
OME004_GF	Wilcannia Hospital	Medical	35	66	77	49	80	77	67
OME005_GF	Wilcannia Hospital	Medical	35	61	71	42	75	71	62

Table A-3: Predicted noise levels during daytime standard hours – new weir

Monday to Friday 7am-6pm

Saturday 8am-1pm

This sheet presents the noise assessment results for when works are carried out at the new weir during the above times

Key:	
	Noise level is within the NML, or does not trigger additional mitigation requirements
	Noticeable to clearly audible (0 to 10 dBA above the NML) - standard mitigation measures recommended only
	Moderately intrusive (10 to 20 dBA above the NML)
	Highly intrusive (>20 dBA above the NML)
	Highly intrusive and highly noise affected (>75 dBA)
	Non-residential receivers where predicted noise levels are above the NML

ID (note: GF=ground floor, F1=floor 1)	Address	Usage	Daytime standard hours NML	New weir stages													
				Site preparation	Upgrade site access road	Install cofferdam	Sheet piling - fishway	Fishway construction	Remove cofferdam	Reinstate right embankment	Install cofferdam downstream	Install cofferdam upstream	Piling	Concreting	Install weir and fishway gates	Install powerlines, remove cofferdams, reinstate left bank	Site rehab
RES001_GF	30 Ross St	Residential	45	25	27	10	31	5	3	26	9	9	26	27	15	25	26
RES002_GF	26 Ross St	Residential	45	30	32	18	39	13	11	34	17	17	33	34	20	32	31
RES003_GF	24 Ross St	Residential	45	30	32	18	39	13	11	34	17	17	33	34	20	32	31
RES004_GF	22 Ross St	Residential	45	28	32	18	36	10	11	34	17	17	33	34	24	33	29
RES005_GF	20 Ross St	Residential	45	30	32	18	39	13	11	34	17	17	33	34	24	33	31
RES006_GF	18 Ross St	Residential	45	30	32	18	39	13	11	34	17	17	33	34	22	33	31
RES007_GF	16 Ross St	Residential	45	28	32	18	33	11	11	34	17	10	33	34	22	33	29
RES008_GF	14 Ross St	Residential	45	29	32	18	39	13	11	34	17	17	34	34	24	33	31
RES009_GF	12 Ross St	Residential	45	26	27	10	31	5	3	27	9	8	26	28	14	25	27
RES010_GF	2 Ross St	Residential	45	31	33	18	35	11	11	34	11	13	29	30	16	29	32
RES011_GF	21 Ross St	Residential	45	31	32	18	39	13	11	34	17	17	34	35	21	33	32
RES012_GF	28 Bourke St	Residential	45	25	30	17	37	11	10	32	16	16	32	33	24	31	26
RES013_GF	30 Bourke St	Residential	45	30	32	18	38	12	11	34	17	17	33	34	25	32	31
RES014_GF	32 Bourke St	Residential	45	30	32	18	39	13	11	34	17	17	33	34	25	33	31
RES015_GF	34 Bourke St	Residential	45	32	34	20	41	15	13	36	19	19	36	37	26	35	33
RES016_GF	36 Bourke St	Residential	45	30	32	18	39	13	11	34	17	17	34	34	25	33	31
RES017_GF	40 Bourke St	Residential	45	30	32	18	39	13	11	34	17	17	34	34	21	33	31
RES018_GF	42 Bourke St	Residential	45	30	32	19	39	13	12	34	17	17	34	35	24	33	31
RES019_GF	2-4 Reid St	Residential	45	31	32	19	39	13	12	34	18	18	34	35	25	33	32
RES020_GF	6-8 Reid St	Residential	45	31	33	19	40	14	12	35	18	18	34	35	21	33	32
RES021_GF	10 Reid St	Residential	45	31	33	19	40	14	12	35	18	18	34	35	23	34	32
RES022_GF	12 Reid St	Residential	45	31	35	22	40	15	15	37	19	19	35	36	22	34	34
RES023_GF	14-16 Reid St	Residential	45	30	32	19	39	13	12	34	18	17	33	34	25	34	31
RES024_GF	14-16 Reid St	Residential	45	31	33	19	40	14	12	35	18	18	35	36	27	34	32
RES025_GF	14-16 Reid St	Residential	45	31	33	19	40	14	12	35	18	18	35	36	25	34	32
RES026_GF	38 Reid St	Residential	45	32	34	16	32	9	9	30	13	13	21	26	11	30	33
RES027_GF	5 Reid St	Residential	45	31	33	19	40	14	12	35	18	18	34	35	24	34	32
RES028_GF	13-15 Reid St	Residential	45	34	36	22	43	17	15	38	21	21	37	38	27	37	35
RES029_GF	3 Reid St	Residential	45	33	35	22	42	16	15	37	20	20	37	38	27	36	34
RES030_GF	1 Reid St	Residential	45	31	33	19	29	12	12	34	10	9	22	24	12	29	32
RES031_GF	2-10 Field St	Residential	45	33	35	20	42	16	13	37	20	20	36	37	23	36	34
RES032_GF	2-6 Byrnes St	Residential	45	32	34	20	40	14	13	36	19	19	35	36	26	34	33
RES033_GF	69 Reid St	Residential	45	36	38	23	43	17	16	38	22	22	38	39	25	37	37
RES034_GF	77 Reid St	Residential	45	35	36	23	43	17	16	38	22	22	38	39	25	37	36
RES035_GF	83 Reid St	Residential	45	35	37	23	43	17	16	39	22	22	38	40	26	38	36
RES036_GF	89 Reid St	Residential	45	35	37	24	44	18	17	39	23	23	39	40	26	38	36
RES037_GF	93-99 Reid St	Residential	45	35	38	24	44	18	17	40	23	23	39	41	27	38	36
RES038_GF	92 Reid St	Residential	45	33	37	23	43	17	16	38	20	22	38	39	25	38	34

ID (note: GF=ground floor, F1=floor 1)	Address	Usage	Daytime standard hours NML	New weir stages													
				Site preparation	Upgrade site access road	Install cofferdam	Sheet piling - fishway	Fishway construction	Remove cofferdam	Reinstate right embankment	Install cofferdam downstream	Install cofferdam upstream	Piling	Concreting	Install weir and fishway gates	Install powerlines, remove cofferdams, reinstate left bank	Site rehab
RES039_GF	90 Reid St	Residential	45	35	37	24	44	18	17	39	21	22	39	40	32	38	36
RES040_GF	86-88 Reid St	Residential	45	34	37	23	44	18	16	39	23	23	38	40	33	38	35
RES041_GF	76 Reid St	Residential	45	34	36	23	43	17	16	38	22	22	38	39	29	37	35
RES042_GF	74 Reid St	Residential	45	35	37	23	44	18	16	39	22	23	38	40	32	38	36
RES043_GF	65-67 Reid St	Residential	45	35	38	24	44	18	17	40	24	23	39	41	33	39	36
RES044_GF	52 Reid St	Residential	45	33	36	22	43	17	15	38	21	22	37	39	25	36	34
RES045_GF	6 Wilson St	Residential	45	35	37	24	44	18	17	39	23	23	39	40	26	38	36
RES046_GF	2-8 Martin St	Residential	45	36	38	23	44	18	16	39	22	23	39	40	26	38	37
RES047_GF	1-3 Palmer St	Residential	45	37	40	26	46	20	19	42	17	25	35	43	25	40	38
RES048_GF	5-7 Palmer St	Residential	45	38	40	27	47	21	20	42	26	26	42	44	29	41	39
RES049_GF	139-143 Woore St	Residential	45	35	38	25	44	18	18	39	24	24	39	40	28	39	36
RES050_GF	131-133 Woore St	Residential	45	35	37	24	44	18	17	39	23	23	39	40	27	38	36
RES051_GF	125 Woore St	Residential	45	34	37	23	43	17	16	39	23	23	38	40	26	38	35
RES052_GF	123 Woore St	Residential	45	34	36	23	43	17	16	38	23	23	38	39	26	37	35
RES053_GF	119-121 Woore St	Residential	45	37	39	26	46	20	19	41	25	25	41	42	30	40	38
RES054_GF	18 Martin St	Residential	45	33	36	23	43	17	16	38	22	22	38	39	25	37	34
RES055_GF	111 Woore St	Residential	45	34	36	22	43	17	15	38	22	22	37	39	30	37	35
RES056_GF	113 Woore St	Residential	45	33	35	21	40	14	14	35	20	19	34	36	21	33	34
RES057_GF	109 Woore St	Residential	45	33	36	22	43	17	15	38	21	21	37	38	30	37	34
RES058_GF	107 Woore St	Residential	45	32	34	23	42	16	16	38	21	22	37	38	30	37	33
RES059_GF	105 Woore St	Residential	45	35	37	24	44	18	17	39	23	23	39	40	30	38	36
RES060_GF	103 Woore St	Residential	45	32	36	22	42	16	15	38	22	22	37	38	32	36	33
RES061_GF	13 Cleaton St	Residential	45	23	25	13	32	6	6	27	10	10	26	27	22	25	24
RES062_GF	11 Cleaton St	Residential	45	28	31	16	34	8	9	30	12	12	28	30	21	28	29
RES063_GF	95 Woore St	Residential	45	34	36	21	42	16	14	37	21	21	36	38	30	36	35
RES064_GF	87-89 Woore St	Residential	45	34	36	21	41	15	14	37	20	20	36	37	28	36	35
RES065_GF	16 Myers St	Residential	45	26	31	16	37	11	9	33	14	15	32	34	18	31	29
RES066_GF	73 Woore St	Residential	45	31	33	15	33	8	8	28	12	13	27	28	20	29	32
RES067_GF	71 Woore St	Residential	45	32	35	21	41	15	14	37	20	20	36	37	23	36	33
RES068_GF	69 Woore St	Residential	45	32	35	21	41	15	14	37	20	20	36	37	23	35	33
RES069_GF	63 Woore St	Residential	45	31	34	22	41	15	14	37	20	20	36	37	26	35	32
RES070_GF	61 Woore St	Residential	45	33	36	22	42	16	15	38	19	19	35	36	27	35	34
RES071_GF	59 Woore St	Residential	45	31	34	20	40	14	13	35	19	19	35	36	25	35	32
RES072_GF	57 Woore St	Residential	45	31	33	20	40	14	13	35	19	19	35	36	23	34	32
RES073_GF	51-55 Woore St	Residential	45	31	33	20	40	14	13	35	18	18	35	36	21	34	32
RES074_GF	47-49 Woore St	Residential	45	29	31	18	37	11	11	33	17	17	32	33	20	34	29
RES075_GF	45 Woore St	Residential	45	25	28	18	35	11	11	30	12	12	29	31	16	28	27
RES076_GF	43 Woore St	Residential	45	30	32	19	39	13	12	34	17	17	34	35	24	33	31
RES077_GF	31-33 Woore St	Residential	45	30	32	18	39	13	11	34	17	17	33	34	26	33	31
RES078_GF	27-29 Woore St	Residential	45	25	27	10	27	2	3	22	6	6	21	23	12	20	26
RES079_GF	23-25 Woore St	Residential	45	29	31	18	38	12	11	33	16	16	33	34	24	32	30
RES080_GF	19-21 Woore St	Residential	45	29	31	18	38	12	11	33	16	16	33	33	23	32	30
RES081_GF	32A Bourke St	Residential	45	32	34	21	41	15	14	36	17	17	33	34	24	32	33
RES082_GF	34A Bourke St	Residential	45	32	34	21	41	15	14	36	19	19	36	37	27	35	33
RES083_GF	148 Woore St	Residential	45	35	38	25	44	18	18	39	24	24	39	40	28	39	36
RES084_GF	140-142 Woore St	Residential	45	35	37	25	44	18	17	39	24	24	39	40	28	38	36
RES085_GF	40 Adams St	Residential	45	34	37	24	44	18	17	39	23	23	38	40	27	38	35
RES086_GF	38 Adams St	Residential	45	34	37	25	44	18	18	39	25	23	39	40	31	38	36
RES087_GF	44 Adams St	Residential	45	34	37	24	43	17	17	39	23	23	38	40	27	38	36
RES088_GF	46 Adams St	Residential	45	34	36	24	43	17	17	38	22	23	37	38	27	37	35
RES089_GF	48 Adams St	Residential	45	34	37	24	43	17	17	38	23	23	38	39	27	37	35
RES090_GF	137 Hood St	Residential	45	34	37	24	44	18	17	39	21	23	37	39	33	38	35
RES091_GF	143-145 Hood St	Residential	45	34	37	25	44	18	18	39	24	24	39	40	28	38	35
RES092_GF	143-145 Hood St	Residential	45	34	37	25	44	18	18	39	24	24	39	40	28	38	35
RES093_GF	134A Woore St	Residential	45	34	37	24	44	18	17	39	23	23	38	40	28	38	35
RES094_GF	134B Woore St	Residential	45	29	35	18	35	11	11	30	16	16	30	31	26	31	30
RES095_GF	132A Woore St	Residential	45	34	37	24	43	17	17	39	23	23	38	40	27	38	35
RES096_GF	132B Woore St	Residential	45	32	35	22	33	15	15	36	15	15	27	29	17	31	33
RES097_GF	131 Hood St	Residential	45	29	36	23	43	18	16	38	23	23	38	39	27	37	35

ID (note: GF=ground floor, F1=floor 1)	Address	Usage	Daytime standard hours NML	New weir stages													
				Site preparation	Upgrade site access road	Install cofferdam	Sheet piling - fishway	Fishway construction	Remove cofferdam	Reinstate right embankment	Install cofferdam downstream	Install cofferdam upstream	Piling	Concreting	Install weir and fishway gates	Install powerlines, remove cofferdams, reinstate left bank	Site rehab
RES098_GF	129 Hood St	Residential	45	27	30	17	33	10	10	28	13	13	27	29	23	31	28
RES099_GF	122 Wore St	Residential	45	33	36	24	43	17	16	38	22	22	38	39	26	37	34
RES100_GF	120 Woore St	Residential	45	30	32	22	38	15	15	34	19	19	33	35	29	32	31
RES101_GF	5 Warrali Ave	Residential	45	35	37	23	44	18	16	39	19	21	34	36	24	37	36
RES102_GF	7 Warrali Ave	Residential	45	38	40	23	44	18	16	39	22	22	37	39	24	37	39
RES103_GF	9 Warrali Ave	Residential	45	36	38	23	44	18	16	39	22	22	39	40	26	38	37
RES104_GF	11 Warrali Ave	Residential	45	36	38	23	44	18	16	39	22	22	39	40	26	38	37
RES105_F 1	13 Warrali Ave	Residential	45	36	38	23	44	18	17	40	22	22	39	40	26	38	37
RES106_GF	17 Warrali Ave	Residential	45	36	38	23	45	19	16	40	23	23	39	41	26	38	37
RES107_GF	4 Warrali Ave	Residential	45	36	37	23	44	18	16	39	22	22	39	40	26	38	37
RES108_GF	6 Warrali Ave	Residential	45	36	37	23	44	18	16	39	22	22	39	40	26	38	37
RES109_GF	8 Warrali Ave	Residential	45	36	38	23	44	18	16	39	22	22	39	40	26	38	37
RES110_GF	10 Warrali Ave	Residential	45	36	38	23	44	18	17	39	22	22	39	40	26	38	37
RES111_GF	12 Warrali Ave	Residential	45	36	38	23	45	19	17	40	23	23	39	41	31	38	37
RES112_GF	14 Warrali Ave	Residential	45	36	38	24	45	19	17	40	23	23	39	41	30	39	37
RES113_GF	16 Warrali Ave	Residential	45	37	38	23	45	19	16	40	23	23	40	41	27	39	38
RES114_GF	1 South of river bend	Residential	45	54	57	48	50	41	41	46	45	45	46	48	44	46	55
RES115_GF	2 South of river bend	Residential	45	53	57	47	50	41	40	46	44	45	46	47	43	46	54
Wilcannia sports grounds	Wilcannia sports grounds	Active rec	65	30	31	18	35	11	11	30	16	14	29	30	15	28	31
Wilcannia Swimming Pool	Wilcannia Swimming Pool	Active rec	65	31	33	11	29	4	4	29	8	8	22	24	13	29	32
COM001_GF	9-11 Ross St	Commercial	70	19	22	13	29	6	6	24	9	9	23	24	14	22	20
COM002_GF	9-11 Ross St	Commercial	70	29	33	19	39	13	12	35	18	18	34	35	24	33	31
COM003_GF	Ross St	Commercial	70	33	35	20	41	15	13	36	20	20	36	37	23	35	34
COM004_GF	18-22 Bourke St	Commercial	70	32	34	19	40	14	12	36	19	19	35	36	22	34	33
COM005_F 1	24-26 Bourke St	Commercial	70	30	34	20	41	15	13	36	19	19	35	36	23	35	33
COM005_F 2	24-26 Bourke St	Commercial	70	30	34	20	41	15	13	36	19	19	35	36	23	35	33
COM006_GF	24-26 Bourke St	Commercial	70	32	34	20	41	15	13	36	19	19	35	36	23	35	33
COM007_GF	34-36 Reid St	Commercial	70	31	33	20	40	14	13	36	20	19	34	36	29	35	32
COM008_GF	40 Reid St	Commercial	70	32	35	21	41	15	14	36	20	20	36	37	23	36	33
COM009_GF	35-39 Reid St	Commercial	70	35	37	23	44	18	16	39	22	22	39	40	26	38	36
COM010_F 1	21 Reid St	Commercial	70	34	36	22	43	17	15	38	21	21	38	39	24	37	35
COM010_F 2	21 Reid St	Commercial	70	34	36	22	43	17	15	38	21	21	38	39	25	37	35
COM011_GF	19 Reid St	Commercial	70	32	33	20	40	14	13	35	18	19	35	36	25	34	33
COM012_GF	7 Reid St	Commercial	70	28	32	18	38	12	11	34	17	17	33	34	24	32	30
COM013_F 1	45 Reid St	Commercial	70	33	35	21	42	16	14	37	21	21	37	38	24	37	34
COM013_F 2	45 Reid St	Commercial	70	33	35	21	42	16	14	37	21	21	37	38	24	37	34
COM014_GF	65-67 Reid St	Commercial	70	35	37	22	43	17	15	38	21	21	37	38	25	37	36
COM015_GF	79 Reid St	Commercial	70	35	37	23	43	17	16	39	22	22	38	39	30	37	36
COM016_GF	82 Reid St	Commercial	70	34	36	23	43	17	16	38	22	22	38	39	28	37	35
COM017_F 1	89 Reid St	Commercial	70	35	36	22	38	15	15	37	20	16	35	37	27	34	36
COM017_F 2	89 Reid St	Commercial	70	35	36	22	43	17	15	38	22	22	37	39	27	37	36
COM018_GF	64 Reid St	Commercial	70	32	35	22	38	15	15	34	20	17	34	35	25	36	33
COM019_GF	56 Reid St	Commercial	70	33	37	23	43	17	16	38	21	21	37	38	25	36	35
COM020_GF	54 Reid St	Commercial	70	33	36	23	43	17	16	38	21	22	37	38	24	36	34
COM021_GF	48 Reid St	Commercial	70	34	36	22	43	17	15	38	21	22	38	39	25	39	35
COM022_F 1	46 Reid St	Commercial	70	33	35	21	42	16	14	37	21	21	37	38	24	36	34
COM022_F 2	46 Reid St	Commercial	70	33	35	21	42	16	14	37	21	21	37	38	24	36	34
COM023_GF	18-20 Myers St	Commercial	70	32	35	22	42	16	15	37	20	21	36	37	24	36	34
COM024_GF	2 Myers St	Commercial	70	31	36	23	41	15	16	37	20	20	36	37	25	35	34
IND001_F 1	39-41 Bourke St	Industrial	75	31	32	18	39	13	11	34	17	17	34	35	20	33	32
IND001_F 2	39-41 Bourke St	Industrial	75	31	32	19	39	13	12	34	18	18	34	35	26	33	32
IND002_GF	39-41 Bourke St	Industrial	75	33	35	21	42	16	14	37	20	20	36	37	28	36	34
IND003_GF	39-41 Bourke St	Industrial	75	30	32	18	39	13	11	34	17	17	34	35	23	33	31
OCT001_F 1	89 Reid St	Commercial	70	34	36	22	42	16	15	38	21	21	37	38	24	37	35
OCT001_F 2	89 Reid St	Commercial	70	35	36	22	42	16	15	38	21	22	37	39	31	37	36
OED001_GF	26 Reid St	Educational	55	31	34	20	40	14	13	36	19	19	35	36	22	35	32
OED002_GF	26 Reid St	Educational	55	26	28	12	31	5	5	26	9	9	25	27	12	25	27
OED003_GF	26 Reid St	Educational	55	31	33	19	40	14	12	35	18	18	34	35	21	34	32
OED004_GF	Lot 3711 Warrali Ave	Educational	55	39	41	27	48	22	20	43	26	26	42	44	29	42	40

ID (note: GF=ground floor, F1=floor 1)	Address	Usage	Daytime standard hours NML	New weir stages													
				Site preparation	Upgrade site access road	Install cofferdam	Sheet piling - fishway	Fishway construction	Remove cofferdam	Reinstate right embankment	Install cofferdam downstream	Install cofferdam upstream	Piling	Concreting	Install weir and fishway gates	Install powerlines, remove cofferdams, reinstate left bank	Site rehab
OED005_GF	Lot 3711, Warrali Ave	Educational	55	19	22	16	26	9	9	22	13	13	20	23	12	23	20
OED005_GF	Lot 3711, Warrali Ave	Educational	55	19	22	16	26	9	9	22	13	13	20	23	12	23	20
OHO001_GF	2 Myers St	Residential	45	31	34	15	33	7	8	29	12	12	28	29	15	35	32
OME001_GF	Wilcannia Hospital	Medical	55	31	33	18	40	14	11	35	18	17	34	35	21	33	32
OME002_GF	Wilcannia Hospital	Medical	55	31	35	20	40	14	13	36	18	18	34	35	21	33	34
OME003_GF	Wilcannia Hospital	Medical	55	30	32	11	26	4	4	25	7	7	20	21	6	19	31
OME004_GF	Wilcannia Hospital	Medical	55	34	36	21	42	16	14	37	20	20	37	38	28	36	35
OME005_GF	Wilcannia Hospital	Medical	55	31	33	19	39	13	12	34	17	17	34	35	23	33	32
Reconciliation Park	Reconciliation Park	Passive rec	60	26	28	10	27	3	3	22	7	7	21	22	9	20	27
Baker Park	Baker Park	Passive rec	60	<36	<38	<23	<43	<17	<16	<38	<22	<22	<38	<39	<25	<37	<37
Ray Hunter Memorial Park	Ray Hunter Memorial Park	Passive rec	60	<36	<38	<23	<43	<17	<16	<38	<22	<22	<38	<39	<25	<37	<37

Table A-4: Predicted noise levels during night-time working hours (5:00am to 7:00am) – new weir

All days between 10pm and 7am

This sheet presents the noise assessment results for when works are carried out at the new weir during the above times

Key:	
	Noise level is within NML, or does not trigger additional mitigation requirements
	Noticeable (0 to 5 dBA above the NML)
	Clearly audible (5 to 15 dBA above the NML)
	Moderately intrusive (15 to 25 dBA above the NML)
	Highly intrusive (>25 dB above the NML)

ID (note: GF=ground floor, F1=floor 1)	Address	Usage	Daytime standard hours NML	New weir stages													
				Site preparation	Upgrade site access road	Install cofferdam	Sheet piling - fishway	Fishway construction	Remove cofferdam	Reinstate right embankment	Install cofferdam downstream	Install cofferdam upstream	Piling	Concreting	Install weir and fishway gates	Install powerlines, remove cofferdams, reinstate left bank	Site rehab
RES001_GF	30 Ross St	Residential	35	25	27	10	31	5	3	26	9	9	26	27	15	25	26
RES002_GF	26 Ross St	Residential	35	30	32	18	39	13	11	34	17	17	33	34	20	32	31
RES003_GF	24 Ross St	Residential	35	30	32	18	39	13	11	34	17	17	33	34	20	32	31
RES004_GF	22 Ross St	Residential	35	28	32	18	36	10	11	34	17	17	33	34	24	33	29
RES005_GF	20 Ross St	Residential	35	30	32	18	39	13	11	34	17	17	33	34	24	33	31
RES006_GF	18 Ross St	Residential	35	30	32	18	39	13	11	34	17	17	33	34	22	33	31
RES007_GF	16 Ross St	Residential	35	28	32	18	33	11	11	34	17	10	33	34	22	33	29
RES008_GF	14 Ross St	Residential	35	29	32	18	39	13	11	34	17	17	34	34	24	33	31
RES009_GF	12 Ross St	Residential	35	26	27	10	31	5	3	27	9	8	26	28	14	25	27
RES010_GF	2 Ross St	Residential	35	31	33	18	35	11	11	34	11	13	29	30	16	29	32
RES011_GF	21 Ross St	Residential	35	31	32	18	39	13	11	34	17	17	34	35	21	33	32
RES012_GF	28 Bourke St	Residential	35	25	30	17	37	11	10	32	16	16	32	33	24	31	26
RES013_GF	30 Bourke St	Residential	35	30	32	18	38	12	11	34	17	17	33	34	25	32	31
RES014_GF	32 Bourke St	Residential	35	30	32	18	39	13	11	34	17	17	33	34	25	33	31
RES015_GF	34 Bourke St	Residential	35	32	34	20	41	15	13	36	19	19	36	37	26	35	33
RES016_GF	36 Bourke St	Residential	35	30	32	18	39	13	11	34	17	17	34	34	25	33	31
RES017_GF	40 Bourke St	Residential	35	30	32	18	39	13	11	34	17	17	34	34	21	33	31
RES018_GF	42 Bourke St	Residential	35	30	32	19	39	13	12	34	17	17	34	35	24	33	31
RES019_GF	2-4 Reid St	Residential	35	31	32	19	39	13	12	34	18	18	34	35	25	33	32
RES020_GF	6-8 Reid St	Residential	35	31	33	19	40	14	12	35	18	18	34	35	21	33	32
RES021_GF	10 Reid St	Residential	35	31	33	19	40	14	12	35	18	18	34	35	23	34	32
RES022_GF	12 Reid St	Residential	35	31	35	22	40	15	15	37	19	19	35	36	22	34	34
RES023_GF	14-16 Reid St	Residential	35	30	32	19	39	13	12	34	18	17	33	34	25	34	31
RES024_GF	14-16 Reid St	Residential	35	31	33	19	40	14	12	35	18	18	35	36	27	34	32
RES025_GF	14-16 Reid St	Residential	35	31	33	19	40	14	12	35	18	18	35	36	25	34	32
RES026_GF	38 Reid St	Residential	35	32	34	16	32	9	9	30	13	13	21	26	11	30	33
RES027_GF	5 Reid St	Residential	35	31	33	19	40	14	12	35	18	18	34	35	24	34	32
RES028_GF	13-15 Reid St	Residential	35	34	36	22	43	17	15	38	21	21	37	38	27	37	35
RES029_GF	3 Reid St	Residential	35	33	35	22	42	16	15	37	20	20	37	38	27	36	34
RES030_GF	1 Reid St	Residential	35	31	33	19	29	12	12	34	10	9	22	24	12	29	32
RES031_GF	2-10 Field St	Residential	35	33	35	20	42	16	13	37	20	20	36	37	23	36	34
RES032_GF	2-6 Byrnes St	Residential	35	32	34	20	40	14	13	36	19	19	35	36	26	34	33
RES033_GF	69 Reid St	Residential	35	36	38	23	43	17	16	38	22	22	38	39	25	37	37
RES034_GF	77 Reid St	Residential	35	35	36	23	43	17	16	38	22	22	38	39	25	37	36
RES035_GF	83 Reid St	Residential	35	35	37	23	43	17	16	39	22	22	38	40	26	38	36
RES036_GF	89 Reid St	Residential	35	35	37	24	44	18	17	39	23	23	39	40	26	38	36
RES037_GF	93-99 Reid St	Residential	35	35	38	24	44	18	17	40	23	23	39	41	27	38	36
RES038_GF	92 Reid St	Residential	35	33	37	23	43	17	16	38	20	22	38	39	25	38	34
RES039_GF	90 Reid St	Residential	35	35	37	24	44	18	17	39	21	22	39	40	32	38	36
RES040_GF	86-88 Reid St	Residential	35	34	37	23	44	18	16	39	23	23	38	40	33	38	35
RES041_GF	76 Reid St	Residential	35	34	36	23	43	17	16	38	22	22	38	39	29	37	35
RES042_GF	74 Reid St	Residential	35	35	37	23	44	18	16	39	22	23	38	40	32	38	36
RES043_GF	65-67 Reid St	Residential	35	35	38	24	44	18	17	40	24	23	39	41	33	39	36
RES044_GF	52 Reid St	Residential	35	33	36	22	43	17	15	38	21	22	37	39	25	36	34

ID (note: GF=ground floor, F1=floor 1)	Address	Usage	Daytime standard hours NML	New weir stages													
				Site preparation	Upgrade site access road	Install cofferdam	Sheet piling - fishway	Fishway construction	Remove cofferdam	Reinstate right embankment	Install cofferdam downstream	Install cofferdam upstream	Piling	Concreting	Install weir and fishway gates	Install powerlines, remove cofferdams, reinstate left bank	Site rehab
RES045_GF	6 Wilson St	Residential	35	35	37	24	44	18	17	39	23	23	39	40	26	38	36
RES046_GF	2-8 Martin St	Residential	35	36	38	23	44	18	16	39	22	23	39	40	26	38	37
RES047_GF	1-3 Palmer St	Residential	35	37	40	26	46	20	19	42	17	25	35	43	25	40	38
RES048_GF	5-7 Palmer St	Residential	35	38	40	27	47	21	20	42	26	26	42	44	29	41	39
RES049_GF	139-143 Woore St	Residential	35	35	38	25	44	18	18	39	24	24	39	40	28	39	36
RES050_GF	131-133 Woore St	Residential	35	35	37	24	44	18	17	39	23	23	39	40	27	38	36
RES051_GF	125 Woore St	Residential	35	34	37	23	43	17	16	39	23	23	38	40	26	38	35
RES052_GF	123 Woore St	Residential	35	34	36	23	43	17	16	38	23	23	38	39	26	37	35
RES053_GF	119-121 Woore St	Residential	35	37	39	26	46	20	19	41	25	25	41	42	30	40	38
RES054_GF	18 Martin St	Residential	35	33	36	23	43	17	16	38	22	22	38	39	25	37	34
RES055_GF	111 Woore St	Residential	35	34	36	22	43	17	15	38	22	22	37	39	30	37	35
RES056_GF	113 Woore St	Residential	35	33	35	21	40	14	14	35	20	19	34	36	21	33	34
RES057_GF	109 Woore St	Residential	35	33	36	22	43	17	15	38	21	21	37	38	30	37	34
RES058_GF	107 Woore St	Residential	35	32	34	23	42	16	16	38	21	22	37	38	30	37	33
RES059_GF	105 Woore St	Residential	35	35	37	24	44	18	17	39	23	23	39	40	30	38	36
RES060_GF	103 Woore St	Residential	35	32	36	22	42	16	15	38	22	22	37	38	32	36	33
RES061_GF	13 Cleaton St	Residential	35	23	25	13	32	6	6	27	10	10	26	27	22	25	24
RES062_GF	11 Cleaton St	Residential	35	28	31	16	34	8	9	30	12	12	28	30	21	28	29
RES063_GF	95 Woore St	Residential	35	34	36	21	42	16	14	37	21	21	36	38	30	36	35
RES064_GF	87-89 Woore St	Residential	35	34	36	21	41	15	14	37	20	20	36	37	28	36	35
RES065_GF	16 Myers St	Residential	35	26	31	16	37	11	9	33	14	15	32	34	18	31	29
RES066_GF	73 Woore St	Residential	35	31	33	15	33	8	8	28	12	13	27	28	20	29	32
RES067_GF	71 Woore St	Residential	35	32	35	21	41	15	14	37	20	20	36	37	23	36	33
RES068_GF	69 Woore St	Residential	35	32	35	21	41	15	14	37	20	20	36	37	23	35	33
RES069_GF	63 Woore St	Residential	35	31	34	22	41	15	14	37	20	20	36	37	26	35	32
RES070_GF	61 Woore St	Residential	35	33	36	22	42	16	15	38	19	19	35	36	27	35	34
RES071_GF	59 Woore St	Residential	35	31	34	20	40	14	13	35	19	19	35	36	25	35	32
RES072_GF	57 Woore St	Residential	35	31	33	20	40	14	13	35	19	19	35	36	23	34	32
RES073_GF	51-55 Woore St	Residential	35	31	33	20	40	14	13	35	18	18	35	36	21	34	32
RES074_GF	47-49 Woore St	Residential	35	29	31	18	37	11	11	33	17	17	32	33	20	34	29
RES075_GF	45 Woore St	Residential	35	25	28	18	35	11	11	30	12	12	29	31	16	28	27
RES076_GF	43 Woore St	Residential	35	30	32	19	39	13	12	34	17	17	34	35	24	33	31
RES077_GF	31-33 Woore St	Residential	35	30	32	18	39	13	11	34	17	17	33	34	26	33	31
RES078_GF	27-29 Woore St	Residential	35	25	27	10	27	2	3	22	6	6	21	23	12	20	26
RES079_GF	23-25 Woore St	Residential	35	29	31	18	38	12	11	33	16	16	33	34	24	32	30
RES080_GF	19-21 Woore St	Residential	35	29	31	18	38	12	11	33	16	16	33	33	23	32	30
RES081_GF	32A Bourke St	Residential	35	32	34	21	41	15	14	36	17	17	33	34	24	32	33
RES082_GF	34A Bourke St	Residential	35	32	34	21	41	15	14	36	19	19	36	37	27	35	33
RES083_GF	148 Woore St	Residential	35	35	38	25	44	18	18	39	24	24	39	40	28	39	36
RES084_GF	140-142 Woore St	Residential	35	35	37	25	44	18	17	39	24	24	39	40	28	38	36
RES085_GF	40 Adams St	Residential	35	34	37	24	44	18	17	39	23	23	38	40	27	38	35
RES086_GF	38 Adams St	Residential	35	34	37	25	44	18	18	39	25	23	39	40	31	38	36
RES087_GF	44 Adams St	Residential	35	34	37	24	43	17	17	39	23	23	38	40	27	38	36
RES088_GF	46 Adams St	Residential	35	34	36	24	43	17	17	38	22	23	37	38	27	37	35
RES089_GF	48 Adams St	Residential	35	34	37	24	43	17	17	38	23	23	38	39	27	37	35
RES090_GF	137 Hood St	Residential	35	34	37	24	44	18	17	39	21	23	37	39	33	38	35
RES091_GF	143-145 Hood St	Residential	35	34	37	25	44	18	18	39	24	24	39	40	28	38	35
RES092_GF	143-145 Hood St	Residential	35	34	37	25	44	18	18	39	24	24	39	40	28	38	35
RES093_GF	134A Woore St	Residential	35	34	37	24	44	18	17	39	23	23	38	40	28	38	35
RES094_GF	134B Woore St	Residential	35	29	35	18	35	11	11	30	16	16	30	31	26	31	30
RES095_GF	132A Woore St	Residential	35	34	37	24	43	17	17	39	23	23	38	40	27	38	35
RES096_GF	132B Woore St	Residential	35	32	35	22	33	15	15	36	15	15	27	29	17	31	33
RES097_GF	131 Hood St	Residential	35	29	36	23	43	18	16	38	23	23	38	39	27	37	35
RES098_GF	129 Hood St	Residential	35	27	30	17	33	10	10	28	13	13	27	29	23	31	28
RES099_GF	122 Wore St	Residential	35	33	36	24	43	17	16	38	22	22	38	39	26	37	34
RES100_GF	120 Woore St	Residential	35	30	32	22	38	15	15	34	19	19	33	35	29	32	31
RES101_GF	5 Warrali Ave	Residential	35	35	37	23	44	18	16	39	19	21	34	36	24	37	36
RES102_GF	7 Warrali Ave	Residential	35	38	40	23	44	18	16	39	22	22	37	39	24	37	39
RES103_GF	9 Warrali Ave	Residential	35	36	38	23	44	18	16	39	22	22	39	40	26	38	37
RES104_GF	11 Warrali Ave	Residential	35	36	38	23	44	18	16	39	22	22	39	40	26	38	37
RES105_F 1	13 Warrali Ave	Residential	35	36	38	23	44	18	17	40	22	22	39	40	26	38	37

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RES106_GF	17 Warrali Ave	Residential	35	36	38	23	45	19	16	40	23	23	39	41	26	38	37
RES107_GF	4 Warrali Ave	Residential	35	36	37	23	44	18	16	39	22	22	39	40	26	38	37
RES108_GF	6 Warrali Ave	Residential	35	36	37	23	44	18	16	39	22	22	39	40	26	38	37
RES109_GF	8 Warrali Ave	Residential	35	36	38	23	44	18	16	39	22	22	39	40	26	38	37
RES110_GF	10 Warrali Ave	Residential	35	36	38	23	44	18	17	39	22	22	39	40	26	38	37
RES111_GF	12 Warrali Ave	Residential	35	36	38	23	45	19	17	40	23	23	39	41	31	38	37
RES112_GF	14 Warrali Ave	Residential	35	36	38	24	45	19	17	40	23	23	39	41	30	39	37
RES113_GF	16 Warrali Ave	Residential	35	37	38	23	45	19	16	40	23	23	40	41	27	39	38
RES114_GF	1 South of river bend	Residential	35	54	57	48	50	41	41	46	45	45	46	48	44	46	55
RES115_GF	2 South of river bend	Residential	35	53	57	47	50	41	40	46	44	45	46	47	43	46	54
OHO001_GF	2 Myers St	Residential	35	31	34	15	33	7	8	29	12	12	28	29	15	35	32
OME001_GF	Wilcannia Hospital	Medical	35	31	33	18	40	14	11	35	18	17	34	35	21	33	32
OME002_GF	Wilcannia Hospital	Medical	35	31	35	20	40	14	13	36	18	18	34	35	21	33	34
OME003_GF	Wilcannia Hospital	Medical	35	30	32	11	26	4	4	25	7	7	20	21	6	19	31
OME004_GF	Wilcannia Hospital	Medical	35	34	36	21	42	16	14	37	20	20	37	38	28	36	35
OME005_GF	Wilcannia Hospital	Medical	35	31	33	19	39	13	12	34	17	17	34	35	23	33	32