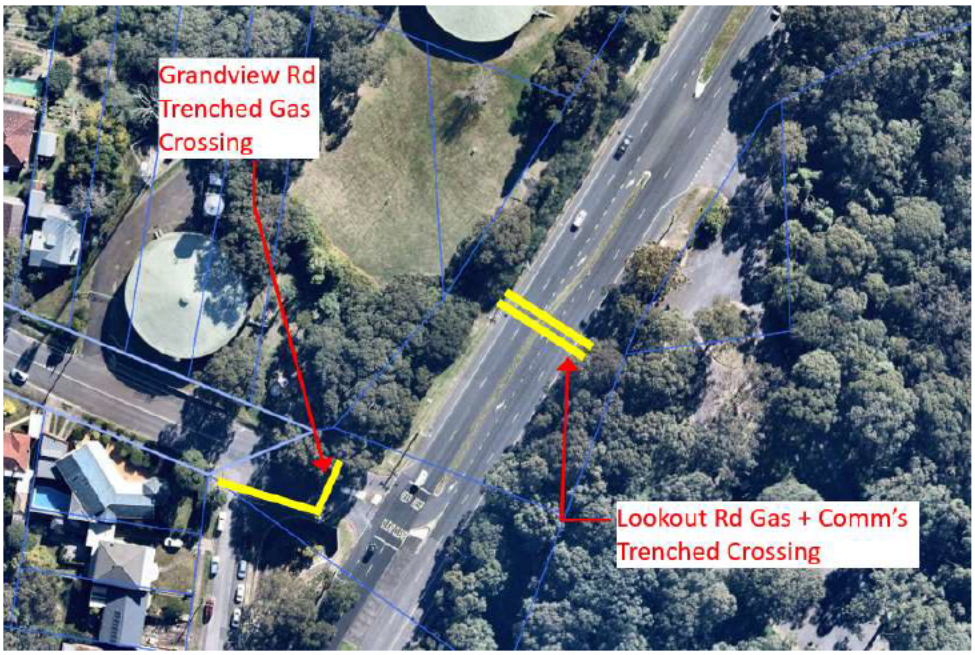
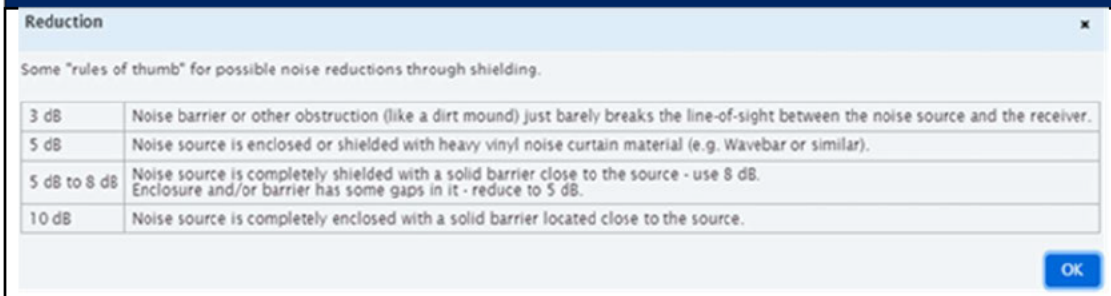
RP2J Project OOHW application form

Out of hours work approval request form			
No:	**Notification date:**	**Approval date:**	**Project:**
025	**17/09/2021**		**RP2J – Southern Utilities**
A. Contact details	**Name**	**Mobile number**	**Email**
Contractor Environmental Site Representative	Richard Lipar	[redacted]	[redacted]
Contractor Project Manager	Mike Billington	[redacted]	[redacted]
Contractor Foreman	Daniel Tregeagle	[redacted]	[redacted]
Contractor Project Engineer	Joey O'Connor	[redacted]	[redacted]

B. Details of work: Include a map showing location of work extent and nearest sensitive receivers	
Location / chainages:	Lookout Rd Gas and Comm's Trenched Road Crossings at CH71150 Grandview Road Gas Trenched Road Crossings Refer Map Below: 
NCA/s:	NCA-13
Description of works – also include a brief description of the sequence of activities:	Works involve constructing trenched utility crossings across Lookout and Grandview Roads including, excavation, conduit install, backfill with stabilised sand and reinstatement of pavement (asphalt and roadbase) Refer to **Appendix A** for more detailed summary of planned shifts, location, activities and plant.
Machinery/ plant to be used	Refer to **Appendix A** for detailed summary of machinery / plant that will be used and corresponding shifts.

Out of hours work approval request form	
Traffic control measures required:	Lookout Road Northbound Lane Closures McCaffrey Drive Eastbound Lane Closures
Lighting required:	Lighting towers will be provided to highlight road works zone for motorists, and battery operated task lighting will be provided at specific locations.
Proposed dates:	11/10/21 - 13/10/21 (3 Nights on Lookout Road Northbound) 11/10/21 – 13/10/21 (3 Nights in Grandview Road) 18/10/21 – 20/10/21 (3 Nights on Lookout Road Southbound)
Proposed times:	Start 1900 – Finish 0500 on each shift
Justification – why does work need to occur outside of standard construction hours?: (attach support information as required)	Works need to be carried out under a contra-flow traffic arrangement on Lookout Road and full closure of Grandview Road for the safety of workers and public. City of Newcastle Council will not issue a Road Occupancy Licence (ROL) for daytime closure of Grandview Road. TfNSW - Road Access Management (RAM) will not issue a Road Occupancy Licence (ROL) for contra-flow traffic on Lookout Road during the day.
C. Risk assessment	
NML (refer Table 3-2 of OOHW protocol)	Evening: 54 dB(A). Night: 38 dB(A)
Is the work highly noise intensive? (above 75dB(A) $L_{Aeq\ (15\ minute)}$)	No
Risk factor category (refer section 4.3 of OOHW protocol):	Low Risk. Maximum worst case cumulative predicted noise level ($L_{Aeq\ 15\ min.}$) = 71dB(A) during the evening period and 60dB(A) during the night period. This is >25dB(A) above RBL (33dB(A)) for one resident.
D. Details of noise or vibration assessment completed:	
Detailed noise assessments were completed using noise modelling program named *KNOWnoise: Minor Works* which is developed and owned by Hutchison Weller. This program, and it's more advanced version *KNOWnoise,* are used on many large-scale infrastructure projects to determine and model likely noise impacts on sensitive receivers. As works are predicted to carry over the Evening and Night OOHW Periods, a detailed noise assessment was completed to determine predicted noise impacts for the Evening and Night Periods. The evening periods have different plant modelled as some higher impact works such as sawcutting at Grandview Rd and rock breaking on Lookout Rd will be carried out during these periods. Detailed noise assessment reports are attached to this OOHW Application. Report includes a map of predicted impacts on sensitive receivers and predicted noise levels at each receiver's address. Grandview and Lookout Road areas were treated separately as the equipment required for each area differs significantly. One limitation of the noise assessment is that it cannot model the cumulative impacts from both activities. However, as the impact from the closest works at Grandview Road is 15dB(A) higher than the impact from the Lookout Road works, the cumulative impact is negligible. Where noise reductions such as noise blankets are applied to the noise assessments it is detailed in the table in **Appendix B** of the noise assessments. The reductions applied are in line with the following:	



Reduction

Some "rules of thumb" for possible noise reductions through shielding.

3 dB	Noise barrier or other obstruction (like a dirt mound) just barely breaks the line-of-sight between the noise source and the receiver.
5 dB	Noise source is enclosed or shielded with heavy vinyl noise curtain material (e.g. Wavebar or similar).
5 dB to 8 dB	Noise source is completely shielded with a solid barrier close to the source - use 8 dB. Enclosure and/or barrier has some gaps in it - reduce to 5 dB.
10 dB	Noise source is completely enclosed with a solid barrier located close to the source.

OK

All applicable data was added to the model, including but not limited to, specific information on the proposed activity, project adopted RBLs and NMLs, extent of works, plant and equipment to be used, proposed mitigation measures etc. Using this data, and data within the program, detailed noise assessment reports were produced giving accurate predicted noise impacts for the period assessed. Specific assessment methodology is described on Page 3 of each report.

Predicted impacts:

The noise assessment considers 4 separate periods/location of work, impacts are summarised as follows:

Grandview Road - Evening Period (11/10/21 to 13/10/21)

The predicted maximum worst case cumulative noise level (LAeq, 15 min) is 71dB(A).
There are 7 receivers for which the works will be noticeable (1- 5 dB(A) above NML).
There are 4 receivers for which the works will be Clearly Audible (6-15 dB(A) above NML).
There are 1 receivers for which the works will be Moderately Intrusive (15-25 dB(A) above NML)

Grandview Road - Night Period (11/10/21 to 13/10/21)

The predicted maximum worst case cumulative noise level (LAeq, 15 min) is 60dB(A).
There are 12 receivers for which the works will be noticeable (1- 5 dB(A) above NML).
There are 10 receivers for which the works will be Clearly Audible (6-15 dB(A) above NML).
There are 2 receivers for which the works will be Moderately Intrusive (15-25 dB(A) above NML)

Lookout Road - Evening Period (11/10/21 to 13/10/21 and 18/10/21 to 20/10/21)

The predicted maximum worst case cumulative noise level (LAeq, 15 min) is 54dB(A).
There are 2 receivers for which the works will be noticeable (1- 5 dB(A) above NML).

Lookout Road - Night Period (11/10/21 to 13/10/21 and 18/10/21 to 20/10/21)

The predicted maximum worst case cumulative noise level (LAeq, 15 min) is 45dB(A).
There are 19 receivers for which the works will be noticeable (1- 5 dB(A) above NML).
There are 4 receivers for which the works will be Clearly Audible (6-15 dB(A) above NML).

Refer to the following detailed Noise Assessments in **Appendix B**:

Predicted Vibration Impacts:

No vibration impacts are predicted as a result of these works. A light weight plate compactor will be used for backfill of trenched crossings at Grandview. The closest point of the trench will be 13m from the closest dwelling resulting in estimated vibration impacts of 0.3 – 0.6mm/s.

The activity is not considered to encroach into either “human comfort” (>1mm/s) or “structural damage” (>5mm/s) vibration criteria, based on distance, and equipment and methodology used.

Out of hours work approval request form

E. Proposed mitigation measures, including respite

Works at Grandview Rd and Lookout Rd have been combined to minimise the total number of nights of OOHW. Recent OOHW (Refer Application 24) was located at the opposite end of the project to ensure the same receivers are not continually affected. Additionally, works have been planned to be carried out in 2 separate blocks with 4 days in between to provide respite to the residents. Sawcutting for the Lookout Road Crossings will also be carried out during daytime lane closures, to limit high impact works to be carried out at night.

The following mitigation measures were proposed based on those identified in the *OOHW Protocol – Section 5.1* and *Table 5-1: Hierarchy for application of additional mitigation for airborne noise.*

Standard Mitigation Measures (OOHW Protocol):

- Modifying behavioural practices on site
- Equipment selection / maintaining and monitoring plant
- Use and siting of plant and hoardings
- Site inductions
- Use of non-tonal reversing alarms
- Stakeholder notification
- Planning noisier work to be carried out earlier in the period.

NVMP Mitigation measures:

- Noise blankets to be utilised for the Grandview Rd properties during all activities/nights.
- Reduction of machinery usage outside these properties during the night period is also noted.
- Where practical, operating machines at low speed / power and switching them off when not in use rather than leaving them idling for prolonged periods;
- Minimising the reversing of machines;
- All employees, contractors and subcontractors are to receive an environmental induction.
- No swearing or unnecessary shouting or loud stereos/radios on site.
- Limit compression braking at night in residential areas.
- No dropping of materials from height, throwing of metal items and slamming of doors.

Additional Mitigation Measures (OOHW Protocol):

For Residents 5-15 dB(A) above NML

- Notification
- Verification
- Duration Respite

For Residents 15-25 dB(A) above NML

- Phone Call / Individual Briefing
- Duration Respite
- Respite offer period 2
- Verification

F. Community consultation

Out of hours work approval request form
Outline consultation undertaken for the proposed OOHW: Individual briefings (face to face meetings) were carried out for two of the residential properties identified in the 'Moderately Intrusive' classification (15-25 dB(A) above NML). This briefing included gaining approval from the property that exceeded 25 dB(A) above the RBL i.e., [redacted] New Lambton Heights Attempts have been made to contact the residents of [redacted] with no response to date. **Note: The property details for consultation will differ slightly to the noise assessments, as the noise model recognises 162 & 164 Lookout Road as a single dwelling and recognises 1 Grandview as 160 Lookout Road.** The properties identified in **Appendix E** will be provided a written notification describing the upcoming OOH works and likely impacts. Refer to **Appendix D** for draft notification letter to be delivered no more than 5 days prior to undertaking the works.
Has respite periods for OOHW been identified with the affected community on a monthly basis and a three-month schedule of likely OOHW provided (refer CoA E29)? Yes, likely OOHW identified in 3 monthly look-ahead notification which covers likely OOHW. September notification was delivered to the community on 09th September and October notification will be delivered in early October. All affected receivers for this application received the 3 monthly notification. Refer to **Appendix C** for three month Lookahead. Respite has been taken into account as works have been planned to start about 2 weeks after previous OOHW on 30/09/21 as part of OOHW Application 22.
Has the outcome of community consultation, the identified respite periods and scheduling of likely OOHW been provided to the ER, EPA and Planning Secretary? The schedule of OOHW is provided to the ER, EPA and the Planning Secretary on a monthly basis. Transport for NSW also provides further detail on the community consultation and respite to the ER and Planning Secretary through the OOHW application process when relevant to OOHW, and when approval is sought. The EPA will be provided with relevant information through the six-monthly compliance reporting process by Transport.
G. Respite framework
Outline any previous respite within the last month and the status of community agreements (where relevant)? Previous OOHW scheduled on 30th of September providing about 2 weeks respite before this activity.
Have cumulative impacts from OOHW permitted by an EPL been considered during the development appropriate respite? N/A
H. Details of non-residential receivers (if any) and corresponding NMLs
Comments: Using the current noise assessment software it is noted that noise at the nearby sensitive receiver of John Hunter Hospital will not exceed the NML of 38db(A) during the planned works.
I. Are there any properties at risk of exceeding the screening criteria for cosmetic damage?
Comments: No

Out of hours work approval request form			
I. Review/ Endorsements			
Contractor Community Liaison Representative			Date: 21 Sept 2021
	The affected sensitive receivers will be notified no later than 5 days prior to start of work via letter		
	Have the works been reviewed and endorsed?		Yes
	Name:	Signature:	Date:
	Nikki Taylor	[redacted]	17/09/21
	Comments:		
Transport for NSW Environmental Manager (or delegate)	Agreed mitigation measures:		
	Have the works been reviewed and endorsed? Have the works been approved where neither low or high risk?		Yes / No Yes / No
	Name:	Signature:	Date:
	Andrew Grainger	[redacted]	21/09/2021
	Comments:		
Transport for NSW Project Manager	Have the works been reviewed and endorsed? Have the works been approved where neither low or high risk?		Yes / ~~No~~ ~~Yes~~ / No
	Name:	Signature:	Date:
	Brett Kendall	[redacted]	21/09/2021
	Comments:		
ER approval (low risk activities)	Are the works approved?		Yes / No
	Name:	Signature:	Date:
	Simon Williams	[redacted]	22/09/2021
	Comments:		
Planning Secretary approval (high risk activities)	Are the works approved?		Yes / No
	Name:	Signature:	Date:
	Comments:		

Appendix A – Detailed Schedule of Activities

SHIFT NO.	PLANNED DATE	LOCATION	ACTIVITIES & SEQUENCE	PLANT USED	REF. NOISE ASSESSMENTS
1	**Mon, 11 Oct 21**	Lookout Rd - NB Carriageway CH71150	1900 - 1930: Complete pre-start briefing with project team at compound 1930 - 1945: Set up traffic control 2015 - 2030: Mobilise equipment to the work area 2030 - 2200: Demolish Pavement Along line of Gas Trench 2200 - 0000: Excavate trench and install conduits 0000 - 0130: Backfill trench with stabilised sand to underside of pavement 0130 - 0300: Place Asphalt Pavement Layer 1 0300 - 0345: Install Road Plates to trench and make safe for traffic 0345 - 0415: Clean up and de-mobilise from roadway 0415 – 0500: Remove traffic control and reopen lanes to traffic	Lighting Towers x 2 Light Vehicle Truck (10Tonne) 12-15T Excavator (with Breaker) 6-8T Excavator Telehandler Plate Compactor	ID 0002 - Lookout Rd Trenched Utility Crossings (Night Period) ID 0003 - Lookout Rd Trenched Utility Crossings (Evening Period)
		Grandview Road Crossing (15m of Trench)	1900 - 1930: Complete pre-start briefing with project team at compound 1930 - 1945: Set up traffic control 2015 - 2030: Mobilise equipment to the work area 2030 - 2200: Sawcut and Demolish Pavement Along line of Trench 2200 - 0000: Excavate trench and install Gas conduit 0000 - 0130: Backfill trench with stabilised sand and roadbase 0130 - 0300: Place asphalt temporary reinstatement 0300 - 0330: Clean up and de-mobilise from roadway 0415 – 0500: Remove traffic control and reopen lanes to traffic	Lighting Tower Light Vehicle Truck (10Tonne) 6T Excavator Road Saw Plate Compactor	ID 0001 - Grandview Jemena Gas Crossings (Night Period) ID 0004 - Grandview Jemena Gas Crossings (Evening Period)
2	**Tue, 12 Oct 21**	Lookout Rd - NB Carriageway CH71150	1900 - 1930: Complete pre-start briefing with project team at compound 1930 - 1945: Set up traffic control 2015 - 2030: Mobilise equipment to the work area 2030 - 2200: Demolish Pavement Along line of Comm's Trench 2200 - 0000: Excavate Comm's trench and install conduits, Place Asphalt to Gas Trench Layer 2 0000 - 0130: Backfill Comm's trench with stabilised sand, Place Asphalt to Gas Trench Layer 3 0130 - 0300: Place Asphalt Pavement to Comm's Trench Layer 1 0300 - 0345: Install Road Plates to Comm's trench and make safe for traffic 0345 - 0415: Clean up and de-mobilise from roadway 0415 – 0500: Remove traffic control and reopen lanes to traffic	Lighting Towers x 2 Light Vehicle Truck (10Tonne) 12-15T Excavator (with Breaker) 6-8T Excavator Telehandler Plate Compactor	ID 0002 - Lookout Rd Trenched Utility Crossings (Night Period) ID 0003 - Lookout Rd Trenched Utility Crossings (Evening Period)
		Grandview Road Verge and Lookout Rd Cul-de-sac	1900 - 1930: Complete pre-start briefing with project team at compound 1930 - 1945: Set up traffic control 2015 - 2030: Mobilise equipment to the work area 2030 - 2200: Sawcut and Demolish Pavement Along line of Trench 2200 - 0000: Excavate trench and install Gas conduit 0000 - 0130: Backfill trench with stabilised sand and roadbase 0130 - 0300: Place asphalt temporary reinstatement 0300 - 0330: Clean up and de-mobilise from roadway 0415 – 0500: Remove traffic control and reopen lanes to traffic	Lighting Tower Light Vehicle Truck (10Tonne) 6T Excavator Road Saw Plate Compactor	ID 0001 - Grandview Jemena Gas Crossings (Night Period) ID 0004 - Grandview Jemena Gas Crossings (Evening Period)
3	**Wed, 13 Oct 21**	Lookout Rd - NB Carriageway CH71150	1900 - 1930: Complete pre-start briefing with project team at compound 1930 - 1945: Set up traffic control 2015 - 2030: Mobilise equipment to the work area 2030 - 2200: Place Asphalt to Comm's Trench Layer 2 2200 - 0000: Place Asphalt to Comm's Trench Layer 3 0000 - 0100: Clean up and de-mobilise from roadway 0100 - 0415: Contingency 0415 – 0500: Remove traffic control and reopen lanes to traffic	Lighting Towers x 2 Light Vehicle Truck (10Tonne) 12-15T Excavator (with Breaker) 6-8T Excavator Telehandler Plate Compactor	ID 0002 - Lookout Rd Trenched Utility Crossings (Night Period) ID 0003 - Lookout Rd Trenched Utility Crossings (Evening Period)
		Grandview Road Verge and Lookout Rd Cul-de-sac	1900 - 1930: Complete pre-start briefing with project team at compound 1930 - 1945: Set up traffic control 2015 - 2030: Mobilise equipment to the work area 2030 - 2200: Sawcut and Demolish Pavement Along line of Trench 2200 - 0000: Excavate trench and install Gas conduit 0000 - 0130: Backfill trench with stabilised sand and roadbase 0130 - 0300: Place asphalt temporary reinstatement 0300 - 0330: Clean up and de-mobilise from roadway 0415 – 0500: Remove traffic control and reopen lanes to traffic	Lighting Tower Light Vehicle Truck (10Tonne) 6T Excavator Road Saw Plate Compactor	ID 0001 - Grandview Jemena Gas Crossings (Night Period) ID 0004 - Grandview Jemena Gas Crossings (Evening Period)

SHIFT NO.	PLANNED DATE	LOCATION	ACTIVITIES & SEQUENCE	PLANT USED	REF. NOISE ASSESSMENTS
			RESPITE PERIOD (4 NIGHTS)		
4	**Mon, 18 Oct 21**	Lookout Rd - SB Carriageway CH71150	1900 - 1930: Complete pre-start briefing with project team at compound 1930 - 1945: Set up traffic control 2015 - 2030: Mobilise equipment to the work area 2030 - 2200: Demolish Pavement Along line of Gas Trench 2200 - 0000: Excavate trench and install conduits 0000 - 0130: Backfill trench with stabilised sand to underside of pavement 0130 - 0300: Place Asphalt Pavement Layer 1 0300 - 0345: Install Road Plates to trench and make safe for traffic 0345 - 0415: Clean up and de-mobilise from roadway 0415 – 0500: Remove traffic control and reopen lanes to traffic	Lighting Towers x 2 Light Vehicle Truck (10Tonne) 12-15T Excavator (with Breaker) 6-8T Excavator Telehandler Plate Compactor	ID 0002 - Lookout Rd Trenched Utility Crossings (Night Period) ID 0003 - Lookout Rd Trenched Utility Crossings (Evening Period)
5	**Tue, 19 Oct 21**	Lookout Rd - SB Carriageway CH71150	1900 - 1930: Complete pre-start briefing with project team at compound 1930 - 1945: Set up traffic control 2015 - 2030: Mobilise equipment to the work area 2030 - 2200: Demolish Pavement Along line of Comm's Trench 2200 - 0000: Excavate Comm's trench and install conduits, Place Asphalt to Gas Trench Layer 2 0000 - 0130: Backfill Comm's trench with stabilised sand, Place Asphalt to Gas Trench Layer 3 0130 - 0300: Place Asphalt Pavement to Comm's Trench Layer 1 0300 - 0345: Install Road Plates to Comm's trench and make safe for traffic 0345 - 0415: Clean up and de-mobilise from roadway 0415 – 0500: Remove traffic control and reopen lanes to traffic	Lighting Towers x 2 Light Vehicle Truck (10Tonne) 12-15T Excavator (with Breaker) 6-8T Excavator Telehandler Plate Compactor	ID 0002 - Lookout Rd Trenched Utility Crossings (Night Period) ID 0003 - Lookout Rd Trenched Utility Crossings (Evening Period)
6	**Wed, 20 Oct 21**	Lookout Rd - SB Carriageway CH71150	1900 - 1930: Complete pre-start briefing with project team at compound 1930 - 1945: Set up traffic control 2015 - 2030: Mobilise equipment to the work area 2030 - 2200: Place Asphalt to Comm's Trench Layer 2 2200 - 0000: Place Asphalt to Comm's Trench Layer 3 0000 - 0100: Clean up and de-mobilise from roadway 0100 - 0415: Contingency 0415 – 0500: Remove traffic control and reopen lanes to traffic	Lighting Towers x 2 Light Vehicle Truck (10Tonne) 12-15T Excavator (with Breaker) 6-8T Excavator Telehandler Plate Compactor	ID 0002 - Lookout Rd Trenched Utility Crossings (Night Period) ID 0003 - Lookout Rd Trenched Utility Crossings (Evening Period)

Appendix B - RP2J - Southern Utilities - Noise Impact Assessments

Construction noise impact assessment

Grandview Jemena Gas Crossings

Proposed works	Jemena Gas Crossings		
Proponent	Quickway		
Assessment Date	15/09/2021		
Prepared by	Mike Billington	**Assessment Id**	0001

Introduction

This report has been prepared using the construction noise self-assessment platform KNOWnoise: *Minor Works* and presents an assessment of the likely noise impacts related to proposed works associated with the above project. Where possible, these works would be completed during standard construction hours; however, there may be a need to work outside these hours due to technical, community or access limitations. The location of the proposed works is illustrated in Appendix A.

Planned works

A description of the proposed works is as follows.

Jemena Gas Crossings in Grandview Rd

Proposed activities and equipment for the works are summarised in Appendix B.

Though subject to change, the works are expected to commence around 11/10/2021 and would be completed by 13/10/2021.

Assessment criteria and mitigation requirements

The Interim Construction Noise Guideline (ICNG) (DECC 2009) describes noise more than the background level as potentially having an adverse impact on sensitive receivers and increasing the likelihood of complaint. During standard construction hours, where construction noise is within 10 dB(A) of the RBL, impacts would be acceptable.

Where construction noise is more than 10 dB(A) above the RBL during standard construction hours, a residential receiver is considered noise affected and the proponent should undertake all reasonable and feasible steps necessary to manage the impact and consult with the affected community.

Above a LAeq, 15 minute noise level of 75 dB(A), a receiver is highly affected, requiring consideration of additional mitigation measures including alternative accommodation in the night period.

Outside standard construction hours, construction noise at a residential receiver more than 5 dB(A) above the RBL is taken to be noise affected.

In addition, annoying noise such as rock hammers, impact piling, or other impulsive noise sources usually result in greater annoyance than continuous construction noise. A 5 dB(A) penalty is applicable to such activities prior to comparison with the NMLs.

Other sensitive land uses, such as schools and offices, typically find noise from construction disruptive when the properties are being used (such as during work and school times). Table 2 presents NMLs from the ICNG for sensitive land uses based on the principle that the characteristic activities for each of these land uses should not be unduly disturbed.

Table 1 Non-residential sensitive land uses noise management levels

Land use	Noise assessment location	NML ($L_{Aeq,15min}$)
Classrooms at schools and other educational institutions	Internal	45
Places of worship		
Active recreation areas (such as sporting activities and activities which generate their own noise or focus for participants)	External	65
Passive recreation areas (contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External	60
Industrial premises	External	75
Office, retail outlets	External	70

As part of planning for out of hours works, standard mitigation measures, as described in the ICNG and CNVG, would be implemented where reasonable and feasible. However, after these measures have been applied, noise and vibration levels may continue to exceed the NMLs.

In this case, additional mitigation measures outlined in the CNVG, which largely focus on engagement with affected sensitive receivers, should be implemented where reasonable and feasible, unless other agreements are in place with the impacted receiver.

Triggers and additional mitigation measures for airborne noise are summarised in Table 2. Further details of specific additional mitigation measures are described in the CNVG.

Table 2 Triggers for additional mitigation measures – Airborne noise (Roads and Maritime 2016)

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

Notes:
PC = Phone calls
V = verification
IB = Individual briefings
N= Notification
AA = Alternative accommodation
SN = Specific notifications
RO = Respite offer
R1 = Respite period 1
R2 = Respite period 2
DR = Duration respite
Perception = relates to levels above RBL
NML = Noise management level
HA = Highly affected

Existing environment and noise management levels

The proposed works would be undertaken in a predominantly Urban, characterised as:

Areas with medium density transportation or some commerce or industry.

Typically traffic is moving from one area to another (light & heavy vehicles) with heavy peak hour traffic movement.

May be on or close to bus route/ light rail.

Background noise levels adopted for the project area and associated noise management levels (NMLs) are summarised in Table 3. NMLs have been established in line with the ICNG.

Table 3 Construction NMLs

Land use	**Urban**		Using custom background noise data?		**Yes**
Criterion	Day	Weekend Day	Evening	Night	Sleep
RBL	56	56	49	33	
NML	61	61	54	38	38

Sleep disturbance

The ICNG recommends where construction works are planned to extend over more than two consecutive nights, the maximum noise level should be considered for the purposes of establishing the likelihood of sleep disturbance. The Road Noise Policy suggests that maximum internal noise levels below 50-55 dB(A) are unlikely to awaken people from sleep and one or two noise events per night, with maximum internal noise levels of 65-70 dB(A) are not likely to affect health and wellbeing significantly.

Based on this, a sleep awakening criterion of 55 dB(A) (internal) is typically adopted for works. Given that noise attenuation of 10 dB(A) is typically provided by an open window, a sleep awakening criterion of LAmax 65 dB(A) (external) has been applied to residential bedroom façades. This is consistent with the sleep disturbance threshold described in Appendix E of the CNVG.

Assessment methodology

Based on the nominated works area (illustrated in Appendix A), proposed equipment and the minimum distance from the works to each sensitive receiver, noise levels were calculated based on CONCAWE (1981) P*ropagation of noise from petroleum and petrochemical complexes to neighboring communities.*

This method considers geometric spreading, atmospheric absorption, ground effects and is valid for meteorological conditions of a gentle breeze from source to receiver and stable atmosphere (temperature inversion).

KNOWnoise: Minor works is a 2-Dimensional assessment platform and does not consider terrain effects (e.g. hills, valleys) or the presence of solid structures such as homes or noise barriers. This will result in a conservative prediction, suitable for the project being assessed.

Considering the nature of the works and the type of surrounding land uses, sensitive receivers up to a radius of 600 metres from the works have been included in the assessment.

Sound power levels and predicted noise levels depend on the number of plant items operating at any one time and their precise location relative to a sensitive receiver. Equipment was assumed to be working at the worst-case location relative to each receiver and represents a worst-case assessment. Where the activity is further away from receivers or less equipment is used the predicted levels will decrease.

Sound power levels for plant and equipment expected to be used for each activity has been estimated based on guidance in the following standards and guidelines as well as typical measured noise levels for specific equipment.

- Australian Standard AS2436-2010: Guide to noise and vibration control on construction, demolition and maintenance sites
- Construction Noise and Vibration Strategy 7TP-ST-157/2.0 (CNVS), (TfNSW, 2018)
- Construction Noise and Vibration Guideline (CNVG) (Roads and Maritime Services, 2016)

- British Standard 5228-1:2009 Code of practice for noise and vibration control on construction and open sites
- United Kingdom Department for Environment, Food and Rural Affairs (DEFRA) Noise database for prediction of noise on construction and open sites

Construction noise sources and associated sound power levels are listed in Appendix B. The maximum predicted LAeq noise level within the work area was identified for each receiver.

Predicted noise levels

Detailed predicted noise levels for each potentially affected receiver are presented Appendix C.

A summary of predicted noise levels in comparison with ICNG assessment criteria for the Evening period is presented in Table 4.

Table 4 Summary of predicted noise levels with comparison against ICNG criteria for the Evening period.

Criterion	Predicted number of receivers
Maximum cumulative predicted $L_{Aeq,\ 15\ minute}$ noise level	71 dB(A)
Number of highly noise affected receivers (>75 dB)	0
1 – 10 dB above NML	8
10 – 20 dB above NML	2
20+ dB above NML	0

For works outside standard hours, up to 0 receivers are predicted to be classified as Highly Impacted during the Evening period. A summary of the number of receivers in each class is presented in Table 5.

Table 5 Summary of predicted noise levels with comparison against CNVG criteria

Impact class	Predicted noise level	Predicted number of receivers
Noticeable	1 – 5 dB above NML	7
Clearly audible	5 – 15 dB above NML	4
Moderately impacted	15 – 25 dB above NML	1
Highly Impacted	> 25 dB above NML	0

Predicted impact classes for the Evening period are illustrated graphically in Appendix C. Each identified receiver in the study area has been coloured to highlight the predicted level of impact.

Sleep disturbance

In the event works are planned for more than two consecutive nights, up to 2 are expected to exceed the sleep awakening criteria. Where any exceedances if the awakening criteria are predicted, additional care should be taken and mitigation measures implemented in the with the CNVG.

Proposed noise mitigation measures

The safeguards and controls listed in Table 6 will be implemented where reasonable and feasible with the intention of achieving the project noise criteria and to maintain noise impacts at a practical minimum.

Table 6 Safeguards and controls

Action	Description
Community consultation or notification	Notify the affected community. The notification will detail work activities, dates and hours, impacts and mitigation measures, indication of work schedule over the night time period, any operational noise benefits from the works (where applicable) and contact telephone number. Notification should be a minimum of 7 calendar days prior to the start of works. For projects other than maintenance works more advanced consultation or notification may be required.
Site inductions	All employees, contractors and subcontractors are to receive an environmental induction. The induction would at least include: • all project specific and relevant standard noise and vibration mitigation measures • relevant licence and approval conditions • permissible hours of work • any limitations on high noise generating activities • location of nearest sensitive receivers • construction employee parking areas • designated loading/unloading areas and procedures site opening/closing times (including deliveries) environmental incident procedures
Behaviour	No swearing or unnecessary shouting or loud stereos/radios on site. Limit compression braking at night in residential areas. No dropping of materials from height, throwing of metal items and slamming of doors.
Verification	Where indicated in Appendix C, a noise verification program would be undertaken for the duration of the works.
Construction hours	Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods.
Respite for out-of-hours works	Respite would be scheduled as indicated in Appendix C and described in the CNVG.
Equipment selection	Use quieter construction methods where feasible and reasonable. Ensure plant including the silencer is well maintained. Plant noise levels will have an operating noise emission level compliant with Appendix F of the CNVG
Use and siting of plant	The offset distance between noisy plant and adjacent sensitive receivers is to be maximised. Plant used intermittently to be throttled down or shut down. Noise-emitting plant to be directed away from sensitive receivers.

Action	Description
Plan worksites and activities to minimise noise and vibration.	Locate compounds away from sensitive receivers and discourage access from local roads. Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site. Where additional activities or plant may only result in a marginal noise increase and speed up works, consider limiting duration of impact by concentrating noisy activities at one location and move to another as quickly as possible. Very noise activities should be scheduled for normal working hours. If the work can not be undertaken during the day, it should be completed before 11:00pm. Where practicable, work should be scheduled to avoid major student examination periods when students are studying for examinations such as before or during Higher School Certificate and at the end of higher education semesters.
Non-tonal reverse alarms	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work.
Shield stationary noise sources such as pumps, generators, and compressors	These should be enclosed or shielded where reasonable and feasible.
Implement any project specific mitigation measures	
1	Noise Attenuation Blankets

Appendix A Project location and predicted level of impact

Appendix B Proposed activities and equipment

Jemena Gas Crossings

Equipment	Quantity	Usage	Reduction	SWL
Concrete Saw (Std)*	1	20 %	5	107
Excavator (03 tonne)	1	40 %	5	80
Truck (10 tonne)	1	20 %	5	88
Ute	1	40 %	0	81

Activity Sound Power Level: 107

Appendix C Detailed noise predicted for each receiver and activity

Assessment: Jemena Gas Crossings				Evening	Results summary		
NCA	ID	Address	Land use	NML	Cumulative Predicted LAeq, 15 minute noise level	Exceedance of NML, dB	Impact classification
	529836	7 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	54	57	3	**Noticable**
	529824	10 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	54	59	5	**Clearly Audible**
	529779	172 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	54	55	1	**Noticable**
	529730	164 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	54	68	14	**Clearly Audible**
	529729	5 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	54	59	5	**Noticable**
	529697	168 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	54	59	5	**Noticable**
	529649	9 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	54	55	1	**Noticable**
	529611	12 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	54	55	1	**Noticable**
	529596	166 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	54	61	7	**Clearly Audible**
	529594	160 LOOKOUT ROAD NEW LAMBTON HEIGHTS	NONE	54	71	17	**Moderately Intrusive**
	529593	170 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	54	57	3	**Noticable**
	529583	3 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	54	63	9	**Clearly Audible**

Construction noise impact assessment

Grandview Jemena Gas Crossings

Proposed works	Jemena Gas Crossings		
Proponent	Quickway		
Assessment Date	15/09/2021		
Prepared by	Mike Billington	**Assessment Id**	0001

Introduction

This report has been prepared using the construction noise self-assessment platform KNOWnoise: *Minor Works* and presents an assessment of the likely noise impacts related to proposed works associated with the above project. Where possible, these works would be completed during standard construction hours; however, there may be a need to work outside these hours due to technical, community or access limitations. The location of the proposed works is illustrated in Appendix A.

Planned works

A description of the proposed works is as follows.

Jemena Gas Crossings in Grandview Rd

Proposed activities and equipment for the works are summarised in Appendix B.

Though subject to change, the works are expected to commence around 11/10/2021 and would be completed by 13/10/2021.

Assessment criteria and mitigation requirements

The Interim Construction Noise Guideline (ICNG) (DECC 2009) describes noise more than the background level as potentially having an adverse impact on sensitive receivers and increasing the likelihood of complaint. During standard construction hours, where construction noise is within 10 dB(A) of the RBL, impacts would be acceptable.

Where construction noise is more than 10 dB(A) above the RBL during standard construction hours, a residential receiver is considered noise affected and the proponent should undertake all reasonable and feasible steps necessary to manage the impact and consult with the affected community.

Above a LAeq, 15 minute noise level of 75 dB(A), a receiver is highly affected, requiring consideration of additional mitigation measures including alternative accommodation in the night period.

Outside standard construction hours, construction noise at a residential receiver more than 5 dB(A) above the RBL is taken to be noise affected.

In addition, annoying noise such as rock hammers, impact piling, or other impulsive noise sources usually result in greater annoyance than continuous construction noise. A 5 dB(A) penalty is applicable to such activities prior to comparison with the NMLs.

Other sensitive land uses, such as schools and offices, typically find noise from construction disruptive when the properties are being used (such as during work and school times). Table 2 presents NMLs from the ICNG for sensitive land uses based on the principle that the characteristic activities for each of these land uses should not be unduly disturbed.

Table 1 Non-residential sensitive land uses noise management levels

Land use	Noise assessment location	NML ($L_{Aeq,15min}$)
Classrooms at schools and other educational institutions	Internal	45
Places of worship		
Active recreation areas (such as sporting activities and activities which generate their own noise or focus for participants)	External	65
Passive recreation areas (contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External	60
Industrial premises	External	75
Office, retail outlets	External	70

As part of planning for out of hours works, standard mitigation measures, as described in the ICNG and CNVG, would be implemented where reasonable and feasible. However, after these measures have been applied, noise and vibration levels may continue to exceed the NMLs.

In this case, additional mitigation measures outlined in the CNVG, which largely focus on engagement with affected sensitive receivers, should be implemented where reasonable and feasible, unless other agreements are in place with the impacted receiver.

Triggers and additional mitigation measures for airborne noise are summarised in Table 2. Further details of specific additional mitigation measures are described in the CNVG.

Table 2 Triggers for additional mitigation measures – Airborne noise (Roads and Maritime 2016)

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

Notes:
PC = Phone calls
V = verification
IB = Individual briefings
N= Notification
AA = Alternative accommodation
SN = Specific notifications
RO = Respite offer
R1 = Respite period 1
R2 = Respite period 2
DR = Duration respite
Perception = relates to levels above RBL
NML = Noise management level
HA = Highly affected

Existing environment and noise management levels

The proposed works would be undertaken in a predominantly Urban, characterised as:

Areas with medium density transportation or some commerce or industry.

Typically traffic is moving from one area to another (light & heavy vehicles) with heavy peak hour traffic movement.

May be on or close to bus route/ light rail.

Background noise levels adopted for the project area and associated noise management levels (NMLs) are summarised in Table 3. NMLs have been established in line with the ICNG.

Table 3 Construction NMLs

Land use	**Urban**		Using custom background noise data?		**Yes**
Criterion	Day	Weekend Day	Evening	Night	Sleep
RBL	56	56	49	33	
NML	61	61	54	38	38

Sleep disturbance

The ICNG recommends where construction works are planned to extend over more than two consecutive nights, the maximum noise level should be considered for the purposes of establishing the likelihood of sleep disturbance. The Road Noise Policy suggests that maximum internal noise levels below 50-55 dB(A) are unlikely to awaken people from sleep and one or two noise events per night, with maximum internal noise levels of 65-70 dB(A) are not likely to affect health and wellbeing significantly.

Based on this, a sleep awakening criterion of 55 dB(A) (internal) is typically adopted for works. Given that noise attenuation of 10 dB(A) is typically provided by an open window, a sleep awakening criterion of LAmax 65 dB(A) (external) has been applied to residential bedroom façades. This is consistent with the sleep disturbance threshold described in Appendix E of the CNVG.

Assessment methodology

Based on the nominated works area (illustrated in Appendix A), proposed equipment and the minimum distance from the works to each sensitive receiver, noise levels were calculated based on CONCAWE (1981) P*ropagation of noise from petroleum and petrochemical complexes to neighboring communities.*

This method considers geometric spreading, atmospheric absorption, ground effects and is valid for meteorological conditions of a gentle breeze from source to receiver and stable atmosphere (temperature inversion).

KNOWnoise: Minor works is a 2-Dimensional assessment platform and does not consider terrain effects (e.g. hills, valleys) or the presence of solid structures such as homes or noise barriers. This will result in a conservative prediction, suitable for the project being assessed.

Considering the nature of the works and the type of surrounding land uses, sensitive receivers up to a radius of 600 metres from the works have been included in the assessment.

Sound power levels and predicted noise levels depend on the number of plant items operating at any one time and their precise location relative to a sensitive receiver. Equipment was assumed to be working at the worst-case location relative to each receiver and represents a worst-case assessment. Where the activity is further away from receivers or less equipment is used the predicted levels will decrease.

Sound power levels for plant and equipment expected to be used for each activity has been estimated based on guidance in the following standards and guidelines as well as typical measured noise levels for specific equipment.

- Australian Standard AS2436-2010: Guide to noise and vibration control on construction, demolition and maintenance sites
- Construction Noise and Vibration Strategy 7TP-ST-157/2.0 (CNVS), (TfNSW, 2018)
- Construction Noise and Vibration Guideline (CNVG) (Roads and Maritime Services, 2016)

- British Standard 5228-1:2009 Code of practice for noise and vibration control on construction and open sites
- United Kingdom Department for Environment, Food and Rural Affairs (DEFRA) Noise database for prediction of noise on construction and open sites

Construction noise sources and associated sound power levels are listed in Appendix B. The maximum predicted LAeq noise level within the work area was identified for each receiver.

Predicted noise levels

Detailed predicted noise levels for each potentially affected receiver are presented Appendix C.

A summary of predicted noise levels in comparison with ICNG assessment criteria for the Night period is presented in Table 4.

Table 4 Summary of predicted noise levels with comparison against ICNG criteria for the Night period.

Criterion	Predicted number of receivers
Maximum cumulative predicted $L_{Aeq,\ 15\ minute}$ noise level	60 dB(A)
Number of highly noise affected receivers (>75 dB)	0
1 – 10 dB above NML	16
10 – 20 dB above NML	4
20+ dB above NML	1

For works outside standard hours, up to 0 receivers are predicted to be classified as Highly Impacted during the Night period. A summary of the number of receivers in each class is presented in Table 5.

Table 5 Summary of predicted noise levels with comparison against CNVG criteria

Impact class	Predicted noise level	Predicted number of receivers
Noticeable	1 – 5 dB above NML	12
Clearly audible	5 – 15 dB above NML	10
Moderately impacted	15 – 25 dB above NML	2
Highly Impacted	> 25 dB above NML	0

Predicted impact classes for the Night period are illustrated graphically in Appendix C. Each identified receiver in the study area has been coloured to highlight the predicted level of impact.

Sleep disturbance

In the event works are planned for more than two consecutive nights, up to 0 are expected to exceed the sleep awakening criteria. Where any exceedances if the awakening criteria are predicted, additional care should be taken and mitigation measures implemented in the with the CNVG.

Proposed noise mitigation measures

The safeguards and controls listed in Table 6 will be implemented where reasonable and feasible with the intention of achieving the project noise criteria and to maintain noise impacts at a practical minimum.

Table 6 Safeguards and controls

Action	Description
Community consultation or notification	Notify the affected community. The notification will detail work activities, dates and hours, impacts and mitigation measures, indication of work schedule over the night time period, any operational noise benefits from the works (where applicable) and contact telephone number. Notification should be a minimum of 7 calendar days prior to the start of works. For projects other than maintenance works more advanced consultation or notification may be required.
Site inductions	All employees, contractors and subcontractors are to receive an environmental induction. The induction would at least include: • all project specific and relevant standard noise and vibration mitigation measures • relevant licence and approval conditions • permissible hours of work • any limitations on high noise generating activities • location of nearest sensitive receivers • construction employee parking areas • designated loading/unloading areas and procedures site opening/closing times (including deliveries) environmental incident procedures
Behaviour	No swearing or unnecessary shouting or loud stereos/radios on site. Limit compression braking at night in residential areas. No dropping of materials from height, throwing of metal items and slamming of doors.
Verification	Where indicated in Appendix C, a noise verification program would be undertaken for the duration of the works.
Construction hours	Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods.
Respite for out-of-hours works	Respite would be scheduled as indicated in Appendix C and described in the CNVG.
Equipment selection	Use quieter construction methods where feasible and reasonable. Ensure plant including the silencer is well maintained. Plant noise levels will have an operating noise emission level compliant with Appendix F of the CNVG
Use and siting of plant	The offset distance between noisy plant and adjacent sensitive receivers is to be maximised. Plant used intermittently to be throttled down or shut down. Noise-emitting plant to be directed away from sensitive receivers.

Action	Description
Plan worksites and activities to minimise noise and vibration.	Locate compounds away from sensitive receivers and discourage access from local roads. Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site. Where additional activities or plant may only result in a marginal noise increase and speed up works, consider limiting duration of impact by concentrating noisy activities at one location and move to another as quickly as possible. Very noise activities should be scheduled for normal working hours. If the work can not be undertaken during the day, it should be completed before 11:00pm. Where practicable, work should be scheduled to avoid major student examination periods when students are studying for examinations such as before or during Higher School Certificate and at the end of higher education semesters.
Non-tonal reverse alarms	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work.
Shield stationary noise sources such as pumps, generators, and compressors	These should be enclosed or shielded where reasonable and feasible.
Implement any project specific mitigation measures	
1	Noise Attenuation Blankets

Appendix A Project location and predicted level of impact

Appendix B Proposed activities and equipment

Jemena Gas Crossings

Equipment	Quantity	Usage	Reduction	SWL
Daymakers / Lighting plant	1	100 %	5	88
Excavator (06 tonne)	1	40 %	5	85
Plate compactor (medium e.g. 400kg)	1	10 %	5	93
Truck (10 tonne)	1	30 %	5	90
Ute	1	10 %	5	70

Activity Sound Power Level: 96

Appendix C Detailed noise predicted for each receiver and activity

Assessment: Jemena Gas Crossings				Night	Results summary		
NCA	ID	Address	Land use	NML	Cumulative Predicted LAeq, 15 minute noise level	Exceedance of NML, dB	Impact classification
	529855	NEW LAMBTON HEIGHTS INFANTS SC 176 LOOKOUT ROAD NEW LAMBTON HEIGHTS	NONE	38	40	2	**Noticable**
	529851	20 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	38	0	**Noticable**
	529836	7 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	45	7	**Clearly Audible**
	529827	174 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	42	4	**Noticable**
	529824	10 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	48	10	**Clearly Audible**
	529779	172 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	43	5	**Clearly Audible**
	529770	11 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	42	4	**Noticable**
	529757	17 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	39	1	**Noticable**
	529736	14 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	43	5	**Noticable**
	529730	164 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	57	19	**Moderately Intrusive**
	529729	5 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	48	10	**Clearly Audible**
	529723	18 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	39	1	**Noticable**
	529697	168 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	48	10	**Clearly Audible**
	529649	9 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	43	5	**Clearly Audible**
	529642	174A LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	40	2	**Noticable**
	529636	174 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	41	3	**Noticable**
	529614	15 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	40	2	**Noticable**
	529611	12 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	44	6	**Clearly Audible**
	529596	166 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	50	12	**Clearly Audible**
	529594	160 LOOKOUT ROAD NEW LAMBTON HEIGHTS	NONE	38	60	22	**Moderately Intrusive**
	529593	170 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	45	7	**Clearly Audible**
	529583	3 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	52	14	**Clearly Audible**
	529573	16 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	41	3	**Noticable**
	529570	NEW LAMBTON HEIGHTS INFANTS SC 176 LOOKOUT ROAD NEW LAMBTON HEIGHTS	NONE	38	39	1	**Noticable**

Construction noise impact assessment

Lookout Road Trenched Utility Crossings

Proposed works	Trenched Road Crossings - Evening Period		
Proponent	Quickway		
Assessment Date	16/09/2021		
Prepared by	Mike Billington	**Assessment Id**	0003

Introduction

This report has been prepared using the construction noise self-assessment platform KNOWnoise: *Minor Works* and presents an assessment of the likely noise impacts related to proposed works associated with the above project. Where possible, these works would be completed during standard construction hours; however, there may be a need to work outside these hours due to technical, community or access limitations. The location of the proposed works is illustrated in Appendix A.

Planned works

A description of the proposed works is as follows.

Demolish existing pavement along trench line

Proposed activities and equipment for the works are summarised in Appendix B.

Though subject to change, the works are expected to commence around 11/10/2021 and would be completed by 20/10/2021.

Assessment criteria and mitigation requirements

The Interim Construction Noise Guideline (ICNG) (DECC 2009) describes noise more than the background level as potentially having an adverse impact on sensitive receivers and increasing the likelihood of complaint. During standard construction hours, where construction noise is within 10 dB(A) of the RBL, impacts would be acceptable.

Where construction noise is more than 10 dB(A) above the RBL during standard construction hours, a residential receiver is considered noise affected and the proponent should undertake all reasonable and feasible steps necessary to manage the impact and consult with the affected community.

Above a LAeq, 15 minute noise level of 75 dB(A), a receiver is highly affected, requiring consideration of additional mitigation measures including alternative accommodation in the night period.

Outside standard construction hours, construction noise at a residential receiver more than 5 dB(A) above the RBL is taken to be noise affected.

In addition, annoying noise such as rock hammers, impact piling, or other impulsive noise sources usually result in greater annoyance than continuous construction noise. A 5 dB(A) penalty is applicable to such activities prior to comparison with the NMLs.

Other sensitive land uses, such as schools and offices, typically find noise from construction disruptive when the properties are being used (such as during work and school times). Table 2 presents NMLs from the ICNG for sensitive land uses based on the principle that the characteristic activities for each of these land uses should not be unduly disturbed.

Table 1 Non-residential sensitive land uses noise management levels

Land use	Noise assessment location	NML ($L_{Aeq,15min}$)
Classrooms at schools and other educational institutions	Internal	45
Places of worship		
Active recreation areas (such as sporting activities and activities which generate their own noise or focus for participants)	External	65
Passive recreation areas (contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External	60
Industrial premises	External	75
Office, retail outlets	External	70

As part of planning for out of hours works, standard mitigation measures, as described in the ICNG and CNVG, would be implemented where reasonable and feasible. However, after these measures have been applied, noise and vibration levels may continue to exceed the NMLs.

In this case, additional mitigation measures outlined in the CNVG, which largely focus on engagement with affected sensitive receivers, should be implemented where reasonable and feasible, unless other agreements are in place with the impacted receiver.

Triggers and additional mitigation measures for airborne noise are summarised in Table 2. Further details of specific additional mitigation measures are described in the CNVG.

Table 2 Triggers for additional mitigation measures – Airborne noise (Roads and Maritime 2016)

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

Notes:
PC = Phone calls
V = verification
IB = Individual briefings
N= Notification
AA = Alternative accommodation
SN = Specific notifications
RO = Respite offer
R1 = Respite period 1
R2 = Respite period 2
DR = Duration respite
Perception = relates to levels above RBL
NML = Noise management level
HA = Highly affected

Existing environment and noise management levels

The proposed works would be undertaken in a predominantly Urban, characterised as:

Areas with medium density transportation or some commerce or industry.

Typically traffic is moving from one area to another (light & heavy vehicles) with heavy peak hour traffic movement.

May be on or close to bus route/ light rail.

Background noise levels adopted for the project area and associated noise management levels (NMLs) are summarised in Table 3. NMLs have been established in line with the ICNG.

Table 3 Construction NMLs

Land use	**Urban**		Using custom background noise data?		**Yes**
Criterion	Day	Weekend Day	Evening	Night	Sleep
RBL	56	56	49	33	
NML	61	61	54	38	38

Sleep disturbance

The ICNG recommends where construction works are planned to extend over more than two consecutive nights, the maximum noise level should be considered for the purposes of establishing the likelihood of sleep disturbance. The Road Noise Policy suggests that maximum internal noise levels below 50-55 dB(A) are unlikely to awaken people from sleep and one or two noise events per night, with maximum internal noise levels of 65-70 dB(A) are not likely to affect health and wellbeing significantly.

Based on this, a sleep awakening criterion of 55 dB(A) (internal) is typically adopted for works. Given that noise attenuation of 10 dB(A) is typically provided by an open window, a sleep awakening criterion of LAmax 65 dB(A) (external) has been applied to residential bedroom façades. This is consistent with the sleep disturbance threshold described in Appendix E of the CNVG.

Assessment methodology

Based on the nominated works area (illustrated in Appendix A), proposed equipment and the minimum distance from the works to each sensitive receiver, noise levels were calculated based on CONCAWE (1981) P*ropagation of noise from petroleum and petrochemical complexes to neighboring communities.*

This method considers geometric spreading, atmospheric absorption, ground effects and is valid for meteorological conditions of a gentle breeze from source to receiver and stable atmosphere (temperature inversion).

KNOWnoise: Minor works is a 2-Dimensional assessment platform and does not consider terrain effects (e.g. hills, valleys) or the presence of solid structures such as homes or noise barriers. This will result in a conservative prediction, suitable for the project being assessed.

Considering the nature of the works and the type of surrounding land uses, sensitive receivers up to a radius of 600 metres from the works have been included in the assessment.

Sound power levels and predicted noise levels depend on the number of plant items operating at any one time and their precise location relative to a sensitive receiver. Equipment was assumed to be working at the worst-case location relative to each receiver and represents a worst-case assessment. Where the activity is further away from receivers or less equipment is used the predicted levels will decrease.

Sound power levels for plant and equipment expected to be used for each activity has been estimated based on guidance in the following standards and guidelines as well as typical measured noise levels for specific equipment.

- Australian Standard AS2436-2010: Guide to noise and vibration control on construction, demolition and maintenance sites
- Construction Noise and Vibration Strategy 7TP-ST-157/2.0 (CNVS), (TfNSW, 2018)
- Construction Noise and Vibration Guideline (CNVG) (Roads and Maritime Services, 2016)

- British Standard 5228-1:2009 Code of practice for noise and vibration control on construction and open sites
- United Kingdom Department for Environment, Food and Rural Affairs (DEFRA) Noise database for prediction of noise on construction and open sites

Construction noise sources and associated sound power levels are listed in Appendix B. The maximum predicted LAeq noise level within the work area was identified for each receiver.

Predicted noise levels

Detailed predicted noise levels for each potentially affected receiver are presented Appendix C.

A summary of predicted noise levels in comparison with ICNG assessment criteria for the Evening period is presented in Table 4.

Table 4 Summary of predicted noise levels with comparison against ICNG criteria for the Evening period.

Criterion	Predicted number of receivers
Maximum cumulative predicted $L_{Aeq,\ 15\ minute}$ noise level	54 dB(A)
Number of highly noise affected receivers (>75 dB)	0
1 – 10 dB above NML	0
10 – 20 dB above NML	0
20+ dB above NML	0

For works outside standard hours, up to 0 receivers are predicted to be classified as Highly Impacted during the Evening period. A summary of the number of receivers in each class is presented in Table 5.

Table 5 Summary of predicted noise levels with comparison against CNVG criteria

Impact class	Predicted noise level	Predicted number of receivers
Noticeable	1 – 5 dB above NML	2
Clearly audible	5 – 15 dB above NML	0
Moderately impacted	15 – 25 dB above NML	0
Highly Impacted	> 25 dB above NML	0

Predicted impact classes for the Evening period are illustrated graphically in Appendix C. Each identified receiver in the study area has been coloured to highlight the predicted level of impact.

Sleep disturbance

In the event works are planned for more than two consecutive nights, up to 0 are expected to exceed the sleep awakening criteria. Where any exceedances if the awakening criteria are predicted, additional care should be taken and mitigation measures implemented in the with the CNVG.

Proposed noise mitigation measures

The safeguards and controls listed in Table 6 will be implemented where reasonable and feasible with the intention of achieving the project noise criteria and to maintain noise impacts at a practical minimum.

Table 6 Safeguards and controls

Action	Description
Community consultation or notification	Notify the affected community. The notification will detail work activities, dates and hours, impacts and mitigation measures, indication of work schedule over the night time period, any operational noise benefits from the works (where applicable) and contact telephone number. Notification should be a minimum of 7 calendar days prior to the start of works. For projects other than maintenance works more advanced consultation or notification may be required.
Site inductions	All employees, contractors and subcontractors are to receive an environmental induction. The induction would at least include: • all project specific and relevant standard noise and vibration mitigation measures • relevant licence and approval conditions • permissible hours of work • any limitations on high noise generating activities • location of nearest sensitive receivers • construction employee parking areas • designated loading/unloading areas and procedures site opening/closing times (including deliveries) environmental incident procedures
Behaviour	No swearing or unnecessary shouting or loud stereos/radios on site. Limit compression braking at night in residential areas. No dropping of materials from height, throwing of metal items and slamming of doors.
Verification	Where indicated in Appendix C, a noise verification program would be undertaken for the duration of the works.
Construction hours	Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods.
Respite for out-of-hours works	Respite would be scheduled as indicated in Appendix C and described in the CNVG.
Equipment selection	Use quieter construction methods where feasible and reasonable. Ensure plant including the silencer is well maintained. Plant noise levels will have an operating noise emission level compliant with Appendix F of the CNVG
Use and siting of plant	The offset distance between noisy plant and adjacent sensitive receivers is to be maximised. Plant used intermittently to be throttled down or shut down. Noise-emitting plant to be directed away from sensitive receivers.

Action	Description
Plan worksites and activities to minimise noise and vibration.	Locate compounds away from sensitive receivers and discourage access from local roads. Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site. Where additional activities or plant may only result in a marginal noise increase and speed up works, consider limiting duration of impact by concentrating noisy activities at one location and move to another as quickly as possible. Very noise activities should be scheduled for normal working hours. If the work can not be undertaken during the day, it should be completed before 11:00pm. Where practicable, work should be scheduled to avoid major student examination periods when students are studying for examinations such as before or during Higher School Certificate and at the end of higher education semesters.
Non-tonal reverse alarms	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work.
Shield stationary noise sources such as pumps, generators, and compressors	These should be enclosed or shielded where reasonable and feasible.
Implement any project specific mitigation measures	
1	Noise Blankets

Appendix A Project location and predicted level of impact

Appendix B Proposed activities and equipment

Trenched Road Crossings

Equipment	Quantity	Usage	Reduction	SWL
Daymakers / Lighting plant	2	100 %	5	91
Excavator (06 tonne)	1	30 %	5	84
Excavator 12 t (1000 kg Breaker)*	1	30 %	5	108
Truck (10 tonne)	1	30 %	5	90
Ute	1	40 %	0	81

Activity Sound Power Level: 108

Appendix C Detailed noise predicted for each receiver and activity

Assessment: Trenched Road Crossings - Evening Period				Evening	Results summary		
NCA	ID	Address	Land use	NML	Cumulative Predicted LAeq, 15 minute noise level	Exceedance of NML, dB	Impact classification
	530094	10 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	54	54	0	**Noticable**
	529923	160 LOOKOUT ROAD NEW LAMBTON HEIGHTS	NONE	54	54	0	**Noticable**

Construction noise impact assessment

Lookout Road Trenched Utility Crossings

Proposed works	Lookout Road Trenched Utility Crossings		
Proponent	Quickway		
Assessment Date	15/09/2021		
Prepared by	Mike Billington	**Assessment Id**	0002

Introduction

This report has been prepared using the construction noise self-assessment platform KNOWnoise: *Minor Works* and presents an assessment of the likely noise impacts related to proposed works associated with the above project. Where possible, these works would be completed during standard construction hours; however, there may be a need to work outside these hours due to technical, community or access limitations. The location of the proposed works is illustrated in Appendix A.

Planned works

A description of the proposed works is as follows.

Lookout Road Trenched Gas and Comm's Utility Crossings

Proposed activities and equipment for the works are summarised in Appendix B.

Though subject to change, the works are expected to commence around 11/10/2021 and would be completed by 20/10/2021.

Assessment criteria and mitigation requirements

The Interim Construction Noise Guideline (ICNG) (DECC 2009) describes noise more than the background level as potentially having an adverse impact on sensitive receivers and increasing the likelihood of complaint. During standard construction hours, where construction noise is within 10 dB(A) of the RBL, impacts would be acceptable.

Where construction noise is more than 10 dB(A) above the RBL during standard construction hours, a residential receiver is considered noise affected and the proponent should undertake all reasonable and feasible steps necessary to manage the impact and consult with the affected community.

Above a LAeq, 15 minute noise level of 75 dB(A), a receiver is highly affected, requiring consideration of additional mitigation measures including alternative accommodation in the night period.

Outside standard construction hours, construction noise at a residential receiver more than 5 dB(A) above the RBL is taken to be noise affected.

In addition, annoying noise such as rock hammers, impact piling, or other impulsive noise sources usually result in greater annoyance than continuous construction noise. A 5 dB(A) penalty is applicable to such activities prior to comparison with the NMLs.

Other sensitive land uses, such as schools and offices, typically find noise from construction disruptive when the properties are being used (such as during work and school times). Table 2 presents NMLs from the ICNG for sensitive land uses based on the principle that the characteristic activities for each of these land uses should not be unduly disturbed.

Table 1 Non-residential sensitive land uses noise management levels

Land use	Noise assessment location	NML ($L_{Aeq,15min}$)
Classrooms at schools and other educational institutions	Internal	45
Places of worship		
Active recreation areas (such as sporting activities and activities which generate their own noise or focus for participants)	External	65
Passive recreation areas (contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External	60
Industrial premises	External	75
Office, retail outlets	External	70

As part of planning for out of hours works, standard mitigation measures, as described in the ICNG and CNVG, would be implemented where reasonable and feasible. However, after these measures have been applied, noise and vibration levels may continue to exceed the NMLs.

In this case, additional mitigation measures outlined in the CNVG, which largely focus on engagement with affected sensitive receivers, should be implemented where reasonable and feasible, unless other agreements are in place with the impacted receiver.

Triggers and additional mitigation measures for airborne noise are summarised in Table 2. Further details of specific additional mitigation measures are described in the CNVG.

Table 2 Triggers for additional mitigation measures – Airborne noise (Roads and Maritime 2016)

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

Notes:
PC = Phone calls
V = verification
IB = Individual briefings
N= Notification
AA = Alternative accommodation
SN = Specific notifications
RO = Respite offer
R1 = Respite period 1
R2 = Respite period 2
DR = Duration respite
Perception = relates to levels above RBL
NML = Noise management level
HA = Highly affected

Existing environment and noise management levels

The proposed works would be undertaken in a predominantly Urban, characterised as:

Areas with medium density transportation or some commerce or industry.

Typically traffic is moving from one area to another (light & heavy vehicles) with heavy peak hour traffic movement.

May be on or close to bus route/ light rail.

Background noise levels adopted for the project area and associated noise management levels (NMLs) are summarised in Table 3. NMLs have been established in line with the ICNG.

Table 3 Construction NMLs

Land use	**Urban**		Using custom background noise data?		**Yes**
Criterion	Day	Weekend Day	Evening	Night	Sleep
RBL	56	56	49	33	
NML	61	61	54	38	38

Sleep disturbance

The ICNG recommends where construction works are planned to extend over more than two consecutive nights, the maximum noise level should be considered for the purposes of establishing the likelihood of sleep disturbance. The Road Noise Policy suggests that maximum internal noise levels below 50-55 dB(A) are unlikely to awaken people from sleep and one or two noise events per night, with maximum internal noise levels of 65-70 dB(A) are not likely to affect health and wellbeing significantly.

Based on this, a sleep awakening criterion of 55 dB(A) (internal) is typically adopted for works. Given that noise attenuation of 10 dB(A) is typically provided by an open window, a sleep awakening criterion of LAmax 65 dB(A) (external) has been applied to residential bedroom façades. This is consistent with the sleep disturbance threshold described in Appendix E of the CNVG.

Assessment methodology

Based on the nominated works area (illustrated in Appendix A), proposed equipment and the minimum distance from the works to each sensitive receiver, noise levels were calculated based on CONCAWE (1981) P*ropagation of noise from petroleum and petrochemical complexes to neighboring communities.*

This method considers geometric spreading, atmospheric absorption, ground effects and is valid for meteorological conditions of a gentle breeze from source to receiver and stable atmosphere (temperature inversion).

KNOWnoise: Minor works is a 2-Dimensional assessment platform and does not consider terrain effects (e.g. hills, valleys) or the presence of solid structures such as homes or noise barriers. This will result in a conservative prediction, suitable for the project being assessed.

Considering the nature of the works and the type of surrounding land uses, sensitive receivers up to a radius of 600 metres from the works have been included in the assessment.

Sound power levels and predicted noise levels depend on the number of plant items operating at any one time and their precise location relative to a sensitive receiver. Equipment was assumed to be working at the worst-case location relative to each receiver and represents a worst-case assessment. Where the activity is further away from receivers or less equipment is used the predicted levels will decrease.

Sound power levels for plant and equipment expected to be used for each activity has been estimated based on guidance in the following standards and guidelines as well as typical measured noise levels for specific equipment.

- Australian Standard AS2436-2010: Guide to noise and vibration control on construction, demolition and maintenance sites
- Construction Noise and Vibration Strategy 7TP-ST-157/2.0 (CNVS), (TfNSW, 2018)
- Construction Noise and Vibration Guideline (CNVG) (Roads and Maritime Services, 2016)

- British Standard 5228-1:2009 Code of practice for noise and vibration control on construction and open sites
- United Kingdom Department for Environment, Food and Rural Affairs (DEFRA) Noise database for prediction of noise on construction and open sites

Construction noise sources and associated sound power levels are listed in Appendix B. The maximum predicted LAeq noise level within the work area was identified for each receiver.

Predicted noise levels

Detailed predicted noise levels for each potentially affected receiver are presented Appendix C.

A summary of predicted noise levels in comparison with ICNG assessment criteria for the Night period is presented in Table 4.

Table 4 Summary of predicted noise levels with comparison against ICNG criteria for the Night period.

Criterion	Predicted number of receivers
Maximum cumulative predicted $L_{Aeq,\ 15\ minute}$ noise level	45 dB(A)
Number of highly noise affected receivers (>75 dB)	0
1 – 10 dB above NML	17
10 – 20 dB above NML	0
20+ dB above NML	0

For works outside standard hours, up to 0 receivers are predicted to be classified as Highly Impacted during the Night period. A summary of the number of receivers in each class is presented in Table 5.

Table 5 Summary of predicted noise levels with comparison against CNVG criteria

Impact class	Predicted noise level	Predicted number of receivers
Noticeable	1 – 5 dB above NML	19
Clearly audible	5 – 15 dB above NML	4
Moderately impacted	15 – 25 dB above NML	0
Highly Impacted	> 25 dB above NML	0

Predicted impact classes for the Night period are illustrated graphically in Appendix C. Each identified receiver in the study area has been coloured to highlight the predicted level of impact.

Sleep disturbance

In the event works are planned for more than two consecutive nights, up to 0 are expected to exceed the sleep awakening criteria. Where any exceedances if the awakening criteria are predicted, additional care should be taken and mitigation measures implemented in the with the CNVG.

Proposed noise mitigation measures

The safeguards and controls listed in Table 6 will be implemented where reasonable and feasible with the intention of achieving the project noise criteria and to maintain noise impacts at a practical minimum.

Table 6 Safeguards and controls

Action	Description
Community consultation or notification	Notify the affected community. The notification will detail work activities, dates and hours, impacts and mitigation measures, indication of work schedule over the night time period, any operational noise benefits from the works (where applicable) and contact telephone number. Notification should be a minimum of 7 calendar days prior to the start of works. For projects other than maintenance works more advanced consultation or notification may be required.
Site inductions	All employees, contractors and subcontractors are to receive an environmental induction. The induction would at least include: • all project specific and relevant standard noise and vibration mitigation measures • relevant licence and approval conditions • permissible hours of work • any limitations on high noise generating activities • location of nearest sensitive receivers • construction employee parking areas • designated loading/unloading areas and procedures site opening/closing times (including deliveries) environmental incident procedures
Behaviour	No swearing or unnecessary shouting or loud stereos/radios on site. Limit compression braking at night in residential areas. No dropping of materials from height, throwing of metal items and slamming of doors.
Verification	Where indicated in Appendix C, a noise verification program would be undertaken for the duration of the works.
Construction hours	Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods.
Respite for out-of-hours works	Respite would be scheduled as indicated in Appendix C and described in the CNVG.
Equipment selection	Use quieter construction methods where feasible and reasonable. Ensure plant including the silencer is well maintained. Plant noise levels will have an operating noise emission level compliant with Appendix F of the CNVG
Use and siting of plant	The offset distance between noisy plant and adjacent sensitive receivers is to be maximised. Plant used intermittently to be throttled down or shut down. Noise-emitting plant to be directed away from sensitive receivers.

Action	Description
Plan worksites and activities to minimise noise and vibration.	Locate compounds away from sensitive receivers and discourage access from local roads. Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site. Where additional activities or plant may only result in a marginal noise increase and speed up works, consider limiting duration of impact by concentrating noisy activities at one location and move to another as quickly as possible. Very noise activities should be scheduled for normal working hours. If the work can not be undertaken during the day, it should be completed before 11:00pm. Where practicable, work should be scheduled to avoid major student examination periods when students are studying for examinations such as before or during Higher School Certificate and at the end of higher education semesters.
Non-tonal reverse alarms	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work.
Shield stationary noise sources such as pumps, generators, and compressors	These should be enclosed or shielded where reasonable and feasible.
Implement any project specific mitigation measures	
1	Noise Attenuation Blankets

Appendix A Project location and predicted level of impact

Appendix B Proposed activities and equipment

Trenched Road Crossings

Equipment	Quantity	Usage	Reduction	SWL
Daymakers / Lighting plant	2	100 %	5	91
Excavator (06 tonne)	1	30 %	5	84
Excavator (15 tonne)	1	40 %	5	94
Plate compactor (small e.g. 60kg)	1	20 %	5	92
Telehandler	1	10 %	5	85
Truck (10 tonne)	1	20 %	5	88
Ute	1	20 %	0	78

Activity Sound Power Level: 98

Appendix C Detailed noise predicted for each receiver and activity

Assessment: Lookout Road Trenched Utility Crossings				Night	Results summary		
NCA	ID	Address	Land use	NML	Cumulative Predicted LAeq, 15 minute noise level	Exceedance of NML, dB	Impact classification
	530146	136 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	43	5	**Clearly Audible**
	530145	138 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	43	5	**Noticable**
	530122	NEW LAMBTON HEIGHTS INFANTS SC 176 LOOKOUT ROAD NEW LAMBTON HEIGHTS	NONE	38	38	0	**Noticable**
	530105	7 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	41	3	**Noticable**
	530095	20 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	38	0	**Noticable**
	530094	10 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	45	7	**Clearly Audible**
	530059	172 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	40	2	**Noticable**
	530051	11 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	40	2	**Noticable**
	530024	14 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	41	3	**Noticable**
	530021	164 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	44	6	**Clearly Audible**
	530020	5 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	42	4	**Noticable**
	530016	18 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	39	1	**Noticable**
	529996	168 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	42	4	**Noticable**
	529962	9 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	40	2	**Noticable**
	529952	174 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	39	1	**Noticable**
	529938	15 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	38	0	**Noticable**
	529935	12 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	43	5	**Noticable**
	529930	5A MARSHALL STREET NEW LAMBTON HEIGHTS	RES	38	39	1	**Noticable**
	529925	166 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	42	4	**Noticable**
	529923	160 LOOKOUT ROAD NEW LAMBTON HEIGHTS	NONE	38	45	7	**Clearly Audible**
	529922	170 LOOKOUT ROAD NEW LAMBTON HEIGHTS	RES	38	41	3	**Noticable**
	529915	3 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	43	5	**Noticable**
	529907	16 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	RES	38	40	2	**Noticable**

Appendix C – 3 Month Look Ahead Notification Letter

September 2021

Out of hours early work at New Lambton Heights from September to December 2021

The NSW Government is funding early work for the Newcastle Inner City Bypass between Rankin Park and Jesmond.

Transport for NSW have awarded a contract to Quickway to relocate major utilities at the southern end of the Rankin Park to Jesmond project to help prepare for the main construction of the bypass. This early work will be continuing in September.

We will be carrying out essential night work on Lookout Road and surrounding areas. Work is required outside normal project hours for the safety of workers and road users, and to minimise traffic delays.

Work hours will be **7pm** and **6am** between **Monday** and **Friday**, weather permitting. High impact noisy work will be done **before 11pm**. If wet weather prevents the work occurring as planned it will be rescheduled and you will be notified.

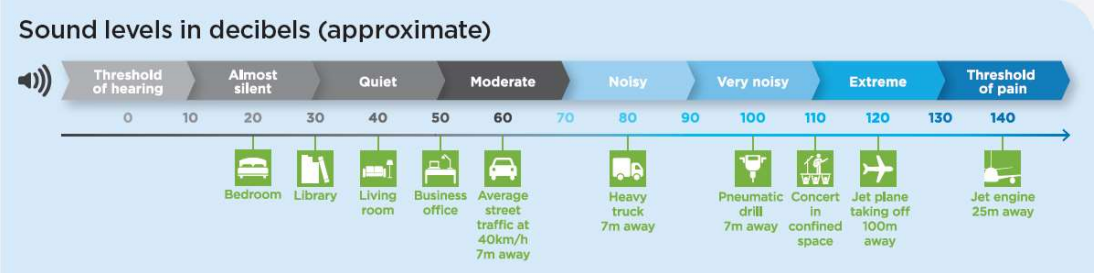
Date	Work Activity	Equipment
September	Median island removal and pavement infill on Lookout Road **Expected duration – 6 shifts over four weeks**	Traffic control, excavators, trucks, lighting towers, compaction rollers, road saw, asphalt profiler, asphalt paver, concrete agitator trucks.
Late September	Overhead powerline works on Lookout Road and McCaffrey Drive **Expected duration – 7 Shifts over two weeks**	Traffic control, trucks, excavator, elevated working platforms, lighting towers
Mid October	Trenched Utility Crossings across Lookout Road and Grandview Road **Expected duration – 6 Shifts over two weeks**	Traffic control, excavators, trucks, lighting towers, compaction rollers, road saw, asphalt profiler, asphalt paver, concrete agitator trucks.
Late October	Overhead powerline works on McCaffrey Drive and Lookout Road **Expected duration – 2 Shifts**	Traffic control, trucks, excavator, elevated working platforms, lighting towers
November	Overhead powerline works on Lookout Road **Expected duration – 4 Shifts over two weeks**	Traffic control, trucks, excavator, elevated working platforms, lighting towers
December	Watermain installation on Lookout Road Southbound **Expected duration – 4 Shifts over two weeks**	Traffic control, excavators, trucks, lighting towers, compaction rollers, road saw,

How will the work affect you?

The work will involve the use of machinery which generates noise, light and vibration. We will make every effort to minimise these impacts with our equipment selection, positioning of machines and noise blankets, turning off vehicles when not in use and using non-tonal reversing alarms.

Appropriate respite periods for the night work will be provided in consultation with the community at each affected location. This may include limiting the number of consecutive nights and extending the duration night of work, or increasing the number of consecutive nights and shortening the duration of night work.

Noise levels will vary between moderate to noisy, the diagram on the next page provides a guide to the noise you can expect. Directly affected residents will be contacted and advised of the likely impact and what we are doing to minimise disruption during the work.



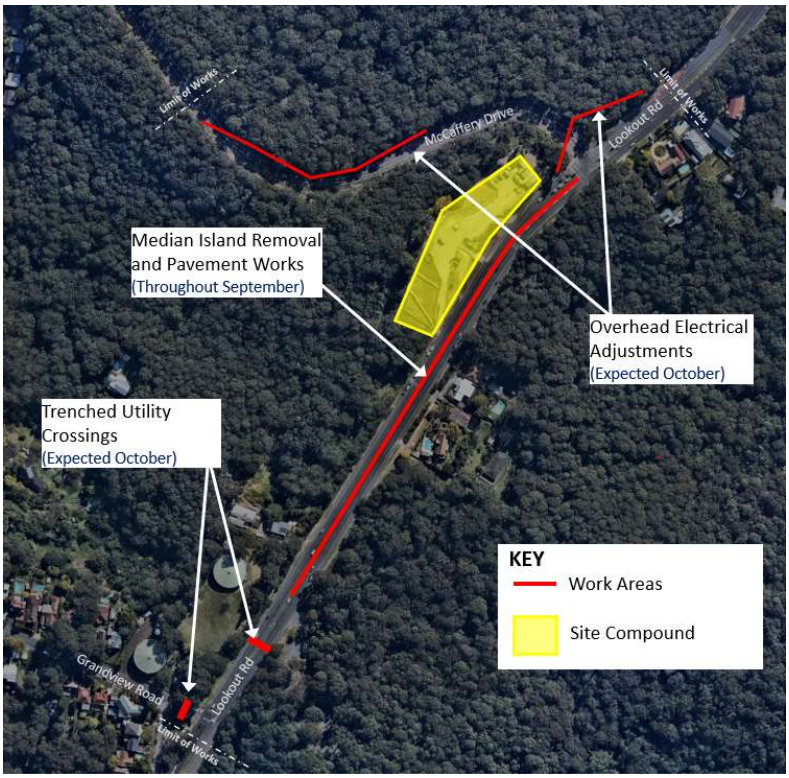
Traffic changes

There will be some temporary traffic changes to ensure the work zone is safe including realignment of travel lanes, installation of safety barriers and a 60km/h speed limit between McCaffrey Drive and Grandview Road. A 40km/h speed limit will apply during temporary lane closures. Travel times will be affected. Please keep to speed limits and follow the direction of traffic controllers and signs. For the latest traffic updates, you can call 132 701, visit livetraffic.com or download the Live Traffic NSW App.

Contact

If you would like to provide feedback, or have any questions about this work, please contact our project team on 1800 818 433 (24 hours – select option 2) or email southern.utilities.RP2J@quickway.com.au. For more information about the Newcastle Inner City Bypass between Rankin Park and Jesmond, visit nswroads.work/rp2j. Thank you for your patience during this important work.

Location of work



Appendix D

- **Draft Notification Letter for Residents**

October 2021

Out of hours early work at New Lambton Heights from Monday 11 October

The NSW Government is funding early work for the Newcastle Inner City Bypass between Rankin Park and Jesmond.

Transport for NSW has awarded a contract to Quickway to relocate major utilities at the southern end of the Rankin Park to Jesmond project to help prepare for the main construction of the bypass. This early work will be continuing in October. We will be carrying out essential night work on Grandview Road and Lookout Road. Work will include:

- digging a trench across Lookout Road for new gas and communications utilities
- digging a trench across Grandview Road and Lookout Road cul-de-sac for new gas utility

Work is required outside normal project hours for the safety of workers and road users, and to minimise traffic delays.

We will be working from **Monday 11 October** between **7pm** and **5am**, **Monday** to **Wednesday nights** and will complete the work in **six nights**, weather permitting. High impact, noisy work will be carried out before **11pm**. If wet weather prevents the work occurring as planned, it will be rescheduled and you will be notified.

How will the work affect you?

The work will involve the use of machinery which generates noise, light and vibration. We will make every effort to minimise these impacts with our equipment selection, positioning of machines and noise blankets, turning off vehicles when not in use and using non-tonal reversing alarms. We will temporarily close Grandview Road during the work and a detour will be in place. We will also close lanes on Lookout Road at times.

Traffic changes

There will be temporary traffic changes to ensure the work zone is safe. We have included a detour map for your information.

Partial closure of Grandview Road
From **7pm** to **5am** on **Monday 11 October, Tuesday 12 October** and **Wednesday 13 October**, weather permitting. The detour route could add up to five minutes to each journey. Local access will be permitted to residents at the corner of Grandview Road and Marshall Street.

Lane closures and contra-flow traffic on Lookout Road
From **7pm** to **5am** on **Monday 11 October, Tuesday 12 October, Wednesday 13 October, Monday 18 October, Tuesday 19 October** and **Wednesday 20 October**, weather permitting.

A 40km/h speed limit will be in place during temporary lane closures on Lookout Road and traffic will operate under contra-flow. Travel times will be affected.

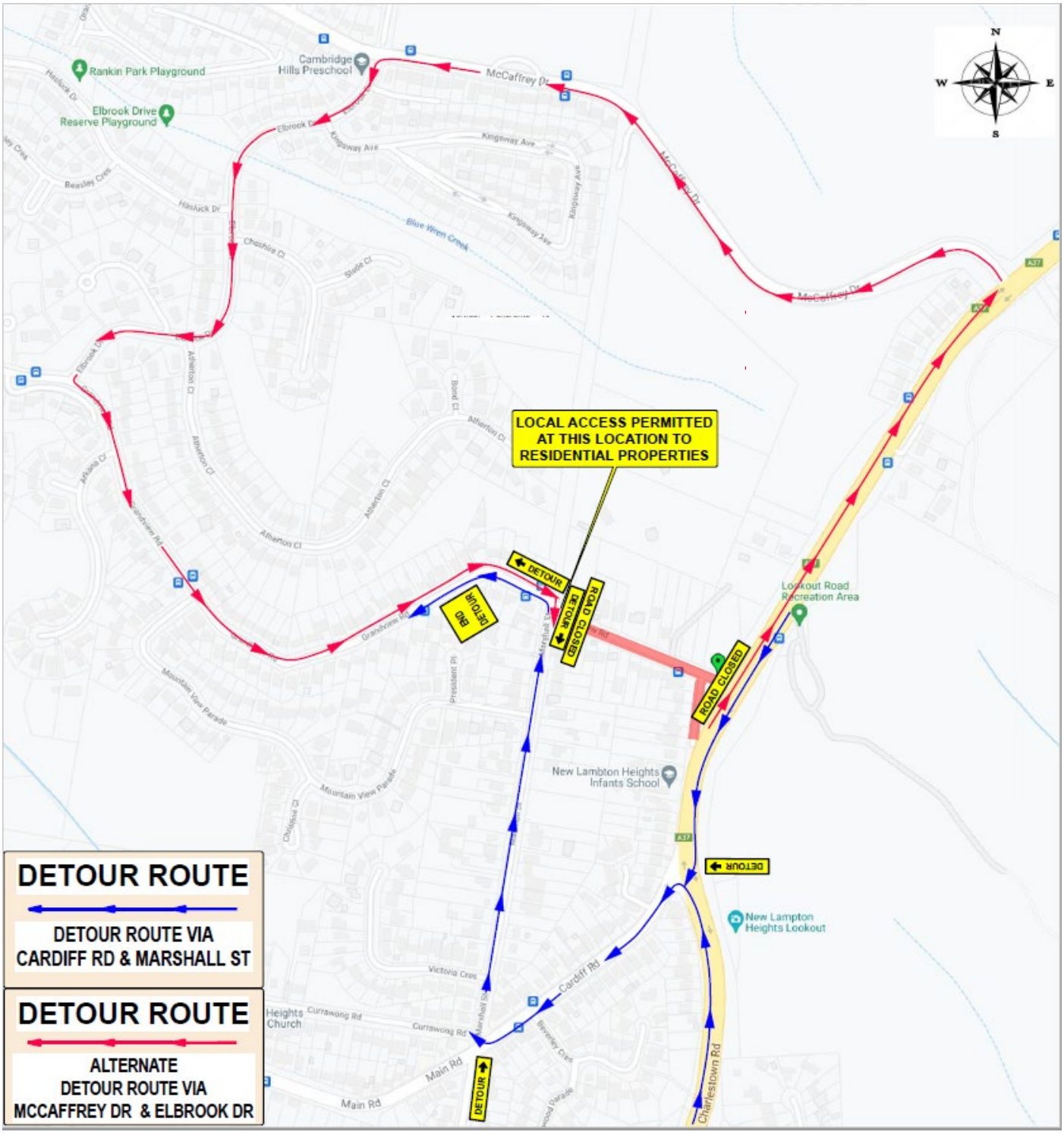
Please keep to speed limits and follow the direction of traffic controllers and signs. For the latest traffic updates, you can call 132 701, visit livetraffic.com or download the Live Traffic NSW App.

Contact

If you would like to provide feedback, have any questions about this work or would like to provide your contact details for future notices, please contact or Community Relations Manager on 1800 818 433 (24 hours – select option 2) or email southern.utilities.RP2J@quickway.com.au.

For more information about the Newcastle Inner City Bypass between Rankin Park and Jesmond, visit nswroads.work/rp2j. Thank you for your patience during this important work.

Detour route during Grandview Road closure



- **Appendix E – Consultation Record**

Address	NCA	Land Use	Work Location	NML (RBL +5 dB(A))	Predicted Noise Level at reciever	Exceedance of NML	Exceedance of RBL	OOH Protocol Risk Rating (high/low)	Impact Classification	Mitigation Measures (PC, V, IB, N, AA, SN, RO, R1, R2, DR)	Date Notification completed / sent	Notification type (SMS / Email / Phone Call / Notification Letter / Door knock)	Written Agreement to all OoHW
20 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	38	0	5	Low	Noticable	N, V	TBA	Notification Letter	
17 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	39	1	6	Low	Noticable	N, V	TBA	Notification Letter	
18 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	39	1	6	Low	Noticable	N, V	TBA	Notification Letter	
15 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	40	2	7	Low	Noticable	N, V	TBA	Notification Letter	
NEW LAMBTON HEIGHTS INFANTS SC 176 LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	40	2	7	Low	Noticable	N, V	TBA	Notification Letter	
16 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	41	3	8	Low	Noticable	N, V	TBA	Notification Letter	
11 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	42	4	9	Low	Noticable	N, V	TBA	Notification Letter	
174 LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	42	4	9	Low	Noticable	N, V	TBA	Notification Letter	
174 LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	42	4	9	Low	Noticable	N, V	TBA	Notification Letter	
14 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	43	5	10	Low	Clearly Audible	N, V	TBA	Notification Letter	
172 LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	43	5	10	Low	Clearly Audible	N, V	TBA	Notification Letter	
9 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	43	5	10	Low	Clearly Audible	N, V	TBA	Notification Letter	
12 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	44	6	11	Low	Clearly Audible	N, V	TBA	Notification Letter	
170 LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	45	7	12	Low	Clearly Audible	N, V	TBA	Notification Letter	
7 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	45	7	12	Low	Clearly Audible	N, V	TBA	Notification Letter	
168 LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	48	10	15	Low	Clearly Audible	N, V	TBA	Notification Letter	
5 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	48	10	15	Low	Clearly Audible	N, V	TBA	Notification Letter	
10 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	48	10	15	Low	Clearly Audible	N, V	TBA	Notification Letter	
166 LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	50	12	17	Low	Clearly Audible	N, V	TBA	Notification Letter	
3 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	52	14	19	Low	Clearly Audible	N, V	TBA	Notification Letter	
162 LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	57	19	24	Low	Moderately Intrusive	V, IB, N	TBA	Face to Face Briefing	
164 LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	57	19	24	Low	Moderately Intrusive	V, IB, N	TBA	Email and phone call	
1 GRANDVIEW ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	60	22	27	Low	Moderately Intrusive	V, IB, N	TBA	Face to Face Briefing	
136 LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	43	5	10	Low	Clearly Audible	N, V	TBA	Notification Letter	
138 LOOKOUT ROAD NEW LAMBTON HEIGHTS	13	Residential	Grandview Road	38	43	5	10	Low	Noticable	N, V	TBA	Notification Letter	