

Out of hours work approval request form			
<b>No:</b>	<b>Notification date:</b>	<b>Approval date:</b>	<b>Project:</b>
3	21/11/2019		Newcastle Inner City Bypass – Rankin Park to Jesmond
<b>A. Contact details</b>	<b>Name</b>	<b>Mobile number</b>	<b>Email</b>
Environmental Site Representative	██████	██████████	██████████████████████████████
Construction Manager	██████	██████████	██████████████████████████████
Foreman	██████	██████████	██████████████████████████████
Project Engineer	██████	██████████	██████████████████████████████
<b>B. Details of work:</b> Include a map showing location of work extent and nearest sensitive receivers	Location (Chainage):	Southern interchange – Lookout Road from about 50 north of Grandview Road to 80 metres north of McCaffrey Drive. Northern interchange – Newcastle Road roundabout to about 150 metres west. Northern interchange – Newcastle Inner City Bypass roundabout to about 160 metres north Refer further detail for location of proposed night time pothole investigation sites at <b>Attachment A</b> .	
	NCA/s:	NCA 2, NCA 4, NCA 5 and NCA 13	
	Description of works:	Non-destructive pothole investigation for design verification at various locations. It is anticipated that up to 16 investigation sites would occur in the vicinity of the southern interchange on Lookout Road. Up to a further six investigations sites would occur on Newcastle Road and the existing section of the Newcastle Inner City Bypass in the vicinity of the northern interchange. It would be anticipated that up to four investigations sites would be completed during a single night shift with investigative work taking place for between 30 and 60 minutes at any one location. Under a worst case scenario (ie unexpected ground	

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		conditions eg rock, inaccurate records of services, substantial depth), this may extend up to two to three hours.
	Machinery/ plant to be used	<ul style="list-style-type: none"> <li>• x2 Light vehicles</li> <li>• x1 Vacuum truck</li> <li>• Hand tools eg concrete saw</li> <li>• x1 surveyor with equipment</li> </ul>
	Traffic control measures required:	<p>Shoulder or single lane closures where investigations are located on or immediately adjacent to existing road pavement. Traffic control would only be set up on one carriageway at any one time. Actual constraints would be detailed in the Road Occupancy Licence (ROL), but typically include speed limit reductions (ie 40km/h) at the approach and departure area of individual investigations sites.</p> <p>The pothole vacuum truck and support vehicles would be parked in the shoulder, while the slow lane would provide a safety buffer between the investigation site and public road users.</p>
	Lighting required:	Additional lighting such as day makers are not proposed. It is considered that there is sufficient street lighting in the area that would be supplemented with hand-held torches, helmet torches and other similar portable lighting where required.
	Proposed dates:	<p>This OoHW activity is scheduled to occur between 9 and 20 December.</p> <p>It is anticipated this activity will require 8 nights, with contingency of 2 nights to accommodate unexpected circumstances or wet weather.</p>
	Proposed timings:	<p>Start: 7:30pm Completion: 6am</p> <p>Up to three hours at each investigation site.</p>

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	<p>Justification - why does work need to occur outside of standard construction hours?: (attach support information as required)</p>	<p>Up to 20 non-destructive investigation sites require completion at night due to constraints imposed by the Traffic Management Centre (TMC) which does not allow reduced speed limits or single lane closures on arterial roads when traffic demand is high ie day time periods.</p>
<p><b>C. Risk assessment</b></p>	<p><b>Noise</b> – A risk assessment has been undertaken using the Roads and Maritime <i>Construction Noise and Vibration Guide</i> (Roads and Maritime Services, 2016) and associated noise estimator tool (refer <b>Attachment B</b>) to predict noise impact at various distances from each investigation site during the night time OOHW period. The input data for noise calculations included:</p> <ul style="list-style-type: none"> <li>• Relevant Noise Catchment Area (NCA) specific RBLs</li> <li>• Type and quantity of plant and equipment</li> </ul> <p>Predicted noise levels were compared to the table in Attachment 2 – Application of OOHW Mitigation Measures of the approved Out of Hours Protocol when determining the application of Standard and Additional mitigation measures.</p> <p><b>Vibration</b> – Plant required to undertake the pothole investigation OOHW activity is not of a vibration inducing type and would not encroach on minimum safe working distances. Based on the proximity of the investigation sites to residential receivers, light and heavy vehicles on the road network would remain the predominant source of vibration.</p>	
<p><b>NML (refer Table 3-2 of OOHW protocol)</b></p>	<p><b>Noise catchment area 2</b> Evening – 48 Night – 40</p> <p><b>Noise catchment area 4</b> Evening – 51 Night – 41</p> <p><b>Noise catchment area 5</b> Evening – 56 Night – 46</p> <p><b>Noise catchment area 13</b> Evening – 54 Night – 38</p>	
<p><b>Is the work highly noise intensive? (above 75dB(A)<sub>LAeq</sub> (15 minute))</b></p>	<p>No</p> <p>The highly noise affected level of 75 dB(A) has been predicted to occur at distance of less than 9 metres in NCA 13 (the NCA with the lowest night time RBL). There are no investigation sites at or near this distance to sensitive receivers in any of the noise catchments where night work is proposed.</p>	

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<p><b>Risk factor category (low or high):</b></p>	<p style="text-align: center;">Low <span style="float: right; border: 1px solid black; padding: 2px;">High</span></p> <p>Comments</p> <p>In accordance with the risk factors nominated in Table 3.1 of the OOHW protocol, this work activity is considered to be high risk due to the following:</p> <ul style="list-style-type: none"> <li>• More than 5dBA<sub>Leq(15minutes)</sub> above the Rating Background Level (RBL)</li> </ul> <p>Other risk factors associated with the investigation activity fall within the low risk category, that is:</p> <ul style="list-style-type: none"> <li>• On one or two occasions</li> <li>• No impulsive or tonal noise vibration</li> </ul>
<p><b>D. Details of noise or vibration assessment completed:</b></p>	<p>Comments:</p> <p><b>Noise modelling</b></p> <p>A noise assessment has been undertaken using the Roads and Maritime <i>Construction Noise and Vibration Guide</i> (Roads and Maritime Services, 2016) and associated noise estimator tool (refer <b>Attachment B</b>) to predict noise impact at various distances from each investigation site during the night time OOHW period. Modelling was confined to this period (between 10pm and 7am) as this represents the time during which the predicted impact on sensitive receivers is considered greatest (ie the largest impact area within each catchment).</p> <p>The model is also considered conservative as it evaluates a worst case scenario where all plant and equipment is operating continuously and simultaneously for the nominated OOHW period.</p> <p><b>Attenuation applied to modelling</b></p> <p>As the noise estimator tool provides predictions based on a direct line of sight to receivers, and therefore does not consider the effects of topography or other attenuation provided by physical structures (eg solid walls, fences and intervening buildings such as other residential receivers) a scaled shielding correction has been applied based on distance to compensate for the built-up urbanised landscape. The shielding corrections applied to each respective catchment include:</p> <p><b>Noise catchment area 2/4/5</b></p> <ul style="list-style-type: none"> <li>• 10 dBA for distances greater than 105 metres</li> <li>• 5 dBA for distance greater than 60 metres but less than 100 metres</li> </ul> <p><b>Noise catchment area 13</b></p> <ul style="list-style-type: none"> <li>• 10 dBA for distances greater than 140 metres</li> <li>• 5 dBA for distance greater than 90 metres but less than 140 metres</li> </ul> <p><b>Noise modelling results</b></p> <p>Detailed noise calculations and results for the OOHW night time period are provided in <b>Attachment B</b>. A summary of these results is provided below:</p> <p><b>Noise catchment area 2/4/5</b></p> <ul style="list-style-type: none"> <li>• Investigation activities are predicted to be noticeable (ie &lt;5 above background) at distances up to 160 metres</li> <li>• Investigation activities are predicted to be clearly audible (ie +5 above NML) at distances up to 105 metres</li> <li>• Investigation activities are predicted to be moderately intrusive (ie</li> </ul>

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	<p>+15 above NML) at distances up to 60 metres</p> <ul style="list-style-type: none"> <li>Investigation activities are not predicted to achieve “highly noise affected” levels at any sensitive receiver.</li> </ul> <p><b>Noise catchment area 13</b></p> <ul style="list-style-type: none"> <li>Investigation activities are predicted to be noticeable (ie &lt;5 above background) at distances up to 210 metres</li> <li>Investigation activities are predicted to be clearly audible (ie +5 above NML) at distances up to 140 metres</li> <li>Investigation activities are predicted to be moderately intrusive (ie +15 above NML) at distances up to 90 metres</li> <li>Investigation activities are not predicted to achieve “highly noise affected” levels at any sensitive receiver.</li> </ul> <p>For perspective, Roads and Maritime have produced a “managing noise” fact sheet that provides a visual representation of commonly experience noise levels (refer <b>Attachment C</b>). Based on the above, sensitive receivers within 60 metres in NCA 4 and 90 metres in NCA 13, would be predicted to experience noise levels between that equivalent to a business office and a motor vehicle travelling down an average 40km/h street at 7 metres ie between 50 and 60 dBA. It should be recognised that this would be under a worst case scenario where all equipment is operating simultaneously and continuously for the period the investigation is in process. As discussed previously, this would only occur for short periods of time at any one investigation location that would typically take up to 60 minutes to complete.</p>
<p><b>E. Proposed Mitigation Measures</b></p>	<p><b>Standard mitigation measure for all catchments</b></p> <ul style="list-style-type: none"> <li>Pothole investigation work carried out during standard working hours wherever road occupancy licence constraints are not imposed</li> <li>Administrative controls, induction / tool box training sessions</li> <li>Noisier tasks to be carried out earlier in the night shift (during evening or day period) where feasible eg saw cutting</li> <li>Plant and equipment turned off when not in use</li> <li>Plant and equipment serviced regularly and operated in accordance with the manufacture’s specifications</li> <li>Non-tonal reversing alarms (squawkers) used instead of reversing beepers</li> <li>Radios used for communication to prevent the need for yelling</li> <li>Designated vehicle parking away from sensitive receivers</li> </ul> <p><b>Specific and additional mitigation measures</b></p> <p><b>Noise catchment area 2/4/5</b></p> <ul style="list-style-type: none"> <li>Standard consultation requirement predicted for distances of 160 metres or less</li> <li>Representative verification noise monitoring at distances up to 105 metres</li> <li>Targeted notification which may include individual briefing, phone call or specific notification predicted for distances of 60m or less</li> </ul> <p><b>Noise catchment area 13</b></p> <ul style="list-style-type: none"> <li>Standard consultation requirement predicted for distances of 210m or less</li> <li>Representative verification noise monitoring at distances up to 140 metres</li> <li>Targeted notification which may include individual briefing, phone</li> </ul>

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	<p>call or specific notification predicted for distances of 90m or less</p> <p>The specific and additional mitigation measures identified above are defined in Section 4 of the Out of Hours Protocol.</p>
<b>F. Community Consultation carried out including details of community feedback and how this has been addressed</b>	<p>Notification letters have been sent to potentially impacted receivers, and no concerns have been raised.</p> <p>Subsequent community consultation would be undertaken at least five days, and not more than 14 days, prior to OOHW commencing consistent with specific and additional mitigation measures in Section E (proposed mitigation measures) above.</p>
<b>G. Respite framework – dates of previous respite periods, OOHW period 1 or 2, community agreements etc</b>	<p>Respite is not proposed as work at individual investigation sites would be completed within a single shift, typically between 30 minutes and three hours. It would not be expected that any one sensitive receiver would experience noise impacts from pothole investigation work (from multiple investigation sites) for more than one night.</p>
<b>H. Details of non-residential receivers (if any) and corresponding NMLs</b>	<p>Non-residential land uses are primarily located in the vicinity of Jesmond roundabout. These comprise a mixture of retail outlets, other commercial activities (eg hotels). An NML of 70 has been applied to these properties which align with office and retail outlets. Properties comprising short-term accommodation adopt the residential NMLs for the respective NCAs.</p>
<b>I. Are there any properties at risk of exceeding the screening criteria for cosmetic damage?</b>	<p>Plant required to undertake the pothole investigation OOHW activity is not of a vibration inducing type and would not encroach on minimum safe working distances. Based on the proximity of the investigation sites to residential receivers and non-residential receivers, light and heavy vehicles on the road network would remain the predominant source of vibration.</p>
<b>E. Review/ Endorsements</b>	
<b>Community Liaison Representative</b>	Community notified: Yes, via letter. <span style="float: right;">Date: 6/11/19</span>
	Additional consultation requirements:
	Have the works been reviewed and endorsed? <span style="float: right;"><input checked="" type="radio"/> Yes <input type="radio"/> No</span>
	Name: [REDACTED] Signature: [REDACTED] Date: [REDACTED]
	[REDACTED]
	<p>Comments:</p> <p style="text-align: center;"><i>Subsequent notification to take place in addition to individual briefings as required.</i></p>

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<b>Roads and Maritime Environmental Manager (or delegate)</b>	Agreed mitigation measures:		
	Have the works been reviewed and endorsed? <input checked="" type="radio"/> Yes <input type="radio"/> No		
	Name:	Signature:	Date:
	[Redacted]	[Redacted]	21/11/2019
<b>Roads and Maritime Project Manager</b>	Have the works been reviewed and endorsed? <input checked="" type="radio"/> Yes <input type="radio"/> No		
	Name:	Signature:	Date:
	[Redacted]	[Redacted]	21/11/19
	Comments:		
<b>ER approval (low risk activities)</b>	Are the works approved? Yes / No		
	Name:	Signature:	Date:
	Comments:		
<b>Planning Secretary approval (high risk activities)</b>	Are the works approved? Yes / No		
	Name:	Signature:	Date:
	Comments:		

## Attachment 2 – Application of OOHW mitigation measures

OOHW period	dB(A)	Mitigation measures
<b>OOHW period 1</b> Monday–Friday: 6 pm – 10 pm Saturday: 7 am - 8 am and 5 pm – 10 pm Sunday and Public Hol.: 8 am – 6 pm	0-5 dB(A) above NML	<b>Standard mitigation measures:</b> <ul style="list-style-type: none"> <li>• Behavioural practices on site</li> <li>• Equipment selection / maintaining and monitoring plant</li> <li>• Use and siting of plant and hoardings</li> <li>• Site inductions</li> <li>• Use of non-tonal reversing alarms</li> <li>• Notification</li> <li>• Planning noisier work to be carried out earlier in the period</li> </ul>
	5-15 dB(A) above NML	<b>Standard mitigation measures:</b> <ul style="list-style-type: none"> <li>• Standard measures as above.</li> </ul> <b>Additional mitigation measures:</b> <ul style="list-style-type: none"> <li>• Notification</li> <li>• Respite offer period 1</li> <li>• Duration respite</li> </ul>
	15-25 dB(A) above NML	<b>Standard mitigation measures:</b> <ul style="list-style-type: none"> <li>• Standard measures as above</li> </ul> <b>Additional mitigation measures:</b> <ul style="list-style-type: none"> <li>• Notification</li> <li>• Verification</li> <li>• Respite offer period 1</li> <li>• Duration respite</li> </ul>
	>25 d(B)A above NML	<b>Standard mitigation measures:</b> <ul style="list-style-type: none"> <li>• Standard measures as above.</li> </ul> <b>Additional mitigation measures:</b> <ul style="list-style-type: none"> <li>• Notification</li> <li>• Verification</li> <li>• Individual briefing</li> <li>• Respite offer period 1</li> <li>• Duration respite</li> <li>• Phone calls</li> <li>• Specific notifications</li> </ul>



OOHW period	dB(A)	Mitigation measures
<b>OOHW period 2</b> Monday– Friday: 10 pm – 7 am Saturday: 10 pm - 8 am Sunday and Public Hol. 6 pm – 7 am	0-5 dB(A) above NML	<b>Standard mitigation measures:</b> <ul style="list-style-type: none"> <li>• Behavioural practices on site</li> <li>• Equipment selection / maintaining and monitoring plant</li> <li>• Use and siting of plant and hoardings</li> <li>• Site inductions</li> <li>• Use of non-tonal reversing alarms</li> <li>• Notification</li> <li>• Planning noisier work to be carried out earlier in the period</li> </ul>
	5-15 dB(A) above NML	<b>Standard mitigation measures:</b> <ul style="list-style-type: none"> <li>• Standard measures as above.</li> </ul> <b>Additional mitigation measures:</b> <ul style="list-style-type: none"> <li>• Notification</li> <li>• Verification</li> <li>• Respite offer period 2</li> <li>• Duration respite</li> </ul>
	15-25 dB(A) above NML	<b>Standard mitigation measures:</b> <ul style="list-style-type: none"> <li>• Standard measures as above</li> </ul> <b>Additional mitigation measures:</b> <ul style="list-style-type: none"> <li>• Notification</li> <li>• Verification</li> <li>• Individual briefing</li> <li>• Respite offer period 2</li> <li>• Duration respite</li> <li>• Phone calls</li> <li>• Specific notifications</li> </ul>
	>25 dB(A) above NML	<b>Standard mitigation measures:</b> <ul style="list-style-type: none"> <li>• Standard measures as above.</li> </ul> <b>Additional mitigation measures:</b> <ul style="list-style-type: none"> <li>• Notification</li> <li>• Verification</li> <li>• Individual briefing</li> <li>• Respite offer period 2</li> <li>• Duration respite</li> <li>• Phone calls</li> <li>• Specific notifications</li> <li>• Alternative accommodation</li> </ul>

**Table of hours (standard, OOH, Highly affected noise hours, respite periods)**

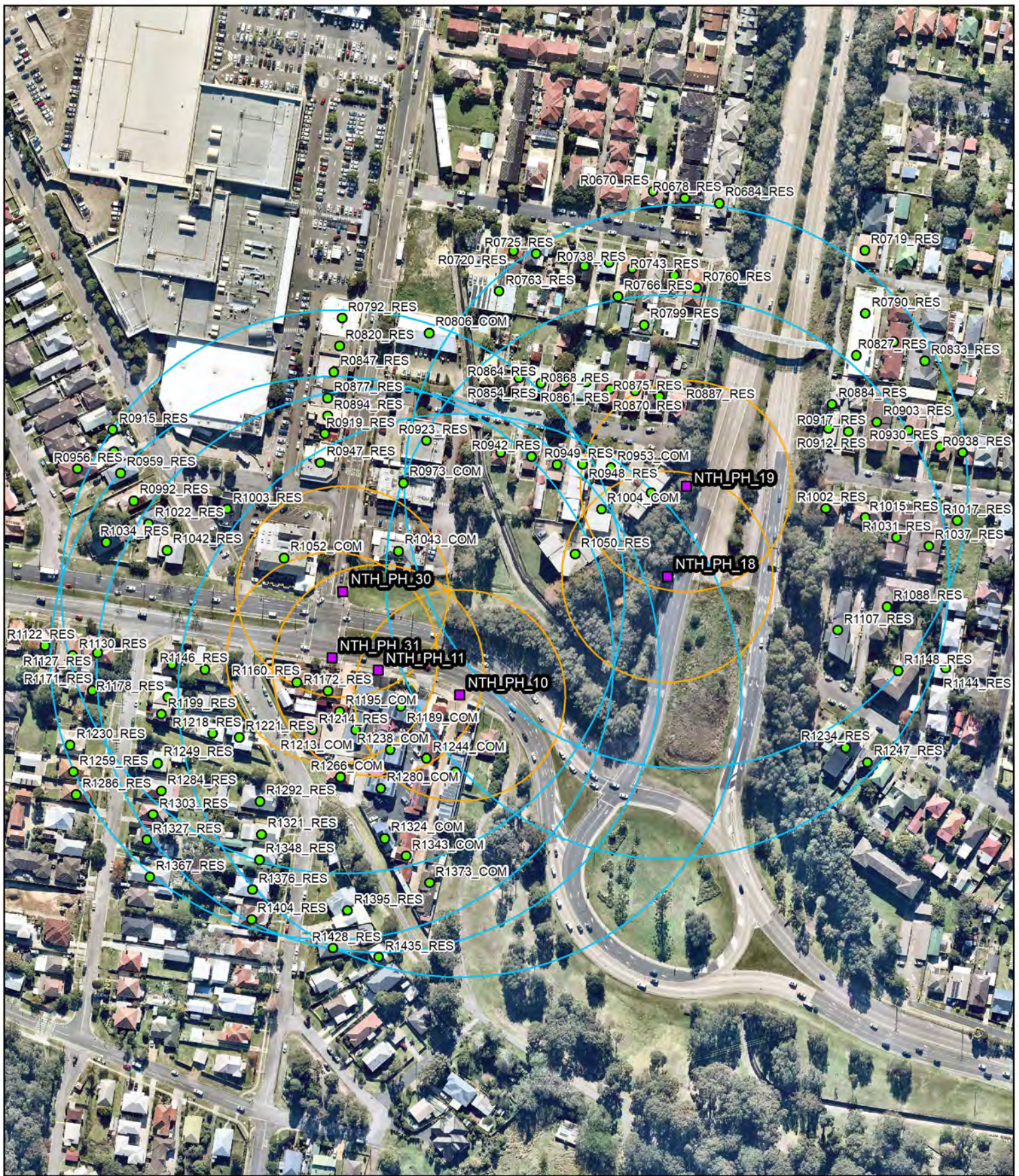
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1 AM	1 AM	1 AM	1 AM	1 AM	1 AM	1 AM
2 AM	2 AM	2 AM	2 AM	2 AM	2 AM	2 AM
3 AM	3 AM	3 AM	3 AM	3 AM	3 AM	3 AM
4 AM	4 AM	4 AM	4 AM	4 AM	4 AM	4 AM
5 AM	5 AM	5 AM	5 AM	5 AM	5 AM	5 AM
6 AM	6 AM	6 AM	6 AM	6 AM	6 AM	6 AM
7 AM	7 AM	7 AM	7 AM	7 AM	7 AM	7 AM
8 AM	8 AM	8 AM	8 AM	8 AM	8 AM	8 AM
9 AM	9 AM	9 AM	9 AM	9 AM	9 AM	9 AM
10 AM	10 AM	10 AM	10 AM	10 AM	10 AM	10 AM
11 AM	11 AM	11 AM	11 AM	11 AM	11 AM	11 AM
12 PM	12 PM	12 PM	12 PM	12 PM	12 PM	12 PM
1 PM	1 PM	1 PM	1 PM	1 PM	1 PM	1 PM
2 PM	2 PM	2 PM	2 PM	2 PM	2 PM	2 PM
3 PM	3 PM	3 PM	3 PM	3 PM	3 PM	3 PM
4 PM	4 PM	4 PM	4 PM	4 PM	4 PM	4 PM
5 PM	5 PM	5 PM	5 PM	5 PM	5 PM	5 PM
6 PM	6 PM	6 PM	6 PM	6 PM	6 PM	6 PM
7 PM	7 PM	7 PM	7 PM	7 PM	7 PM	7 PM
8 PM	8 PM	8 PM	8 PM	8 PM	8 PM	8 PM
9 PM	9 PM	9 PM	9 PM	9 PM	9 PM	9 PM
10 PM	10 PM	10 PM	10 PM	10 PM	10 PM	10 PM
11 PM	11 PM	11 PM	11 PM	11 PM	11 PM	11 PM
12 AM	12 AM	12 AM	12 AM	12 AM	12 AM	12 AM

**Legend**

<b>Standard hours (CoA E26)</b>	
Monday to Friday	7 am to 6 pm
Saturday	8 am to 5 pm
<b>Highly affected noise hours (CoA E30)</b>	
Monday to Friday	8 am to 6 pm
Saturday	8 am to 1 pm
<b>OOHW Day</b>	
Saturday	7 am to 8 am and 5 pm to 6 pm
Sundays and public holidays	8 am to 6 pm
<b>OOHW Evening</b>	
Monday to Sunday and public holidays	6 pm to 10 pm
<b>OOHW Night</b>	
Monday to Saturday	10 pm to 7 am
Sundays and public holidays	10 pm to 8 am
<b>Respite Periods</b>	
<b>OOHW period 1</b>	
Monday to Friday	6 pm – 10 pm
Saturday	7 am - 8 am and 5 pm – 10 pm

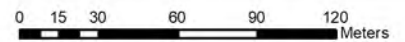
Sunday and public holidays	8 am – 6 pm
<b>OOHW period 2</b>	
Monday to Friday	10 pm – 7 am
Saturday	10 pm (Sat) - 8 am (Sun)
Sunday and public holidays	6 pm (Sun) – 7 am (Mon)

**Attachment A: Noise Catchment Area 2/4/5 pothole investigation  
night work consultation area**



- Noise affected receivers NCA4 pothole
- NCA4 pothole standard notification 160m
- Potholes nightwork NCA4
- NCA4 pothole additional notification 60m

Data attribution  
 Imagery: Nearmap under licence to Hills Environmental  
 Data: Supplied by Roads and Maritime Service



Newcastle Inner City Bypass  
 Rankin Park to Jesmond



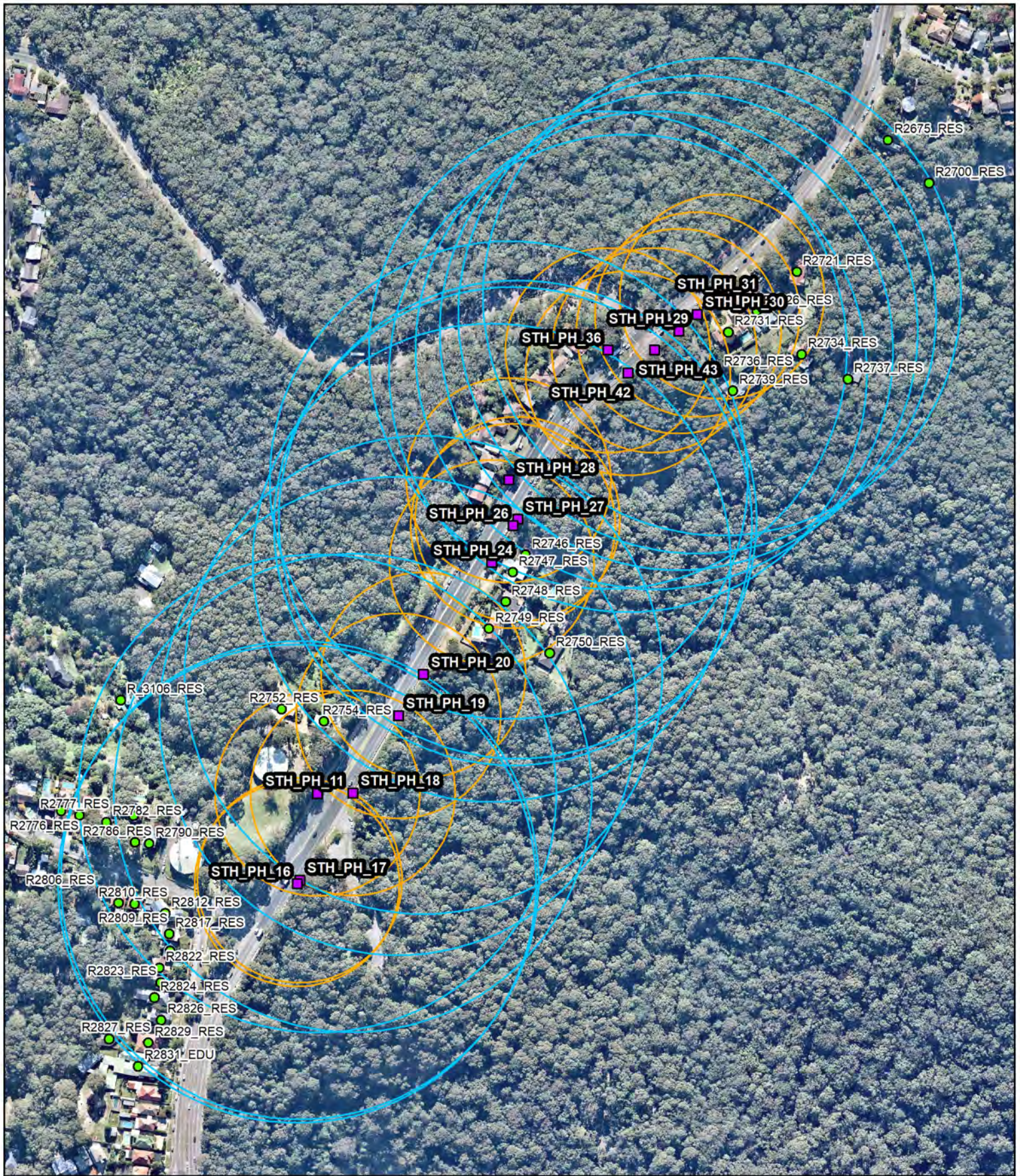
Noise catchment area 4  
 Pothole night work notification areas



Prepared for: Roads and Maritime Service

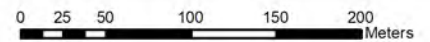
Date: 18 November 2019

**Attachment A: Noise Catchment Area 13 pothole investigation  
night work consultation area**



- Noise affected receivers NCA13 pothole
- NCA13 pothole standard notification 210m
- Potholes nightwork NCA 13
- NCA13 pothole additional notification 90m

Data attribution  
 Imagery: Nearmap under licence to Hills Environmental  
 Data: Supplied by Roads and Maritime Service



Newcastle Inner City Bypass  
 Rankin Park to Jesmond



Noise catchment area 13  
 Pothole night work notification areas

Prepared for: Roads and Maritime Service

Date: 18 November 2019

**Attachment B: Noise Catchment Area 2/4/5 pothole investigation  
night work noise calculations**



### Noise Estimator (Individual Plant)

**Please input information into yellow cells**  
Please pick from drop-down list in orange cells

Project name	RP2J	
Scenario name	PH NCA 4 - night work NML	
Receiver address	NCA 4	
Select area ground type	Developed settlements (urban and suburban areas)	
Select type of background noise level input	User Input	
<b>Representative Noise Environment</b>		
<b>Noise area category</b>		
RBL or LA90 Background level (dB(A))	Day	47
	Evening	46
	Night	36
LAeq(15minute) Noise mangement level (dB(A))	Day	57
	Day (OOHW)	52
	Evening	51
	Night	41
Is all plant at the same representative distance to the receiver? Y/N	Y	
Representative distance (m)	160	All at Representative Distance

**Steps:**  
 1. Enter project name (cell C9).  
 2. Enter scenario name (cell C10).  
 3. Enter receiver address (cell C11).  
 4. Select area ground type (cell C12) - water, undeveloped green fields (e.g. rural areas with isolated dwellings) or developed settlements (e.g. urban and suburban areas)  
 5. Select the type of background noise level input - Representative noise environment (to make assumptions) or user input (where noise monitoring data is available):  
 (a) where representative noise environment is selected - select the appropriate noise area category (cell C16). The worksheet titled 'Representative Noise Environ.' provides a number of examples to help select the noise area category.  
 (b) where user input is selected - enter the measured background noise level for each time period (cells D17 to D19).  
 6. Is all plant at the same representative distance to the receiver? Select Y or N (cell C24):  
 (a) where Y is selected - enter the representative distance in cell C25.  
 (b) where N is selected - go to step #7  
 7. For the scenario (e.g. shallow excavation), select plant from the drop-down list in cells A28 to A47 (e.g. dump trucks + excavator).  
 (a) enter quantity for each selected plant in cells D28 to D47.  
 (b) where N is selected from step #6 - enter the distance to receiver for each individual plant in cells E28 to E47.  
 (c) is there line of sight to receiver? select from drop down list in cells F28 to F47. Solid barrier can be in the form of road cutting, solid construction hoarding, acoustic curtain, timber lapped and capped fence, shipping container, site office, etc. Please note that vegetation and trees are not considered to be a form of solid barrier.  
 8. Identify the level above background and/or noise mangement level (see rows 57 to 62).  
 9. Identify and implement standard mitigation measures where feasible and reasonable. Include any shielding implemented as part of the standard mitigation measures by changing the selection in the 'Is there line of sight to receiver' drop-down list.  
 10. Identify and implement feasible and reasonable additional mitigation measures (see rows 63 to 65).  
 11. Document a summary report detailing:  
 (a) project description (including location, duration, hours of work, construction methodology, plant, potentially impacted receivers, etc.).  
 (b) background noise levels.  
 (c) noise management levels.  
 (d) predicted noise levels for each time period.  
 (e) sleep disturbance affected distance for night works.  
 (f) mitigation measures.  
 (g) team member responsible for implementing mitigation measures and managing noise and vibration.  
 (Note that suitable noise management levels for other noise-sensitive businesses not identified in the Construction Noise Estimator should be investigated on a project-by-project basis.

Type/ model plant (See Sources Sheet)	SWL LAeq (dB(A))	SPL @7m (dB(A))	Quantity	Individual distance to receiver (m)	Is there line of sight to receiver? Y/N	Quantity correction (dBA)	Shielding correction (dBA)	Distance used in calculation (m)	Contribution SPL (dB(A))
Vacuum truck	105	80	1		No (behind substantial solid barrier)	0	-10	160	39
Light vehicles	103	78	1		No (behind substantial solid barrier)	0	-10	160	37
People Talking	76	51	4		No (behind substantial solid barrier)	6	-10	160	16
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888

**Total SPL LAeq(15minute) (dB(A))** **41**

	Residential receiver	Non-residential receivers						
		Classroom at schools and other educational institutions	Hospital wards and operating theatres	Place of worship	Active recreation	Passive recreation	Industrial premise	Offices, retail outlets
Noise Management Level (dB(A))	Standard hours	57	55	65	65	60	75	70
	Day (OOHW)	52	55	65	65	60	75	70
	OOHW Period 1	51		65	65	60	75	70
	OOHW Period 2	41		65	65	60	75	70
Level above background (dB(A))	Standard hours	48						
	Day (OOHW)	43						
	OOHW Period 1	43						
	OOHW Period 2	5						
Level above NML (dB(A))	Standard hours	19						
	Day (OOHW)	14						
	OOHW Period 1	14						
	OOHW Period 2	0						
Additional mitigation measures	Standard Hours	-	-	-	-	-	-	-
	Day (OOHW)	-	-	-	-	-	-	-
	OOHW Period 1	-	-	-	-	-	-	-
	OOHW Period 2	N						

Abbreviation	Measure
N	Notification
SN	Specific notifications
PC	Phone calls
IB	Individual briefings
RO	Respite offer
R1	Respite period 1
R2	Respite period 2
DR	Duration respite
AA	Alternative accommodation
V	Verification

# Noise Estimator (Individual Plant)

**Please input information into yellow cells**  
Please pick from drop-down list in orange cells

Project name	RP2J
Scenario name	PH NCA 4 - night work NML +5
Receiver address	NCA 4
Select area ground type	Developed settlements (urban and suburban areas)
Select type of background noise level input	User Input

	Representative Noise Environment	User Input
<b>Noise area category</b>		
<b>RBL or LA90 Background level (dB(A))</b>	Day	47
	Evening	46
	Night	36
<b>L<sub>Aeq(15minute)</sub> Noise magement level (dB(A))</b>	Day	57
	Day (OOHW)	52
	Evening	51
	Night	41

Is all plant at the same representative distance to the receiver? Y/N	Y	
Representative distance (m)	105	All at Representative Distance

**Steps:**  
 1. Enter project name (cell C9).  
 2. Enter scenario name (cell C10).  
 3. Enter receiver address (cell C11).  
 4. Select area ground type (cell C12) - water, undeveloped green fields (e.g. rural areas with isolated dwellings) or developed settlements (e.g. urban and suburban areas).  
 5. Select the type of background noise level input - Representative noise environment (to make assumptions) or user input (where noise monitoring data is available):  
     (a) where representative noise environment is selected - select the appropriate noise area category (cell C16). The worksheet titled 'Representative Noise Environ.' provides a number of examples to help select the noise area category.  
     (b) where user input is selected - enter the measured background noise level for each time period (cells D17 to D19).  
 6. Is all plant at the same representative distance to the receiver? Select Y or N (cell C24):  
     (a) where Y is selected - enter the representative distance in cell C25.  
     (b) where N is selected - go to step #7  
 7. For the scenario (e.g. shallow excavation), select plant from the drop-down list in cells A28 to A47 (e.g. dump trucks + excavator).  
     (a) enter quantity for each selected plant in cells D28 to D47.  
     (b) where N is selected from step #6 - enter the distance to receiver for each individual plant in cells E28 to E47.  
     (c) is there line of sight to receiver? select from drop down list in cells F28 to F47. Solid barrier can be in the form of road cutting, solid construction hoarding, acoustic curtain, timber lapped and capped fence, shipping container, site office, etc. Please note that vegetation and trees are not considered to be a form of solid barrier.  
 8. Identify the level above background and/or noise mangement level (see rows 57 to 62).  
 9. Identify and implement standard mitigation measures where feasible and reasonable. Include any shielding implemented as part of the standard mitigation measures by changing the selection in the 'Is there line of sight to receiver' drop-down list.  
 10. Identify and implement feasible and reasonable additional mitigation measures (see rows 63 to 65).  
 11. Document a summary report detailing:  
     (a) project description (including location, duration, hours of work, construction methodology, plant, potentially impacted receivers, etc.).  
     (b) background noise levels.  
     (c) noise management levels.  
     (d) predicted noise levels for each time period.  
     (e) sleep disturbance affected distance for night works.  
     (f) mitigation measures.  
     (g) team member responsible for implementing mitigation measures and managing noise and vibration.

(Note that suitable noise management levels for other noise-sensitive businesses not identified in the Construction Noise Estimator should be investigated on a project-by-project basis.)

Type/ model plant (See Sources Sheet)	SWL LAeq (dB(A))	SPL @7m (dB(A))	Quantity	Individual distance to receiver (m)	Is there line of sight to receiver? Y/N	Quantity correction (dBA)	Shielding correction (dBA)	Distance used in calculation (m)	Contribution SPL (dB(A))
Vacuum truck	105	80	1		No (behind substantial solid barrier)	0	-10	105	44
Light vehicles	103	78	1		No (behind substantial solid barrier)	0	-10	105	42
People Talking	76	51	4		No (behind substantial solid barrier)	6	-10	105	21
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888

**Total SPL LAeq(15minute) (dB(A))**      **46**

	Residential receiver	Non-residential receivers						
		Classroom at schools and other educational institutions	Hospital wards and operating theatres	Place of worship	Active recreation	Passive recreation	Industrial premise	Offices, retail outlets
Noise Management Level (dB(A))	Standard hours	57	55	65	65	60	75	70
	Day (OOHW)	52	55	65	65	60	75	70
	OOHW Period 1	51		65	65	60	75	70
	OOHW Period 2	41		65	65	60	75	70
Level above background (dB(A))	Standard hours	0						
	Day (OOHW)	0						
	OOHW Period 1	0						
	OOHW Period 2	10						
Level above NML (dB(A))	Standard hours	0						
	Day (OOHW)	0						
	OOHW Period 1	0						
	OOHW Period 2	5						
Additional mitigation measures	Standard Hours	-	-	-	-	-	-	-
	Day (OOHW)	-	-	-	-	-	-	-
	OOHW Period 1	-	-	-	-	-	-	-
	OOHW Period 2	V, N, R2, DR	-	-	-	-	-	-

Abbreviation	Measure
N	Notification
SN	Specific notifications
PC	Phone calls
IB	Individual briefings
RO	Respite offer
R1	Respite period 1
R2	Respite period 2
DR	Duration respite
AA	Alternative accommodation
V	Verification

## Noise Estimator (Individual Plant)

Please input information into yellow cells  
Please pick from drop-down list in orange cells

Project name	RP2J
Scenario name	PH NCA 4 - night NML +15
Receiver address	NCA 4
Select area ground type	Developed settlements (urban and suburban areas)
Select type of background noise level input	User Input

Noise area category	Representative Noise Environment	User Input
RBL or LA90 Background level (dB(A))	Day	47
	Evening	46
	Night	36
LAeq(15minute) Noise mangement level (dB(A))	Day	57
	Day (OOHW)	52
	Evening	51
	Night	41

Is all plant at the same representative distance to the receiver? Y/N	Y
Representative distance (m)	60 <i>All at Representative Distance</i>

**Steps:**

- Enter project name (cell C9).
- Enter scenario name (cell C10).
- Enter receiver address (cell C11).
- Select area ground type (cell C12) - water, undeveloped green fields (e.g. rural areas with isolated dwellings) or developed settlements (e.g. urban and suburban areas)
- Select the type of background noise level input - Representative noise environment (to make assumptions) or user input (where noise monitoring data is available):
  - where representative noise environment is selected - select the appropriate noise area category (cell C16). The worksheet titled 'Representative Noise Environ.' provides a number of examples to help select the noise area category.
  - where user input is selected - enter the measured background noise level for each time period (cells D17 to D19).
- Is all plant at the same representative distance to the receiver? Select Y or N (cell C24):
  - where Y is selected - enter the representative distance in cell C25.
  - where N is selected - go to step #7
- For the scenario (e.g. shallow excavation), select plant from the drop-down list in cells A28 to A47 (e.g. dump trucks + excavator).
  - enter quantity for each selected plant in cells D28 to D47.
  - where N is selected from step #6 - enter the distance to receiver for each individual plant in cells E28 to E47.
  - is there line of sight to receiver? select from drop down list in cells F28 to F47. Solid barrier can be in the form of road cutting, solid construction hoarding, acoustic curtain, timber lapped and capped fence, shipping container, site office, etc. Please note that vegetation and trees are not considered to be a form of solid barrier.
- Identify the level above background and/or noise mangement level (see rows 57 to 62).
- Identify and implement standard mitigation measures where feasible and reasonable. Include any shielding implemented as part of the standard mitigation measures by changing the selection in the 'Is there line of sight to receiver' drop-down list.
- Identify and implement feasible and reasonable additional mitigation measures (see rows 63 to 65).
- Document a summary report detailing:
  - project description (including location, duration, hours of work, construction methodology, plant, potentially impacted receivers, etc.).
  - background noise levels.
  - noise management levels.
  - predicted noise levels for each time period.
  - sleep disturbance affected distance for night works.
  - mitigation measures.
  - team member responsible for implementing mitigation measures and managing noise and vibration.

(Note that suitable noise management levels for other noise-sensitive businesses not identified in the Construction Noise Estimator should be investigated on a project-by-project basis.)

Type/ model plant (See Sources Sheet)	SWL LAeq (dB(A))	SPL @7m (dB(A))	Quantity	Individual distance to receiver (m)	Is there line of sight to receiver? Y/N	Quantity correction (dBA)	Shielding correction (dBA)	Distance used in calculation (m)	Contribution SPL (dB(A))
Vacuum truck	105	80	1		No (behind solid barrier)	0	-5	60	54
Light vehicles	103	78	1		No (behind solid barrier)	0	-5	60	52
People Talking	76	51	4		No (behind solid barrier)	6	-5	60	31
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888

**Total SPL LAeq(15minute) (dB(A))** **56**

	Residential receiver	Non-residential receivers							
		Classroom at schools and other educational institutions	Hospital wards and operating theatres	Place of worship	Active recreation	Passive recreation	Industrial premise	Offices, retail outlets	
Noise Management Level (dB(A))	Standard hours	57	55	65	55	65	60	75	70
	Day (OOHW)	52	55	65	55	65	60	75	70
	OOHW Period 1	51		65	55	65	60	75	70
	OOHW Period 2	41		65	55			75	70
Level above background (dB(A))	Standard hours	9							
	Day (OOHW)	9							
	OOHW Period 1	10							
	OOHW Period 2	20							
Level above NML (dB(A))	Standard hours		1						
	Day (OOHW)	4	1						
	OOHW Period 1	5							
	OOHW Period 2	15							
Additional mitigation measures	Standard Hours	-	-	-	-	-	-	-	-
	Day (OOHW)	-	-	-	-	-	-	-	-
	OOHW Period 1	N, R1, DR	-	-	-	-	-	-	-
	OOHW Period 2	V, IB, N, PC, SN, R2, DR	-	-	N	-	-	-	-

Abbreviation	Measure
N	Notification
SN	Specific notifications
PC	Phone calls
IB	Individual briefings
RO	Respite offer
R1	Respite period 1
R2	Respite period 2
DR	Duration respite
AA	Alternative accommodation
V	Verification

**Attachment B: Noise Catchment Area 13 pothole investigation  
night work noise calculations**

### Noise Estimator (Individual Plant)

**Please input information into yellow cells**  
Please pick from drop-down list in orange cells

Project name	RP2J
Scenario name	PH NCA 13 - night time NML
Receiver address	NCA 13
Select area ground type	Developed settlements (urban and suburban areas)
Select type of background noise level input	User Input

Noise area category		Representative Noise Environment	User Input
RBL or LA90 Background level (dB(A))	Day		56
	Evening		49
	Night		33
LAeq(15minute) Noise mangement level (dB(A))	Day		66
	Day (OOHW)		61
	Evening		54
	Night		38

Is all plant at the same representative distance to the receiver? Y/N	Y	All at Representative Distance
Representative distance (m)	210	

**Steps:**

1. Enter project name (cell C9).
2. Enter scenario name (cell C10).
3. Enter receiver address (cell C11).
4. Select area ground type (cell C12) - water, undeveloped green fields (e.g. rural areas with isolated dwellings) or developed settlements (e.g. urban and suburban areas)
5. Select the type of background noise level input - Representative noise environment (to make assumptions) or user input (where noise monitoring data is available):
  - (a) where representative noise environment is selected - select the appropriate noise area category (cell C16). The worksheet titled 'Representative Noise Environ.' provides a number of examples to help select the noise area category.
  - (b) where user input is selected - enter the measured background noise level for each time period (cells D17 to D19).
6. Is all plant at the same representative distance to the receiver? Select Y or N (cell C24):
  - (a) where Y is selected - enter the representative distance in cell C25.
  - (b) where N is selected - go to step #7
7. For the scenario (e.g. shallow excavation), select plant from the drop-down list in cells A28 to A47 (e.g. dump trucks + excavator).
  - (a) enter quantity for each selected plant in cells D28 to D47.
  - (b) where N is selected from step #6 - enter the distance to receiver for each individual plant in cells E28 to E47.
  - (c) is there line of sight to receiver? select from drop down list in cells F28 to F47. Solid barrier can be in the form of road cutting, solid construction hoarding, acoustic curtain, timber lapped and capped fence, shipping container, site office, etc. Please note that vegetation and trees are not considered to be a form of solid barrier.
8. Identify the level above background and/or noise mangement level (see rows 57 to 62).
9. Identify and implement standard mitigation measures where feasible and reasonable. Include any shielding implemented as part of the standard mitigation measures by changing the selection in the 'Is there line of sight to receiver' drop-down list.
10. Identify and implement feasible and reasonable additional mitigation measures (see rows 63 to 65).
11. Document a summary report detailing:
  - (a) project description (including location, duration, hours of work, construction methodology, plant, potentially impacted receivers, etc.).
  - (b) background noise levels.
  - (c) noise management levels.
  - (d) predicted noise levels for each time period.
  - (e) sleep disturbance affected distance for night works.
  - (f) mitigation measures.
  - (g) team member responsible for implementing mitigation measures and managing noise and vibration.

(Note that suitable noise management levels for other noise-sensitive businesses not identified in the Construction Noise Estimator should be investigated on a project-by-project basis.)

Type/ model plant (See Sources Sheet)	SWL LAeq (dB(A))	SPL @7m (dB(A))	Quantity	Individual distance to receiver (m)	Is there line of sight to receiver? Y/N	Quantity correction (dBA)	Shielding correction (dBA)	Distance used in calculation (m)	Contribution SPL (dB(A))
Vacuum truck	105	80	1		No (behind substantial solid barrier)	0	-10	210	36
Light vehicles	103	78	1		No (behind substantial solid barrier)	0	-10	210	34
People Talking	76	51	4		No (behind substantial solid barrier)	6	-10	210	13
					No (behind substantial solid barrier)	0	-10		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888

<b>Total SPL LAeq(15minute) (dB(A))</b>	<b>38</b>
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		Residential receiver	Non-residential receivers						
			Classroom at schools and other educational institutions	Hospital wards and operating theatres	Place of worship	Active recreation	Passive recreation	Industrial premise	Offices, retail outlets
Noise Management Level (dB(A))	Standard hours	66	55	65	55	65	60	75	70
	Day (OOHW)	61	55	65	55	65	60	75	70
	OOHW Period 1	54		65	55	65	60	75	70
	OOHW Period 2	38		65	55			75	70
Level above background (dB(A))	Standard hours	38							
	Day (OOHW)	38							
	OOHW Period 1	5							
	OOHW Period 2	5							
Level above NML (dB(A))	Standard hours	38							
	Day (OOHW)	38							
	OOHW Period 1	5							
	OOHW Period 2	5							
Additional mitigation measures	Standard Hours	-	-	-	-	-	-	-	-
	Day (OOHW)	-	-	-	-	-	-	-	-
	OOHW Period 1	-	-	-	-	-	-	-	-
	OOHW Period 2	N	-	-	-	-	-	-	-

Abbreviation	Measure
N	Notification
SN	Specific notifications
PC	Phone calls
IB	Individual briefings
RO	Respite offer
R1	Respite period 1
R2	Respite period 2
DR	Duration respite
AA	Alternative accommodation
V	Verification

# Noise Estimator (Individual Plant)

**Please input information into yellow cells**  
Please pick from drop-down list in orange cells

Project name	RP2J
Scenario name	PH NCA 13 - night time NML +5
Receiver address	NCA 13
Select area ground type	Developed settlements (urban and suburban areas)
Select type of background noise level input	User Input

Noise area category		Representative Noise Environment	User Input
RBL or LA90 Background level (dB(A))	Day		56
	Evening		49
	Night		33
LAeq(15minute) Noise mangement level (dB(A))	Day		66
	Day (OOHW)		61
	Evening		54
	Night		38

Is all plant at the same representative distance to the receiver? Y/N	Y	All at Representative Distance
Representative distance (m)	140	All at Representative Distance

- Steps:**
- Enter project name (cell C9).
  - Enter scenario name (cell C10).
  - Enter receiver address (cell C11).
  - Select area ground type (cell C12) - water, undeveloped green fields (e.g. rural areas with isolated dwellings) or developed settlements (e.g. urban and suburban areas)
  - Select the type of background noise level input - Representative noise environment (to make assumptions) or user input (where noise monitoring data is available):
    - where representative noise environment is selected - select the appropriate noise area category (cell C16). The worksheet titled 'Representative Noise Environ.' provides a number of examples to help select the noise area category.
    - where user input is selected - enter the measured background noise level for each time period (cells D17 to D19).
  - Is all plant at the same representative distance to the receiver? Select Y or N (cell C24):
    - where Y is selected - enter the representative distance in cell C25.
    - where N is selected - go to step #7
  - For the scenario (e.g. shallow excavation), select plant from the drop-down list in cells A28 to A47 (e.g. dump trucks + excavator).
    - enter quantity for each selected plant in cells D28 to D47.
    - where N is selected from step #6 - enter the distance to receiver for each individual plant in cells E28 to E47.
    - is there line of sight to receiver? select from drop down list in cells F28 to F47. Solid barrier can be in the form of road cutting, solid construction hoarding, acoustic curtain, timber lapped and capped fence, shipping container, site office, etc. Please note that vegetation and trees are not considered to be a form of solid barrier.
  - Identify the level above background and/or noise mangement level (see rows 57 to 62).
  - Identify and implement standard mitigation measures where feasible and reasonable. Include any shielding implemented as part of the standard mitigation measures by changing the selection in the 'Is there line of sight to receiver' drop-down list.
  - Identify and implement feasible and reasonable additional mitigation measures (see rows 63 to 65).
  - Document a summary report detailing:
    - project description (including location, duration, hours of work, construction methodology, plant, potentially impacted receivers, etc.).
    - background noise levels.
    - noise management levels.
    - predicted noise levels for each time period.
    - sleep disturbance affected distance for night works.
    - mitigation measures.
    - team member responsible for implementing mitigation measures and managing noise and vibration.

(Note that suitable noise management levels for other noise-sensitive businesses not identified in the Construction Noise Estimator should be investigated on a project-by-project basis.

Type/ model plant (See Sources Sheet)	SWL LAeq (dB(A))	SPL @7m (dB(A))	Quantity	Individual distance to receiver (m)	Is there line of sight to receiver? Y/N	Quantity correction (dBA)	Shielding correction (dBA)	Distance used in calculation (m)	Contribution SPL (dB(A))
Vacuum truck	105	80	1		No (behind substantial solid barrier)	0	-10	140	41
Light vehicles	103	78	1		No (behind substantial solid barrier)	0	-10	140	39
People Talking	76	51	4		No (behind substantial solid barrier)	6	-10	140	18
					No (behind substantial solid barrier)	0	-10		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888

**Total SPL LAeq(15minute) (dB(A))** **43**

	Residential receiver	Non-residential receivers							
		Classroom at schools and other educational institutions	Hospital wards and operating theatres	Place of worship	Active recreation	Passive recreation	Industrial premise	Offices, retail outlets	
Noise Management Level (dB(A))	Standard hours	66	55	65	55	65	60	75	70
	Day (OOHW)	61	55	65	55	65	60	75	70
	OOHW Period 1	54		65	55	65	60	75	70
	OOHW Period 2	38		65	55			75	70
Level above background (dB(A))	Standard hours								
	Day (OOHW)								
	OOHW Period 1								
	OOHW Period 2	10							
Level above NML (dB(A))	Standard hours								
	Day (OOHW)								
	OOHW Period 1								
	OOHW Period 2	5							
Additional mitigation measures	Standard Hours	-	-	-	-	-	-	-	-
	Day (OOHW)	-	-	-	-	-	-	-	-
	OOHW Period 1	-	-	-	-	-	-	-	-
	OOHW Period 2	V, N, R2, DR	-	-	-	-	-	-	-

Abbreviation	Measure
N	Notification
SN	Specific notifications
PC	Phone calls
IB	Individual briefings
RO	Respite offer
R1	Respite period 1
R2	Respite period 2
DR	Duration respite
AA	Alternative accommodation
V	Verification

## Noise Estimator (Individual Plant)

Please input information into yellow cells  
Please pick from drop-down list in orange cells

Project name	RP2J
Scenario name	PH NCA 13 - night time NML+15
Receiver address	NCA 13
Select area ground type	Developed settlements (urban and suburban areas)
Select type of background noise level input	User Input

Noise area category		Representative Noise Environment	User Input
RBL or LA90 Background level (dB(A))	Day		56
	Evening		49
	Night		33
LAeq(15minute) Noise mangement level (dB(A))	Day		66
	Day (OOHW)		61
	Evening		54
	Night		38

Is all plant at the same representative distance to the receiver? Y/N	Y	All at Representative Distance
Representative distance (m)	90	All at Representative Distance

- Steps:**
- Enter project name (cell C9).
  - Enter scenario name (cell C10).
  - Enter receiver address (cell C11).
  - Select area ground type (cell C12) - water, undeveloped green fields (e.g. rural areas with isolated dwellings) or developed settlements (e.g. urban and suburban areas)
  - Select the type of background noise level input - Representative noise environment (to make assumptions) or user input (where noise monitoring data is available):
    - where representative noise environment is selected - select the appropriate noise area category (cell C16). The worksheet titled 'Representative Noise Environ.' provides a number of examples to help select the noise area category.
    - where user input is selected - enter the measured background noise level for each time period (cells D17 to D19).
  - Is all plant at the same representative distance to the receiver? Select Y or N (cell C24):
    - where Y is selected - enter the representative distance in cell C25.
    - where N is selected - go to step #7
  - For the scenario (e.g. shallow excavation), select plant from the drop-down list in cells A28 to A47 (e.g. dump trucks + excavator).
    - enter quantity for each selected plant in cells D28 to D47.
    - where N is selected from step #6 - enter the distance to receiver for each individual plant in cells E28 to E47.
    - is there line of sight to receiver? select from drop down list in cells F28 to F47. Solid barrier can be in the form of road cutting, solid construction hoarding, acoustic curtain, timber lapped and capped fence, shipping container, site office, etc. Please note that vegetation and trees are not considered to be a form of solid barrier.
  - Identify the level above background and/or noise mangement level (see rows 57 to 62).
  - Identify and implement standard mitigation measures where feasible and reasonable. Include any shielding implemented as part of the standard mitigation measures by changing the selection in the 'Is there line of sight to receiver' drop-down list.
  - Identify and implement feasible and reasonable additional mitigation measures (see rows 63 to 65).
  - Document a summary report detailing:
    - project description (including location, duration, hours of work, construction methodology, plant, potentially impacted receivers, etc.).
    - background noise levels.
    - noise management levels.
    - predicted noise levels for each time period.
    - sleep disturbance affected distance for night works.
    - mitigation measures.
    - team member responsible for implementing mitigation measures and managing noise and vibration.

(Note that suitable noise management levels for other noise-sensitive businesses not identified in the Construction Noise Estimator should be investigated on a project-by-project basis.)

Type/ model plant (See Sources Sheet)	SWL LAeq (dB(A))	SPL @7m (dB(A))	Quantity	Individual distance to receiver (m)	Is there line of sight to receiver? Y/N	Quantity correction (dBA)	Shielding correction (dBA)	Distance used in calculation (m)	Contribution SPL (dB(A))
Vacuum truck	105	80	1		No (behind solid barrier)	0	-5	90	51
Light vehicles	103	78	1		No (behind solid barrier)	0	-5	90	49
People Talking	76	51	4		No (behind solid barrier)	6	-5	90	28
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888
					Yes	0	0		-888

**Total SPL LAeq(15minute) (dB(A))** **53**

	Residential receiver	Non-residential receivers							
		Classroom at schools and other educational institutions	Hospital wards and operating theatres	Place of worship	Active recreation	Passive recreation	Industrial premise	Offices, retail outlets	
Noise Management Level (dB(A))	Standard hours	66	55	65	55	65	60	75	70
	Day (OOHW)	61	55	65	55	65	60	75	70
	OOHW Period 1	54		65	55	65	60	75	70
	OOHW Period 2	38		65	55			75	70
Level above background (dB(A))	Standard hours	3							
	Day (OOHW)	3							
	OOHW Period 1	4							
	OOHW Period 2	20							
Level above NML (dB(A))	Standard hours	3							
	Day (OOHW)	3							
	OOHW Period 1	3							
	OOHW Period 2	15							
Additional mitigation measures	Standard Hours	-	-	-	-	-	-	-	-
	Day (OOHW)	-	-	-	-	-	-	-	-
	OOHW Period 1	-	-	-	-	-	-	-	-
	OOHW Period 2	V, IB, N, PC, SN, R2, DR	-	-	-	-	-	-	-

Abbreviation	Measure
N	Notification
SN	Specific notifications
PC	Phone calls
IB	Individual briefings
RO	Respite offer
R1	Respite period 1
R2	Respite period 2
DR	Duration respite
AA	Alternative accommodation
V	Verification

**Attachment C: Noise management fact sheet**



# Managing noise

## Fact sheet

March 2018

We recognise construction noise can be a major annoyance, especially in residential areas. We are committed to mitigating and limiting construction noise impacts, wherever possible.

### What is noise?

We define noise as ‘unwanted sound’. Noise is perceived differently from one person to the next and is measured on a scale of units called decibels. We assess noise by averaging the quietest and loudest (actual or predicted) measurements while also considering how the human ear perceives it.

### What is construction noise?

Construction noise is unwanted sound caused by construction works or activities. It is temporary and often changes as construction activities change and work progresses.

Construction activities that have the potential to generate unwanted noise or vibration include:

- major earthwork activities
- project vehicle movements
- reversing alarms and beepers
- controlled blasting
- rock hammering and crushing
- bridge construction
- installation of piles
- concrete manufacturing

- asphaltting and concreting
- sawcutting and breaking of rock and concrete
- loading, unloading or moving equipment and construction materials
- tunneling.

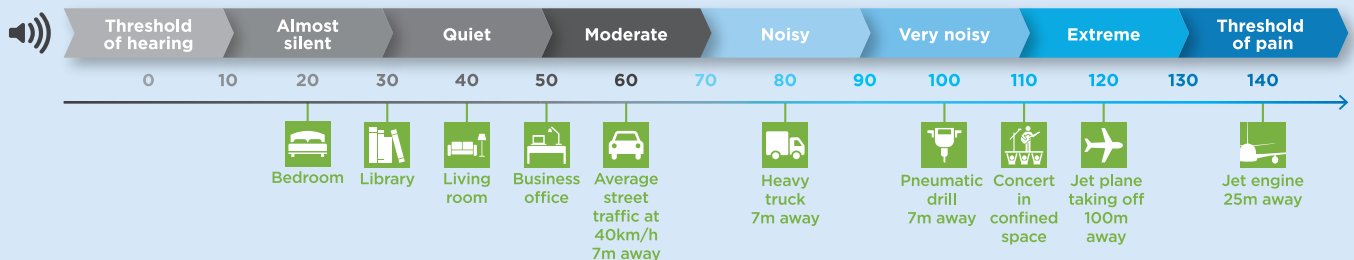
### Construction noise guidelines and criteria

Our assessment and management of construction noise is guided by five key documents:

- *Environmental Planning & Assessment Act 1979* (EP&A Act)
- *Protection of the Environment Operations Act 1997* (PoEO Act)
- *Department of Environment and Climate Change NSW Interim Construction Noise Guidelines (2009)*
- *Roads and Maritime Environmental Noise Management Manual (2001)*
- *Australian Standards AS2346 - Guide to noise control on construction, maintenance and demolition site (2010).*

Together, these documents provide noise criteria and guidelines which we use when managing construction noise during the delivery of our projects.

### Sound levels in decibels (approximate)



## How we assess construction noise and vibration impact

Potential construction noise issues are considered and assessed during project planning and development.

We carry out background noise measurements and prepare impact assessments that consider the distance from the work area to sensitive receivers. Where noise may exceed guidelines and is likely to adversely impact sensitive receivers, we actively seek management measures to reduce noise and vibration impacts and aim to proactively communicate with and advise potentially affected people.

Large or complex projects are assessed in greater detail than small or short duration projects due to the longer duration of potential noise impacts.

## How do we manage construction noise and vibration?

We prepare a noise and vibration management plan for each project to document how we will work to reduce construction noise and vibration. It includes:

- identification of potentially impacted stakeholders (residential and business)
- an outline of all construction noise conditions and requirements
- details of all mitigation measures that will be implemented in areas where the construction noise and vibration impact may exceed guidelines
- procedures for managing noise and providing respite periods when works at night and early in the morning are required.

## How do we reduce construction noise and vibration impacts?

Mitigation measures adopted to reduce and manage noise and vibration during construction may include:

- maximising the distance between noisy equipment and residential areas
- scheduling noisy work at less sensitive time periods (such as during normal daytime work hours where possible)
- regular maintenance of equipment
- installing noise control equipment on machinery and tools
- noise compliance monitoring
- locating compounds, stockpiles and crushing plants as far as possible away from residential areas

- use of temporary noise barriers
- scheduling respite periods for high noise activities, such as rock crushing (such as two hours on, two hours off)
- installing noise mitigation treatments designed for road traffic noise as early as possible to provide additional relief during construction
- scheduling noise generating activities outside of school examination periods
- providing advanced notice of planned noisy work to neighbouring communities to help them plan
- use of multiple explosive charges of the smallest possible size in sequenced detonation rather than single large blasts.

Unfortunately, in some instances, we have limited options available to reduce noise impacts given the type and range of machinery and equipment required to carry out the tasks. Where noise is excessive and prolonged, respite periods will be scheduled to provide some relief to neighbours.

## Out of hours work

Work is carried out during standard construction hours (from 7am to 6pm Monday to Friday and from 8am to 1pm on Saturdays) wherever possible. However, 'out of hours' work, (at night and early in the morning) may also be required where it is necessary to close roads or traffic lanes for major construction activities (such as resurfacing or installing bridges), to ensure the safety of our workers or to minimise impacts to peak period commuter traffic.

Activities that may occur outside standard hours include, but are not limited to:

- delivery of large or oversize machinery, prefabricated elements and construction materials
- bridge work:
  - lifting and setting of bridge span and beams
  - demolition of existing bridges
- utility relocation such as telephone, water, power or sewerage
- emergency work.

Any work such as grinding and asphaltting requiring full or partial road closures, to minimise impact on road users and allow for safe separation of workers and traffic.

## More information

This information is general in nature. For more information about specific projects or noise management strategies please visit our website at [rms.nsw.gov.au](http://rms.nsw.gov.au)



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