



Transport
for NSW

Please pick from drop-down list in orange cells

Noise area category		R4
Background level (dB(A))	Day	55
	Evening	50
	Night	45
Noise Management Level (dB(A))	Day (OOHW)	65
	Evening	60
	Night	55
Scenario		Site establishment
Is there line of sight to receiver?		No (behind solid barrier)

Distanced Based Assessment (Construction Scenario)

Steps for Assessment:

- Schedule noisy works to occur in standard hours where possible or before 11pm and implement Standard Measures.
- Select the representative noise area category. The worksheet titled 'Representative Noise Environ.' provides a number of examples to help select the noise area category.
- Select the scenario. If not found in drop-down list, refer to 'Source List' and select a representative scenario with similar plant combination.
- Is there line of sight to receiver? Select the appropriate scenario from the drop down list.

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. 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 and any gaps would compromise the acoustic integrity of the solid barrier.

- Determine if there are any receivers (both residential and non-residential receivers) within the affected distance for each relevant time period. Consider background noise measurements to check assumption in Step #2 if:

(a) there are many affected receivers and the impact duration at any one receiver is more than 3 weeks; or

(b) there are a few affected receivers and the impact duration at any one receiver is more than 6 weeks.

Note that consideration need to be given to the construction staging plan when determining impact duration.

- Identify if there are any receivers within the additional mitigation measures distances and identify feasible and reasonable measures at each receiver

- Where night works are involved, identify sleep disturbance affected distance.

- Document the outcomes of these steps.

(Note that suitable noise management levels for other noise-sensitive businesses not identified in the Construction and Maintenance Noise Estimator should be investigated on a project-by-project basis. Please contact a Transport for NSW noise specialist for more information)

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

Note that spot check verification of noise levels and individual briefings are not required for projects with less than 3 weeks impact duration

Residential receiver			L _{Aeq} (5minute) noise level above background (L _{A90})												L _{Aeq} (5minute) 75 dB(A) or greater (Highly affected)			Sleep disturbance L _{Amax} 65 dB(A)
			5 to 10 dB(A)			10 to 20 dB(A)			20 to 30 dB(A)			> 30 dB(A)						
			Noticeable			Clearly audible			Moderately intrusive			Highly intrusive						
			Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	
Undeveloped green fields, rural areas with isolated dwellings	Day	35							N, PC, RO	15	75	N, PC, RO	15	75	N, PC, RO	15	75	
	Day (OOHW)	75				N, R1, DR	35	65	N, R1, DR	15	75	N, R1, DR, PC, SN	5	80	N, PC, RO	15	75	
	Evening	125				N, R1, DR	75	60	N, R1, DR	25	70	N, R1, DR, PC, SN	5	80	N, PC, RO	15	75	
	Night	185	N	185	50	N, R2, DR	125	55	N, PC, SN, R2, DR	35	65	AA, N, PC, SN, R2, DR	15	75	N, PC, RO	15	75	45
	Highly Affected	15													N, PC, RO	15	75	
Developed settlements (urban and suburban)	Day	45							N, PC, RO	15	75	N, PC, RO	15	75	N, PC, RO	15	75	
	Day (OOHW)	85				N, R1, DR	45	65	N, R1, DR	15	75	N, R1, DR, PC, SN	#N/A	85	N, PC, RO	15	75	
	Evening	140				N, R1, DR	85	60	N, R1, DR	25	70	N, R1, DR, PC, SN	5	80	N, PC, RO	15	75	
	Night	215	N	215	50	N, R2, DR	140	55	N, PC, SN, R2, DR	45	65	AA, N, PC, SN, R2, DR	15	75	N, PC, RO	15	75	50
	Highly Affected	15													N, PC, RO	15	75	
Propagation across a valley / over water	Day	55							N, PC, RO	15	75	N, PC, RO	15	75	N, PC, RO	15	75	
	Day (OOHW)	100				N, R1, DR	55	65	N, R1, DR	15	75	N, R1, DR, PC, SN	#N/A	85	N, PC, RO	15	75	
	Evening	170				N, R1, DR	100	60	N, R1, DR	25	70	N, R1, DR, PC, SN	5	80	N, PC, RO	15	75	
	Night	275	N	275	50	N, R2, DR	170	55	N, PC, SN, R2, DR	55	65	AA, N, PC, SN, R2, DR	15	75	N, PC, RO	15	75	60
	Highly Affected	15													N, PC, RO	15	75	



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Background level (dB(A))	Day	55
	Evening	50
	Night	45
Noise Management Level (dB(A))	Day (OOHW)	65
	Evening	60
	Night	55
Scenario		Utility, property, service adjustment
Is there line of sight to receiver?		No (behind solid barrier)

Distanced Based Assessment (Construction Scenario)

Steps for Assessment:

- Schedule noisy works to occur in standard hours where possible or before 11pm and implement Standard Measures.
- Select the representative noise area category. The worksheet titled 'Representative Noise Environ.' provides a number of examples to help select the noise area category.
- Select the scenario. If not found in drop-down list, refer to 'Source List' and select a representative scenario with similar plant combination.
- Is there line of sight to receiver? Select the appropriate scenario from the drop down list.

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. 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 and any gaps would compromise the acoustic integrity of the solid barrier.

6. Determine if there are any receivers (both residential and non-residential receivers) within the affected distance for each relevant time period. Consider background noise measurements to check assumption in Step #2 if:

(a) there are many affected receivers and the impact duration at any one receiver is more than 3 weeks; or

(b) there are a few affected receivers and the impact duration at any one receiver is more than 6 weeks.

Note that consideration need to be given to the construction staging plan when determining impact duration.

7. Identify if there are any receivers within the additional mitigation measures distances and identify feasible and reasonable measures at each receiver

8. Where night works are involved, identify sleep disturbance affected distance.

9. Document the outcomes of these steps.

(Note that suitable noise management levels for other noise-sensitive businesses not identified in the Construction and Maintenance Noise Estimator should be investigated on a project-by-project basis. Please contact a Transport for NSW noise specialist for more information)

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

Note that spot check verification of noise levels and individual briefings are not required for projects with less than 3 weeks impact duration

Residential receiver			L _{Aeq} (5minute) noise level above background (L _{A90})												L _{Aeq} (5minute) 75 dB(A) or greater (Highly affected)			Sleep disturbance L _{Amax} 65 dB(A)
			5 to 10 dB(A)			10 to 20 dB(A)			20 to 30 dB(A)			> 30 dB(A)						
			Noticeable			Clearly audible			Moderately intrusive			Highly intrusive						
			Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	
Undeveloped green fields, rural areas with isolated dwellings	Day	45							N, PC, RO	15	75	N, PC, RO	15	75	N, PC, RO	15	75	
	Day (OOHW)	85				N, R1, DR	45	65	N, R1, DR	15	75	N, R1, DR, PC, SN	10	80	N, PC, RO	15	75	
	Evening	135				N, R1, DR	85	60	N, R1, DR	25	70	N, R1, DR, PC, SN	10	80	N, PC, RO	15	75	
	Night	195	N	195	50	N, R2, DR	135	55	N, PC, SN, R2, DR	45	65	AA, N, PC, SN, R2, DR	15	75	N, PC, RO	15	75	
	Highly Affected	15													N, PC, RO	15	75	
Developed settlements (urban and suburban)	Day	50							N, PC, RO	15	75	N, PC, RO	15	75	N, PC, RO	15	75	
	Day (OOHW)	95				N, R1, DR	50	65	N, R1, DR	15	75	N, R1, DR, PC, SN	#N/A	85	N, PC, RO	15	75	
	Evening	155				N, R1, DR	95	60	N, R1, DR	25	70	N, R1, DR, PC, SN	10	80	N, PC, RO	15	75	
	Night	235	N	235	50	N, R2, DR	155	55	N, PC, SN, R2, DR	50	65	AA, N, PC, SN, R2, DR	15	75	N, PC, RO	15	75	
	Highly Affected	15													N, PC, RO	15	75	
Propagation across a valley / over water	Day	60							N, PC, RO	15	75	N, PC, RO	15	75	N, PC, RO	15	75	
	Day (OOHW)	110				N, R1, DR	60	65	N, R1, DR	15	75	N, R1, DR, PC, SN	#N/A	85	N, PC, RO	15	75	
	Evening	190				N, R1, DR	110	60	N, R1, DR	30	70	N, R1, DR, PC, SN	10	80	N, PC, RO	15	75	
	Night	305	N	305	50	N, R2, DR	190	55	N, PC, SN, R2, DR	60	65	AA, N, PC, SN, R2, DR	15	75	N, PC, RO	15	75	
	Highly Affected	15													N, PC, RO	15	75	



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Noise area category		R4
Background level (dB(A))	Day	55
	Evening	50
	Night	45
Noise Management Level (dB(A))	Day	65
	Day (OOHW)	60
	Evening	55
	Night	50
Scenario		Profiling
Is there line of sight to receiver?		No (behind solid barrier)

Distanced Based Assessment (Construction Scenario)

Steps for Assessment:

- Schedule noisy works to occur in standard hours where possible or before 11pm and implement Standard Measures.
- Select the representative noise area category. The worksheet titled 'Representative Noise Environ.' provides a number of examples to help select the noise area category.
- Select the scenario. If not found in drop-down list, refer to 'Source List' and select a representative scenario with similar plant combination.
- Is there line of sight to receiver? Select the appropriate scenario from the drop down list.

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(a) there are many affected receivers and the impact duration at any one receiver is more than 3 weeks; or

(b) there are a few affected receivers and the impact duration at any one receiver is more than 6 weeks.

Note that consideration need to be given to the construction staging plan when determining impact duration.

7. Identify if there are any receivers within the additional mitigation measures distances and identify feasible and reasonable measures at each receiver

8. Where night works are involved, identify sleep disturbance affected distance.

9. Document the outcomes of these steps.

(Note that suitable noise management levels for other noise-sensitive businesses not identified in the Construction and Maintenance Noise Estimator should be investigated on a project-by-project basis. Please contact a Transport for NSW noise specialist for more information)

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

Note that spot check verification of noise levels and individual briefings are not required for projects with less than 3 weeks impact duration

Residential receiver			L _{Aeq} (5minute) noise level above background (L _{A90})												L _{Aeq} (5minute) 75 dB(A) or greater (Highly affected)			Sleep disturbance L _{Amax} 65 dB(A)
			5 to 10 dB(A)			10 to 20 dB(A)			20 to 30 dB(A)			> 30 dB(A)						
			Noticeable			Clearly audible			Moderately intrusive			Highly intrusive						
			Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	
Undeveloped green fields, rural areas with isolated dwellings	Day	50							N, PC, RO	20	75	N, PC, RO	20	75	N, PC, RO	20	75	105
	Day (OOHW)	95				N, R1, DR	50	65	N, R1, DR	20	75	N, R1, DR, PC, SN	10	80	N, PC, RO	20	75	
	Evening	145				N, R1, DR	95	60	N, R1, DR	25	70	N, R1, DR, PC, SN	10	80	N, PC, RO	20	75	
	Night	215	N	215	50	N, R2, DR	145	55	N, PC, SN, R2, DR	50	65	AA, N, PC, SN, R2, DR	20	75	N, PC, RO	20	75	
	Highly Affected	20													N, PC, RO	20	75	
Developed settlements (urban and suburban)	Day	60							N, PC, RO	20	75	N, PC, RO	20	75	N, PC, RO	20	75	115
	Day (OOHW)	105				N, R1, DR	60	65	N, R1, DR	20	75	N, R1, DR, PC, SN	#N/A	85	N, PC, RO	20	75	
	Evening	165				N, R1, DR	105	60	N, R1, DR	30	70	N, R1, DR, PC, SN	10	80	N, PC, RO	20	75	
	Night	255	N	255	50	N, R2, DR	165	55	N, PC, SN, R2, DR	60	65	AA, N, PC, SN, R2, DR	20	75	N, PC, RO	20	75	
	Highly Affected	20													N, PC, RO	20	75	
Propagation across a valley / over water	Day	70							N, PC, RO	20	75	N, PC, RO	20	75	N, PC, RO	20	75	140
	Day (OOHW)	125				N, R1, DR	70	65	N, R1, DR	20	75	N, R1, DR, PC, SN	#N/A	85	N, PC, RO	20	75	
	Evening	205				N, R1, DR	125	60	N, R1, DR	35	70	N, R1, DR, PC, SN	10	80	N, PC, RO	20	75	
	Night	335	N	335	50	N, R2, DR	205	55	N, PC, SN, R2, DR	70	65	AA, N, PC, SN, R2, DR	20	75	N, PC, RO	20	75	
	Highly Affected	20													N, PC, RO	20	75	



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Noise area category		R4
Background level (dB(A))	Day	55
	Evening	50
	Night	45
Noise Management Level (dB(A))	Day (OOHW)	65
	Evening	60
	Night	55
Scenario		Profiling
Is there line of sight to receiver?		Yes

Distanced Based Assessment (Construction Scenario)

Steps for Assessment:

- Schedule noisy works to occur in standard hours where possible or before 11pm and implement Standard Measures.
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- Select the scenario. If not found in drop-down list, refer to 'Source List' and select a representative scenario with similar plant combination.
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(a) there are many affected receivers and the impact duration at any one receiver is more than 3 weeks; or

(b) there are a few affected receivers and the impact duration at any one receiver is more than 6 weeks.

Note that consideration need to be given to the construction staging plan when determining impact duration.

7. Identify if there are any receivers within the additional mitigation measures distances and identify feasible and reasonable measures at each receiver

8. Where night works are involved, identify sleep disturbance affected distance.

9. Document the outcomes of these steps.

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Abbreviation	Measure
N	Notification
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Residential receiver			L _{Aeq} (5minute) noise level above background (L _{A90})												L _{Aeq} (5minute) 75 dB(A) or greater (Highly affected)			Sleep disturbance L _{Amax} 65 dB(A)
			5 to 10 dB(A)			10 to 20 dB(A)			20 to 30 dB(A)			> 30 dB(A)						
			Noticeable			Clearly audible			Moderately intrusive			Highly intrusive						
			Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	
Undeveloped green fields, rural areas with isolated dwellings	Day	95							N, PC, RO	25	75	N, PC, RO	25	75	N, PC, RO	25	75	155
	Day (OOHW)	145				N, R1, DR	95	65	N, R1, DR	25	75	N, R1, DR, PC, SN	20	80	N, PC, RO	25	75	
	Evening	215				N, R1, DR	145	60	N, R1, DR	50	70	N, R1, DR, PC, SN	20	80	N, PC, RO	25	75	
	Night	310	N	310	50	N, R2, DR	215	55	N, PC, SN, R2, DR	95	65	AA, N, PC, SN, R2, DR	25	75	N, PC, RO	25	75	
	Highly Affected	25													N, PC, RO	25	75	
Developed settlements (urban and suburban)	Day	105							N, PC, RO	30	75	N, PC, RO	30	75	N, PC, RO	30	75	180
	Day (OOHW)	165				N, R1, DR	105	65	N, R1, DR	30	75	N, R1, DR, PC, SN	10	85	N, PC, RO	25	75	
	Evening	255				N, R1, DR	165	60	N, R1, DR	60	70	N, R1, DR, PC, SN	20	80	N, PC, RO	30	75	
	Night	390	N	390	50	N, R2, DR	255	55	N, PC, SN, R2, DR	105	65	AA, N, PC, SN, R2, DR	30	75	N, PC, RO	30	75	
	Highly Affected	30													N, PC, RO	30	75	
Propagation across a valley / over water	Day	125							N, PC, RO	30	75	N, PC, RO	30	75	N, PC, RO	30	75	230
	Day (OOHW)	205				N, R1, DR	125	65	N, R1, DR	30	75	N, R1, DR, PC, SN	10	85	N, PC, RO	30	75	
	Evening	335				N, R1, DR	205	60	N, R1, DR	70	70	N, R1, DR, PC, SN	20	80	N, PC, RO	30	75	
	Night	530	N	530	50	N, R2, DR	335	55	N, PC, SN, R2, DR	125	65	AA, N, PC, SN, R2, DR	30	75	N, PC, RO	30	75	
	Highly Affected	30													N, PC, RO	30	75	



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Noise area category		R4
Background level (dB(A))	Day	55
	Evening	50
	Night	45
Noise Management Level (dB(A))	Day (OOHW)	65
	Evening	60
	Night	55
Scenario		Paving / asphaltting
Is there line of sight to receiver?		No (behind solid barrier)

Distanced Based Assessment (Construction Scenario)

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- Schedule noisy works to occur in standard hours where possible or before 11pm and implement Standard Measures.
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			Noticeable			Clearly audible			Moderately intrusive			Highly intrusive									
			Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Affected distance (m)			
Undeveloped green fields, rural areas with isolated dwellings	Day	25							N, PC, RO	10	75	N, PC, RO	10	75	N, PC, RO	10	75	185			
	Day (OOHW)	60				N, R1, DR	25	65	N, R1, DR	10	75	N, R1, DR, PC, SN	5	80	N, PC, RO	10	75				
	Evening	105				N, R1, DR	60	60	N, R1, DR	20	70	N, R1, DR, PC, SN	5	80	N, PC, RO	10	75				
	Night	155	N	155	50	N, R2, DR	105	55	N, PC, SN, R2, DR	25	65	AA, N, PC, SN, R2, DR	10	75	N, PC, RO	10	75				
	Highly Affected	10													N, PC, RO	10	75				
Developed settlements (urban and suburban)	Day	35							N, PC, RO	10	75	N, PC, RO	10	75	N, PC, RO	10	75	215			
	Day (OOHW)	70				N, R1, DR	35	65	N, R1, DR	10	75	N, R1, DR, PC, SN	#N/A	85	N, PC, RO	10	75				
	Evening	115				N, R1, DR	70	60	N, R1, DR	20	70	N, R1, DR, PC, SN	5	80	N, PC, RO	10	75				
	Night	180	N	180	50	N, R2, DR	115	55	N, PC, SN, R2, DR	35	65	AA, N, PC, SN, R2, DR	10	75	N, PC, RO	10	75				
	Highly Affected	10													N, PC, RO	10	75				
Propagation across a valley / over water	Day	40							N, PC, RO	10	75	N, PC, RO	10	75	N, PC, RO	10	75	280			
	Day (OOHW)	80				N, R1, DR	40	65	N, R1, DR	10	75	N, R1, DR, PC, SN	#N/A	85	N, PC, RO	10	75				
	Evening	140				N, R1, DR	80	60	N, R1, DR	20	70	N, R1, DR, PC, SN	5	80	N, PC, RO	10	75				
	Night	230	N	230	50	N, R2, DR	140	55	N, PC, SN, R2, DR	40	65	AA, N, PC, SN, R2, DR	10	75	N, PC, RO	10	75				
	Highly Affected	10													N, PC, RO	10	75				



Transport
for NSW

Please pick from drop-down list in orange cells

Noise area category		R4
Background level (dB(A))	Day	55
	Evening	50
	Night	45
Noise Management Level (dB(A))	Day (OOHW)	65
	Evening	60
	Night	55
Scenario		Road furniture installation
Is there line of sight to receiver?		No (behind solid barrier)

Distanced Based Assessment (Construction Scenario)

Steps for Assessment:

- Schedule noisy works to occur in standard hours where possible or before 11pm and implement Standard Measures.
- Select the representative noise area category. The worksheet titled 'Representative Noise Environ.' provides a number of examples to help select the noise area category.
- Select the scenario. If not found in drop-down list, refer to 'Source List' and select a representative scenario with similar plant combination.
- Is there line of sight to receiver? Select the appropriate scenario from the drop down list.

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. 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 and any gaps would compromise the acoustic integrity of the solid barrier.

6. Determine if there are any receivers (both residential and non-residential receivers) within the affected distance for each relevant time period. Consider background noise measurements to check assumption in Step #2 if:

- (a) there are many affected receivers and the impact duration at any one receiver is more than 3 weeks; or
- (b) there are a few affected receivers and the impact duration at any one receiver is more than 6 weeks.

Note that consideration need to be given to the construction staging plan when determining impact duration.

7. Identify if there are any receivers within the additional mitigation measures distances and identify feasible and reasonable measures at each receiver

8. Where night works are involved, identify sleep disturbance affected distance.

9. Document the outcomes of these steps.

(Note that suitable noise management levels for other noise-sensitive businesses not identified in the Construction and Maintenance Noise Estimator should be investigated on a project-by-project basis. Please contact a Transport for NSW noise specialist for more information)

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

Note that spot check verification of noise levels and individual briefings are not required for projects with less than 3 weeks impact duration

Residential receiver			L _{Aeq} (5minute) noise level above background (L _{A90})												L _{Aeq} (5minute) 75 dB(A) or greater (Highly affected)			Sleep disturbance L _{Amax} 65 dB(A)
			5 to 10 dB(A)			10 to 20 dB(A)			20 to 30 dB(A)			> 30 dB(A)						
			Noticeable			Clearly audible			Moderately intrusive			Highly intrusive						
			Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	
Undeveloped green fields, rural areas with isolated dwellings	Day	25							N, PC, RO	5	75	N, PC, RO	5	75	N, PC, RO	5	75	
	Day (OOHW)	40				N, R1, DR	25	65	N, R1, DR	5	75	N, R1, DR, PC, SN	#N/A	80	N, PC, RO	5	75	
	Evening	75				N, R1, DR	40	60	N, R1, DR	15	70	N, R1, DR, PC, SN	#N/A	80	N, PC, RO	5	75	
	Night	125	N	125	50	N, R2, DR	75	55	N, PC, SN, R2, DR	25	65	AA, N, PC, SN, R2, DR	5	75	N, PC, RO	5	75	
	Highly Affected	5													N, PC, RO	5	75	
Developed settlements (urban and suburban)	Day	25							N, PC, RO	5	75	N, PC, RO	5	75	N, PC, RO	5	75	
	Day (OOHW)	45				N, R1, DR	25	65	N, R1, DR	5	75	N, R1, DR, PC, SN	5	85	N, PC, RO	5	75	
	Evening	85				N, R1, DR	45	60	N, R1, DR	15	70	N, R1, DR, PC, SN	#N/A	80	N, PC, RO	5	75	
	Night	140	N	140	50	N, R2, DR	85	55	N, PC, SN, R2, DR	25	65	AA, N, PC, SN, R2, DR	5	75	N, PC, RO	5	75	
	Highly Affected	5													N, PC, RO	5	75	
Propagation across a valley / over water	Day	25							N, PC, RO	5	75	N, PC, RO	5	75	N, PC, RO	5	75	
	Day (OOHW)	55				N, R1, DR	25	65	N, R1, DR	5	75	N, R1, DR, PC, SN	#N/A	85	N, PC, RO	5	75	
	Evening	100				N, R1, DR	55	60	N, R1, DR	15	70	N, R1, DR, PC, SN	#N/A	80	N, PC, RO	5	75	
	Night	170	N	170	50	N, R2, DR	100	55	N, PC, SN, R2, DR	25	65	AA, N, PC, SN, R2, DR	5	75	N, PC, RO	5	75	
	Highly Affected	5													N, PC, RO	5	75	



Please pick from drop-down list in orange cells

Noise area category		R4
Background level (dB(A))	Day	55
	Evening	50
	Night	45
Noise Management Level (dB(A))	Day (OOHW)	65
	Evening	60
	Night	55
Scenario		Compound operation
Is there line of sight to receiver?		No (behind solid barrier)

Distanced Based Assessment (Construction Scenario)

Steps for Assessment:

- Schedule noisy works to occur in standard hours where possible or before 11pm and implement Standard Measures.
- Select the representative noise area category. The worksheet titled 'Representative Noise Environ.' provides a number of examples to help select the noise area category.
- Select the scenario. If not found in drop-down list, refer to 'Source List' and select a representative scenario with similar plant combination.
- Is there line of sight to receiver? Select the appropriate scenario from the drop down list.

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. 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 and any gaps would compromise the acoustic integrity of the solid barrier.

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- (b) there are a few affected receivers and the impact duration at any one receiver is more than 6 weeks.

Note that consideration need to be given to the construction staging plan when determining impact duration.

7. Identify if there are any receivers within the additional mitigation measures distances and identify feasible and reasonable measures at each receiver

8. Where night works are involved, identify sleep disturbance affected distance.

9. Document the outcomes of these steps.

(Note that suitable noise management levels for other noise-sensitive businesses not identified in the Construction and Maintenance Noise Estimator should be investigated on a project-by-project basis. Please contact a Transport for NSW noise specialist for more information)

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

Note that spot check verification of noise levels and individual briefings are not required for projects with less than 3 weeks impact duration

Residential receiver			L _{Aeq} (5minute) noise level above background (L _{A90})												L _{Aeq} (5minute) 75 dB(A) or greater (Highly affected)			Sleep disturbance L _{Amax} 65 dB(A)
			5 to 10 dB(A)			10 to 20 dB(A)			20 to 30 dB(A)			> 30 dB(A)						
			Noticeable			Clearly audible			Moderately intrusive			Highly intrusive						
			Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))				
Undeveloped green fields, rural areas with isolated dwellings	Day	30						N, PC, RO	10	75	N, PC, RO	10	75	N, PC, RO	10	75		
	Day (OOHW)	65				N, R1, DR	30	65	N, R1, DR	10	75	N, R1, DR, PC, SN	5	80	N, PC, RO	10	75	
	Evening	115				N, R1, DR	65	60	N, R1, DR	20	70	N, R1, DR, PC, SN	5	80	N, PC, RO	10	75	
	Night	170	N	170	50	N, R2, DR	115	55	N, PC, SN, R2, DR	30	65	AA, N, PC, SN, R2, DR	10	75	N, PC, RO	10	75	45
	Highly Affected	10												N, PC, RO	10	75		
Developed settlements (urban and suburban)	Day	40						N, PC, RO	15	75	N, PC, RO	15	75	N, PC, RO	15	75		
	Day (OOHW)	75				N, R1, DR	40	65	N, R1, DR	15	75	N, R1, DR, PC, SN	#N/A	85	N, PC, RO	10	75	
	Evening	130				N, R1, DR	75	60	N, R1, DR	25	70	N, R1, DR, PC, SN	5	80	N, PC, RO	15	75	
	Night	200	N	200	50	N, R2, DR	130	55	N, PC, SN, R2, DR	40	65	AA, N, PC, SN, R2, DR	15	75	N, PC, RO	15	75	50
	Highly Affected	15												N, PC, RO	15	75		
Propagation across a valley / over water	Day	45						N, PC, RO	15	75	N, PC, RO	15	75	N, PC, RO	15	75		
	Day (OOHW)	90				N, R1, DR	45	65	N, R1, DR	15	75	N, R1, DR, PC, SN	#N/A	85	N, PC, RO	15	75	
	Evening	155				N, R1, DR	90	60	N, R1, DR	25	70	N, R1, DR, PC, SN	5	80	N, PC, RO	15	75	
	Night	250	N	250	50	N, R2, DR	155	55	N, PC, SN, R2, DR	45	65	AA, N, PC, SN, R2, DR	15	75	N, PC, RO	15	75	60
	Highly Affected	15												N, PC, RO	15	75		

Overview of additional mitigation measures

After standard noise mitigation measures have been applied noise levels may still exceed noise management levels. The Construction and Maintenance Noise Estimator will indicate which additional measures apply. Note that assistance from Transport Communication and Stakeholder Engagement is available to coordinate and deliver community consultation and notification. The team also has the latest noise fact sheets and letter templates.

The range of additional measures are described below. Note in instances where there are many receivers above the NML it may not be practical to discuss the project with every receiver recommended below. Instead the community should be proactively engaged so they have an incentive to participate in discussion. Support from the community may be demonstrated from surveys, online feedback, contact phone numbers and community events.

Longer term impacts
During long term works or at fixed sites the additional mitigation measures above may become less effective. In these situations at-receiver noise mitigation may be considered where feasible and reasonable if options for at-source noise mitigation and management measures have been exhausted.

At-receiver mitigation may include temporary window and door screens, temporary localised shielding or permanent forms of mitigation. Feasible and reasonable considerations for providing at-receiver treatments should include:

- time of day of the noise increase and exceedence of criteria
- time of use of affected receivers
- how many decibels the noise levels are to increase

Abbreviation	Measure	Description
N	Notification (letterbox drop or equivalent)	Advance warning of works and potential disruptions can assist in reducing the impact on the community. The notification may consist of using variable message sign, letterbox drop (or equivalent), web site / social media or a combination to distribute information detailing work activities, time periods over which these will occur, impacts and mitigation measures. Notification should be a minimum of 5 working days prior to the start of works. The approval conditions for projects may also specify requirements for notification to the community about works that may impact on them.
SN	Specific notifications	Specific notifications are letterbox dropped (or equivalent) to identified stakeholders no later than 5 working days ahead of construction activities that are likely to exceed the noise objectives. The specific notification provides additional information when relevant and informative to more highly affected receivers than covered in general letterbox drops. This form of communication is used to support periodic notifications, or to advertise unscheduled works.
PC	Phone calls	Phone calls detailing relevant information made to identified/affected stakeholders, who have provided their contact details, within seven calendar days of proposed work. Phone calls provide affected stakeholders with personalised contact and tailored advice, with the opportunity to provide comments on the proposed work and specific needs. Where the resident cannot be telephoned then an alternative form of engagement should be used.
IB	Individual briefings	Individual briefings are used to inform stakeholders about the impacts of high noise activities and mitigation measures that will be implemented. Project representatives would visit identified stakeholders at least 48 hours ahead of potentially disturbing construction activities. Individual briefings provide affected stakeholders with personalised contact and tailored advice, with the opportunity to comment on the project. Where the resident cannot be met with individually then an alternative form of engagement should be used.
RO	Respite offer	Respite Offers should be considered where there are high noise and vibration generating activities near receivers. As a guide work should be carried out in continuous blocks that do not exceed 3 hours each, with a minimum respite period of one hour between each block. The actual duration of each block of work and respite should be flexible to accommodate the usage of and amenity at nearby receivers. The purpose of such an offer is to provide residents with respite from an ongoing impact. This measure is evaluated on a project-by-project basis, and may not be applicable to all projects, or when duration respite has been agreed (see below).
R1	Respite Period 1	Out of hours construction noise in out of hours period 1 shall be limited to no more than three consecutive evenings per week except where there is a Duration Respite. For night work these periods of work should be separated by not less than one week and no more than 6 evenings per month.
R2	Respite Period 2	Night time construction noise in out of hours period 2 shall be limited to two consecutive nights except for where there is a Duration Respite. For night work these periods of work should be separated by not less than one week and no more than 6 nights per month. Where possible, high noise generating works shall be completed before 11pm.
DR	Duration respite	Respite offers and respite periods 1 and 2 may be counterproductive in reducing the impact on the community for longer duration projects. In this instance and where it can be strongly justified it may be beneficial to increase the work duration, number of evenings or nights worked through Duration Respite so that the project can be completed more quickly. Transport staff should engage with the community where noise levels are expected to exceed the NML to demonstrate support for Duration Respite.
AA	Alternative accommodation	Alternative accommodation options may be offered (as a last resort) to residents living in close proximity to construction works that are likely to experience highly intrusive noise levels. The specifics of the offer will be identified on a project-by-project basis, however an AA offer is unlikely to be made for maintenance works. Additional aspects for consideration shall include whether the highly intrusive activities occur throughout the night or before midnight.
V	Verification	Verification may be required for building or asset condition where works are likely to cause vibration impact or for noise levels following reasonable complaints. See Appendix F of the Construction Noise and Vibration Guideline (Roads) for more details.

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

- Notes ¹**(refer to detailed descriptions in Table C1 above):

1.

AA

V

IB

N

PC

SN

= Alternative accommodation

= Validation of predicted noise levels

= Individual briefings

= Notification box drops

= Phone calls

= Specific notifications

R1

R2

DR

RO

HA

= Respite period 1

= Respite period 2

= Duration respite

= Project specific respite offer

= Highly affected

2.

All affected receivers

Ground vibration - minimum working distances from sensitive receivers

As a guide, minimum working distances from sensitive receivers for typical items of vibration intensive plant are listed in the table below. The minimum distances are quoted for both cosmetic damage (refer to BS 7385:2-1993 for light-framed residential type structures and DIN 4150-3:2016 for fragile or heritage type structures) and human comfort (refer to EPA's Assessing Vibration - a technical guideline). The minimum working distances for cosmetic damage must be complied with at all times, unless otherwise approved by Transport for NSW or under the environmental license as relevant.

Recommended minimum working distances for vibration intensive plant from sensitive receiver

Plant item	Rating / Description	Minimum working distance		
		Cosmetic damage		Human Response
		Light-framed structure (BS 7385)	Heritage and other sensitive structures (DIN 4150)	EPA's Vibration Guideline
Vibratory Roller	< 50 kN (Typically 1-2 tonnes)	5 m	14 m	15 m to 20 m
	< 100 kN (Typically 2-4 tonnes)	6 m	16 m	20 m
	< 200 kN (Typically 4-6 tonnes)	12 m	33 m	40 m
	< 300 kN (Typically 7-13 tonnes)	15 m	41 m	100 m
	> 300 kN (Typically 13-18 tonnes)	20 m	54 m	100 m
	> 300 kN (> 18 tonnes)	25 m	68 m	100 m
Small Hydraulic Hammer	(300 kg - 5 to 12t excavator)	2 m	5 m	7 m
Medium Hydraulic Hammer	(900 kg - 12 to 18t excavator)	7 m	19 m	23 m
Large Hydraulic Hammer	(1600 kg - 18 to 34t excavator)	22 m	60 m	73 m
Vibratory Pile Driver	Sheet piles	20 m	50 m	100 m
Pile Boring	≤ 800 mm	2 m (nominal)	5 m	7 m
Jackhammer	Hand held	1 m (nominal)	2 m	3 m
Profiler	Wirtgen W210	4 m	-	-
Asphalt Paver	Vogele Super 1800-3	1 m	-	-
Steel Drum Roller	Hamm HD70 (Oscillating Mode)	2 m	-	-
Steel Drum Roller	Hamm HD70 (Static Mode)	1 m	-	-

The minimum working distances are indicative and will vary depending on the particular item of plant, local geotechnical conditions and the dominant frequency of the construction vibration levels. They apply to cosmetic damage of typical light-framed residential buildings and heritage/fragile buildings and assume that construction vibration could include low frequency content associated with the increased risk of cosmetic damage. Vibration monitoring is recommended to confirm the minimum working distances at specific sites. Additionally, detailed analysis based on the frequency dependent guideline vibration levels in BS 7385:2-1993 and DIN 4150-3:2016 may be utilised in conjunction with site specific measurements to derive alternative cosmetic damage objectives and minimum working distances. For heritage listed / fragile structures, specialist advice from an appropriately qualified structural engineer who is familiar with heritage structures is required to support any proposed relaxation of the initial cosmetic damage

Operational aspects of some receivers may be highly sensitive to noise and vibration over and above typical noise and vibration allowances based on annoyance and human comfort. For highly sensitive receivers (eg, high technology facilities with sensitive equipment, recording studios and cinemas), specific assessment is required to ensure satisfactory operation of the facility and determine if any mitigation or management measures are required to minimise the potential impacts. Some guidance where building contents contain sensitive equipment may be found in these additional references:

* Australian Standard 2834-1995 Computer Accommodation, Chapter 2.9 Vibration, p16

* Gordon CG Generic Vibration Criteria for Vibration Sensitive Equipment Proceedings of International Society for Optical Engineering (SPIE), Vol. 1619, San Jose, CA, November 4-6, 1991, pp. 71-85

* ASHRAE Applications Handbook (SI) 2003, Chapter 47 Sound and Vibration Control, pp47.39-47.40

* ISO 8569 1996 Measurement & Evaluation of Shock & Vibration Effects on Sensitive Equipment in buildings

In relation to human comfort (response), the minimum working distances in the above table relate to continuous vibration. For most construction activities, vibration emissions are intermittent in nature and for this reason, higher vibration levels, occurring over shorter periods are allowed (see EPA's Assessing Vibration: a technical guideline). Where the predicted vibration levels for construction activities exceed the human comfort objectives, the procedures in Appendix C of the Construction Noise and Vibration Guideline (Roads) are to be followed in order to mitigate the potential impacts at sensitive receivers.

If the predicted ground-borne vibration levels exceed the cosmetic damage screening levels, a different construction method with lower source vibration levels must be used where feasible and reasonable otherwise construction works should not proceed unless attended vibration measurements are undertaken at the commencement of the works to verify the site-specific minimum working distances. If there is any risk of exceedance of the cosmetic damage objective, a permanent vibration monitoring system should be installed, to warn plant operators (via flashing light, audible alarm, SMS, etc) when vibration levels are approaching the cosmetic damage objective. Appendix G of the Construction Noise and Vibration Guideline (Roads) presents the process in the form of a flowchart.