Sydney Harbour Bridge Step Free Access

Addendum review of environmental factors

Roads and Maritime Services | June 2018

NSW GOVERNMENT

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Prepared by Cardno and Roads and Maritime Services
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Approval and authorisation

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Rev A	10 May 2018	Chloe Vandervord	Belinda Crichton
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Executive summary

Roads and Maritime Services (Roads and Maritime) proposes to modify the Sydney Harbour Bridge Step Free Access project by increasing the number of night-works at the northern and southern ends of the bridge (proposed modification). The proposed modification supports the overall Sydney Harbour Bridge Step Free Access project, which will allow mobility impaired persons to access the pedestrian footpath. It is anticipated that night works would occur for 66 nights in total at the northern and southern sites.

A review of environmental factors (REF) was prepared for the Sydney Harbour Bridge Step Free Access project in October 2017 (referred to in this addendum REF as the project REF). The project REF was placed on public display between 23 October 2017 and 12 November 2017 for community and stakeholder comment. A submissions report, dated December 2017 was prepared to respond to issues raised. After consideration of the project REF and submissions report, Roads and Maritime made a decision to proceed with the project

The purpose of this addendum REF is to describe the proposed modification, to document and assess the likely impacts of the proposed modification on the environment, and to detail protective measures to be implemented.

Chapter 2 of the project REF addresses the strategic need for the project and the project objectives. The proposed modification assessed in this addendum REF is consistent with the strategic need of the project. The modification is required to support the main works of the Sydney Harbour Bridge Step Free Access project.

Section 2.3 of the project REF identifies the proposal objectives and development criteria that apply to the proposed modification.

There are no feasible alternative options to undertaking night works considering the constraints at the site including maintaining continuous pedestrian access, traffic impacts and road closures.

The *State Environment Planning Policy (Infrastructure) 2007* (ISEPP) applies to the modification. Clause 94 permits development on any land for the purpose of road infrastructure facilities. The modification can be assessed under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), with no development consent from Council required.

The potential impacts identified in this addendum REF are sufficiently addressed by the safeguards and mitigation measures outlined in the project REF.

The modification is considered justified against the projects need and project objectives.

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Appendices

1. Introduction

1.1 Proposed modification overview

Roads and Maritime Services (Roads and Maritime) proposes to modify the Sydney Harbour Bridge Step Free Access project by increasing the number of night-works at the northern and southern sites (proposed modification).

Key features of the proposed modification would include increasing the number of night works to 66 nights for both the northern and southern sites.

The location of the project on the northern site is shown in Figure 1-1 and the location of the proposed lift in Figure 1-2. The proposed lift on the southern site is shown in Figure 1-3 and the proposed modification in Figure 1-4. Chapter 3 describes the proposed modification in more detail.

A review of environmental factors (REF) was prepared for the Sydney Harbour Bridge Step Free Access REF in October 2017 (referred to in this addendum REF as the project REF). The project REF was placed on public display between 23 October 2017 and 12 November 2017 for community and stakeholder comment. A submissions report, dated December 2017 was prepared to respond to issues raised. After consideration of the project REF and submissions report, Roads and Maritime made a decision to proceed with the project

In addition, the following supplementary reports have been prepared for the Sydney Harbour Bridge Step Free Access project:

- Sydney Harbour Bridge Step Free Access Addendum review of environmental factors (March 2018) to assess the likely impacts of constructing a temporary City of Sydney Council (Council) depot on Hickson Road, Dawes Point to support construction of the southern lift.
- Sydney Harbour Bridge Step Free Access REF consistency assessment (May 2018) to assess the likely impacts of removing an additional tree, tree trimming and modifying the haulage route to the southern site.

Figure 1-1: Location of the project at the northern site

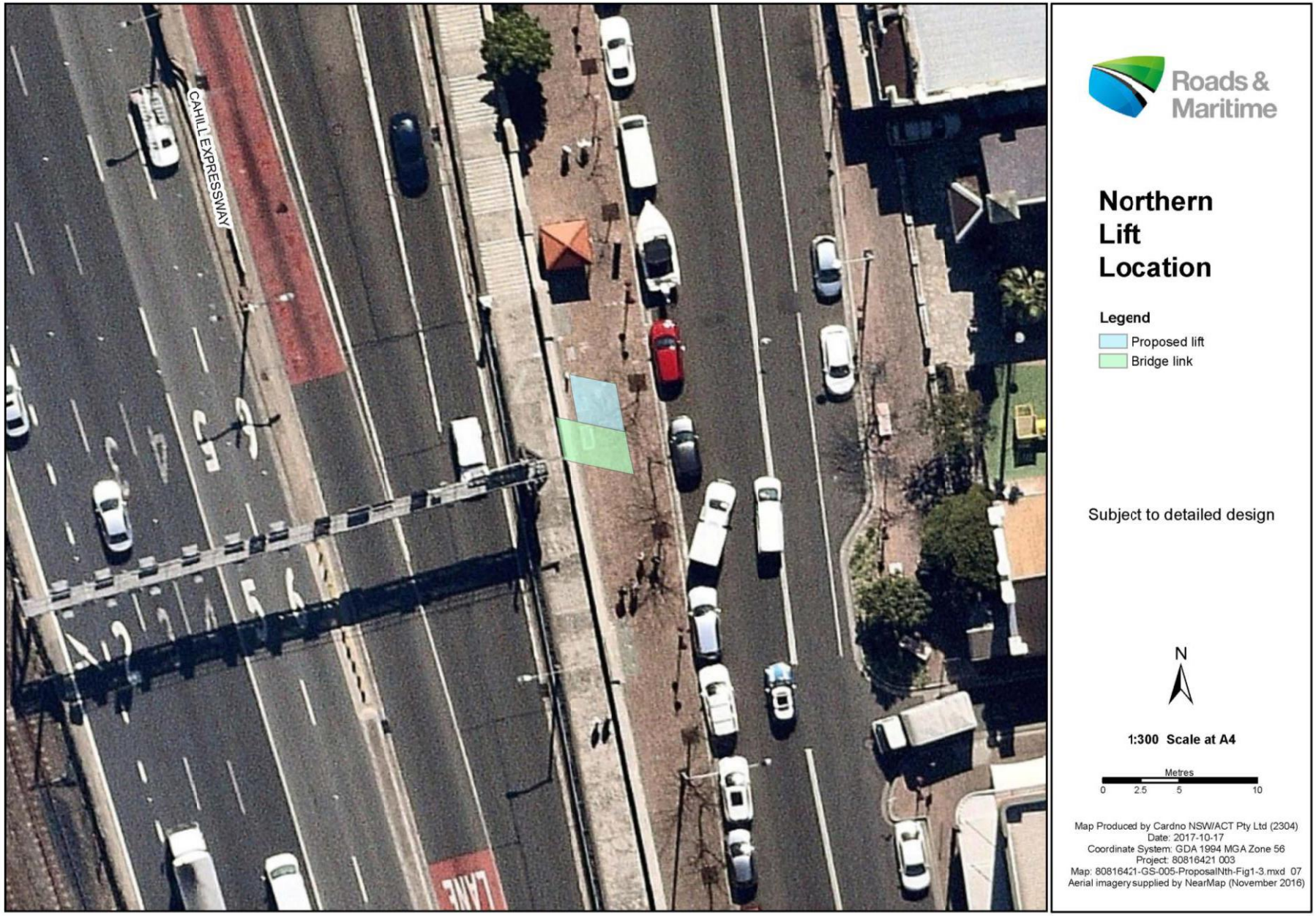

Figure 1-2: Location of the lift at the northern site

Figure 1-3: Location of the project at the southern site

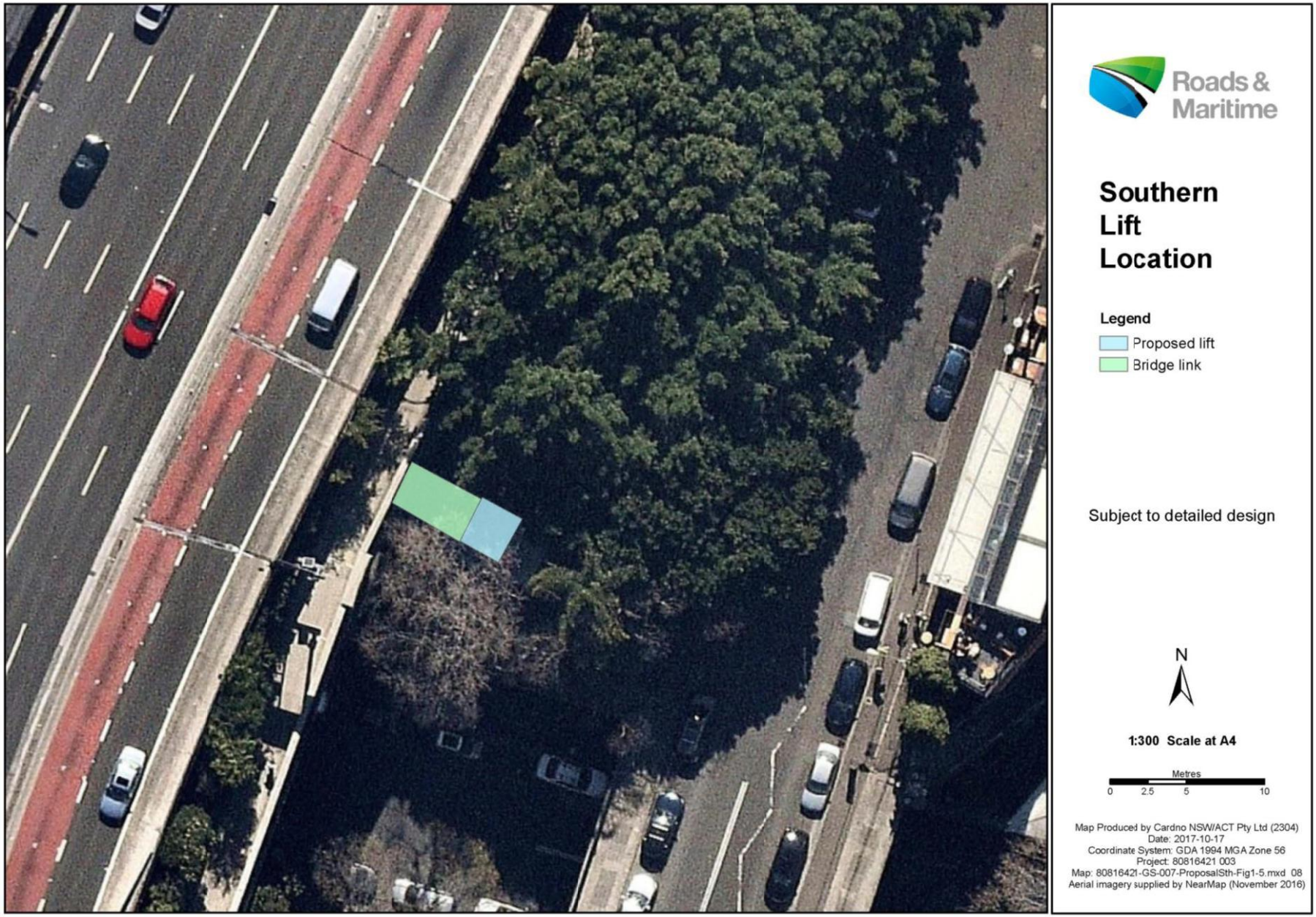

Figure 1-4: Location of the lift at the southern site

1.2 Purpose of the report

This addendum review of environmental factors (REF) has been prepared by Cardno on behalf of Roads and Maritime. For the purposes of these works, Roads and Maritime is the proponent and the determining authority under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

This addendum REF is to be read in conjunction with the project REF, submissions report and previous supplementary reports for the project. The purpose of this addendum REF is to describe the proposed modification, to document and assess the likely impacts of the proposed modification on the environment, and to detail mitigation and management measures to be implemented.

The description of the proposed work and assessment of associated environmental impacts has been undertaken in context of clause 228 of the Environmental Planning and Assessment Regulation 2000, *Is an EIS Required? Best Practice Guidelines for Part 5 of the Environmental Planning and Assessment Act 1979* (*Is an EIS Required?* guidelines) (DUAP, 1995/1996), *Roads and Road Related Facilities EIS Guideline* (DUAP, 1996), the *Biodiversity Conservation Act 2016* (BC Act), the *Fisheries Management Act 1994* (FM Act), and the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

In doing so, the addendum REF helps to fulfil the requirements of:

- Section 5.5 of the EP&A Act including that Roads and Maritime examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the addendum REF would be considered when assessing:

- Whether the proposed modification is likely to result in a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning under Division 5.2 of the EP&A Act.
- The significance of any impact on threatened species as defined by the BC Act and/or FM Act, in section 1.7 of the EP&A Act and therefore the requirement for a Species Impact Statement or a Biodiversity Development Assessment Report.
- The significance of any impact on nationally listed biodiversity matters under the EPBC Act, including whether there is a real possibility that the activity may threaten long-term survival of these matters, and whether offsets are required and able to be secured.
- The potential for the proposed modification to significantly impact any other matters of national environmental significance or Commonwealth land and therefore the need to make a referral to the Australian Government Department of the Environment and Energy for a decision by the Australian Government Minister for the Environment on whether assessment and approval is required under the EPBC Act.

2. Need and options considered

2.1 Strategic need for the proposed modification

Chapter 2 of the project REF addresses the strategic need for the project, the project objectives and the options that were considered. The proposed modification described and assessed in this addendum REF is considered consistent with the strategic need for the project.

The proposed modification is required to support the main works of the Sydney Harbour Bridge Step Free Access project. The works are proposed at night-time to maintain pedestrian access and for road safety and traffic reasons. The proposed modification would enable works which require road closures on the Sydney Harbour Bridge to occur during off-peak times and maintain access to the walkway.

2.2 Proposal objectives and development criteria

Section 2.3 of the project REF identifies the proposal objectives for the Sydney Harbour Bridge Step Free Access project. This modification is required to support the objectives of the main project.

There are no development criteria for this proposed modification.

2.3 Alternatives and options considered

There are three main constraints on construction of the project which necessitate night works. These are:

- Pedestrian access across the Sydney Harbour Bridge is to be maintained at all times. The walkway across the bridge is congested throughout the day including the afternoon peak until approximately 7pm. As such the footpath regrading works would occur after 7pm and continue until 4am
- Road closures on the Sydney Harbour Bridge can only occur between 10pm and 4am. For safety reasons a number of activities, such as concreting, installation of the steel frames for the lifts and parapet removal can only be undertaken during these road closures
- It is Roads and Maritime best practice that noisy activities (such as saw cutting and jack hammering) do not occur after midnight.

Considering these constraints, on balance the proposed modification is the most appropriate option for traffic, safety, pedestrian access and noise mitigation reasons.

3. Description of the proposed modification

3.1 The proposed modification

Roads and Maritime proposes to modify the Sydney Harbour Bridge Step Free Access Project by having up to 66 nights of night works in total at the southern and northern sites. Key features of the proposed modification include:

- Up to 66 nights of night works; 40 nights at the southern site and 26 nights at the northern site including:
    - Noisy activities (e.g. saw cutting and jack hammering) from 7pm – 12am
    - Construction activities (e.g. material placement, concreting and lift shaft construction) from 6pm-4am
- Road closures from 10pm – 4am for lanes 7 and 8 of the Sydney Harbour Bridge
- Access on the walkway maintained throughout construction.

3.2 Construction activities

The additional works are proposed at night-time for access and road safety reasons and include the scenarios listed in Table 3-1.

Table 3-1 Construction Scenarios

Scenario	Duration	Period
Scenario 1a – Footpath Construction (Saw cutting)		
Footpath Saw cutting South	5 nights	OOHW Period 1 & 2
Footpath Saw cutting North	2 nights	OOHW Period 1 & 2
Scenario 1b – Footpath Construction (Demolition)		
Footpath Demolition South	2 nights per week for 10 weeks	OOHW Period 1 & 2
Footpath Demolition with Electrical North	2 nights per week for 5 weeks	OOHW Period 1 & 2
Scenario 1c – Footpath Construction (FRP Completion)		
Footpath FRP Completion with Louvre Install South	3 nights	OOHW Period 2
Footpath FRP Completion North	3 nights	OOHW Period 2
Scenario 2a – Lift Construction (Parapet Removal)		
Parapet Removal South	2 nights	OOHW Period 2
Parapet Removal North	2 nights	OOHW Period 2
Scenario 2b – Lift Construction (Steel Frame Install)		

Scenario	Duration	Period
Steel Frame Install South	2 nights	OOHW Period 2
Steel Frame Install North	2 nights	OOHW Period 2
Scenario 2c – Lift Construction (Steel Landing)		
Structural Steel Landing South	1 night	OOHW Period 2
Structural Steel Landing North	1 night	OOHW Period 2
Scenario 2d – Lift Construction (Glass Panel Install)		
Glass panel install South	4 nights	OOHW Period 2
Glass panel install North	4 nights	OOHW Period 2
Scenario 2e – Lift Construction (Louvre and Roof Canopy Install)		
Lift construction louvre and roof canopy install north	2 nights	OOHW Period 2
Scenario 3 – Utilities		
Utilities Electrical South	3 nights	OOHW Period 1 & 2

3.2.1Construction hours and duration

Construction night works would total 66 nights over a six month period.

The following hours of works are proposed:

- Up to 66 nights of night works; 40 nights at the southern site and 26 nights at the northern site including:
    - Noisy activities (e.g. saw cutting and jack hammering) from 7pm – 12am.
    - Construction activities (e.g. material placement, concreting and lift shaft construction) from 6pm-4am
- At the southern site, works would not occur on a Friday or Saturday night.

The Roads and Maritime *Construction Noise and Vibration Guideline* classifies out of hours work (OOHW) into two periods as follows:

- OOHW Period 1:
    - Monday to Friday: 6pm to 10pm
    - Saturday: 7am-8am and 1pm to 10pm
    - Sundays and public holidays: 8am to 6pm
- OOHW Period 2:
    - Monday to Friday: 10pm to 7am
    - Saturday: 10pm to 8am

- Sundays and public holidays: 8pm to 7am

3.2.2Plant and equipment

The following plant and equipment is proposed for the night time construction works.

- Concrete Saw
- Concrete Trucks
- Concrete Pump
- Concrete Vibrators
- Bin Skip Collection
- Excavator
- Road Saw
- Jack Hammer
- Ratchet Gun
- Grinder
- Squawker
- Coring Machine
- Wire Sawing
- Minor Grinding
- Trucks
- 30t Crane
- EWP

Associated sound power levels and number of plant required for each scenario is summarised in Table 3-2. The noise levels represent the total noise level at the source. For a further breakdown refer to Appendix A.

The noise level of plant and equipment associated with the proposed works was assumed based upon experience and the plant noise data provided in Table F.1 of the Roads and Maritime *Construction Noise and Vibration Guideline*.

Table 3-2 Proposed Construction Plant

Scenario	Number of Plant	Total L_{Aeq}
Scenario 1a (south) – Footpath Construction (Saw cutting)	1	118
Scenario 1a (north) – Footpath Construction (Saw cutting)	1	118
Scenario 1b (south) – Footpath Construction (Demolition	5	119
Scenario 1b (north) – Footpath Construction (Demolition)	6	119
Scenario 1c (south) – Footpath Construction (FRP Completion and Louvre)	5	117
Scenario 1c (north) – Footpath Construction (FRP Completion and Louvre)	5	117
Scenario 2a (south) – Lift Construction (Parapet Removal)	3	119
Scenario 2a (north) – Lift Construction (Parapet Removal)	3	119
Scenario 2b (south) – Lift Construction (Steel Frame Install)	4	116
Scenario 2b (north) – Lift Construction (Steel Frame Install)	4	116
Scenario 2c (south) – Lift Construction (Structural Steel Landing)	4	107
Scenario 2c (north) – Lift Construction (Structural Steel Landing)	4	107
Scenario 2d (south) – Lift Construction (Glass Panel Install)	5	116

Scenario	Number of Plant	Total L_{Aeq}
Scenario 2d (north) – Lift Construction (Glass Panel Install)	5	116
Scenario 2e (north) – lift Construction (Louvre and Roof Canopy Install)	4	115
Scenario 3 (south) – Utilities	3	119

3.2.3Traffic management and access

Two lanes (lanes 7 and 8) on the Sydney Harbour Bridge would be closed when the night works are in progress.

This would result in traffic diversions for the southbound access onto the Sydney Harbour Bridge at High Street and Mount Street, North Sydney. Traffic would likely be diverted to the Falcon Street entry onto the Warringah Freeway.

Pedestrian access across the Sydney Harbour Bridge would be maintained throughout the construction period.

4. Statutory and planning framework

This chapter describes the statutory and planning framework that would apply during the proposal's construction and operation by considering the provisions of relevant state environmental planning policies, local environmental plans and other legislation. Relevant legislation is outlined in Table 4-1.

Table 4-1 Relevant legislation for the proposal and proposal modification

State Legislation	Approval Authority	Relevance to the Proposal	Required Permits and Approvals
Environmental Planning and Assessment Act 1979 (EP&A Act)	Roads and Maritime	The works require determination under Division 5.1 of this Act.	Roads and Maritime is the determining authority for the proposed modification.
State Environmental Planning Policy (Infrastructure) 2007 (ISEPP)	Roads and Maritime	Aims to facilitate the effective delivery of infrastructure across the State. Clause 94 permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent. Part 2 contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development.	As the proposed modification is for a road infrastructure facilities and is to be carried out by Roads and Maritime it can be assessed under Division 5.1 of the EP&A Act. Consultation with public authorities is not required (refer Chapter 5).
State Environmental Planning Policy (State and Regional Development) 2011		Declares certain development to be State significant development under section 4.36 of the EP&A Act. Development in The Rocks is considered State Significant Development.	The proposed modification falls within The Rocks development site. However, in accordance with Clause 1 of Schedule 3 as an EIS is not required for this project, this SEPP does not apply.
State Environmental Planning Policy (State Significant Precincts) 2005		Provides planning controls for State significant precincts. Part 2, 12A identifies The Rocks as part of the Sydney Harbour Foreshore Site. For land that is not State significant development, the consent authority for development on this land is the City of Sydney Council.	Development consent under Division 4.1 of the EP&A Act is not required.

State Legislation	Approval Authority	Relevance to the Proposal	Required Permits and Approvals
Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005		Provides development control and planning provisions for the Sydney Harbour Catchment. The proposal footprint is located within the boundary of the Sydney Harbour Catchment. ISEPP prevails to the extent of any inconsistency with this SREP. Part 3, Division 2 describes matters that are to be taken into consideration by public authorities and others before they carry out activities to which Part 5 of the EP&A Act applies.	The matters of specific relevance to this proposal and the required outcomes are generally consistent with those outlined in Table 4-1 Section 4.1.1 of the project REF.
Sydney Local Environment Plan 2012 (Sydney LEP)	City of Sydney Council	The proposed modification is located within the Sydney LGA where the applicable planning instrument is the Sydney LEP.	ISEPP overrides the provisions of the Sydney LEP and development consent under Part 4 of the EP&A Act is not required.
North Sydney Local Environment Plan 2013 (North Sydney LEP)	North Sydney Council	The applicable planning instrument for the north lift is the North Sydney LEP. While the policies and provisions of the Local Environmental Plan (LEP) do not apply to the proposal (refer Section 4.1.1 of the REF), they are relevant in identifying potential land use impacts and planning policy conflicts.	ISEPP overrides the provisions of the North Sydney LEP and development consent under Division 4.1 of the EP&A Act is not required.
Contaminated Land Management Act 1997	Environment Protection Authority (EPA)	Must report to EPA if contaminated land is encountered during the works that meets the duty to report contamination requirements under Section 60 of this Act.	None. The proposed modification is not expected to encounter contaminated land.
Heritage Act 1977	OEH (NSW Heritage Office)	Relates to non-Aboriginal historic artefacts and/or sites (older than 50 years) if uncovered during the works.	The proposed modification is not expected to have an impact on heritage.
National Parks and Wildlife Act 1974	OEH	Relates to disturbance or destruction of any Aboriginal objects or places and removal of identified native species,	None. The works are not expected to disturb any items.

State Legislation	Approval Authority	Relevance to the Proposal	Required Permits and Approvals
		populations and ecological communities.	
Protection of the Environment Operations Act 1997 (POEO Act)	Environment Protection Authority (EPA)	Relates to noise, air and water pollution and waste management for activities that may cause water pollution. 'Scheduled activities' as listed under Schedule 1 of the Act require an Environment Protection Licence (EPL) from the EPA, unless clauses in Schedule 1 specify otherwise.	None. The proposed works are not listed as a scheduled activity under this Act.
Roads Act 1993	Various	Consent of the appropriate roads authority must be received in the event that there is a need to close, or conduct works on or over a public road.	A licence to work on the Bradfield Highway would be required by the Transport Management Centre. Unclassified or local roads such as Broughton Street and Cumberland Street, the relevant roads authority is the local council. Roads and Maritime does not require consent under the Act due to provisions of Clause 5(1), Schedule 2 of the Act.
Biodiversity Conservation Act 2016 (BC Act)	OEH	Prohibits harm or damage to any threatened species, populations, communities and/or their habitat. A Species Impact Statement (SIS) is to be prepared where a significant impact on threatened species and/or ecological communities.	None. The proposed works are not anticipated to have a significant impact on threatened species recorded in the vicinity of the site.
Place Management Act 1988	Property NSW	Consultation with Property NSW is required if the proposed modification is within Sydney Harbour Foreshore Authority – Foreshore Area.	Roads and Maritime consulted with Property NSW as during preparation of main project REF. Further consultation in regards to the proposed works is not considered necessary (refer Section 5.1)

State Legislation	Approval Authority	Relevance to the Proposal	Required Permits and Approvals
Waste Avoidance and Resource Recovery Act 2001	OEH	The works would use resources and generate waste, and as such needs to consider the Resource Management Hierarchy (Avoidance, Recovery and Disposal) in the Act.	None. The proposed activity would not generate additional waste to that identified in the project REF.

4.1.1Environment Protection and Biodiversity Conservation Act 1999

Under the EPBC Act a referral is required to the Australian Government for proposed 'actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land. These are considered in Appendix A and chapter 6 of the addendum REF.

A referral is not required for proposed road actions that may affect nationally listed threatened species, endangered ecological communities and migratory species. This is because requirements for considering impacts to these biodiversity matters are the subject of a strategic assessment approval granted under the EPBC Act by the Australian Government in September 2015.

Potential impacts to these biodiversity matters are also considered as part of chapter 6 of the addendum REF.

Findings – matters of national environmental significance (other than biodiversity matters)

The assessment of the proposed modification's impact on matters of national environmental significance and the environment of Commonwealth land found that there would be no change to the findings of the determined activity and would be unlikely to cause a significant impact on matters of national environmental significance or the environment of Commonwealth land. A referral to the Australian Department of the Environment is not required.

4.2 Confirmation of statutory position

The proposed modification is categorised as development for the purpose of road infrastructure facilities and is being carried out by or on behalf of a public authority. Under clause 94 of the ISEPP the proposed modification is permissible without consent. The proposed modification is not State significant infrastructure or State significant development. The proposed modification can be assessed under Division 5.1 of the EP&A Act. Consent from Council is not required.

5. Consultation

5.1 ISEPP consultation

Part 2 of the ISEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. The ISEPP consultation checklist determined that, with the exception of Property NSW, no consultation with public authorities was required for the proposed modification. The checklist is in Appendix C.

Property NSW is a statutory authority that owns and manages some of the NSW Governments most significant foreshore assets including Sydney's heritage and cultural precincts at The Rocks (southern site). Property NSW were consulted as part of the main project REF and they had no comments on the project. As such further consultation in regards to additional night time works was not considered necessary.

5.2 Community consultation

Consultation on the project REF was carried out in October 2017. Feedback received during consultation was summarised and can be found in the submissions report available on the project web page.

As part of the development of this addendum REF a noise assessment was undertaken (refer Section 6.1) which identified sensitive receivers which may be impacted by the proposed modification. These sensitive receivers were consulted via a doorknock, between Thursday 14 and Friday 15 June, and flyers advising of the proposed schedule changes were provided. Roads and Maritime requested feedback by Friday 22 June. The area of consultation and the flyer distrusted to residences and businesses are provided in Appendix E.

Where residences could not be doorknocked such as large apartment buildings, a flyer was left in each mailbox.

On the northern side of the bridge:

- 1081 residential and commercial apartments received the flyer
- 49 businesses doorknocked
- 33 residences doorknocked
- 1 church doorknocked
- 2 schools doorknocked.

On the southern side of the bridge:

- 51 residential and commercial apartments received the flyer
- 19 businesses doorknocked
- 8 residences doorknocked
- 1 church doorknocked.

In total 68 nearby business and 1173 residences were consulted about the proposed modifications.

Issues that have been raised as a result of this consultation are outlined below in Table 5-1.

Table 5-1: Summary of issues raised by the community

Group	Issue raised	Response / where addressed in addendum REF
Residences	No objections to additional night works were received	N/A
Local Business	Glenmore Hotel has requested no work on Friday and Saturday night	Section 3.2.1 outlines the construction hours for the proposed modifications. These hours do not allow nights works on either a Friday or Saturday night at the southern lift site.
	Businesses that did trade at night indicated that they were not concerned about additional night work.	N/A
	The main concern that was raised by businesses was around maintaining road access for deliveries. One business indicated a preference for night works to be scheduled earlier in the week to maintain road access for deliveries	A Traffic Management Plan (TMP) will be prepared as part of the CEMP. The TMP will include measures to maintain access to businesses for deliveries during night works.

5.3 Ongoing or future consultation

Community consultation will continue to be undertaken with local residents and the community leading up to and during construction of the proposed lifts. A Communication Plan (CP) will be prepared and implemented as part of the Construction Environmental Management Plan (CEMP).

Roads and Maritime will seek approval from the Transport Management Centre to work on the Sydney Harbour Bridge at night.

6. Environmental assessment

This section of the addendum REF provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposed modification of the Sydney Harbour Bridge Step Free Access Project. All aspects of the environment potentially impacted upon by the proposed modification are considered. This includes consideration of the factors specified in the guidelines *Roads and Related Facilities EIS Guideline* (DUAP, 1996) and *Is an EIS required?* (DUAP, 1999) as required under clause 228(1) of the Environmental Planning and Assessment Regulation 2000. The factors specified in clause 228(2) of the Environmental Planning and Assessment Regulation 2000 are also considered in Appendix B.

Site-specific safeguards and management measures are provided to ameliorate the identified potential impacts.

6.1 Noise

6.1.1 Methodology

A supplementary noise assessment has been carried out to determine the predicted noise impacts associated with the additional night-works at the southern and northern lift locations. This report is provided in Appendix A and summarised in the following sections. Appendix A and the following sections should be read in conjunction with the original Noise Impact Assessment prepared for the REF.

Noise modelling has been carried out to determine whether the proposed modification works are likely to impact nearby noise sensitive receivers.

6.1.2 Existing environment

The existing acoustic environment varies throughout the project extent to the south. The Fort Street Public School, The Garrison Church and nearby residential receivers located along Watson Road, Lower Fort Street and Cumberland Street currently experience significant levels of noise from both local roads and the Sydney Harbour Bridge.

Similarly the existing acoustic environment near the northern worksite also varies throughout the project extent to the north. The school, and nearby residential receivers located along Broughton Street and further east from the Bridge, and Alfred Street to the west also currently experience significant road traffic noise levels.

Noise Catchments

Works associated with the modelled scenarios (refer Section 3.2) are likely to remain within a finite work area. Therefore construction works have been modelled as a number of point sources operating simultaneously for each construction scenario to provide the worst case predicted noise levels at each sensitive location. Sensitive areas have been grouped into four noise catchment areas in Figures 1 and 2 of Appendix A.

Background Nosie Levels

Based on site measurements carried out for the project REF assessment, the calculated Rating background Levels (RBLs) for the project are shown below in Table 6.1.

Table 6-1: Rating Background Noise Level

Logger/Noise Catchment Area	Measurement Location	Measured Rating Background Noise Level, dB(A)		
		07:00-18:00	18:00-22:00	22:00-07:00
1	87 Lower Fort Street	49	48	43
2	Cumberland Street (existing council depot building)	59	58	49
3	Residential towers Alfred Street (near Bradfield Park)	57	55	46
4	3a-9b Broughton Street, Kirribilli	59	59	42

Applicable Noise Criteria

Taking into consideration the measured RBLs in Table 6.1, the applicable construction noise management levels for standard and non-standard hours for the project are shown in Table 6-2.

Table 6-2: Construction Noise Management Levels

Noise catchment Area	Construction Noise Management Level, dB(A)			Sleep Disturbance $L_{A1, 1min}$
	Standard Hours (RBL +10 dB(A))	Standard Hours (RBL +5 dB(A))		
	Day	Evening	Night	
1	59	53	48	69
2	69	63	44	70
3	67	60	51	70
4	69	64	47	69

6.1.3 Potential impacts

Noise modelling has been carried out to determine whether the proposed step free access construction works are likely to impact nearby noise sensitive receivers. The predicted noise levels for each construction activity are shown in Appendix A.

In accordance with the noise management levels stipulated in Table 6-2, dwellings exposed to levels of construction noise above 69 dB(A) may cause sleep disturbance, with dwellings exposed to levels above the night-time RBL +5 dB(A) considered noise affected.

For all of the scenarios listed in Table 3.1, noise management levels are predicted to be significantly exceeded in all NCAs, and sleep disturbance noise criteria is expected to be exceeded at locations near to the works especially in NCAs 2 & 3 for all scenarios.

It should be noted that this assessment has endeavoured to carry out "worst case" noise modelling, and noise levels are predicted based all modelled sources operating simultaneously. Should the work sites or plant and equipment be amended, the predicted noise levels would change accordingly.

The predicted exceedances are generally a result of works being located in close proximity to the adjacent receivers. This modelling has been carried out to provide a worst case scenario and it may be possible to reduce the number of plant operating simultaneously to reduce noise emissions.

6.1.4 Safeguards and management measures

Best practice mitigation measures, depending on the predicted level of exceedance of the NMLs, are outlined in the Roads and Maritime *Construction Noise & Vibration Guideline* and replicated in Appendix D.

Receivers generally located within the yellow and red areas on the attached noise contour maps should be considered subject to 'highly intrusive' noise levels, and mitigation measures in accordance with the Roads and Maritime *Construction Noise & Vibration Guideline* adopted accordingly (refer Appendix D).

Receivers generally located within the pink areas on the attached noise contour maps should be considered to be subject to 'clearly audible' noise levels and mitigation measures in accordance with the Roads and Maritime *Construction Noise & Vibration Guideline* adopted accordingly.

The safeguards and mitigation measures outlined in the project REF sufficiently address these impacts and mitigation measures above, and are listed in Section 7.2. No additional safeguards or mitigation measures have been identified.

Mitigation measures in accordance with Roads and Maritime *Construction Noise & Vibration Guideline* should be adopted where feasible, or in consultation with the adjacent community.

6.2 Other impacts

This section outlines other impacts that may result from the proposed modification.

6.2.1Existing environment and potential impacts

Environmental factor	Existing environment	Potential impacts	REF Standard/additional safeguard number
Traffic and Transport	As per Section 6.2.2 of the REF	The proposed night works would require closure of lanes 7 and 8 of the Sydney Harbour Bridge between the hours of 10pm and 4am when the night works are being undertaken. This would result in traffic diversions for the southbound access onto the Sydney Harbour Bridge at High Street and Mount Street, North Sydney. Traffic would likely be diverted to the Falcon Street entry onto the Warringah Freeway. The proposed nights works would require modifications to pedestrian access across the Sydney Harbour Bridge. Whilst pedestrian access would be maintained throughout the construction period, the width of the walkway would be narrowed at certain sections to complete the regrading works (half the footpath would be regraded at a time). These road closures and pedestrian access requirements would be outlined in the Traffic Management Plan prepared as part of the CEMP.	Core standard safeguard TT1 Section 4.8 of QA G36 Environment Protection Additional safeguard TT2 Additional safeguard TT3 Additional safeguard TT4
Socio-economic	As per Section 6.9.2 of the REF	The proposed night works would have additional noise impacts on residential and businesses during the evening and night. These impacts would be managed according to the Communication Plan prepared as part of the CEMP.	Core standard safeguard SE1

6.2.2 Safeguards and management measures

The safeguards and mitigation measures outlined in the project REF sufficiently address these impacts and are listed in Section 7.2. No additional safeguards or mitigation measures have been identified.

6.3 Cumulative impacts

The cumulative impacts of the proposed modification are consistent with those assessed in the project REF.

7. Environmental management

7.1 Environmental management plans

A number of safeguards and management measures have been identified to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the proposed modification. Should the proposed modification proceed, these management measures would be addressed if required during detailed design and incorporated into the Contractors Environmental Management Plan (CEMP) and applied during the construction and operation of the proposed modification.

7.2 Summary of safeguards and management measures

Environmental safeguards and management measures for the Sydney Harbour Bridge Step Free Access project are summarised in Table 7-1. No additional safeguards and management measures were identified in this addendum REF. The safeguards and management measures will be incorporated into the detailed design phase of the proposed modification, the CEMP and implemented during construction and operation of the proposed modification, should it proceed. These safeguards and management measures will minimise any potential adverse impacts arising from the proposed works on the surrounding environment.

Table 7-1: Summary of safeguards and management measures

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
GEN1	General - minimise environmental impacts during construction	A CEMP will be prepared and submitted for review and endorsement of the Roads and Maritime Environment Manager prior to commencement of the activity. As a minimum, the CEMP will address the following: • any requirements associated with statutory approvals • details of how the project will implement the identified safeguards outlined in the REF • issue-specific environmental management plans • roles and responsibilities • communication requirements • induction and training requirements • procedures for monitoring and evaluating environmental performance, and for corrective action	Contractor / Roads and Maritime project manager	Pre-construction / detailed design	Core standard safeguard GEN1

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
		• reporting requirements and record-keeping • procedures for emergency and incident management • procedures for audit and review. The endorsed CEMP will be implemented during the undertaking of the activity.			
GEN2	General - notification	All businesses, residential properties and other key stakeholders (e.g. schools, local councils) affected by the activity will be notified at least five days prior to commencement of the activity.	Contractor / Roads and Maritime project manager	Pre-construction	Core standard safeguard GEN2
GEN3	General – environmental awareness	All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the project. This will include up-front site induction and regular "toolbox" style briefings. Site-specific training will be provided to personnel engaged in activities or areas of higher risk. These include • areas of heritage sensitivity adjoining residential areas requiring particular noise management measures	Contractor / Roads and Maritime project manager	Pre-construction / detailed design	Core standard safeguard GEN3
GEN4	General – ancillary facility location	Potential ancillary locations to be chosen based on the following criteria: • At least 40 metres distant from the nearest waterway	Contractor / Roads and Maritime project manager	Pre-construction / detailed design	Core standard safeguard GEN4

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
		• Of low ecological and heritage conservation significance • Of relatively low ground • Outside the 1 in 10 year annual recurrence interval floodplain At least 100 metres distant from residential dwellings and other land uses that may be sensitive to noise.			
H1	Non-Aboriginal heritage	A Non-Aboriginal Heritage Management Plan (NAHMP) will be prepared and implemented as part of the CEMP. It will provide specific guidance on measures and controls to be implemented to avoid and mitigate impacts to Non-Aboriginal heritage. The NAHMP will be prepared in consultation with the Office of Environment and Heritage. Prior to the removal of the North Sydney Bus Shelter, the Road and Maritime Environmental Branch should be consulted.	Contactor	Pre-construction	Core standard safeguard H1 Section 4.10 of QA G36 Environment Protection
H2	Non-Aboriginal heritage	The Standard Management Procedure - Unexpected Heritage Items (Roads and Maritime, 2015) will be followed in the event that any unexpected heritage items, archaeological remains or potential relics of Non-Aboriginal origin are encountered. Work will only re-commence once the requirements of the procedure have been satisfied.	Contactor	Pre-construction	Core standard safeguard H2 Section 4.10 of QA G36 Environment Protection
H3	Non-Aboriginal heritage	A heritage induction should be provided for all workers prior to works	Contactor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
		commencing. If unexpected archaeological finds are discovered during the proposed works, the Roads and Maritime Unexpected Heritage Items Procedure should be enacted, a heritage consultant should be engaged to assess the find and the NSW Heritage Division would be notified of the discovery of a relic in accordance with Section 146 of the NSW Heritage Act 1977.			H3
H4	Non-Aboriginal heritage	The sections of the parapet to be removed for the bridge links should be adaptively reused as seating, wayfinding or interpretative aids	Roads and Maritime	Detailed design and Construction	Additional safeguard H4
H5	Non-Aboriginal heritage	Existing screening vegetation around the lift structures should be preserved as much as possible to help obscure the lifts from view to reduce visual impacts.	Roads and Maritime	Detailed design and Construction	Additional safeguard H5
H6	Non-Aboriginal heritage	Archival recording of the section of the Sydney Harbour Bridge to be impacted, and the North Sydney Bus Shelter should be undertaken prior to works commencing. Archival recording should be conducted according to Heritage Division archival recording guidelines (Heritage Office 1998 and 2006).	Roads and Maritime	Pre-construction	Additional safeguard H6
H7	Non-Aboriginal heritage	During detailed design, materials which are unobtrusive, modern and light, such as glass panelling and slim frame elements should be considered, which would reduce visual bulk.	Contractor	Design	Additional safeguard H7

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
H8	Non-Aboriginal heritage	Opportunities to enhance public appreciation of the heritage value of the Sydney Harbour Bridge should be taken, including incorporating heritage interpretation and signage in the area of the lift structures.	Roads and Maritime	Detailed design and Construction	Additional safeguard H8
H9	Non-Aboriginal heritage	A material conservation specialist should be engaged to advise on best practice for techniques for removing, storing and re-establishing on site the sections of removed concrete parapet.	Roads and Maritime	Pre-construction	Additional safeguard H9
H10	Non-Aboriginal heritage	Design plans for the Step Free Access project should be included in planning archives for the Sydney Harbour Bridge	Roads and Maritime	Pre-construction	Additional safeguard H10
H11	Non-Aboriginal heritage	The proposed break in the concrete parapet to accommodate the installation of the lift shafts would be designated to a location that would minimise, where possible, disruption of the form of the decorative elements at both sides, in particular the symmetry of the interior rectangular design of the parapet	Roads and Maritime	Detailed design and construction	Additional safeguard H11
H12	Non-Aboriginal Heritage	Prior to commencement of any works, approval under S60 of the Heritage Act 1977 will be obtained from OEH	Roads and Maritime	Pre-construction	Additional safeguard H12
H13	Non-Aboriginal Heritage	The site boundary will be a minimum of 0.5m from the sandstone wall. The timber hoarding used for the site boundary will be covered in a printed graphic.	Contractor	Construction	Additional safeguard H13 (from the Ancillary site addendum REF)

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
TT1	Traffic and transport	A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the Roads and Maritime Traffic Control at Work Sites Manual (RTA, 2010) and QA Specification G10 Control of Traffic (Roads and Maritime, 2008). The TMP will include: Vehicle Movement Plan Pedestrian Management Plan Confirmation of haulage routes Measures to maintain access to local roads and properties Site specific traffic control measures (including signage) to manage and regulate traffic movement Measures to maintain pedestrian and cyclist access Requirements and methods to consult and inform the local community of impacts on the local road network Access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads. A response plan for any construction traffic incident Consideration of other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic Monitoring, review and amendment mechanisms.	Contractor	Pre-construction	Core standard safeguard TT1 Section 4.8 of QA G36 Environment Protection

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
TT2	Traffic and transport	Pedestrian detours would be clearly signposted in advance and throughout any closures and detours.	Contractor	Construction	Additional safeguard TT2
TT3	Traffic and transport	Delivery schedules and programming will be planned for periods outside of peak traffic periods.	Contractor	Pre-construction	Additional safeguard TT3
TT4	Traffic and transport	Emergency services would be notified of any up-coming lane/road closures and proposed detour routes. Any emergency access routes would be maintained throughout construction.	Roads and Maritime/ contractor	Pre-construction/ construction	Additional safeguard TT4
TT5	Traffic and transport	Consultation with the construction contractor, local residences and businesses would be undertaken regarding the removal of parking spaces during construction for ancillary sites and construction vehicles.	Roads and Maritime	Pre-construction	Additional safeguard TT5
UD1	Landscape character and visual impacts	An Urban Design Plan will be prepared to support the final detailed project design and implemented as part of the CEMP. The Urban Design Plan will present an integrated urban design for the project, providing practical detail on the application of design principles and objectives identified in the environmental assessment. The Plan will include design treatments for: Location and identification of existing vegetation and proposed landscaped areas, including species to be used	Contactor	Detailed design / pre-construction	Core standard safeguard UD1

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
		Built elements including fences Pedestrian and cyclist elements including footpath location, paving types and pedestrian crossings Fixtures such as seating, lighting, fencing and signs Details of the staging of landscape works taking account of related environmental controls such as erosion and sedimentation controls and drainage Procedures for monitoring and maintaining landscaped or rehabilitated areas. The Urban Design Plan will be prepared in accordance with relevant guidelines, including: Beyond the Pavement urban design policy procedures and principles (Roads and Maritime, 2014) Landscape Guideline (RTA, 2008) Bridge Aesthetics (Roads and Maritime 2012) Noise Wall Design Guidelines (Roads and Maritime, 2016) Shotcrete Design Guideline (Roads and Maritime, 2016).			
UD2	Design development	During detailed design, the following design elements would be considered: Material selection for lifts, screens, balustrades, handrails and awnings to achieve a consistent design approach	Contractor	Detailed design / pre-construction	Additional safeguard UD2

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
		Lift design must be as visually unobtrusive and transparent as possible to allow the visual attributes of the existing historic area to be fully appreciated Security fencing to match existing fencing types and reduce public access to maintenance areas Providing safe and manageable solutions for maintenance workers The 'tie-in' of the proposed urban domain works with existing pathways Minimising the extent of established vegetation clearing and street trees Urban design treatments related to lighting, fencing, signage, seating and paving Ensuring a safe pedestrian environment by using CPTED principles Potential reuse of removed sections of Sydney Harbour Bridge parapets Lighting on the lift shaft, approaches and signage for user safety Feature lighting to enhance the nearby landscape and improve passive surveillance.			
UD3	Landscape design	A Landscape Plan will be prepared and will adopt a simple approach to: Restoring ground profiles Ensuring landscaping matches the existing surrounding conditions. The Landscape Plan would consider the need for low maintenance requirements.	Contractor	Detailed design / pre-construction	Additional safeguard UD3

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
UD4	Landscape character and visual impacts	The proposed ancillary site would be fenced and screened to minimise visibility to the site	Contractor	Construction	Additional safeguard UD4
UD5	Construction impacts	Outside of construction hours, all machinery/ equipment would be removed housed in temporary laydown areas. The site should be kept neat and clean of general litter and neat for the duration of works.	Contractor	Construction	Additional safeguard UD5
NV1	Noise and vibration	A Noise and Vibration Management Plan (NVMP) will be prepared and implemented as part of the CEMP. The NVMP will generally follow the approach in the Interim Construction Noise Guideline (ICNG) (DECC, 2009) and Roads and Maritime Construction and Vibration Guidelines (2016) and identify: All potential significant noise and vibration generating activities associated with the activity Feasible and reasonable mitigation measures to be implemented, taking into account Beyond the Pavement: urban design policy procedures and principles (Roads and Maritime, 2014). A monitoring program to assess performance against relevant noise and vibration criteria Arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures	Contactor	Pre-construction	Core standard safeguard NV1 Section 4.6 of QA G36 Environment Protection

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
		Contingency measures to be implemented in the event of non-compliance with noise and vibration criteria. Use of temporary noise barriers / anti-gawk screens with no gaps where practical Application of respite periods for noisy activities			
NV2	Noise and vibration	All sensitive receivers (e.g. schools, local residents) likely to be affected will be notified at least five days prior to commencement of any works associated with the activity that may have an adverse noise or vibration impact. The notification will provide details of: The project The construction period and construction hours Contact information for project management staff Complaint and incident reporting How to obtain further information.	Contactor	Construction	Core standard safeguard NV3
NV3	Noise and vibration	Implementation of the following site specific mitigation measures where practical Provision of solid two metre high anti-gawk barrier. Inclusion of an angled return at the top of barrier should be implemented where practical Acoustic curtains to be placed around noisy stationary plant, where practical, to mitigate noise emissions at source	Contactor	Construction	Additional safeguard NV3

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
		Reduce the number of plant operating at one time when outside of work hours Use any equipment with a lower sound level if available for equipment with high source noise levels such as rock hammers and plant emitting continuous noise such as generators Keep all plant and equipment well maintained Use quieter and less noise emitting equipment and methods where feasible and reasonable Use non-tonal reversing beeps or equivalent on all vehicles and mobile plant regularly used on site.			
NV4	Noise and vibration	Carry out works during standard hours of operation unless absolutely necessary for safety reasons. Ensure any out-of-hours work complies with the requirements of G36 Environmental Protection (Roads and Maritime, 2014) relating to community notification requirements.	Contactor	Construction	Additional safeguard NV4
B1	Biodiversity	A Flora and Fauna Management Plan will be prepared in accordance with Roads and Maritime's Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects (RTA, 2011) and implemented as part of the CEMP. It will include, but not be limited to: Plans showing areas to be cleared and areas to be protected, including	Contractor	Pre-construction	Core standard safeguard B1 Section 4.8 of QA G36 Environment Protection

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
		exclusion zones, protected habitat features and revegetation areas Requirements set out in the Landscape Guideline (RTA, 2008) Pre-clearing survey requirements Procedures for unexpected threatened species finds and fauna handling Procedures addressing relevant matters specified in the Policy and guidelines for fish habitat conservation and management (DPI Fisheries, 2013) Protocols to manage weeds and pathogens.			
B2	Biodiversity	Measures to further avoid and minimise the construction footprint and native vegetation or habitat removal will be investigated during detailed design and implemented where practicable and feasible.	Contactor	Detailed design / pre-construction	Core standard safeguard B2
B3	Biodiversity	A qualified ecologist will supervise the removal of the required trees.	Contractor	Construction	Additional safeguard B3
B4	Biodiversity	Perform a pre-construction survey to ensure that no wildlife has taken up occupancy within the adjacent trees and building located at the southern site	Contractor	Pre-construction	Additional safeguard B4
B6	Biodiversity	Prior to any demolition or any tree removal works, a final tree removal and retention plan will be provided by a qualified arborist. A separate site specific tree protection plan will also be required	Contractor	Pre-construction	Additional safeguard B6

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
B7	Biodiversity	Tree removal and pruning shall be undertaken by a Contracting Arborist with minimum AQF Level 3 Arboricultural Qualifications and will comply with the NSW Work Cover Code of Practice for the Amenity Tree Industry	Contractor	Construction	Additional safeguard B7
SW1	Soil and water	A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP. The SWMP will identify all reasonably foreseeable risks relating to soil erosion and water pollution and describe how these risks will be addressed during construction.	Contractor	Detailed design / pre-construction	Core standard safeguard SW1 Section 2.1 of QA G38 Soil and Water Management
SW2	Soil and water	A site specific Erosion and Sediment Control Plan/s will be prepared and implemented as part of the SWMP The Plan will include arrangements for managing wet weather events, including monitoring of potential high risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather.	Contractor	Detailed design / Pre-construction	Core standard safeguard SW2 Section 2.2 of QA G38 Soil and Water Management
SW3	Soil and water	Sweep and remove all material deposited onto the surrounding roads at the end of each working shift and before rainfall. Ensure that the no swept material enters the stormwater drains.	Contractor	Construction	Additional safeguard SW3
SW4	Soil and water	Manage an incident in accordance with Roads and Maritime's Environmental	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
		Incident Classification and Management Procedure and contact the Roads and Maritime services contract manager as soon as is practical.			SW4
SW5	Soil and water	If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. All other works that may impact on the contaminated area will cease until the nature and extent of the contamination has been confirmed and any necessary site-specific controls or further actions identified in consultation with the Roads and Maritime Environment Manager and/or EPA.	Contractor	Construction	Core standard safeguard SW5 Section 4.2 of QA G36 Environment Protection
SW6	Accidental spill	A site specific emergency spill plan will be developed, and include spill management measures in accordance with the Roads and Maritime Code of Practice for Water Management (RTA, 1999) and relevant EPA guidelines. The plan will address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including Roads and Maritime and EPA officers).	Contractor	Detailed design / Pre-construction	Core standard safeguard SW6 Section 4.3 of QA G36 Environment Protection
AH1	Aboriginal heritage	The Standard Management Procedure - Unexpected Heritage Items (Roads and Maritime, 2015) will be followed in the	Contactor	Detailed design / pre-construction	

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
		event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction. This applies where Roads and Maritime does not have approval to disturb the object/s or where a specific safeguard for managing the disturbance (apart from the Procedure) is not in place. Work will only re-commence once the requirements of that Procedure have been satisfied.			
AQ1	Air quality	Prepare and implement an Air Quality Management Plan (AQMP) as part of the CEMP. The AQMP will include, but not be limited to: Identifying potential dust generating activities Providing for the monitoring the weather conditions Providing for the monitoring of dust generation onsite Specifying the inclusion of dust suppression control measures during high- wind events Specifying the inclusion of emission control measures to reduce vehicle exhaust and machinery emissions Preventing equipment idling for an excessive period of time	Contractor	Construction	Core standard safeguard AH1 Section 4.9 of QA G36 Environment Protection
AQ2	Air quality	All construction plant, equipment and vehicles to be properly maintained and operated so as to alleviate excessive exhaust emissions.	Contractor	Construction	Core standard safeguard AQ5

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
					Section 4.4 of QA G36 Environment Protection
AQ3	Air quality	Waste and material loads leaving the subject site are to be covered at all times.	Contractor	Construction	Additional safeguard AQ23
AQ4	Air quality	Measures would be implemented to suppress dust resulting from loading and unloading of materials such as demolition materials.	Contractor	Construction	Additional safeguard AQ4
AQ5	Air quality	Works that would create concrete dust would be undertaken in accordance with the Contractors Site Specific Safety management plan and Safe Work Australia Codes of Practice.	Contractor	Construction	Additional safeguard AQ5
SE1	Socio-economic	A Communication Plan (CP) will be prepared and implemented as part of the CEMP to help provide timely and accurate information to the community during construction. The CP will include (as a minimum): Mechanisms to provide details and timing of proposed activities to affected residents, including changed traffic and access conditions Contact name and number for complaints. The CP will be prepared in accordance with the Community Involvement and	Contactor	Detailed design / pre-construction	Core standard safeguard SE1

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
		Communications Resource Manual (RTA, 2008).			
W1	Waste	A Waste Management Plan (WMP) will be prepared and implemented as part of the CEMP. The WMP will include but not be limited to: Measures to avoid and minimise waste associated with the project Classification of wastes and management options (re-use, recycle, stockpile, disposal) Statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions Procedures for storage, transport and disposal Monitoring, record keeping and reporting. The WMP will be prepared taking into account the Environmental Procedure - Management of Wastes on Roads and Maritime Services Land (Roads and Maritime, 2014) and relevant Roads and Maritime Waste Fact Sheets.	Contactor	Detailed design / pre-construction	Core standard safeguard W1 Section 4.2 of QA G36 Environment Protection
W2	Waste	Do not leave waste material onsite once the work is completed.	Contactor	Construction	Additional safeguard W2
W3	Waste	Due to the age of the existing structure, a hazardous building material survey is recommended prior to removal. The survey may identify potential	Roads and Maritime	Pre-Construction	Additional safeguard W3

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
		environmental and health risks associated with demolition and disposal.			
GGCC1	Greenhouse gas and climate change	Ensure opportunities are taken to reduce construction material quantities, where possible.	Roads and Maritime	Detailed Design	Additional safeguard GGCC1
GGCC2	Greenhouse gas and climate change	Purchase materials with low embodied energies where practical in accordance with Road and Maritime purchasing policy.	Contractor	Construction	Additional safeguard GGCC2
GGCC3	Greenhouse gas and climate change	Aim to reduce the proposal's transport footprint (haul distance) by purchasing materials and disposing of waste locally.	Contractor	Construction	Additional safeguard GGCC3
GGCC4	Greenhouse gas and climate change	Consider lift design to limit energy usage during operation (i.e. solar power, type of light)	Roads and Maritime	Design	Additional safeguard GGCC4
U1	Utilities	Prior to the commencement of works: The construction contractor must undertake a DBYD enquiry immediately prior to commencement of the works and a service locator should be employed during construction activities. The location of existing utilities and relocation details will be confirmed following consultation with the affected utility owners An emergency response plan (if required) would be developed by the construction contractor, in consultation with the asset owner. The plan would need to be approved by Roads and	Contactor	Detailed design / pre-construction	Core standard safeguard U1

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
		Maritime prior to construction and should be followed in the event that any utilities or services are damaged. If the scope or location of proposed utility relocation works falls outside of the assessed proposal scope and footprint, further assessment will be undertaken.			
U2	Utilities	Hand excavation to be used in the vicinity of existing underground construction	Contactor	Construction	Additional safeguard U2
U3	Utilities	Decommission any utilities associated with the Council depot	Contactor	Construction	Additional safeguard U3
U4	Utilities	Prior to removal of the bus shelter, Roads and Maritime should consult with the affected stakeholder regarding the advertisement.	Roads and Maritime	Pre-construction	Additional safeguard U4
CC1	Cumulative construction impacts	All management plans to be prepared as part of the proposal including but not limited to the Construction Noise and Vibration Management Plan and Traffic Management Plan would need to consider other developments in the area. This would include consultation with local developers, Roads and Maritime, City of Sydney and North Sydney Council to obtain information about project timeframes and impacts. Identify and implement appropriate safeguards and management measures to minimise cumulative impacts when building the proposal.	Contractor	Pre-construction/ construction	Additional safeguard CC1

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard/additional safeguard
		Ensure that the safeguards and management measures included for this proposal and the Toll Plaza upgrade project offer sufficient mitigation to minimise noise impacts to adjacent receivers. This includes additive impacts from daytime/night-time work taking place at the same time on both projects, cumulative impacts affecting people during the day and at night from overlaps in the work programs or people being exposed to noise impacts for a longer period of time than the 6 month work program for this proposal.			
CC2	Cumulative construction impacts	Discuss the proposal with the CBD Task Force to ensure that road users are not adversely affected by this proposal and the controls implemented under the City Centre Access Strategy.	Roads and Maritime	Pre-construction	Additional safeguard CC2

7.3 Licensing and approvals

All relevant licenses, permits, notifications and approvals needed for the Sydney Harbour Bridge Step Free Access project and when they need to be obtained are listed in **Table 7-2**. No additional licenses are required for this proposal modification.

Table 7-2: Summary of licensing and approval required

Instrument	Requirement	Timing
Heritage Act 1977 (s60)	Permit to carry out activities to an item listed on the State Heritage Register or to which an interim heritage order applies from the Heritage Council of NSW.	Prior to start of the activity.
Road occupation licence under section 138	Permit to carry out activities that would impact on the operational efficiency of the road network.	Prior to start of the activity.

8. Conclusion

This chapter provides the justification for the proposal modification taking into account its biophysical, social and economic impacts, the suitability of the site and whether or not this modification of the proposal is in the public interest. The proposal modification is also considered in the context of the objectives of the EP&A Act, including the principles of ecologically sustainable development as defined in Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*.

8.1 Justification

The proposal modification supports the overall project which will provide step free access to the Sydney Harbour Bridge, allowing mobility impaired persons to access the pedestrian footpath.

Key features of the proposed modification would include:

- Increasing the number of night works from 25 nights to 65 nights for both the northern and southern sites.

Minor potential environmental impacts have been identified. No additional safeguards or mitigation measures have been identified. The safeguards and mitigation measures outlined in the project REF sufficiently address these impacts and are listed in Section 7.2. This will ensure the proposal is delivered in accordance with its objective of minimising the proposal's environmental and socioeconomic impacts on road and pedestrian users and the surrounding community.

The modification is considered justified against the projects need and objectives.

8.2 Objects of the EP&A Act

Table 8-1 demonstrates how the proposal would meet the objectives of Division 5.1 of the EP&A Act.

Table 8-1: Summary of licensing and approval required

Object	Comment
1.3(a) To promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources.	The proposal supports delivery of the overall project which aims to provide step free access to the Sydney Harbour Bridge for the mobility impaired members of the community. As such, it would promote social welfare of the community by allowing the continued use of this asset by these members.
1.3(b) To facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment.	The proposal would support the delivery of the overall project which will enable access to the Sydney Harbour Bridge for persons with a disability. As such, it would help to promote the area and maintain the economic value of the infrastructure.
1.3(c) To promote the orderly and economic use and development of land.	The proposal would support the delivery of the overall project which will enable access to the Sydney Harbour Bridge for persons with a disability. As such, it would help to promote the area and maintain the economic value of the infrastructure.

Object	Comment
1.3(d) To promote the delivery and maintenance of affordable housing.	Not relevant to this proposal.
1.3(e) To protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats.	Not relevant to this proposal.
1.3(f) To promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage).	Not relevant to this proposal.
1.3(g) To promote good design and amenity of the built environment.	The proposal supports delivery of the overall project which aims to provide step free access to the Sydney Harbour Bridge for the mobility impaired members of the community. As such, it would allow the continued use of this asset by these members.
1.3(h) To promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants.	Not relevant to the project.
1.3(i) To promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State.	Not relevant to the project.
1.3(j) To provide increased opportunity for community participation in environmental planning and assessment.	Not relevant to this proposal.

8.2.1 Sustainability Principles

The sustainability principles considered in the project REF Section 8.2.1 to 8.2.4 are consistent with and applicable to this proposed modification.

8.3 Conclusion

This addendum REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity.

This has included consideration where relevant, of conservation agreements and plans of management under the NPW Act, biodiversity stewardship sites under the BC Act, wilderness areas, areas of outstanding value, impacts on threatened species, populations and ecological communities and their habitats and other protected fauna and native plants. It has also considered potential impacts to matters of national environmental significance listed under the Federal EPBC Act.

A number of potential environmental impacts from the proposed modification have been avoided or reduced during the design development and options assessment. The proposed modification as described in the addendum REF best meets the project objectives, but would still result in some impacts on noise and traffic and transport. Safeguards and management measures as detailed in this addendum REF would ameliorate or minimise these expected impacts. The proposed modification would also support the overall

Sydney Harbour Bridge Step Free Access project, which will allow mobility impaired persons to access the pedestrian footpath. On balance the proposed modification is considered justified and the following conclusions are made.

Significance of impact under NSW legislation

The proposed modification would not result in a change to the findings of the project REF [also refer to the submissions report and any other previous addendum REFs if relevant] and would be unlikely to cause a significant impact on the environment. Therefore it is not necessary for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning under Division 5.2 of the EP&A Act. A Biodiversity Development Assessment Report or Species Impact Statement is not required. The proposed modification is subject to assessment under Division 5.1 of the EP&A Act. Consent from Council is not required.

Significance of impact under Australian legislation

The proposed modification would not likely cause a significant impact on matters of national environmental significance or the environment of Commonwealth land within the meaning of the EPBC Act. A referral to the Australian Government Department of the Environment and Energy is not required.

9. Certification

This addendum review of environmental factors provides a true and fair review of the proposed modification in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposed modification.

Belinda Crichton

Senior Environmental Officer

Cardno (NSW/ACT) Pty Ltd

Date: 26 June 2018

I have examined this addendum review of environmental factors and accept it on behalf of Roads and Maritime Services.

Omar Ghattas

Project Manager

Roads and Maritime Services, Greater Sydney Program Office

Date: 26 June 2018

10. References

Cardno 2018 *Sydney Harbour Bridge Step Free Access Project Supplementary Noise Impact Assessment – Additional Night Works*. Prepared for Roads and Maritime, 3 May 2018.

Cardno 2017 *Review of Environmental Factors - Sydney Harbour Bridge Step Free Access.* Prepared for Prepared for Roads and Maritime, October 2017

Terms and acronyms used in this addendum REF

Term / Acronym	Description
BC Act	*Biodiversity Conservation Act 2016* (NSW).
CEMP	Construction / Contractor's environmental management plan
EIA	Environmental impact assessment
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW). Provides the legislative framework for land use planning and development assessment in NSW
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
ESD	Ecologically sustainable development. Development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased
Heritage Act	*Heritage Act 1977* (NSW)
ISEPP	State Environmental Planning Policy (Infrastructure) 2007
LEP	Local Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act.
NES	Matters of national environmental significance under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
Roads and Maritime	NSW Roads and Maritime Services
SEPP	State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act.
TSC Act	*Threatened Species Conservation Act 1995* (NSW)
QA Specifications	Specifications developed by Roads and Maritime Services for use with road work and bridge work contracts let by Roads and Maritime Services.

Appendix A

Supplementary Noise Impact Assessment – Additional Night Works

Our Ref pl_F032_130618_02JM.docx

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Thursday, 14 June 2018

Cardno
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ST LEONARDS NSW 2065

ATTN: Belinda Crichton

Dear Belinda,

SYDNEY HARBOUR BRIDGE – STEP FREE ACCESS PROJECT
SUPPLEMENTARY NOISE IMPACT ASSESSMENT – ADDITIONAL NIGHTWORKS

This supplementary noise impact assessment was conducted on behalf of Roads and Maritime Services (Roads and Maritime), as an addendum to the Review of Environmental Factors prepared for the proposed step free access to the pedestrian footpath on the Sydney Harbour Bridge. The pedestrian footpath is on the eastern side of the Sydney Harbour Bridge and is currently accessed via steps at Broughton Street to the north and Cumberland Street to the south.

This assessment has been carried out to determine the predicted noise impacts associated with these additional night-works located near the existing pedestrian steps at the northern and southern ends of the bridge. This report should be read in conjunction with the original Noise Impact Assessment prepared for the REF.

3D Noise modelling has been carried out to determine whether the proposed step free access construction works are likely to impact nearby noise sensitive receivers. The modelling takes into account the surrounding topography and buildings located around the proposed worksites.

1.0. Existing Noise Environment

The existing acoustic environment varies throughout the project extent to the south and south. To the south, the Fort Street Public School, The Garrison Church and nearby residential receivers located along Watson Road, Lower Fort Street and Cumberland Street currently experience significant levels of noise from both local roads and the Sydney Harbour Bridge.

Similarly the existing acoustic environment near the northern worksite also varies throughout the project extent to the north. The school, and nearby residential receivers located along Broughton Street and further east from the Bridge, and Alfred Street to the west also currently experience significant road traffic noise levels.

1.1. Noise Catchment Areas

Works associated with the modelled stages are likely to remain within a finite work area. Therefore construction works have been modelled as a number of point sources operating simultaneously for each construction phase to provide the worst case predicted noise levels at each sensitive location. Sensitive areas have been grouped into noise catchment areas as shown below in Figure 1and Figure 6-2.

Figure 1: Noise Catchment Areas – South

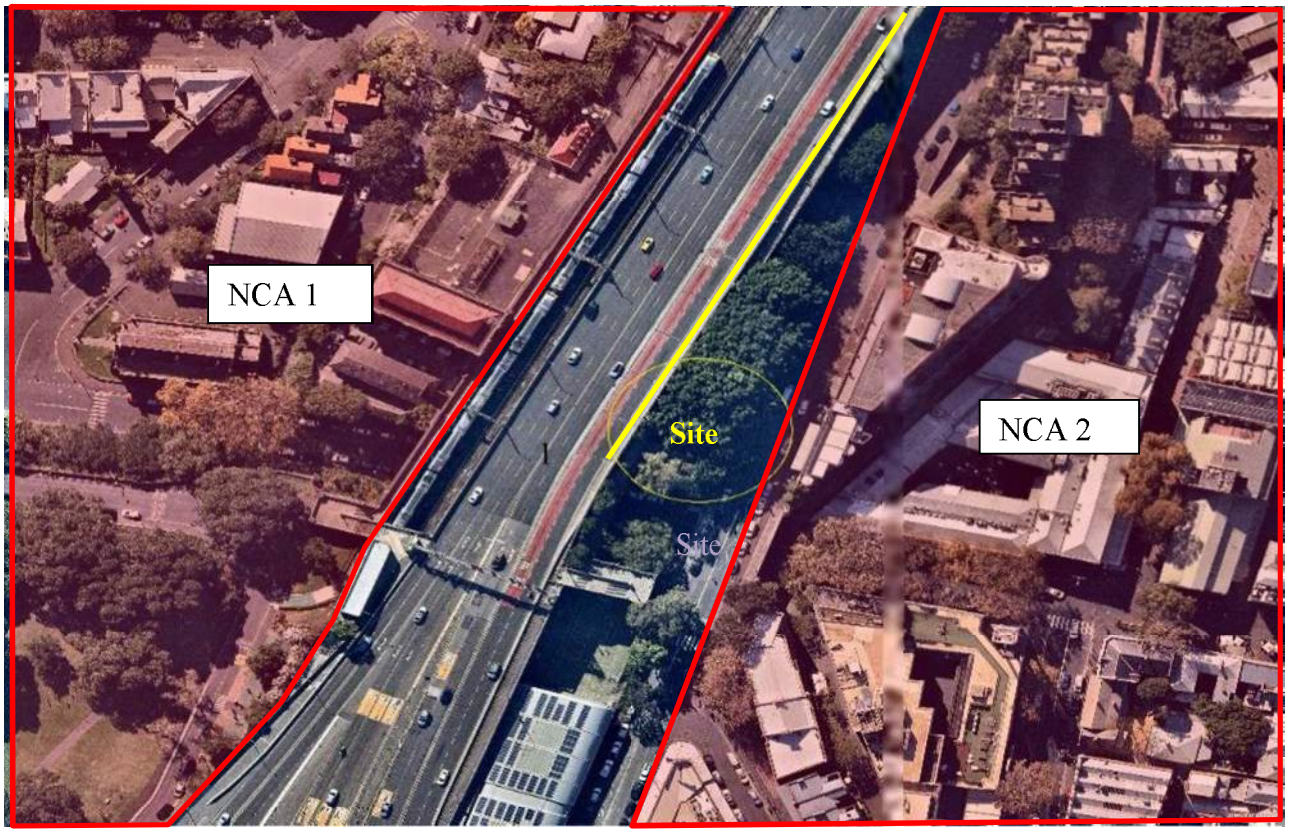


Figure 2: Noise Catchment Areas - North

2.0. Existing Noise Environment

Based on site measurements carried out for the REF assessment, the calculated RBLs for the project are shown below in Table 1.

Table 1: Rating Background Noise Level

Logger	Measurement Location	Measured Rating Background Noise Level, dB(A)		
		07:00-18:00	18:00-22:00	22:00-07:00
1	87 Lower Fort Street	49	48	43
2	Cumberland Street (existing council depot building)	59	58	49
3	Residential towers Alfred Street (near Bradfield Park)	57	55	46
4	3a-9b Broughton Street, Kirribilli.	59	59	42

3.0. Applicable Noise Criteria

Taking into consideration the measured RBLs in Table 1, the applicable construction noise management levels for standard and non-standard hours for the project are shown in 0.

Table 2: Construction noise management levels

Noise Catchment Area	Logger Label	Noise Management Level, dB(A)			Sleep Disturbance $L_{A1, 1\ min}$
		Standard Hours (RBL + 10 dB(A))	Outside Standard Hours (RBL + 5 dB(A)		
		Day	Evening	Night	
1	1	59	53	48	69
2	2	69	63	44	70
3	3	67	60	51	70
4	4	69	64	47	69

4.0. Proposed Additional Construction Works

The additional works are proposed at night-time for access and road safety reasons and include the following construction activities:

Scenario	Duration
Scenario 1a –Footpath Construction (Saw cutting)	
Footpath Saw cutting South	5 Nights
Footpath Saw cutting North	2 Nights
Scenario 1b –Footpath Demolition	
Footpath Demolition South	2 per week for 10 weeks
Footpath Demolition North	2 per week for 5 weeks
Scenario 1c –Footpath Construction (FRP Completion)	
Footpath FRP Completion South	3 Nights

Scenario	Duration
Footpath FRP Completion North	3 Nights
Scenario 2a –Lift Construction (Parapet Removal)	
Parapet Removal South	2 Nights
Parapet Removal North	2 Nights
Scenario 2b –Lift Construction (Steel Frame Install)	
Steel Frame Install South	2 Nights
Steel Frame Install North	2 Nights
Scenario 2c –Lift Construction (Steel Landing)	
Structural Steel Landing South	1 Nights
Structural Steel Landing North	1 Nights
Scenario 2d –Lift Construction (Glass Panel Install)	
Glass panel Install South	4 Nights
Glass panel Install North	4 Nights
Scenario 2e –Lift Construction (Louvre and Roof Canopy Install)	
Lift Construction Louvre and Roof Canopy Install North	2 Nights
Scenario 3 - Utilities	
Utilities Electrical South	3 Nights

4.1. Construction Timing

We understand that construction works are proposed for outside of standard hours for traffic safety and access reasons. Roads and Maritime will need to seek approval from the Transport Management Centre to work on the Sydney Harbour Bridge at night. All night work must be undertaken in accordance with Roads and Maritime Construction Noise & Vibration Guideline where feasible, or in consultation with the adjacent community.

5.0. Construction Noise Impact Assessment

5.1. Construction Noise Assessment Methodology

An assessment on the potential level of construction noise impact has been carried out to determine whether mitigation will be required, and to determine appropriate management controls. Detailed construction equipment proposed for each stage are shown below in Table 4.

The noise level of plant and equipment associated with the proposed works was assumed based upon experience and the plant noise data provided in Table F-1 of the Roads and Maritime Construction Noise and Vibration Guideline.

5.2. Noise Modelling Inputs and Assumptions

The following modelling inputs and assumptions were made for the modelling:

Table 3: Modelling Assumptions

Modelling Element	Input / Assumption. Source Reference
3D Ground Elevation Geometry	Provided by Cardno
Surrounding Buildings Locations & Heights	Site Survey, Nearmap and Google Street.
Road Alignment	Provided by Cardno
Ground Absorption	75% over soft ground
Assessment Standard	ISO 9613-2:1996 – Acoustics – Attenuation of Sound During Propagation Outdoors (Part 2: General Method of Calculation)
Weather conditions	Receiver is downwind of the source, under moderate wind shear conditions, as per the assumptions of ISO 9613.
Receiver Height	Assumed to be 1.5 m above ground for prediction models for ground floor. Subsequent floor level receiver heights have been modelled at + 2.8 m above the floor below.

5.3. Construction Plant & Equipment

The following plant and equipment is proposed for the additional construction works:

Table 4: Proposed Construction Plant

Plant	Number of Plant	Sound Power Level, L_{Aeq} ,dB(A)
Scenario 1a (south) –Footpath Construction (Saw cutting)	***Total L_{Aeq}**	**118**
Concrete Saw	1	118
Scenario 1a (north) –Footpath Construction (Saw cutting)	***Total L_{Aeq}**	**118**
Concrete Saw	1	118
Scenario 1b (south) –Footpath Demolition	***Total L_{Aeq}**	**119**
Ratchet Gun	1	115
Grinder	1	114
Jackhammer	1	113
Bin Skip Collection	1	110
Carpentry Saw	1	100
Scenario 1b (north) – Footpath Demolition	***Total L_{Aeq}**	**119**
Ratchet Gun	2	109
Grinder	1	102
Jackhammer	1	113
1x Bin Skip Collection	1	110
Carpentry Saw	1	100
Scenario 1c (south) – Footpath Construction (FRP Completion)	***Total L_{Aeq}**	**117**
Concrete Pump	1	102

Plant	Number of Plant	Sound Power Level, L_{Aeq} ,dB(A)
Concrete Vibrators	2	113
Concrete Truck	1	109
Squawker	1	102
Scenario 1c (north) – Footpath Construction (FRP Completion)	***Total L_{Aeq}**	**117**
Concrete Pump	1	102
Concrete Vibrators	2	113
Concrete Truck	1	109
Squawker	1	102
Scenario 2a (south) – Lift Construction (Parapet Removal)	***Total L_{Aeq}**	**119**
Coring Machine	1	114
Wire Sawing	1	114
Minir Grinding	1	114
Scenario 2a (north) – Lift Construction (Parapet Removal)	***Total L_{Aeq}**	**119**
Coring Machine	1	114
Wire Sawing	1	114
Minir Grinding	1	114
Scenario 2b (South) –Lift Construction (Steel Frame Install)	***Total L_{Aeq}**	**116**
Trucks	2	103
Ratchet Gun	1	115
300t Mobile Crane	1	103
Scenario 2b (North) –Lift Construction (Steel Frame Install)	***Total L_{Aeq}**	**116**
Trucks	2	103
Ratchet Gun	1	115
300t Mobile Crane	1	103
Scenario 2c (south) – Lift Construction (Structural Steel Landing)	**Total L_{Aeq}**	**107**
30t Crane	1	103
EWP	2	98
Squawker	1	102
Scenario 2c (north) – Lift Construction (Structural Steel Landing)	***Total L_{Aeq}**	**107**
30t Crane	1	103
EWP	2	98
Squawker	1	102
Scenario 2d (south) –Lift Construction (Glass Panel Install)	***Total L_{Aeq}**	**116**
EWP	2	98

Plant	Number of Plant	Sound Power Level, L_{Aeq} ,dB(A)
Squawker	1	102
Ratchet Gun	1	115
Truck	1	103
Scenario 2d (north) –Lift Construction (Glass Panel Install)	***Total L_{Aeq}**	**116**
EWP	2	98
Squawker	1	102
Ratchet Gun	1	115
Truck	1	103
Scenario 2e (north) –Lift Construction (Louvre and Roof Canopy Install)	***Total L_{Aeq}**	**115**
EWP	2	98
Squawker	1	102
Ratchet Gun	1	115
Scenario 3 (south) - Utilities	***Total L_{Aeq}**	**119**
Excavator	2	110
Concrete Saw	1	118

**These noise levels represent the total noise level at the source.*

6.0. Predicted Construction Noise Levels

The predicted noise levels for each construction activity are shown in Appendix A.

In accordance with the noise management levels stipulated above, dwellings exposed to levels of construction noise above 69 dB(A) may cause sleep disturbance, with dwellings exposed to levels above the night-time RBL +5 dB(A) considered noise affected.

For all of the scenarios noise management levels are predicted to be significantly exceeded in all NCAs, and sleep disturbance noise criteria is expected to be exceeded at locations near to the works especially in NCAs 2 & 3 for all scenarios.

It should be noted that this assessment has endeavoured to carry out "worst case" noise modelling, and noise levels are predicted based all modelled sources operating simultaneously. Should the work sites or plant and equipment be amended, the predicted noise levels will change accordingly.

The predicted exceedances are generally a result of works being located in close proximity to the adjacent receivers. This modelling has been carried out to provide a worst case scenario (with all the listed plant for each scenario operating simultaneously) and it may be possible to reduce the number of plant operating simultaneously to reduce noise emissions.

The predicted results for each proposed construction stage are shown below in Table 5 to Table 8 for the north and south worksites respectively.

Recommended Mitigation Measures for each property based on the predicted exceedance in accordance with the RMS Construction Noise & Vibration Guideline are detailed be Table 10 to Table 13.

Table 5: Predicted Noise Levels – South Stage 1a to 2a

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	Predicted Construction Noise Level dB(A), L_{Aeq}				ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
					1a	1b	1c	2a		1a	1b	1c	2a
1	Lower Fort Street 1-19	83	F 1	SE	52	53	47	49	48	4	5	-	1
1	Lower Fort Street 21-23	84	F 1	SE	53	54	47	48	48	5	6	-	-
1	Lower Fort Street 25-37	85	F 1	SE	54	55	43	44	48	6	7	-	-
2	Park Hyatt Sydney	87	F 3	W	47	48	49	51	44	3	4	5	7
2	Park Hyatt Sydney	88	F 3	NW	48	49	40	42	44	4	5	-	-
1	Lower Fort Street 18	92	GF – F2	SE	57	58	44	45	48	9	10	-	
1	Lower Fort Street 20a & 22	93	F 2	SE	56	57	48	51	48	8	9	-	3
1	Lower Fort Street 20b	94	F 2	SE	56	57	49	51	48	8	9	1	3
1	Lower Fort Street 20c	95	F 2	SE	57	58	50	52	48	9	10	2	4
1	Lower Fort Street 20d	96	F 2	SE	57	58	51	52	48	9	10	3	4
1	Lower Fort Street 20d	97	F 2	SE	58	59	49	46	48	10	11	1	-
1	Lower Fort Street 20e	98	F 1	E	57	58	42	43	48	9	10	-	-
1	Lower Fort Street 20e	98	F 2	E	57	58	42	43	48	9	10	-	-
1	Trinity Avenue 8-12	99	F 2	E	59	60	53	54	48	11	12	5	6
1	Trinity Avenue 14-16	100	F 1	E	58	59	54	55	48	10	11	6	7
1	Trinity Avenue 18-22	101	F 1	E	58	59	52	53	48	10	11	4	5
1	Trinity Avenue Council Property?	102	F 3	E	64	65	62	63	48	16	17	14	15
2	Hickson Road Arts Exchange 36-64	103	F 4	SW	59	60	53	56	44	15	16	9	12
2	Hickson Road 7-77	105	F 3	W	46	47	36	38	44	2	3	-	-
2	Cumberland Street 2-60 B	108	F 2	W	65	66	57	59	44	21	22	13	15
2	Cumberland Street 2-60 C	110	F 4	W	71	72	62	64	44	27	28	18	20
2	Cumberland Street 2-60 A	111	F 8	W	75	76	68	69	44	31	32	24	25
2	Cumberland Street 2-60 D	112	F 3	W	72	73	64	65	44	28	29	20	21
2	Cumberland Street	113	F 3	W	74	75	69	70	44	30	31	25	26

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	Predicted Construction Noise Level dB(A), L_{Aeq}				ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
					1a	1b	1c	2a		1a	1b	1c	2a
2	Hickson Road 66-84	114	F 4	SW	59	60	46	42	44	15	16	2	-
2	George Street 25	116	F 2	W	55	56	39	46	44	11	12	-	2
2	George Street 23	117	F 2	SW	59	60	43	40	44	15	16	-	
2	George Street 43-45 47	118	F 2	W	53	54	46	49	44	9	10	2	5
2	Playfair Street 5	119	F 2	W	53	54	49	51	44	9	10	5	7
2	Playfair Street 20	120	F 1	W	57	58	51	52	44	13	14	7	8
2	Playfair Street 33	121	F 2	W	57	58	50	55	44	13	14	6	11
2	George Street 53-65	122	F 6	W	63	64	59	61	44	19	20	15	17
2	George Street 53-65	123	F 6	NW	62	63	58	59	44	18	19	14	15
2	Playfair Street 12-26	126	F 2	W	52	53	53	57	44	8	9	9	13
2	Gloucester Walk 18	127	F 2	NW	55	56	54	56	44	11	12	10	12
2	KV Courts Cumberland Street	128	GF	W	61	62	61	65	44	17	18	17	21
2	Cumberland Street 100-104	129	F 1	W	65	66	63	66	44	21	22	19	22
2	Gloucester Street 26-44	130	F 1	W	68	69	65	70	44	24	25	21	26
2	Gloucester Streetn35-75	131	F 1	NW	68	69	66	70	44	24	25	22	26
2	Harrington Street 39-43	132	F 1	W	60	61	61	64	44	16	17	17	20
2	George Street 87-89	133	GF	W	46	47	42	44	44	2	3	-	0
2	Cumberland Street 110	134	F 2	W	64	65	61	66	44	20	21	17	22
2	Gloucester Street 54B-54C	136	F 1	W	65	66	63	64	44	21	22	19	20
2	Cloucester Street 58A	137	F 1	W	62	63	60	64	44	18	19	16	20
2	Cloucester Street 58B	138	F 1	W	61	62	59	64	44	17	18	15	20
2	Harrington Street 85	139	F 2	W	60	61	59	60	44	16	17	15	16
2	Cumberland Street 110B	140	F 2	W	62	63	59	64	44	18	19	15	20
2	Cumberland Street next to B&B	141	F 2	W	60	61	58	62	44	16	17	14	18

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	Predicted Construction Noise Level dB(A), L_{Aeq}				ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
					1a	1b	1c	2a		1a	1b	1c	2a
2	Cumberland Street Sydney Harbour B&B	142	F 2	NW	60	61	57	61	44	16	17	13	17
2	Longs Lane/Cahill Express A	143	F 2	W	59	60	59	61	44	15	16	15	17
2	Cloucester Street The Big Dig	144	GF	W	49	50	45	48	44	5	6	1	4
2	Cloucester Street Terraces	145	F 1	W	58	59	57	58	44	14	15	13	14
2	Cloucester Street Terraces /Cahill Xpres	146	F 1	W	56	57	56	58	44	12	13	12	14
2	Shangri-la Foyers	148	F 2	NE	58	59	57	60	44	14	15	13	16
2	Shangri-la Hotel	150	F 24	NE	61	62	60	62	44	17	18	16	18
2	Quay West Suites	151	F 1	NW	51	52	40	47	44	7	8	-	3
2	Four Seasons Hotel	152	F 29	W	59	60	58	60	44	15	16	14	16
2	Harrington Street 68	154	F 8	N	60	61	59	62	44	16	17	15	18
2	Harrington Street 66	155	F 3	W	61	62	58	62	44	17	18	14	18
2	Harrington Street 44	156	F 1	W	63	64	60	63	44	19	20	16	19
2	George Street 135	157	F 2	W	57	58	54	56	44	13	14	10	12
2	George Street 111-115	158	F 2	W	57	58	54	58	44	13	14	10	14
2	George Street 111-115	159	F 2	W	58	59	53	57	44	14	15	9	13
2	George Street 91	160	F 2	W	59	60	59	64	44	15	16	15	20
1	Lower Fort Street 58	163	GF	E	58	59	45	46	48	10	11	-	-
1	Lower Fort Street 56	164	F 1	E	60	61	55	50	48	12	13	7	2
1	Lower Fort Street 54	165	F 1	E	60	61	56	51	48	12	13	8	3
1	Lower Fort Street 52	166	F 1	E	61	62	54	57	48	13	14	6	9
1	Lower Fort Street 50	167	F 1	E	61	62	54	56	48	13	14	6	8
1	Lower Fort Street 39-41	169	F 1	SE	54	55	43	45	48	6	7	-	-
1	Lower Fort Street 45-61	171	F 3	SE	60	61	54	55	48	12	13	6	7

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	Predicted Construction Noise Level dB(A), L_{Aeq}				ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
					1a	1b	1c	2a		1a	1b	1c	2a
1	Lower Fort Street 63-73	172	F 1	SE	58	59	52	54	48	10	11	4	6
1	Lower Fort Street 75-77	173	F 1	SE	60	61	53	55	48	12	13	5	7
1	Lower Fort Street 79	174	F 1	SE	60	61	54	56	48	12	13	6	8
1	Lower Fort Street 81-83	175	F 2	SE	62	63	57	53	48	14	15	9	5
1	Lower Fort Street 87	176	GF	SE	60	61	48	57	48	12	13	-	9
1	Windmill Street 71-73	177	F 3	S	61	62	51	53	48	13	14	3	5
1	Argyle Place 62-64	178	F 1	E	62	63	56	58	48	14	15	8	10
1	Windmill Street 92	179	F 1	E	58	59	49	50	48	10	11	1	2
1	Windmill Street 90	180	F 1	S	59	60	54	52	48	11	12	6	4
1	Windmill Street 88	181	F 1	S	58	59	53	51	48	10	11	5	3
1	Windmill Street 86	182	F 1	S	59	60	47	47	48	11	12	-	-
1	Windmill Street 84	183	F 1	S	58	59	45	46	48	10	11	-	-
1	Windmill Street 82	184	F 1	S	58	59	47	47	48	10	11	-	-
1	Windmill Street 80	185	F 1	S	56	57	45	45	48	8	9	-	-
1	Pottinger Street 2-34	187	GF	SE	52	53	47	48	48	4	5	-	-
1	Windmill Street 65	189	F 3	S	57	58	50	52	48	-	-	-	-
1	Windmill Street 35-67	192	F 1	S	56	57	52	57	48	-	-	-	-
1	Argyle Place 60	194	F 1	N	61	62	55	56	48	-	-	-	-
1	Argyle Place 58	195	F 1	N	62	63	51	53	48	-	-	-	-
1	Argyle Place 56	196	F 1	N	62	63	55	59	48	-	-	-	-
1	Argyle Place 54	197	F 1	N	63	64	58	60	48	-	-	-	-
1	Argyle Place 52	198	F 1	N	62	63	54	56	48	-	-	-	-
1	Argyle Place 50	202	F 1	E	59	60	56	58	48	-	-	-	-
2	Cumberland Street 100-104	205	F 1	NE	66	67	63	66	44	-	-	-	-

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	Predicted Construction Noise Level dB(A), L_{Aeq}				ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
					1a	1b	1c	2a		1a	1b	1c	2a
2	Cumberland Street	206	F 3	NE	71	72	56	58	44	-	-	-	-
1	Argyle Place 44	207	F 1	S	59	60	56	58	48	-	-	-	-
1	Lower Fort Street 18	208	F 1	NE	50	51	37	38	48	-	-	-	-

Table 6: Predicted Noise Levels – South Stages 2b to 3

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	Predicted Construction Noise Level dB(A), L_{Aeq}				ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
					2b	2c	2d	3a		2b	2c	2d	3a
2	Park Hyatt Sydney	87	F 3	W	35	37	48	38	44	-	-	4	-
1	Lower Fort Street 20d	97	F 2	SE	42	40	44	44	48	-	-	1	-
1	Lower Fort Street 20e	98	F 1	E	43	32	40	45	48	-	-	1	-
1	Trinity Avenue 18-22	101	F 1	E	44	42	50	47	48	-	-	3	-
1	Trinity Avenue Council Property?	102	F 3	E	50	51	60	52	48	-	-	4	-
2	Hickson Road Arts Exchange 36-64	103	F 4	SW	56	44	53	58	44	-	-	2	-
2	Hickson Road 7-77	106	F 3	SW	37	25	34	40	44	12	3	12	14
2	Cumberland Street 2-60 A	111	F 8	W	69	58	66	72	44	15	3	12	19
2	Cumberland Street 2-60 D	112	F 3	W	61	54	63	62	44	23	8	16	24
2	Cumberland Street	113	F 3	W	75	60	68	78	44	25	14	22	28
2	Hickson Road 66-84	114	F 4	SW	43	36	45	44	44	17	10	19	18
2	George Street 25	116	F 2	W	43	31	38	43	44	31	16	24	34
2	George Street 23	117	F 2	SW	42	33	39	45	44	-	-	1	-
2	Playfair Street 5	119	F 2	W	46	39	48	49	44	-	-	-	1

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	Predicted Construction Noise Level dB(A), L_{Aeq}				ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
					2b	2c	2d	3a		2b	2c	2d	3a
2	Playfair Street 20	120	F 1	W	47	41	49	50	44	-	-	-	3
2	Playfair Street 33	121	F 2	W	47	41	50	50	44	2	-	4	5
2	George Street 53-65	122	F 6	W	49	49	57	49	44	3	-	5	6
2	George Street 53-65	123	F 6	NW	47	48	56	48	44	3	-	6	6
2	Playfair Street 12-26	126	F 2	W	47	43	52	48	44	5	5	13	5
2	Gloucester Walk 18	127	F 2	NW	52	44	52	56	44	3	4	12	4
2	KV Courts Cumberland Street	128	GF	W	56	51	60	51	44	3	-	8	4
2	Cumberland Street 100-104	129	F 1	W	64	53	62	65	44	8	-	8	12
2	Gloucester Street 26-44	130	F 1	W	71	56	65	70	44	12	7	16	7
2	Gloucester Streetn35-75	131	F 1	NW	71	56	65	69	44	20	9	18	21
2	Harrington Street 39-43	132	F 1	W	62	51	60	52	44	27	12	21	26
2	George Street 87-89	133	GF	W	42	32	41	57	44	27	12	21	25
2	Cumberland Street 110	134	F 2	W	63	51	60	63	44	18	7	16	8
2	Gloucester Street 54B-54C	136	F 1	W	63	53	62	63	44	-	-	-	13
2	Cloucester Street 58A	137	F 1	W	62	51	58	61	44	19	7	16	19
2	Cloucester Street 58B	138	F 1	W	59	49	58	61	44	19	9	18	19
2	Harrington Street 85	139	F 2	W	58	49	58	60	44	18	7	14	17
2	Cumberland Street 110B	140	F 2	W	60	49	58	61	44	15	5	14	17
2	Cumberland Street next to B&B	141	F 2	W	59	48	57	59	44	14	5	14	16
2	Cumberland Street Sydney Harbour B&B	142	F 2	NW	57	47	56	59	44	16	5	14	17
2	Longs Lane/Cahill Express A	143	F 2	W	52	48	57	49	44	15	4	13	15
2	Cloucester Street The Big Dig	144	GF	W	42	35	44	43	44	13	3	12	15
2	Cloucester Street Terraces	145	F 1	W	50	47	56	51	44	8	4	13	5

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	Predicted Construction Noise Level dB(A), L_{Aeq}				ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
					2b	2c	2d	3a		2b	2c	2d	3a
2	Shangri-la Foyers	148	F 2	NE	54	47	55	49	44	6	3	12	7
2	Shangri-la Hotel	150	F 24	NE	61	50	59	60	44	9	1	11	7
2	Quay West Suites	151	F 1	NW	39	27	36	40	44	10	3	11	5
2	Four Seasons Hotel	152	F 29	W	58	48	57	57	44	17	6	15	16
2	Harrington Street 66	155	F 3	W	59	48	57	61	44	14	4	13	13
2	Harrington Street 44	156	F 1	W	60	50	58	61	44	15	5	14	16
2	George Street 135	157	F 2	W	53	44	53	55	44	15	4	13	17
2	George Street 111-115	158	F 2	W	51	44	55	53	44	16	6	14	17
2	George Street 91	160	F 2	W	51	48	58	59	44	7	-	11	9
1	Lower Fort Street 58	163	GF	E	44	36	43	47	48	6	-	9	5
1	Lower Fort Street 56	164	F 1	E	43	45	50	46	48	7	4	14	15
1	Lower Fort Street 52	166	F 1	E	43	44	53	46	48	-	-	2	-
1	Lower Fort Street 50	167	F 1	E	42	43	52	45	48	-	-	5	-
1	Lower Fort Street 39-41	169	F 1	SE	51	33	42	53	48	-	-	5	-
1	Lower Fort Street 45-61	171	F 3	SE	37	43	52	42	48	-	-	4	-
1	Lower Fort Street 63-73	172	F 1	SE	41	42	51	45	48	3	-	-	5
1	Lower Fort Street 75-77	173	F 1	SE	41	43	52	43	48	-	-	4	-
1	Lower Fort Street 79	174	F 1	SE	41	43	52	43	48	-	-	3	-
1	Lower Fort Street 81-83	175	F 2	SE	42	46	55	44	48	-	-	4	-
1	Lower Fort Street 87	176	GF	SE	41	37	46	43	48	-	-	4	-
1	Windmill Street 71-73	177	F 3	S	42	41	50	44	48	-	-	7	-
1	Windmill Street 92	179	F 1	E	41	42	47	44	48	-	-	2	-
1	Windmill Street 90	180	F 1	S	41	43	52	43	48	-	-	6	-
1	Windmill Street 86	182	F 1	S	40	42	45	42	48	-	-	4	-

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	Predicted Construction Noise Level dB(A), L_{Aeq}				ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
					2b	2c	2d	3a		2b	2c	2d	3a
1	Windmill Street 84	183	F 1	S	39	35	44	42	48	-	-	4	-
1	Argyle Place 60	194	F 1	N	43	42	52	44	48	-	-	1	-
1	Argyle Place 58	195	F 1	N	40	41	50	42	48	-	-	5	-
1	Argyle Place 56	196	F 1	N	43	44	55	45	48	-	-	4	-
1	Argyle Place 54	197	F 1	N	43	45	56	45	48	-	-	2	-
1	Argyle Place 52	198	F 1	N	42	43	52	43	48	-	-	7	-
1	Argyle Place 50	202	F 1	E	41	45	54	43	48	-	-	8	-
2	Cumberland Street 100-104	205	F 1	NE	64	53	62	66	44	-	-	4	-
2	Cumberland Street	206	F 3	NE	56	47	56	57	44	-	-	6	-
1	Argyle Place 44	207	F 1	S	40	46	55	40	48	20	9	18	22
1	Lower Fort Street 18	208	F 1	NE	49	27	36	52	48	12	3	12	13

Table 7: Predicted Noise Levels – North Stage 1a to 2a

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	Predicted Construction Noise Level dB(A), L_{Aeq}				ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
					2b	2c	2d	2e		2b	2c	2d	2e
4	Broughton Street 37	1	F 2	W	69	63	64	70	49	20	14	15	21
4	Broughton Street 33	2	F 2	W	70	64	65	71	49	21	15	16	22
4	Broughton Street 31	3	F 1	W	73	63	65	70	49	24	14	16	21
4	Broughton Street 23	4	F 1	W	73	64	66	72	49	24	15	17	23
4	Broughton Street 19 21	5	F 1	W	79	66	69	76	49	30	17	20	27
4	Broughton Street 11-17	6	F 1	W	83	67	71	78	49	34	18	22	29
4	Broughton Street 3A-9B	9	F 1	W	77	69	67	72	49	28	20	18	23

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	Predicted Construction Noise Level dB(A), L_{Aeq}				ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
					2b	2c	2d	2e		2b	2c	2d	2e
4	Fitzroy Street 31	11	F 2	W	61	69	63	66	49	16	20	14	17
4	Jeffereys Street 52-56 rear	12	F 2	W	65	68	63	67	49	16	19	14	18
4	Pitt Street 38	13	F 1	W	62	67	57	60	49	13	18	8	11
4	Pitt Street 41 43 45	14	F 2	W	60	65	55	58	49	11	16	6	9
4	Kirribilli Avenue 40-42	15	F 1	W	58	60	52	56	49	9	11	3	7
3	Alfred Street Sth 84	16	F 15	E	45	64	63	65	50	-	14	13	15
3	Glen Street 30	18	F 14	SE	59	65	64	66	50	9	15	14	16
3	Alfred Street Sth 80	20	F 12	E	59	67	66	68	50	14	17	16	18
3	Alfred Street Sth 70	21	F 6	E	60	67	66	68	50	10	17	16	18
3	Alfred Street Sth 68	22	F 10	E	57	69	67	69	50	10	19	17	19
3	Alfred Street Sth 52	23	F 10	E	53	69	67	68	50	6	19	17	18
3	Alfred Street Sth 38	25	F 19	E	48	69	65	67	50	-	19	15	17
3	Alfred Street Sth 48-50	26	F 20	E	41	67	64	65	50	-	17	14	15
3	Dind Street 2	27	GF	E	43	51	47	52	50	-	1	-	2
3	Alfred Street Sth 30	28	F 7	E	41	65	59	61	50	-	15	9	11
3	Northcliff Street 19 21	29	F 1	N	42	59	50	48	50	-	9	0	-
3	Alfred Street Sthv26-28	30	F 1	E	43	58	54	56	50	-	8	4	6
3	Alfred Street Sth 20-24	31	F 9	E	40	63	57	59	50	-	13	7	9
3	Northcliff Street 3	32	F 8	E	41	55	48	50	50	-	5	-	-
3	Northcliff Street 7	33	F 8	E	42	62	58	60	50	-	12	8	10
4	Burton Street 34	34	F 2	W	65	57	57	63	49	16	8	8	14
4	Bligh Street 14	37	F 1	W	58	68	62	64	49	11	19	13	15
4	Bligh Street 14A	38	F 1	S	55	67	60	63	49	8	18	11	14
4	Jeffereys Street 60	39	F 2	W	57	69	61	66	49	8	20	12	17

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	Predicted Construction Noise Level dB(A), L_{Aeq}				ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
					2b	2c	2d	2e		2b	2c	2d	2e
4	Jeffereys Street 52-56	40	F 2	W	53	68	61	65	49	8	19	12	16
4	Jeffereys Street 48 50	41	F 2	W	51	68	61	64	49	7	19	12	15
4	Jeffereys Street 50	42	F 2	W	52	68	59	63	49	6	19	10	14
4	Jeffereys Street 44	43	F 2	W	51	68	58	63	49	4	19	9	14
4	Jeffereys Street 40 42	44	F 1	W	59	66	52	59	49	10	17	3	10
4	Jeffereys Street 36 38	45	F 1	W	50	64	51	59	49	3	15	2	10
4	Jeffereys Street 34	46	F 1	W	50	65	53	57	49	4	17	4	8
4	Jeffereys Street 30-32	47	F 1	W	52	64	56	61	49	6	15	7	12
4	Jeffereys Street 28	48	F 1	W	58	63	58	61	49	9	14	9	12
4	Jeffereys Street 24	49	F 1	W	58	61	58	62	49	9	12	9	13
4	Jeffereys Street 22	50	F 1	W	59	62	58	62	49	10	13	9	13
4	Jeffereys Street 20	51	F 1	W	61	62	57	61	49	12	13	8	12
4	Jeffereys Street 18	52	F 1	W	60	60	56	60	49	12	11	7	11
4	Kirribilli Avenue 44-50	54	F 2	N	57	62	55	58	49	8	13	6	9
4	Jeffereys Street 31B	55	F 2	W	54	67	62	64	49	10	18	13	15
4	Fitzroy Street 33	56	F 2	W	50	67	62	64	49	9	18	13	15
4	Jeffereys Street	57	F 3	W	54	65	61	66	49	10	16	12	17
4	Robertson Lane 35	60	F 3	W	62	66	64	67	49	13	17	15	18
4	Bligh Street 16-18	61	GF	S	53	63	57	61	49	4	14	8	12
4	Bligh Street 20-26	62	F 2	N & S	62	64	63	67	49	13	16	14	18
4	Bligh Street 28-32	63	F 2	N & S	59	63	62	65	49	12	15	13	16
4	Fitzroy Street 32	67	F 1	S	55	63	58	62	49	8	14	9	13
4	Fitzroy Street 34	68	F 1	N & S	54	63	59	63	49	9	14	10	15
4	Fitzroy Street 36-50	71	F 2	N	58	63	62	64	49	9	14	13	15

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	Predicted Construction Noise Level dB(A), L_{Aeq}				ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
					2b	2c	2d	2e		2b	2c	2d	2e
4	Robertson Road 46	72	F 8	W	63	65	60	63	49	14	17	11	14
4	Broughton Street 37	79	F 2	NW	67	62	63	68	49	20	13	14	19
4	Jeffereys Street	209	F 3	W	43	61	52	49	49	20	12	5	8

Table 8: Predicted Noise Levels – North Stages 2b to 2e

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	Predicted Construction Noise Level dB(A), L_{Aeq}				ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
					2b	2c	2d	2e		2b	2c	2d	2e
4	Broughton Street 37	1	F 2	W	67	57	65	63	49	18	8	16	14
4	Broughton Street 33	2	F 2	W	68	58	66	64	49	19	9	17	15
4	Broughton Street 31	3	F 1	W	70	58	66	65	49	21	9	17	16
4	Broughton Street 23	4	F 1	W	72	60	68	66	49	23	11	19	17
4	Broughton Street 19 21	5	F 1	W	78	63	71	70	49	29	14	22	21
4	Broughton Street 11-17	6	F 1	W	81	65	73	72	49	32	16	24	23
4	Broughton Street 3A-9B	9	F 1	W	75	60	69	68	49	26	11	20	19
4	Fitzroy Street 31	11	F 2	W	62	55	63	65	49	13	6	14	16
4	Jeffereys Street 52-56 rear	12	F 2	W	63	56	64	62	49	14	7	15	13
4	Pitt Street 38	13	F 1	W	59	46	54	56	49	10	-	5	7
4	Pitt Street 41 43 45	14	F 2	W	58	46	55	54	49	9	-	6	5
4	Kirribilli Avenue 40-42	15	F 1	W	55	43	52	52	49	6	-	3	3
3	Alfred Street Sth 84	16	F 15	E	61	53	62	62	50	11	3	12	12
3	Glen Street 30	18	F 14	SE	61	54	63	62	50	11	4	13	12
3	Alfred Street Sth 80	20	F 12	E	57	56	65	64	50	7	6	15	14

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	Predicted Construction Noise Level dB(A), L_{Aeq}				ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
					2b	2c	2d	2e		2b	2c	2d	2e
3	Alfred Street Sth 70	21	F 6	E	56	57	65	65	50	6	7	15	15
3	Alfred Street Sth 68	22	F 10	E	58	57	65	65	50	8	7	15	15
3	Alfred Street Sth 52	23	F 10	E	55	56	65	65	50	5	6	15	15
3	Alfred Street Sth 38	25	F 19	E	54	55	64	64	50	4	5	14	14
3	Alfred Street Sth 48-50	26	F 20	E	43	54	62	62	50	-	4	12	12
3	Alfred Street Sth 30	28	F 7	E	38	49	58	58	50	-	-	8	8
3	Alfred Street Sthv26-28	30	F 1	E	40	44	53	53	50	-	-	3	3
3	Alfred Street Sth 20-24	31	F 9	E	41	47	56	56	50	-	-	6	6
3	Northcliff Street 7	33	F 8	E	42	48	57	57	50	-	-	7	7
4	Burton Street 34	34	F 2	W	57	51	60	59	49	8	2	11	10
4	Bligh Street 14	37	F 1	W	57	52	61	61	49	8	3	12	12
4	Bligh Street 14A	38	F 1	S	54	51	60	60	49	5	2	11	11
4	Jeffereys Street 60	39	F 2	W	56	54	63	63	49	7	5	14	14
4	Jeffereys Street 52-56	40	F 2	W	55	53	62	62	49	6	4	13	13
4	Jeffereys Street 48 50	41	F 2	W	52	52	61	61	49	3	3	12	12
4	Jeffereys Street 50	42	F 2	W	51	52	60	60	49	2	3	11	11
4	Jeffereys Street 44	43	F 2	W	53	51	60	59	49	4	2	11	10
4	Jeffereys Street 40 42	44	F 1	W	49	48	56	52	49	-	-	7	3
4	Jeffereys Street 36 38	45	F 1	W	49	45	52	52	49	-	-	3	3
4	Jeffereys Street 34	46	F 1	W	51	46	53	52	49	2	-	4	3
4	Jeffereys Street 30-32	47	F 1	W	53	49	57	58	49	4	-	8	9
4	Jeffereys Street 28	48	F 1	W	55	49	58	58	49	6	-	9	9
4	Jeffereys Street 24	49	F 1	W	58	50	58	58	49	9	1	9	9
4	Jeffereys Street 22	50	F 1	W	59	50	59	58	49	10	1	10	9

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	Predicted Construction Noise Level dB(A), L_{Aeq}				ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
					2b	2c	2d	2e		2b	2c	2d	2e
4	Jeffereys Street 20	51	F 1	W	58	49	57	56	49	9	-	8	7
4	Jeffereys Street 18	52	F 1	W	58	48	57	56	49	9	-	8	7
4	Kirribilli Avenue 44-50	54	F 2	N	55	47	55	54	49	6	-	6	5
4	Jeffereys Street 31B	55	F 2	W	55	53	62	62	49	6	4	13	13
4	Fitzroy Street 33	56	F 2	W	54	52	60	61	49	5	3	11	12
4	Jeffereys Street	57	F 3	W	57	54	63	62	49	8	5	14	13
4	Robertson Lane 35	60	F 3	W	61	55	63	64	49	12	6	14	15
4	Bligh Street 16-18	61	GF	S	51	50	59	60	49	2	1	10	11
4	Bligh Street 20-26	62	F 2	N	64	55	64	64	49	15	6	15	15
4	Bligh Street 28-32	63	F 2	N	59	53	62	62	49	10	4	13	13
4	Fitzroy Street 32	67	F 1	S	53	50	59	59	49	4	1	10	10
4	Fitzroy Street 34	69	F 1	N	54	52	61	61	49	6	3	12	12
4	Fitzroy Street 36-50	71	F 2	N	53	53	61	62	49	4	4	12	13
4	Robertson Road 46	72	F 9	W	60	52	60	61	49	11	3	11	12
4	Jefferey Street	76	F 2	NW	46	45	54	54	49	5	-	5	5
4	Broughton Street 37	79	F 2	NW	66	55	64	62	49	17	6	15	13

7.0. Recommendations

Section 9 of the REF Noise Assessment report details recommended best practice mitigation measures and a detailed schedule of required mitigation measures depending on the predicted level of exceedance of the NMLs. This table is included below for information.

7.1. RMS Recommended Mitigation Measures

In addition Table 10 to Table 13 below provide the recommended RMS mitigation measures for night-time (referenced from the RMS Construction Noise & Vibration Guideline for each of the modelled properties for additional information. These tables have been colour coded with Table 9 below for clarification.

Table 9: Schedule of Recommended RMS Mitigation Measures for Night-Works

Predicted airborne $L_{Aeq(15min)}$ noise level at receiver				
Perception	dB(A) above RBL	dB(A) above NML	Type of Additional Mitigation Measures	Mitigation Levels:
All hours				
75dBA or greater			N, V, PC, RO	HA
OOHW Period 2: Mon - Fri (10pm - 7am), Sat (10pm - 8am), Sun/Pub Hol (6am - 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:				
AA = Alternative Accommodation		R1 = Respite Period 1		
V = Verification		R2 = Respite Period 2		
IB = Individual Briefings		DR = Duration Respite		
N = Notification		Perception = relates to level above RBL		
PC = Phone Calls		NML = Noise Management Level		
SN = Specific Notifications		HA = Highly Affected (> 75 dB(A) - applies to residences only)		

7.2. Additional Site Mitigation Measures

Provision of temporary noise barriers is not likely to be practical for this site given the elevated nature of the surrounding receivers. However, provision of anti-gawk screens with no gaps around the worksites may provide some screening to the closest ground level receivers, particularly when the works are on the bridge.

The primary impacts which may result in complaint are a likely to be from hammering or sawing and / or impulsive sources like squawkers. For this reason the use of hammers and concrete saws should be scheduled for outside of the middle hours of the night, where possible.

Where short term hammering or sawing is required throughout the night period, short term temporary relocations may be required for receivers located very close to the works within the 69 dB(A) noise contour on the attached noise contour maps.

Table 10: Recommended Mitigation Measures – South Stage 1a to 2a

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
						1a Footpath Saw Cutting	1b Footpath Demolition	1c FRP Completion	2a Parapet Removal
1	Lower Fort Street 1-19	83	F 1	SE	48	N	V, N, R2, DR	-	N
1	Lower Fort Street 21-23	84	F 1	SE	48	V, N, R2, DR	V, N, R2, DR	-	-
1	Lower Fort Street 25-37	85	F 1	SE	48	V, N, R2, DR	V, N, R2, DR	-	-
2	Park Hyatt Sydney	87	F 3	W	44	N	N	V, N, R2, DR	V, N, R2, DR
2	Park Hyatt Sydney	88	F 3	NW	44	N	V, N, R2, DR	-	-
1	Lower Fort Street 18	92	GF – F2	SE	48	V, N, R2, DR	V, N, R2, DR	-	-
1	Lower Fort Street 20a & 22	93	F 2	SE	48	V, N, R2, DR	V, N, R2, DR	-	N
1	Lower Fort Street 20b	94	F 2	SE	48	V, N, R2, DR	V, N, R2, DR	N	N
1	Lower Fort Street 20c	95	F 2	SE	48	V, N, R2, DR	V, N, R2, DR	N	N
1	Lower Fort Street 20d	96	F 2	SE	48	V, N, R2, DR	V, N, R2, DR	N	N
1	Lower Fort Street 20d	97	F 2	SE	48	V, N, R2, DR	V, N, R2, DR	N	-
1	Lower Fort Street 20e	98	F 1	E	48	V, N, R2, DR	V, N, R2, DR	-	-
1	Lower Fort Street 20e	98	F 2	E	48	V, N, R2, DR	V, N, R2, DR	-	-
1	Trinity Avenue 8-12	99	F 2	E	48	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
1	Trinity Avenue 14-16	100	F 1	E	48	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
1	Trinity Avenue 18-22	101	F 1	E	48	V, N, R2, DR	V, N, R2, DR	N	V, N, R2, DR
1	Trinity Avenue Council Property?	102	F 3	E	48	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
2	Hickson Road Arts Exchange 36-64	103	F 4	SW	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
2	Hickson Road 7-77	105	F 3	W	44	N	N	-	-
2	Hickson Road 7-77	106	F 3	SW	44	N	N	-	-
2	Cumberland Street 2-60 B	108	F 2	W	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
						1a Footpath Saw Cutting	1b Footpath Demolition	1c FRP Completion	2a Parapet Removal
2	Cumberland Street 2-60 C	110	F 4	W	44	AA, V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	Cumberland Street 2-60 A	111	F 8	W	44	AA, V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR
2	Cumberland Street 2-60 D	112	F 3	W	44	AA, V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	Cumberland Street	113	F 3	W	44	AA, V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR
2	Hickson Road 66-84	114	F 4	SW	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	N	-
2	George Street 25	116	F 2	W	44	V, N, R2, DR	V, N, R2, DR	-	N
2	George Street 23	117	F 2	SW	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	-	-
2	George Street 43-45 47	118	F 2	W	44	V, N, R2, DR	V, N, R2, DR	N	V, N, R2, DR
2	Playfair Street 5	119	F 2	W	44	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
2	Playfair Street 20	120	F 1	W	44	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
2	Playfair Street 33	121	F 2	W	44	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
2	George Street 53-65	122	F 6	W	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	George Street 53-65	123	F 6	NW	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
2	Playfair Street 12-26	126	F 2	W	44	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
2	Gloucester Walk 18	127	F 2	NW	44	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
2	KV Courts Cumberland Street	128	GF	W	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	Cumberland Street 100-104	129	F 1	W	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	Gloucester Street 26-44	130	F 1	W	44	V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR
2	Gloucester Streetn35-75	131	F 1	NW	44	V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
						1a Footpath Saw Cutting	1b Footpath Demolition	1c FRP Completion	2a Parapet Removal
2	Harrington Street 39-43	132	F 1	W	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	George Street 87-89	133	GF	W	44	N	N	-	-
2	Cumberland Street 110	134	F 2	W	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	Gloucester Street 54B-54C	136	F 1	W	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	Cloucester Street 58A	137	F 1	W	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	Cloucester Street 58B	138	F 1	W	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	Harrington Street 85	139	F 2	W	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	Cumberland Street 110B	140	F 2	W	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	Cumberland Street next to B&B	141	F 2	W	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
2	Cumberland Street Sydney Harbour B&B	142	F 2	NW	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
2	Longs Lane/Cahil xpress A	143	F 2	W	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	Cloucester Street The Big Dig	144	GF	W	44	V, N, R2, DR	V, N, R2, DR	N	N
2	Cloucester Street Terraces	145	F 1	W	44	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
2	Cloucester Street Terraces /Cahill Xpres	146	F 1	W	44	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
2	Shangri-la Foyers	148	F 2	NE	44	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
2	Shangri-la Hotel	150	F 24	NE	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	Quay West Suites	151	F 1	NW	44	V, N, R2, DR	V, N, R2, DR	-	N
2	Four Seasons Hotel	152	F 29	W	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
2	Harrington Street 68	154	F 8	N	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	Harrington Street 66	155	F 3	W	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
						1a Footpath Saw Cutting	1b Footpath Demolition	1c FRP Completion	2a Parapet Removal
2	Harrington Street 44	156	F 1	W	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	George Street 135	157	F 2	W	44	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
2	George Street 111-115	158	F 2	W	44	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
2	George Street 111-115	159	F 2	W	44	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
2	George Street 91	160	F 2	W	44	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
1	Lower Fort Street 58	163	GF	E	48	V, N, R2, DR	V, N, R2, DR	-	-
1	Lower Fort Street 56	164	F 1	E	48	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	N
1	Lower Fort Street 54	165	F 1	E	48	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	N
1	Lower Fort Street 52	166	F 1	E	48	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
1	Lower Fort Street 50	167	F 1	E	48	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
1	Lower Fort Street 39-41	169	F 1	SE	48	V, N, R2, DR	V, N, R2, DR	-	-
1	Lower Fort Street 45-61	171	F 3	SE	48	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
1	Lower Fort Street 63-73	172	F 1	SE	48	V, N, R2, DR	V, N, R2, DR	N	V, N, R2, DR
1	Lower Fort Street 75-77	173	F 1	SE	48	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
1	Lower Fort Street 79	174	F 1	SE	48	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
1	Lower Fort Street 81-83	175	F 2	SE	48	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
1	Lower Fort Street 87	176	GF	SE	48	V, N, R2, DR	V, N, R2, DR	-	V, N, R2, DR
1	Windmill Street 71-73	177	F 3	S	48	V, N, R2, DR	V, N, R2, DR	N	V, N, R2, DR
1	Argyle Place 62-64	178	F 1	E	48	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
1	Windmill Street 92	179	F 1	E	48	V, N, R2, DR	V, N, R2, DR	N	N
1	Windmill Street 90	180	F 1	S	48	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	N
1	Windmill Street 88	181	F 1	S	48	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	N
1	Windmill Street 86	182	F 1	S	48	V, N, R2, DR	V, N, R2, DR	-	-
1	Windmill Street 84	183	F 1	S	48	V, N, R2, DR	V, N, R2, DR	-	-

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
						1a Footpath Saw Cutting	1b Footpath Demolition	1c FRP Completion	2a Parapet Removal
1	Windmill Street 82	184	F 1	S	48	V, N, R2, DR	V, N, R2, DR	-	-
1	Windmill Street 80	185	F 1	S	48	V, N, R2, DR	V, N, R2, DR	-	-
1	Pottinger Street 2-34	187	GF	SE	48	N	V, N, R2, DR	-	-

Table 11: Recommended Mitigation Measures – South Stages 2b to 3

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
						2b Steel Frame Install	2c Steel Landing	2d Glass Panel	3a Utilities
2	Park Hyatt Sydney	87	F 3	W	44	-	-	N	-
1	Lower Fort Street 20d	97	F 2	SE	48	-	-	N	-
1	Lower Fort Street 20e	98	F 1	E	48	-	-	N	-
1	Trinity Avenue 18-22	101	F 1	E	48	-	-	N	-
1	Trinity Avenue Council Property?	102	F 3	E	48	-	-	N	-
2	Hickson Road Arts Exchange 36-64	103	F 4	SW	44	-	-	N	-
2	Hickson Road 7-77	106	F 3	SW	44	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR
2	Cumberland Street 2-60 A	111	F 8	W	44	V, IB, N, PC, SN, R2, DR	N	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
2	Cumberland Street 2-60 D	112	F 3	W	44	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	Cumberland Street	113	F 3	W	44	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
						2b Steel Frame Install	2c Steel Landing	2d Glass Panel	3a Utilities
2	Hickson Road 66-84	114	F 4	SW	44	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	George Street 25	116	F 2	W	44	AA, V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR
2	George Street 23	117	F 2	SW	44	-	-	N	-
2	Playfair Street 5	119	F 2	W	44	-	-	-	N
2	Playfair Street 20	120	F 1	W	44	-	-	-	N
2	Playfair Street 33	121	F 2	W	44	N	-	N	V, N, R2, DR
2	George Street 53-65	122	F 6	W	44	N	-	V, N, R2, DR	V, N, R2, DR
2	George Street 53-65	123	F 6	NW	44	N	-	V, N, R2, DR	V, N, R2, DR
2	Playfair Street 12-26	126	F 2	W	44	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
2	Gloucester Walk 18	127	F 2	NW	44	N	N	V, N, R2, DR	N
2	KV Courts Cumberland Street	128	GF	W	44	N	-	V, N, R2, DR	N
2	Cumberland Street 100-104	129	F 1	W	44	V, N, R2, DR	-	V, N, R2, DR	V, N, R2, DR
2	Gloucester Street 26-44	130	F 1	W	44	V, N, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR
2	Gloucester Streetn35-75	131	F 1	NW	44	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	Harrington Street 39-43	132	F 1	W	44	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR
2	George Street 87-89	133	GF	W	44	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR
2	Cumberland Street 110	134	F 2	W	44	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR
2	Gloucester Street 54B-54C	136	F 1	W	44	-	-	-	V, N, R2, DR
2	Cloucester Street 58A	137	F 1	W	44	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	Cloucester Street 58B	138	F 1	W	44	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
						2b Steel Frame Install	2c Steel Landing	2d Glass Panel	3a Utilities
2	Harrington Street 85	139	F 2	W	44	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
2	Cumberland Street 110B	140	F 2	W	44	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
2	Cumberland Street next to B&B	141	F 2	W	44	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
2	Cumberland Street Sydney Harbour B&B	142	F 2	NW	44	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
2	Longs Lane/Cahill Express A	143	F 2	W	44	V, IB, N, PC, SN, R2, DR	N	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
2	Cloucester Street The Big Dig	144	GF	W	44	V, N, R2, DR	N	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
2	Cloucester Street Terraces	145	F 1	W	44	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR
2	Shangri-la Foyers	148	F 2	NE	44	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR
2	Shangri-la Hotel	150	F 24	NE	44	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR
2	Quay West Suites	151	F 1	NW	44	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR
2	Four Seasons Hotel	152	F 29	W	44	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
2	Harrington Street 66	155	F 3	W	44	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR
2	Harrington Street 44	156	F 1	W	44	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
2	George Street 135	157	F 2	W	44	V, IB, N, PC, SN, R2, DR	N	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
2	George Street 111-115	158	F 2	W	44	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
2	George Street 91	160	F 2	W	44	V, N, R2, DR	-	V, N, R2, DR	V, N, R2, DR
1	Lower Fort Street 58	163	GF	E	48	V, N, R2, DR	-	V, N, R2, DR	V, N, R2, DR
1	Lower Fort Street 56	164	F 1	E	48	V, N, R2, DR	N	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
1	Lower Fort Street 52	166	F 1	E	48	-	-	N	-
1	Lower Fort Street 50	167	F 1	E	48	-	-	V, N, R2, DR	-
1	Lower Fort Street 39-41	169	F 1	SE	48	-	-	V, N, R2, DR	-

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
						2b Steel Frame Install	2c Steel Landing	2d Glass Panel	3a Utilities
1	Lower Fort Street 45-61	171	F 3	SE	48	-	-	N	-
1	Lower Fort Street 63-73	172	F 1	SE	48	N	-	-	V, N, R2, DR
1	Lower Fort Street 75-77	173	F 1	SE	48	-	-	N	-
1	Lower Fort Street 79	174	F 1	SE	48	-	-	N	-
1	Lower Fort Street 81-83	175	F 2	SE	48	-	-	N	-
1	Lower Fort Street 87	176	GF	SE	48	-	-	N	-
1	Windmill Street 71-73	177	F 3	S	48	-	-	V, N, R2, DR	-
1	Windmill Street 92	179	F 1	E	48	-	-	N	-
1	Windmill Street 90	180	F 1	S	48	-	-	V, N, R2, DR	-
1	Windmill Street 86	182	F 1	S	48	-	-	N	-
1	Windmill Street 84	183	F 1	S	48	-	-	N	-
1	Argyle Place 60	194	F 1	N	48	-	-	N	-
1	Argyle Place 58	195	F 1	N	48	-	-	V, N, R2, DR	-
1	Argyle Place 56	196	F 1	N	48	-	-	N	-
1	Argyle Place 54	197	F 1	N	48	-	-	N	-
1	Argyle Place 52	198	F 1	N	48	-	-	V, N, R2, DR	-
1	Argyle Place 50	202	F 1	E	48	-	-	V, N, R2, DR	-
2	Cumberland Street 100-104	205	F 1	NE	44	-	-	N	-
2	Cumberland Street	206	F 3	NE	44	-	-	V, N, R2, DR	-
1	Argyle Place 44	207	F 1	S	48	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
1	Lower Fort Street 18	208	F 1	NE	48	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR

Table 12: Recommended Mitigation Measures – North Stage 1a to 2a

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
						1a Footpath Saw Cutting	1b Footpath Demolition	1c FRP Completion	2a Parapet Removal
4	Broughton Street 37	1	F 2	W	49	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
4	Broughton Street 33	2	F 2	W	49	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
4	Broughton Street 31	3	F 1	W	49	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
4	Broughton Street 23	4	F 1	W	49	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
4	Broughton Street 19 21	5	F 1	W	49	AA, V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR
4	Broughton Street 11-17	6	F 1	W	49	AA, V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR
4	Broughton Street 3A-9B	9	F 1	W	49	AA, V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
4	Fitzroy Street 31	11	F 2	W	49	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
4	Jeffereys Street 52-56 rear	12	F 2	W	49	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
4	Pitt Street 38	13	F 1	W	49	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Pitt Street 41 43 45	14	F 2	W	49	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Kirribilli Avenue 40-42	15	F 1	W	49	V, N, R2, DR	V, N, R2, DR	N	V, N, R2, DR
3	Alfred Street Sth 84	16	F 15	E	50	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
3	Glen Street 30	18	F 14	SE	50	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
3	Alfred Street Sth 80	20	F 12	E	50	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
3	Alfred Street Sth 70	21	F 6	E	50	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
3	Alfred Street Sth 68	22	F 10	E	50	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
3	Alfred Street Sth 52	23	F 10	E	50	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
3	Alfred Street Sth 38	25	F 19	E	50	AA, V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
						1a Footpath Saw Cutting	1b Footpath Demolition	1c FRP Completion	2a Parapet Removal
3	Alfred Street Sth 48-50	26	F 20	E	50	AA, V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
3	Dind Street 2	27	GF	E	50	AA, V, IB, N, PC, SN, R2, DR	N	AA, V, IB, N, PC, SN, R2, DR	N
3	Alfred Street Sth 30	28	F 7	E	50	AA, V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
3	Northcliff Street 19 21	29	F 1	N	50	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	-	AA, V, IB, N, PC, SN, R2, DR
3	Alfred Street Sthv26-28	30	F 1	E	50	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	N	V, N, R2, DR
3	Alfred Street Sth 20-24	31	F 9	E	50	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
3	Northcliff Street 3	32	F 8	E	50	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	AA, V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR
3	Northcliff Street 7	33	F 8	E	50	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Burton Street 34	34	F 2	W	49	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Bligh Street 14	37	F 1	W	49	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
4	Bligh Street 14A	38	F 1	S	49	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 60	39	F 2	W	49	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
4	Jeffereys Street 52-56	40	F 2	W	49	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
4	Jeffereys Street 48 50	41	F 2	W	49	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
4	Jeffereys Street 50	42	F 2	W	49	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 44	43	F 2	W	49	N	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 40 42	44	F 1	W	49	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	N	V, N, R2, DR
4	Jeffereys Street 36 38	45	F 1	W	49	N	V, IB, N, PC, SN, R2, DR	N	V, N, R2, DR
4	Jeffereys Street 34	46	F 1	W	49	N	V, IB, N, PC, SN, R2, DR	N	V, N, R2, DR

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
						1a Footpath Saw Cutting	1b Footpath Demolition	1c FRP Completion	2a Parapet Removal
4	Jeffereys Street 30-32	47	F 1	W	49	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 28	48	F 1	W	49	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 24	49	F 1	W	49	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 22	50	F 1	W	49	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 20	51	F 1	W	49	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 18	52	F 1	W	49	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Kirribilli Avenue 44-50	54	F 2	N	49	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 31B	55	F 2	W	49	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
4	Fitzroy Street 33	56	F 2	W	49	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
4	Jeffereys Street	57	F 3	W	49	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
4	Robertson Lane 35	60	F 3	W	49	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
4	Bligh Street 16-18	61	GF	S	49	N	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Bligh Street 20-26	62	F 2	N & S	49	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
4	Bligh Street 28-32	63	F 2	N & S	49	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
4	Fitzroy Street 32	67	F 1	S	49	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Fitzroy Street 34	68	F 1	N & S	49	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
4	Fitzroy Street 36-50	71	F 2	N	49	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
4	Robertson Road 46	72	F 8	W	49	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Broughton Street 37	79	F 2	NW	49	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
4	Jeffereys Street	209	F 3	W	49	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR	AA, V, IB, N, PC, SN, R2, DR

Table 13: Recommended Mitigation Measures – North Stages 2b to 2e

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
						2b Steel Frame Install	2c Steel Landing	2d Glass Panel	2e Canopy Install
4	Broughton Street 37	1	F 2	W	49	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR
4	Broughton Street 33	2	F 2	W	49	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
4	Broughton Street 31	3	F 1	W	49	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
4	Broughton Street 23	4	F 1	W	49	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
4	Broughton Street 19 21	5	F 1	W	49	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
4	Broughton Street 11-17	6	F 1	W	49	AA, V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
4	Broughton Street 3A-9B	9	F 1	W	49	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
4	Fitzroy Street 31	11	F 2	W	49	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
4	Jeffereys Street 52-56 rear	12	F 2	W	49	V, N, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR
4	Pitt Street 38	13	F 1	W	49	V, N, R2, DR	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Pitt Street 41 43 45	14	F 2	W	49	V, N, R2, DR	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Kirribilli Avenue 40-42	15	F 1	W	49	V, N, R2, DR	AA, V, IB, N, PC, SN, R2, DR	N	N
3	Alfred Street Sth 84	16	F 15	E	50	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR
3	Glen Street 30	18	F 14	SE	50	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR
3	Alfred Street Sth 80	20	F 12	E	50	V, N, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR
3	Alfred Street Sth 70	21	F 6	E	50	V, N, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
3	Alfred Street Sth 68	22	F 10	E	50	V, N, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
3	Alfred Street Sth 52	23	F 10	E	50	V, N, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
3	Alfred Street Sth 38	25	F 19	E	50	N	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
						2b Steel Frame Install	2c Steel Landing	2d Glass Panel	2e Canopy Install
3	Alfred Street Sth 48-50	26	F 20	E	50	AA, V, IB, N, PC, SN, R2, DR	N	V, N, R2, DR	V, N, R2, DR
3	Alfred Street Sth 30	28	F 7	E	50	AA, V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
3	Alfred Street Sthv26-28	30	F 1	E	50	AA, V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR	N	N
3	Alfred Street Sth 20-24	31	F 9	E	50	AA, V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
3	Northcliff Street 7	33	F 8	E	50	AA, V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Burton Street 34	34	F 2	W	49	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR
4	Bligh Street 14	37	F 1	W	49	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR
4	Bligh Street 14A	38	F 1	S	49	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 60	39	F 2	W	49	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 52-56	40	F 2	W	49	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 48 50	41	F 2	W	49	N	N	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 50	42	F 2	W	49	N	N	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 44	43	F 2	W	49	N	N	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 40 42	44	F 1	W	49	AA, V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	N
4	Jeffereys Street 36 38	45	F 1	W	49	AA, V, IB, N, PC, SN, R2, DR	AA, V, IB, N, PC, SN, R2, DR	N	N
4	Jeffereys Street 34	46	F 1	W	49	N	AA, V, IB, N, PC, SN, R2, DR	N	N
4	Jeffereys Street 30-32	47	F 1	W	49	N	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 28	48	F 1	W	49	V, N, R2, DR	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR

NCA	Most Affected Receivers	Object No.	Most Affected Floor	Facade Facing	ICNG Night time Noise Management Levels (NMLs), dB(A)	Predicted Worst Case Exceedance of ICNG NMLs, dB(A)			
						2b Steel Frame Install	2c Steel Landing	2d Glass Panel	2e Canopy Install
4	Jeffereys Street 24	49	F 1	W	49	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 22	50	F 1	W	49	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 20	51	F 1	W	49	V, N, R2, DR	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 18	52	F 1	W	49	V, N, R2, DR	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Kirribilli Avenue 44-50	54	F 2	N	49	V, N, R2, DR	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street 31B	55	F 2	W	49	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR
4	Fitzroy Street 33	56	F 2	W	49	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR
4	Jeffereys Street	57	F 3	W	49	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Robertson Lane 35	60	F 3	W	49	V, N, R2, DR	V, N, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR
4	Bligh Street 16-18	61	GF	S	49	N	N	V, N, R2, DR	V, N, R2, DR
4	Bligh Street 20-26	62	F 2	N	49	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
4	Bligh Street 28-32	63	F 2	N	49	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR
4	Fitzroy Street 32	67	F 1	S	49	N	N	V, N, R2, DR	V, N, R2, DR
4	Fitzroy Street 34	69	F 1	N	49	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR
4	Fitzroy Street 36-50	71	F 2	N	49	N	N	V, N, R2, DR	V, N, R2, DR
4	Robertson Road 46	72	F 9	W	49	V, N, R2, DR	N	V, N, R2, DR	V, N, R2, DR
4	Jefferey Street	76	F 2	NW	49	V, N, R2, DR	AA, V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, N, R2, DR
4	Broughton Street 37	79	F 2	NW	49	V, IB, N, PC, SN, R2, DR	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR

8.0. Conclusion

Updated supplementary 3D Noise Modelling has been carried out to determine the predicted noise levels for receiver buildings located around the proposed night-works.

Predicted noise levels at each building for each construction scenario are provided in Table 5 to Table 8.

Predicted construction noise levels are expected to exceed the Noise Management Levels at most nearby receivers for all modelled scenarios to varying degrees. However, it should be noted that this assessment is conservative and assumes that all the plant listed in Table 4 for each scenario, is operating simultaneously, and this will not generally be the case.

Graphical representation of the predicted noise levels are shown in Appendix A.

Recommended Mitigation measures in accordance with the RMS Construction Noise & Vibration Guideline (refer Table 9), based on the level of predicted exceedance of the required Noise Management Levels are included in Table 10 to Table 13.

We trust that the above is constructive. Please contact the undersigned if you require any further information.

Yours sincerely

Julie McDonagh
Manager Acoustics Qld
For **Cardno**

APPENDIX A – NOISE CONTOUR MAPS

Figure 3: Scenario 1a (south) –Footpath Saw Cutting

Figure 4: Scenario 1b (south) –Footpath Demolition

Figure 5: Scenario 1c (south) – Footpath Construction (FRP Completion)

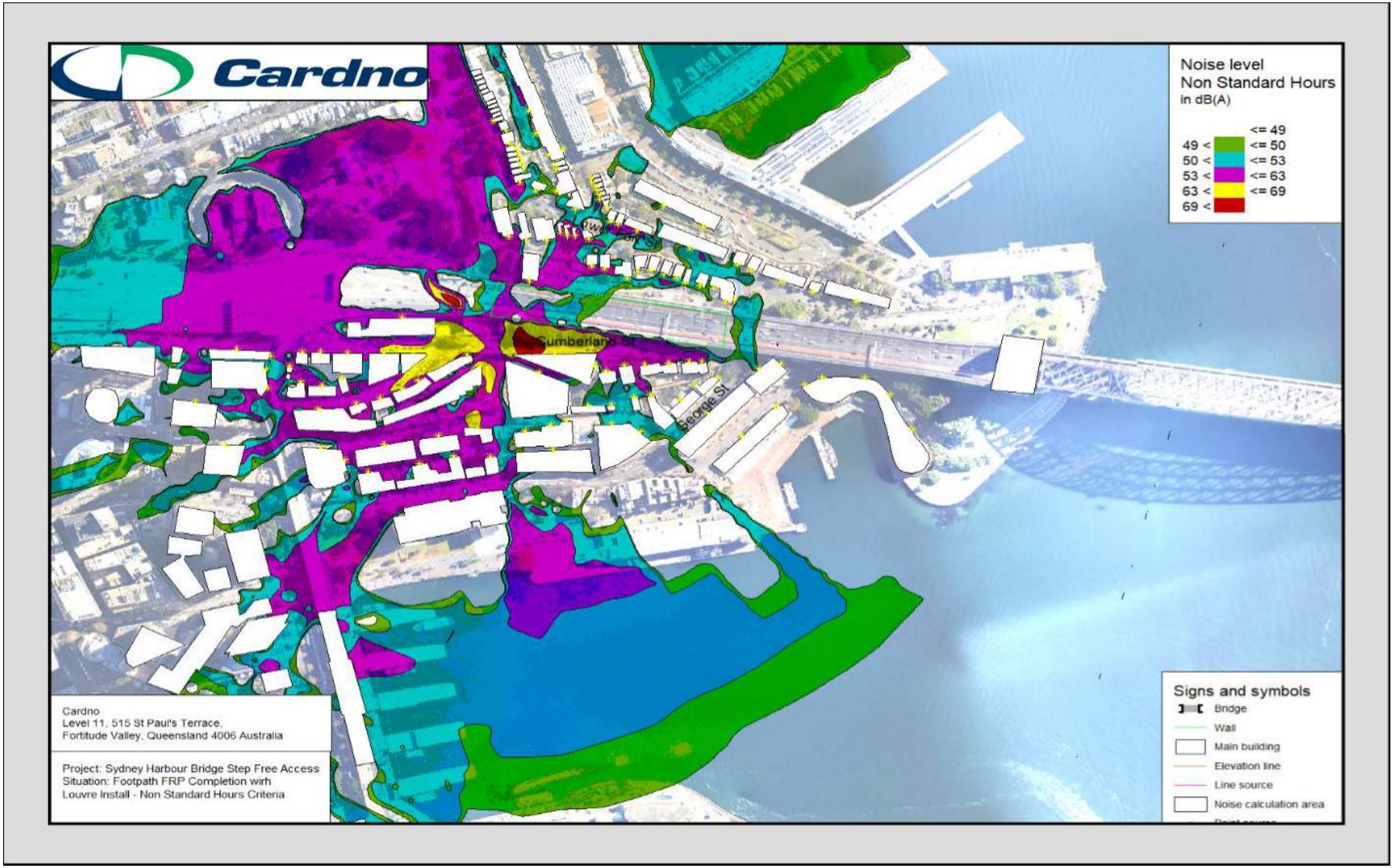


Figure 6: Scenario 2a (south) – Lift Construction (Parapet Removal)

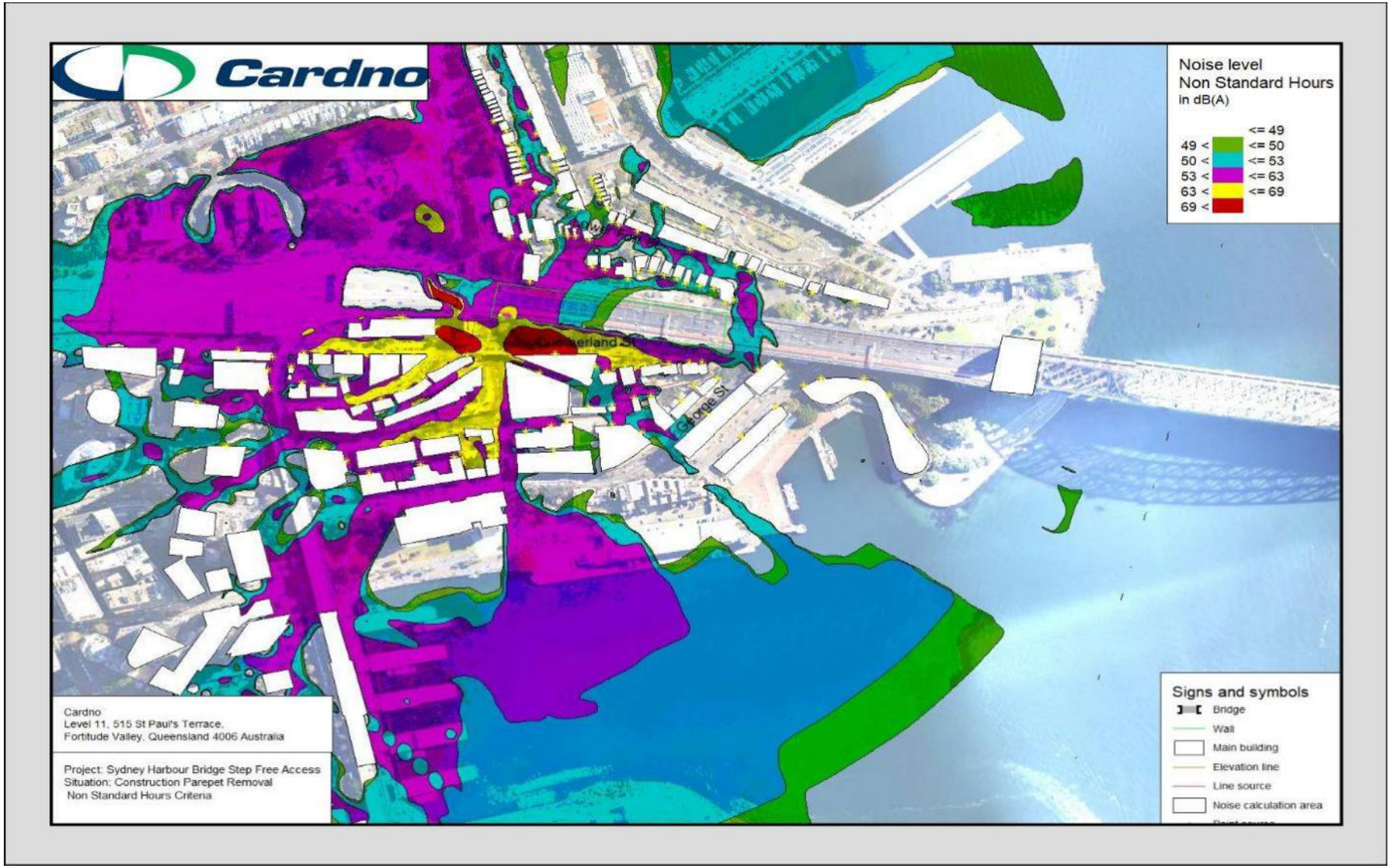


Figure 7: Scenario 2b (South) –Lift Construction (Steel Frame Install)

Figure 8: Scenario 2c (South) – Lift Construction (Structural Steel Landing)

Figure 9: Scenario 2d (south) –Lift Construction (Glass Panel Install)

Figure 10: Scenario 3 (south) - Utilities

Figure 11: Scenario 1a (north) –Footpath Saw Cutting

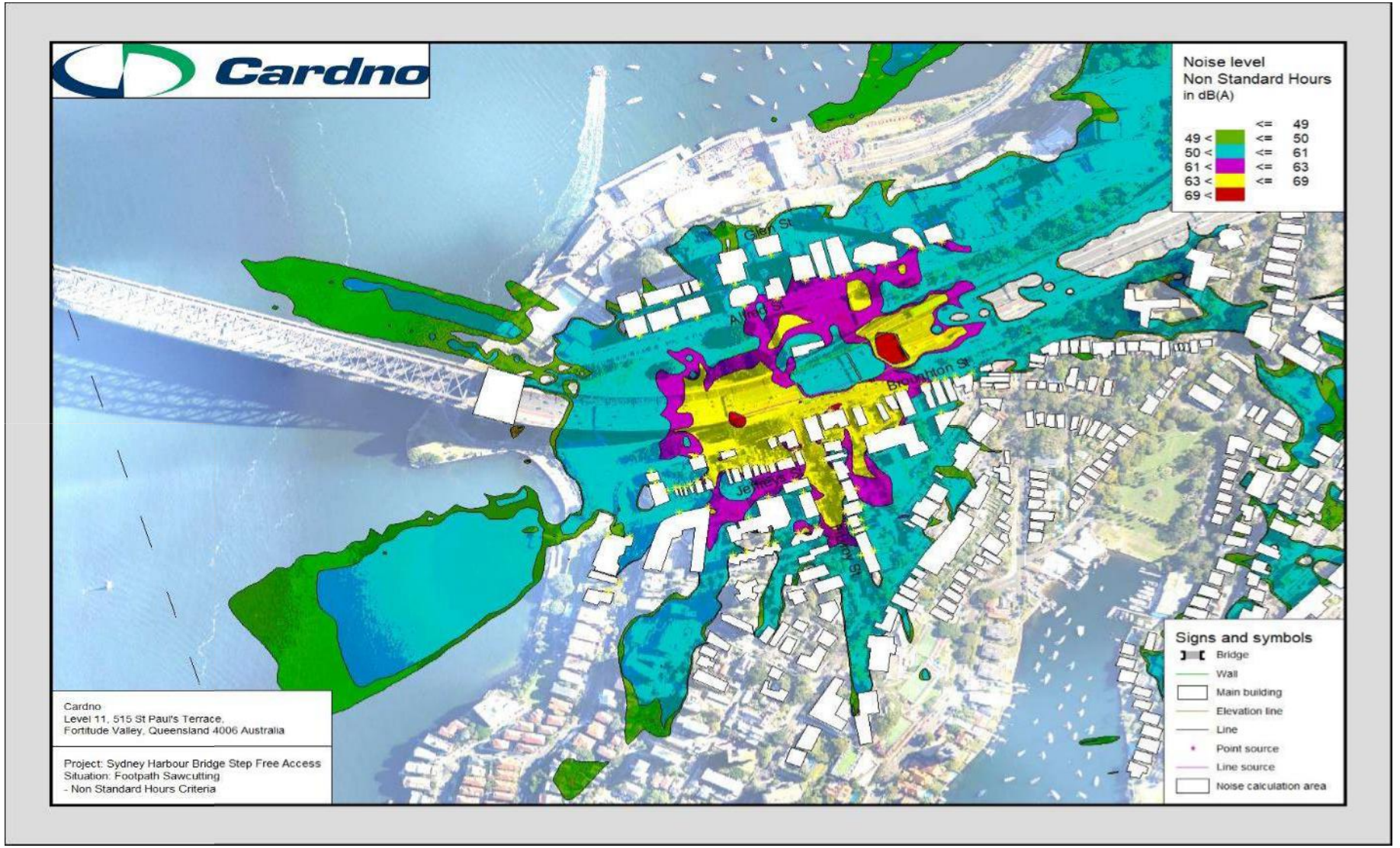


Figure 12: Scenario 1b (north) –Footpath Demolition

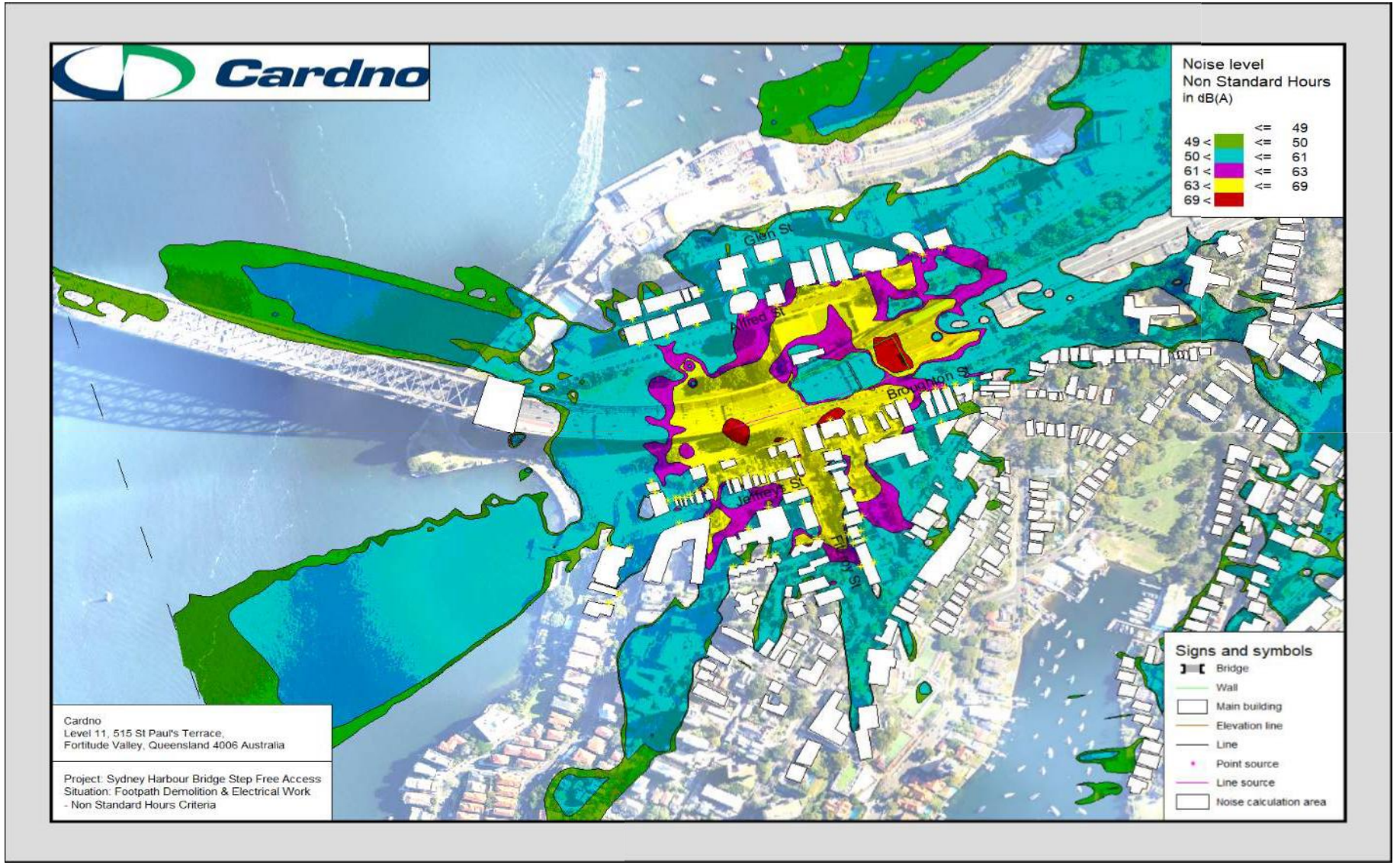


Figure 13: Scenario 1c (north) – Footpath Construction (FRP Completion)

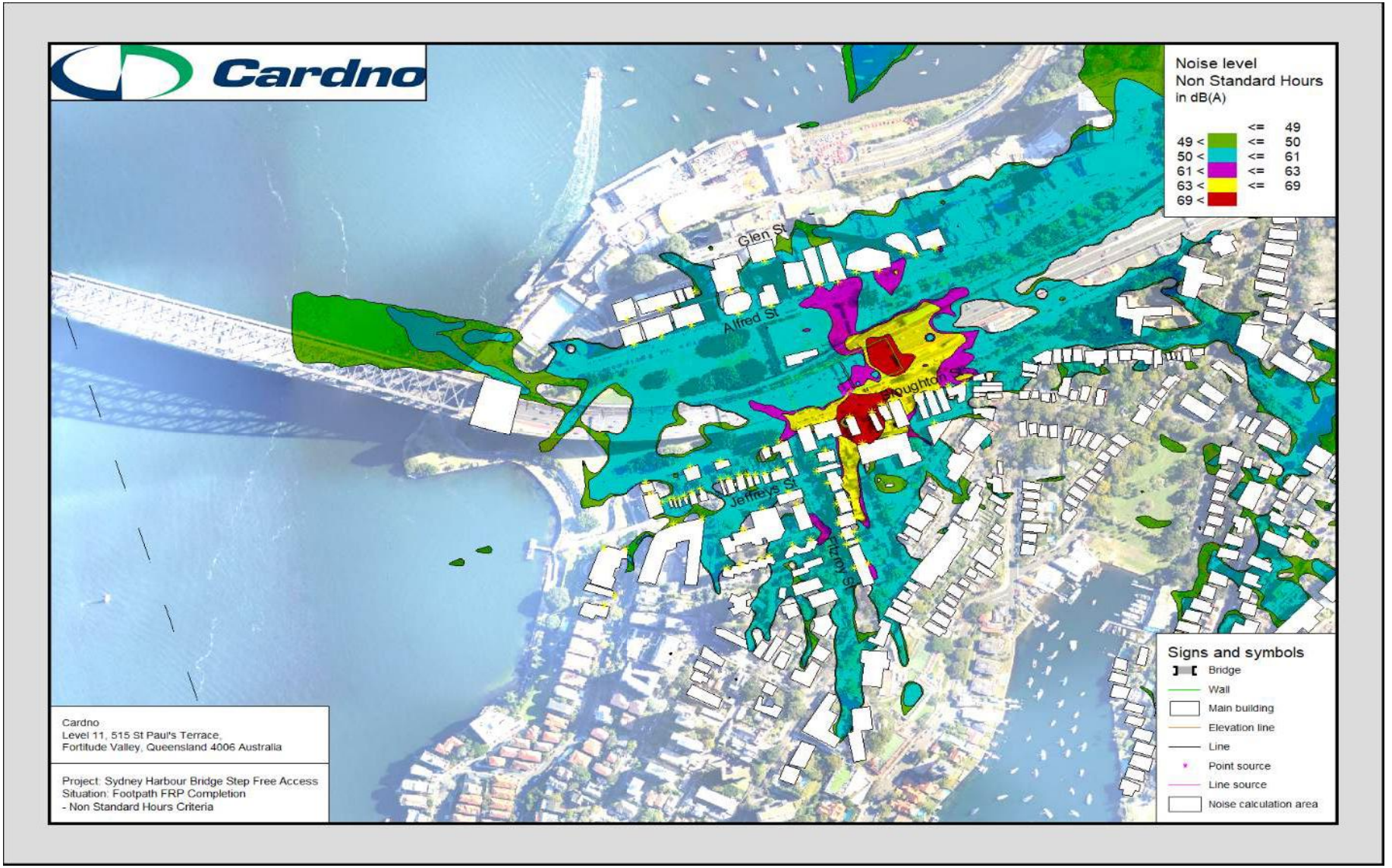


Figure 14: Scenario 2a (north) – Lift Construction (Parapet Removal)

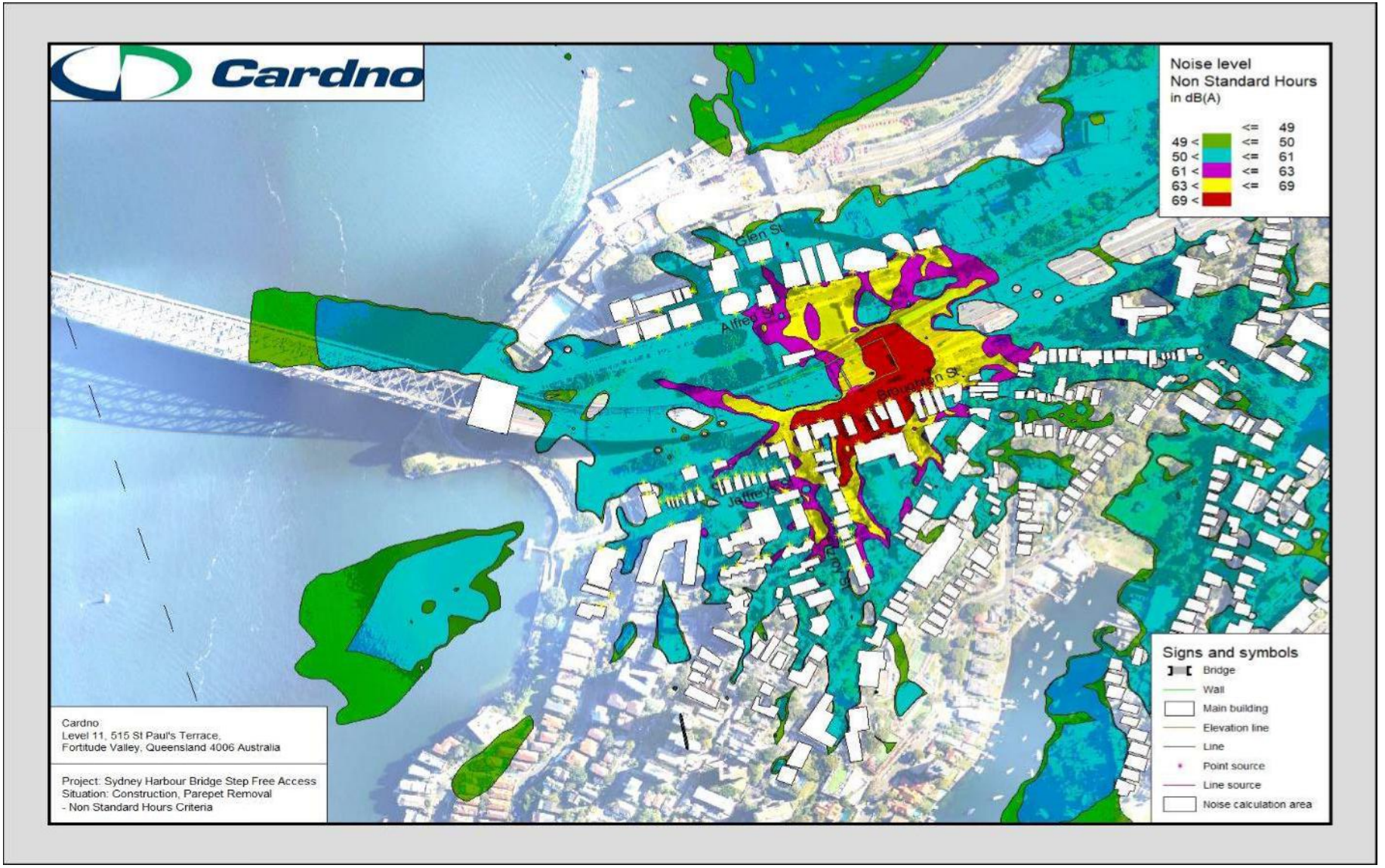


Figure 15: Scenario 2b (north) –Lift Construction (Steel Frame Install)

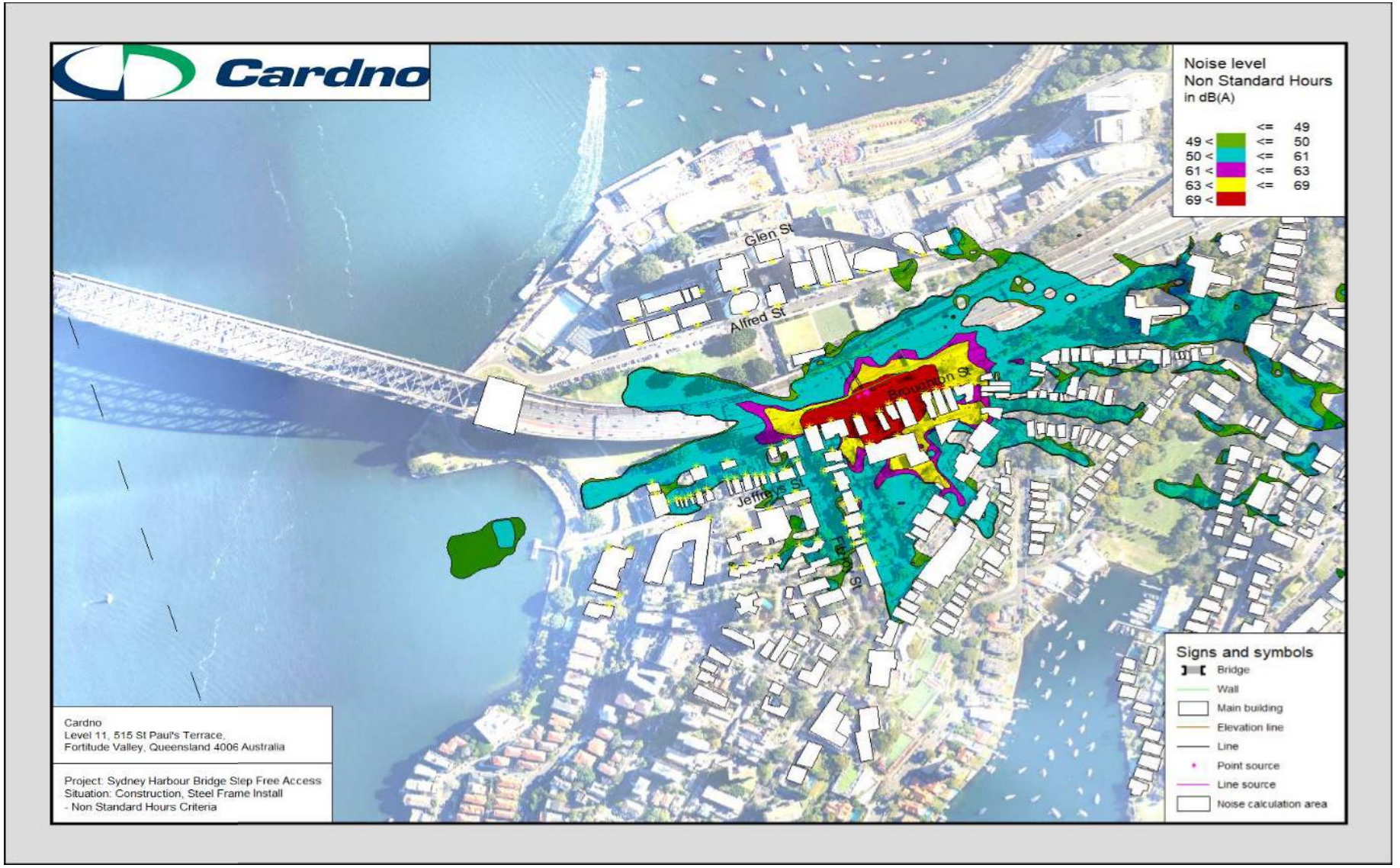


Figure 16: Scenario 2c (north) – Lift Construction (Structural Steel Landing)

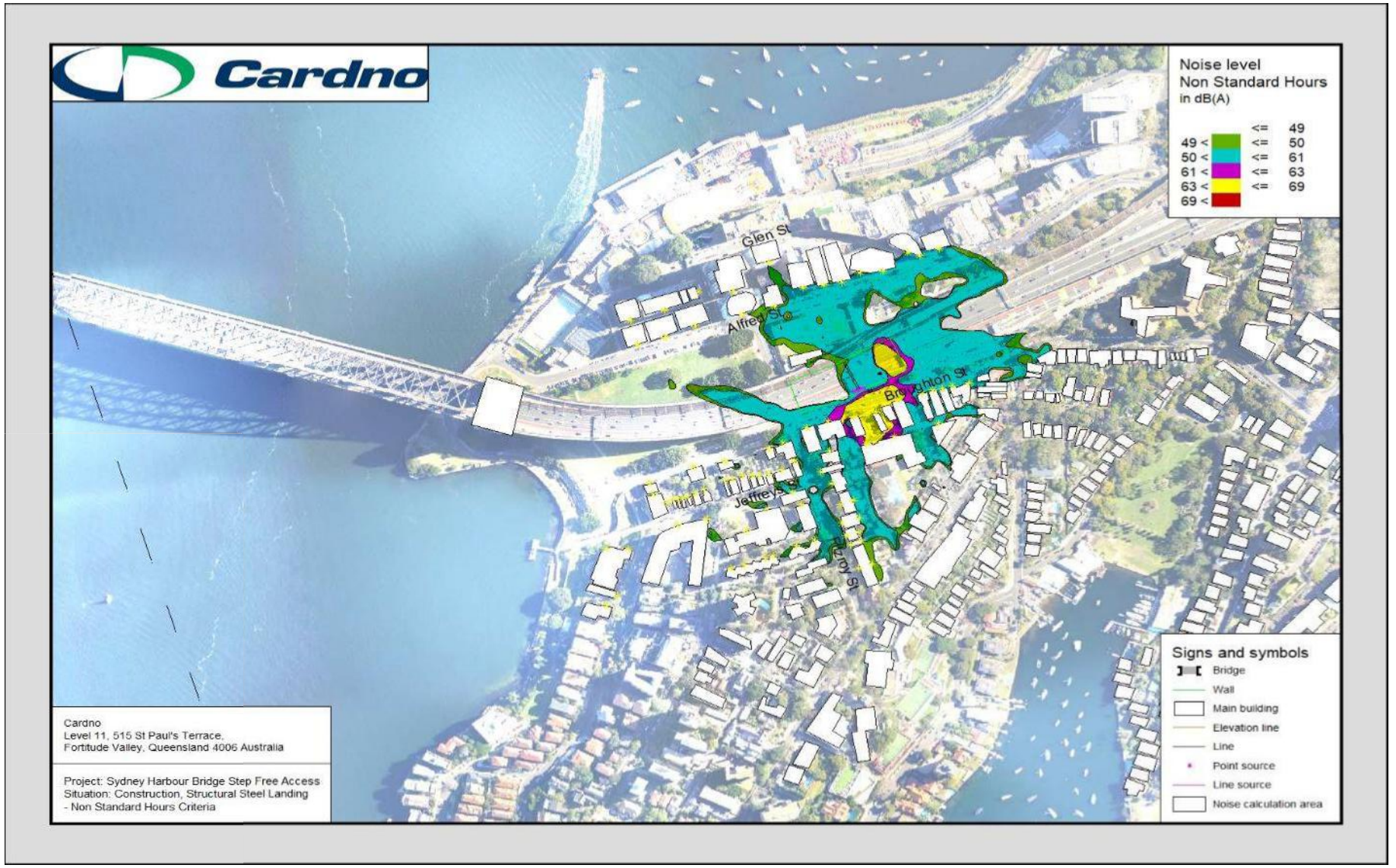


Figure 17: Scenario 2d (north) –Lift Construction (Glass Panel Install)

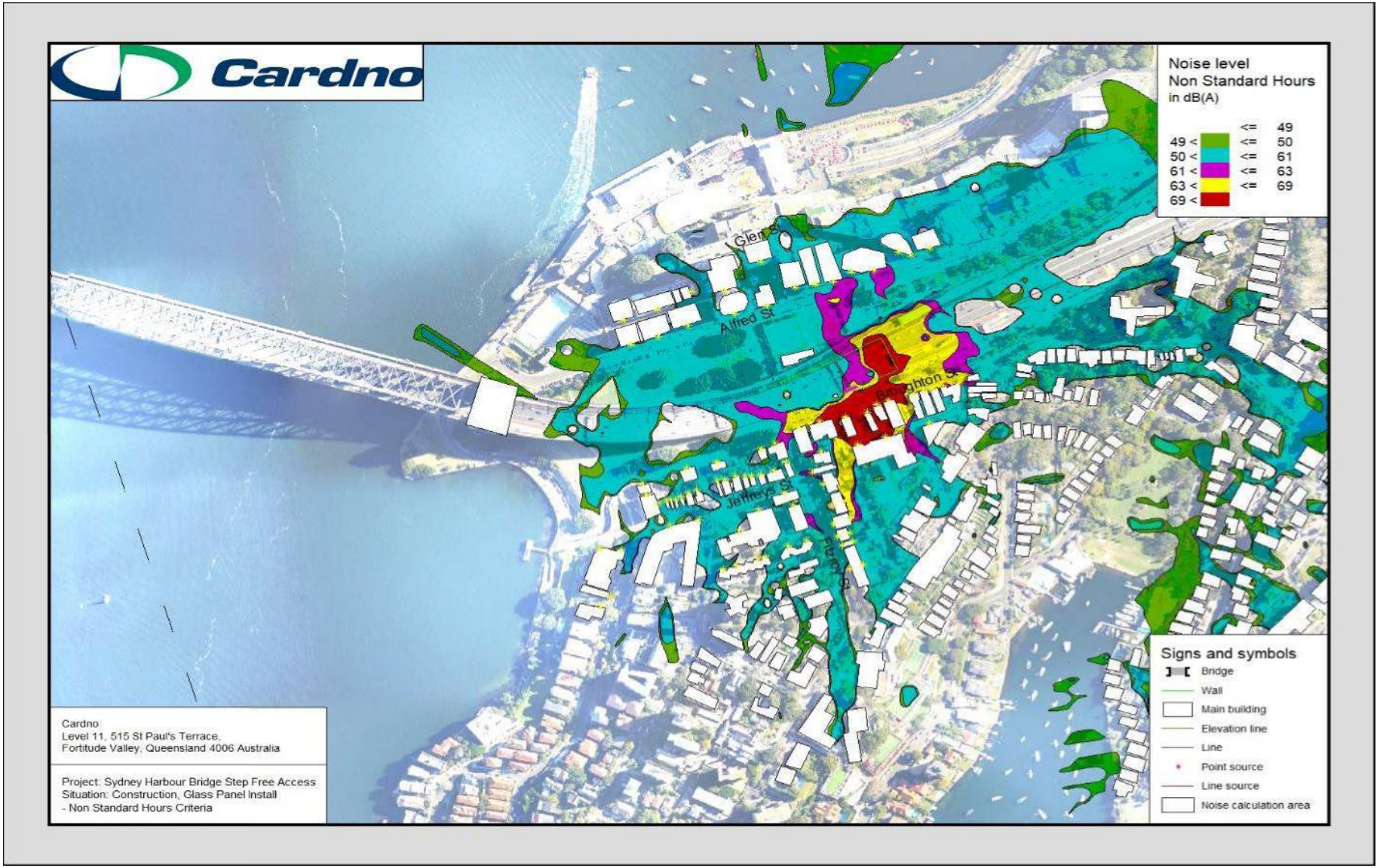
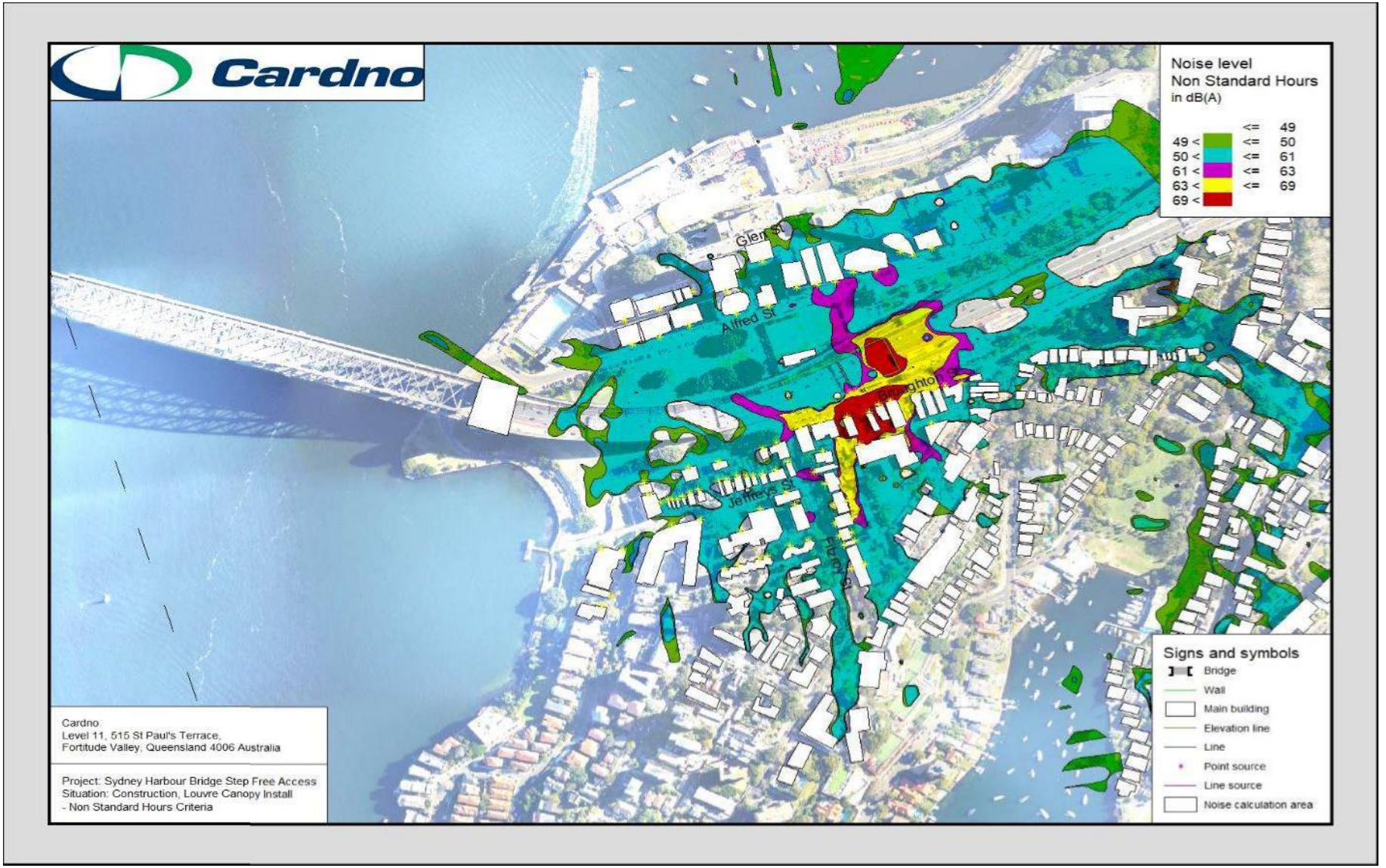


Figure 18: Scenario 2e (north) –Lift Construction (Louvre and Roof Canopy Install)



Appendix B

Consideration of clause 228(2) factors and matters of national environmental significance

Clause 228(2) Checklist

In addition to the requirements of the *Is an EIS required?* (1995/1996) guideline and the *Roads and Related Facilities EIS Guideline* (DUAP, 1996) as detailed in the addendum REF, the following factors, listed in clause 228(2) of the Environmental Planning and Assessment Regulation 2000, have also been considered to assess the likely impacts of the proposed modification on the natural and built environment.

Factor	Impact
a. Any environmental impact on a community? There would be temporary lane closures on the Sydney Harbour Bridge (two lanes for 73 nights over 6 months). This would inconvenience road users. The works will also lead to amenity impacts in terms of noise. This will affect local residents and businesses.	Traffic delays and diversions: temporary, negative minor and adverse Noise impacts (night): temporary, moderate impact and adverse
b. Any transformation of a locality? The proposal would result in temporary noise disturbance	Impacts would be moderate adverse and temporary.
c. Any environmental impact on the ecosystems of the locality? No impact on ecosystems during construction or operation.	Nil
d. Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? The proposal would result in short term disruptions due to noise. Noise impacts would affect the environmental quality of the receiving environment for a short period.	Temporary moderate adverse impacts.
e. Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?	Nil
f. Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act* 1974)?	Nil
g. Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?	Nil
h. Any long-term effects on the environment?	Nil
i. Any degradation of the quality of the environment? Refer to factor D.	Refer to factor D.
j. Any risk to the safety of the environment?	Nil
k. Any reduction in the range of beneficial uses of the environment? Pedestrian access on the Sydney Harbour Bridge will be maintained during construction. There will be temporary traffic diversions due to lane closures.	Traffic delays and diversions: temporary minor, adverse and reversible.

Factor	Impact
l. Any pollution of the environment? Noise pollution.	Noise pollution will be moderate adverse and temporary
m. Any environmental problems associated with the disposal of waste?	Nil
n. Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?	Nil
o. Any cumulative environmental effect with other existing or likely future activities? The proposal would occur at the same time as a number of other projects. This has the potential to lead to cumulative traffic management and amenity issues.	Traffic impacts: potential cumulative impacts at night Noise: potential additive and cumulative noise impacts
p. Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?	Nil

Matters of National Environmental Significance

Under the environmental assessment provisions of the EPBC Act, the following matters of national environmental significance and impacts on Commonwealth land are required to be considered to assist in determining whether the proposed modification should be referred to the Australian Government Department of the Environment.

Under the EPBC Act strategic assessment approval a referral is not required for proposed road actions that may affect nationally listed threatened species, populations, endangered ecological communities and migratory species. Impacts on these matters are assessed in detail as part of this addendum REF in accordance with Australian Government significant impact criteria and taking into account relevant guidelines and policies.

Factor	Impact
a. Any impact on a World Heritage property? The proposal is located within the World Heritage buffer zone for the Sydney Harbour Bridge. The southern lift and Sydney Opera House do not have a visual sightline between the two, therefore there would be a neutral impact (nil) to the area.	Nil
b. Any impact on a National Heritage place? The Sydney Harbour Bridge is listed on the National Heritage List. The heritage assessment for the proposal found that the national heritage values of the Sydney Harbour Bridge would not be significantly impacted, and would continue to meet the required values.	Nil
c. Any impact on a wetland of international importance?	Nil
d. Any impact on a listed threatened species or communities?	Nil
e. Any impacts on listed migratory species?	Nil
f. Any impact on a Commonwealth marine area?	Nil
g. Does the proposed modification involve a nuclear action (including uranium mining)?	Nil
Additionally, any impact (direct or indirect) on Commonwealth land?	Nil

Appendix C

Statutory consultation checklists

ISEPP

Council related infrastructure or services

Issue	Potential impact	Yes / No	If 'yes' consult with the relevant local council(s).	ISEPP clause
Stormwater	Are the works likely to have a *substantial* impact on the stormwater management services which are provided by council?	No	City of Sydney Council	ISEPP cl.13(1)(a)
Traffic	Are the works likely to generate traffic to an extent that will *strain* the capacity of the existing road system in a local government area?	No	City of Sydney Council	ISEPP cl.13(1)(b)
Sewerage system	Will the works involve connection to a council owned sewerage system? If so, will this connection have a *substantial* impact on the capacity of any part of the system?	No	City of Sydney Council	ISEPP cl.13(1)(c)
Water usage	Will the works involve connection to a council owned water supply system? If so, will this require the use of a *substantial* volume of water?	No	City of Sydney Council	ISEPP cl.13(1)(d)
Temporary structures	Will the works involve the installation of a temporary structure on, or the enclosing of, a public place which is under local council management or control? If so, will this cause more than a *minor* or *inconsequential* disruption to pedestrian or vehicular flow?	No	City of Sydney Council	ISEPP cl.13(1)(e)
Road & footpath excavation	Will the works involve more than *minor* or *inconsequential* excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance?	No	City of Sydney Council	ISEPP cl.13(1)(f)

Local heritage items

Issue	Potential impact	Yes / No	If 'yes' consult with the relevant local council(s)	ISEPP clause
Local heritage	Is there is a local heritage item (that is not also a State heritage item) or a heritage conservation area in the study area for the works? If yes, does a heritage assessment indicate that the potential impacts to the heritage significance of the item/area are more than *minor* or *inconsequential*?	No	City of Sydney Council	ISEPP cl.14

Flood liable land

Issue	Potential impact	Yes / No	If 'yes' consult with local Council(s)	ISEPP clause
Flood liable land	Are the works located on flood liable land? If so, will the works change flood patterns to more than a *minor* extent?	No	City of Sydney Council	ISEPP cl.15

Public authorities other than councils

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
National parks and reserves	Are the works adjacent to a national park or nature reserve, or other area reserved under the *National Parks and Wildlife Act 1974*, or on land acquired under that Act?	No	Office of Environment and Heritage	ISEPP cl.16(2)(a)
National parks and reserves	Are the works on land in Zone E1 National Parks and Nature Reserves or in a land use zone equivalent to that zone?	No	Office of Environment and Heritage	ISEPP cl. 16(2)(b)
Aquatic reserves and marine parks	Are the works adjacent to an aquatic reserve or a marine park declared under the *Marine Estate Management Act 2014*?	No	Department of Industry	ISEPP cl.16(2)(c)
Sydney Harbour foreshore	Are the works in the Sydney Harbour Foreshore Area as defined by the *Sydney Harbour Foreshore Authority Act 1998*?	Yes	Property NSW (formerly Sydney Harbour Foreshore Authority)	ISEPP cl.16(2)(d)

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Bush fire prone land	Are the works for the purpose of residential development, an educational establishment, a health services facility, a correctional centre or group home in bush fire prone land?	No	Rural Fire Service	ISEPP cl.16(2)(f)
Artificial light	Would the works increase the amount of artificial light in the night sky and that is on land within the dark sky region as identified on the dark sky region map? (Note: the dark sky region is within 200 kilometres of the Siding Spring Observatory)	No	Director of the Siding Spring Observatory	ISEPP cl. 16(2)(g)
Defence communications buffer land	Are the works on buffer land around the defence communications facility near Morundah? (Note: refer to Defence Communications Facility Buffer Map referred to in clause 5.15 of Lockhardt LEP 2012, Narrandera LEP 2013 and Urana LEP 2011).	No	Secretary of the Commonwealth Department of Defence	ISEPP cl. 16(2)(h)
Mine subsidence land	Are the works on land in a mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961*?	No	Mine Subsidence Board	ISEPP cl. 16(2)(i)

Growth Centres SEPP

Issue	Potential impact	Yes / No	If 'yes' consult with	SEPP clause
Clearing native vegetation	Do the works involve clearing native vegetation (as defined in the *Local Land Services Act 2013)* on land that is not ***subject land*** (as defined in cl 17 of schedule 7 of the *Threatened Species Conservation Act 1995*)?	No	Department of Planning and Environment	SEPP 18A

Appendix D

Extracts from the Roads and Maritime *Noise and Vibration Management Guideline*

Appendix C – Additional mitigation measures

C.1 Overview of additional mitigation measures

After standard noise mitigation measures (Appendix B) have been applied noise levels may still exceed noise management levels. Where exceedances remain consider implementing the following approaches in Tables C.1 to C.3 where feasible and reasonable. Note that assistance from Roads and Maritime 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 in Tables C.1 to C.3 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.

Notification (letterbox drop or equivalent)

Advanced warning of works and potential disruptions can assist in reducing the impact on the community. The notification may consist of a letterbox drop (or equivalent) 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.

Specific notifications (SN)

Specific notifications are letterbox dropped (or equivalent) to identified stakeholders no later than seven calendar 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.

The exact conditions under which specific notifications would proceed are defined in the relevant Additional Mitigation Measures (Tables C1 to C3). This form of communication is used to support periodic notifications, or to advertise unscheduled works.

Phone calls (PC)

Phone calls detailing relevant information made to identified/affected stakeholders 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.

Individual briefings (IB)

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.

Respite Offers (RO)

Respite Offers should be considered made 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.

Respite Period 1 (R1)

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.

Respite Period 2 (R2)

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 6 nights per month. Where possible, high noise generating works shall be completed before 11pm.

Duration Respite (DR)

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.

The project team should engage with the community where noise levels are expected to exceed the NML to demonstrate support for Duration Respite.

Where there are few receivers above the NML each of these receivers should be visited to discuss the project to gain support for Duration Respite.

Alternative Accommodation (AA)

Alternative accommodation options may be offered to residents living in close proximity to construction works that are likely to experience highly intrusive noise levels (Tables C1-C3). The specifics of the offer will be identified on a project-by-project basis. Additional aspects for consideration shall include whether the highly intrusive activities occur throughout the night or before midnight.

Verification

Please see Appendix F for more details about verification of Noise and Vibration levels as part of routine checks of noise levels or following reasonable complaints. This verification should include measurement of the background noise level and construction noise. Note this is not required for projects less than three weeks unless to assist in managing complaints.

C.1 Airborne noise

Shorter tem impacts

For calculated noise levels the tables show additional measures to be implemented for each receiver depending on how far above the background noise level or NML the impact is. These measures are most appropriate for shorter term works.

For distance based assessments the distances where additional mitigation measures should be implemented are identified by cross referencing the Mitigation Levels in Table C1 with the plant and Mitigation Levels in Table D2 and D3. Note this is automatically completed by the Estimator spreadsheet.

As an example using distance based methods consider a NML of 45dBA in OOHW Period 1 in Table C1 below. Letter box drops should be completed at Mitigation Levels greater than 50dBA (NML+5dBA). From Table D2 this corresponds to receivers at distances equal to or less than 340m for a concrete saw.

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

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

Notes (refer to detailed descriptions):

1 AA = Alternative Accommodation
V = Verification
IB = Individual briefings
N = Notification
R2 = Respite Period 2
DR = Duration Respite
R1 = Respite Period 1
PC = Phone calls
SN = Specific notifications
Perception = relates to level above RBL

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

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:

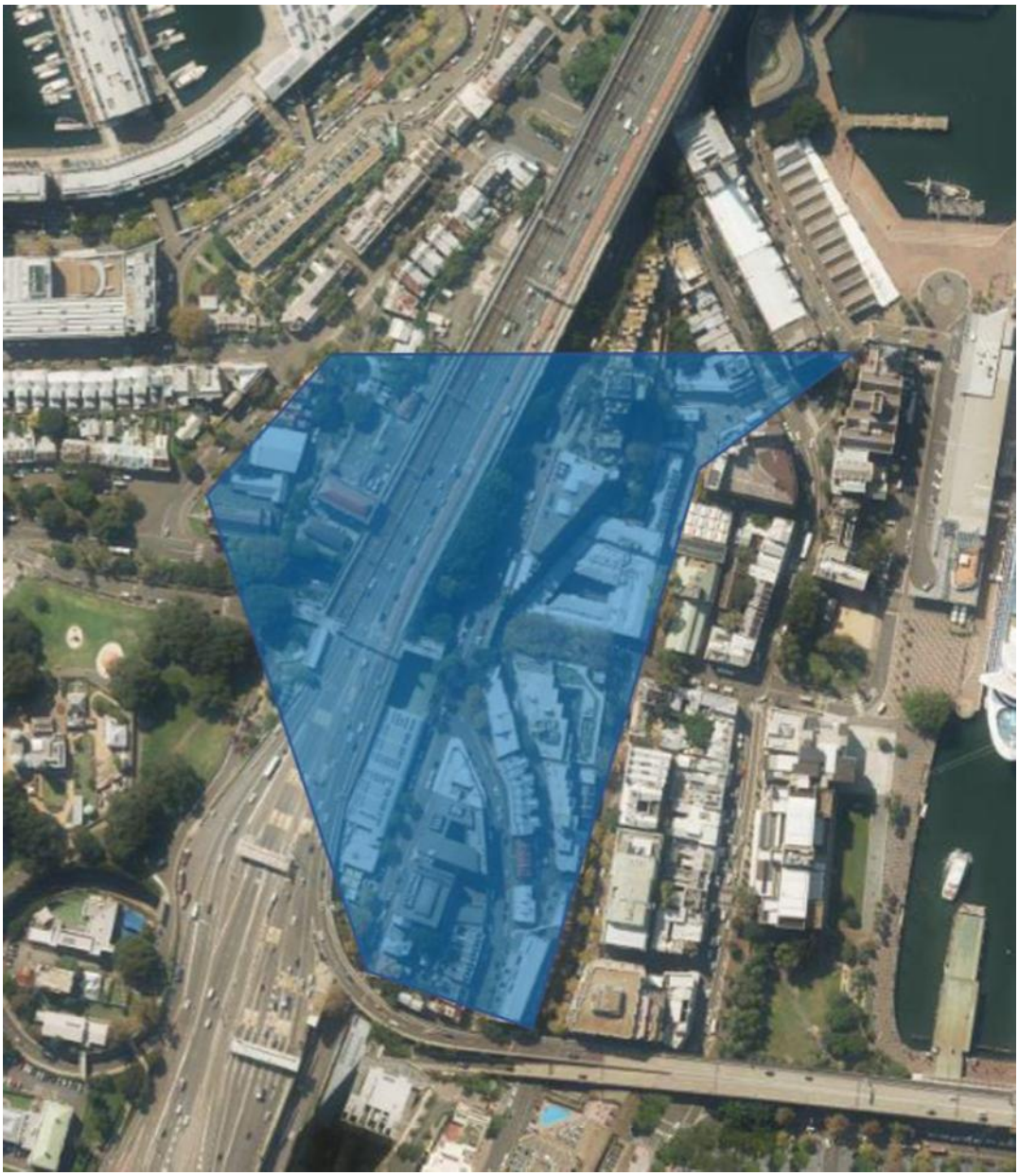
- time of day of the noise increase and exceedence of criteria
- time of use of affected receivers
- how many decibels the noise levels are to increase
- how long the mitigation will provide benefit to the receiver during the project
- optimal design of acoustic sheds and noise barriers/hoardings

Appendix E

Area of Consultation and Consultation Flyer

Direct consultation area

Southern side of the bridge:



Northern side of the bridge:

Consultation Flyer

June 2018

Sydney Harbour Bridge Access Lifts - proposed accelerated night work schedule

Roads and Maritime Services is installing lifts to the Sydney Harbour Bridge pedestrian walkway at Kirribilli and The Rocks.

In order to complete the work as quickly as possible we are proposing to increase the number of night shifts that we will work during the construction of the project from two to five nights a week.

We are preparing an addendum to the Review of Environmental Factors for the project to allow us to increase the number of night shifts we will work. If you have any comments about the new program please contact us by Friday 22 June.

You can contact the project team on 1800 581 595 or email sydneyharbourbridgeprojects@rms.nsw.gov.au

More information about the project is available on Roads and Maritime's website at rms.nsw.gov.au/sydneyharbourbridge

We thank you for your patience and support while we complete this important work.

rms.nsw.gov.au/

13 22 13

Customer feedback
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