NSW GOVERNMENT

SYD Sydney's Airport

Transport for NSW

Sydney Gateway Road Project

Response to submissions report

May 2020

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Executive summary

Overview

Transport for NSW and Sydney Airport Corporation are proposing new direct high capacity road connections linking the Sydney motorway network at St Peters interchange with Sydney Airport's domestic and international terminals and beyond.

The Sydney Gateway road project ('the project') would comprise new and upgraded sections of road connecting to the airport terminals. It would also include four new bridges over Alexandra Canal and other operational infrastructure and road connections. The new connections and increased road capacity would help improve traffic flow to and from Sydney Airport and towards Port Botany, making the movement of people and goods easier, safer and faster.

The project is located in the suburbs of Tempe, St Peters and Mascot, in the Inner West, Bayside and City of Sydney local government areas. The majority of the project site is located on government-owned land, which mainly consists of Commonwealth-owned land (leased to Sydney Airport Corporation).

The project would connect Sydney Airport Terminal 1 (the International Terminal) and Terminals 2/3 (the Domestic Terminals) with each other and with the Sydney motorway network via St Peters interchange. It would also facilitate the movement of traffic towards Port Botany via General Holmes Drive.

The project is subject to approval under NSW and Commonwealth legislation. Parts of the project located on Commonwealth-owned land leased to Sydney Airport Corporation are subject to the *Airports Act 1996* (Cth) (the Airports Act). In accordance with the Airports Act, these parts of the project are major airport development. A major development plan (MDP), approved by the Australian Minister for Infrastructure, Transport and Regional Development, is required before a major airport development can be undertaken at a leased airport.

Parts of the project located on other land have been declared State significant infrastructure in accordance with the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) and State Environmental Planning Policy (State and Regional Development) 2011. As State significant infrastructure, these parts of the project need approval from the NSW Minister for Planning and Public Spaces. An environmental impact statement (EIS) is required to support the application for approval for State significant infrastructure under the EP&A Act.

EIS/preliminary draft MDP

A combined EIS/preliminary draft MDP was prepared in accordance with the EP&A Act and Airports Act, and was lodged for approval by the NSW Minister for Planning and Public Spaces and the Australian Minister for Infrastructure, Transport and Regional Development. With respect to the approval requirements under the EP&A Act and relevant to this report, the EIS/preliminary draft MDP was exhibited by the NSW Department of Planning, Industry and Environment (the Department) between 20 November and 19 December 2019, and submissions were received by the Department.

With respect to the approval requirements under the Airports Act, the EIS/preliminary draft MDP was exhibited by Sydney Airport Corporation between 20 November 2019 and 21 February 2020, and submissions were received by Sydney Airport Corporation. The approval under the Airports Act will be sought from the Australian Government Minister for Infrastructure, Transport and Regional Development.

Purpose of this report

This report documents and considers the issues raised in community, government agency, organisation and other submissions received by the Department during public exhibition of the EIS/preliminary draft MDP, in accordance with section 5.17(6)(a) of the EP&A Act. Transport has carefully considered the content of the submissions and has prepared responses to the issues raised, with the responses provided in this report.

The report provides additional information and clarification about some design features and information presented in the EIS/preliminary draft MDP. It also provides a summary of the results of additional design work (project refinements) and investigations, undertaken since exhibition commenced, to further reduce the potential impacts of the project and/or respond to issues raised.

The report also provides a final set of mitigation measures, which incorporate amendments made to respond to issues raised in submissions and/or take into account additional information and project refinements.

Overview of submissions

The Department registered a total of 90 submissions on its Major Projects website. This comprised 57 submissions from the community and 33 submissions from key stakeholders (NSW Government agencies, local councils, landholders and businesses, peak bodies and community groups). Further information on the submissions received is provided in Chapter 2 of this report.

Key issues of concern raised by the community and responses to the issues are provided below.

Active transport connectivity, particularly in relation to:

- Consistency of the proposed active transport link with NSW Government and local council strategic planning for cycling and active transport
- Connectivity to other local active transport networks and destinations, including to Sydney Airport
- Design of the proposed temporary and permanent active transport links.

Response: An active transport strategy would be developed in consultation with Sydney Airport Corporation to identify, integrate and enhance active transport links.

Potential noise and vibration impacts during construction and operation, including:

- Construction noise impacts related to heavy vehicle movements, and the impacts of out-of-hours work
- Increase in operational noise, including the impact of removing the shipping containers at the Tyne Container Services site in Tempe
- Clarification about the measures that would be implemented to manage impacts.

Response: The potential for noise impacts during construction, including out of hours work, will be managed in accordance a Construction Noise and Vibration Management Plan. The plan will detail processes, responsibilities and measures to manage impacts during construction.

Increases in noise levels at Tempe due to operation of the project will be mitigated through feasible and reasonable noise mitigation including a noise barrier and at-property treatment.

Potential air quality and odour impacts and proposed mitigation, including:

- Odour emissions during work at the former Tempe landfill
- Dust emissions during construction
- Predicted emissions during operation.

Response: A Construction Air Quality Management Plan will be implemented as part of the Construction Environmental Management Plan (CEMP) and would detail processes, responsibilities and measures to manage air quality, odour and landfill gas during construction. In addition, an odour management strategy will be implemented, which will include requirements for construction planning, monitoring, and inclusion of contingency planning and rectification measures.

Key issues of concern raised by key stakeholders and responses to the issues are provided below.

Traffic, transport and access impacts during construction, including:

- Impacts on traffic and intersection performance of the local road network
- Effects on travel times to Sydney Airport
- Changes in access arrangements and connectivity.

Response: A Construction Traffic and Access Management Plan will be prepared as part of the CEMP and would detail processes, responsibilities and measures to minimise traffic and access delays and disruptions, and identify and respond to road safety during construction.

Design requirements for, and connectivity of, the proposed temporary and permanent active transport links.

Response: An active transport strategy would be developed in consultation with Sydney Airport Corporation to identify, integrate and enhance active transport links.

Noise and vibration impacts during construction and operation, including potential for additional noise and vibration at sensitive receivers.

Response: The potential noise impacts during construction will be managed in accordance a Construction Noise and Vibration Management Plan. The plan will detail processes, responsibilities and measures to manage impacts during construction. Receivers predicted to experience increases in road traffic noise during operation have been identified for feasible and reasonable noise mitigation.

Concern that the project does not include direct access for heavy vehicles/container trucks at Canal Road.

Response: Providing dedicated ramps at Canal Road for freight vehicles is not part of the project scope. However, the design of the project has been modified in consultation with the freight industry to not preclude the ramps should they be required in the future.

Managing the potential for contamination, odour and leachate impacts during works at the former Tempe landfill.

Response: A Remedial Action Plan will be prepared to describe the remediation strategy to ensure existing contamination does not pose a risk to human health or the environment during operation of the project. In addition, a leachate management plan and an odour management plan will be implemented to manage potential impacts during construction. These would include the requirement for construction planning, methods to collect, store, treat and dispose of leachate, and contingency and rectification measures for odour.

Loss of empty container storage.

Response: Transport is working closely with industry participants including NSW Ports and Tyne Container Services to explore options for additional storage at alternative facilities or for containers to be moved offshore by the shipping lines to ease capacity for the whole market.

Summaries of the issues raised in submissions, and responses to these issues, are detailed in Parts B and C of this report.

Mitigation and management measures

The EIS/preliminary draft MDP identified the proposed approach to environmental management and the mitigation measures that would be adopted to avoid or reduce the potential impacts of the project. After consideration of the issues raised in the submissions, the mitigation measures have been updated to:

- Make additional commitments based on design refinements and the findings of further assessments as described in Chapter 3
- Make additional commitments to response to issues raised in the submissions
- Modify the wording so that the intent of the measure is clearer.

A full list of the final environmental management measures proposed for the project is provided in Chapter 11.

The next steps

Approval process

The NSW Department of Planning, Industry and Environment will, on behalf of the NSW Minister for Planning and Public Spaces, review the EIS/preliminary draft MDP and this response to submissions report. Once the Department has completed its assessment, a draft Environmental Assessment Report will be prepared for the Planning Secretary of the Department, which may include recommended conditions of approval for those parts of the project that are State significant infrastructure in accordance with the EP&A Act.

The Planning Secretary's Environmental Assessment Report will be provided to the NSW Minister for Planning and Public Spaces, who will then approve the project (with any conditions considered appropriate) or refuse to give approval to the project.

The Minister for Planning and Public Space's determination, including any conditions of approval and the Environmental Assessment Report, will be published on the Department's Major Projects website following determination.

Subject to approval of the project, the detailed design would be developed with the objective of minimising potential impacts on the local and regional environment and the community. The design and construction methodology would continue to be developed with this overriding objective in mind, taking into account the input of stakeholders and the local community, and the conditions of approval.

Consultation during design and delivery

If the project is approved, a construction contractor(s) would be engaged to carry out detailed design and construct the project. Transport, Sydney Airport Corporation and the construction contractor(s) would continue to engage with stakeholders and the community in the lead up to, and during, construction.

A communications strategy would be developed for the construction phase of the project to detail the processes to facilitate communication and feedback between the project team and the community. Implementing the strategy would ensure that:

- The community and stakeholders have a high level of awareness and notification of processes and activities associated with the project
- Accurate and accessible information is made available
- A timely response is given to issues and concerns raised by the community
- Feedback from the community is encouraged
- Opportunities for input are provided.

Community and stakeholder consultation carried out during construction will include updates on the planned construction activities and program and notifications to affected residents and businesses. Enquiries and concerns will be addressed in a timely manner through a complaints handling system.

Glossary of terms and abbreviations

Term / abbreviation	Definition
µg/m³	micrograms per cubic metre
Aboriginal cultural heritage	The tangible (objects) and intangible (dreaming stories, song lines and places) cultural practices and traditions associated with past and present day Aboriginal communities.
ABS	Australian Bureau of Statistics
Acid sulfate soils	Naturally occurring soils, sediments or organic substrates (eg peat) that are formed under waterlogged conditions. These soils contain iron sulfide minerals (predominantly as the mineral pyrite) or their oxidation products. In an undisturbed state below the water table, acid sulfate soils are benign. However if the soils are drained, excavated or exposed to air by a lowering of the water table, the sulfides react with oxygen to form sulfuric acid.
AEP	annual exceedance probability
Afternoon peak	Trips travelling on the network during the average one hour peak period between 5pm and 6pm on a weekday.
Airports Act	*Airports Act 1996 (Cth)*
Alignment	The geometric layout (eg of a road or railway) in plan (horizontal) and elevation (vertical).
Annual exceedance probability	The frequency of flood events is generally referred to in terms of their annual exceedance probability (AEP) or average recurrence interval (ARI). For example, for a flood magnitude having a five per cent AEP, there is a five per cent probability (or 1 in 20 chance) that there would be floods of greater magnitude each year.
ANZECC guidelines	*Australian Guidelines for Water Quality Monitoring and Reporting* (ANZECC/ARMCANZ, 2000)
ARTC	Australian Rail Track Corporation
Arterial roads	The main or trunk roads of the road network that carry predominantly through traffic between regions.
At-grade	A road at ground level, not on an embankment or in a cutting.
Australian Government	Government of the Commonwealth of Australia
BDAR	Biodiversity Development Assessment Report
Blue Book	*Managing Urban Stormwater: Soils and construction - Volume 1* (Landcom, 2004)
Bore	Constructed connection between the surface and a groundwater source that enables groundwater to be transferred to the surface either naturally or through artificial means.
Botany Rail Line	A dedicated freight rail line that forms part of the Sydney Metropolitan Freight Network. The line extends from near Marrickville Station to Port Botany.
Capping layer	A layer of material with low permeability placed upon (usually) contaminated material or waste to contain the contamination and to minimise the infiltration of water.
Carbon dioxide	A naturally occurring gas, also a by-product of burning fossil fuels from fossil carbon deposits, such as oil, gas and coal, of burning biomass, of land use changes and of industrial processes (eg cement production). It is the principle anthropogenic greenhouse gas that affects the Earth's radiative balance.
Carriageway	The portion of a roadway used by vehicles including shoulders and ancillary lanes.
CASA	Civil Aviation Safety Authority
Catchment	The land area draining through the main stream, as well as tributary streams, to a particular site. It always relates to an area above a specific location.

Term / abbreviation	Definition
CEMP	construction environmental management plan
Climate change	A change in the state of the climate that can be identified (eg by statistical tests) by changes in the mean and/or variability of its properties, and that persists for an extended period of time, typically decades or longer (CSIRO and BoM, 2015).
CLM Act	*Contaminated Land Management Act 1997 (NSW)*
CO	carbon monoxide
CO_2	carbon dioxide
Commonwealth land	Land owned by the Commonwealth of Australia. For this project, the majority of the project site consists of Commonwealth-owned land leased to Sydney Airport Corporation for the operation of Sydney Airport. Refer also Sydney Airport land.
Concept design	An initial functional layout of a road/road system or other infrastructure. Used to facilitate understanding of a project, establish feasibility, provide basis for estimating, and determine further investigations needed for detailed design.
Construction	Includes all physical work required to construct the project.
Construction ancillary facilities	Temporary facilities during construction that include, but are not limited to, construction work areas, sediment basins, temporary water treatment plants, pre-cast yards and material stockpiles, laydown areas, parking, maintenance workshops and offices, and construction compounds.
Construction compound	An area used as the base for construction activities, usually for the storage of plant, equipment and materials, and/or construction site offices and worker facilities.
Construction environmental management plan	A site-specific plan developed for the construction phase of the project, to ensure that all contractors and sub-contractors comply with the environmental conditions of approval for the project, and that the environmental risks are properly managed.
Construction footprint	The construction footprint forms part of the overall project site. It consists of the land required to construct the project, including the location of construction compounds.
CPTD	Crime prevention through environmental design
Cth	Commonwealth
Cumulative impacts	Impacts that, when considered together, have different and/or more substantial impacts than a single impact assessed on its own.
Curfew	See Sydney Airport curfew
dB	Decibels
dBA	Decibels (A-weighted)
DECC	(previous) Department of Environment and Climate Change
DECCW	(previous) Department of Environment, Climate Change and Water
Detailed design	The stage of design where project elements are designed in detail, suitable for construction
Discharge	The rate of flow of water measured in terms of volume per unit time, for example, cubic metres per second (m^3/s). Discharge is different from the speed or velocity of flow, which is a measure of how fast the water is moving (eg metres per second (m/s)).
DITRDC	Australian Department of Infrastructure, Transport, Regional Development and Communications
Domestic terminals	Terminals 2 and 3 at Sydney Airport, as defined below.
DPIE	Department of Planning, Industry, and Environment
Drainage	Natural or artificial means for the interception and removal of surface or subsurface water.

Term / abbreviation	Definition
Drawdown	Reduction in the height of the water table caused by changes in the local environment.
Earthworks	All operations involved in loosening, excavating, placing, shaping and compacting soil or rock.
EIS	environmental impact statement
EMP	environmental management plan
Enabling works	Works required to enable the commencement of the main construction works.
Environment	Includes all aspects of the surroundings of humans, whether affecting any human as an individual or in his or her social groupings (from the EP&A Act).
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EP&A Regulation	Environmental Planning and Assessment Regulation 2000 (NSW)
Erosion	A natural process where wind or water detaches a soil particle and provides energy to move the particle.
Exposure pathway	The route a substance takes from its source (where it began) to its endpoint (where it ends), and how people can come into contact with (or get exposed) to it. An exposure pathway has five parts: a source of contamination (such as chemical leakage into the subsurface); an environmental media and transport mechanism (such as movement through groundwater); a point of exposure (such as a private well); a route of exposure (eating, drinking, breathing, or touching), and a receptor population (people potentially or actually exposed). When all five parts are present, the exposure pathway is termed a completed exposure pathway.
Feasible and reasonable	Consideration of best practice taking into account the benefit of proposed measures and their technological and associated operational application in the NSW and Australian context. 'Feasible' relates to engineering considerations and what is practical to build. 'Reasonable' relates to the application of judgement in arriving at a decision, taking into account mitigation benefits and cost of mitigation versus benefits provided, community expectations and nature and extent of potential improvements.
Flood	Relatively high stream flow which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flooding associated with major drainage before entering a watercourse, and/or coastal inundation resulting from super-elevated sea levels and/or waves overtopping coastline defences, excluding tsunami.
Flood prone/liable land	Land susceptible to flooding by the probable maximum flood. Note that the flood prone land is also known as flood liable land.
Flood storage area	Those parts of the floodplain that are important for the temporary storage of floodwaters during the passage of a flood. The extent and behaviour of flood storage areas may change with flood severity, and loss of flood storage can increase the severity of flood impacts by reducing natural flood attenuation. It is necessary to investigate a range of flood sizes before defining flood storage areas.
Floodplain	Area of land which is inundated by floods up to and including the probable maximum flood event (ie flood prone land).
Grade	The rate of longitudinal rise (or fall) with respect to the horizontal expressed as a percentage or ratio.
Greenhouse gas	Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of terrestrial radiation emitted by the Earth's surface, the atmosphere itself, and by clouds. Water vapour (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4) and ozone (O_3) are the primary greenhouse gases in the Earth's atmosphere (CSIRO and BoM, 2015).
Groundwater	Water that is held in rocks and soil beneath the earth's surface.
ha	hectare

Term / abbreviation	Definition
Heavy vehicles	A heavy vehicle is classified as a class 3 vehicle (a two axle truck) or larger, in accordance with the Austroads vehicle classification system.
Heritage Act	*Heritage Act 1977* (NSW)
Heritage listed item	Any place, building or object listed on a statutory heritage register.
HIAL	high intensity approach lighting
High intensity approach lights	A series of lights that provide visual guidance to aircraft approaching a runway.
Hydrology	The study of rainfall and surface water runoff processes.
Impact	Influence or effect exerted by a project or other activity on the natural, built and community environment.
IS	infrastructure sustainability
ISCA	Infrastructure Sustainability Council of Australia
L_{Aeq}	The equivalent continuous sound level – the energy average of the varying noise over the sample period equivalent to the level of constant noise that contains the same energy as the varying noise environment. A common measure of environmental and road traffic noise.
Landscape character	The aggregate of built, natural and cultural aspects that make up an area and provide a sense of place. Includes all aspects of a tract of land – built, planted and natural topographical and ecological features.
Landscape character zone	An area of landscape with similar properties or strongly defined spatial qualities, distinct from areas immediately adjacent.
Lane	A portion of the carriageway allotted for the use of a single line of vehicles.
Leachate	Liquid that drains from a landfill or stockpile.
LEP	local environmental plan
Level of service	The standard measure used to assess the operational performance of these intersections. Level of service is ranked from A to F, with A representing the best performance and the worst. It is based on the average delay experienced by vehicles driving through the intersection (in seconds).
m^3	cubic metres
Major development	Development within Commonwealth-owned land leased to an airport lessee company for the operation of an airport, which meets the definitions under section 89 of the Airports Act.
Major development plan	A document required to support the application for approval of a major development under section 90 of the Airports Act, with the required contents defined by section 91 of the Airports Act.
Master Plan	*Sydney Airport Master Plan 2039*
MDP	major development plan
Methodology	The method for analysis and evaluation of the relevant subject matter.
ML	mega litres
mm	millimetre
mm/s	millimetres per second
Morning peak	The average one hour peak period between 8am and 9am on a normal working weekday.
Motorway	Fast, high volume controlled access roads. May be tolled or untolled.
NASF	National Airports Safeguarding Framework

Term / abbreviation	Definition
NCA	noise catchment area
NO_2	nitrogen dioxide
Northern lands	Land leased and owned by Sydney Airport Corporation located to the north-west of Sydney Airport on the western side of Alexandra Canal, between Canal Road and Alexandra Canal.
NSW	New South Wales
NSW EPA	NSW Environment Protection Authority
Obstruction limitation surface	An invisible surface that defines the airspace surrounding an airport that must be protected from obstacles to ensure that aircraft flying in good weather during the initial and final stages of flight, or in the vicinity of the airport, can do so safely.
OLS	obstacle limitation surface
Operational footprint	The operational footprint forms part of the overall project site. It consists of land that would be occupied by permanent project infrastructure.
Overbridge	A bridge that conveys a road, rail or pedestrians over the described road.
PANS-OPS	Procedures for Navigational Services – Aircraft Operations Surfaces
Pavement	The portion of a carriageway placed above the subgrade for the support of, and to form a running surface for, vehicular traffic.
Per-and poly-fluoroalkyl substances	Manufactured chemicals used in products that resist heat, oil, stains and water. There are many types, with the best-known examples being perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), which were used in some fire-fighting foams.
PFAS	per-and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
Place making	A multi-faceted approach to the planning, design, and management of public spaces, which aims to create public spaces that promote people's health, happiness, and well-being.
PM	particulate matter
PM_{10}	Airborne particulate matter with an aerodynamic diameter of less than 10 micrometre (µm).
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of less than 2.5 micrometre (µm).
PMF	probable maximum flood
POEO Act	Protection of the *Environment Operations Act 1974 (NSW)*
Pre-construction	All work prior to construction.
Prescribed airspace	The airspace above any part of either the OLS or the PANS-OPS surfaces, regulated under the Airports Act.
Probable maximum flood	The flood that occurs as a result of the probable maximum precipitation on a study catchment. The probable maximum flood is the largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation coupled with the worst flood producing catchment conditions.
Procedures for Navigational Services – Aircraft Operations	The Procedures for Navigational Services – Aircraft Operations (PANS-OPS) surface protects aircraft flying into and out of the airport when the flight is guided solely by instruments in conditions of poor visibility. The PANS-OPS surface is generally situated above the OLS.
Project	Construction and operation of the Sydney Gateway road project.

Term / abbreviation	Definition
Project site	The area that would be directly affected by construction and operation of the project, including the construction footprint and the proposed location of the project's operational infrastructure (the operational footprint).
Proponent	The person or organisation that proposes to carry out the project or activity.
RAP	remediation action plan
Residual land	Acquired land that formed part of the project's construction footprint, but is not required as part of the pro.
Risk	Chance of something happening that will potentially have an undesirable effect. It is measured in terms of consequence and likelihood.
Road reserve	A legally defined area of land within which facilities such as roads, footpaths and associated features may be constructed for public travel.
Roads and Maritime	Roads and Maritime Services
Runoff	The amount of rainfall that ends up as streamflow, also known as rainfall excess.
Salinity	The total soluble mineral content of water or soil (dissolved solids), with concentrations of total salts are expressed as milligrams per litre (equivalent to parts per million).
Scour	The erosion of material by the action of flowing water.
Screenline	Theoretical boundaries specifically designed to collectively analyse directional and two-way traffic volumes.
SEARs	Secretary's Environmental Assessment Requirements
Secretary's environmental assessment requirements	Requirements and specifications for an environmental assessment prepared by the Secretary of the Department of Planning and Environment under section 115Y of the *Environmental Planning and Assessment Act 1979* (NSW).
Sensitive receiver	Land uses and activities that are sensitive to potential noise, vibration, air and visual impacts, such as residential dwellings, schools and recreation areas.
Span	The distance between the centres of adjacent supports of a bridge.
Spoil	Material generated by excavation.
St Peters interchange	A component of the New M5 project, located at the former Alexandria Landfill site at St Peters. In its ultimate configuration it would connect the New M5, the M4-M5 Link and the Sydney Gateway road project with Euston Road and Gardeners Road.
State significant infrastructure	Major transport and services infrastructure considered to have State significance as a result of size, economic value or potential impacts.
Stockpile	Temporary stored materials such as soil, sand, gravel and spoil/waste.
Study area	The study area is defined as the wider area including and surrounding the project site, with the potential to be directly or indirectly affected by the project (eg by noise and vibration, visual or traffic impacts). The actual size and extent of the study area varies according to the nature and requirements of each assessment and the relative potential for impacts.
Surface water	Water flowing or held in streams, rivers and other wetlands in the landscape.
Sustainable development	Development which meets the needs of the present, without compromising the ability of future generations to meet their own needs (Brundtland, 1987).
Sydney Airport curfew	The curfew was established by the *Sydney Airport Curfew Act 1995* (Cth), which limits the operating hours of Sydney Airport between the hours of 11pm and 6am. The Act does not stop all aircraft movements during these hours, but limits movements by restricting the types of aircraft that can operate, the runways they can use, and the number of flights allowed.
Sydney Airport land	Commonwealth-owned land leased to Sydney Airport Corporation for the operation of Sydney Airport.

Term / abbreviation	Definition
Sydney Airport northern lands	Consists of land leased and owned by Sydney Airport Corporation, located between Canal Road and Alexandra Canal.
Sydney Water	Sydney Water Corporation
tCO_2-e	tonnes of CO2-equivalent
Tempe Lands	Consists of land owned by Inner West Council that was formally part of the Tempe landfill site. The land was remediated and now contains a number of open space and recreation facilities (including the Tempe Golf Range and Academy, off-leash dog exercise area and Tempe Wetlands).
Terminal 1	Sydney Airport's international terminal
Terminal 2	One of Sydney Airport's two domestic terminals, used by number of domestic and regional airlines including Virgin Australia, Jetstar and Rex.
Terminal 3	Qantas's domestic terminal
Terminals 2/3	Sydney Airport's domestic terminals
TEU	twenty foot equivalent units
Twenty foot equivalent units (TEU)	Unit of measure which describes the capacity of container ships and terminals. Measure is based on the volume of a twenty foot shipping container. For example a 40 foot container would be considered to be two TEUs.
Typical cross section	A cross section of a carriageway showing typical dimensional details, furniture locations and features of the pavement construction.
Urban design	The process and product of designing human settlements, and their supporting infrastructure, in urban and rural environments.
Viaduct	Elevated structure convey a road or rail across other infrastructure or landscape features.
Viewpoint	The specific location of a view, typically used for assessment purposes.
Visual amenity	The value of a particular area or view in terms of what is seen.
Visual impact	The impacts on the views from residences, workplaces, and public places. This can be positive (ie benefit or an improvement) or negative (ie adverse or a detraction).
Waste	Waste is defined by the NSW EPA as any matter (whether liquid, solid, gaseous or radioactive) that is discharged, emitted or deposited in the environment in such volume, constituency or manner as to cause an alteration to the environment.
Waste hierarchy	Approach of prioritising waste avoidance and resource recovery (including reuse, reprocessing, recycling and energy recover) before consideration of waste disposal.
Water table	The surface of saturation in an unconfined aquifer, or the level at which pressure of the water is equal to atmospheric pressure.
Windshear and turbulence	Windshear is defined as a change of horizontal wind direction and/or speed with height. Rapid changes in wind velocity encountered during the landing and take-off phases of flight can be hazardous to aircraft. Turbulence is caused by a disruption to smooth air flow. Turbulence in the lower atmosphere is generally created by the flow of air around obstacles such as landforms or buildings. Meteorological conditions such as boundaries between different air masses can also result in turbulence.
Work area	Individual areas within the project site that are subject to construction at any one time.

Part

A

Part A

Introduction

1. Introduction and background

1.1 Sydney Gateway

Sydney Kingsford Smith Airport (Sydney Airport) and Port Botany are two of Australia's most important infrastructure assets, providing essential domestic and international connectivity for people and goods. Together they form a strategic centre, which is set to grow significantly over the next 20 years. To support this growth, employees, residents, visitors and businesses need reliable access to the airport and port, and efficient connections to Sydney's strategic centres.

The NSW and Australian governments are making major investments in the transport network to achieve this vision. New road and freight rail options are being investigated to cater for the forecast growth in passengers and freight through Sydney Airport and Port Botany. Part of this solution is Sydney Gateway, which comprises the following road and rail projects:

- Sydney Gateway road project (the subject of this document)
- Botany Rail Duplication.

Sydney Gateway (shown on Figure 1.1) will expand and improve the road and freight rail networks to Sydney Airport and Port Botany to keep Sydney moving and growing. The Sydney Gateway road project (shown on Figure 1.2) forms part of the NSW Government's long-term strategy to invest in an integrated transport network and make journeys easier, safer and faster.

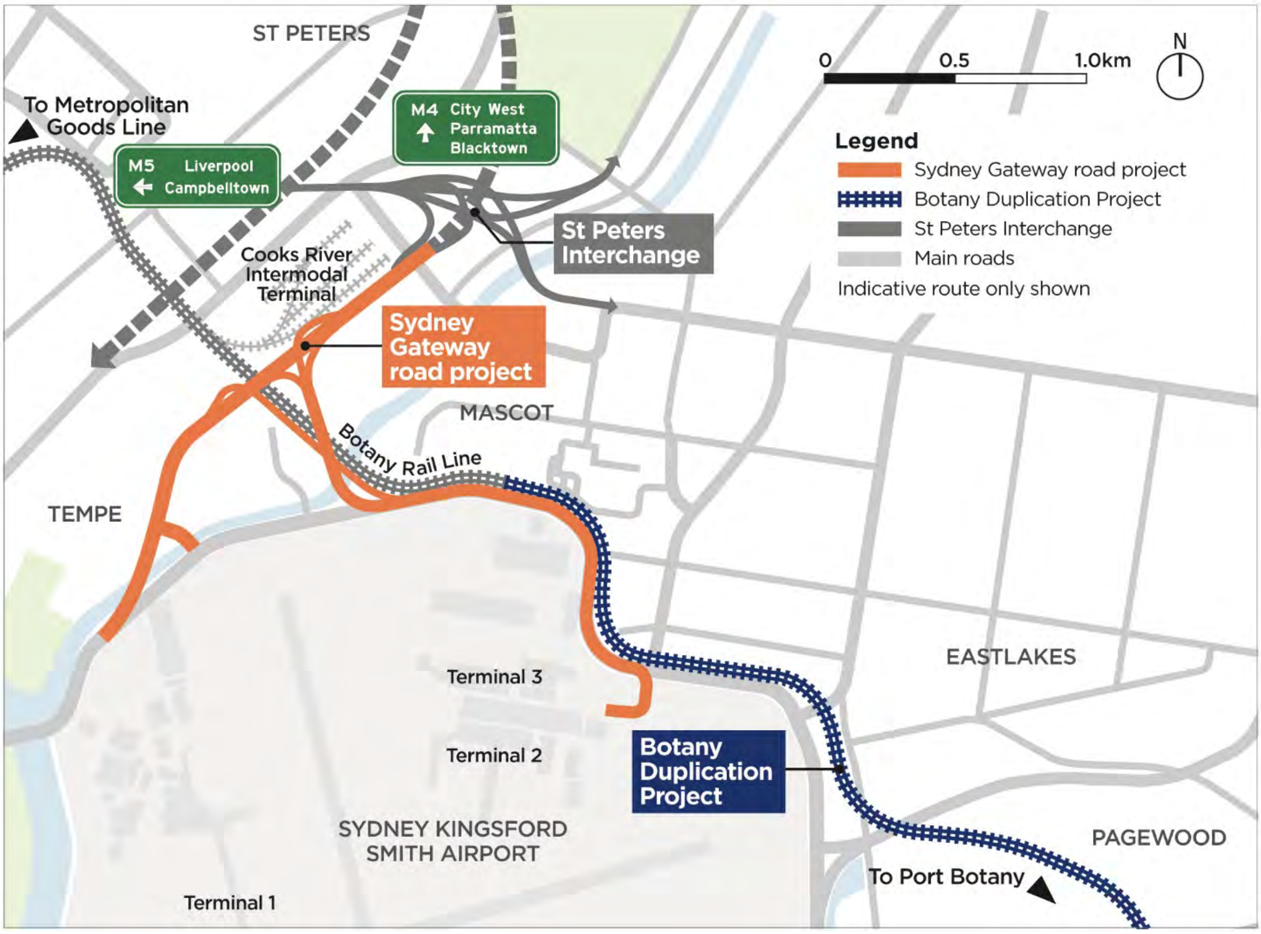

Figure 1.1 Sydney Gateway

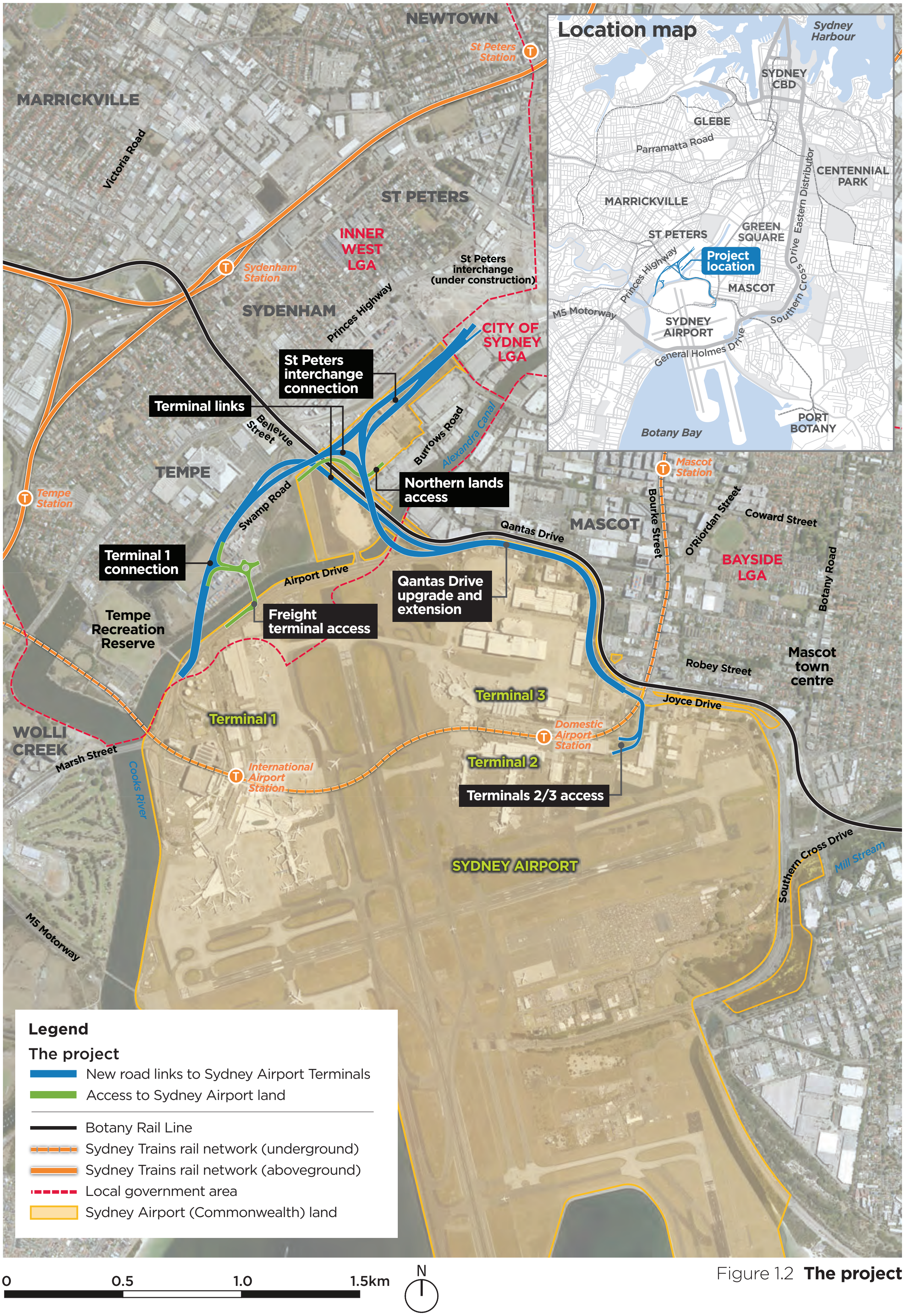

Figure 1.2 **The project**

1.2 Project overview

Transport and Sydney Airport Corporation are proposing new direct high capacity road connections linking the Sydney motorway network at St Peters interchange with Sydney Airport's domestic and international terminals and beyond.

The Sydney Gateway road project ('the project') would comprise new and upgraded sections of road connecting to the airport terminals. It would also include four new bridges over Alexandra Canal and other operational infrastructure and road connections. The new connections and increased road capacity would help improve traffic flow to and from Sydney Airport and towards Port Botany, making the movement of people and goods easier, safer and faster.

1.2.1 Location

The project is located in the suburbs of Tempe, St Peters and Mascot, in the Inner West, Bayside and City of Sydney local government areas. The location of the project is shown on Figure 1.2.

The location of the project site, which is defined as the area that would be directly affected by construction and the location of project infrastructure, is shown on Figure 1.3. The majority of the project site is located on government-owned land, which mainly consists of Commonwealth-owned land (leased to Sydney Airport Corporation) (shown on Figure 1.3).

1.2.2 The project

The project would connect Sydney Airport Terminal 1 (the International Terminal) and Terminals 2/3 (the Domestic Terminals) with each other and with the Sydney motorway network via St Peters interchange. It would also facilitate the movement of traffic towards Port Botany via General Holmes Drive. The project would provide three main routes for traffic:

- Between the Sydney motorway network and Terminal 1, and towards the M5 motorway and the Princes Highway
- Between the Sydney motorway network and Terminals 2/3, and towards General Holmes Drive, Port Botany and Southern Cross Drive
- Between Terminal 1 and Terminals 2/3.

The project would also provide improved access to Sydney Airport land located on both sides of Alexandra Canal and across the Botany Rail Line.

The key features of the project include:

- Road links to provide access between the Sydney motorway network and Sydney Airport's terminals, consisting of the following components:
  - St Peters interchange connection – a new elevated section of road extending from St Peters interchange to the Botany Rail Line, including an overpass over Canal Road
  - Terminal 1 connection – a new section of road connecting Terminal 1 with the St Peters interchange connection, including a bridge over Alexandra Canal and an overpass over the Botany Rail Line
  - Qantas Drive upgrade and extension – widening and upgrading Qantas Drive to connect Terminals 2/3 with the St Peters interchange connection, including a high-level bridge over Alexandra Canal
  - Terminal links – two new sections of road connecting Terminal 1 and Terminals 2/3, including a bridge over Alexandra Canal
  - Terminals 2/3 access – a new elevated viaduct and overpass connecting Terminals 2/3 with the upgraded Qantas Drive

- Road links to provide access to Sydney Airport land:
  - A new section of road and an overpass connecting Sydney Airport's northern lands on either side of the Botany Rail line (the northern lands access)
  - A new section of road, including a signalised intersection with the Terminal 1 connection and a bridge, connecting Sydney Airport's existing and proposed freight facilities on either side of Alexandra Canal (the freight terminal access)
- An active transport link, about 1.3 kilometres long and located along the western side of Alexandra Canal, to maintain connections between Sydney Airport, Mascot and the Sydney central business district
- Intersection upgrades or modifications
- Provision of operational ancillary infrastructure including maintenance bays, new and upgraded drainage infrastructure, signage and lighting, retaining walls, noise barriers, flood mitigation basin, utility works and landscaping.

1.3 Statutory context and assessment

The project is subject to approval under NSW and Commonwealth legislation. Parts of the project located on Commonwealth-owned land leased to Sydney Airport Corporation (Sydney Airport land) (shown on Figure 1.3) are subject to the *Airports Act 1996* (Cth) (the Airports Act). In accordance with the Airports Act, these parts of the project are major airport development. A major development plan (MDP), approved by the Australian Minister for Infrastructure, Transport and Regional Development, is required before a major airport development can be undertaken at a leased airport.

Parts of the project located on other land (shown on Figure 1.3) have been declared State significant infrastructure in accordance with the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) and *State Environmental Planning Policy (State and Regional Development) 2011*. As State significant infrastructure, these parts of the project need approval from the NSW Minister for Planning and Public Spaces. An environmental impact statement (EIS) is required to support the application for approval for State significant infrastructure under the EP&A Act.

A combined EIS/preliminary draft MDP was prepared in accordance with the Airports Act and the EP&A Act, and was lodged for approval by the Australian Minister for Infrastructure, Transport and Regional Development and the NSW Minister for Planning and Public Spaces. With respect to the approval requirements under the EP&A Act and relevant to this report, the EIS/preliminary draft MDP was exhibited by the NSW Department of Planning, Industry and Environment between 20 November and 19 December 2019, and submissions were received by the Department.

With respect to the approval requirements under the Airports Act, the EIS/preliminary draft MDP was exhibited by Sydney Airport Corporation between 20 November 2019 and 21 February 2020, and submissions were received by Sydney Airport Corporation.

Further information on the exhibition process is provided in section 2.1. Further information on the approval and assessment process for the project is provided in Chapter 3 of the EIS/preliminary draft MDP.

1.4 Purpose and structure of this report

The Secretary of the Department of Planning, Industry and Environment provided copies of the submissions received by the Department to Transport. In accordance with section 5.17(6)(a) of the EP&A Act, the Secretary directed Transport to provide '…a *Response to Submissions that addresses the issues identified in the submissions from members of the public, interest groups and government agencies.'*

This report documents and considers the issues raised in community, government agency, organisation and other submissions received by the NSW Department of Planning, Industry and Environment during public exhibition of the EIS/preliminary draft MDP in accordance with the EP&A Act. Transport has carefully considered the content of the submissions and has prepared responses to the issues raised, with the responses provided in this report.

The report provides additional information and clarification about some design features and information presented in the EIS/preliminary draft MDP. It also provides a summary of the results of additional design work (project refinements) and investigations, undertaken since exhibition commenced, to further reduce the potential impacts of the project and/or respond to issues raised.

The report also provides a final set of mitigation measures, which incorporate amendments made to respond to issues raised in submissions and/or take into account additional information and project refinements.

The report is structured in four parts as follows:

Part A Introduction – including:

- An introduction to the report (Chapter 1)
- A summary of the public exhibition process (for exhibition undertaken in accordance with the EP&A Act) and submissions received (Chapter 2)
- Project refinements, clarifications and additional information (Chapter 3)

Part B Responses to key stakeholder submissions – including:

- Responses to submissions from local councils (Chapter 4)
- Responses to submissions from NSW Government agencies (Chapter 5)
- Responses to submissions from key landholders and businesses (Chapter 6)
- Responses to submissions from peak bodies, representative organisations and community groups (Chapter 7)

Part C Responses to community submissions – including:

- Responses to issues raised in submissions from members of the public in relation to the development and assessment of the project, including consultation undertaken, alternatives considered and the need for the project (Chapter 8)
- Responses to issues raised in submissions from members of the public in relation to the project description, including project features and the indicative construction methodology described in the EIS/preliminary draft MDP (Chapter 9)
- Responses to issues raised in submissions from members of the public in relation to the potential impacts of the project and how these would be managed (Chapter 10)

Part D Mitigation measures and conclusion – including:

- Updated mitigation measures (Chapter 11)
- A conclusion to the report (Chapter 12).

The project description chapters provided in the EIS/preliminary draft MDP (Chapters 7 and 8) have been updated taking into account the refinements and clarifications described in Chapter 3 of this report. The updated project description is provided in Appendix A to this report.

Further information on the project's background, location, approval requirements, strategic need, options and alternatives are provided in Chapters 2 to 6 of the EIS/preliminary draft MDP. The results of the assessment of the potential impacts of the project during construction and operation are described in Chapters 9 to 26 of the EIS/preliminary draft MDP.

Figure 1.3 **Sydney Airport (Commonwealth) land**

2. Exhibition and submissions

This chapter provides a summary of the exhibition process and the submissions received during exhibition, including a breakdown of the types and numbers of submissions received and key issues raised.

2.1 Exhibition in accordance with the EP&A Act

The EP&A Act requires public exhibition of an EIS and the Airports Act requires exhibition of a draft MDP for public comment. The combined EIS/preliminary draft MDP was exhibited as a single document, subject to two separate exhibition and submission processes.

The EIS/preliminary draft MDP was placed on public exhibition by the Department of Planning, Industry and Environment ('the Department') for a period of four weeks, commencing on 20 November and concluding on 19 December 2019. It was made available in hard copy at 10 locations:

- Transport – 20-44 Ennis Road, Milsons Point
- Sydney Airport – Ground Floor, Nigel Love Building, International Terminal
- City of Sydney Council – Town Hall Customer Service Centre, Level 2, 456 Kent Street, Sydney
- Green Square Library – 355 Botany Road, Zetland
- Bayside Council – Rockdale Customer Service Centre, 444-446 Princes Highway, Rockdale
- Eastgardens Library – 152 Bunnerong Road, Eastgardens
- Mascot Library – 2 Hatfield Street, Mascot
- Arncliffe Library – 11 Firth Street, Arncliffe
- Inner West Council – Petersham Customer Service Centre, 2-14 Fisher Street, Petersham
- Marrickville Library – 313 Marrickville Road, Marrickville.

Online versions of the EIS/preliminary draft MDP were made available on the Department's website (*www.planningportal.nsw.gov.au/major-projects/projects/on-exhibition*).

Advertisements were placed in newspapers to advise of the public exhibition periods, where the EIS/preliminary draft MDP could be viewed, and to provide details of community consultation activities and information sessions.

To support public exhibition and provide opportunities for the community and stakeholders to ask questions and find out more before making a submission, a range of consultation tools were used, including:

- Dedicated phone number, email address and project website (*www.nswroads.work/sydneygateway*)
- An interactive portal on the project website
- Provision of a detailed project overview and fact sheets with key environmental and project information
- Stakeholder briefings
- Community information sessions, information booths and doorknocks
- Distribution of community and business updates, in hard copy and electronically
- Media releases and advertising
- Social media.

The Department and Transport invited members of the public and representatives of organisations and government agencies to make submissions on the project. Interested stakeholders and members of the community were able to review the EIS/preliminary draft MDP online or at display locations, participate in consultation and engagement activities, and make a written submission to the Department for consideration in its assessment of the project.

It is noted that the Department's assessment will focus on those aspects of the project that are subject to approval as State significant infrastructure in accordance with the EP&A Act.

2.2 Submissions received

The receipt of submissions was coordinated and managed by the Department. Submissions were received and registered by the Department and uploaded onto the NSW major projects planning portal website (*www.planningportal.nsw.gov.au/major-projects/project/10156*). Submissions were accepted by electronic online submission or post, and were forwarded to Transport for review and consideration.

A total of 90 submissions was recorded on the major projects website by the Department according to three categories. A breakdown of submissions by the submitter category recorded by the Department is provided in Table 2.1.

Table 2.1 Breakdown of submissions recorded by the Department

Submitter type	Number of submissions recorded
Public submissions	
Community members	56
Members of Parliament	1
Sub-total	***57***
Public authority submissions	
NSW Government departments/agencies[1,2,3]	9
Local councils	4
Sub-total	***13***
Organisation submissions	
Landholders and businesses	9
Peak bodies, representative organisations and community groups	11
Sub-total	***20***
Total submissions	**90**

Notes:
1. One submission from the NSW Department of Primary Industries noted that they had no comment.
2. The Department categorised ARTC as a public authority during the submission registration process.
3. Two submissions were received from different divisions within NSW Health. These were recorded, and have been addressed by this report, as a single submission.

Correspondence was received from Tyne Container Services after the closure of the exhibition period. This correspondence has been considered and addressed in this report.

2.2.1 Support/objection

The Department recorded the following as part of the submission registration process:

- Six submissions registered support of the project
- 42 submissions registered an objection to the project.

2.3 Approach to analysing submissions

Each submission was reviewed and the issues raised were summarised and categorised according to the issues raised. The analysis of submissions involved identifying the issues raised and categorising the issues into key issue (eg project background and assessment) and sub-issue categories (eg assessment and approval process), which were based on the information and environmental aspects considered by the EIS/preliminary draft MDP. This provided an understanding of the frequency of the issues that were raised and the key areas of concern.

2.3.1 Review of key stakeholder submissions

Submitters classified as public authorities or organisations by the Department were considered to be 'key stakeholders' for the purposes of this report. Each key stakeholder submission was reviewed, and the issues raised in each were summarised broadly according to the order and headings provided in each submission (where such headings were provided). In some instances, related issues have been grouped under a single heading. The issues raised in each submission, and responses to these issues, are provided in Part B of this report. Where relevant, input to the responses was sought from the technical specialists who assisted with preparation of the EIS/preliminary draft MDP.

Further detail on issues raised, including background, contextual information and full submissions, is provided in the detailed submissions available via the major projects website (https://www.planningportal.nsw.gov.au/major-projects/project/10156).

2.3.2 Review of community submissions

An assessment of each community submission was undertaken, with each submission individually reviewed to understand the issues raised. The analysis involved identifying the issues raised, and categorising them into key issues and sub-issues.

The issues raised were then summarised and grouped according to the key issue and sub-issue categories. Responses to the issues are provided in Part C of this report according to these categories. Where relevant, input to the responses was sought from the technical specialists who assisted with preparation of the EIS/preliminary draft MDP.

Each issue identified in Part C is presented as a summary of the issues raised by individual submissions. This means that, while the exact wording of a particular submission may not be present in the summary of the issue, the intent of issues raised has been captured. A response has been provided to each grouped issue summary.

2.4 Overview of issues raised

2.4.1 Key stakeholder submissions

The key stakeholder issue categories are shown on Figure 2.1. This figure shows that the majority of issues raised (72 per cent) related to the potential environmental impacts of the project. The top three most frequently raised categories of issues were:

- Environmental impacts
- Project description – design features
- Background and assessment.

A breakdown of the sub-issues raised for the top issue category (environmental impacts) is shown on Figure 2.2. This figure shows that the most frequently raised issues in this category were:

- Noise and vibration
- Construction traffic, transport and access
- Water impacts (which included issues relating to water quality, flooding and groundwater).

A breakdown of the sub-issues raised for the 'project description – design features' issue category is shown on Figure 2.3. This figure shows that the most frequently raised issues in this category were:

- Active transport
- Canal Road ramps
- Urban design and landscaping.

Further information on the issues raised in key stakeholder submissions is provided in Part B.

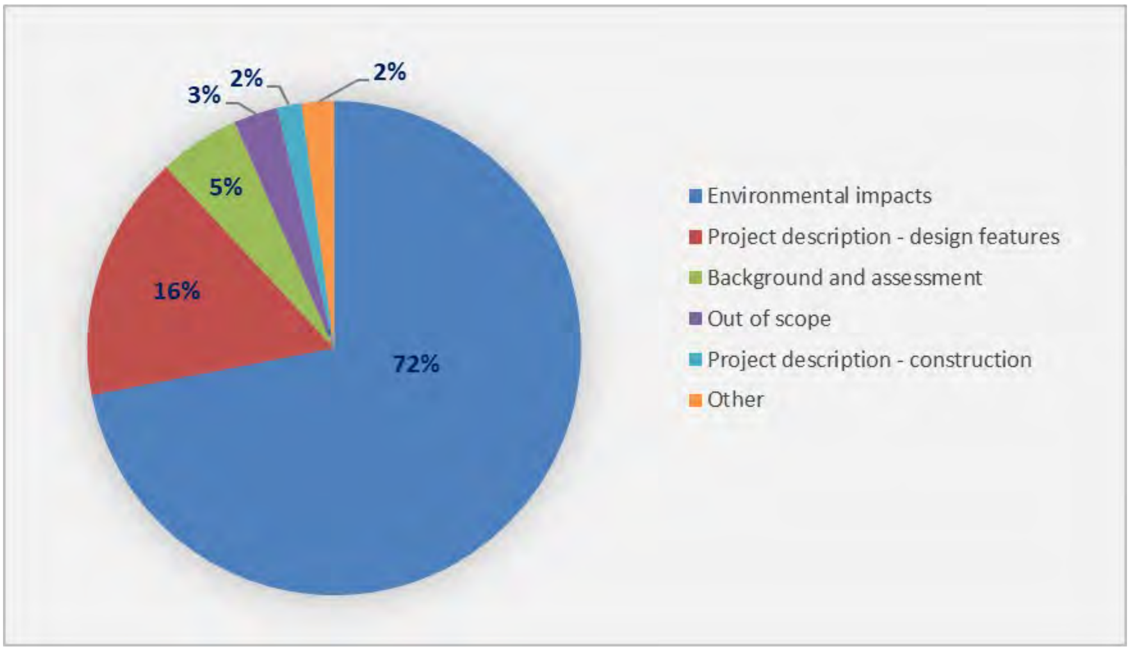

Figure 2.1 Key issues raised in key stakeholder submissions

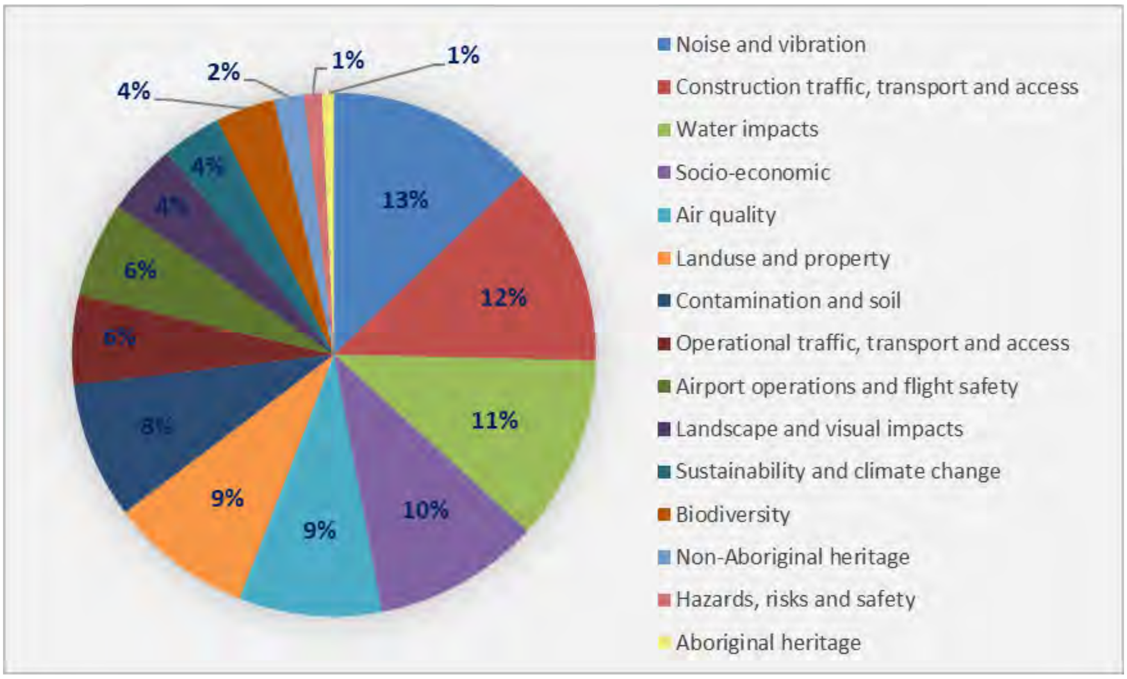

Figure 2.2 Types of environmental impact issues raised in key stakeholder submissions

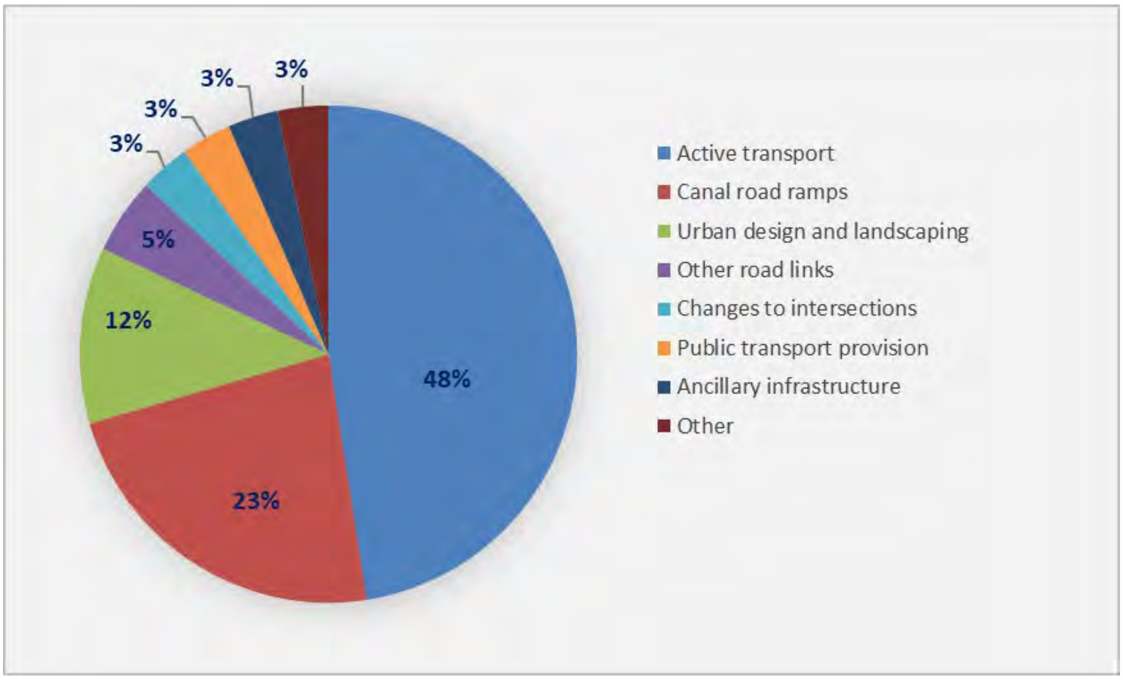

Figure 2.3 Types of project description – design features issues raised in key stakeholder submissions

2.4.2 Community submissions

The key issue categories raised by community submissions are shown on Figure 2.4. This figure shows that the majority of issues raised (44 per cent) related to the project description – design features of the project. The top three most frequently raised categories of issues were:

- Project description – design features
- Environmental impacts
- Background and assessment.

A breakdown of the sub-issues raised for the top key issue category (project description – design issues) is shown on Figure 2.5. This figure shows that the most frequently raised issues in this category were:

- Active transport
- Canal road ramps
- Urban design and landscaping.

A breakdown of the sub-issues raised for the 'environmental impacts' key issue category is shown on Figure 2.6. This figure shows that the most frequently raised issues in this category were:

- Noise and vibration
- Air quality
- Hazards, risk and safety.

Further information on the issues raised in community submissions is provided in Part C.

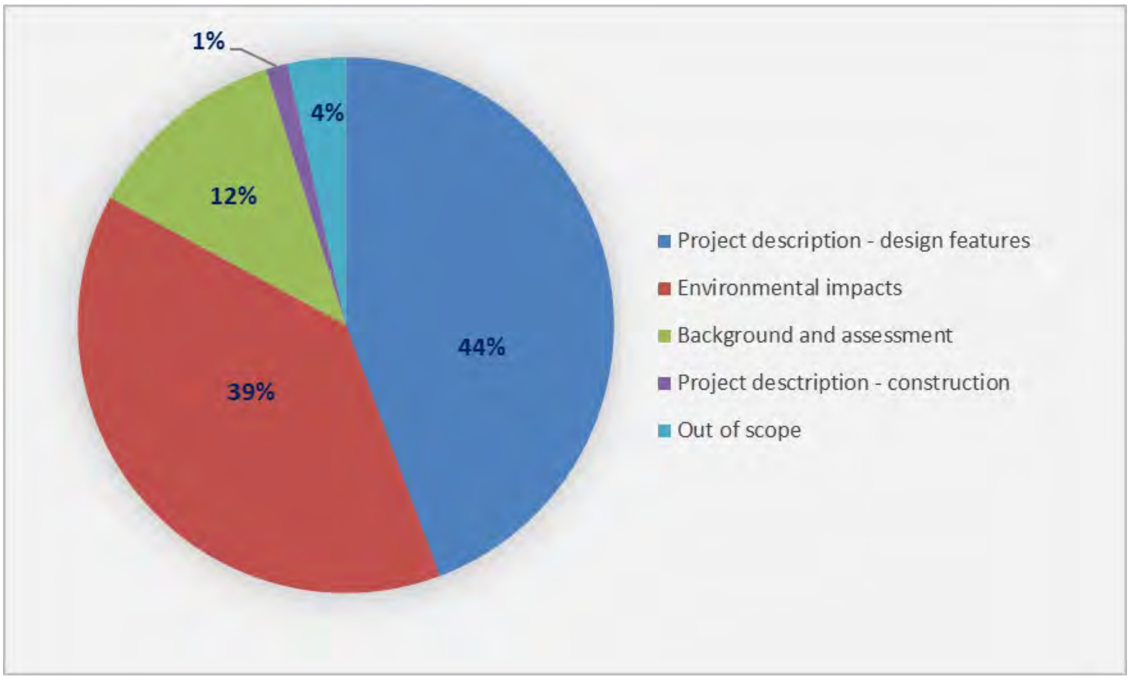

Figure 2.4 Key issues raised in community submissions

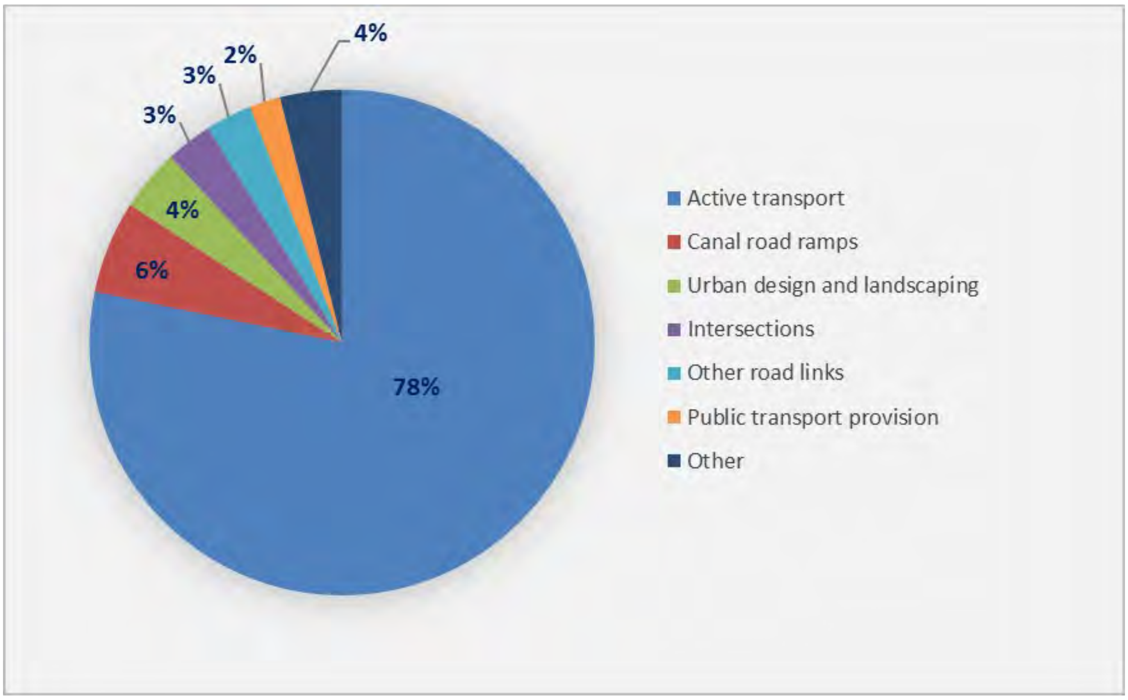

Figure 2.5 **Types of project description issues raised in community submissions**

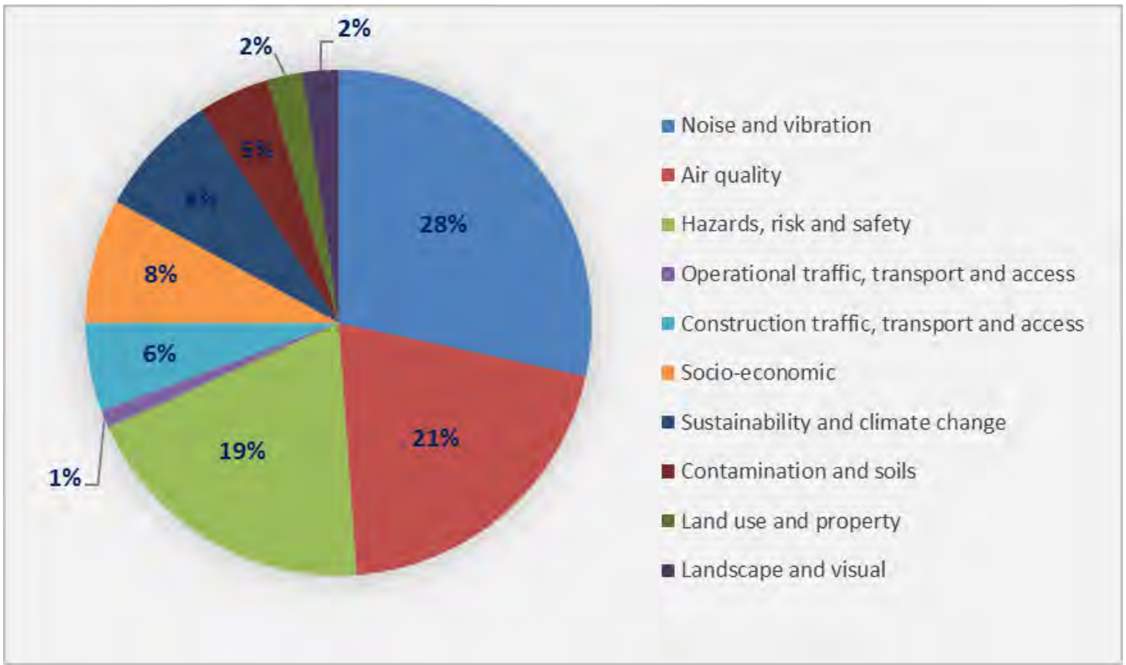

Figure 2.6 Types of environmental impact issues raised in community submissions

3. Project refinements and clarifications

This chapter provides a summary of the results of additional design work (refinements) and investigations undertaken since exhibition commenced. It also provides clarifications in relation to information presented in the EIS/preliminary draft MDP and describes the results of additional assessments undertaken since exhibition.

3.1 Design refinements

The following design refinements are proposed to further reduce the potential impacts of the project and/or respond to issues raised during exhibition:

- Realignment to avoid the Cooks River Intermodal Terminal
- Emplacement areas and mounds
- Improved access to residual land
- Seventh Street pedestrian crossing
- Sydney desalination pipeline maintenance vehicle turning area
- Additional construction area for active transport link crossing.

The proposed refinements are described in the following sections.

3.1.1 Realignment to avoid the Cooks River Intermodal Terminal

The exhibited project

As described in section 1.2.2 and shown on Figure 1.2 of this report, the key features of the project include the St Peters interchange connection. This feature consists of a new elevated section of road extending from the St Peters interchange (currently under construction) to the Botany Rail Line, and includes an overpass over Canal Road. This feature is described in section 7.5 and shown on Figures 7.4 and 7.5 of the EIS/preliminary draft MDP.

The alignment of the St Peters interchange connection, as exhibited, affects an area along the eastern boundary and south-eastern corner of the Cooks River Intermodal Terminal site. The Cooks River Intermodal Terminal is located on privately-owned land with a street address of Talbot Street and 20 Canal Road, St Peters.

The property impacts are described in Chapter 19 of the EIS/preliminary draft MDP. It was estimated that the exhibited project would permanently impact about 0.9 hectares (about 6.5 per cent) of the intermodal terminal site, and temporarily impact (during construction) an additional 0.5 hectares. These land requirements would affect three lots – Lot A DP 1188682, Lot 2 DP 451456 and Lot 22 DP 1069118.

It is noted in Table 19.3 of the EIS/preliminary draft MDP that '…the design is currently being refined with the aim of minimising the potential impacts on this property.'

Justification for the proposed refinement

Following consultation with the landowner and operator in 2019, it is proposed that the St Peters interchange connection would be realigned to avoid direct impacts on the Cooks River Intermodal Terminal.

This proposed refinement would remove the requirement for land at the Cooks River Intermodal Terminal and reduce the project's impact on land used for empty container storage. It would also avoid direct impacts on the terminal's infrastructure located on the required land, and potential impacts on site operations.

Description

Design features and location

The proposed realignment is shown in Figure 3.1 and Figure 3.2.

The St Peters interchange connection would be realigned about 35 metres south-east of the original alignment. As a result of the interconnected nature of a number of adjoining road sections and infrastructure, the realignment would also result in flow-on changes to these features by a similar (or smaller) amount. This would result in minor changes to the alignment of the Terminal 1 connection, northern lands access, eastbound terminal link and westbound terminal link.

No changes to lane configuration are proposed.

The proposed flood mitigation basin (described in section 7.10.8 of the EIS/preliminary draft MDP) located between lanes of the St Peters interchange connection and the westbound terminal link would be modified to account for the change in alignment. The indicative extent of the modified basin is shown in Figure 3.1. The total area of the basin would change as a result of this refinement, however the storage volume and function would remain the same.

Construction

The indicative construction methodology would be as described in section 8.2 of the EIS/preliminary draft MDP.

Project footprint and land requirements

The proposed refinement is located on land subject to the EP&A Act and Sydney Airport land (see Figure 3.1 and Figure 3.2).

The proposed refinement would reduce the project's land requirements and the construction and operational footprints. The new footprints are shown on Figure 3.1 and Figure 3.2.

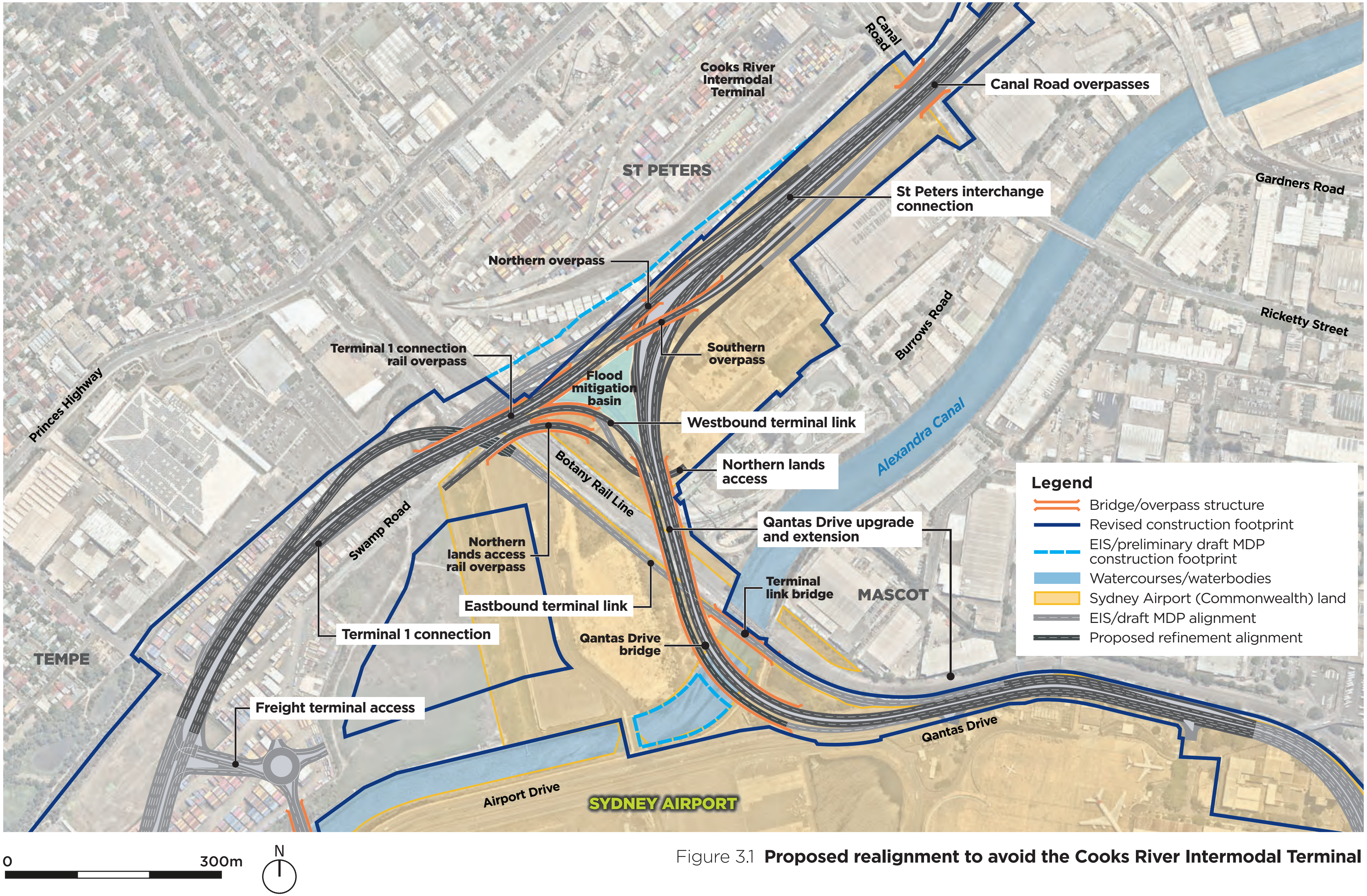

Figure 3.1 **Proposed realignment to avoid the Cooks River Intermodal Terminal**

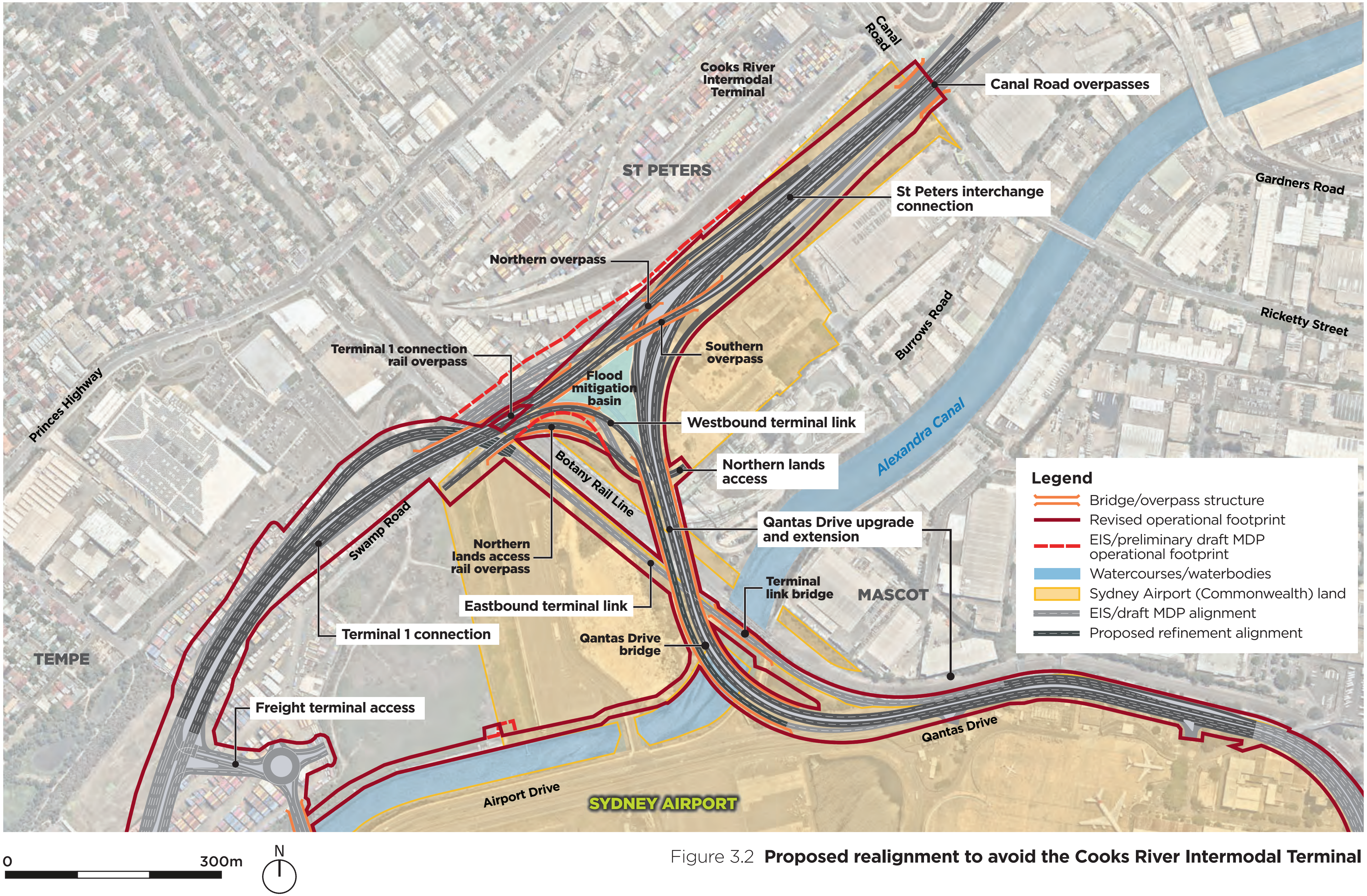

Figure 3.2 **Proposed realignment to avoid the Cooks River Intermodal Terminal**

Assessment

The potential impacts of the project, including the proposed refinement, were compared to those of the exhibited project described in the EIS/preliminary draft MDP. The potential changes to key impacts are described below.

Noise

An additional noise and vibration assessment was undertaken following exhibition of the project (see section 3.3.1 of this report). The assessment considered the potential change in noise and vibration impacts as a result of the proposed realignment.

The assessment concluded that changes to construction noise and vibration impacts are predicted to be minor as a result of the following:

- The distance between the project site and the nearest sensitive receivers in Sydenham, more than 300 metres away
- The proposed refinement would result in a further increase in separation (by 35 metres) between sensitive receivers and the project
- No changes to construction methods and activities are proposed.

The additional operational assessment, which included the proposed refinement along with other considerations (see section 3.3.1), identified that:

- Predicted noise levels at residential receivers are largely consistent with the exhibited EIS/preliminary draft MDP, with the impacts predicted to be greatest in 2036 and during the night-time period
- Marginally different noise levels were predicted within noise catchment area NCA01 located to the north of the Princes Highway in St Peters. The number of receivers in NCA01 that are predicted to exceed the criteria and be eligible for consideration of at-property treatment reduced to 63 (compared with 78 identified by the EIS/preliminary draft MDP).

In accordance with mitigation measure NV3, operational noise mitigation measures will be confirmed during detailed design. Requirements for at-property noise treatments in properties identified as ‘eligible’ in the noise and vibration assessment will be reviewed. The implementation of treatments will be undertaken in accordance with the *At-Receiver Noise Treatment Guideline* (Roads and Maritime, 2017).

Airport operations

During construction, impacts on operations at Sydney Airport would not vary from those described in section 11.3.1 of the EIS/preliminary draft MDP. The proposed change in alignment is unlikely to change the location of any nominated construction work areas in the vicinity of Sydney Airport.

During operation, the proposed refinements are not expected to result in any changes to the impacts outlined in section 11.4.1 of the EIS/preliminary draft MDP. The proposed infrastructure would remain below the airport’s airspace. The project refinements, including the relation to the Sydney Airport’s obstacle limitation surface are shown in Figure 3.1 and Figure 3.2.

The change in alignment would not be substantially different from the road infrastructure assessed in the EIS/preliminary draft MDP in terms of location and height above the ground. Due to this, any potential influence of the proposed refinement on windshear and turbulence along the approach to the main north-south runway in winds with an easterly component would be minimal compared to the design outlined in the EIS/preliminary draft MDP. Transport notes that the location of the proposed design change is around 800 to 900 metres from the threshold of Runway 16R, and that aircraft would typically be at a height of 60 metres or greater above the runway at that location. The proposed design refinement would be likely, therefore, to have minimal influence on windshear and turbulence along the approach to Runway 16R.

Surface water and flooding

As described above, the refinement includes changes to the proposed flood mitigation basin. However, the refinement is not expected to affect flood behavior compared to the potential impacts described in the EIS/preliminary draft MDP. The displacement of floodplain storage due to the importation of fill to construct the St Peters interchange connection would be similar to that described in the EIS/preliminary draft MDP.

The proposed flood mitigation basin would be appropriately sized during detailed design to ensure the potential for flooding impacts is no worse than that described in the EIS/preliminary draft MDP. The design of the basin would be informed by the additional flood modelling that would be undertaken in accordance with mitigation measure HF1. Measure HF1 commits to preparing a flood mitigation strategy and implementing relevant measures as part of the design and during construction. The strategy will include undertaking additional flood modelling, taking into account detailed design and proposed construction planning and methodologies.

Therefore, the proposed refinement would not result in any material changes to overland flow paths or flood behavior within Alexandra Canal compared to the assessment in the EIS/preliminary draft MDP.

Land use and property impacts

The proposed refinement would result in a minor reduction in the impacts on industrial zoned land. The permanent impacts on land zoned for particular uses as a result of the exhibited project are described in Chapter 19 (Table 19.4) of the EIS/preliminary draft MDP. Table 19.4 notes that the project (as exhibited) would affect about 18.5 hectares of land zoned IN1 General Industrial by the relevant local environmental plan, with a permanent change in land use from industrial to transport infrastructure. This included the potential impacts on the Cooks River Intermodal Terminal site (which is zoned IN1 by the *Marrickville Local Environmental Plan 2011, Sydney Local Environmental Plan 2012*). This estimated impact on industrial zoned land would change as a result of the proposed refinement, with a net reduction in the impacts on IN1 zoned land of 0.6 hectares. The proposed refinement would also increase the impact on land zoned SP2 Infrastructure by less than 0.1 hectares.

With respect to property impacts, the proposed refinement would avoid the potential temporary and permanent direct property impacts on the Cooks River Intermodal Terminal (described in sections 19.3.3 and 19.4.2 of the EIS/preliminary draft MDP). Transport notes that the operator of the Cooks River Intermodal Terminal has a responsibility to conduct its activities in a manner that does not pose safety risks to adjacent land uses (including any future land uses). The proposed refinement would also result in a change to property impacts for the Sydney Airport land at Burrows Road (which is currently leased by a number of businesses). The proposed refinement would require an additional 0.2 hectares of this property as part of the project's operational footprint, with a total of 5.1 hectares (57.3 per cent) of this property being required (including the estimated land requirements as per the EIS/preliminary draft MDP). Following construction, the amount of land available for other uses in accordance with the Sydney Airport Master Plan would reduce to 3.7 hectares.

In accordance with mitigation measure LU1, the design will continue to be refined to minimise land requirements and potential impacts on existing land uses and properties as far as possible. Consultation with landholders will be ongoing to identify any further practical opportunities to minimise impacts on operations where practicable.

Changes to mitigation measures

No changes to the mitigation measures are proposed in response to the proposed refinement.

3.1.2 Emplacement areas and mounds

The exhibited project

As described in section 7.10.2 of the EIS/preliminary draft MDP, the project would involve excavating about 90,000 cubic metres of waste material from the former Tempe landfill. It was proposed to retain and re-emplace some of this material within the boundary of the former Tempe landfill site in the form of two emplacement mounds. The re-emplacement of material within mounds on the site was proposed to reduce the need for off-site disposal and associated truck movements.

The location of the two mounds was described as follows:

- One mound in the area bounded by the Terminal 1 connection, the freight terminal access and the western side of Alexandra Canal (see Figure 7.3 of the EIS/preliminary draft MDP)
- Two potential options for the location of the second mound were proposed – either north of the freight terminal access or west of the Terminal 1 connection (see Figure 7.3 of the EIS/preliminary draft MDP).

Both options for the location of the second mound were proposed to be located in project's residual land (described in section 7.12.3 of the EIS/preliminary draft MDP) that would be returned to Inner West Council at the completion of construction.

Justification for the proposed refinement

As a result of further consideration and consultation with Inner West Council and Sydney Airport Corporation, the proposed arrangement for the emplacement mounds has been refined. Only one mound is now proposed, in the area bounded by the Terminal 1 connection, the freight terminal access and the western side of Alexandra Canal (as originally proposed in the EIS/preliminary draft MDP). A second mound is not proposed, and the two options for the location of the second mound described above are no longer being considered.

The proposed refinement would reduce the area of residual land that would be occupied by emplacement mounds, allowing more land to be made available for other future uses (to be determined by Inner West Council in accordance with the current master planning process). The mound, which would form part of the project, would be located on land proposed to be retained by Transport and would not impact on Inner West Council land.

Description

Design features and location

Figure 3.3 shows the location of the proposed single mound. This mound is proposed in the same location as the single mound described in section 7.10.2 of the EIS/preliminary draft MDP. The design of the mound would be as described in section 7.10.2. The mound would contain about 35,000 cubic metres of waste material excavated from the former Tempe landfill. It would have a maximum height of 13.6 metres above the existing ground level and would occupy an area of about three hectares. The mound would be designed in accordance with the requirements the *Environmental Guidelines: Solid waste landfills* (NSW EPA, 2016a). Access to the mound would be limited. The area would be appropriately fenced off to ensure no public access.

In accordance with mitigation measure AS1, the final landform will be reviewed and refined during detailed design (in consultation with Sydney Airport Corporation and relevant aviation regulatory agencies) to:

- Address aviation matters, including windshear and turbulence
- Minimise the volume of material excavated from the former Tempe landfill
- Maximise open space and community use opportunities
- Avoid disturbance outside the project boundary.

Any changes to road infrastructure and final landforms will be reviewed with consideration of the *National Airports Safeguarding Framework (Guideline B)*, and in consultation with Sydney Airport Corporation and relevant aviation regulatory agencies.

The design, landscaping and future use of the mound would be co-ordinated with relevant stakeholders and would be defined in the urban design and landscape plan to be developed in accordance with mitigation measure LV1.

Construction

The indicative construction methodology would be as described in section 8.2.5 of the EIS/preliminary draft MDP. However, as only one mound is now proposed, there would now be a need to remove about 55,000 cubic metres of excavated landfill material from the site for disposal at an appropriately-licensed landfill.

Removing this material would result in an estimated additional 6,900 truck movements. This traffic would use access point A7 and the corresponding haulage route along Bellevue Street to the Princes Highway described in section 8.6.1 and shown on Figure 8.19 of the EIS/preliminary draft MDP.

The additional truck movements would lengthen the duration of the construction activity in this location by about four months.

Project footprint and land requirements

The proposed refinement is located on land subject to the EP&A Act (see Figure 3.3). The proposed refinement would not affect the construction and operation footprints or change the project's permanent and temporary land requirements.

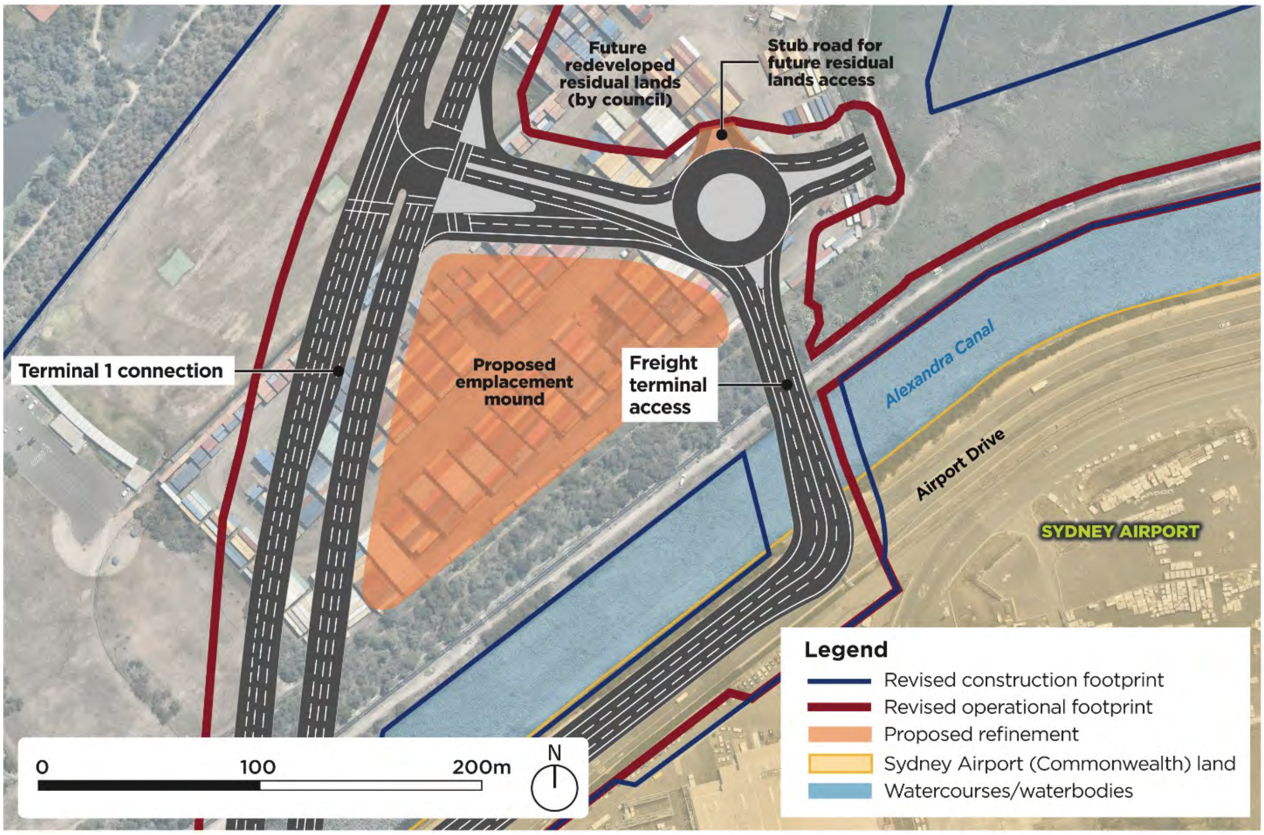

Figure 3.3 Proposed emplacement mound and additional stub road to residual land

Assessment

The potential impacts of the project, including the proposed refinement, were compared to those of the exhibited project described in the EIS/preliminary draft MDP. The potential changes to key impacts are described below.

Traffic, transport and access

Table 8.8 of the EIS/preliminary draft MDP provides indicative construction traffic volumes for earthworks. These volumes have been updated to include 6,900 heavy vehicle movements associated with transporting the additional landfill material for disposal off site (see Table 3.3). These additional movements would be via access point A7 at Bellevue Street (shown on Figure 8.19 in Appendix A). The additional truck movements would not affect the daily peak construction movements assessed in the EIS/preliminary draft MDP. However, the movements would occur over a longer period of time.

As noted above, the additional traffic generated by the disposal of waste material off site would use Bellevue Street and the Princes Highway. The majority of existing traffic on this street is generated by Tyne Container Services, which would cease to operate prior to construction of the project. The closure of this business in this location would result in less traffic along Bellevue Street, making it suitable for construction haulage vehicles.

It is recognised that significant congestion currently occurs during peak periods as a result of right turning queues at the Princes Highway/Bellevue Street intersection. For this reason, it is proposed that construction workforce vehicles arrive and depart compounds and site car parks before and after peak periods.

The Transport Management Centre will be responsible for managing the capacity and functionality of various roads proposed to be used during construction. Measures to minimise access disruption and delays would be implemented before any approval for works is granted, including undertaking works when traffic volumes are lower, where practicable.

In accordance with mitigation measure TT15, construction haulage vehicles will be managed to:

- Adhere to the nominated haulage routes identified in the Construction Traffic and Access Management Plan and posted speed limits
- Minimise idling and queuing on public roads
- Minimise movement of vehicles during peak periods.

In accordance with mitigation measure TT7, where reasonable and feasible, work areas, activities and construction access arrangements will be modified to address any traffic flow issues identified by key stakeholders.

The potential impacts of the movement of haulage vehicles used to remove the additional landfill material are considered to be consistent with the impacts predicted in the EIS/preliminary draft MDP. However, these vehicle movements would occur over a longer period.

Airport operations

An additional windshear and turbulence assessment was undertaken following exhibition of the project (see section 3.3.2 of this report). The assessment included consideration of a single mound in accordance with the proposed refinement.

In general, the results indicated that:

- One mound would influence turbulence slightly less than two mounds
- The mound would also have significantly less influence on turbulence than the existing containers located on the Tyne Container Services site, which would be removed as part of the project
- There is little difference in the average wind speeds required to exceed the turbulence criterion with and without the mound. The differences are within the margin of error of the modelling method, indicating that the mound would have little influence on turbulence along the northern approach to the main north–south runway.

Noise

The proposed refinement is not expected to affect the potential construction noise and vibration impacts predicted in the EIS/preliminary draft MDP. This is because the noise and vibration assessment considered the impacts of a worst-case ‘site establishment’ scenario, which included the use of noise-intensive equipment such as concrete saws and hydraulic breakers. This equipment is only necessary to remove areas of hardstand that are present within the former Tempe landfill, in the area currently occupied by Tyne Container Services. Only hardstand areas required to construct the roadway would be removed.

It is expected that the works required to construct the proposed mound would involve equipment with lower noise emissions than the equipment included for the assessed site establishment activity. Given the distance to the nearest sensitive receivers in Tempe, the noise impact would not change substantially. Not including the second mound would result in increased vehicle movements to remove the excess material. Removing this material would result in noise impacts associated with the additional traffic movements which would extend the duration of the peak traffic movements identified in the EIS/preliminary draft MDP by about four months. As outlined in section 10.4.4 of the EIS/preliminary draft MDP, construction traffic noise impacts are considered to be minimal as they are not expected to result in an increase of 2 dB. This is a result of all haulage routes being currently subject to high traffic volumes and therefore the additional vehicles are not substantial enough to increase noise impacts.

The additional operational noise and vibration assessment, which included the proposed mound along with other considerations (see section 3.3.1), did not identify any changes in operational noise or vibration impacts with the proposed refinement.

Land use and property impacts

The proposed refinement would not change the potential impacts on land use zones and property described by the EIS/preliminary draft MDP. The single emplacement mound is still proposed to be located on land that would be acquired from Inner West Council.

Sections 7.12.4 and 19.4.3 of the EIS/preliminary draft MDP describes how, following construction, some of the land required to construct the project in Tempe (including land within the Tempe Lands and other areas on the former Tempe landfill) would be available for other uses. This land is referred to as 'residual land'. Council is developing a master plan to identify how this land could be used, which will consider council's Recreation Needs Study.

The two location options for the additional mound (originally proposed by the EIS/preliminary draft MDP) affected the largest parcel of residual land located to the east of the Terminal 1 connection and north of the freight terminal access. As it is no longer proposed to provide a mound in this area, council would not have to incorporate a mound in this location into their master plan. This potentially provides more flexibility for a range of land uses at this location.

Following discussions with Inner West Council, the area of land on which the single mound is proposed to be located would be retained by Transport. This area would not form part of the project's residual land. As a result, the total area of residual land that would be available for future use has reduced slightly compared to the 10 hectares described in section 19.4.3 of the EIS/preliminary draft MDP. Based on the concept design, it is now estimated that the residual land would comprise a total of about eight hectares on part of the following lots:

- Lot 25 DP 1227132
- Lots 303, 304 and 305 of DP 1136081.

The amount of residual land available for use by Inner West Council would be confirmed during detailed design. The design, landscaping and future uses for the proposed mound would be coordinated with Inner West Council and other relevant stakeholders, and would be refined as part of the landscaping for the project.

In accordance with mitigation measure LU3, Transport will continue to consult with Inner West Council regarding the proposed future uses of residual land in the Tempe Lands and adjoining area. This will include consultation during council's master planning process for these areas as appropriate. This will ensure that the urban design and landscape plan for the project is consistent with the outcomes of this process.

Landscape character and visual amenity

The proposed refinement would potentially result in a minor temporary increase in landscape character impacts during construction for landscape character zones 6 (residential) and 7 (warehousing and employment) (as described in section 21.2.2 of the EIS/preliminary draft MDP). Impacts to landscape character zone 6 are predicted to remain at moderate for the zone as a whole due to additional vehicle movements. Impacts on landscape character zone 7 would increase from low to moderate/low as a result of construction vehicle movements through the western part of this zone.

During operation, the proposed refinement has the potential to improve landscape character impacts relative to those described in section 21.4.1 of the EIS/preliminary draft MDP. Removing the second mound has the potential to result in improved landscape character outcomes for the project. The proposed refinement would change views from two of the 26 viewpoints considered by the landscape character and visual impact assessment (see section 21.4.2 of the EIS/preliminary draft MDP). The following changes are predicted:

- Viewpoint 7: The magnitude of impacts from this viewpoint would reduce to negligible with a beneficial change in views likely to be experienced
- Viewpoint 26: The proposed refinement would have a beneficial effect on this view. However, due to the magnitude of impacts associated with the Terminal 1 connection (which is also located in this view) and the sensitivity of the vista along Alexandra Canal, the project's overall visual effect on this viewpoint would not change.

Waste management and disposal

Section 24.2.3 of the EIS/preliminary draft MDP identified a number of potential facilities where waste could be disposed of, depending on its classification. The facilities to which material would be disposed would be confirmed during detailed design following more detailed testing of material. The disposal locations would be defined in the Construction Waste Management Plan, which is required by mitigation measure WM2. In accordance with measure WM4, all waste disposal will be in accordance with the *Waste Classification Guidelines* (NSW EPA, 2014).

Changes to mitigation measures

Due to the reduction in the number of emplacement mounds proposed, mitigation measures AS1, CS4 and CS5 have been amended to remove reference to multiple mounds.

3.1.3 Improved access to residual land

The exhibited project

Following construction, it is expected that some of the land required to construct the project in Tempe (including land within Tempe Lands and other areas on the former Tempe landfill previously occupied by Tyne Container Services) would be made available for other uses. This residual land would be handed back to the landowner (Inner West Council). Potential future uses of residual land could include open/space recreation, industrial or other future uses in accordance with the priorities of local and regional strategic planning documents, Inner West Council and the community. Council is developing a master plan to identify how this land could be used, which will consider council's Recreation Needs Study.

Justification for the proposed refinement

The EIS/preliminary draft MDP did not include specific details about how this land would be accessed from the project. Following consultation with Inner West Council it is proposed to provide a stub road connection on the freight terminal access roundabout. This would facilitate future road connections and improved access to and from the residual lands. Future internal access requirements would be confirmed by Council's master plan.

Description

Design features and location

The proposed refinement is located on the northern side of the freight terminal access roundabout as shown on Figure 3.3.

The access road stub would be about 11 metres long, and would be designed in accordance with the standards and design requirements described in section 7.2.2 of the EIS/preliminary draft MDP.

The design and construction of any future road connecting to the stub would be the responsibility of Inner West Council, and would be subject to a separate assessment and approval process.

Construction

The indicative construction methodology would be as described in section 8.2.3 of the EIS/preliminary draft MDP.

Project footprint and land requirements

The proposed refinement is located on land subject to the EP&A Act. The proposed refinement would not affect the construction and operation footprints or change the project's permanent and temporary land requirements.

Assessment

The potential impacts of the project, including the proposed refinement, were compared to those in the EIS/preliminary draft MDP.

The proposed refinement would improve access to the residual lands.

There would be no other changes to impacts.

Changes to mitigation measures

No changes to mitigation measures are proposed.

3.1.4 Seventh Street pedestrian crossing

The exhibited project

As described in section 7.4.2 and shown on Figure 7.15 of the EIS/preliminary draft MDP, the proposed left turn lanes from Seventh Street to Qantas Drive at the Seventh Street/Qantas Drive/Robey Street intersection did not include facilities for pedestrians to cross. This means that pedestrians from Robey Street and Qantas Drive would not be able to safely access the footpath along Seventh Street or towards Terminals 2/3.

Justification for the proposed refinement

It is proposed to retain a signalised pedestrian crossing at this location. This would provide safe pedestrian access across the intersection to Terminals 2/3, including the two left turn lanes from Seventh Street to the proposed pedestrian island at the corner of Seventh Street and Qantas Drive.

It is recognised that pedestrian movements in the Terminals 2/3 precinct, including across Seventh Street, are currently being reviewed by Sydney Airport Corporation as part of the proposed minor variation to the approved T2/T3 Ground Access Solutions and Hotel MDP.

Accordingly, the pedestrian crossing and adjacent civil infrastructure shown in Figure 3.4 may be slightly different to that proposed by the minor variation to the T2/T3 Ground Access Solutions and Hotel MDP. The proposed works in this location would be coordinated between Transport and Sydney Airport Corporation and would be the subject of a separate assessment and approval.

Description

Design features and location

Figure 3.4 shows the location of the proposed crossing. The crossing would be signalised and activated by pedestrians. This would allow the left turn lanes to operate as a free-flow movement, with the exception of when signals are activated.

An embankment batter or retaining wall would be provided at the western extent of the crossing to limit the need for additional land requirements. This would be confirmed during detailed design.

Construction

The indicative construction methodology would be as described in section 8.2.3 of the EIS/preliminary draft MDP.

Project footprint and land requirements

The proposed refinement is located on Sydney Airport land. The proposed refinement would not affect the construction and operation footprints or change the project's permanent and temporary land requirements.

Assessment

The potential impacts of the project, including the proposed refinement, were compared to those of the exhibited project described in the EIS/preliminary draft MDP. The potential changes to key impacts are described below.

Traffic, transport and access

The refinement would not change existing movements. It would complete the pedestrian connection from the northern side of Qantas Drive to the southern side and to Terminals 2/3.

There would be intermittent, short-term impacts on traffic flow, when the signals are activated and free flowing traffic would be interrupted. However, the frequency of crossing use would be relatively low and no significant impacts are expected.

Changes to mitigation measures

No changes to mitigation measures are proposed.

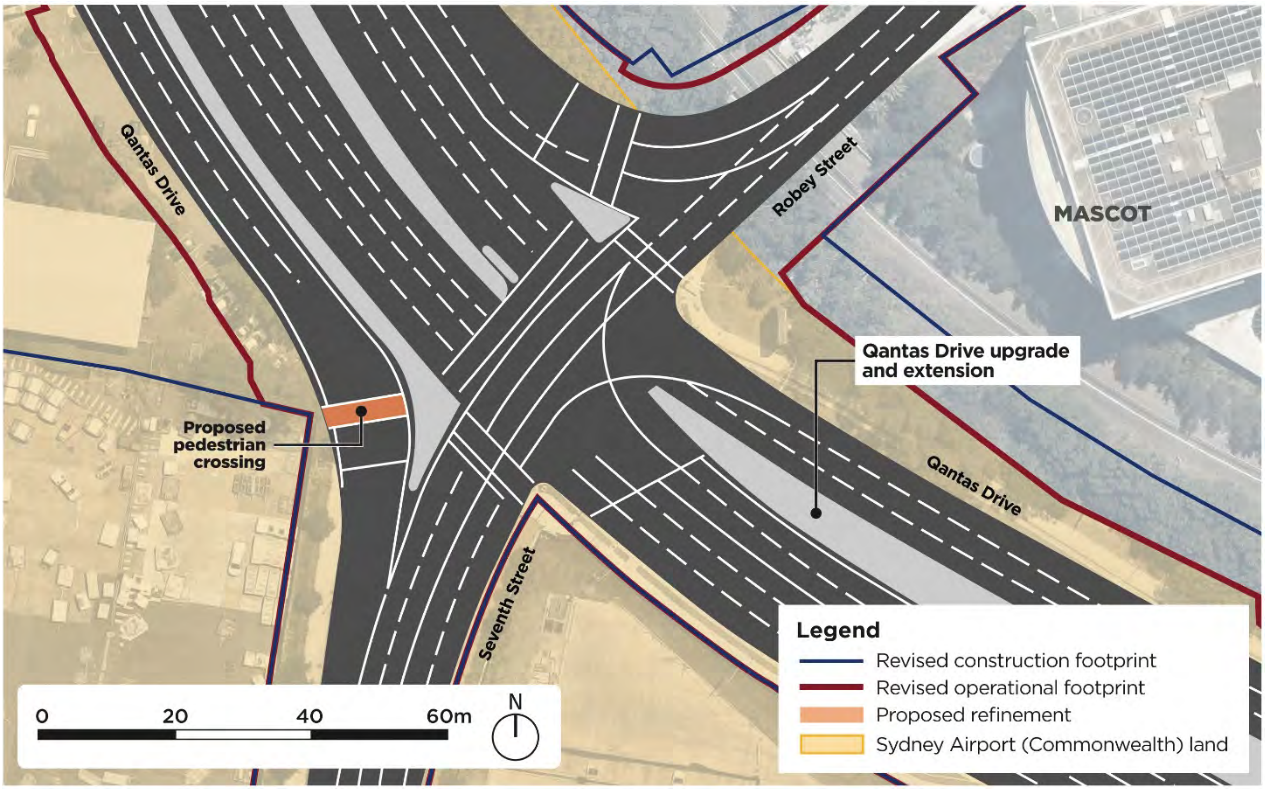

Figure 3.4 Proposed pedestrian crossing at Seventh Street

3.1.5 Sydney desalination pipeline maintenance vehicle turning area

The exhibited project

The exhibited project did not include specific facilities for maintenance vehicles to turn in the vicinity of the Sydney desalination pipeline. However, an indicative area was shown on Figure 7.4 of the EIS/preliminary draft MDP.

Justification for the proposed refinement

Following stakeholder consultation, it is proposed to construct a vehicle turning area immediately to the west of the location shown in the EIS/preliminary draft MDP.

The proposed refinement would avoid impacts on Sydney Airport land reserved for the high intensity approach lights, which guide aircraft to the main north–south runway at Sydney Airport.

Description

Design features and location

Figure 3.5 shows the location of the proposed refinement. A paved vehicle turning area would be constructed on the western edge of the land occupied by the high intensity approach lights, adjacent to the proposed active transport link. The location of the proposed turning area is shown in Figure 3.5.

The turning area would be designed in consultation with the operators of the Sydney desalination pipeline.

Construction

The indicative construction methodology would be as described in section 8.2.3 of the EIS/preliminary draft MDP.

Project footprint and land requirements

The proposed refinement is located on land subject to the EP&A Act. The proposed refinement would result in minor changes to the operational footprint and permanent land requirements (see Figure 3.5 and Table 3.1). The acquisition or lease arrangements would be as described in section 19.3.1 of the EIS/preliminary draft MDP.

Table 3.1 Permanent land requirements for the proposed maintenance vehicle turning area

Location	Property title	Ownership	Estimated change of area (hectares) required for proposed refinement and proportion of lot required[1]	Total estimated area (hectares) required for the project and proportion of lot required[1]
Swamp Road, St Peters (HIAL)	Lot 1 DP 869306	Commonwealth of Australia	Reduction of 0.05 ha (9%)	0.05 ha (9%)
Swamp Road, Tempe	Lot 2 DP 869306	Private	Increase of 0.05 ha (7%)	0.3 ha (35%)

Note: 1. The estimate of land required is based on a concept design that is subject to refinement during detailed design, and the final area required may vary from that shown

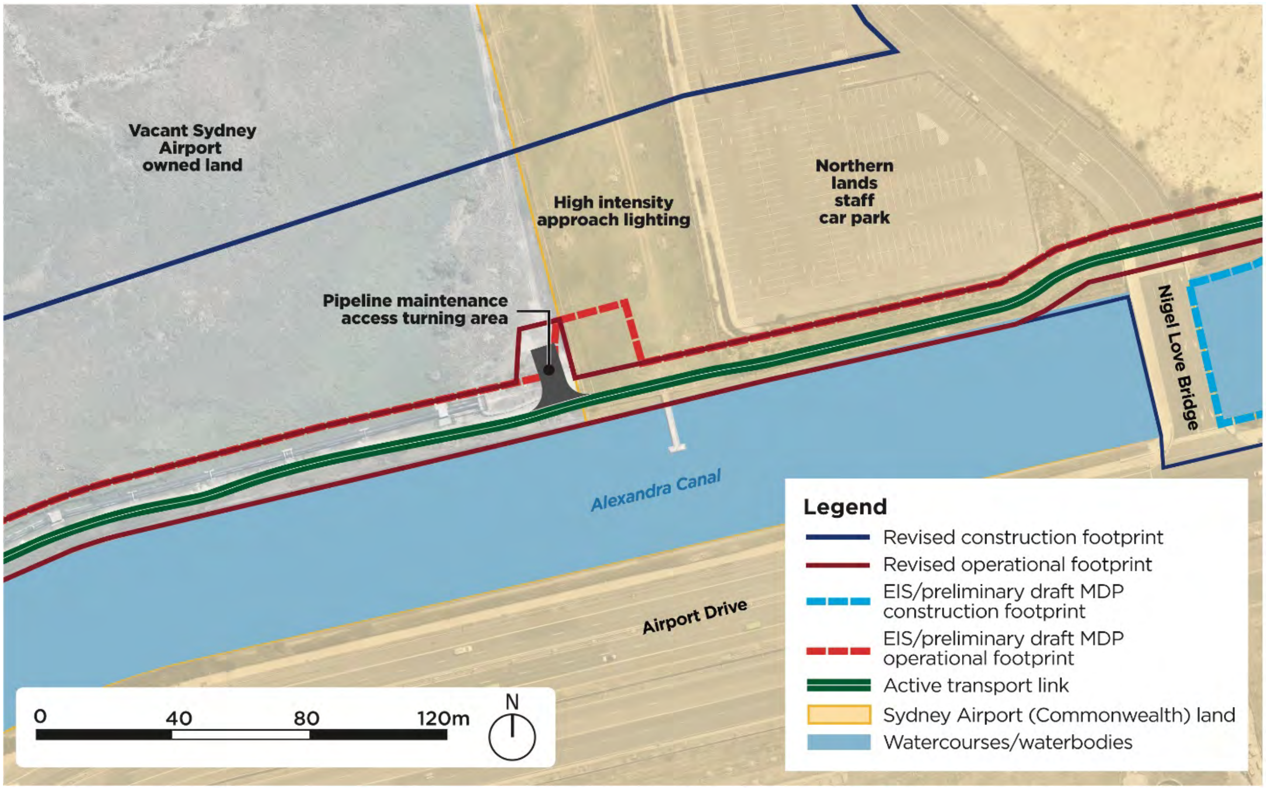

Figure 3.5 Sydney desalination pipeline maintenance turning area

Assessment

The potential impacts of the project, including the proposed refinement, were compared to those in the EIS/preliminary draft MDP.

The proposed refinement change the location of impacts. However, as a result of the similarities in the vegetation across the two areas, which are not considered to have biodiversity conservation values, no changes to the impacts described in the EIS/preliminary draft MDP are predicted.

There would be no other changes to impacts associated with the proposed refinement.

Changes to mitigation measures

No changes to mitigation measures are proposed.

3.1.6 Additional construction area for active transport link crossing

The exhibited project

Section 8.1.3 of the EIS/preliminary draft MDP describes the construction footprint and work areas required for the project, including the proposed active transport link. The footprint is shown on Figures 8.1 to 8.6 of the EIS/preliminary draft MDP. The exhibited construction footprint excluded a section of Alexandra Canal to the east of the Nigel Love bridge.

Justification for the proposed refinement

Further development of the active transport link is considering alignments that cross Alexandra Canal between the Nigel Love bridge and the existing rail bridge. It is proposed to include this area as part of the construction footprint to ensure that alternative alignments for the canal crossing can be considered.

Description

Design features and location

Figure 3.6 shows the location of the proposed refinement.

The proposed refinement involves an adjustment to the construction footprint to provide flexibility for the design of the active transport link crossing of Alexandra Canal.

The active transport link crossing would be designed to be 0.5 metres above the one per cent AEP flood level in the canal, and above the peak maximum flood if possible.

The proposed location of the crossing, tie-in points on either side of Alexandra Canal, and effects on flooding, would be confirmed during detailed design.

Construction

The indicative construction methodology would be as described in section 8.2.3 of the EIS/preliminary draft MDP.

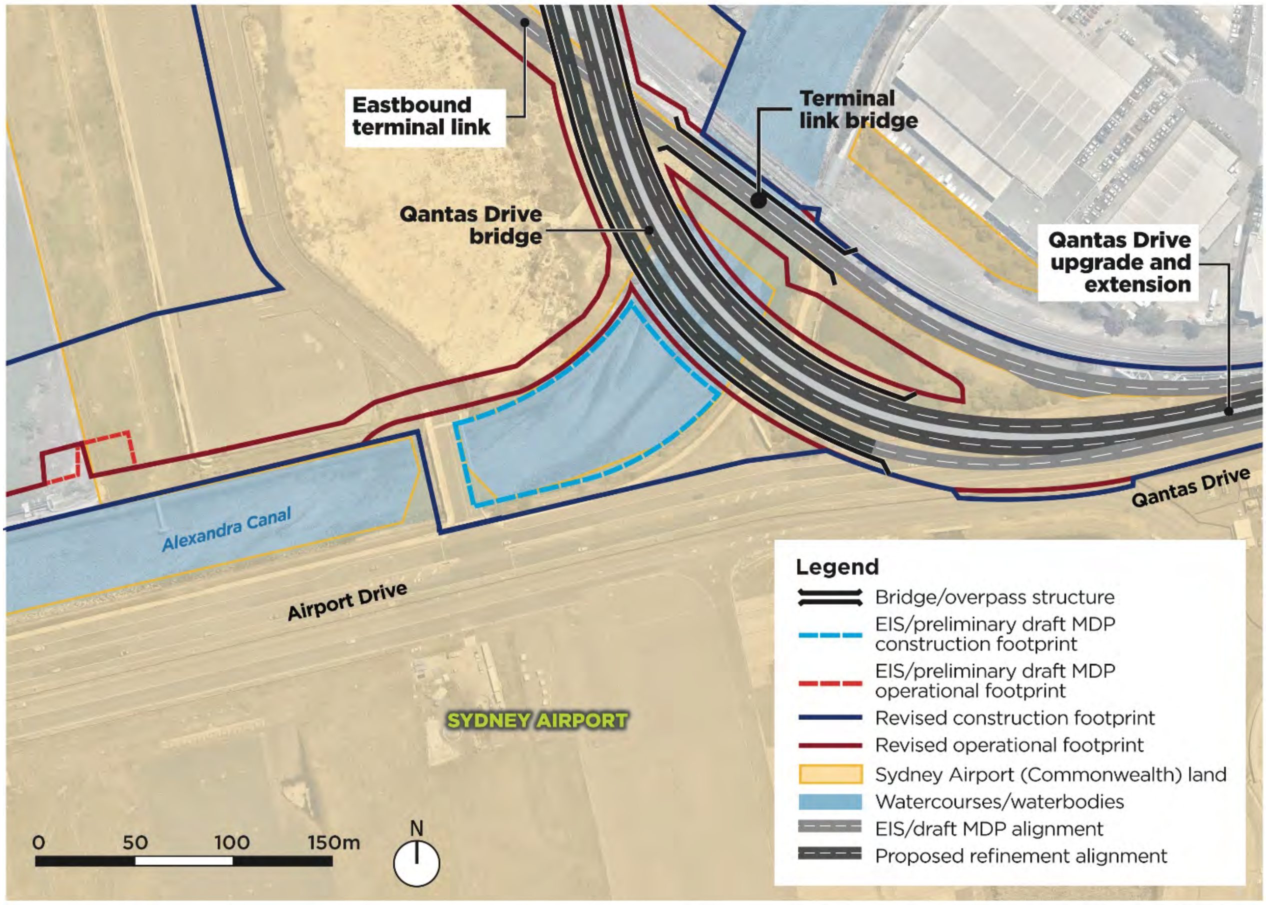

Figure 3.6 Additional construction area for active transport link crossing

Project footprint and land requirements

The proposed refinement is located on land subject to the EP&A Act and Sydney Airport land (see Figure 3.6). The Commonwealth of Australia holds aerial title over part of the land owned by the NSW Government at this location.

The proposed refinement would result in minor changes to the construction footprint over Alexandra Canal (see Figure 3.6) and the project's temporary land requirements (see Table 3.2). The acquisition or lease arrangements would be as described in section 19.3.1 of the EIS/preliminary draft MDP.

Table 3.2 Temporary land requirement changes for the active transport link crossing

<table>
<tr><th>Location</th><th>Property title</th><th>Ownership</th><th>Estimated change of area (hectares) required for proposed refinement and proportion of lot required[1]</th><th>Total estimated area (hectares) required for the project and proportion of lot required[1]</th></tr>
<tr><td rowspan="2">Alexandra Canal, Mascot/St Peters/Tempe</td><td>Lot 13 DP 1050464</td><td>NSW Government</td><td>Increase of 0.7 ha (5%)</td><td>1 ha (8%)</td></tr>
<tr><td>Lot 12 DP 1050464</td><td>NSW Government[2]</td><td>Increase of <0.1 ha (<1%)</td><td><0.1 ha (69 %)</td></tr>
</table>

Notes: 1. The estimate of land required is based on a concept design that is subject to refinement during detailed design, and the final area required may vary from that shown
2. The Commonwealth of Australia has aerial title above some of the lots identified.

Assessment

The potential impacts of the project including the proposed refinement were compared to those in the EIS/preliminary draft MDP.

The proposed active transport link bridge is located in a critical area of the canal where overbank flooding and discharges from the Sydney Airport northern ponds occurs during events less frequent than the one per cent AEP.

The bridge would be designed to be 0.5 metres above the one per cent AEP flood level in the canal with the intent to also be above the peak maximum flood if possible. A key constraint is the minimum clearance required to the underside of the Qantas Drive extension bridge and the overall height of the active transport link bridge structure.

The landing points and approach ramps of the bridge would need to be carefully designed to minimise any influence on overbank flows, with particular regard to discharges from Sydney Airport's northern ponds. Modelling to confirm the extent of any potential changes to predicted flood impacts would be undertaken in accordance with mitigation measure HF2.

Changes to mitigation measures

No changes to the mitigation measures are proposed.

3.2 Clarifications

In response to issues raised in the submissions and during ongoing stakeholder consultation, this section clarifies information included in the EIS/preliminary draft MDP, namely:

- Proposed active transport connections
- Return of residual land to Inner West Council

- Construction traffic volumes and routes, including use of Holbeach Avenue by heavy vehicles
- Impacts to advertising structures
- Providing direct access to Canal Road
- Impacts on empty container storage.

It is noted that none of these clarifications are changes to the design of the project as described in the EIS/preliminary draft MDP. Further information regarding these clarifications is provided below.

3.2.1 Proposed active transport connections

A number of submissions received during the exhibition period raised concerns about active transport in the study area, and queried what was proposed as part of the project. About 77 per cent of the community and 42 per cent of key stakeholders respectively raised concerns in relation to active transport.

The following sections provide clarification and further details of what is proposed as part of the project, how it fits with the existing active transport network, and the options that were considered during project development. It consolidates the information provided in the EIS/preliminary draft MDP, and provides additional information where relevant.

Existing active transport network

Cycle networks

The cycle network in the vicinity of the project includes cycleways, shared paths, marked on-road space, and shared road lanes where there is no special provision for cyclists. These facilities are used for a mix of recreational and commuter trips. The quality of this infrastructure for cyclists varies with some poor condition and non-compliant facilities such as along parts of Qantas Drive and the Giovanni Brunetti bridge and some recently upgraded including access into Terminal 1 along the recently upgraded Marsh Street near Terminal 1 and into Terminal 1. The key cycling infrastructure in the study area is made up of three off-road links - the Alexandra Canal cycleway, Cooks River shared path and its connections and the Bourke Road cycleway.

The Alexandra Canal cycleway is located within the project site and forms the main east–west and north–south connections for active transport across the study area. The path runs adjacent to Airport Drive along the eastern side of Alexandra Canal from the existing cycle bridge to Coward Street. It connects to Terminal 1 via a recently completed path connecting to the terminal as well as Wolli Creek, and surrounding areas via Marsh Street. The cycleway is also connected to paths located within the Tempe Recreation Reserve via an existing bridge located west of the Airport Drive/Link Road intersection. This cycleway complements the nearby Cooks River shared path and facilitates and forms part of a popular route used by commuter cyclists.

The path continues north along the east bank of Alexandra Canal linking to Coward Street (on road cycle facilities) to connect with the Bourke Road cycleway in Mascot. The Bourke Road cycleway provides a north–south link into the Sydney central business district.

Pedestrian networks

The pedestrian network in the vicinity of the project generally consists of roadside footpaths, shared paths (pedestrian/cyclist) and dedicated road crossings. The local and arterial roads in the study area provide footpaths along their length. Streets in Mascot (including around Mascot Station and in Mascot generally) provide a higher degree of pedestrian amenity due to the network of small or detailed streetscapes and mix of residential and commercial land uses.

Pedestrian facilities are generally limited near Sydney Airport, with many facilities of poorer quality due to uneven pavements and limited separation from busy roads.

Pedestrian accessibility to Terminal 1 via Marsh Street and Airport Drive is limited due to narrow footpaths on the Giovanni Brunetti bridge. A direct link exists from the Alexandra Canal shared path to the Terminal 1 precinct via a pedestrian/cycle bridge and overpass which connects into the car park at Terminal 1.

Terminals 2/3 are linked to the Mascot Station precinct with pedestrian access provided via Robey and O'Riordan streets. Upgrades to the pedestrian network on Seventh Street, Sir Reginald Ansett Drive and Qantas Drive have recently been completed by Roads and Maritime and Sydney Airport Corporation. There is an informal narrow path continuing from the Alexandra Canal cycleway on the northern side of Airport Drive and along the northern side of Qantas Drive linking to the paths located west of Robey Street.

A footpath on Canal Road provides access over Alexandra Canal between Ricketty Street and Princes Highway.

Why is a new active transport link required?

The project would impact the existing cycleway adjacent to Airport Drive along the eastern side of Alexandra Canal. This cycleway is part of a popular regional cycle route extending from Wolli Creek Station to Coward Street, Mascot, where it connects to shared paths on Bourke Street, Bourke Road and Gardeners Road which provide access to other areas of Sydney including the Sydney CBD along Bourke Street.

Constructing the project would impact the existing cycleway. In addition, the Sydney Airport Master Plan proposes to close Airport Drive to non-airport traffic, which would also necessitate relocation of the existing cycleway.

Due to the acknowledged importance of the existing cycleway, it was identified that an alternate route was required following completion of the project.

How was the preferred route selected and what options were considered?

Process and constraints

As described in section 6.5.5 and shown on Figure 6.10 of the EIS/preliminary draft MDP, an options development and assessment process for a new active transport link was undertaken by Transport (then Roads and Maritime Services) in 2018 and 2019. The process involved consultation with stakeholders, including bike groups, local councils, residents and community groups.

The following constraints and functional requirements were considered as part of each option:

- The route needs to connect to the existing shared path at Coward Street and cross Alexandra Canal at one or more locations
- Access requirements and maintenance clearances around the Sydney desalination pipeline need to be maintained
- Land acquisition requirements and the rights of existing easement holders
- To provide adequate levels of safety for users, crime prevention through environmental design (CPTED) principles need to be incorporated
- A positive user experience was desired and would result from options incorporating a shorter route, less steep inclines and providing canal views

Options identified

Four potential options to relocate the active transport link were considered:

- Option 1 – on the western side of Alexandra Canal, along the desalination pipeline easement, with underpasses of the proposed Terminal 1 connection and freight terminal access bridges, and the existing Nigel Love bridge
- Option 2 – along the proposed Terminal 1 connection and the eastbound terminal link roads

- Option 3a – via the eastern edge of the Tempe Recreation Reserve and through the Tempe Wetlands, connecting to Swamp Road in Tempe and the proposed eastbound terminal link
- Option 3b – similar to option 3a, via the eastern edge of the Tempe Recreation Reserve, connecting to the southern end of South Street in Tempe, and via Swamp Road and the proposed eastbound terminal link.

All options would be longer than the existing route.

In addition to the options considered in section 6.5.5 of the EIS/preliminary draft MDP, Transport also considered a shared path from Tempe Recreation Reserve to other shared paths at St Peters interchange along the proposed Terminal 1 connection and St Peters interchange connection. However, there was concern regarding the safety of this route due to the relative isolation and lack of passive surveillance. Furthermore, consultation with cycle groups indicated a strong preference for shared user paths along the banks of Alexandra Canal, which could connect with Sydney Park, rather than a path immediately adjacent to the proposed new road infrastructure.

How the options were assessed

Each of the options was assessed against the constraints and functional requirements. This included discussion of each option in a forum, which was attended by local councils, Sydney Airport Corporation and the then Transport for NSW/Roads and Maritime.

Preferred option

The outcome of the assessment was that option 1 (located along the western side of Alexandra Canal) was selected as the preferred route. This option would provide the shortest, flattest route, and a similar level of amenity to the existing route. This route would be suitable for both commuters and leisure users, and would maximise the experience of canal views, which was strongly advocated by all user groups and stakeholders.

How does the preferred option relate to local and regional strategic planning for cycling/active transport?

Plans for a principal bicycle network in Sydney are under development. The draft network was considered during development of the project. The proposed active transport link is consistent with the draft network. The new link would maintain the connection along Alexandra Canal provided by the existing route, which also forms part of the regional cycle network.

The development of the proposed active transport link has also taken into account other relevant strategic plans and policies, including the Priority Cycleways Program*,* the *Greater Sydney Region Plan* (Greater Sydney Commission, 2018a), *Eastern City District Plan* (Greater Sydney Commission, 2018b) and the *Future Transport Strategy 2056* (Transport for NSW, 2018a).

What is proposed as part of the project?

Section 7.9 of the EIS/preliminary draft MDP describes what is proposed as part of the project. In summary, a new link would be provided along the western side of Alexandra Canal. The proposed active transport link would be a shared pedestrian and cycle path. The alignment of the proposed link is shown in Figures 7.3 and 7.4 of the EIS/preliminary draft MDP.

The southern end of the new link would connect to the existing shared path near the southern end of the proposed Terminal 1 connection bridge. The link would cross to the western side of Alexandra Canal via the existing (unnamed) pedestrian/cyclist bridge located near the intersection of Link Road and Airport Drive. The alignment would then head north-east along the western side of Alexandra Canal adjacent to the Sydney desalination pipeline.

The new link would continue along the western edge of the canal, passing under the proposed Terminal 1 connection bridge, the freight terminal bridge and the existing Nigel Love bridge. The link would then cross to the eastern side of the canal, via a new bridge located south of the Terminal link bridge. On the eastern side of the canal, the link would connect to the existing cycle path near the proposed Terminal link bridge.

The proposed new link would be about 160 metres longer than the existing path.

The proposed new route has been designed to ensure suitable grades are achieved. The new route would also provide separation from adjacent roadways, canal views and improved air quality and user experience compared to the existing route which is closer to Airport Drive. The proposed new link has been designed with reference to the principles of crime prevention through environmental design.

A new section of shared path would also be provided as part of the freight terminal access. This path would provide pedestrian and cyclist access to the Sydney Airport freight terminal located on Link Road from areas to the north.

The path would extend along Airport Drive, crossing Alexandra Canal via the freight terminal bridge to intersect the Terminal 1 connection. The alignment of the proposed link is shown in Figure 7.3 of the EIS/preliminary draft MDP.

Temporary active transport routes proposed during construction are described below.

Design details and requirements

The proposed active transport links have been and would continue to be designed in accordance with:

- Guide to Road Design Part 6A: Paths for Walking and Cycling (Austroads, 2017b)
- Relevant Australian Standards, including AS 1428.1-2009 Design for access and mobility
- The requirements of the Disability Discrimination Act 1992
- Relevant CPTED principles.

The design would address the following minimum requirements:

- A minimum clear width of 3.5 metres
- Horizontal and vertical clearances to structure and adjacent obstacles
- A crossfall that considers the suitability for all users.

Urban design and landscaping along and in the vicinity of the active transport links would be defined by the urban design and landscape plan for the project, which will be prepared in accordance with mitigation measure LV1.

How will the proposed active transport link connect with other facilities and links (existing and future), including destinations such as train stations?

The proposed link would ensure that the Alexandra Canal cycleway remains part of the regional cycle network between Wolli Creek Station and Coward Street, Mascot, and connects to shared paths on Bourke Street, Bourke Road and Gardeners Road.

Extending the Alexandra Canal cycleway further north towards Sydney Park has been identified as a potential future connection. However, this does not form part of the project for which approval is being sought. Developing such a link would require a coordinated approach involving Sydney Water, Bayside Council, Inner West Council and the City of Sydney, and landowners along the canal. Transport is committed to working with these stakeholders to explore future options to extend the existing shared user path along Alexandra Canal.

Constraints associated with available land and adjacent land uses, and the need to maximise road capacity to achieve the project objectives meant that including an active transport link between the Alexandra Canal cycleway and the Terminals 2/3 precinct was not possible. However, Transport recognises that there is demand for an active transport connection between the Alexandra Canal cycleway and the Terminals 2/3 precinct. Transport is working closely with Sydney Airport Corporation to explore options for active transport connections that could be delivered. The Sydney Airport Active Transport Forum, which includes local councils and bicycle user groups, would continue to be consulted as part of this process.

Consideration of further potential links to other facilities or locations (including those described above) would be undertaken by Transport in consultation with Sydney Airport Corporation and in conjunction with relevant stakeholders (ie councils). This would be in the form of an active transport strategy to be developed in accordance with mitigation measure TT18.

What connections to Sydney Airport terminals and end of trip facilities are/will be available?

A number of initiatives to improve active transport access and facilities at Sydney Airport have been implemented over the past six years, including the new footbridge and cycleway connection linking the external cycleway network to the Terminal 1 precinct (removing six vehicle conflict points), and provision of secure bicycle storage facilities and end-of-trip facilities. Additional infrastructure to support active transport has also been installed in the Terminals 2/3 precinct, with three metre wide shared paths extending into the precinct and enhanced crossing facilities at the precinct entry.

Sydney Airport Corporation envisages further improvements as part of the Five-Year Ground Transport Plan (which forms part of the Sydney Airport Master Plan 2039) and the approved T2/T3 Ground Transport Solutions and Hotel Major Development Plan, details of which will be further developed and discussed with key stakeholders as the plans are implemented.

Transport is working closely with Sydney Airport Corporation to explore options for additional active transport connections that could be delivered. The Sydney Airport Active Transport Forum, which includes local councils and bicycle user groups, would continue to be consulted as part of this process.

Where to from here?

As described in section 9.4.7 of the EIS/preliminary draft MDP, a number of connectivity gaps exist in the current active transport network of the area. In accordance with mitigation measure TT18, Transport and Sydney Airport Corporation will prepare an active transport strategy to integrate and enhance accessibility opportunities. The strategy will be prepared in conjunction with relevant stakeholders and provide a guide for future active transport infrastructure provision. The active strategy will include consideration of:

- Opportunities for additional connections to and around the Sydney Airport terminals
- Integration with planning for future facilities in accordance with the Sydney Airport Master Plan
- Need for additional end of trip facilities at Sydney Airport.

In addition, the NSW Government is delivering cycleway network improvements through the Priority Cycleways Program and the Connecting Centres cycling partnership program. Transport is also establishing a principal bicycle network in collaboration with councils.

Planning for future regional connections is being considered by the NSW Government guided by the Greater Sydney Region Plan, District Plans, and the Future Transport Strategy 2056.

Temporary active transport routes during construction

Transport is committed to providing safe cycling and walking connections during construction of the project and is working with shortlisted construction contractors to maintain existing pedestrian and cyclist connectivity in a safe manner.

A temporary active transport link is required to maintain the safety of users during construction. Section 8.6.4 of the EIS/preliminary draft MDP outlines the proposed temporary active transport links to be provided during the construction of the project, with these routes to be confirmed by the construction contractor as part of construction planning and detailed design.

Early construction and diversion to the proposed new path along the western side of Alexandra Canal will be undertaken to ensure the best possible active transport experience during the project construction period.

To account for construction staging, different alignments would be used at different times to avoid active work areas. Only one alignment would be used at any time.

As shown on Figure 8.20 of the EIS/preliminary draft MDP, the temporary active transport link would cross Alexandra Canal via the existing pedestrian and cycle bridge located west of Link Road. The link would then generally follow or be located adjacent to the existing access road along the eastern edge of Tempe Recreation Reserve and along the southern edge of the Tempe Wetlands. The temporary active transport link would turn south-east and cross the work area for the Terminal 1 connection, the Sydney Airport high intensity approach lights and the Sydney Airport employee car park, before crossing Alexandra Canal at the Nigel Love bridge and re-joining the existing cycleway.

The temporary route would be refined to ensure that acceptable levels of user safety is maintained throughout construction. Safety measures to be put in place would potentially include:

- Fencing to separate the path from surrounding construction areas
- Installation of culverts where routes are required to cross under active work areas or where works would occur above the link.

Provision for pedestrians in the project design

The project would generally maintain existing pedestrian facilities in the vicinity of the project with the exception of facilities located along Qantas Drive west of the Seventh Street/Robey Street intersection on both sides of the road.

Where existing pedestrian facilities are located in close proximity to the project, they would be maintained where possible (such as along Sir Reginald Ansett Drive). Some modification to existing facilities would be required at the Link Road intersection, where existing paths would be adjusted to reflect the closure of the western leg of this intersection.

Existing pedestrian movements around the intersection of Seventh Street and Sir Reginald Ansett Drive would be retained, with the new intersection design to ensure that all existing pedestrian movements are maintained. An additional pedestrian crossing is now proposed at Seventh Street (see section 3.1.4).

A new signalised pedestrian crossing would also be provided at the intersection of the Terminal 1 connection and the freight terminal access. These facilities would provide access across the Terminal 1 connection to the adjacent residual lands which would be subject to a future master plan being undertaken by Inner West Council.

3.2.2 Return of residual land to Inner West Council

As described in sections 7.12.4 and 19.4.3 of the EIS/preliminary draft MDP, it is expected that some of the land required to construct the project in Tempe (about eight hectares of land, including land within the Tempe Lands and other areas on the former Tempe landfill) would be returned to council following completion of construction. As agreed with Inner West Council, the following amenities would be provided at the completion of the project:

- For the open space areas located west of the Terminal 1 connection:
  - An off-leash dog exercise area
  - A car parking area
  - Grassed open space for the remainder of this area affected by the project
- For land east of the Terminal 1 connection:
  - A handstand area
  - A new path linking the car park area (noted above) with the proposed section of active transport link located adjacent to the freight terminal access.

In accordance with mitigation measure LU3, Transport will continue to consult with Inner West Council regarding the future use of residual land in the Tempe Lands and adjoining area in accordance with the master planning process for these areas; and will ensure that the urban design and landscape plan for the project does not inhibit the outcomes of this process.

Given the proximity of the residual land to the airport, any future use in this location would also need to take into consideration aviation matters.

3.2.3 Construction traffic volumes and routes, including use of Holbeach Avenue by heavy vehicles

Section 8.6 of the EIS/preliminary draft MDP describes the proposed haulage routes to be used and indicative construction traffic volumes required for the project.

Following submissions from a number of stakeholders regarding the suitability of the proposed haulage routes, indicative traffic volumes and proposed access points, Transport has determined that Holbeach Avenue and access point A8 are no longer required to be used by heavy construction vehicles. Heavy vehicle access to the western bridges compound and work areas would be via access points A4, A5, A6 and A7 (refer to Figure 3.7). Further review of the proposed construction traffic using access point A8 has also resulted in a revision of the estimated light vehicle movements during the peak periods.

Table 3.3 provides the updated construction traffic information and shows the changes to vehicle movements to access points A7 and A8 (underlined and in bold font).

Table 3.3 Revised indicative construction traffic volumes

Work area	Access points	Morning peak vehicle volumes (vehicles per hour)		Afternoon peak vehicle volumes (vehicles per hour)	
		Light	Heavy	Light	Heavy
St Peters interchange connection, including compound C1	A1	0	20	330	20
	A2	10	10	10	10
	A3	330	20	0	20
Eastern bridges, including compound C2	A4, A5, A6 and A7	330	20	330	20
Terminal 1 connection and western bridges, including compound C3	**A7**	10	20	10	20
	A8	**100**	0	**100**	0
Qantas Drive, including compound C4	A9 for access to compound	50	20	50	20
Terminals 2/3 access, including compound C5	A10	100	20	100	20
Airport Drive	A11	10	10	10	10
	A12	10	10	10	10
Qantas Drive	A13	30	20	30	15

Table 8.8 of the EIS/preliminary draft MDP also describes the construction traffic movements required for earthworks activities.

Further refinement of the earthworks quantities has resulted in a reduction of the number of vehicles required for the importation of fill. As a result, the required number of vehicle movements to import fill have reduced to 9,800 from 10,200.

Also, as described in section 3.1.2 of this report, the number of truck movements required to transfer landfill waste to off-site disposal locations has increased. Table 3.4 provides the updated construction traffic volumes required for earthworks activities including these two changes (underlined and in bold font).

Figure 3.7 **Preliminary site accesses and haulage routes**

Table 3.4 Revised indicative earthworks traffic volumes

Work area	Access points	Direction of movement	Total movements
St Peters interchange connection, including compound C1	A1 or A3	Inbound	27,600
Terminal 1 and western bridges, including compound C3	A7	Inbound	**9,800**
		Outbound	**6,900**
Terminals 2/3 access, including compound C5	Off Sir Reginald Ansett Drive or A10	Inbound	1,700
		Outbound	300

3.2.4 Impacts to advertising structures

As described in section 19.3.3 of the EIS/preliminary draft MDP, the project would require some structures to be removed. Since exhibition, further work has been undertaken to minimise impacts on advertising structures. As a result of these further investigations, it is confirmed that the project would result in direct impacts (ie removal) of 24 advertising structures. This is three less structures than proposed in the EIS/preliminary draft MDP. The change in impacts is a result of the following:

- Avoiding a structure located adjacent to Sir Reginald Ansett Drive (refer to Figure 3.8).
- Confirming that two structures initially identified as advertising structures are currently used for wayfinding signage. The location of these two structures are shown in Figure 3.8.

The resulting impacts on advertising structures by the project would reduce from 27 to 24 structures.

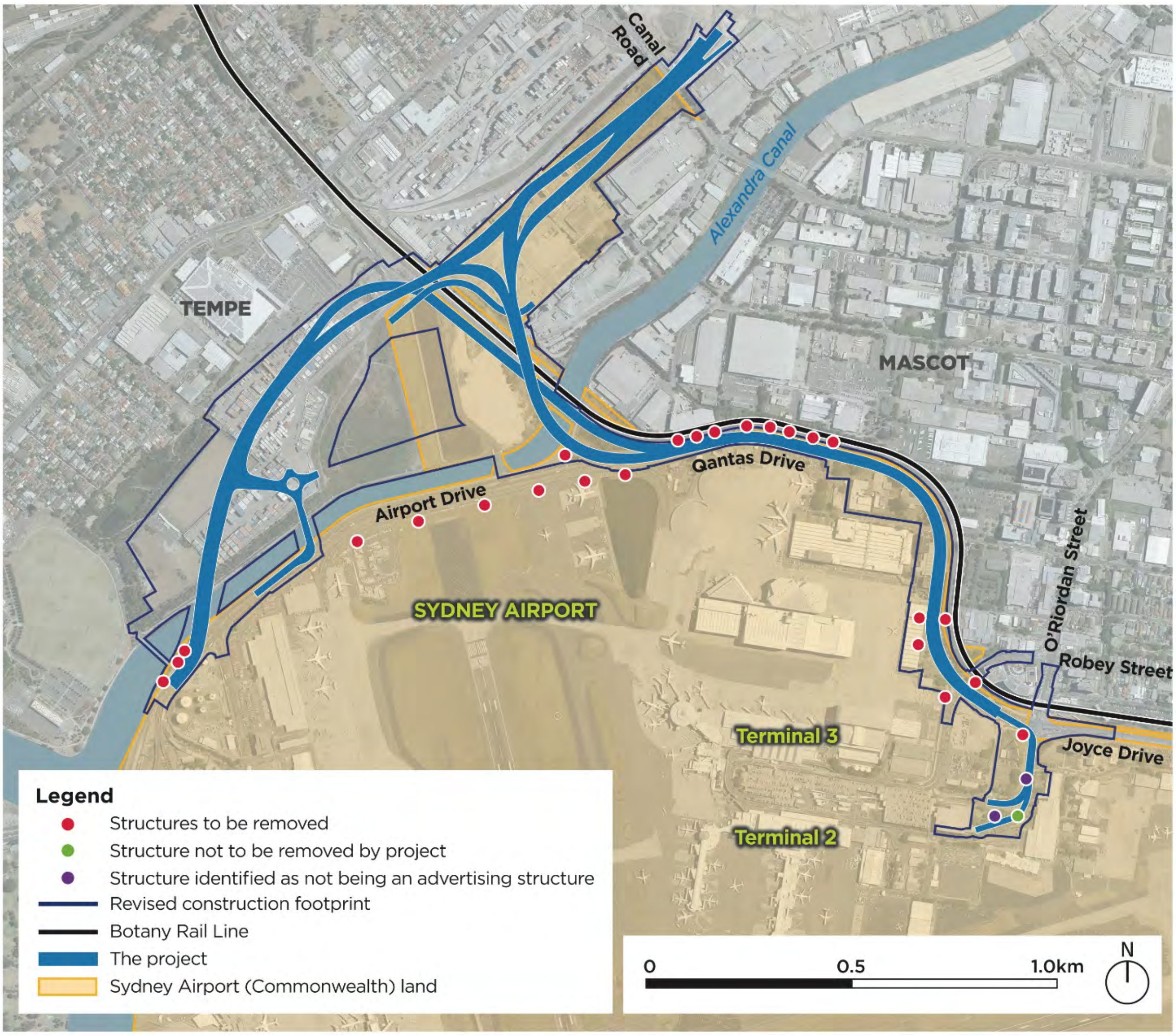

Figure 3.8 Changes to impacts on advertising structures

3.2.5 Providing direct access to Canal Road

A number of the key stakeholder submissions received during the exhibition period raised concerns about the need for direct access to the project for freight vehicles (via the provision of ramps to/from Canal Road) and queried why this was not proposed as part of the project. About 23 per cent of key stakeholder submissions raised concerns in relation to this matter. Concerns raised included:

- How the project objectives can be met without providing direct access to Canal Road
- Impacts of not providing direct access to Canal Road, particularly in terms of ongoing traffic congestion in Mascot and associated amenity impacts on residents
- Efficiency of empty container deliveries to Port Botany without the Canal Road access ramps.

The following sections provide clarification and additional information in relation to these issues.

Meeting the project objectives without providing direct access to Canal Road

Without infrastructure investment, forecast freight demand in and around Sydney Airport and the Port Botany precinct is expected to place further pressure on existing road infrastructure in the area.

As stated in the section 5.3 of the EIS/preliminary draft MDP, the objectives of the project are to:

- Improve connectivity to Sydney Airport terminals by providing high capacity direct road connections that cater for forecast growth in passenger and air freight volumes
- Support the efficient distribution of freight to and from Sydney Airport and Port Botany to logistic centres in Western Sydney
- Improve the liveability of Mascot town centre by reducing congestion and heavy vehicle movements on the local road network.

The project has been designed to achieve these objectives. The new road infrastructure would provide high capacity, direct connections between Sydney Airport and the Sydney motorway network, and would support efficient distribution of freight to and from Sydney Airport and Port Botany by reducing congestion in the network.

Modelling indicates that the project would provide additional network capacity for up to 60,000 vehicle trips per day in 2036. The forecast demand for the project would attract traffic away from other local and arterial roads within the study area, resulting in lower traffic volumes on most roads compared with the volumes predicted without the project. Heavy vehicles travelling from south-west and western Sydney would be able to use the Sydney motorway network and the project to travel to and from Port Botany, bypassing the local road network in Mascot. The modelling indicates that the project would significantly reduce heavy vehicle movements through Mascot along routes such as O'Riordan Street and Botany Road. As a result, the road network is predicted to operate with substantially less congestion than it would have without the project being implemented.

Transport recognises the important role of the Cooks River Intermodal Terminal in the container supply chain. However, only a proportion of the heavy vehicle movements in the local area travel directly between the Cooks River Intermodal Terminal and Port Botany. The former Roads and Maritime Services considered an early concept for access ramps on and off the project at Canal Road. Options for both tolled and untolled ramps were modelled. The results of modelling indicated that the ramps would lead to an increase in vehicles accessing Princes Highway and Canal Road from outside the local area network, which would reduce capacity and traffic performance along these key routes.

This analysis informed the decision that the future transport and general traffic benefits of including ramps at Canal Road as part of the project would be low compared to the estimated costs of constructing the ramps and acquiring additional land from Sydney Airport Corporation and the Australian Government. The analysis also indicated that the project objectives would be achieved without providing direct access to and from Canal Road.

Freight-only ramps were considered as a result of consultation with the freight industry. However, the traffic benefits for freight-only ramps would be less than for ramps open to general traffic, with a similar cost of construction.

Following feedback, Transport has been working with the freight industry throughout 2019 to further consider dedicated heavy vehicle access onto and off the project at Canal Road. While the ramps are not part of the project's scope or funding package approved by the NSW Government, the project team has refined the design of the project to ensure future construction of the ramps is not precluded. Future ramps would be subject to funding approval, land agreements and planning approvals.

Impacts on traffic congestion and amenity in Mascot

Without infrastructure investment, forecast freight demand in and around Sydney Airport and the Port Botany precinct is expected to place further pressure on existing road infrastructure in Mascot.

The project would reduce congestion and heavy vehicle movements in Mascot. Modelling indicates that the project would provide additional network capacity for up to 60,000 vehicle trips per day in 2036. The forecast demand for the project would attract traffic away from other local and arterial roads within the study area, resulting in lower traffic volumes on most roads compared with the volumes predicted without the project. As a result, the road network is predicted to operate with substantially less congestion than it would have without the project being implemented.

In relation to the routes used by heavy vehicle travelling between the Cooks River Intermodal Terminal and Port Botany, predicted traffic demand would shift from O'Riordan Street and Botany Road in the Mascot town centre. It is predicted that these roads would carry between 25 to 30 per cent less traffic in 2036 than they would have without the project, as vehicles use the project to bypass the surrounding road network. Heavy vehicles travelling from south-west and western Sydney would be able to use the Sydney motorway network and the project to travel to and from Port Botany, bypassing the local road network in Mascot.

Providing direct access between the project and Canal Road or the Cooks River Intermodal Terminal would remove a proportion of trucks from the Mascot area. However, the ramps are not needed to reduce congestion and heavy vehicle movements on the local road network and improve the liveability of Mascot town centre.

Efficiency of empty container deliveries to Port Botany

Freight vehicles travelling to Port Botany from Cooks River Freight Terminal would continue to travel through Mascot. However, as traffic would be attracted away from the local road network and onto the project, there is predicted to be an improvement in travel times along this route compared to without the project. It is predicted that O'Riordan Street and Botany Road would carry between 25 to 30 per cent less traffic in 2036 than they would have without the project, as vehicles use the project to bypass the surrounding road network. The project would also reduce the volume of heavy vehicles on Gardeners Road and reduce traffic growth on General Holmes Drive and Southern Cross Drive. These traffic reductions would take pressure of the local road network, ease congestion, and improve the efficiency of empty container deliveries from the Cooks River Intermodal Terminal to Port Botany.

The delivery of the Sydney Gateway road project would be coordinated with Transport for NSW's wider infrastructure delivery program. This includes a number of programs, such as the Mascot intersection upgrade program, aimed at delivering a safe and reliable road network around Mascot. Further to this, operational network performance reviews would be carried out following the opening of the New M5 and the M4/M5 Link. Should these reviews identify the need for further traffic management measures on the transport network, a program would be developed to carry out such works. These works are likely to deliver benefits and relief to the network during and after the construction of the Sydney Gateway road project.

3.2.6 Impacts on empty container storage

Transport acknowledges the challenges that the freight industry faces in relation to the management and storage of empty containers. An assessment of the empty container sector in Sydney was provided in Technical Working Paper 12 (Business Impact Assessment) as part of the EIS/preliminary draft MDP. The assessment notes that 'Since 2017, trade imbalances and the drought have caused a substantial build-up of empty containers in Sydney with ECPs reported to be 85 to 95 per cent of capacity and with overflow storage of empty containers at more than 20 transport depots'.

As described in section 20.3.4 of the EIS/preliminary draft MDP, the supply of empty containers requiring storage in Sydney has increased in recent years due a reduction in agricultural exports and the drought, together with increased container trade. The supply of empty containers in Sydney is expected to increase further. The volume of containers handled at Port Botany is forecast to grow to 2.9 million twenty-foot equivalents (TEUs) by 2021, almost 3.4 million TEUs by 2026, and four million TEUs by 2031. Noting the predicted increases in container supply, empty container storage capacity in Sydney has remained largely unchanged since 2015.

The assessment of the empty container sector and potential impacts due to the project presented in Appendix D to Technical Working Paper 12 in the EIS/preliminary draft MDP noted that the empty container park sector has reached a critical situation. The growth in demand for empty container storage has exhausted the available capacity of existing empty container parks in Sydney. The closure of the Tyne Container Services empty container park at Tempe due to the project would exacerbate current issues associated with empty container capacity. There is a lack of available industrial land close to Port Botany onto which the business could relocate. However, the assessment also noted there are underlying challenges facing the sector that need to be addressed irrespective of the project.

The assessment concluded that new intermodal terminals, which are currently being delivered, and changes in mode share towards rail would eventually address any capacity constraints faced by the industry in general. However, operational and commercial changes would be required across the sector to facilitate these changes.

Recognising the challenges currently facing the empty container supply chain in Sydney, Transport's Freight Industry Branch commissioned the NSW Empty Container Supply Chain Study in July 2019. The study notes there is already a deficit in empty container park capacity in Sydney to adequately manage the cycles in demand. It also notes that, while the demand for empty container storage has been growing in recent years, there has been no meaningful investment in empty container parks. This has been exacerbated by trade imbalances, and issues with current transactional and commercial arrangements and operational practices within the industry. The study considers the potential loss of empty container storage capacity if the Tyne Container Services empty container park at Tempe closes. It notes that recent and current developments associated with intermodal terminals in Sydney should address the loss in capacity. However, changes would be required in the logistics of managing empty containers to realise the additional capacity that the intermodal terminals can provide. The proposed Botany Rail Duplication would complement the increased use of intermodal terminals for empty container storage by providing increased capacity for delivery of empty containers to Port Botany by rail.

The study identifies a range recommendations to address commercial, operational and information issues currently faced by the industry. The recommendations are largely actions for the industry to implement. The recommendations include Transport establishing an empty container working group, with assistance from the Port Transport and Logistics Taskforce, to facilitate the implementation of recommendations by industry.

The draft study report was completed in late 2019. In December 2019, the freight industry was engaged for comment via the Port Transport and Logistics Taskforce. Transport's Freight Industry Branch is currently reviewing the draft report, including comments from the industry, with a view to finalising the report in 2020 and facilitating implementation of the key recommendations.

Tyne Container Services has advised that half of the approximately 10,000 TEUs (equating to around 6,500 containers) currently stored at their Tempe facility will be relocated to their Punchbowl and Molineux Point sites between April and September 2020. To offset the remaining 5,000 TEUs in the short term, Transport is working with industry participants, including NSW Ports and Tyne Container Services, to explore options for additional storage at alternative facilities or for containers to be moved offshore by shipping lines to ease capacity for the whole market.

In February and March 2020, shipping lines acted to improve empty container capacity by collecting a significant number of empty containers and shipping them back to Asia. This helped reduce the number of empty containers and improve existing empty container park use, from around 95 per cent of current capacity in early February 2020 to around 85 per cent.

3.3 Additional information and assessments

The following assessments have been undertaken since exhibition:

- Additional noise and vibration assessment
- Additional windshear and turbulence modelling
- Additional odour assessment
- Development of proposed surface water quality discharge criteria
- Historical Archaeological Research Design and Excavation Methodology for 30 Canal Road, St Peters
- Additional contamination investigation.

The assessments have been undertaken to assist with considering and responding to issues raised in submissions and during consultation with stakeholders and/or to further progress commitments made in the EIS/preliminary draft MDP.

An overview of these additional assessments is provided in the following sections. Full reports are provided in Appendices B to F.

3.3.1 Additional noise and vibration assessment

A noise and vibration assessment was undertaken as part of the EIS/preliminary draft MDP to assess the potential construction and operation noise and vibration impacts of the project. The results of this assessment are provided in Technical Working Paper 2 (Noise and Vibration) and summarised in Chapter 10 of the EIS/preliminary draft MDP.

Following exhibition of the EIS/preliminary draft MDP, an additional assessment of the potential construction and operation noise and vibration impacts of the project was undertaken. The purpose of the additional assessment was to assess changes in predicted noise and vibration levels as a result of the proposed realignment to avoid the Cooks River Intermodal Terminal (see section 3.1.1 of this report), and to respond to issues and queries in submissions. The additional assessment considered:

- Changes to noise levels as a result of a proposed realignment to avoid the Cooks River Intermodal Terminal
- Potential noise and vibration impacts at the building at 396 Princes Highway
- Screening offered by the building at 396 Princes Highway and the effect on noise levels at other sensitive receivers
- The contribution of noise levels from existing traffic on Unwins Bridge Road where impacts were predicted as a result the project
- Potential noise levels at passive recreation areas, including additional areas within Tempe Recreation Reserve and at the Tempe Wetlands
- Potential impacts at the new (relocated) Qantas Flight Training Centre, which received planning approval in November 2019
- Waste emplacement mound between Alexandra Canal, Terminal 1 connection and freight terminal access.

The full assessment results are provided in Appendix B.

Key findings of the assessment in relation to the above issues are provided in section 3.1.1 and in the responses in Parts B and C.

3.3.2 Additional windshear and turbulence modelling

A windshear and turbulence assessment was undertaken as part of the EIS/preliminary draft MDP in accordance with *National Airports Safeguarding Framework Guideline B: Managing the Risk of Building Generated Windshear and Turbulence at Airports*. The results of this assessment are provided in Technical Working Paper 3 (Airport Operations) and summarised in Chapter 11 of the EIS/preliminary draft MDP.

Following exhibition, an additional assessment of the potential windshear and turbulence effects of the project was undertaken. The assessment involved a sensitivity analysis of various project elements using computer modelling (computational fluid dynamics) to understand the influence on windshear and turbulence. It included an assessment of changes in windshear and turbulence as a result of the proposed refinement to the emplacement mounds (see section 3.1.2 of this report).

The testing included configurations with and without the proposed emplacement mound. The configurations were tested in nine wind directions at 22.5° intervals in accordance with *National Airports Safeguarding Framework Guideline B*. In five of the wind directions, the wake zone of the mound intersects the northern approach to the main north–south runway.

For each test configuration and wind direction, the wind speeds required to exceed the wind shear and turbulence criterion from *National Airports Safeguarding Framework Guideline B* were measured in the wind tunnel across an array of measurement points. The points extended 1,200 metres to the north of the runway threshold and up to 70 metres above the runway. Lower wind speeds were required to exceed the turbulence criterion (compared to the windshear criteria), confirming that turbulence is the limiting criteria

Key findings of the assessment with respect to the proposed emplacement mounds are provided in section 3.1.2. The full assessment results are provided in Appendix C.

3.3.3 Additional odour assessment

An odour assessment was undertaken as part of the EIS/preliminary draft MDP to assess the potential for odour impacts during works at the former Tempe landfill. The results of this assessment are provided in Technical Working Paper 17 (Odour Assessment) and summarised in Chapter 12 of the EIS/preliminary draft MDP.

Following exhibition, an additional assessment of the potential for odour impacts during works at the former landfill was undertaken. The purpose of the assessment was to consider the potential for odour to be generated from leachate during excavation. The assessment provided additional information to respond to issues raised by the NSW EPA, Inner West Council, and other stakeholders.

The full assessment results are provided in Appendix D. Key findings are provided in the responses in Parts B and C.

In summary, the additional assessment predicts a small reduction in potential odour emissions from works at the former Tempe landfill compared to the predictions made in Technical Working Paper 17. This reduction is attributed to the emplacement mounds design refinement (see section 3.1.2). As a result of this refinement, the majority of excavated waste at the former landfill would be loaded into trucks and removed off site. This refinement considerably reduces the area of exposed waste and more than compensates for the additional odour emissions from storage of surface leachate on site.

3.3.4 Surface water quality discharge criteria

Section 16.1.4 of the EIS/preliminary draft MDP describes the proposed approach to developing water quality discharge criteria for the project. It provided preliminary criteria based on 15 months of water quality monitoring that was undertaken within Alexandra Canal and Cooks River during the assessment process. These preliminary criteria, provided in Appendix B of Technical Working Paper 8 (Surface Water) were developed with reference to the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand Governments (ANZG), 2018) (the Water Quality Guidelines) and the *Australian Guidelines for Water Quality Monitoring and Reporting* (ANZECC/ARMCANZ, 2000) (the ANZECC guidelines).

Transport has revised the preliminary discharge criteria taking into account additional baseline monitoring data collected over an 11 month period between April 2019 and February 2020. The revised criteria are provided in Appendix E. Transport would adopt this criteria for any extracted groundwater that is intended to be discharged to Alexandra Canal. The criteria have been developed to ensure that any construction phase discharge from the project that meets the criteria would not result in a material change to existing water quality.

3.3.5 Historical Archaeological Assessment Research Design and Excavation Methodology

Mitigation measure NAH8 commits to preparing and implementing a Historical Archaeological Research Design and Excavation Methodology at the following locations within the project site:

- Intact sections of Alexandra Canal along the western bank of the canal on either side of the existing pedestrian and rail bridges
- Vacant land at 30 Canal Road (Lot 4 DP 555771 and Lot 3 DP 825649)

- Land located north of Canal Road that is currently used for the construction (stockpiling) of the New M5 (Lot A DP 391775, Lot B DP 394647 and Lot 2 DP1168612)
- Sydney Airport land considered to contain low or moderate archaeological potential
- Land along Qantas Drive considered to contain low or moderate archaeological potential
- Sydney Airport land located east of Sydney Airport northern lands car park and west of Botany Rail Line (Lot 1 DP 826101)
- Land to the west of Boral's St Peters facility and east of the Botany Rail Line.

Mitigation measure NAH8 commits to identifying the specific features of archaeological significance that could be present at these locations and provide a scope for further investigations to confirm and specify appropriate archaeological management for any remains identified.

Artefact Heritage commenced preparing the Historical Archaeological Research Design and Excavation Methodology for 30 Canal Road in December 2019. This included considering the likelihood of intact and significant archaeological remains associated with non-Aboriginal land use from 1830 onwards to occur within the site. The likelihood assessment was determined by detailed analysis of historical plans, land titles and contamination reports, which included site history details for the site.

This assessment concluded that:

- There was low and moderate potential for archaeological remains at the site
- Any remains would not meet the threshold of archaeological significance
- Earlier more significant remains associated with the pre-1880 land use are unlikely to have survived
- The project would not impact locally or state significant archaeological remains at the site.

The assessment made the following recommendations:

- Transport's *Unexpected Heritage Items Heritage Procedure 02* (Roads and Maritime, 2015a) would be implemented during all excavation works
- All relevant staff, contractors and subcontractors must be made aware of statutory obligations for heritage under the *Heritage Act 1977* (NSW) and best practice guidelines as outlined in the Burra Charter (Australia ICOMOS 2013) to ensure no significant unexpected archaeological remains are impacted
- If human remains, or suspected human remains, are found during the works, all work in the vicinity must cease, the site should be secured, and the NSW Police and Heritage Council must be notified in accordance with the *Unexpected Heritage Items Heritage Procedure 02.*

3.3.6 Additional contamination investigations

Technical Working Paper 5 (Contamination and soils) included an evaluation of contamination risks in accordance with the *National Environment Protection (Assessment of Site Contamination) Measure 1999*. The evaluation was based on development of a preliminary conceptual site model, which was informed by:

- Assessing historical land use activities at and adjacent to the project site
- Reviewing historical contamination investigations undertaken by others
- Contamination investigations carried out at 154 locations within the project site.

Following exhibition of the EIS/preliminary draft MDP, further targeted contamination investigations were undertaken at 262 locations. The additional investigations were undertaken in areas where information gaps were considered to exist and for due diligence purposes.

A key focus for the additional investigations was the Sydney Airport northern lands, located west of Alexandra Canal and south of the Botany Rail Line. During earlier investigations, a black 'tar-like' substance was identified within shallow soils and fill material in this location. The additional investigations confirmed the presence of tar throughout the Sydney Airport northern lands at depths of up to two metres.

Further contamination investigations are required to better understand the extent and volume of this tar material, including its presence on Sydney Airport land.

Part B

Part B

Response to key stakeholders

4 Local councils

This chapter provides responses to issues raised in submissions by local councils. The approach to analysing submissions and structuring responses is described in section 2.3 of this report. The issues raised in key stakeholder submissions have been summarised broadly according to the order and headings provided in each submission (where such headings were provided). In some instances, related issues have been grouped under a single heading.

4.1 Inner West Council

4.1.1 Transport, traffic and infrastructure

Limited scope of traffic and transport assessment area

Issue

The study area should be expanded to include, as a minimum, the three inner west crossing points of the T3/T8 heavy rail line - Edgeware Road (Bedwin Bridge), Gleeson Avenue (Sydenham Station) and Richardson Crescent (Tempe Station).

Without a broader geographic study area, it is not possible to adequately assess the true impacts of the project. Limiting the western/north-western border of the study area to the T3/T8 line means that traffic impacts on the Inner West LGA have only gained minimal consideration. The rail corridor has only three crossing points within the Inner West LGA, consequently all inner west traffic heading to and from the project, Sydney Airport and Port Botany is funneled through these three locations.

Response

The study area for the traffic, transport and access assessment generally extends from St Peters and Erskineville in the north, to Banksia in the south-west and Botany in the south-east. It includes the road and transport networks surrounding Sydney Airport, including those within Mascot, St Peters and Tempe (see Figure 9.1 of the EIS/preliminary draft MDP). With respect to the three nominated locations, the following changes in weekday daily traffic volumes are predicted based on outputs from the strategic model for the Sydney Greater Metropolitan Area and relative to 2016 traffic volumes:

- Edgeware Road – increases of 10 to 12 per cent (northbound) and 78 to 83 per cent (southbound) over the period 2026 and 2036
- Gleeson Avenue – decreases of 44 to 55 per cent (northbound) and 19 to six per cent over the period 2026 and 2036
- Richardson Crescent – decreases of four to six per cent (eastbound) and zero to five per cent (westbound).

An increase in southbound traffic volumes is anticipated on Edgeware Road at Bedwin Bridge of up to 83 per cent in 2036 compared to 2016 volumes. The predicted northbound traffic volumes are much lower in 2036 with increases of up to 12 per cent. By comparison, Gleeson Avenue and Richardson Crescent are predicted to have significantly lower traffic volumes in 2036, with increases of up to 6 per cent (Gleeson Avenue southbound and Richardson Crescent eastbound). Gleeson Avenue northbound is predicted to experience traffic volume reductions of 44 per cent in 2036. These locations would continue to convey traffic from the west and north-west with or without the project in place. As traffic growth on the wider network is from a variety of sources, the growth on these roads is not solely attributable to the project.

The study is sufficient and appropriate to ensure that all relevant impacts are captured.

General construction activity

Issue

The proponent should develop a detailed construction program, in consultation with Council, which includes community consultation, respite periods and respite arrangements for residents, parking, traffic and transport management plans, temporary active transport management initiatives, and contingency planning for ‘worst case scenarios’.

Response

A conceptual construction methodology and work program was developed for the purposes of the environmental impact assessment and is described in Chapter 8 of the EIS/preliminary draft MDP.

The appointed construction contractor would develop a detailed construction program based on the final construction approach, methods and activities. The detailed construction program would be updated routinely throughout construction.

As described in section 27.2.1 of the EIS/preliminary draft MDP, and in accordance with mitigation measure EM1, the management of environmental impacts during construction will be documented in the construction environmental management plan (CEMP). The CEMP will provide a centralised mechanism through which all potential construction-related environmental impacts would be managed. It would also provide the overall framework for the system and procedures to ensure that environmental impacts are minimised, and that legislative and approval requirements are fulfilled during construction. The CEMP will also include detailed management plans (environmental sub-plans), which will define how specific environmental issues are to be managed during construction in accordance with the mitigation measures (see Chapter 11) and the project’s approval conditions.

The mitigation measures provide for the development of detailed management plans, which will address specific issues as raised in council’s submission. For example, mitigation measure TT1 provides for a Construction Traffic and Access Management Plan to be prepared prior to construction and implemented as part of the CEMP. Mitigation measure SE3 provides for preparation of a communications strategy to detail the process of communicating and engaging with the community and stakeholders, including council, in the lead up to, and during, construction.

Respite arrangements would be addressed as part of the Construction Noise and Vibration Management Plan to be prepared as part of the CEMP (see mitigation measure NV5).

Mitigation measure TT13 commits to developing and implementing a worker parking strategy, which would include measures to encourage workers to use alternative transport arrangements.

Proposed night works

Issue

Night work should be minimised. Should night work be unavoidable, justification should be provided to affected parties and adequate notice provided in advance of the work. The proponent must develop a specific night works construction program, which includes details regarding advance notification of residents, limits to the hours of night-time works and the number of consecutive nights, noise reduction awareness programs for workers, and respite management systems.

Response

Construction work would be undertaken during standard construction hours wherever possible. However, some out-of-hours work would be required. Section 8.3.3 of the EIS/preliminary draft MDP describes the need and justification for out-of-hours work. Out-of-hours work is required to minimise the potential impacts on critical infrastructure and operations, including the operation of Sydney Airport, arterial roads and the Botany Rail Line. Out-of-hours works would be timed, where possible, to occur in parallel with other such works to minimise the activity durations. However, due to the nature of the works, some activities may not be able to be undertaken in parallel. The estimated duration of night works for each activity would be confirmed as part of the detailed construction planning and programming to be undertaken by the appointed construction contractor.

Mitigation measures NV5, NV6 and NV10 are relevant to the management of out-of-hours work, and provide for the development of location and activity specific management measures, including respite.

In accordance with mitigation measure NV5 a Construction Noise and Vibration Management Plan will be prepared prior to construction and implemented during construction. The plan will detail processes, responsibilities and measures to manage noise and vibration and minimise the potential for impacts during construction. The measures will include notifications and consultation with potentially affected residents.

Measure NV6 provides for location and activity specific noise and vibration impact assessments to be undertaken for works, including those that need to occur outside standard construction hours and are likely to result in noise levels greater than the relevant noise management levels. The assessments will confirm the receivers that would be impacted by the works, and the predicted impacts at those receivers, to assist with selecting appropriate management measures. Noise monitoring will be carried out at the start of new noise and vibration intensive activities to confirm that actual levels are consistent with the predictions.

Measure NV10 provides for noisy work and vibration intensive activities to be scheduled during standard construction hours as far as possible. Works or activities that cannot be undertaken during standard construction hours will be scheduled as early as possible during the evening and/or night-time periods. Construction activities that intrude into the prescribed airspace would need to be undertaken during Sydney Airport's curfew period. In accordance with measure NV10, respite measures will be implemented for noisy work and vibration intensive activities in a manner consistent with the *Construction Noise and Vibration Guideline* (Roads and Maritime, 2016).

Construction Management Plan

Issue

The detailed Construction Management Plan should address:

- Construction traffic volumes, including further information regarding management of access point A8 and the projected movements at access point A7
- Impacts of access to the Eastern Bridges compound, including suitability of the access route via Bellevue Street
- Impacts of access to the Western Bridges compound, including use of access point A8 by heavy vehicles and impacts on users of Tempe Reserve
- Impacts of overflow construction worker parking on Tempe Reserve, residents and businesses, including provision of spaces within the compounds/site, encouraging alternative travel arrangements for workers and demonstrating the availability of sufficient working parking.

Response

Construction traffic access management

As described above and in Chapter 9 of the EIS/preliminary draft MDP, transport, traffic and access will be managed during construction in accordance with the Construction Traffic and Access Management Plan, required by mitigation measure TT1. The Construction Traffic and Access Management Plan will include measures to manage traffic at all compound access points. In accordance with measure TT7, where reasonable and feasible, construction access arrangements will be modified to address any traffic flow issues identified by key stakeholders.

The EIS/preliminary draft MDP identifies preliminary access routes with the aim of providing direct and efficient access to major roads and, where possible, avoid local streets. These will be confirmed by the construction contractor. Access is required to compounds C2 and C3 for heavy vehicles. As described in section 3.2.3 of this report, only light vehicles would use the Holbeach Avenue access route. As a result, Bellevue Street would be the only access from Princes Highway able to service compounds C2 and C3 with heavy vehicles. Bellevue Street is a B-double route, which currently carries heavy vehicles to the Tyne

Container Terminals site. This street is therefore considered appropriate for use as a heavy vehicle access during construction.

Construction worker parking

Section 8.6.3 of the EIS/preliminary draft MDP notes the number of parking spaces that would be provided within the construction footprint, including at every compound, to cater for the estimated workforce. It is estimated that about 980 parking spaces would be provided.

The potential impacts of parking during construction are described in section 9.3.7 of the EIS/preliminary draft MDP. This section notes that there may be a shortfall of about 110 spaces during peak construction periods. This would be managed in accordance with mitigation measure TT13, which requires a worker parking strategy to be developed and implemented. The worker parking strategy will include measures to encourage workers to use alternative transport arrangements, such as public transport, and promote the use of shuttle buses to move workers between compounds and work areas where capacity in one parking area is limited but other parking areas have capacity. The number of workers required for the project would be confirmed by the construction contractor.

Parking spaces at Tempe Recreation Reserve would only be used if there are no other alternatives within the construction footprint, and if use of these spaces does not coincide with peak usage periods for the reserve (such as during weekends, school sports etc).

Traffic volumes

Issue

Council requests clarification regarding which predicted traffic volumes are correct - the additional 250 movements (AM and PM peak hours) predicted at Holbeach Avenue conflicts with information provided in section 8.6.2 of the EIS/preliminary draft MDP.

Additional information is requested regarding queuing on the right turn bay on the Princes Highway into Holbeach Ave as well as delays on Holbeach Ave exiting onto the Princes Highway as a result of the additional traffic. Measures to alleviate any impact should be provided.

There appears to be no comparative analysis of traffic generated from the existing sites and traffic generated once these sites are removed and replaced by the projected construction traffic (particularly during the peak construction period). Such an analysis is essential to predict likely impacts on the adjacent road network.

Response

Section 8.6 of the EIS/preliminary draft MDP describes the proposed haulage routes and indicative construction traffic volumes. These will be confirmed by the construction contractor.

As indicated in the submission, there was an inconsistency between the information in Table 8.7 of the EIS/preliminary draft MDP and Table 5-4 in Technical Working Paper 1 (Transport, traffic and access). The larger volume of heavy vehicles is proposed to access the site via Bellevue Street, which is an existing B-double route and more suitable for construction haulage. However, as described in section 3.2.3 of this report, Transport has reviewed the proposed haulage routes and indicative construction traffic volumes. As a result of this review, it was determined that only light vehicles would use the Holbeach Avenue access point A8 and the estimated peak hour traffic volumes was revised down from 250 to 100 vehicles per hour.

It is recognised that significant parts of the local road network are currently congested during peak periods. Congestion of the Princes Highway during peak periods is known to be affected by queues from downstream intersections. For this reason, it is proposed that construction workforce vehicles arrive and depart the various compounds and site car parks before and after these peak periods.

An analysis of the performance of the Princes Highway/Holbeach Avenue intersection during construction was undertaken. This analysis indicated that the right turn performance from the Princes Highway to Holbeach Avenue would operate at level of service F during construction, which is acceptable for minor right turn movements from major arterial roads. The key performance criteria for this intersection outside of peak hours is the right turn queue length.

The modelling indicated a minimum signal time of 14 seconds would be needed to ensure that right turn queues are contained within available storage bays. This is sufficient to allow up to 40 construction vehicles to be added to the existing 60 vehicles making this turn. This signal phase currently operates with an average of 13 seconds between 6 am and 7 am. This is based on a worst-case assumption of 100 per cent of construction vehicles arriving from the south in the morning, which is unlikely to occur. The modelling took into account existing movements as well as additional movements during construction. Queueing issues at this intersection are therefore not anticipated.

As described above and in Chapter 9 of the EIS/preliminary draft MDP, transport, traffic and access will be managed during construction in accordance with the Construction Traffic and Access Management Plan (mitigation measure TT1). The Construction Traffic and Access Management Plan will include measures to manage traffic at all compound access points. In accordance with mitigation measure TT7, where reasonable and feasible, construction access arrangements will be modified to address any traffic flow issues identified by key stakeholders.

The Transport Management Centre would have a key role to play and would be responsible for managing the capacity and functionality of various roads using the road occupancy license process. This process would include consideration of local peak periods related to different users on different parts of the road network. As part of the process, steps to minimise access disruption and delays would need to be implemented before any approval for works is granted, including undertaking works when traffic volumes are lower wherever possible.

Mitigation measure TT5 also commits Transport to developing construction staging and temporary work plans with the aim of minimising conflict with the existing road network as far as possible.

Enhanced public transport to Sydney Airport

Issue

The project should provide significant improvements to public transport access to Sydney Airport by:

- Provision of bus lanes (possibly bus rapid transit) and other bus priority measures
- Removal of station access fees and 'non-compete clause' for the Airport Link heavy rail line.

Response

Provision of bus only lanes

As described in Section 5.3 of the EIS/preliminary draft MDP, the objectives of the project are to:

- Improve connectivity to Sydney Airport terminals by providing high capacity direct road connections that cater for forecast growth in passenger and air freight volumes
- Support the efficient distribution of freight to and from Sydney Airport and Port Botany to logistic centres in Western Sydney
- Improve the liveability of Mascot town centre by reducing congestion and heavy vehicle movements on the local road network.

Achieving the objectives requires consideration of the road network as a whole and the need to maintain and improve capacity. The road corridors that would be upgraded are significantly constrained by both the freight rail corridor to the north and the Sydney Airport jet base to the south. The majority of available space is required to safeguard the future performance of the road network. This would leave insufficient available space to add bus only lanes. Converting a general traffic lane to a bus only lane would constrain road capacity for all other vehicles and be inconsistent with the objectives of the project.

Removal of the station access fee

Changes to the station access fee that apply to passengers using the Domestic Airport and International Airport stations on the T8 Airport and South Line are outside of the scope of the project.

To encourage the use of the rail line, the station access was capped in 2014 for customers using the Domestic Airport or International Airport stations more than once a week. The current cap is $30.16.

'Non-compete' clause

Provisions in the contractual arrangements for the T8 Airport and South Line Domestic Airport and International Airport stations do not directly prevent development of new bus routes to and from Sydney Airport. However, they do give protection to the Airport Link Company from certain events, such as the NSW Government developing a competing bus route between Sydney's central business district and the airport. Bus routes from other locations are not precluded and are being considered.

Transport's Sydney's Bus Future program will provide improved commuter bus access to Sydney Airport, with better east, west and south links. The program includes new bus routes and extra bus services to the airport. The program will introduce substantial improvements to bus travel times around the airport precinct.

Transport's More Trains More Services program will continue to provide additional capacity to the rail system over the next ten years. Since 2017, the program has delivered more than 1700 additional weekly services across the rail network. The next stages of the program will focus on delivering improvements for the T8 Airport and South lines.

The proposed ground transport interchange at Terminals 2/3, to be developed by Sydney Airport Corporation, will also provide direct and efficient access for vehicles and allow for an increase in the number of public transport services to and from Sydney Airport.

Changes to the contractual arrangements associated with the T8 Airport and South Line and stations, and additional bus routes, are outside the scope of the project.

Access to residual lands

Issue

The project should address the following access limitations:

- Access to residual lands - the proposed access to residual lands via the new Link Road extension is circuitous and restrictive. Should this land, or a part of it, be used as a Council material depot, access from the site to southern sections of the Inner West LGA (particularly Tempe, Sydenham, Marrickville, St Peters, Newtown) would be extremely difficult.
- Closure of Swamp Road and associated impacts on access to adjacent properties and residual lands.

Response

Access to the area of land located to the west of the Terminal 1 connection (currently occupied by the Tempe Lands, including the Tempe Golf Driving Range and Academy and the off-leash dog exercise area), which would become part of the project's residual lands, is currently via Holbeach Avenue. This access would not change as a result of the project.

Access to areas to the east of the Terminal 1 connection (currently occupied by Tyne Container Services and the Inner West Council depot), which would also become part of the project's residual lands, is currently via Swamp Road. As described in Table 7.1 of the EIS/preliminary draft MDP, Swamp Road would be closed as part of the project. Once the project is operational, access to these areas would be via the Princes Highway, Marsh Street and the project, using the Terminal 1 connection and the freight terminal access components. It is acknowledged that this access route would be longer than existing access arrangements. However the project alignment does not allow the Swamp Road access to be retained.

Section 3.1.3 of this report describes a proposed design refinement to improve access to the residual land. This involves providing an access stub road to the largest parcel of residual land located to the east of the Terminal 1 connection and north of the freight terminal access. The other smaller parcel of land would contain the proposed emplacement mound (see section 3.1.2 of this report), which would be retained by Transport. Accordingly, access to this smaller area would be restricted to road maintenance staff only.

Transport notes that council is preparing a master plan for the residual lands, which will confirm future land uses and internal access arrangements. In accordance with mitigation measure LU3, Transport will continue to consult with Inner West Council regarding the future use of residual land in the Tempe Lands and adjoining area, including development of Council's master planning process for these areas as appropriate.

The closure of Swamp Road would not result in operational impacts on properties currently using the road for access, as this land would be acquired by Transport and the activities of the current tenants (Tyne Containers and the Inner West Council) would cease. It is not feasible to retain access along the alignment of Swamp Road during operation. This is as a result of the presence of the proposed new road infrastructure, restrictions associated with road geometry, Sydney Airport's prescribed airspace, and clearance requirements for the crossing of the Botany Rail Line.

Sustainability of infrastructure

Issue

Infrastructure should be based on ecologically sustainable development principles and include water sensitive urban design, ecological restoration using endemic species from the Cooks River Valley, mitigation of the urban heat island effect, and zero or low emission development and operation. The project and its infrastructure should make a positive contribution to the area in the form of water quality improvements, ecosystem services and infrastructure designed as habitat (especially piers over Alexandra Canal).

Response

Section 28.2.3 of the EIS/preliminary draft MDP provides reasons justifying carrying out the project with regard to the principles of ecologically sustainable development (as defined by clause 7(4) of Schedule 2 of the EP&A Regulation):

- The precautionary principle
- Intergenerational equity
- Conservation of biological diversity and ecological integrity
- Improved valuation and pricing of environmental resources.

Specific consideration has also been given in the EIS/preliminary draft MDP to particular measures, such as the water quality targets of the Botany Bay and Catchment Water Quality Improvement Plan, incorporating water sensitive urban design (mitigation measure SW3), and measures to manage the urban heat island effect (mitigation measure CC3).

The species selected for replanting would include local endemic species from the Cooks River Valley where possible. However, the species selection will need to consider Sydney Airport's operational constraints, including the airport's prescribed airspace and minimising the risk of wildlife strike. As such, species would be selected to minimise opportunities to attract wildlife at levels likely to present a hazard to aircraft operations (mitigation measure AS5). There are no known breeding species of threatened bats or birds that would be impacted by the project. Whilst birds and bats may use the crevices of bridge structures over time, the project would not include specific habitat structures, in case this increases the risk of wildlife strike. Further information on these and other initiatives that would support the sustainability considerations of the project are described in sections 4.1.5, 4.1.6 and 4.1.9 of this report.

Mitigation measure SU1 provides for a holistic sustainability management plan to be developed to ensure that sustainability considerations are embedded during detailed design, construction and operation. This includes project-specific sustainability initiatives and implementation protocols to support achievement of an ‘excellent’ Design and As Built rating under ISCA’s sustainability rating tool (V1.2).

Design of critical elements

Issue

Council requests that a design review panel be established to ensure design excellence for the proposed infrastructure. Particular attention should be paid to the detail design of key structural elements such as the motorway overpasses/flyovers. The Project has the opportunity to pursue high levels of design excellence creating featured sculptural elements rather than simplistic bridge structures.

Response

In accordance with new mitigation measure LV3, the Director for the Centre for Urban Design at Transport will convene and facilitate an urban design review panel for the detailed design of the project. The panel will comprise the Government Architect, Director Bridges Technical Services (Transport), and an urban design-qualified representative from Sydney Airport Corporation.

Princes Highway

Issue

Council seeks commitment that measures to improve local amenity and pedestrian and cyclist conditions along the Princes Highway will be pursued in conjunction with the project. Consideration should be given to opportunities to capitalise on any traffic reductions along the Princes Highway that may result, including opportunities for public domain, sustainable transport and place making.

Response

The scope of the project for which approval is sought does not include works on or in the vicinity of the Princes Highway. Any opportunities for amenity improvements created by the project would need to be pursued separately.

Access between terminals

Issue

The design should be reviewed to enhance access between Sydney Airport terminals. The proposed removal of Airport Drive will necessitate a diversion to Sydney Gateway to move between Sydney Airport’s T1 and T2/T3. This diversion will apply to the existing 400 bus service, as well as parking shuttles, pedestrians, cyclists and motorists.

Response

The project would provide a high capacity free flowing connection between Sydney Airport Terminal 1 and Terminals 2/3. Although the travel distance would be longer than the present Airport Drive connection, this would be offset by the higher vehicle speed and reduced delays at key intersections. This arrangement would also provide additional capacity to cater for future growth in the number of aircraft passengers. The project would replace Airport Drive along this corridor, consistent with the Sydney Airport Master Plan.

Connection options with respect to Airport Drive were evaluated in section 6.4.6 of the EIS/preliminary draft MDP. Bypassing Airport Drive is preferred as it would remove the public safety risks associated with potential incursions into Sydney Airport’s prescribed airspace caused by large trucks. Relocating the active transport link to the eastern side of Alexandra Canal also provides a longer journey distance for pedestrians and cyclists; however the proposed alignment provides better connections to existing regional active transport networks.

Lighting (construction and operational)

Issue

Construction and operational lighting is to be designed and configured to avoid negative impacts on aircraft operations, residential properties and environmentally sensitive areas.

Response

Mitigation measure LV8 requires lighting to be designed in accordance with *AS 4282 Control of the Obtrusive Effects of Outdoor Lighting*.

In accordance with mitigation measure LV11, lighting of construction work areas, compounds and work sites will be oriented to minimise glare and light spill impact on adjacent receivers. In accordance with mitigation measure AS10, construction lighting will comply with section 9.21 of the Manual of Standards (CASA, 2017) and the *National Airports Safeguarding Framework Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity.*

Barrier effect

Issue

Connectivity and access to and through the site is to be ensured through detailed design of active transport and other links associated with the project.

Response

Future active transport access opportunities would be considered by the active transport strategy. In accordance with mitigation measure TT18, an active transport strategy will be prepared to integrate and enhance accessibility opportunities. The strategy will be prepared in conjunction with relevant stakeholders which includes local councils and provide a guide for future active transport infrastructure provision.

4.1.2 Active transport

Active transport links

Issue

The active transport plan is to be prepared in consultation with all adjacent councils, the local community and local bicycle user groups to ensure the following construction and operation issues are addressed:

- Concerns with proposed connectivity of active transport links to surrounding network and potential to be subject to flooding
- Temporary active transport links, including changes to the one-way road section in Tempe Reserve to two-way traffic, provision of routes which are safe, direct, with no additional time or distance burdens and with maximum gradients of five per cent, the viability of the cycleway during construction and interaction with worksite traffic.

Response

Connectivity of active transport links

The clarification provided in section 3.2.1 provides further information about the proposed connectivity and design of active transport. The project includes relocating the existing Alexandra Canal cycleway to the western side of Alexandra Canal – providing a new active transport link/shared path along the western side of the canal connecting with the existing regional cycle network. Any additional local connections within the project site will be defined by the active transport strategy, to be prepared in accordance with mitigation measure TT18. The purpose of this strategy will be to provide a guide for future active transport infrastructure provision. Measure TT18 commits to preparing the strategy in conjunction with relevant stakeholders, including Inner West and Bayside councils.

Further information about the strategic context, background, features, connections and design requirements for the proposed active transport link are provided in section 3.2.1 of this report.

Potential for links to be subject to flooding

Areas within and in the vicinity of the proposal site, including the existing active transport link, are flood prone. Short sections of the proposed active transport link are located in areas adjacent to Alexandra Canal where overbank flooding occurs during flood events less frequent than the one percent annual exceedance probability (AEP) event. Mitigation measures HF1 and HF2 commit to further flood modelling and development of a flood mitigation strategy for all temporary and permanent project components. The results of modelling will be used to inform the design of the active transport link to address potential flood risks as far as possible.

Temporary active transport links during construction

Transport is committed to providing safe cycling and walking connections during construction and operation of the project. Transport is working with the shortlisted contractors that are currently tendering for the project to maintain existing pedestrian and cycle connectivity in a safe and efficient manner. Transport is also committed to ensuring that all pedestrian and cycle infrastructure delivered by the project is designed and constructed in accordance with the Austroads Guide to Road Design, other applicable safety and design standards, and with consideration of crime prevention through environmental design principles.

4.1.3 Industrial lands

Impacts on industrial lands

Issue

There is no assessment relating to the project's impacts on industrial lands, including those to be returned to Inner West Council (under the Proposed Acquisition Notice). A number of issues are raised in relation to the land being significantly impacted by air and noise pollution with no mitigation measures proposed. Additionally, there is:

- A swale across the front of the land
- No downstream easement rights to Alexandra Canal
- Loss of connectivity to other Council land
- No certainty on future height of the land where there are severe limitations placed on development of the sites by Sydney Airport's Obstacle Limitation Surface.

Response

Chapter 19 of the EIS/preliminary draft MDP describes potential impacts on land use and properties as a result of the project, including impacts on industrial land. Section 19.4.1 notes that the project would impact about 18.5 hectares of land zoned for industrial uses by the relevant LEP. About 10 hectares of this land is zoned AD3 (Airport Logistics and Support) by the Sydney Airport Master Plan and is therefore not expected to be used for industrial purposes in the long-term (excluding potential airport related uses that could be considered industrial land uses).

Section 3.1 of this report describes a number of proposed design refinements, including a realignment of the project to avoid the Cooks River Intermodal Terminal and a new access point (stub road) to the residual land located east of the freight terminal access. The drainage design in this area would be refined during detailed design, taking into account the proposed new access, to ensure it does not adversely affect existing surface water movement on land that would be handed back to council.

The proposed refinements would reduce the amount of industrial land impacted by the project (by 0.6 hectares) compared with the amount documented in the EIS/preliminary draft MDP. The majority of this reduction has occurred the Cooks River Intermodal Terminal site, with the proposed refinements avoiding impacts on this property.

In accordance with mitigation measure LU3, Transport will continue to consult with Inner West Council regarding the future use of residual land and the master planning process for these areas as appropriate; and will ensure that the urban design and landscape plan for the project is consistent with the outcomes of this process. Council's master plan will identify future land uses for the residual land, including open space and/or industrial land uses.

Transport does not propose to increase the height of land being handed back to council. Any changes in elevation required on land that being handed back to council would be undertaken in accordance with the terms agreed to between Transport and council.

Access between the two areas of residual lands on either side of the project (Terminal 1 connection) would be available for vehicles (via the project and existing road network) and pedestrians (via pedestrian paths and crossings).

Acquisition impacts

Issue

The EIS should consider the project's impacts in relation to the 'retain and manage' principle of industrial land under objective 23 of the *Greater Sydney Region Plan* and Planning Priority 12 of the *Eastern City District Plan,* particularly in the context of the Inner West local government area. The EIS does not explain why all of the land to be resumed is required when a comparison is made of the road plans and the acquisition plans.

Any future design amendments to the project must minimise the permanent acquisition of industrial land.

It is essential that any land returned to Council is in useable form with self-sufficient access and easement rights.

Response

Chapter 19 of the EIS/preliminary draft MDP describes potential impacts on land use as a result of the project, including impacts on industrial land.

The permanent land requirements for the project are described in sections 7.11.2 and 19.3.1 of the EIS/preliminary draft MDP. In total, it is estimated that about 35.7 hectares of land within the project site would be permanently required for the project (including the proposed refinements described in Chapter 3 of this report). The permanent land requirements are anticipated to include:

- 20.9 hectares of Commonwealth-owned land
- 14.1 hectares of land owned by the NSW or local government
- 0.7 hectares of privately-owned land.

The permanent land requirements, which relate to the operational footprint and concept design, would be refined during the detail design phase. The land acquisition requirements would be based on the final road alignment and operational footprint.

Additional land would be temporarily required to construct the project. This land would not form part of the operational footprint of the project. Following construction, it is anticipated that some of the land required to construct the project in Tempe (including land within the Tempe Lands and other areas on the former Tempe landfill) would be available for other uses. Further information on residual land is provided in the responses in section 4.1.10 of this report and in section 19.4.3 of the EIS/preliminary draft MDP.

In accordance with mitigation measure LU1, the design will continue to be refined to minimise land requirements and potential impacts on existing land uses and properties as far as possible.

A response to issues raised in relation to access to residual land is provided in section 4.1.1.

4.1.4 Noise and vibration

Impacts on users of Tempe Reserve and associated facilities

Issue

The noise assessment does not consider users of Tempe Recreation Reserve including the playing fields, wetlands or other elements of the reserve. Further assessment of noise and vibration impacts on open space and residual lands should be carried out.

There is an absence of significant noise management measures proposed for Tempe Reserve (and the wetlands) other than a noise barrier, which will only provide a reduction of 5 dBA while the anticipated rise in noise will be up to 13 dBA.

It is recognised that further measures will be proposed to manage noise and it is requested that particular care should be taken to protect Tempe residents from noise associated with construction, operational traffic and reduced noise attenuation of ground-borne aircraft noise noting that Tyne Container Services currently acts as a noise barrier between Tempe and Sydney Airport.

Future noise mitigation measures should include the establishment of permanent monitoring stations in the Tempe residential area and Tempe Reserve. Improved noise attenuation should also be provided.

Response

Impact on receivers at Tempe Recreation Reserve and Tempe Wetlands

Sensitive receivers considered by the noise and vibration assessment are shown in Figure 10.2 of the EIS/preliminary draft MDP. The playing fields at Tempe Recreation Reserve were considered within noise catchment area number three (NCA03) as an outdoor area. No impacts above the noise management levels were predicted during construction for this area. An increase of between one and two dBA was predicted during operation. It is noted that the assessment was undertaken on the basis that the stacked containers at Tyne Container Services would not be in place.

Updated assessments for construction and operational noise have been undertaken to respond to issues raised in submissions and provide information in relation to the proposed design refinements (see section 3.1 of this report). The updated assessments are included in Appendix B.

For construction noise, the assessment included an additional area within Tempe Recreation Reserve further from the project site and in Tempe Wetlands. The assessment adopted a noise management level of 60 dBA in accordance with the *Interim Construction Noise Guideline* (DECC, 2009). Consistent with the assessment undertaken for the EIS/preliminary draft MDP, the construction noise modelling considered various scenarios relating to each construction activity. During construction, noise levels at the additional area within Tempe Recreation Reserve are predicted to comply with the appropriate criteria due to the distance between the works and this receiver being sufficient to reduce construction noise levels.

The assessment also predicted a ‘marginal to minor’ impact (between one to 10 dB exceedance of the noise management level) at Tempe Wetlands when site establishment works are undertaken nearby. Noise levels during other construction stages would be generally further away from this receiver and are predicted to comply with the noise management level.

In relation to operational noise, a daytime noise criteria of 55 dBA $L_{Aeq\ (15\ hour)}$ for open space (passive use) was adopted in accordance with the *NSW Road Noise Policy* (DECCW, 2011). The results of modelling of road traffic noise predicted that noise levels at Tempe Wetlands would be mostly at or below this criteria, except for a small area at the north-eastern end (south of Smith Street). This area is closest to the project site and has line-of-sight to the new roadway. The predicted daytime road traffic noise levels at this location are up to two dB above the 55 dBA criterion. It is noted, however, that the results of the noise monitoring carried out to inform the noise impact assessment in the EIS/preliminary draft MDP, including at a location at Alexandra Canal adjacent to Tempe Recreation Reserve, indicate that average noise levels (L_{Aeq}) in the reserves already typically exceed the predicted daytime road traffic noise levels from the project.

The assessment in the EIS/preliminary draft MDP considered potential construction noise impacts for residents in Tempe for a range of indicative construction scenarios. Construction noise levels in Tempe are predicted to comply with day time noise management levels for the majority of construction scenarios. Where exceedances are predicted, they are generally very minor, and would only occur during the use of certain noisy plant and equipment, which would only occur infrequently. While night-time noise impacts are indicated at Tempe in the EIS/preliminary draft MDP, Transport notes that works outside standard daytime construction hours that are likely to affect the amenity of sensitive receivers are only permitted where they cannot occur during the day. Daytime construction activities are not restricted in much of the proposed construction footprint close to the residential areas in Tempe, which would minimise the risk of disturbance due to night works.

The residences in Tempe to the east of Princes Highway are also predicted to experience an increase in road traffic noise due to the project. The greatest increases (up to 13 dbA compared to existing road traffic noise) are predicted in the areas around the intersection of South Street and Smith Street as this area would be closest to the new road. Predicted road traffic noise levels at many residences in this location are expected to exceed the relevant criteria.

In accordance with applicable guidelines, Transport has considered additional noise mitigation for this location. A five metre high noise wall is proposed to attenuate noise from the new road in Tempe. It is anticipated that this noise wall would reduce predicted road traffic noise levels from the road by around 5 dBA at the most affected residences. Even with the noise wall in place, however, a number of residences would be considered further for at-receiver treatment.

Transport notes that the assessment road traffic noise does not consider existing noise levels in this location from all sources. While road traffic noise levels are predicted to increase in residential areas near the Tempe Wetlands, existing road traffic noise levels are low in this area compared to existing ambient levels. In many cases predicted road traffic noise levels due to the project are very similar to existing ambient noise levels during the day and night, as confirmed by background monitoring carried out to inform the EIS/preliminary draft MDP. For example, daytime and night-time road traffic noise levels at 1 Fanning Street, Tempe are predicted to be 56 and 52 dBA respectively in 2036 due to the project. The noise monitoring carried out at this location indicated that existing ambient noise levels during the day were around 60-60 dBA and 53 dBA at night.

The assessment presented in the EIS/preliminary draft MDP considered increases in noise from ground-based aviation activities due to the proposed closure of the empty container park at Tempe and removal of the containers. The assessment concluded that worst case noise levels increases would be less than 3 dBA due to removal of containers, which is not likely to be noticeable in the nearest residential areas in Tempe. The assessment did not consider the potential attenuation of noise from ground-based aviation activities the proposed noise wall would provide. It is likely that the proposed noise wall would reduce increases in noise from ground-based aviation activities further.

Mitigation of impacts

Construction noise impacts in the reserves at Tempe, including Tempe Wetlands, are predicted to be minimal and limited to the site establishment work phase. Impacts would be managed in accordance with the Construction Noise and Vibration Management Plan (mitigation measure NV5), which would be developed in accordance with the *Construction Noise and Vibration Guideline* (Roads and Maritime, 2016).

The *Noise Mitigation Guideline* (Roads and Maritime, 2015b) defines the process for selecting feasible and reasonable noise mitigation measures for operational noise impacts associated with road projects. The process focusses on protecting the amenity of residents that would experience noise levels over the long term, rather than for transient receivers such as users of open space areas. Noise barriers are generally not considered reasonable to construct where open spaces alone are impacted by road projects.

As indicated in section 10.5.1 of the EIS/preliminary draft MDP, a five metre high noise barrier is proposed in this area adjacent to the Tempe Wetlands to provide mitigation to residential receivers in Tempe. The proposed noise barrier would reduce predicted road traffic noise levels around the Tempe Wetlands by up to 5 dB.

Monitoring

In accordance with mitigation measure NV16, operational noise mitigation performance will be documented in an Operational Noise and Vibration Review conducted within 12 months of the commencement of operation. The need for additional mitigation or management measures to address identified operational performance issues and meet relevant operational noise criteria will be assessed and implemented where feasible and reasonable.

No permanent noise monitoring stations are proposed.

4.1.5 Urban ecology and biodiversity

Issue

Council raised a number of concerns and provided a number of recommendations in relation to impacts on biodiversity.

Response

Responses to issues raised by council are provided in Table 4.1.

Table 4.1 Responses to biodiversity issues raised by Inner West Council

Recommendation/issue	Response
Council requested the following in relation to replanting and landscaping: ▪ Any loss of vegetation must be replaced in a mutually agreed form and location, as soon as the replacement site is available with lost trees being replaced at a ratio of 4 to 1, generally using the advanced trees with container sizes of at least 75L ▪ Areas of vegetation removed must be replaced with new local native plantings in the Tempe, Cooks River and Alexandra Canal area (ideally with mature vegetation) ▪ Any lost foraging areas must be replaced in a suitable form and at an appropriate location in consultation with Council ▪ Amenity trees (including fig trees) removed to construct the project should be replaced in accordance with the tree management strategy ▪ The mitigation measures should include creation of vegetated buffer zones through planting of local native species within the project site and surrounding areas.	In accordance with mitigation measure LV4, a tree management strategy will be developed, including measures to offset the loss of trees and achieve a net increase in tree canopy. The final location of replacement trees will be confirmed in consultation with Inner West Council and Sydney Airport Corporation. As described in section 7.12.3 of the EIS/preliminary draft MDP, and in accordance with mitigation measure LV1, an urban design and landscape plan will be prepared for the project. Further information on the contents of the plan is provided in section 7.12.3. Replanting would use local endemic species where practical. The selection and location of species will need to consider Sydney Airport's operational constraints, particularly in terms of the airport's prescribed airspace and minimising the risk of wildlife strike. As such, species will be selected to minimise opportunities to attract wildlife at levels likely to present a hazard to aviation operations (mitigation measure AS5).
The salt marsh community on the naturalised section of Alexandra Canal, at Tempe Reserve, adjoining the project site should be given special attention to ensure that it is not disrupted. This area should be preserved and/or enhanced as part of the project.	The salt marsh community is outside the project site and would not be directly impacted. The potential for indirect impacts would be managed by implementing a range of mitigation measures, including the Construction Biodiversity Management Plan (mitigation measure BD3) and the Construction Soil and Water Management Plan (mitigation measure CS9).

Recommendation/issue	Response
Council requested the following in relation to fauna habitat: ▪ The loss of foraging habitat is considered significant due to limited alternative areas in the surrounding urban context, consequently any potential impact on foraging areas must be minimised ▪ Council contests the statement in Table 22.4 that the impacts on habitat are minimal ▪ While the small linear patches of vegetation fringing Alexandra Canal appear as regrowth on fill material they act as habitat stepping stones ▪ The highly disturbed areas (exotic grassland and weeds) referred to in Table 22.3 of the EIS are considered locally significant and should be protected ▪ Any impacts on vegetation should be minimised and vegetation should be replaced after construction (with suitable local native species, especially in riparian areas) ▪ Areas of exotic vegetation that are valuable wildlife habitats (including reptiles, small mammals and for small birds) should be preserved and/or enhanced ▪ Residual impacts have been understated, as they do not appear to have taken into consideration the higher value of vegetation loss in a highly urbanised context (where there is so little vegetation).	Potential impacts on biodiversity values were assessed by the EIS/preliminary draft MDP in accordance with the requirements of relevant legislation and guidelines, including the Biodiversity Assessment Method. Detailed results of the assessment are provided in Technical Working Paper 14 (Biodiversity) and are summarised in section 22.3.2 of the EIS/preliminary draft MDP. The assessment approach is described in Chapter 3 of Technical Working Paper 14. The assessment concluded that the vegetation proposed to be removed provides limited habitat resources for native fauna due to its highly modified nature and the surrounding urban environment. The vegetation includes foraging and shelter resources for common native fauna typical of urban environments. Although a small number of food trees for the Grey-headed Flying-fox and foraging habitat for microbats would be removed, the impact is not considered to be significant in the context of available foraging habitat in the study area. Not all vegetation within the construction footprint would need to be removed. The area of vegetation removed would be limited to the minimum amount necessary to construct the project. Retained vegetation would be fenced to prevent damage or disturbance during construction. As described in section 22.6.1 of the EIS/preliminary draft MDP, project infrastructure has been sited to maximise the use of existing cleared areas and avoid areas of native vegetation as far as practicable. Mitigation measure BD2 commits to limiting vegetation clearing to the minimum necessary to construct the project. The measure also commits to establishing and maintaining exclusion areas around any native vegetation adjoining the project site in close proximity to work locations. Replacement trees will be provided in accordance with the urban design and landscape plan, as described above.
Council requested the following in relation to indirect contamination impacts on wetlands: ▪ Impacts on the coastal wetlands area must be managed by ensuring contaminated runoff does not reach this area and no stockpiles or construction activities are nearby ▪ Concern is expressed that there is a possibility of contaminated runoff (or sub-surface water) reaching Tempe Wetlands. Stormwater management and control must aim to (as a minimum) achieve BBWQIP targets and stormwater must be treated appropriately.	The coastal wetlands area and Tempe Wetlands are outside the construction footprint and are not expected to be directly impacted. No stormwater outlets are proposed into the wetlands. The potential for indirect impacts will be managed by implementing a range of mitigation measures, including the Construction Biodiversity Management Plan (mitigation measure BD3) and the Construction Soil and Water Management Plan (mitigation measure CS9).

Recommendation/issue	Response
Council requested the following in relation to impacts on the Grey-headed Flying-fox: ▪ Construction should be managed to ensure that there is no disturbance to Grey-headed Flying-fox flyways and to ensure light spill does not disturb them ▪ Consideration should be given to the impact of traffic/movement as a disturbance factor for the Grey-headed Flying-fox and the possibility of vehicle strikes.	Impacts on the Grey-headed Flying-fox are discussed in sections 22.3 and 22.4 of the EIS/preliminary draft MDP. The assessment concludes that the project would not directly impact any Grey-headed Flying-fox breeding camps. Although the project would introduce additional light, noise and vibration associated with street lighting and the movement of vehicles, fauna in the project site would be accustomed to existing light, noise and vibration associated with the operation of Sydney Airport and the surrounding road and rail network. In this context, the project is predicted to comprise only a minor increase in these potential impacts. The project is unlikely to increase the extent, duration, or magnitude of these impacts, to the extent that there would be a significant impact on biodiversity values. Few terrestrial fauna species occur in the project site that are at risk of vehicle strike, and those that occur are already subject to this risk. The project is unlikely to significantly increase the risk of vehicle collisions with fauna.
Council's microbat monitoring programs have found that several species of microbats consistently forage in areas along the Cooks River. Care should be taken to ensure microbats are not disturbed, both during construction and operation of the project.	In accordance with mitigation measure BD3 a Construction Biodiversity Management Plan will be developed and implemented as part of the CEMP and will include measures to manage biodiversity and minimise the potential for impacts during construction. Potential impacts to microbats would be considered during the preparation of this plan and measures to manage the potential for impacts included where relevant. As described above, no significant impacts on fauna during operation are expected, as fauna species would be accustomed to existing light, noise and vibration associated with the operation of Sydney Airport and the surrounding road and rail network. As such, no additional mitigation measures are proposed.
All bridges/overpasses should be designed in a manner which provides viable microbat habitat areas.	As described in section 7.2.2 and 7.12 of the EIS/preliminary draft MDP, the project (including the proposed bridges) has been, and would continue to be, designed in accordance with relevant road design standards and requirements. As described in section 11.2.5 of the EIS/preliminary draft MDP, the presence of wildlife (including bats) on or in the immediate vicinity of an airport site can create an aviation safety hazard. To minimise this risk, bridge designs would also consider the *National Airports Safeguarding Framework* (Guideline C) (International Birdstrike Committee, 2006a) and *Recommended Practices No. 1 – Standards for Aerodrome Bird/Wildlife Control* (International Birdstrike Committee, 2006b).

Recommendation/issue	Response
The areas of native vegetation (referred to in Table 22.4 of the EIS) are connected by weedy habitats. The weedy links referred to are considered critical in maintaining connectivity between the native habits. Fragmentation of habitats is a significant issue, and it is essential that any vegetation lost should be replaced immediately once construction in that area has ceased. Revegetation should not wait until the overall project has been completed.	Habitat fragmentation as a result of the removal of non-native vegetation was assessed in accordance with the Biodiversity Assessment Method and is considered in section 8.8.3 of Technical Working Paper 14 (Biodiversity) and summarised in Chapter 22 of the EIS/preliminary draft MDP. The assessment concluded that the project would result in minimal impact on connectivity and movement corridors, and that it is unlikely that the project would create an additional barrier to the movement of pollinator and seed dispersal vectors, such as insects and birds. The urban design and landscape plan for the project (described in section 7.12.3 of the EIS/preliminary draft MDP and required by mitigation measure LV1) and rehabilitation strategy (mitigation measure CS21) will include strategies to progressively rehabilitate/regenerate and or revegetate disturbed areas.
The project will increase edge effects, especially lighting, noise and potential for contamination through stormwater runoff. Any barriers (physical or otherwise) to fauna movement created by the project must be mitigated against. There will also be impacts during operations and the cumulative effects of noise and light must be considered.	The potential for edge effects, and direct and indirect impacts on biodiversity as a result of lighting, noise and water quality issues, was considered by the biodiversity assessment. Vegetation in the study area is fragmented by the existing rail corridor, roads and urban development. It is unlikely that the project would create an additional barrier to the movement of pollinator and seed dispersal vectors, such as insects and birds. The project would create few additional edge effects and is unlikely to significantly increase existing edge effects (see Table 22.5 of the EIS/preliminary draft MDP). The assessment noted that fauna in the study area would be accustomed to existing light, noise and vibration associated with the operation of Sydney Airport and the surrounding road and rail network, and that the project is likely to comprise only a minor increase in these potential impacts. The project is unlikely to increase the extent, duration, or magnitude of these impacts, to the extent that there would be a significant impact on biodiversity values.
The project must include measures to mitigate noise and light spill, through buffer plantings, light fittings and warmer spectrum lights.	The biodiversity assessment concluded that the project would have minimal additional impacts on biodiversity values during operation. As a result, no mitigation measures are proposed. Planting of replacement trees would be undertaken in accordance with the urban design and landscape plan (LV1) and tree management strategy (mitigation measure LV4).
Council raised the following concerns regarding the heat island effect: ▪ The heat island impact of a surface motorway of between 8 and 10 lanes is significant and it is essential that appropriate measures should be taken to minimise these impacts through treatments such as the use of new technology materials ▪ Wherever possible heat island effect/embodied energy (due to the increased hard surfaces) must be minimised through materials choice, detailed design, use of water sensitive urban design, increased tree canopy and similar measures ▪ Extensive use of planting and water sensitive urban design, introduction of tree coverage/canopies, acoustic barriers that also reduce heat absorption.	In accordance with mitigation measure CC3, the urban design and landscape plan will include consideration of appropriate landscape designs and species to reduce the urban heat island effect. This measure also commits to investigating other measures to mitigate the heat island effect during detailed design, such as light coloured pavements and shading structures for public spaces. Mitigation measure SW3 commits to confirming appropriate treatment measures, including water sensitive urban design, during detailed design.

Recommendation/issue	Response
Sydney Airport lands - Some of these areas have been identified in the Southern Sydney Regional Organisation of Councils Biodiversity Corridors Mapping as Priority Habitat. It is important to note that non-native vegetation can provide important habitat and act as stepping stones for wildlife movement in urban areas. Replacement habitat must be created in the project area. Impacts on both non-native and native vegetation needs to be minimised to ensure that impact on all habitats are minimised.	The biodiversity assessment concluded that the vegetation proposed to be removed on Sydney Airport land provides limited habitat resources for native fauna due to its highly modified nature and the surrounding urban environment. Mitigation measure BD2 commits to minimising vegetation clearance to the minimum necessary to construct the project. This includes both native and non-native vegetation. Replacement habitat would be considered as part of urban design and landscaping plan for the project.
Consideration of cumulative impacts on the threatened Eastern Bentwing Bat should be considered, as roosting habitats have also been affected by the WestConnex Rozelle Interchange project.	The biodiversity assessment considered the potential for impacts on the Eastern Bentwing Bat. The assessment concluded that the project would not impact on potential roosting habitat for the species.
Council should be consulted on the preparation of the Project's Biodiversity Management Plan and the CEMP.	If approved, Transport would continue to engage with stakeholders and the community in the lead up to, and during, construction. The CEMP and associated sub-plans would be prepared by the contractor(s) and approved in accordance with the requirements of the conditions of approval for the project.
Tempe Wetlands is an important local wildlife habitat. Development of the project must avoid impacts on the wetlands and existing ecological restoration sites. Impacts considered should include both direct and indirect impacts during construction and operation.	The project was designed to avoid direct impacts on Tempe Wetlands. The potential for indirect impacts on biodiversity (including at the wetlands) was considered by the biodiversity assessment. In accordance with mitigation measure BD1, the detailed design will avoid or minimise the need to remove and/or disturb native vegetation and fauna habitat. Exclusion areas will be established and maintained around native vegetation adjoining the project site to be retained in close proximity to work locations (mitigation measure BD2). Potential inadvertent impacts will be managed by implementing the Construction Biodiversity Management Plan (mitigation measure BD3).
Opportunities to maintain and expand adjacent coastal wetlands should be capitalised on.	The project would not impact areas mapped as coastal wetlands. The expansion of adjacent coastal wetlands is outside the scope of the project.
Opportunities for integrated ecologically sustainable place-making should be explored including improvements to and integration of; active transport, public domain, public art, indigenous and contemporary heritage, while simultaneously protecting and enhancing biodiversity/ecological areas.	Mitigation measure SU1 commits to implementing a sustainability management plan to ensure that sustainability considerations are implemented during the detailed design, construction and operational phases of the project. As described in section 7.12 of the EIS/preliminary draft MDP, the project has been and would continue to take into account relevant place-making principles, guided by the urban design and landscape plan.
Noting that capped contaminated fill limits the amount of deep soil tree planting which can occur on the site, it is essential that detailed landscape design include opportunities to provide specific deep soil spaces for trees.	The urban design and landscape plan and tree management strategy will provide detailed landscape designs and planting requirements that balance the need for additional and replacement trees with the operational safety requirements of Sydney Airport.

Recommendation/issue	Response
Specific consideration should be given to: ▪ Key fish habitats ▪ Grey-headed flying fox and micro-bats habitats and flyways ▪ Green and Golden Bell Frog habitat ▪ Migrating and threatened bird habitats ▪ Key vegetation communities.	The biodiversity assessment gave specific consideration to these matters, including: ▪ Key fish habitat – see sections 8.3.1 and 8.6 of Technical Working Paper 13 ▪ Grey-headed flying fox and micro-bats habitats and flyways – see sections 8.5.2 and 8.11.3 ▪ Green and Golden Bell Frog habitat – see sections 8.5.2 and 8.11.3 ▪ Migrating and threatened bird habitats – see section 8.11.4 ▪ Key vegetation communities – refer to section 8.3.1.

4.1.6 Environment and amenity

Air quality

Issue

Increased traffic resulting from the project may result in reduced air quality both localised and across the Sydney region. Much of the residual land (with some to be used for open space) will be subject to reduced air quality because of its proximity to the motorway.

Permanent air quality monitoring stations should be installed in adjacent residential areas and lands owned by Council, particularly the open space.

Adjacent residents may be subjected to unacceptable odours emanating from exposed landfill once excavations occur. Council requests that a detailed response program be prepared in consultation with both Council and the local community.

Response

Air quality impacts

The air quality impact assessment involved modelling the potential operational impact of the project. The results are described in Technical Working Paper 4 (Air Quality) and summarised in section 12.5 of the EIS/preliminary draft MDP. The modelling included consideration of a number of pollutants. The assessment concluded that some changes to air quality are expected, with some improvements (as a result of decreases in the concentration of some pollutants) and the potential for some areas to experience increases in some pollutants. The highest potential increases are predicted to occur in close proximity to the new roads, including in the residual land, as well as close to existing roads that experience increased traffic as a result of the project.

Overall, the modelling results indicate that the changes in emissions associated with the project would be much smaller than the underlying reductions in emissions from traffic on the network. This is a result of improvements in vehicle emission-control technology (see section 12.5.1 of the EIS/preliminary draft MDP). On a regional basis, the predicted impacts of the project would be negligible and undetectable in ambient air quality measurements at background locations (see section 12.5.4 of the EIS/preliminary draft MDP).

Permanent air quality monitoring stations

The predicted changes in air quality do not warrant installing permanent air quality monitoring stations. As discussed above, the regional impacts of the project would be negligible and undetectable in ambient air quality measurements.

Odour

An odour assessment was undertaken for the EIS/preliminary draft MDP. The assessment concludes that the potential for odour can be managed during construction at the former Tempe landfill to avoid exceedances of the odour criterion (two odour units) at the nearest sensitive receptors.

As described in section 3.3.3 of this report, the odour assessment has been updated to incorporate the potential for additional odour from landfill leachate. The assessment is based on a conceptual work methodology and intended to provide guidance to the contractor about the implications of working in the former landfill, and for the contractor's consideration as to the extent of works that could be undertaken without exceeding the odour criterion. Based on the findings of this assessment, it is expected that the construction contractor can undertake the works in a manner that ensures compliance is achieved.

In accordance with mitigation measures AQ1 and AQ3, detailed design and construction planning will be carried out with the objective of minimising the potential for odour impacts at the former Tempe landfill as far as practicable. In accordance with measure AQ4, an odour management strategy will be developed prior to construction and implemented for the duration of works involving ground disturbance at the former landfill. The required contents of the strategy are defined by measure AQ4. These include the need to undertake regular odour surveys at receptor locations in accordance with measure AQ5. Where significant odour emissions are observed by the proposed odour surveys, the contingency and rectification measures provided in the odour management strategy will be implemented.

Water quality

Issue

Water quality assessment should be carried out for surface water entering the Cooks River and Alexandra Canal during construction and after construction (during operation) and permanent water quality monitoring stations established. Particular consideration should be given to the Botany Bay Water Quality Improvement Targets and the Cooks River Alliance goals for swimming in the river, in addition to ANZECC Guidelines and urban design principles that include water as a key element.

Response

Water quality assessment

A comprehensive assessment of the potential water quality impacts during construction and operation was undertaken for the EIS/preliminary draft MDP. The results of the assessment are provided in Technical Working Paper 8 (Surface Water) and are summarised in Chapter 16 of the EIS/preliminary draft MDP.

All relevant water quality guidelines were considered by the assessment, including the targets in the *Botany Bay and Catchment Water Quality Improvement Plan* (SMCMA, 2011), which have been used to assess the performance of the stormwater quality treatment measures proposed.

As described in section 7.10.9 of the EIS/preliminary draft MDP, the project includes measures to reduce the potential for impacts on water quality. Generally, treatment devices would be installed near connections to the existing drainage network and/or the outlets at Alexandra Canal. These devices would include gross pollutant traps and other separators designed to remove waste matter, hydrocarbons, nutrients and suspended solids from stormwater runoff. The size and type of devices installed would be confirmed during detailed design.

Mitigation measure SW3 commits to confirming appropriate treatment measures during detailed design, including water sensitive urban design, with the aim of improving water quality within Alexandra Canal and/or achieving the targets provided in the *Botany Bay and Catchment Water Quality Improvement Plan.*

Monitoring

In accordance with mitigation measure SW6, a water quality monitoring program will be developed and implemented as part of the Construction Soil and Water Management Plan to monitor potential surface water quality impacts. The program will define monitoring parameters and locations, and the frequency and duration of monitoring.

The monitoring program will include ongoing baseline monitoring to determine the water quality of potential receiving waters prior to the commencement of construction. Proposed discharge arrangements will be updated as required prior to construction based on the baseline data at the time.

Water quality monitoring will continue for a minimum of 12 months following completion of construction, or until affected watercourses are certified by a suitably qualified and experienced independent expert as returned to an acceptable condition (or as otherwise required by any project conditions of approval).

Further information on the monitoring program, including proposed monitoring locations, is provided in section 16.6.1 of the EIS/preliminary draft MDP. As a minimum, monitoring is proposed at two locations on Alexandra Canal and one location on the Cooks River.

Landscape character and visual amenity

Issue

Tree removal should be minimised. Rather than replacing trees on airport land trees should be planted in adjacent streets and on residual land devoted to open space. Council should be consulted regarding identification of suitable locations for replanting.

Response

In accordance with mitigation measure LV4, a tree management strategy will be developed and include measures to offset the loss of trees and achieve a net increase in tree canopy. The final location of replacement trees will be confirmed in consultation with Inner West Council and Sydney Airport Corporation. Planting locations outside Sydney Airport land will be considered.

Tree canopy and the urban heat island effect

Issue

Section 21.3.3 of the EIS estimates that 1,300 trees will need to be removed. The EIS does not recognise the correlation between the lack of tree canopy and the urban heat island effect.

Measures should be put in place to limit the urban heat island effect, and include the requirements detailed in the submission.

Council recognises that provision of vegetation needs to be balanced with the needs to minimise the likelihood of wildlife strikes to planes operating out of Sydney Airport, however it is considered that a practical balance can be achieved in the positioning and type of vegetation to be provided.

Response

Impacts on trees

Section 21.3.3 of the EIS/preliminary draft MDP provides an assessment of the potential impacts on trees. The assessment notes that the project currently provides for a total of 551 replacement trees, representing a net loss of 749 trees across the project site. Trees removed by the project will be replaced to ensure there is a net increase in tree canopy. In accordance with mitigation measure LV4, a tree management strategy will be prepared to identify how a net increase in tree canopy can be achieved. The strategy will identify:

- Trees and vegetation that can potentially be retained
- Tree replacement locations (including potential locations outside the project site) to provide a net increase in tree canopy, including locations for the translocation of cabbage tree palms
- Opportunities for rapid-growing replacement trees
- Suitable tree species with consideration of Sydney Airport’s wildlife management plan, prescribed airspace and National Airports Safeguarding Framework Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports

- Opportunities for high quality streetscapes
- Relevant on-site processes and tree protection measures.

Urban heat island effect

Section 26.2.1 of the EIS/preliminary draft MDP includes an assessment of the heat island effect in accordance with the requirements of the SEARs. This includes recognition of the potential impacts of the proposed vegetation removal on the heat island effect. The assessment concludes that the project is located in an urbanised area, with a large portion of the project involving the replacement of existing roadways and sealed surfaces. These surfaces already contain absorptive materials that contribute to the urban heat island effect. As a result, a minor increase is predicted.

In accordance with mitigation measure CC3, the urban design and landscape plan will include consideration of appropriate landscape designs and species to reduce the urban heat island effect. The measure also commits to investigating other measures to mitigate the heat island effect during detailed design, such as light coloured pavements and shading structures for public spaces.

4.1.7 Contamination

Assessment is generic and Inner West Council will have no involvement in management or allocation of risk

Issue

If works at the former Tempe landfill are poorly managed, there is the potential for significant health and environmental impacts in the local area, and ongoing liability for Inner West Council. The following issues are identified:

- The risks are unpredictable and unquantifiable and the EIS/preliminary draft MDP provides simplistic or generic assessment, which lacks certainty in its outcomes
- Council is mentioned as an interested party, but has no control over the works, management approaches and resulting risk allocation
- The EIS/preliminary draft MDP states that the approach will be detailed during the development of management plans, detailed design and construction – council will have little if any input to this process
- Once construction is finished, the leasehold land will be handed back to council with no certainty as to the status of the land, other than a likely requirement to comply with a management plan – council will probably have no input into this plan.

Response

An assessment of the potential contamination issues and risks associated with constructing and operating the project at the former Tempe landfill was undertaken for the EIS/preliminary draft MDP. The results of the assessment are detailed in Technical Working Papers 5 (Contamination and Soils) and 16 (Former Tempe Landfill Assessment), and are summarised in Chapter 13 and 15 of the EIS/preliminary draft MDP. The assessment was undertaken in accordance with the legislation and guidelines listed in section 13.1.1 of the EIS/preliminary draft MDP, including the *National Environmental Protection (Assessment of Site Contamination) Measure 1999* (as amended).

Key potential issues relating to the works were assessed by developing a conceptual site model to identify the current contamination sources, receptors and exposure pathways. The assessment found that existing contamination of the project site does not preclude the suitability of the site for the proposed development, subject to implementation of the proposed mitigation measures, including project-specific remediation action plan(s) (RAPs) (in accordance with mitigation measures CS1 and CS3).

The assessment presented is based on a concept design and indicative construction methodology and is considered sufficient to inform the risks and issues potentially associated with the proposed works. The further development of measures to respond to the identified issues and risks is a matter for detailed design and construction planning, which would be undertaken in accordance with the mitigation measures provided in the EIS/preliminary draft MDP and any conditions of approval.

The existing framework for undertaking works within the former Tempe landfill is stipulated in the Site Audit Statements that have been previously prepared for the site. This framework includes environmental management plans (EMPs) that are currently implemented by Inner West Council to manage residual risks associated with the former landfill. The EMPs require that approval is sought from a NSW EPA-accredited site auditor should significant disturbance of the capping layer be required. This approach is reflected by mitigation measure CS3, which requires preparation of RAP(s) and approval by a NSW EPA-accredited site auditor for works on land subject to the EP&A Act. For this land, the remediation works will be validated by a NSW EPA-accredited site auditor to confirm that the requirements of the RAPs have been met.

Transport would consult with council during development of the RAP(s) to confirm how works that would disturb the capping layer would be managed. Mitigation measure CS3 has been updated to include this commitment. Transport would also consult with council during development of the EMP(s) for ongoing monitoring and maintenance of any installed or reinstated remediation systems at the former Tempe landfill (mitigation measure CS23).

Changes to the contamination risk profile

Issue

The project will disturb the entire landfill site and system, resulting in significant changes to existing conditions. The contamination risk profile will also change by opening previous remediation activities. Inner West Council should not be burdened with additional costs or EMP requirements beyond what it had before the project.

The voluntary remediation agreement has lapsed and so cannot be relied upon. The EIS/preliminary draft MDP implies that Transport will follow the requirements in the existing EMP, however these requirements are unlikely to have taken into account the types of risks that might arise as a result of the project.

The proponent is severing council land from other land over which it had responsibilities to manage the remediated landfill. The proponent must ensure that those issues continue to be managed during the construction of the project and during operation, and put council in no worse a position.

Response

The former Tempe landfill includes land outside of the project’s construction footprint, including land owned and occupied by IKEA, Sydney Airport Corporation and Inner West Council. Those parts of the former Tempe landfill that are located outside the construction footprint are not proposed to be disturbed.

The construction footprint includes land required to construct the proposed roadways, bridges and ancillary infrastructure, as well as land needed for the proposed compounds, including site offices, staff amenities, laydown areas, and workforce parking. The construction footprint would also include an internal haulage route for construction vehicles.

The landfill environmental management infrastructure that was previously installed to mitigate landfill risks, including council’s landfill gas, leachate management and disposal systems, are located in discrete locations within the former Tempe landfill area. To the extent that they can be avoided during construction, this infrastructure would be retained as the long-term management infrastructure, satisfying the objectives of the existing voluntary remediation agreement. In accordance with mitigation measure CS6, where existing infrastructure is unable to be avoided, infrastructure will be reinstated such that it continues to operate effectively following construction. Such infrastructure will be identified in any RAP(s) required, which, in accordance with mitigation measure CS3, must be prepared by a suitably qualified and experienced consultant, as defined in Schedule B9 of the *National Environment Protection (Assessment of Site Contamination) Measure 1999* and approved by a NSW EPA-accredited site auditor.

To avoid unnecessary impacts on the former Tempe landfill, the contractor would be required to manage the works to ensure that the integrity of the capping layer is not compromised in areas of the construction footprint that are not proposed to be excavated. This would include a pre-condition assessment, visual monitoring during construction, and a post-construction condition assessment. Where there are impacts on the integrity of the capping layer due to the project then ‘make good’ provisions would apply in accordance with mitigation measure CS21.

Excavation within the former landfill would be generally limited to road construction and utility installation. The road design would include the capability to passively vent landfill gas. Piling through the landfill is also required to support bridge crossings and potentially to support the road pavement. While the project would cause disturbance, it is not expected to significantly change the source-pathway-target linkages described in Chapter 13 of the EIS/preliminary draft MDP. Surface water runoff from the former landfill would be managed in accordance with the Blue Book and, where possible, by isolating runoff from contaminated areas. If discharge to surface waters is required, the runoff would be treated to meet relevant environmental protection licence conditions or site-specific discharge criteria (see section 16.3.2 of the EIS/preliminary draft MDP).

The works would be managed in accordance with the Construction Soil and Water Management Plan, the existing landfill EMP and RAPs prepared to describe the remediation strategy (mitigation measures CS3 and CS9).

The requirements of the voluntary remediation agreement that was made between Inner West Council and the NSW EPA have been fulfilled as documented in the Site Audit Statement that was prepared following the implementation of the RAP. The agreement is understood to be in place, as recognised by EPA’s submission and its active status on the EPA’s Contaminated Sites register. In accordance with mitigation measure CS3, the RAP(s) will set out detailed measures for managing the works within the former landfill, including the requirement to meet the objectives of the Voluntary Remediation Agreement.

As described above, in accordance with mitigation measure CS23, Transport proposes to prepare a new EMP in consultation with Council. This will supersede the existing EMP due to changes to the environmental setting of the land.

Transport will be responsible for managing the former Tempe landfill, for the duration of construction, in relation to the land required for construction. This includes council’s leachate collection, storage, treatment and disposal system. In accordance with mitigation measure GW5, a leachate management strategy will be developed to manage leachate at the former Tempe landfill during construction and ensure that the objectives of the site’s voluntary remediation agreement continue to be met. This will include confirming any required changes to the existing system.

Transport recognises it will be responsible for the ongoing monitoring and maintenance of project infrastructure, including the roadway, emplacement mound and any additional environmental management infrastructure installed within the road corridor to manage landfill contamination risk.

Council should not be burdened by contamination arising as a result of the project

Issue

While it is anticipated that the approval may impose some constraints, it is likely, based on a review of other proposals, that the finalisation will be left to the construction contractor and its consultant, overseen by a site auditor with council only consulted. The contractor will seek to minimise costs to the maximum extent allowed by the approval.

The approval must therefore be robust with a clear allocation of responsibility to Transport in circumstances where the project changes the status quo by excavating within the remediated tip, and seeks to return that part of the land to council.

Inner West Council should not be burdened by contamination issues that arise as a result of the project.

Response

As described in the above responses, a NSW EPA-accredited site auditor would be engaged where the project has the potential to affect the existing landfill remediation systems for works on land subject to the EP&A Act. EPA-accredited site auditors are engaged to independently review contaminated land consultant reports to ensure the methods and interpretation of data are consistent with NSW EPA guidance. Site auditors and assessors provide increased certainty to planning authorities of the nature and extent of contamination and the suitability of a site for specific uses. Commitments to engage NSW EPA-accredited site auditors are provided by mitigation measures CS3, CS20 and CS23.

Transport does not propose to hand back land to Council that requires additional management as a result of the project. In this regard, Transport proposes to jointly prepare a new EMP with Council in accordance with mitigation measure CS23. The EMP will identify ongoing monitoring and maintenance responsibilities. Transport recognises it will be responsible for the ongoing monitoring and maintenance of project infrastructure, including the roadway, emplacement mound and any environmental management infrastructure installed within the road corridor to manage landfill contamination risk.

Transport to be responsible for ensuring compliance with regulatory requirements

Issue

Inner West Council currently has responsibility to comply with regulatory requirements relating to the former Tempe landfill. During construction council will not have the ability to control whether these responsibilities are met. Responsibility for compliance should be adopted by Transport for instruments such as:

- Voluntary Remediation Agreement with EPA (current or updated) and associated Environmental Management Plan - Conditional Surrender Notice with EPA
- Trade Waste Agreement between Council and Sydney Water
- All obligations under environmental legislation such as the Protection of the Environment Operations Act 1997 and Contaminated Land Management Act 1999.

Response

Transport will take responsibility for managing the former Tempe landfill, as it relates to the land required for construction, for the duration of construction.

The existing framework for undertaking works within the former Tempe landfill is defined in the Site Audit Statements that have been previously prepared for the site. This framework includes EMPs that are currently implemented by Inner West Council to manage residual risks associated with the former landfill. The EMPs require that approval is sought from a NSW EPA-accredited site auditor should significant disturbance of the capping layer be required. This approach is reflected by mitigation measure CS3, which requires preparation of RAP(s) and approval by a NSW EPA-accredited site auditor for works on land subject to the EP&A Act. The RAP(s) are to ensure that the works are consistent with the requirements of the voluntary remediation agreement.

Transport will take responsibility for the Trade Waste Agreement associated with managing landfill leachate for the duration of construction. If increases in leachate volumes are identified by the leachate management strategy (in accordance with mitigation measure GW5), supplementary storage, treatment and discharge volumes may be required. Transport would seek to enter into a new Trade Waste Agreement with Sydney Water for the construction phase.

Works within the former Tempe landfill would be undertaken in accordance with relevant legislation, the conditions of approval for the project, and any licences issued under the *Protection of Environment Operations Act 1997*. Preparation of the RAP(s), validation report and EMP would be approved by a NSW EPA-accredited site auditor.

Transport should take responsibility for the entire landfill area

Issue

All risk associated with construction and post-construction changes to the landfill infrastructure should belong to Transport.

Council submits that there is no way of segregating the former landfill based on who has operational control of the surface. Any impact on Transport-managed land at the landfill will also affect Council-managed land.

Responsibility must therefore be assumed by Transport for the entire former landfill area, not just the part subject to excavation or other project activities. Part of the landfill surface is managed by Sydney Airport Corporation and Transport will also need to assume responsibility for this area in order to properly manage landfill risk.

Response

Transport will be responsible for mitigating construction-related impacts and risks within the former Tempe landfill as a result of the project. This would comprise both direct impacts, as well as potential indirect impacts as a result of works adjacent to the former Tempe landfill, where caused by works within the construction footprint.

The construction footprint includes a portion of freehold land owned by Sydney Airport Corporation, which forms part of the landfill management system. Transport will not be granted access to the entire area of this land, but will work closely with Sydney Airport Corporation to ensure that any activities carried out that are separate to the project do not unduly increase risks to the landfill management infrastructure. Similarly, council would be required to manage the landfill outside of the construction footprint to ensure activities on this site does not unduly increase risks to the leachate management system that Transport will be responsible for during construction.

Transport to consider retaining responsibility for the landfill

Issue

The former landfill should be managed as one parcel and by one entity during and post construction, otherwise overlapping responsibility may cause gaps in responsibilities and unintended consequences of pollution release. The current management proposal post construction appears to involve operational handback to Inner West Council, but retention of the land title in part by Transport. This could cause conflict of purpose and financial responsibility between operator and landholder.

Consideration should be given to Transport retaining responsibility of the landfill.

Response

The existing landfill environmental management infrastructure that has been installed to mitigate landfill contamination risks is managed under three separate EMPs, with management responsibility shared by various entities who have control of specific portions of the former landfill site.

The former landfill includes land outside of the project’s construction footprint, including land owned and occupied by IKEA, Sydney Airport Corporation and Inner West Council. The project does not propose to disturb these areas. However, rectification measures would be implemented as defined by the rehabilitation strategy (mitigation measure CS21).

With the exception of leachate management during construction, Transport does not intend to take responsibility for the landfill or landfill infrastructure as it relates to areas outside the construction footprint. In accordance with mitigation measure GW5, a leachate management strategy will be developed to manage leachate at the former Tempe landfill during construction. This will include monitoring to ensure the project does not cause leachate impacts beyond the construction boundary requiring new or additional controls.

At the completion of the project, residual land would be handed back to council in accordance with the terms agreed to between each party. Ongoing management of the former Tempe landfill and associated infrastructure would be addressed in an EMP that would assign the responsibilities of Transport and council. It is expected that council would remain the ‘responsible person’ for the former landfill post construction. The project is not expected to create a new risk path that results in a significant impact to pre-existing contamination at the site.

Assume that landfill impact is unavoidable and plan to further remediate the landfill

Issue

The proposed management for construction assumes no harm to existing assets. If harm is to occur, it will be remediated as part of the project. While practical in action, it would be better to assume disruption / harm to the landfill is unavoidable (though consequences manageable / controllable) and that the landfill will be further remediated as part of the works.

In response to the unavoidable disruptions, there should be commitments to:

- Re-stabilise, re-grade and recap the landfill
- Install new gas and leachate collection systems
- Install improved / upgraded leachate treatment system
- Install new gas management system.

Response

Re-stabilisation, re-grading and recapping of areas where capping is removed or damaged by construction activities will be undertaken by Transport in accordance with relevant legislation and guidelines. The design of the new capping layer will be described in the RAP, which will be developed in consultation with Inner West Council and approved by a NSW EPA-accredited site auditor.

Transport understands that the principal components of the voluntary remediation agreement have been completed to manage the former landfill, as confirmed by the previous Site Audits that confirm the completion of the remediation works and the suitability of the land. Transport is also aware of the various environmental management systems at the former landfill based on information provided by council during preparation of the EIS/preliminary draft MDP. However, as the proposed roadway would not affect the entire landfill area, it is not appropriate or necessary to assume that a broad scale upgrade of all landfill management systems would be required.

Transport is aware of the various environmental management systems at the former landfill based on information provided by council during preparation of the EIS/preliminary draft MDP. However, further investigation will be required to accurately determine asset locations and their existing performance. As the landfill management infrastructure is generally only present in specific locations and the proposed roadway would not affect the entire landfill area, it is not necessary to assume that a broad scale upgrade of all management systems would be required.

In accordance with mitigation measure CS6, the location of all existing landfill management infrastructure, including the bentonite wall, leachate collection system and passive gas collection system, will be confirmed and (if required) the design will be further refined to minimise impacts on this infrastructure. Measures will be developed, and included in the RAP (if required) to protect the landfill management infrastructure during construction, or reinstate the infrastructure such that it continues to operate effectively after construction is finished. Rectification of any damage to landfill infrastructure due to the project would be the responsibility of Transport.

In accordance with new mitigation measure GW7, a condition assessment of the leachate collection, monitoring and treatment system will be carried out by a suitably qualified specialist prior to and following construction to ensure it is returned to council with the same functionality and condition, subject to fair wear and tear.

Assessment of landfill contaminants

Issue

Due to the significant variation and 'hot spots' commonly found in landfill, it is unlikely that all conditions have been identified. Many contamination issues, including but not limited to, the following should be addressed in greater detail:

- Soil – elevated concentrations of contaminates were encountered across the site at varying depths
- Groundwater – concentrations of ammonia and heavy metals exceeded the assessment criteria and low levels of hydrocarbons and PFAS were reported
- Landfill gas – maximum gas concentrations were recorded across the assessment area.

Response

Chapter 13 of the EIS/preliminary draft MDP provides a summary of existing conditions at the site compiled from desktop sources, historic investigations and investigations conducted during the assessment. Table 13.3 provides an overview of potential contamination within the former Tempe landfill (assessment area 1) and Figure 13.5 provides a conceptual model of how conditions and potential contaminants might be affected by construction activities. Based on this information, Table 13.7 provides a preliminary evaluation of the risk of construction activities and the mitigation required to manage these risks.

Investigations undertaken to date have identified that the landfill conditions are highly variable in terms of composition and contaminant characterisation, as would be expected for a former mixed waste landfill. Variability in the material composition would only affect material handling and waste disposal, which will be evaluated and managed in accordance with the Construction Waste Management Plan (mitigation measure WM2). In accordance with mitigation measure CS1, additional soil and groundwater investigations will be undertaken to inform detailed design, construction planning, and preparation of the RAP(s). The investigations will include further characterising the existing contamination status of the project site.

Although no direct impacts on the existing gas collection and venting systems are proposed, landfill gas is anticipated to be encountered during excavation at the former Tempe landfill. In accordance with mitigation measure CS4, an assessment will be undertaken of the potential hazards associated with landfill gas during construction and operation. The assessment will consider the potential for ingress and build-up of gases that may pose a risk to safety.

Gas collection and management infrastructure will form part of the detailed design for areas of the project assessed to be at risk from landfill gas exposure and vapour intrusion, in accordance with the *Contaminated Land Guidelines: Assessment and management of hazardous ground gases* (NSW EPA, 2019).

Mitigation measures CS4 to CS15 address issues and risks associated with landfill gas and soil contamination during construction within the former Tempe landfill. In accordance with measure GW5, a leachate management strategy will be developed to manage leachate within the former landfill during construction in accordance with the existing voluntary remediation agreement.

The level of detail provided in the EIS/preliminary draft MDP is considered sufficient to inform the likelihood of risks, the potential for impacts and the need for future management.

Potential impact on bentonite wall

Issue

The location of the bentonite wall respective to the proposed works is yet to be determined and this is to be left to detailed design. Impact risk and mitigation can be assessed now not later along with the attendant construction cost.

Response

The assessment presented in the EIS/preliminary draft MDP is based on a concept design and indicative construction methodology as well as historical information provided by council in relation to installed landfill management infrastructure and the voluntary remediation process. While it is considered sufficient to inform the risks and issues potentially associated with the project, the further development of appropriate procedures and measures to address works within the former Tempe landfill is a matter for detailed design and construction planning.

The bentonite cut-off wall is described in the EIS/preliminary draft MDP (including in Technical Working Paper 16). The location and extent of the wall has been established based on the validation report from 2005, a survey from 2006, and various drawings provided by Council.

The exact dimensions and location of the wall at depth has not been confirmed. This is because bentonite is typically a slurry mixture when installed, meaning its precise location at depth is difficult to validate afterwards. The 2006 survey provided locations at 25 metre intervals. The current location of the wall surface has been interpolated between these points.

The piers supporting the Terminal 1 connection bridge and the freight terminal bridge have been designed in relation to several key constraints. These include:

- Minimum space for maintenance access to the Sydney desalination pipeline
- Supporting a bridge span that avoids placing a pier within Alexandra Canal
- Avoiding the heritage curtilage of Alexandra Canal walls
- The bentonite wall itself.

As the precise location of the bentonite wall at depth is not validated, meeting these requirements means that the bridge piers have the potential to interface with the wall. This is considered to represent the worst-case scenario and options will be considered during detailed design to locate piers away from the wall. Two proposed stormwater outlets may require shallow excavation at the top of the wall and this issue would receive further detailed consideration during detailed design.

In accordance with mitigation measure CS6, the location of all existing landfill management infrastructure, including the bentonite wall, will be confirmed and (if required) the design will be further refined to avoid or mitigate impacts on this infrastructure where possible. Rectification of any damage due to the project would be the responsibility of Transport.

Improved procedures to reduce leachate generation potential and leachate management requirements

Issue

Leachate volume control is the only apparent active control for leachate level management. Passive controls need to be stated with more detail/acknowledgment.

The leachate treatment system is not well documented. Whilst the EIS acknowledges that the current system will be operated at 450 kL/day, there is no assessment as to its current operation/condition or future condition on hand back.

Council provided a number of requirements in relation to the management of the leachate management system.

Response

In accordance with mitigation measure GW5, a leachate management strategy will be developed to manage leachate at the former Tempe landfill during construction and ensure that the objectives of the site's voluntary remediation agreement continue to be met. The strategy will:

- Identify predicted changes in leachate volumes due to the project, based on the detailed construction methodology
- Identify any required changes to the existing leachate management system due to predicted changes in leachate volume and concentration and any other changes due to the project. This would include the need for supplementary storage, treatment and disposal systems to address increases in leachate beyond the capacity of the existing system
- Describe a framework for monitoring leachate levels and water quality to ensure that no leachate migrates into Alexandra Canal as a result of the project.

The strategy will be developed in consultation with relevant stakeholders, including Inner West Council, Sydney Water and the NSW EPA.

Mitigation measure AQ1 is also relevant to the management of leachate. In accordance with this measure, detailed design will seek to minimise the need to expose waste at the former Tempe landfill during construction.

The existing leachate treatment system is described in Technical Working Paper 16. It has a design capacity to treat an average flow of 80 kilolitres per day (kL/day) and a peak flow of 180 kL/day. A four week sampling program carried out for the project in December 2018 found that daily extraction levels ranged in the order of 60 to 100 kL/day, which is lower than the average discharge of 150 kL/day authorised by the Trade Waste Agreement with Sydney Water.

The potential increase in leachate generation due to the project was modelled using a water balance approach with two scenarios. Based on the average rainfall scenario, leachate generation was estimated at 200 kL/day and up to 450 kL/day for the 90th percentile scenario.

Surface water coming into contact with the landfill waste that does not infiltrate into the ground would also be addressed by the leachate management strategy. Any proposed increases in leachate disposal beyond the authorised limits of a trade waste agreement, may require the contractor to use other methods for appropriate disposal. This would be subject to further discussions with the EPA and Sydney Water to confirm their requirements.

In accordance with mitigation measure GW7, a condition assessment of the leachate collection, monitoring and treatment system will be carried out to ensure it is returned to council with the same functionality and condition, subject to fair wear and tear.

In accordance with mitigation measure EM1, a CEMP will be prepared to detail the approach to environmental management during construction. The CEMP will include detailed management plans that will be include measures for the effective management of contaminated soil, landfill gas and odour.

Contingency management and construction approach

Issue

Construction management of the landfill is focused on waste relocation management/storage and cap re-establishment. There is limited information on protection of the landfill base, landfill cap and remediation or contingency plans.

The construction plan for the project does not appear to reasonably address the risks of and to the old landfill. Construction techniques appear to be standard green-field site practices, without any special arrangements documented for construction activities and works (including piling) over and in the old but still active landfill.

There is significant loading proposed over the top of the landfill for carparks, laydown areas etc and little detail as to the risk of inducing increased settlement, consequential cap failure, storm water ingress save statements that standard storm water and sediment and erosion control measures will be taken.

Response

Chapters 2 and 6 of the EIS/preliminary draft MDP describes the existing constraints at the project site and how the project design has sought to minimise impacts associated with these constraints. One of these is the ground conditions and other environmental management aspects associated with the former Tempe landfill. As described in section 6.5.3 of the EIS/preliminary draft MDP, the project is elevated as far as possible over the former landfill, and the roadway would act as a new seal against groundwater ingress as well as passively venting any gas emissions. Chapters 13 and 16 of the EIS/preliminary draft MDP both directly address the issues of contamination and water quality associated with leachate at the former landfill.

The information received from council does not indicate that there is an engineered ‘base’ at the landfill that needs protection. The piling methods that would be used in this area would be further developed during detailed design. The proposed methods are expected to include installed casings, which would reduce the potential migration of contamination and leachate through any sections of clay at the base of the landfill.

In accordance with mitigation measure CS12, the potential for settlement will be considered as part of the siting and layout of construction compounds and work areas in the former Tempe landfill. Where required, ground treatment (eg foundation layers or sheet piling) will be provided to minimise this risk.

Regular inspection and assessment of the integrity of the landfill cap inside the construction footprint would be undertaken by the construction contractor against a baseline established by Transport in accordance with updated mitigation measure CS22.

Landfill waste excavation and management approach

Issue

There does not appear to be any definitive statement regarding the volume of landfill to be excavated during construction, consequently it is not possible to determine how effective mitigation and remediation measures will be. In particular the number and nature of haulage movements from the site cannot be determined, nor can the site’s ability to accommodate stockpiles awaiting transfer or reinstatement. Additionally, there is no reference apparent to interim management techniques carried out to ensure stockpiled landfill material will not impact on neighbouring residential properties and Tempe Lands (eg air, water and vermin).

The EIS identifies potential impacts on Tempe Tip but indicates that mitigation measures will be identified in management plans to be prepared at a later stage. Many of the risks are therefore currently unresolved. In addition, as specific mitigation measures have generally not been identified, they cannot be enforced by the State Government through project approval conditions.

As a general consideration, all contaminated soil and materials must be disposed of off-site, failing this, much of the site contains contaminated soil and materials, and it is essential that all relevant safety measures be taken including safe removal of the soil, capping of any remaining soil and mitigation measures to ensure there are no impacts on groundwater or adjacent watercourses; and that land be left in a manner that is useful, accessible and low maintenance.

Response

The proposed strategy to manage waste excavated within the boundary of the former Tempe landfill is described in section 8.2.5 of the EIS/preliminary draft MDP. The strategy comprises emplacing some of the waste in mounds located on top of an area of the existing landfill and removing the rest from site for disposal at an appropriately licensed facilities in accordance with the appropriate waste classification.

As described in section 3.1.2 of this report, the concept design has been refined and only one emplacement mound is now proposed, which would emplace about 35,000 cubic metres of landfill material. This means that about 55,000 cubic metres of additional waste material would need to be removed from site and disposed of at an appropriately licenced facility.

The estimated truck movements associated with constructing the Terminal 1 connection and bridges, including removal of the landfill waste have been updated as described in section 3.1.2 of this report. An estimated additional 6,900 truck movements would be required to remove the excess landfill material from site. The process for excavating, temporary storage, testing, re-emplacement and/or removal from site is described in section 8.2.5 of the EIS/preliminary draft MDP.

Responses to issues about the approach to managing works within the former Tempe landfill, including investigations, management approaches and plans, contingency management and approvals are provided above.

Land that is handed back to council would be returned in accordance with the terms that have been agreed to between council and Transport.

Additional risks requiring management

Issue

Some of the potential risks associated with works at the former Tempe Tip are:

- Potential changes in the path of travel of contaminated groundwater due to excavation to the north-east of Tempe Tip, and consequent need for additional remedial infrastructure on additional boundaries
- Potential for works to draw significantly contaminated groundwater from the airport and other areas towards Inner West Council land and the broader LGA
- Changes to leachate volumes and flow pathways due to the weight of the mounds, requiring changes in leachate collection system (or potential overtopping of the bentonite wall).

Response

Potential changes to the path of travel of contaminated groundwater and leachate

There is the potential for temporary changes to groundwater flow patterns during works that require extracting groundwater. Detailed design and construction planning will seek to avoid the need to extract groundwater and minimise groundwater inflows into excavations in accordance with mitigation measure GW1.

Section 15.3.2 of the EIS/preliminary MDP addresses the potential risk of intercepting contaminated groundwater due to dewatering of excavations. Specific ‘at risk’ locations include groundwater beneath the former Tempe landfill (considered as leachate), Sydney Airport Jet Base, and the taxi staging area south of Keith Smith Avenue.

In relation to the former Tempe landfill, the modelled groundwater capture zones for excavations associated with the eastbound terminal link would be up to 30 metres under the reasonable worst case scenario. Therefore based on groundwater levels the excavation may intercept contaminated groundwater (leachate) from the former Tempe landfill. Groundwater dewatering is unlikely to result in substantial changes to the dimensions and behaviour of contamination associated with these sites, because excavation times would be relatively short and groundwater levels would restabilise within pre-project ranges within a few days to weeks once construction of individual elements is complete. Notwithstanding, if excavations do intersect these contaminated areas, any extracted groundwater would be managed in accordance with the dewatering management strategy (mitigation measure GW4) and the leachate management strategy (mitigation measure GW5) to minimise the potential for impacts. In accordance with mitigation measure GW6, the existing groundwater monitoring program will continue during construction, and be supplemented as required, including monitoring potential migration contaminants due to groundwater extraction.

Changes to leachate volume and flow pathways due to the weight of the mound

The leachate level at the location of the proposed emplacement mound is around 10 metres below ground level. At this depth, it is likely that the weight of the mound will have been distributed across the intervening ground area. As a result, it is likely to have minimal effect on flow pathways. It is not expected that leachate volumes would be substantially affected by creation of the mound or changes in the leachate management infrastructure. If any changes to the leachate management infrastructure are required, it would be determined in accordance with the proposed leachate management strategy (mitigation measure GW5).

Risks and contingency events would be considered as part of detailed construction planning by the appointed construction contractor(s), in accordance with the various mitigation measures relevant to construction at the former Tempe landfill.

Landfill gas

Issue

There should be more emphasis on the landfill gas issue, which is as significant as landfill leachate, and has the potential to generate problems during and after construction. Insufficient details have been provided including:

- Management of landfill gas during and after construction
- Emergency procedures to prevent landfill gas migration during excavations
- Emergency response procedures in the case of landfill gas escape (in relation to adjacent residents and businesses.

Response

The existing characteristics and potential impacts of landfill gas at the former Tempe landfill have been considered and assessed to inform the project design and the proposed mitigation measures. It is expected that hazardous ground gases would be encountered during construction. However, the results of the assessments undertaken indicate that the overall risk of ground gas exposure is low.

In accordance with mitigation measure CS14, protocols to address and manage landfill gases within the construction footprint in the former Tempe landfill and Sydney Airport northern lands car park will be developed and implemented during construction. The protocols will consider confined and/or enclosed spaces and appropriate controls as required (eg forced ventilation), and will include appropriate occupational monitoring. Landfill gases within the construction footprint will be managed in accordance with relevant guidelines, including the *Contaminated Land Guidelines: Assessment and management of hazardous ground gases* (NSW EPA, 2019).

The various management plans and strategies required by the mitigation measures (including CS3, CS9, CS4, AQ2, AQ4 and GW5) will define required emergency response, monitoring and contingency management requirements.

NSW EPA Guidelines

Issue

NSW EPA Environmental Guidelines: Solid waste landfills have not been referenced in the project outline, or construction plan. It is referenced in the Technical Working Paper 16. The principles and control concepts for the portion of the project over the landfill should be informed by the principles and concepts for construction and post closure management of solid landfill in NSW. The statements made in the EIS do not appear to acknowledge this in the treatment/management of the landfill cap and bentonite wall during construction and beyond.

Response

Section 8.2.5 of the EIS/preliminary draft MDP states that construction at the former Tempe landfill '…would be undertaken in accordance with any requirements in the existing Environmental Management Plan for the site, the *Environmental Guidelines: Solid waste landfills* (NSW EPA, 2016a) and any environmental protection license conditions that apply to the site'.

Mitigation measure CS3 states that any RAP(s) required must be prepared in accordance with relevant guidelines, including the *Environmental Guidelines: Solid waste landfills* (NSW EPA, 2016a).

The NSW EPA *Contaminated Land Guidelines: Assessment and Management of Hazardous Ground Gases* (NSW, EPA, 2014a) is also a key document regarding undertaking works within a closed and remediated landfill and has been added to mitigation measure CS14. The risk-based framework to design appropriate mitigation measures for works at the former landfill outlined in the guidelines will be implemented.

Future EMP

Issue

The impacts are to be managed via a yet to be developed EMP under the CLM Act and a yet to be developed landfill management plan. The concept plans for both these should be developed now to inform the construction of the raised roadway, particularly its interaction with foundation geology, the waste mass and the bentonite wall. This could have significant implications, particularly with the canal crossings – bridge abutment interaction with the bentonite wall.

Response

The assessment is based on a concept design and construction methodology and is considered sufficient to inform the risks and issues potentially associated with the proposed works for the purposes of the EIS/preliminary draft MDP.

The proposed design includes the roadway, which would act as a seal against water ingress (ie a cap) as well as a vent for any landfill gas. The RAP(s) required by mitigation measure CS3 would be prepared by an appropriately qualified specialist, and these would inform the detailed design of the roadway and other associated infrastructure. Where there are any residual impacts following implementation of the RAP(s), these would be managed by the EMP (mitigation measure CS23). These plans would be developed subject to project approval, in accordance with the mitigation measures and the conditions of approval for the project.

A response to issues regarding the location of the bentonite wall is provided above under the heading 'Potential impact on bentonite wall'.

Post landfill management approach

Issue

The post landfill management is being left to the development of a RAP rather than assessing the critical elements now.

There is very little detail provided on active management measures both during construction and post construction. Detail including some basic contingency plans covering critical risks such as unintended breach of the bentonite wall, the unintended overtopping of the bentonite wall with leachate, the damage and penetration of the underlying clay feature and contamination of ground water should be documented now and not left for detailed design. These plans will need to be adaptive and responsive to detailed design, with detailed design improving rather than formulating these control plans.

Response

The assessment presented in the EIS/preliminary draft MDP is based on a concept design and construction methodology as well as historical information provided by Council in relation to installed landfill management infrastructure and the voluntary remediation process. While it is considered sufficient to inform the risks and issues potentially associated with the proposed works, the further development of detailed procedures and measures to address works within the former landfill is a matter for detailed design and construction planning.

Details regarding the identification and management of existing landfill management infrastructure, its protection during the works, plans to manage environmental issues and risks during the works, and the approvals process for undertaking works in the landfill are described in the responses provided above. As a number of these processes are dependent on one another, it is not possible to develop these documents at this stage of the assessment and approval process.

Land handed back to Council must comply with regulations

Issue

Any land handed back to Council should meet the criteria nominated in the submission, under the conditions of approval for the project.

Site audit statements are required regarding the suitability of land for use when returned to Council and considering adjacent contaminated land impacted by road works. Such site audit statements should not require implementation of an EMP any greater or more burdensome to Council than before the road works

Council must not be responsible for increased management and maintenance costs resulting from the Project removing capping, exposing waste and changing the existing management measures and groundwater and surface water levels and controls. Any EMP prepared for long term management should have an objective not to increase the burden on Council and should be approved by Council.

Response

Mitigation measures CS3, CS20 and CS23 provide a requirement for RAPs, validation statements, site audit statements for the remedial works and an EMP to be prepared and approved by a NSW EPA-accredited site auditor (for works on land subject to the EP&A Act). These documents will also consider immediately adjacent areas that may have the potential to be disturbed by construction. In addition, the land being handed back to council would be returned in accordance with the terms agreed to between council and Transport.

Based on the results of the assessments completed, Transport does not anticipate that the project would cause increased management and maintenance costs with respect to land handed back to council. This would be confirmed in consultation with council in accordance with measure CS23.

Other general issues

Issue

- As potential has been identified for leachate from the Tempe Tip to migrate to the new M5 due to drawdown impacts associated with the new M5, which in turn could increase groundwater levels in Tempe landfill; a condition should be imposed ensuring there is to be no increase in leachate migration
- Post completion monitoring to confirm acceptability for at least two years for gas, leachate migration (for integrity of bentonite wall) and the leachate treatment plant.

Response

The potential for drawdown of leachate from within the former Tempe landfill and migration toward the New M5 tunnels is identified in section 15.5 of the EIS/preliminary draft MDP. This is due to the groundwater management approach adopted by that project and not any works associated with the Sydney Gateway road project. Any groundwater drawdown associated with the New M5 tunnels would be more likely to reduce leachate levels in the former Tempe landfill, not increase them.

Any monitoring post-construction (beyond any requirements of the RAPs) would be in accordance with terms agreed to between council and Transport.

4.1.8 Flooding and drainage

Absence of information on overland flow through the site

Issue

There is an absence of information regarding overland flow passing through the site from upstream properties, as noted in Council's *Alexandra Canal Flood Study*.

Response

Figure 26 in the *Alexandra Canal Flood Study* (WMAwater, 2017) and Figure 4.5 in Technical Working Paper 6 (Flooding) show the defined extent and depth of inundation during a one per cent AEP event based on the respective assessments. Both figures show that the project site is affected by overland flow discharging from Canal Road, the Cooks River Intermodal Terminal, the Botany Rail Line and the northern end of Swamp Road.

While Figure 26 from the *Alexandra Canal Flood Study* (WMAwater, 2017) also shows inundation across the north-western boundary of the project site in the area occupied by Tyne Container Services, the defined inundation in this area is due to local catchment runoff discharging from the Tyne Container Services site rather than overland flow discharging through the project corridor.

It is considered that the definition of overland flow discharging into the project site in the EIS/preliminary draft MDP is consistent with that presented in the Alexandra Canal Flood Study.

Potential gaps in the assessment of peak flood levels

Issue

The EIS does not include the *Alexandra Canal Flood Study* (WMA, 2017), the City of Sydney *Alexandra Canal Catchment Flood Study* (Cardno, 2014) or the *Flood Risk Management Plan* (Cardno, 2014) as reference documents. Unless the information in these documents and models has been used potential exists for significant gaps in the EIS's examination of peak flood levels within the catchment area.

Response

Technical Working Paper 6 (Flooding) contains a comparison of the peak one per cent AEP flood levels and flows reported by previous studies undertaken within the study area. In the *Alexandra Canal Flood Study* (WMAwater, 2017), peak flood levels are presented at four locations that are referred to as flooding 'hotspots'. Of these hotspots, hotspots 1 and 2 are located in areas where mainstream flooding is the dominant flooding mechanism for maximum peak flood levels during a one per cent AEP event (rather than overland flow).

Hotspot 1 is located in Holbeach Avenue, Bay Street and Old Street, where flooding from the Cooks River is the dominant flooding mechanism for maximum peak flood levels. Hotspot 2 is located on the corner of Canal Road and Burrows Road South, where flooding from Alexandra Canal is the dominant flooding mechanism for maximum peak flood levels.

While the focus of the *Alexandra Canal Flood Study* was the definition of flood behaviour due to overland flow, mainstream flooding was also defined using inflows and cross-sectional data for the Cooks River and Alexandra Canal obtained from the *Cooks River Flood Study* (Sydney Water, 2009). The peak flood levels considered by Technical Working Paper 6 are compared with those derived for the Cooks River Flood Study in section A4.7 (Annexure A) of Technical Working Paper 6. This comparison shows that the two-dimensional flood model developed for the EIS/preliminary draft MDP produces peak flood levels that are higher than corresponding results from the *Cooks River Flood Study* by between 0.3 and 0.8 metres. This difference is likely to be a result of the different approaches used to model the main channel of the Cooks River.

Hotspots 3 and 4 in the *Alexandra Canal Flood Study* are located along the Princes Highway in areas that are not directly relevant to the flooding assessment for the project.

For the *Alexandra Canal Catchment Flood Study* (Cardno, 2014a) and the *Alexandra Canal Catchment Floodplain Risk Management Plan* (Cardno, 2014b) (undertaken for the City of Sydney), the downstream limit of the study area is Ricketty Street. As a result, the scope of the two reports is not directly relevant to the assessment undertaken for the project. It is also noted that the *Alexandra Canal Catchment Flood Study* does not contain any peak flood level or flow data with which to compare with results of the flood assessment undertaken for the project.

Discrepancy between EIS and Council's Alexandra Canal Flood Study

Issue

Clarification is also sought regarding the level of affectation of properties associated with and adjacent to the project. There appears to be a discrepancy between the EIS and Council's Alexandra Canal Flood Study, which identifies land within the proposal site as subject to overland flows within the container yard, lands adjacent to the airport northern parking lot, and the industrial lands adjacent to the Botany Rail Line.

Response

Figure 26 in the *Alexandra Canal Flood Study* (WMAwater, 2017) and Figure 4.5 in Technical Working Paper 6 show the defined extent and depth of inundation during a one per cent AEP event. Both figures show inundation to areas of the project site that are within:

- The northern portion of the Tyne Container Services site – as a result of overland flow that discharges from Swamp Road
- Industrial land to the north of the Botany Rail Line – as a result of overland flow that discharges from the Cooks River Intermodal Terminal site and rail corridor.

While Figure 26 also shows inundation across the middle and southern portions of the Tyne Container Services site and within the project site immediately to its east (including land adjacent to the Sydney Airport northern lands car park), these areas are considered to be affected by local drainage rather than major overland. This is on the basis that:

- Flows are generated by local catchment runoff from the Tyne Container Services site
- The depths of overland flow shown on Figure 26 are typically less than 0.15 metres, with the exception of those areas located along defined drainage channels or localised depressions
- Flow behaviour in these areas would be influenced by local drainage, which does not appear to have been included in the *Alexandra Canal Flood Study*.

Table 6.1 in Technical Working Paper 6 describes the key elements of the project that formed the basis of the assessment. The area of the project site that is currently occupied by the Tyne Container Services site would include the proposed Terminal 1 connection and eastbound terminal link. In Table 6.1 it is noted that a drainage system would be provided to control runoff from these areas of new road, which would discharge to a new open channel that is proposed to be located along the southern side of the eastbound terminal link. The proposed channel would discharge to Alexandra Canal. This arrangement would manage the impact that changes in the rate of local catchment runoff would have on downstream areas.

Inappropriate flood impact limit

Issue

The EIS notes that there are no conditions for flooding under the Major Development Plan and seeks to limit flooding to 20 to 50 millimetres. This is larger than considered acceptable in other similar projects (eg WestConnex and Sydney Metro). These projects were required to demonstrate no increase greater than 10 millimetres in areas already affected by flooding, and an increase no greater than 50 millimetres in areas without over-floor flooding. The 20 to 50 millimetres limit is considered inappropriate and it is requested that this be revised to reflect the 'no greater than 10 millimetres' limit.

Response

Chapter 14 of the EIS/preliminary draft MDP describes the potential flooding impacts. The project is located within flood prone land adjoining Alexandra Canal and the Cooks River and would lead to changes in flood behaviour and localised increases in flood levels.

Table 2.2 of Technical Working Paper 6 summarises the adopted assessment criteria and standards used to assess the potential for flooding impacts, based on consideration of relevant legislation, policies and guidelines (as described in section 2 of the working paper). The report notes that floods up to one per cent AEP are considered in the assessment of measures required to mitigate any adverse flood impacts attributable to the project. In addition, the report notes that changes in flood behaviour under larger floods (up to the probable maximum flood) are assessed to identify potential impacts on critical infrastructure and vulnerable development and potentially significant changes in flood hazard.

The assessment concludes that, during construction, flood increases would be minor. These would include localised increases of between 0.02 metres and 0.05 metres for the one per cent AEP event.

During operation, the assessment identified the following minor residual impacts on existing infrastructure:

- Peak flood levels in an area of the Sydney Airport site adjacent to Qantas Drive, which includes several buildings and other structures, would increase by a maximum of 0.03 metres
- During a PMF, the depth of inundation in an area immediately adjacent to the southern approach to the Terminal 1 connection bridge would increase by a maximum of 0.32 metres, with impacts extending east to the freight terminal access bridge
- Temporary increases in flood levels elsewhere in rare to extreme flood events.

In accordance with mitigation measure HF1, a flood mitigation strategy will be prepared and relevant measures will be implemented during detailed design and construction. The strategy will include undertaking additional flood modelling taking into account detailed design and proposed construction planning and methodologies.

In accordance with mitigation measure HF3, where flood levels in the one per cent AEP event are predicted to increase at any residential, commercial and/or industrial buildings as a result of construction or operation of the project, a floor level survey will be carried out. If the survey indicates that existing buildings would experience above floor inundation during a one per cent AEP event, further refinements will be made (as required) to the design of temporary and permanent project components to minimise, as far as practicable, the potential for impacts.

It is noted in Technical Working Paper 6 that a change in peak flood level of plus or minus 0.01 metres is considered to be within the order of accuracy of the flood model. This approach is consistent with the requirements of other similar projects with regards to managing increases in above-floor inundation.

Further analysis needed on overland flows upstream of the site

Issue

Further analysis is required to demonstrate that overland flows from the areas upstream of the site, within Inner West Council, are not being blocked, redirected, or otherwise increased in depth or hazard.

Response

Technical Working Paper 6 describes the approach adopted to assess the potential impact of the project on flood behaviour, including the potential obstruction or redirection of flow discharging to the project site from Canal Road, the Cooks River Intermodal Terminal, the Botany Rail Line and the northern end of Swamp Road:

> *The structure of the TUFLOW models that were developed to define flood behaviour under pre-project conditions was adjusted to incorporate details of the project under operational conditions. The results of modelling a range of events with AEPs of between 50% and 0.2%, as well as the PMF were used to prepare a series of figures showing flooding patterns under operational conditions and afflux diagrams showing the impact the project would have on flood behaviour.*

The flooding assessment (Technical Working Paper 6) concludes that the project would have a minor impact on flood behaviour in areas upstream of the project site on Inner West Council land. The project is elevated on bridge structures where overland flow paths cross the project site.

The assessment also demonstrates that sufficient flood storage exists to mitigate the potential impact on flood behaviour within Alexandra Canal.

4.1.9 Surface water

Tempe Wetlands

Issue

Consider the potential for contaminated water to reach Tempe Wetlands.

Response

Chapter 16 of the EIS/preliminary draft MDP has considered potential impacts on Tempe Wetlands during construction and operation.

Tempe Wetlands is outside the project site and would not be directly impacted by the project. Surface water drainage in the construction footprint (adjacent to the wetlands) is towards Alexandra Canal to the south-east and away from the wetlands. For these reasons, no potential has been identified for contaminated water to enter Tempe Wetlands during construction or operation.

Stormwater quality

Issue

Botany Bay Water Quality Improvement Plan targets must be met, as per the Marrickville DCP. To achieve this, consideration should be given to additional water treatment measures, such as biofilter swales, wetlands and rain gardens.

Stormwater quality targets should address pollutant loads and minimising stormwater runoff volume and velocity, through additional measures such as biofilter swales, rain gardens and wetlands.

Council should be consulted on:

- Detailed design related to stormwater quality and quantity, and the Construction Soil and Water Management Plan
- Mitigation measures through CEMP and detailed design
- All proposed treatment solutions.

Response

Section 16.4.2 of the EIS/preliminary draft MDP considers potential impacts on water quality. As the project would increase the total impervious area (such as road pavement) exposed to direct rainfall, there would be the potential for an increase in runoff volumes, pollutant mobilisation and discharge of higher pollutant loads to receiving environments.

As described in section 7.10.9 of the EIS/preliminary draft MDP, the project includes measures to reduce the potential for impacts on water quality. Generally, treatment devices would be installed near connections to the existing drainage network and/or the outlets at Alexandra Canal. These devices would include gross pollutant traps and other separators designed to remove waste matter, hydrocarbons, nutrients and suspended solids from stormwater runoff. The size and type of devices installed would be confirmed during detailed design.

Modelling was carried out to assess the performance of the proposed treatment measures against the targets in the *Botany Bay and Catchment Water Quality Improvement Plan* (SMCMA, 2011). A summary of the modelling results is provided in Table 16.7 of the EIS/preliminary draft MDP.

The modelling results indicate that although the proposed treatment devices would reduce impacts on water quality during operation, the pollution reduction targets would not be achieved for stormwater originating from the project site. This is because there is insufficient available space to provide appropriately sized water quality controls. Although the pollutant reduction targets would not be met, an overall improvement in the ambient water quality outcomes for Alexandra Canal and Mill Stream is expected. Mitigation measure SW3 commits to confirming appropriate treatment measures with the aim of improving water quality within Alexandra Canal and/or achieving the targets provided in the *Botany Bay and Catchment Water Quality Improvement Plan* (SMCMA, 2011).

The catchments in the study area are highly altered and urbanised. While Transport is supportive of improving environmental values in degraded aquatic ecosystems in the longer term, the project would have limited ability to influence these. Achieving such targets requires a whole of catchment approach and an approach based on scale which is not reflected in the scope of construction works for the project. The design has maximised the ability to contribute to long-term water quality improvement in the wider catchment by incorporating as many stormwater treatment devices as possible within the operational footprint, incorporated as part of the landscaping to treat runoff from the road.

The project also incorporates features to control flow velocities within and at outlets from the road drainage system to minimise the potential for erosion and scouring that would increase sediment load in the receiving waterways and disturb and mobilise contaminated sediment and other material from the waterway channels.

Transport has developed a conceptual construction water treatment approach with reference to relevant guidelines and with consideration of existing water quality to ensure that any treated water discharge from the project would not result in an adverse impact on water quality and is protective of the receiving environment. The final approach to the treatment and management of water quality would be in accordance with the mitigation measures and conditions of approval.

As described above (in section 4.1.1) and in section 27.2.1 of the EIS/preliminary draft MDP, the management of environmental impacts during construction would be documented in the CEMP, which would be prepared by the construction contractor(s). In accordance with mitigation measure CS9, a Construction Soil and Water Management Plan will be prepared as part of the CEMP and implemented during construction. The plan will detail processes, responsibilities and measures to manage potential soil and water quality impacts during construction, including potential impacts associated with the presence of existing contamination, stockpile management, saline soils and acid sulfate soils.

Consultation will be undertaken as part of the development of the CEMP and associated plans in accordance with the conditions of approval for the project.

Water sensitive urban design

Issue

Council requests extensive use of water sensitive urban design, which incorporates green infrastructure.

Response

As noted above, the design has maximised the ability to contribute to long-term water quality improvement in the wider catchment by incorporating as many stormwater treatment devices and erosion control measures as possible within the operational footprint. However, the land available for stormwater treatment is severely limited. There are also other existing site-specific constraints (such as the former Tempe landfill). The principles of water sensitive urban design have therefore been incorporated into the project as far as practicable.

In addition, in accordance with mitigation measure SW3, appropriate water quality treatment measures, including water sensitive urban design incorporated as part of the landscaping, will be considered in the detailed design.

Water quality monitoring

Issue

Full-time water quality monitoring should be introduced to ensure all impacts on the Cooks River and Tempe Wetlands are controlled.

Response

In accordance with mitigation measure SW6, a water quality monitoring program will be developed and implemented as part of the Construction Soil and Water Management Plan to monitor potential surface water quality impacts. The program will define monitoring parameters, monitoring locations and the frequency and duration of monitoring.

The monitoring program will include ongoing baseline monitoring to determine the water quality of potential receiving waters prior to commencement of construction. Proposed discharge will be updated as required prior to construction based on the baseline data at the time.

Water quality monitoring will continue for a minimum of 12 months following the completion of construction, or until affected watercourses are certified by a suitably qualified and experienced independent expert as being rehabilitated to an acceptable condition (or as otherwise required by any project conditions of approval).

It is noted that water quality in Alexandra Canal is affected by its receiving catchment. Permanent full time monitoring would be unlikely to provide useful information regarding impacts associated with the project.

Further information on the monitoring program is provided in section 16.6.1 of the EIS/preliminary draft MDP.

4.1.10 Residual land

Cessation of Council lease

Issue

Council will not be responsible for cessation of the lease with Tyne, as this cessation will be a consequence of the project, the proponent must negotiate cessation of this lease.

Response

Transport is currently negotiating with Tyne Containers to secure its leasehold interest in the Tempe Lands.

Discussions with Tyne Containers have been underway since September 2018 to work towards a mutually agreeable outcome for its interest in the land. Relocation options are currently being explored.

Residual land

Issue

Council requires future investment lands to replace the loss of the associated investment lands.

Any remaining land that was previously owned by Council should be fully returned to Council at no cost and in a form that is both usable and viable to Council, without delay (to minimise any periods of vacancy). Residual land must meet Council requirements prior to being handed back to Council.

A condition is to be placed on any consent requiring Transport to engage with Council and collaborate on the future use of residual land in accordance with Council’s priorities.

Response

As described in sections 7.12.4 and 19.4.3 of the EIS/preliminary draft MDP, it is expected that some of the land required to construct the project in Tempe (about eight hectares of land, including land within Tempe Lands and other areas on the former Tempe landfill) would be returned to council. As described in section 3.2.2 of this report, and in accordance with the agreement with council, land being handed back to council would include the following amenities:

- For the open space areas located west of the Terminal 1 connection:
  - An off-leash dog exercise area on a like for like basis with the existing off-leash dog exercise area
  - Reinstatement of the existing car park area located adjacent to the dog exercise area
  - Grassed open space for the remainder of this area affected by the project
- For land east of the Terminal 1 connection:
  - Reinstatement of handstand area affected by the project on a like for like basis with existing surfaces at this location
  - New path linking the above mentioned car park with the proposed active transport link located on the freight terminal access roundabout.

Transport notes that council is preparing a master plan for the residual lands, which will confirm future land uses and internal access arrangements. The future use of this land would be subject to a separate assessment and approval process. Given the proximity of the residual land to the airport, any future use would also need to take into consideration any aviation requirements.

In accordance with mitigation measure LU3, Transport will continue to consult with Inner West Council regarding the future use of residual land in the Tempe Lands and adjoining area, in accordance with the master planning process for these areas, and will ensure that the urban design and landscape plan for the project does not inhibit the outcomes of this process.

Access to residual land

Issue

Council will not accept responsibility for land which cannot be adequately accessed for maintenance or safely accessed by the community. Residual land must be well integrated with the local road network and not be isolated.

The proposed closure of Swamp Road will mean that parts of adjacent residual land will only be accessible through use of the Sydney Gateway Motorway, with poor connections to the local street network. Concern is expressed that the most usable pocket of residual land will have very limited access to the Inner West and as such will be of only limited use. Such isolated access would severely limit the potential to accommodate uses such as a new Council Deport or other employment or industrial uses.

Response

A response to issues raised in relation to access to residual land is provided in section 4.1.1.

4.1.11 Heritage impacts

Heritage Management Plan

Issue

A detailed Heritage Management Plan should be prepared in consultation with all adjacent Councils, the local community and arboriculture experts/advisor. Careful consideration should be given to Indigenous and post-colonial heritage aspects of the area, particularly in relation to Cooks River and Alexandra Canal.

Response

In accordance with mitigation measure NAH7, a Heritage Management Plan will be prepared prior to construction and implemented as part of the CEMP. It will include measures to manage non-Aboriginal heritage and minimise the potential for impacts during construction. The plan will take into account relevant conservation and heritage management policies in the Alexandra Canal Conservation Management Plan and the Sydney Airport Heritage Management Plan.

4.1.12 Additional considerations

Easement rights

Issue

Council land that is now not adjoining a road, Alexandra Canal or other Council land containing infrastructure that that land relies on, should be given easement rights for stormwater and access rights to and across public roads.

Response

Transport would provide a stormwater pipe beneath the proposed stub road at the freight terminal access roundabout to facilitate future drainage connections by council from the residual land. The future internal drainage network at the residual land would be subject to the land uses to be determined by council as a result of the master planning process. For the same reason, it is not proposed to provide a connection directly to Alexandra Canal.

Access to residual land would be available for council via the publically accessible road network and pedestrian paths. This would include any roadways and pedestrian paths to be constructed as part of the project.

Strategies to be considered

Issue

In planning and managing this project consideration must be given to:

- Recreation Study (Inner West Council 2018) and Recreation Strategy currently under development
- Tempe Reserve Masterplan which is currently being developed by Council
- Cooks River Alliance Management Plan
- Biodiversity Strategy (Marrickville Council).

Response

Section 19.4.3 of the EIS/preliminary draft MDP notes that Council is currently developing a master plan to identify how the project's residual land could be used, which will consider Council's recreational needs study and strategy. Transport is continuing to consult with Inner West Council on the draft master plan, including providing feedback from the community regarding the preferred future use of Tempe Lands. In accordance with mitigation measure LU3, Transport will continue to consult with Inner West Council regarding the future use of residual land in the Tempe Lands and adjoining area as part of the master planning process for these areas as appropriate. As noted above and in accordance with the agreement with council, land being handed back to Council would include reinstatement of the off leash dog park, car park and grassed areas to the west of the Terminal 1 connection, and reinstatement of hardstand to the east of the Terminal 1 connection. In addition, a new pedestrian path would be provided that links the above car park with the shared path on the freight terminal access.

The project would not directly impact land within Tempe Recreation Reserve.

With respect to the *Cooks River Alliance Management Plan* (Cooks River Alliance, 2014) the project is consistent with the following key focus areas:

- Sustainable urban water management – water sensitive urban design will be considered as part of detailed design (mitigation measure SW3)
- Biodiversity – the design of the project has sought to minimise impacts on biodiversity. In accordance with mitigation measure BD1, detailed design will avoid or minimise the need to remove and/or disturb native vegetation and fauna habitat, including impacts on mapped areas of mangrove forest and Tempe Wetlands.

The aim of the *Marrickville Biodiversity Strategy* (Marrickville Council, 2011) is to preserve and enhance Marrickville's biodiversity values and the ecosystem services they provide. As described in section 22.2.2 of the EIS/preliminary draft MDP and as noted above, the design of the project has sought to minimise impacts on biodiversity. In accordance with mitigation measure BD1, detailed design will avoid or minimise the need to remove and/or disturb native vegetation and fauna habitat, including impacts on mapped areas of mangrove forest and Tempe Wetlands

Location of management controls

Issue

Figure 6.1 of Technical Working Paper 8 indicates drainage outlets and swales on either side of the road, which could be on Council land. This infrastructure should be on project land and Council should be granted easement rights to allow it to drain over the road where it has interfered with the flow regime.

Any stormwater measures (eg swales and noise barrier structures) should be on Transport land and not returned to Council.

Response

All stormwater infrastructure and noise barriers would be located within the operational footprint of the project and not within land returned to council.

In accordance with mitigation measure LU4, the location of all utilities, services and other infrastructure will be identified prior to construction to determine requirements for access to this infrastructure. This will include consultation and agreement with service providers (including Inner West Council).

Cooks River Intermodal Terminal access ramps

Issue

The project does not include provision for a Cooks River Intermodal freight access ramp. The absence of this access is critical to the future 'Place' planning for the town centres of Mascot, Wolli Creek and the emerging 'growth centre' of Arncliffe that line the Princes Highway.

Council requests that a link be provided to the Cooks River Intermodal Freight Terminal provided with a dedicated Canal Road (or equivalent) motorway on/off-ramp.

Response

As part of project development, Transport considered the merits of providing access at Canal Road, for vehicles and/or freight, and determined that such a connection was not feasible. While such a connection does not form part of the project for which approval is sought, the design provides for such a connection, should it be required in the future.

Further information regarding the feasibility of a connection at Canal Road is provided in section 3.2.5.

Geotechnical issues – loads and settlement

Issue

Most of the road would be constructed at a lower level than the existing levels although this is not confirmed. One cross section shows the road with batter slopes of about 20 degrees. If the road batters extend up to the boundary with a development site where the surface will be loaded, such as by containers or structures, the stability of the batter slopes may be weak such that it is possible Transport will dictate that no loads can be placed within a certain distance of the crest of the batter. The plans within the EIS do not sufficiently indicate this potential restriction or where the crest will be in relation to site boundaries. Conditions should be imposed preventing such a consequence on the future development of adjoining land.

There is no definitive solution proposed to deal with settlement, but one option seems to be building a heavily reinforced soil structure to help bridge uneven settlements that may occur in future. Transport should be obliged to refine the design and confirm that the road and associated infrastructure can cope with the settlement without substantial maintenance costs.

Response

The project described in the EIS/preliminary draft MDP is based on a reference design, which has included comprehensive site investigations and analysis by a team of engineering professionals. As a result of a number of constraints to the west of Alexandra Canal, including the canal itself, the majority of the project would be constructed on an embankment or elevated structure above the existing ground surface. Where it is located at-grade, for example within the former Tempe landfill, the design has been continuously refined and optimised to minimise the depth of excavation required. This has also considered airport operational constraints which limit how high the infrastructure can be raised above ground level. Further information on this refinement process is provided in section 6.5 and section 6.5.3 of the EIS/preliminary draft MDP.

Transport is investigating the option of using piles to support the road pavement through the former landfill to meet the required settlement criteria. This option, and other design issues raised by council, would be further investigated during development of the detailed design.

Outside the former Tempe landfill, the project would include importing fill material to consolidate the underlying alluvial soil layers located within the St Peters interchange connection work area. The fill material would compact the underlying alluvial soil layers to ensure that settlement during operation would be minimised. Other ground improvement methods may also be used, such as dynamic compaction or concrete injected columns, to ensure a stable foundation for the design.

The design has taken into account existing adjacent development and infrastructure (including buildings, roads, carparks etc). However, it does not make allowance for any future works or developments whose ground loadings are currently unknown. While the project does not constrain future adjacent sites or developments, any future adjacent developments or activities would need to take account of the project to ensure that proposed site loadings are appropriately managed and not limit safe and continued operation of project infrastructure.

Mounds and settlement

Issue

Council requests that no mounds be placed on land to be returned to Council. Furthermore, Council considers that any mounds placed adjacent to Council land will further limit potential future uses of the land because the zone of influence of settlement will extend a significant distance laterally from the edge of the loaded area. This needs to be investigated as part of the impact assessment and no limitations should be placed on Council land.

Response

The project would involve excavation of material contained within the former Tempe landfill. As described in section 7.10.2 of the EIS/preliminary draft MDP and section 3.1.2 of this report, some of this material would be retained within an emplacement mound.

The proposed location of the mound (see section 3.1.2) would be on land retained by Transport. The mound would be designed in accordance with the *Environmental Guidelines: Solid waste landfills*.

4.2 Bayside Council

4.2.1 Strategic planning

Future Transport 2056 and the Sydney Green Grid

Issue

The EIS does not adequately explore opportunities for activation of active transport networks and green grid project opportunities. The EIS is required to give further consideration to the relationship between the project and the socio-economic (eg Mascot) and natural systems (eg green grid projects identified in other plans) to identify wider benefits to be included as part of the project.

The project is in close proximity to the 'Mill Stream and Botany Wetlands Open Space Corridor', 'Alexandra Canal' and 'Freight Lines Chullora to Botany' green grid project opportunities identified in the publication. Any opportunities to contribute to Sydney's green infrastructure and access to quality green spaces should be conditioned as part of any project approval.

Response

Active transport

The project includes relocating the existing Alexandra Canal cycleway to the western side of Alexandra Canal, providing a new active transport link/shared path along the western side of the canal connecting to the existing regional cycle network. Options to integrate with active transport networks will be further explored during detailed design. Further information about the strategic context, background, features, connections and design requirements for the proposed active transport link are provided in section 3.2.1 of this report.

In accordance with mitigation measure TT18, Transport and Sydney Airport Corporation will prepare an active transport strategy to integrate and enhance accessibility opportunities. The purpose of this strategy will be to provide a guide for future active transport infrastructure provision. The strategy will be prepared in consultation with relevant stakeholders, including Inner West and Bayside councils.

Sydney Green Grid

The Sydney Green Grid is a long-term vision for a network of high quality green spaces, which connect communities to the natural landscape throughout Sydney. The Green Grid includes tree-lined streets, waterways, bushland corridors, parks and open spaces; linked to centres, public transport, and public places. The Green Grid forms part of the Greater Sydney Region and District Plans.

As noted in the *Eastern City District Plan* (Greater Sydney Commission, 2018a) councils will lead delivery of the Greater Sydney Green Grid through land use planning and infrastructure investment mechanisms, such as development and land use controls, agreements for dual use of open space and recreational facilities, direct investment in open space, and other funding mechanisms such as local development contributions and Voluntary Planning Agreements.

The long term vision for the Green Grid in the Eastern City District (within which the project is located) identifies Alexandra Canal as one of the ‘other Green Grid opportunities’ in the Eastern City.

This vision, the potential role of the project's landscaping, and opportunities for connections to and along the Alexandra Canal, would be considered as part of the urban design and landscape plan for the project. Transport is collaborating with Sydney Water and local councils on the development of the Alexandra Canal Master Plan. The Greater Sydney Region and District Plans also recognise the important role that cycleways and other active transport connections provide in terms of the Green Grid. The proposed active transport link along Alexandra Canal would be consistent with the long-term vision of Alexandra Canal as a Green Grid corridor.

A Metropolis of Three Cities – The Greater Sydney Region Plan

Issue

Council requests that consideration be given to updating existing contracts in relation to pricing and 'no compete' clauses to encourage sustainable transport (bus/rail patronage) and inclusion of active transport linkages as part of this project.

Response

Provisions in the contractual arrangements for the T8 Airport and South Line Domestic Airport and International Airport stations do not directly prevent development of new bus routes to and from Sydney Airport. However, they do give protection to the Airport Link Company from certain events, such as the NSW Government developing a competing bus route between Sydney's central business district and the airport. Bus routes from other locations are not precluded and are being considered.

To encourage the use of the rail line, the station access was capped in 2014 for customers using the Domestic Airport or International Airport stations more than once a week. The current cap is $30.16.

Changes to the contractual arrangements associated with the T8 Airport and South Line and stations, including the station access fee and provision of additional bus routes, are outside the scope of the project. A response to issues raised in relation to active transport connections is provided above and in section 3.2.1 of this report.

Eastern City District Plan

Planning priorities E9, E11, E14, E15 and E17 from the *Eastern City District Plan* have not been specifically addressed in the EIS, in particular:

- Plan for high-quality, separated walking paths and cycleways that connect to surrounding communities and multiple local centres as part of this project
- Identify ways in which the project can contribute to the health and accessibility of waterways
- Protecting and enhancing bushland and biodiversity - outline alternative measures that will be in place tor additional foraging habitat for the Grey-headed flying fox, eastern Bent Wing-Bat, as well as mangroves
- Enable future open space, green-grid connections and passageways and outline how the project intends to protect and enhance the Green Grid.

Response

As noted in Appendix F of the EIS/preliminary draft MDP, the project is consistent with planning priority E9. The project has been proposed in recognition of the future growth and transport needs of Sydney Airport and Port Botany. The project would provide improved access to Sydney Airport and towards Port Botany, supporting the existing needs and future growth of these international trade gateways. Further information about the need and justification for the project is provided in chapters 5 and 29 of the EIS/preliminary draft MDP.

The project includes relocating the existing Alexandra Canal cycleway to the western side of Alexandra Canal, and connecting to the existing regional cycle network. The relocated route enables cyclists and pedestrians to have improved separation from traffic. Options to integrate with active transport networks will be further explored during detailed design. Further information about the strategic context, background, features, connections and design requirements for the proposed active transport link are provided in section 3.2.1 of this report. In accordance with mitigation measure TT18, Transport and Sydney Airport Corporation will prepare an active transport strategy to integrate and enhance accessibility opportunities. The purpose of this strategy will be to provide a guide for future active transport infrastructure provision. The strategy will be prepared in conjunction with relevant stakeholders, including Inner West and Bayside councils.

The project design includes water quality treatment measures and scour protection measures that minimise water quality impacts and in some cases result in some improvements in water quality. Mitigation measure SW3 commits to considering appropriate treatment measures during detailed design, with the aim of improving water quality within Alexandra Canal and/or achieving the targets provided in the *Botany Bay and Catchment Water Quality Improvement Plan* (SMCMA, 2011).

In relation to additional foraging habitat, in accordance with mitigation measure LV4 a tree management strategy will be developed, including measures to offset the loss of trees and achieve a net increase in tree canopy. The final location of replacement trees will be confirmed in consultation with Inner West Council and Sydney Airport Corporation. As described in section 7.12.3 of the EIS/preliminary draft MDP, and in accordance with mitigation measure LV1, an urban design and landscape plan will be prepared for the project. This will include consideration of habitat opportunities provided by landscaping. It is noted that landscaping will need to consider Sydney Airport's operational constraints, particularly in terms of the airport's prescribed airspace and minimising the risk of wildlife strike. As such, species would be selected to minimise opportunities to attract wildlife at levels likely to present a hazard to aviation operations (as per mitigation measure AS5).

A response to issues raised in relation to the Sydney Green Grid is provided above.

Bayside Community Strategic Plan 2030

Issue

It will be important for the proponent to consider the impacts of the project on local communities and to work with Council to achieve the strategic directions set out in the plan.

Response

The potential socio-economic impacts of the project are considered in Chapter 20 of the EIS/preliminary draft MDP.

The *Bayside 2030: Community Strategic Plan 2018-2030* was reviewed as part of the assessment (see section 20.2.4 of the EIS/preliminary draft MDP). Consultation undertaken by council to inform Bayside 2030 highlighted that communities aspire to have places focused on people and reflect what is meaningful to local communities, such as incorporating public open space. The consultation also identified that communities are seeking improved connectivity, places that are accessible and create a sense of belonging, and integrated transport. The community aspires to have more walking paths, cycleways and transport corridors to support local connectivity.

The active transport components of the project are consistent with the community aspirations noted above. Transport will continue to work with council during detailed design and construction to consider the strategic directions set out in the plan and opportunities for the project to complement these.

Draft Bayside Local Strategic Planning Statement

Issue

Council raises concerns in relation to the lack of access to the Cooks River Intermodal Terminal and the continued impacts on Mascot town centre.

Response

As part of project development, Transport considered the merits of providing access at Canal Road, for vehicles and/or freight, and determined that such a connection was not feasible. While such a connection does not form part of the project for which approval is sought, the design provides for such a connection, should it be required in the future.

Further information regarding the feasibility of a connection at Canal Road is provided in section 3.2.5.

As described in section 9.4.1 of the EIS/preliminary draft MDP, with the project operational, the road network would operate with substantially less congestion than it would without the project. This would improve the travel time and reliability of getting to/from Sydney Airport.

The project would attract traffic away from other local streets and arterial roads, resulting in lower traffic volumes on most roads compared with the volumes predicted without the project. Most of the predicted traffic demand would shift from O'Riordan Street and Botany Road, which passes through the Mascot town centre. It is predicted that these roads would carry between 25 to 30 per cent less traffic in 2036 than they would have without the project. As a result, the project would allow vehicles to bypass the surrounding road network, minimising traffic through Mascot and surrounding local roads. The project would also reduce traffic growth on the M5, General Holmes Drive and Southern Cross Drive as well as forecast traffic growth along local roads, including in and around Mascot.

Analysis of the Strategic Motorway Planning Model for the project indicates that about 50 per cent of heavy vehicles accessing Port Botany would divert to the project daily from existing roads by 2036. In the reverse direction, about 40 per cent of heavy vehicles egressing from Port Botany daily would use the project in 2036 in preference to existing routes.

Discussion Paper - Bayside Transport Strategy 2019

Issue

The discussion paper notes that cycling infrastructure is generally limited to on-road cycling routes and some shared path routes, and that the key cycling connection at Alexandra Canal may potentially be lost with the delivery of the project.

It is important that the proponent work with Bayside Council staff to identify opportunities for cycling infrastructure (active transport) in the locality as part of this project.

Response

The project includes provision of a new active transport link, which would replace the existing link along the eastern side of Alexandra Canal. This would ensure that the key cycling connection along the Alexandra Canal corridor is retained. Transport has been discussing opportunities with Inner West Council and the City of Sydney to work together on future active transport options in the area.

Transport has undertaken a preliminary study of the existing cycling infrastructure and opportunities for future connections in the study area.

Mitigation measure TT18 commits Transport and Sydney Airport to prepare an active transport strategy to integrate and enhance active transport opportunities. The purpose of this strategy will be to provide a guide for future active transport infrastructure provision. The strategy would be prepared in conjunction with relevant stakeholders, including Inner West and Bayside Councils.

Navigating the Future - NSW Ports 30 Year Master Plan (NSW Ports, 2015)

Issue

Access from the project to the existing Cooks River Intermodal Terminal has not been provided. This is inconsistent with the objectives of the NSW Ports Master Plan. Council raises concern that container traffic will continue to travel through the Mascot town centre, a high density mixed use precinct, to access this terminal.

Response

A response to issues raised in relation to direct access to the Cooks River Intermodal Terminal is provided above and in section 3.2.5 of this report.

With regard to the objectives of the NSW Ports' 30 Year Master Plan, as described in Appendix F of the EIS, the plan recognises that while the increased use of freight rail will assist in managing growth in truck volumes, roads will continue to be an important means of moving freight to and from ports and intermodal terminals. It is therefore essential that efficient road connections are available. The project would assist in achieving this and objective 1 of the plan, which is to: 'Provide efficient road connections to the ports and intermodal terminals'.

With regard to objective 1, the plan notes that managing the growth in truck numbers will be important to limit congestion at Port Botany and to limit impacts on the local community. The plan notes a number of actions under this objective, including 'deliver an efficient connection from Foreshore Road to the proposed M4 Motorway connection at St Peters'.

The project would provide new high capacity road connections between the Sydney motorway network at St Peters interchange to Sydney Airport and towards Port Botany, allowing traffic to bypass roads through local areas, including Botany Road. It would provide a connection from St Peters interchange to the arterial road network near Sydney Airport, which would enable trucks to access Foreshore Road via General Holmes Drive and Joyce Drive.

The project, together with the Botany Rail Duplication project, the development of the Sydney motorway network (including the M4 East, New M5 and M4-M5 Link), and other key road infrastructure projects, would expand capacity and support connections to Port Botany.

As indicated above, analysis of the Strategic Motorway Planning Model for the project indicates that about 50 per cent of heavy vehicles accessing Port Botany would divert to the project daily from existing roads by 2036. In the reverse direction, about 40 per cent of heavy vehicles egressing from Port Botany daily would use the project in 2036 in preference to existing routes.

4.2.2 Transport and traffic

Construction stage modelling – 2022 baseline scenario

Issue

The baseline scenario for construction should take into account current network performance (2019) to gauge the impacts of construction activity of the project. The other projects that are likely to be operational will not realise any benefit during the construction periods.

Response

A 2022 future baseline model scenario was used to assess the potential for construction impacts in accordance with traffic modelling best practice (see section 9.1.2 of the EIS/preliminary draft MDP). It is noted that, as shown in Figure 8.11 of the EIS/preliminary draft MDP, the main construction works would start in 2021. It is expected that peak construction activity would occur in 2022. As a result, the 2022 baseline scenario reflects the forecast traffic demands and network performance at the time construction would occur. A 2019 baseline would include other construction activity that may be completed when construction of the project commences. It would also include lower overall traffic volumes on the network which is less representative than the modelling baseline adopted.

A number of other road infrastructure projects would be completed prior to and over a similar timeframe as the project. These include the New M5 (estimated completion December 2020), Airport North precinct upgrade project (estimated completion January 2021) and the Mascot intersection upgrades project (various throughout 2020 to January 2021). For these reasons, adopting a future year 2022 as the baseline is considered more applicable and realistic for assessing potential construction impacts on the road network.

Additional intersections to be assessed

Issue

The potential impacts at the following intersections should also be assessed as they have significant relevance for the Bayside community:

a. Ross Smith Drive/Sir Reginald Ansett Drive

b. Wentworth Avenue underpass/General Holmes Drive

c. Botany Road intersections with Robey Street and King Street

d. The Church Avenue two-way proposal.

Response

Ross Smith Drive/Sir Reginald Ansett Drive

Modelling indicates that currently, and into the future, this intersection is expected to operate at a level of service E or F. This is a result of the limited number of traffic movements at this location and the delay associated with the deliberate metering of traffic on Ross Smith Avenue (to discourage through traffic). The modelling has assumed that the metering would continue to operate in the future scenarios. All future scenarios show a similar level of service of E or F, noting extended queues on Ross Smith Avenue during peak periods.

Wentworth Avenue underpass/General Holmes Drive

The Wentworth Avenue/General Holmes Drive intersection is predicted to operate with a 50 per cent reduction in delays during the morning peak in 2026, improving the level of service from the current F to a level of service C. In 2036, a 48 per cent reduction in delays is predicted, improving the level of service from F to C. During the afternoon peak, while the existing level of service C would remain, there would be a slight increase in delay of six seconds. By 2036, the intersection delay would deteriorate to level of service D with a slight increase in delay of eight seconds.

Botany Road intersections with Robey Street and King Street

The Botany Road intersections with Robey Street and King Street are predicted to operate as follows:

- Robey Street:
  - For the morning peak – reduction in delays of 61 per cent in 2026 (improvement from level of service E to level of service B) and 66 per cent reduction in delays in 2036 (improvement from level of service F to level of service B)
  - For the afternoon peak – reduction in delays of 25 per cent in 2026 (improvement from level of service C to level of service B) and 41 per cent reduction in delays in 2036 (improvement from level of service D to level of service C)
- King Street:
  - For the morning peak – reduction in delays of 68 per cent in 2026 (improvement from level of service F to level of service C) and a 64 per cent reduction in delays in 2036 (level of service F to level of service F)

- For the afternoon peak – reduction in delays are substantial with a 82 per cent reduction in 2026 (level of service F to level of service C) and a 81 per cent reduction in delays in 2036 (level of service F to level of service D).

The Church Avenue two-way proposal

The models developed for the project were established in 2018. As a result, they did not include details of the Church Avenue proposal. In accordance with mitigation measure TT17, a review of the operational network performance will be undertaken 12 months and five years from the commencement of operation to confirm the operational traffic impacts on surrounding arterial roads and key intersections. The review will identify measures (as required) to address impacts on road network performance. The results of the review will be considered in future operational network performance planning carried out by Transport.

Additional streets to be considered by the model

Issue

Forest Road, Wickham Street, Marsh Street, and the M5, which currently carry high traffic volumes to and from Sydney Airport and Port Botany, have not been considered in the model.

The EIS does not consider anecdotal evidence of airport customers using surface roads to reach the airport due to unreliable journey times along the M5 East. Routes 1, 2 and 5 must be included in the construction related travel time changes as these will be the most likely routes for construction vehicles to and from the precinct.

Response

Three traffic models were used for the assessment. The models addressed the strategic and regional changes in road network demand as well as local changes in the study area. The performance of the M5 East was considered in the Sydney Strategic Travel Model and the Strategic Motorway Planning Model, which were used to evaluate road travel demand. The Sydney Gateway Operational Model used the output from the Strategic Motorway Planning model to predict the operational performance of the road network in the study area. Figure 9.1 of the EIS/preliminary draft MDP shows the study area of the local (operational) traffic model. A summary of forecast travel time changes for the identified streets/routes is provided below for the construction stage. The referenced routes relate to those shown in Figure 9.5 of the EIS/preliminary draft MDP.

Route 1 (Princes Highway – May Street to Wickham Street/Forest Road)

- Northbound – no changes anticipated
- Southbound – forecast increases in travel time of between four and 20 per cent with the larger increases expected during the latter stages of construction.

Route 2 (Princes Highway - May Street to Bestic Street (West Botany Street))

- Northbound – some reductions in travel time during the initial construction stages and then increases by up to 18 per cent in the latter stages
- Southbound – some reductions in travel time during the initial construction stage before increasing up to 27 per cent and by four per cent in the latter stage of construction.

Route 5 (Marsh Street - M5 Intersection to Joyce Drive/General Holmes Drive)

- Westbound – reductions in travel time throughout all of the construction stages
- Eastbound – reductions in travel time throughout all of the construction stages, except for the final stage where a marginal increase of two per cent is forecast.

Better linkages are required to encourage active transport

Issue

Pedestrian linkages to and from the airport are very poor leading to pedestrians currently walking along major road corridors unprotected. The proposal must address and provide better linkages to encourage active transport.

Response

The project maintains pedestrian access into both Sydney Airport terminals and provides improved facilities where possible.

A new section of shared path would be provided as part of the freight terminal access. This path would provide pedestrian and cyclist access to the Sydney Airport freight terminal located on Link Road from areas to the north. The path would extend along Airport Drive, crossing Alexandra Canal via the freight terminal bridge to intersect the Terminal 1 connection. The alignment of the proposed link is shown in Figure 7.3 of the EIS/preliminary draft MDP.

At the Terminal 1 connection, a signalised pedestrian crossing is proposed, providing access to residual land east and west of the Terminal 1 connection. Future connections to this path would be subject to the master plan for the residual land being prepared by Inner West Council.

A new active transport link would be constructed to replace the existing link, which would be removed from along Airport Drive.

Plans for a principal bicycle network in Sydney are under development. The draft network has been considered during development of the project, and the proposed active transport link this consistent with the draft network. The new link would also maintain the connection along Alexandra Canal provided by the existing route, which also forms part of the regional cycle network.

The development of the proposed active transport link has also taken into account other relevant strategic plans and policies, including the Priority Cycleways Program, the Greater Sydney Region Plan, Eastern City District Plan, and the Future Transport Strategy 2056.

Further information on proposed pedestrian access arrangements and active transport linkages is provided in section 3.2.1 of this report.

Consideration of airport related traffic peaks

Issue

Airport related traffic tends to peak on Fridays and weekends and it is proposed to undertake a lot of construction during that time. This will impact local community access due to delays and congestion that the construction traffic and closures may impose.

Response

Section 9.2.2 of the EIS/preliminary draft MDP acknowledges that traffic peaks associated with Sydney Airport operations are different to the general road network. Specifically, the airport peak has the effect of extending the road network peak period. The traffic assessment was based on the road network peak hour with the highest traffic volume. While the traffic volumes are similar, analysis has confirmed that the weekday peak is greater than on weekends.

In accordance with mitigation measure TT2, the Construction Traffic and Access Management Plan will include proposed road staging of construction works along Airport Drive, Qantas Drive and key accesses to Sydney Airport's terminals to ensure these key roads maintain satisfactory capacity and minimum levels of service.

The Transport Management Centre will have a key role to play and will be responsible for managing the capacity and functionality of various roads using the road occupancy license process. This process will include consideration of local peaks and shoulder periods related to different users on different parts of the road network. As part of the process, steps to minimise access disruption and delays will need to be implemented before any approval for works is granted, including undertaking works when traffic volumes are lower wherever possible.

Mitigation measure TT5 commits Transport to developing construction staging and temporary work plans with the aim of minimising conflict with the existing road network as far as possible.

The proposed road staging plans and mitigation measures will be developed in consultation with the Airport Precinct Infrastructure Coordination Operations Group and the Traffic and Transport Liaison Group comprising representatives from Transport (various divisions), ARTC, the Transport Management Centre, Sydney Coordination Office, Sydney Airport Corporation, emergency services, and any contractors working in the vicinity of the airport.

Traffic volumes — Holbeach Avenue (compound C3)

Issue

Details are required for the intersection performance and right turn at Princes Highway, including potential increase in delays to traffic through Wolli Creek and Arncliffe and impacts on the local network.

Response

It is recognised that significant parts of the road network are currently congested during peak periods. For this reason, it is proposed that construction workforce vehicles arrive and depart the various compounds and site car parks before and after the peak.

As described in section 3.2.3 of this report, Transport has refined the heavy vehicle haulage routes and determined that only light vehicles would use the Holbeach Avenue access point A8. The estimated peak construction traffic volumes has also been reduced to 100 vehicles.

The right turn performance from the Princes Highway to Holbeach Avenue (or Bellevue Street) currently operates at a level of service F, which is acceptable for minor right turn movements from major arterial roads. The key criteria for performance of this intersection outside of peak hours, is the right turn queue length.

To ensure that right turn queues are contained within available storage bays, to not adversely affect Princes Highway traffic from Arncliffe and Wolli Creek, a minimum signal time of 14 seconds would be needed. This is sufficient to allow up to 40 construction vehicles to be added to the existing 60 vehicles making this turn. It is noted that this signal phase currently operates with an average of 13 seconds. This is based on a worst-case assumption of 100 per cent of construction workforce vehicles arriving from the south, which is unlikely to occur.

Transport, traffic and access will be managed during construction in accordance with the Construction Traffic and Access Management Plan (mitigation measure TT1). The plan will include measures to manage traffic at all compound access points. In accordance with mitigation measure TT7, where reasonable and feasible, construction access arrangements will be modified to address any traffic flow issues identified by key stakeholders.

Travel time delays – General Holmes Drive and O'Riordan Street

Issue

The increase in travel time delays to General Holmes Drive and O'Riordan Street during and post construction is not a good outcome for local residential amenity as it will lead to a land-locked situation for local traffic with significant delays to enter or leave the local precinct in Mascot. Delays along General Holmes Drive will also lead to localised traffic queue jumping using local streets in Brighton-Le-Sands and Kyeemagh.

Response

The project is not expected to lead to a situation where local residents are 'land-locked' by traffic congestion. Minor delays are predicted during construction. During operation, travel times are expected to improve on local and arterial roads.

Construction

Tables 9.8, 9.10 and 9.12 in the EIS/preliminary draft MDP present an analysis of travel time changes for the main east–west traffic routes during the morning and afternoon peak periods, including:

- General Holmes Drive (M5–Mill Pond Drive)
- Airport Drive and Qantas Drive (Flora Street–Robey Street)
- O'Riordan Street (Terminals 2/3-Gardeners Road).

The tables show that, during construction, travel times on some of these routes are predicted to remain the same as the 2022 baseline or reduce. Routes where an increase in travel time is predicted include:

Construction scenario 1

- General Holmes Drive eastbound – increase of just over a minute during the afternoon peak and 25 seconds during the morning peak
- O'Riordan Street northbound – increase of five seconds in the morning peak and 13 seconds in the afternoon peak
- O'Riordan Street southbound – increase of 34 seconds in the morning peak and nearly two minutes in the afternoon peak.

Construction scenario 2

- General Holmes Drive eastbound – increase of 48 seconds during both the morning and afternoon peaks
- General Holmes Drive westbound – increase of 30 seconds during the afternoon peak
- General Holmes Drive westbound – increase of 30 seconds in the afternoon peak
- O'Riordan Street southbound – increases of 14 seconds in the morning peak, and two minutes and 12 seconds in the afternoon peak.

Construction scenario 3

- General Holmes Drive eastbound – increase of one minute and 15 seconds during the afternoon peak and 46 seconds during the morning peak
- O'Riordan Street northbound – increase of one minute and 11 seconds in the afternoon peak
- O'Riordan Street southbound – increase of 36 seconds in the morning peak and two minutes and 55 seconds in the afternoon peak.

Other identified increases in travel times are insignificant (up to 13 seconds) across the other routes.

As noted above, the largest increases in travel time during construction are predicted to occur during the afternoon peak on O'Riordan Street for southbound traffic, during all construction scenarios. These increases in travel time are not anticipated to lead to significant increases in the volumes of traffic travelling through local streets.

The delivery of the Sydney Gateway road project would be coordinated with Transport for NSW's wider infrastructure delivery program. This includes a number of programs, such as the Mascot intersection upgrade program, aimed at delivering a safe and reliable road network around Mascot. Further to this, operational network performance reviews would be carried out following the opening of the New M5 and the M4/M5 Link. Should these reviews identify the need for further traffic management measures on the transport network, a program would be developed to carry out such works. These works are likely to deliver benefits and relief to the network during and after the construction of the Sydney Gateway road project.

Operation

Figure 9.14 of the EIS/preliminary draft MDP shows substantial predicated improvements in travel times during the morning and afternoon peaks in 2036 as a result of the project. The following key travel time reductions are predicted for eastbound traffic compared to the 'without project' scenario:

- Route 4 (M5 East–Marsh Street–Botany Road (via M1)) – reductions of 37 per cent and 28 per cent for the morning and afternoon peaks respectively
- Route 5 (Marsh Street–M5 to Joyce Drive/General Holmes Drive) – reductions of 37 per cent and 39 per cent for the morning and afternoon peaks respectively.

Similar travel time benefits are predicted for the 2036 cumulative scenario, as shown in figures 8-8 and 8- 10 of Technical Working Paper 1, for the morning and afternoon peaks respectively.

Parking

Issue

The EIS is to include an assessment of the number of workers expected to be working on the project at any point in time to assess the impacts of parking and traffic related to construction workers. Given that a lot of the proposed works will be undertaken out of hours and at night time, parking restrictions do not apply in the majority of the residential streets in the vicinity. Night time workers are highly unlikely to use public transport and there is none in the vicinity of the proposed work sites. Workers will be competing with residents for street parking at night time. This has been an ongoing issue with the construction of WestConnex especially at the Marsh Street compound. Impacts of travel and parking associated with construction workers must be addressed in consultation with Bayside Council.

Response

Construction worker parking

Section 8.6.3 of the EIS/preliminary draft MDP notes the number of parking spaces that would be provided within the construction footprint, including at every compound, to cater for the estimated workforce. About 980 spaces would be provided.

The potential impacts of parking during construction are described in section 9.3.7 of the EIS/preliminary draft MDP. This section notes that there may be a shortfall (of about 110 spaces) during peak periods. This would be managed in accordance with mitigation measure TT13, which requires a worker parking strategy to be developed and implemented. The worker parking strategy will include measures to encourage workers to use alternative transport arrangements, such as using public transport and shuttle buses to move workers between compounds and work areas, where capacity in one parking area is limited but other parking areas have capacity.

Transport has agreed with Inner West Council that parking spaces at Tempe Recreation Reserve would only be used if there are no other alternatives within the construction site, and where the use of these spaces does not coincide with peak usage of the reserve (such as during weekends, school sports etc).

Public transport routes 2 and 3

Issue

Delays to these routes in the PM westbound direction will be detrimental to the Bayside community and are to be minimised.

Response

Figures 7-17 and 7-18 of Technical Working Paper 1 (Transport, traffic and access) show the comparative performance of travel time changes along various routes in the morning and afternoon periods for both 2026 and 2036.

Public transport routes 2 and 3 are services that use the Marsh Street/Airport Drive/ Qantas Drive (400, 420, 420N) and General Holmes Drive/Botany Road (303) routes respectively.

The project would result in substantial improvements to bus travel times along most of the assessed corridors compared to predicted travel times in 2026 or 2036 without the project. In 2026, bus travel times would improve by a minimum of 30 per cent, with some routes experiencing improvements of up to 50 per cent. Additional improvements to bus travel times are forecast in 2036.

The exceptions to this are the buses that use routes 2 and 3 in the westbound direction in 2036. Buses using public transport route 2 would experience a travel time increase of just over nine minutes, while buses using route 3 would experience a 45 second increase. For route 2, this would reduce to five minutes on a roundtrip basis and for route 3, a saving of over one minute.

Simultaneous construction activities in the precinct

Issue

Concern is raised that there is a lot of simultaneous construction activity going on in this precinct by various state agencies as well development construction activities. There must be a nominated contact officer within each state agency to facilitate and coordinate all such activities to ensure that it does not hinder local construction work nor disadvantage residents in the precinct. There must be a coordinated approach to minimise local impacts.

Response

The Transport Management Centre and Sydney Coordination Office play a key role in coordinating activities on the road network to minimise the potential for disruption and delays. In accordance with mitigation measure TT5, construction staging and temporary work plans will be prepared to:

- Ensure access to Sydney Airport is maintained at all times during operational hours
- Stage the construction works on key parts of the network, such as Qantas Drive, Airport Drive and access to Sydney Airport terminals, to enable these roads to continue to function with as minimal impact as possible
- Minimise conflict with the existing road network
- Maximise spatial separation between work areas and travel lanes.

In accordance with mitigation measure TT2, the Construction Traffic and Access Management Plan will include proposed road staging of construction works along Airport Drive, Qantas Drive and key accesses to Sydney Airport's terminals to ensure these key roads maintain satisfactory capacity and minimum levels of service.

The proposed road staging plans and mitigation measures will be developed in conjunction with Transport (various divisions), ARTC, the Transport Management Centre, Sydney Coordination Office, Sydney Airport Corporation, emergency services, and any contractors working in the vicinity of the airport.

Adverse intersection performance post construction

Issue

Numerous road intersections will operate at level of service E and F post construction, in particular, the intersections to airport terminals. This outcome is inconsistent with the *Bayside Local Strategic Planning Statement*.

Due to non-reliability of travel time, there is significant anecdotal evidence of airport customers travelling through other State road networks within Bayside (King Georges Road to Stoney Creek Road to Forest Road to Wickham Street to Marsh Street to airport).

Low level of service will lead to traffic continuing to use other roads within the precinct to avoid paying tolls for marginal improvements to travel time.

Response

The project would provide direct, high quality connections between Sydney Airport and the Sydney motorway network at St Peters and improve travel times and reliability of journeys both close to the airport and over longer distances. It is recognised that many intersections in the wider road network would continue to operate at similar levels of service as they do today and would not be affected by the project.

As an untolled roadway, the project would reduce the current tendency of Sydney Airport traffic to avoid higher order roads in the network (such as M5 East, M5, General Holmes Drive) by providing more reliable travel times and travel time savings compared to other current routes. Drivers would therefore have a choice about whether to pay tolls to use the urban motorway network or avoid them and continue to use other arterial roads to access the airport.

Increase in travel time due to changed access arrangements

Issue

Concern is raised about the increase in travel time for buses due to the removal of the right turn from Qantas Drive into Sir Reginald Ansett Drive.

Any increase in travel times for airport workers due to changes to access, especially for Bayside residents who work at the airport, are to be minimised.

The impacts of changes to access to the northern lands is not clear in the EIS and is to be clarified.

Response

Removing the right turn into Sir Reginald Ansett Drive

Removing the right turn eastbound on Qantas Drive into Sir Reginald Ansett Drive would provide substantial benefits to the overall intersection performance and additional capacity on Qantas Drive. Once the project is operational, Sir Reginald Ansett Drive would be accessed via:

- Left turn at Robey Street, right turn on O'Riordan Street, and across Qantas Drive/Joyce Drive into Sir Reginald Ansett Drive
- The new Terminals 2/3 access (elevated roadway) directly into Sir Reginald Ansett Drive/Keith Smith Avenue.

Sydney Airport Corporation is exploring route options for the Blue Emu car park and the shuttle bus that travels between the airport terminals. Signage would be provided to indicate this. This re-routing is considered to be a minor impact necessary to achieve the overall objectives of the project.

For other buses not needing to access Ross Smith Avenue and using the new Terminals 2/3 access, it is expected that travel times would reduce slightly, due to the ability to avoid the Robey Street intersection.

The proposed ground transport interchange at Terminals 2/3 (to be developed by Sydney Airport Corporation) will provide direct and efficient access for vehicles. The interchange will allow for an increase in the number of public transport services to and from Sydney Airport.

Travel time for airport workers following removal of right turn at Lancastrian Drive

The right turn from Qantas Drive into Lancastrian Road would be removed towards the latter stages of construction. Employees requiring access from the south and west would be able to use the following alternative access:

- To access the new Qantas campus – turning left at Robey Street onto O'Riordan Street and then turning left onto King Street
- To access Lancastrian Road and the Qantas catering bridge – by doubling back to Lancastrian Road via the left turn from Qantas Drive to Robey Street, then travelling via Robey Street, O'Riordan Street and Qantas Drive, then via the left turn into Lancastrian Road.

An additional future access option is via the internal road network from Terminals 2/3. This access is being considered by Sydney Airport Corporation as part of ongoing airport development in accordance with the Sydney Airport Master Plan.

Changes to northern lands access

The project includes a new access to the northern lands as described in section 7.8.2 of the EIS/preliminary draft MDP. The northern lands access would consist of a new section of road and overpass to provide access between Sydney Airport land located on either side of the rail corridor to the west of Alexandra Canal. The new access would extend between land accessed from Burrows Road on the northern side of the rail corridor and land on the southern side of the corridor.

Cumulative construction impacts of Botany Rail Duplication and Gateway road project

Issue

Cumulative construction impacts of the Botany Rail Duplication and Gateway road project creates delays of eight to 20 minutes to access airport terminals during peak use on weekends. The delays are currently significant. The projection only shows the impact from the 2022 to 2026 construction period and hence will result in significantly poorer outcomes than presented in EIS especially for Rockdale and Mascot communities, which Council considers unacceptable.

Response

Section 9.5.1 of the EIS/preliminary draft MDP describes the potential for cumulative construction impacts to occur as a result of concurrent construction of the Botany Rail Duplication and Sydney Gateway road project. This would occur over the period of construction for the Botany Rail Duplication project (between 2021 and 2023) and is primarily related to the scope of works and construction methodology of that project.

The referenced travel time increases are anticipated to occur during closure of Robey Street or O’Riordan Street, which would only occur for certain major construction events such as crane lifts over the road for bridge construction. During these periods, works affecting Robey Street and O’Riordan Street would be co-ordinated to minimise delays and inconvenience to road users. It is not expected that construction of the Sydney Gateway road project would require Robey Street or O’Riordan Street to be closed.

No consideration of additional public transport options

Issue

The proposal does not consider the provision of additional public transport options along the new corridor to discourage private vehicle trips (it is recognised that public transport is not part of this proposal but it should be considered for benefits of our local community). The EIS is to be amended to give greater consideration of public transport and active transport options as discussed elsewhere in this submission.

Response

The improved capacity and connectivity that the project would provide, together with the wider changes to the Sydney motorway network, would create potential options for new road-based public transport routes and options for connecting to the airport.

The project would also introduce a range of improvements to bus travel times along the existing routes that service the airport. The project would also substantially improve bus travel times for at least 15 different bus routes within the Sydney Airport area by 30 to 50 per cent. These changes would make the use of existing bus services in the locality more attractive to existing and potential future patrons.

Transport’s Sydney’s Bus Future program will provide improved commuter bus access to Sydney Airport, with better east, west and south links. The program includes new bus routes and extra bus services to the airport. The program will introduce substantial improvements to bus travel options to and around the airport precinct. The proposed ground transport interchange at Terminals 2/3 (to be developed by Sydney Airport

Corporation) will provide direct and efficient access for vehicles. The interchange will allow for an increase in the number of public transport services to and from Sydney Airport. Providing additional public transport options along the new corridor is outside the scope of the project.

A response to issues raised in relation to active transport connections and facilities is provided in sections 4.2.1 and 3.2.1 of this report.

Connections to Port Botany

Issue

The proposal does not provide adequate subsurface and direct connections for Port Botany traffic to access this corridor. It heavily relies on surface road network around the airport for connections to north and west which is a large contributor to the intersections operating at LOS of E or F in peak hours. Council considers this outcome unacceptable.

Response

The opportunity to create a new road connection to Sydney Airport was identified during early planning for the WestConnex program of works. During this process, it was identified that a new interchange at St Peters would create an opportunity to improve access to Sydney Airport and Port Botany. In 2015, the WestConnex Updated Strategic Business Case (Sydney Motorway Corporation, 2015) identified 'Sydney Gateway' as a proposed new road link. The link was proposed between the new St Peters interchange and the Sydney Airport and Port Botany precinct (see section 6.2 of the EIS/preliminary draft MDP).

Both surface and sub-surface (tunnel) options were considered for the project, as described in section 6.4.3 of the EIS/preliminary draft MDP. While surface alignments were expected to be difficult and challenging, tunnel solutions would be less feasible. This is a result of the very deep, sandy sediments and high groundwater table in this area, the geotechnical conditions that are not ideal for tunnelling, and the potential for geotechnical risks. It was anticipated that open-cut excavation would be required, with the potential for significant surface disruption and extensive land acquisition, increasing the likelihood of substantial business disruption. Environmental impacts would include impacts on Alexandra Canal and the need to transport and dispose of large volumes of excavated spoil material and contaminated groundwater. Tunnels would also be significantly more expensive and require more energy to construct and operate over the life of the infrastructure. For these (and other) reasons described in section 6.4.3 of the EIS/preliminary draft MDP, tunnel options were not preferred. This conclusion is consistent with the decision (as part of planning for the WestConnex program of works) that St Peters interchange would deliver a surface road connection with Sydney Gateway. If a tunnel solution had been preferred, a redesign of St Peters interchange would have been required.

The project would deliver a new high capacity road connection between the Sydney motorway network and Sydney Airport, and towards Port Botany. By linking directly to the enhanced Sydney motorway network, the project would improve travel times to Western Sydney and other important freight destinations. Specifically, the grade separation of the project with Qantas Drive, O'Riordan Street and Sir Reginald Ansett Drive would enhance through traffic access and capacity to Port Botany.

Analysis of the Strategic Motorway Planning Model for the project indicates that about 50 per cent of heavy vehicles accessing Port Botany would divert to the project daily from existing roads by 2036. In the reverse direction, about 40 per cent of heavy vehicles egressing from Port Botany daily would use the project in 2036 in preference to existing routes. As a result, the project would attract traffic away from other arterial roads allowing reduced traffic growth on the M5, General Holmes Drive, Southern Cross Drive and Botany Road, which are key routes for the movement of freight.

The project, together with the Botany Rail Duplication project, the M4 East, New M5 and M4-M5 Link, would expand network capacity, improve access for passengers and freight, and assist with meeting the predicted growth in passenger, freight and general traffic movements at Sydney Airport and Port Botany.

Transport has completed the Port Botany Access Study to consider options for additional traffic improvements that may be required around the port in the short, medium and long-term. Transport is working closely with NSW Ports, Sydney Airport Corporation on these options. Planning approval and delivery of these works will be taken forward by Transport once more detailed assessments and funding has been secured. These works are not part of the project.

Cumulative traffic impacts

Issue

The proponent is to consult with Council's Development Services staff to determine the cumulative traffic impacts of a number of existing and proposed concrete batching plants on the project.

Response

The EIS/preliminary draft MDP included assessment of the potential for cumulative traffic and transport impacts in accordance with the SEARs. The SEARs required consideration of projects '*that have been approved but where construction has not commenced, projects that have commenced construction and projects that have recently been completed*' and assessment of 'cumulative impacts on the road, pedestrian and cycle network from other key infrastructure proposals including but not limited to the Botany Rail Duplication and New M5.'

The results of the assessment undertaken in accordance with the SEARs are summarised in section 9.5 of the EIS/preliminary draft MDP.

Mitigation measure TT16 is relevant to the management of cumulative impacts and the need for co-ordination. In accordance with this measure the potential for cumulative construction traffic impacts will be reviewed and coordinated with other projects, in consultation with the Airport Precinct Infrastructure Coordination Operations Group and the Traffic and Transport Liaison Group. The review will include:

- Considering other projects with the potential to affect access and capacity, particularly in the vicinity of Terminals 2/3
- Detailed reviews of programs for traffic staging, lane and road closures for all projects
- Coordinating works and identifying efficient re-routing options during periods of road and lane closures.

Construction traffic and access management plan

Issue

A construction traffic and access management plan must be prepared in consultation with Bayside Council.

Response

In accordance with mitigation measure TT1, a Construction Traffic and Access Management Plan will be prepared prior to construction and implemented as part of the CEMP. The plan will detail processes and responsibilities to minimise traffic and access delays and disruptions, and identify and respond to changes in road safety during construction.

Consultation undertaken as part of the development of the CEMP and associated plans would be in accordance with the conditions of approval.

Cruise ship terminal

Issue

The proposed cruise ship terminal at either Molineaux Point, Port Botany or Yarra Bay, Phillip Bay is taking into consideration the outcomes of Sydney Gateway and Botany Rail Duplication in addressing local traffic congestion.

The Port Authority, however, has released very few details of what the impacts of the cruise ship terminal will be, particularly in relation to traffic and transport impacts. Council is unable to adequately assess traffic benefits of Sydney Gateway without understanding how much of the suggested increased in capacity of the roads being delivered by the project will be taken up by the traffic requirements of the proposed cruise ship terminal.

Response

Transport understands that a detailed business case is currently being prepared for a possible future cruise ship terminal and that a decision on a preferred site has not yet been made. Based on a preliminary project timeline estimate, it is expected that construction could start in 2023, depending on the outcomes of the project planning, assessment and approval process. The detailed business case is expected to include a preliminary study on the terminal’s traffic demand and potential impacts on road and other transport infrastructure. It is not known whether details of the detailed business case will be made public or in what timeframe.

Without the project, any additional traffic generation by a possible future cruise ship terminal at Molineaux Point, Port Botany or Yarra Bay would add to existing congestion on the road network which is already reaching capacity. The project would provide increased capacity and reduced congestion and therefore facilitate any local traffic generation by a possible future cruise ship terminal. The development approval process for the cruise ship terminal would need to consider potential impacts of the facility on the local and regional road network and would provide details of the expected traffic generation, key roads used and performance with and without the facility for comparison.

Cooks River Intermodal Terminal freight access ramp

Issue

The Sydney Gateway EIS does not appear to include the provision of a Cooks River Intermodal freight access ramp. The absence of this access is critical to the future place planning for the town centres of Mascot, Wolli Creek and the emerging 'growth centre' of Arncliffe. Council requires that

- A Cooks River Intermodal link is provided with a dedicated Canal Road (or equivalent) motorway on/ off-ramp
- The project delivers improved heavy vehicle access and intersection upgrades in the Port Botany freight route from Foreshore Road through to Sydney Gateway road.

Response

As part of project development, Transport considered the merits of providing access at Canal Road, for vehicles and/or freight (including traffic from the Cooks River Intermodal Terminal), and determined that such a connection was not feasible. While such a connection does not form part of the project for which approval is sought, the design provides for such a connection, should it be required in the future.

Further information regarding the feasibility of a connection at Canal Road is provided in section 3.2.5.

The project, together with the Botany Rail Duplication project, M4 East, New M5 and M4-M5 Link would expand network capacity, improve access for passengers and freight and assist with meeting the predicted growth in passenger, freight and general traffic movements at the airport and Port Botany.

Analysis of the Strategic Motorway Planning Model for the project indicates that about 50 per cent of heavy vehicles accessing Port Botany would divert to the project daily from existing roads by 2036. In the reverse direction, about 40 per cent of heavy vehicles egressing from Port Botany daily would use the project in 2036 in preference to existing routes. As a result, the project would attract traffic away from other arterial roads allowing reduced traffic growth on the M5, General Holmes Drive, Southern Cross Drive and Botany Road, which are key routes for the movement of freight.

Active transport and community connectivity

Issue

Council requests that the easy, fast and safe access applies across all modes of transport and includes a number of high quality active transit links as detailed in TfNSW's draft Principal Bike Network to complete key local and regional active transport connections.

Council requests the project team continue to liaise with local Councils and stakeholders to enable provision for enhanced community access throughout the project area by way of high-quality, separated walkways and cycleways that connect to multiple local centres and surrounding communities, including:

- Enhanced pedestrian access into the Domestic Terminal, including a grade-separated pedestrian bridge over Qantas Drive from O'Riordan Street
- Green Grid connections:
  - A north-south 'Northern Lands' (Alexandra Canal to Sydney Park) open space link
  - An extended east-west (Mill Pond to Sydenham Metro Station) open space and community link
- Active transport connections:
  - A direct Alexandra Canal to Domestic (T2) link from the west
  - A direct Wentworth Avenue to Domestic (T2) link from the east
  - An improved Cooks River crossing (Cahill Park to Tempe Reserve)
  - An Alexandra Canal to Mascot link (Coward/Ricketty Street)
  - Where possible, a five metre at-grade verge provided adjacent to footings and support of bridges, ramps and overpasses to enable future open space, green-grid connections and passageways.

Response

Enhanced pedestrian access and additional cycle connections into Terminals 2/3

As stated in the Section 5.3 of the EIS/preliminary draft MDP, the objectives of the project are to:

- Improve connectivity to Sydney Airport terminals by providing high capacity direct road connections that cater for forecast growth in passenger and air freight volumes
- Support the efficient distribution of freight to and from Sydney Airport and Port Botany to logistic centres in Western Sydney
- Improve the liveability of Mascot town centre by reducing congestion and heavy vehicle movements on the local road network.

Achieving the objectives requires consideration of the road network as a whole and the need to maintain and improve capacity. The road corridors that would be upgraded are significantly constrained in terms of available space. The majority of available space is required to provide the additional capacity (lanes) needed to support the efficient distribution of traffic to and from Sydney Airport and towards Port Botany. This would leave insufficient space for additional active transport links between the airport terminals, public transport services and existing pedestrian and cycling infrastructure. Suitable connections and infrastructure are included in the project design wherever practicable.

Other active transport connections

The project includes relocating the existing Alexandra Canal cycleway to the western side of Alexandra Canal, providing a new active transport link/shared path along with western side of the canal connecting to the existing regional cycle network.

Any additional local connections within the project site will be defined by the active transport strategy, to be prepared in accordance with mitigation measure TT18. The purpose of this strategy will be to provide a guide for future active transport infrastructure provision. Other local connections and facilities are outside the scope of the project.

Transport notes that continuing the existing cycleway along the canal north towards Sydney Park requires a coordinated approach involving Sydney Water, Bayside, Inner West and City of Sydney councils and the landowners along the canal. Transport is committed to working with these stakeholders to extend the existing Alexandra Canal cycleway along the canal.

The plans for a principal bicycle network in Sydney are under development. The draft network has been considered during the development of the project. The active transport links that would be provided as part of the project are consistent with the draft network. The development of the proposed active transport link has also taken into account other relevant strategic plans and policies, including the Priority Cycleways Program, the Greater Sydney Region Plan, Eastern City District Plan, the Alexandra Canal Master Plan, and the Future Transport Strategy 2056.

Further information about the strategic context, background, features, connections and design requirements for the proposed active transport link are provided in section 3.2.1 of this report.

Green Grid

A description of the Green Grid is provided in section 4.2.1.

Mitigation measure TT18 commits Transport and Sydney Airport to preparing an active transport strategy to integrate and enhance active transport opportunities. The purpose of this strategy will be to provide a guide for future active transport infrastructure provision. The strategy would be prepared in conjunction with relevant stakeholders, including Inner West and Bayside councils.

Public transport

Issue

Council reiterates concerns in relation to the 'no-compete' (bus service) and 'station access fee' (train service) agreements raised in submissions about the Sydney Airport Masterplan. The agreements are considered to negatively impact the desirability of public transport usage at Sydney Airport.

Council requests that the 'station access fee' and 'no compete clause' bound to the Airport Link line contract be removed as a package of measures to increase public transport use to Sydney Airport.

In addition, specific infrastructure (transit lanes etc) should be considered for inclusion in the final design, in particular a bus rapid transit and expanded bus interchanges in Sydney Airport's terminals.

Response

Non-compete clause

Provisions in the contractual arrangements for the T8 Airport and South Line Green Square, Mascot, Domestic Airport and International Airport stations do not directly prevent development of new bus routes to and from Sydney Airport. However, they do give protection to the Airport Link Company from certain events, such as the NSW Government developing a competing bus route between Sydney's central business district and the airport. Bus routes from other locations are not precluded and are being considered.

Transport’s Sydney’s Bus Future program will provide improved commuter bus access to Sydney Airport, with better east, west and south links. The program includes new bus routes and extra bus services to the airport. The program will introduce substantial improvements to bus travel times around the airport precinct.

Transport’s More Trains More Services program will continue to provide additional capacity to the rail system over the next ten years. Since 2017, the program has delivered more than 1700 additional weekly services across the rail network. The next stages of the program will focus on delivering improvements for the T8 Airport and South lines.

The proposed ground transport interchange at Terminals 2/3 to be developed by Sydney Airport Corporation will also provide direct and efficient access for vehicles and allow for an increase in the number of public transport services to and from Sydney Airport.

Changes to the contractual arrangements associated with the T8 Airport and South Line and stations, and additional bus routes, are outside the scope of the project.

Station access fee

Changes to the station access fee that apply to passengers using the Domestic Airport and International Airport stations on the T8 Airport and South Line are outside of the scope of the project.

To encourage the use of the rail line, the station access was capped in 2014 for customers using the Domestic Airport or International Airport stations more than once a week. The current cap is $30.16.

Bus infrastructure

Achieving the project objectives requires consideration of the road network as a whole and the need to maintain and improve capacity. The road corridors that would be upgraded are significantly constrained by both the freight rail corridor to the north and the Sydney Airport jet base to the south. The majority of available space is required to safeguard the future performance of the local and wider road network. This would leave insufficient available space for additional bus only lanes. Adding bus only lanes would constrain road capacity for all other vehicles and be inconsistent with the objectives of the project.

The proposed ground transport interchange at Terminal 2/3 (to be developed by Sydney Airport Corporation) will provide direct and efficient access for vehicles and allow for an increase in the number of public transport services to and from Sydney Airport.

4.2.3 Noise and vibration – amenity

Construction impacts:

Issue

Qantas Drive, Joyce Drive and surrounding roads are major arterial roads and are proposed to be the site of where the majority of road diversions and construction work will be undertaken. Residents of the surrounding areas such as Mascot, and Botany have lived through a number of years of Airport East and North access construction and will now be impacted by a further three years with the construction of the Sydney Gateway project.

Impacts on local traffic movement as well as construction fatigue will potentially have a detrimental impact on local business, liveability and human health as local streets and neighbourhoods are overcome by heavy vehicles, detours, construction noise and adverse visual impacts. Council requests that:

- The proponent consider the cumulative impacts of recently approved projects and those currently under assessment and to work with Council staff to determine the projects that are to be considered in this assessment
- Transport and traffic impacts of the project are regularly communicated to local residents and businesses, with a detailed timeline of the works and upcoming road diversions and should involve extensive community consultation
- Measures be included to protect the safety of 'vulnerable' road users' (pedestrian and bicycle riders) during construction and when detours are active
- Construction compounds during the project period are considered for re-purposing to community open space, with accessible public facilities.

Response

Section 23.3.1 of the EIS/preliminary draft MDP notes that construction fatigue can occur when people experience impacts from projects over an extended period of time with few or no breaks between construction periods. Construction fatigue typically relates to the effects of traffic and access disruptions, noise and vibration, air quality, visual amenity and/or social impacts from projects that have overlapping construction phases or occur one after the other. Construction impacts that occur in this manner are no longer considered to be transient and/or short-term.

Potential construction fatigue impacts were assessed in Technical Working Paper 15 (Human Health). The potential contributions of noise impacts associated with the project to community construction fatigue were considered in Technical Working Paper 2 (Noise and Vibration).

As described in section 23.3.1, there is potential for construction fatigue to occur as a result of construction noise from the project and other concurrent/consecutive projects. The potential for construction fatigue would generally be limited to the eastern part of the study area in Mascot. Implementation of the noise and vibration mitigation measures would minimise the potential for noise impacts. More specific measures would be developed as the design progresses and impacts from other projects (such as Botany Rail Duplication) are known.

During construction, the project team would build a working relationship with the teams for other major projects, to identify stakeholders or community members who may be susceptible to construction fatigue, and put in place appropriate management measures consistent with those provided in relevant chapters.

In accordance with mitigation measures TT16, NV15 and AQ7 the potential for cumulative impacts will be reviewed prior to construction and works coordinated with other relevant projects to minimise potential impacts as far as possible. Assessments would be undertaken for traffic, noise and vibration and air quality (respectively) to better understand the potential cumulative impacts associated with all projects in the vicinity of the project.

Mitigation measure NV10 commits to implementing respite measures for noisy work and vibration intensive activities consistent with the *Construction Noise and Vibration Guideline* (Roads and Maritime, 2016).

In accordance with mitigation measure TT3, the project’s communications strategy will include a mechanism to inform the community of the dates and durations of specific phases within the project, including information about specific lane and road closures and the times of day and night when works will be carried out.

In accordance with mitigation measure TT12, safe pedestrian and cyclist access will be maintained around or through work areas. Where disruption to access cannot be avoided, alternative routes that are accessible will be provided, signposted and communicated.

In accordance with mitigation measure SE3, a communication strategy will be prepared to detail the process of communicating and engaging with the community and stakeholders in the lead up to, and during, construction. This will include measures to communicate issues relating to transport and traffic impacts and management.

As described in section 8.4.2 of the EIS/preliminary draft MDP, the project would include five construction compounds located within the project site. Four of these compounds (C1, C2, C4 and C5) are located on Sydney Airport land and following construction would be returned to Sydney Airport for use consistent with the Sydney Airport Master Plan. Construction compound C3 is located within the Tempe Lands that are owned by Inner West Council. This land would be returned to Inner West Council following construction as described in section 7.12.4 of the EIS/preliminary draft MDP. Council would be responsible for determining appropriate future uses of this land.

4.2.4 Place making and urban design

Urban design

Issue

Council made a number of comments on required amendments to Technical Working Paper 13, including in relation to the unique qualities of the place, how each proposal/strategy will meet the project objectives, reference’s to Sydney’s unique blue sky, access to new areas of open space in Tempe, and the location of the proposed mounds in the Tempe Lands.

Response

It is not proposed to amend the EIS or its technical working papers at this stage of the approvals process.

Technical Working Paper 13 (Urban Design, Landscape Character and Visual Impact Assessment) presents the urban design and place making strategy for the project and provides an overarching urban design vision for the project. It also outlines the urban design objectives and principles for the project based on the WestConnex Urban Design Framework and the contextual analysis undertaken for the project. The Sydney Gateway Urban Design and Place Making Strategy described in section 6.5 of the Technical Working Paper 13 is preliminary and would be further refined as part of the urban design and landscape plan for the project (required by mitigation measure LV1). Consistent with other recent projects, this plan would be developed in consultation with relevant stakeholders.

Further information on the approach and indicative contents of the urban design and landscape plan is provided in section 7.12.3 of the EIS/preliminary draft MDP.

The project includes a refinement in relation to the proposed emplacement mounds. Further information is provided in section 3.1.2 of this report.

Trees

Issue

It is requested that a detailed arboriculture assessment is undertaken as part of this project. If trees are required to be removed, Council seeks consideration of a replacement ratio of 5:1. If suitable land in the direct area is not feasible for replanting, Council staff can assist in finding suitable replacement locations.

Response

Potential impacts on trees were considered by the EIS/preliminary draft MDP, and the results of this assessment are summarised in Chapter 21.

Mitigation measure LV4 commits to developing a tree management strategy, which will include measures to offset the loss of trees and achieve a net increase in tree canopy. The final location of replacement trees will be confirmed in consultation with Inner West Council and Sydney Airport Corporation. The strategy will also include on-site processes and protective measures to ensure trees identified for retention are appropriately protected during construction.

Landscape plan

Issue

It is recommended that a detailed urban design and landscape plan be provided in the next stage. The plan should provide a more defined vision and design principles to the project. The plan should also provide finer details to guide the design for both built and landscape elements such as palette of colours. It should be ensured there is a consistent approach to landscape design, art installations, lighting are under same framework and design principles. It is recommended a more detailed analysis is provided of every identified built and landscape element, including its aspect, constraints and opportunities and provide design/landscape strategies that is suitable for that location. This process should be overseen by art curator(s) and landscape architect(s) throughout the project.

Response

As described in section 7.12.3 of the EIS/preliminary draft MDP and required by mitigation measure LV1, an urban design and landscape plan will be prepared. The plan will present an integrated urban and landscape design for the project and include:

- Design objectives, principles and standards based on:
  - Local environmental and heritage values
  - Urban design context

  - Sustainable design and maintenance
  - Community safety, amenity and privacy
  - Relevant design standards and guidelines
  - Minimising the footprint of the project
- A description of the project's design features, including graphics such as sections, perspective views and sketches
- Landscaping and structural design opportunities to mitigate the visual impacts of road infrastructure and operational fixed facilities
- Details of proposed landscaping
- Details of disturbed areas (including compounds) and the strategies to progressively rehabilitate, regenerate and/or revegetate these areas
- The timing for implementation
- Monitoring and maintenance procedures for built elements, vegetation and landscaping.

The plan will be prepared in consultation with relevant stakeholders, including local councils and the community.

Further information is provided in section 7.12 of the EIS/preliminary draft MDP.

4.2.5 Visual amenity

Impacts on visual amenity

Issue

Council requests additional photomontages for nominated viewpoints and raised concerns/provided suggestions in relation to the design of the project at various viewpoints. Issues included:

- Loss of trees and impacts on vegetation
- Future design of the noise barriers and bridges including opportunities for public art and lighting
- Concerns about visual impacts from mound options and the retaining wall along the Botany Rail line interface
- Need to ensure any proposed living walls are designed to allow for ongoing maintenance.

Response

The design of the project would be subject to further refinement during the detailed design process, guided by the urban design and landscape plan for the project (mitigation measure LV1). Preparing additional photomontages at this stage, based on the concept design, would not provide additional useful information about the intended final urban design and landscaping.

Further information on the approach and indicative contents of the urban design and landscape plan is provided in section 7.12.3 of the EIS/preliminary draft MDP. The provision of landscaping would be a key element in achieving the overall urban design vision and objectives for the project. As described in section 7.12.3 of the EIS/preliminary draft MDP, the design of landscaping would consider:

- Landscaping features to provide a generous landscape curtilage for vegetation (including tree cover), landform and public art to create a memorable landscape setting for the motorway
- Visual separation to the Botany Rail Line, including a green interface to replace existing mature vegetation that would need to be removed to construct the project
- Consider Sydney Airport's operational constraints, particularly in terms of the airport's prescribed airspace and minimising opportunities to attract wildlife at levels likely to present a hazard to aviation operations (in accordance with mitigation measure AS5).

Mitigation measure LV4 commits to developing a tree management strategy which will include measures to offset the loss of trees and achieve a net increase in tree canopy.

In accordance with mitigation measure BD1, detailed design will avoid or minimise the need to remove and/or disturb native vegetation. Mitigation measure BD2 commits to limiting vegetation clearing to the minimum necessary to construct the project. Micro-siting of infrastructure will be undertaken during detailed design to further minimise or avoid impacts on native vegetation where practicable.

Design of the noise barriers would incorporate urban design input and consider opportunities for public art and appropriate lighting.

Section 3.1.5 of this report describes a refinement of the proposed emplacement mounds. The final design of the proposed mound would be in accordance with the urban design and landscape plan.

Excellence in architectural design to minimise visual impact of the flyover structure

Issue

Council has noted inclusions of natural, indigenous and artistic design in the EIS and support further efforts at visually pleasing and artistically significant components of the Sydney Gateway road project. Council requests that the project seeks further development of inclusion of urban design and architectural excellence in its final design.

Response

The urban design and landscape plan (mitigation measure LV1) will present an integrated design for the project incorporating a consistent approach to project design and landscaping.

In accordance with new mitigation measure LV3, the Director for the Centre for Urban Design at Transport will convene and facilitate an urban design review panel. The panel will comprise the Government Architect, Director Bridges Technical Services (Transport), and an urban design-qualified representative from Sydney Airport Corporation.

4.2.6 Socio-economic, land use and property

Property acquisitions

Issue

Council needs more detailed information in order to understand the full extent of impact of acquisitions, particularly to the roads named in section 7.1.1 of the EIS, as not all have been included in the land requirements table. If acquisition of these roads/other Bayside Council land, be it freehold, leasehold, strata, stratum or any other form of interest, Council staff require the information specified in the submission.

Response

Sections 7.11.2 and 8.4.1 of the EIS/preliminary draft MDP describes the temporary and permanent land requirements during construction and operation. Section 19.3.1 provides a summary of these requirements and the resultant impacts on each property. The properties listed in this section are those properties not owned of the NSW Government where land is required as part of the project. The project described in the EIS/preliminary draft MDP did not require any land owned by Bayside Council.

Existing land uses and zoning

Issue

Council understands that the impact to Bayside Council owned open space and recreation uses is nil based on the proposed project details provided. These impacts are present within adjoining Inner West Council's local government area. Council requests Transport to provide a statement confirming this is required.

Response

The project would not directly affect any open space and recreation areas in the Bayside local government area.

4.2.7 Heritage

Heritage status

Issue

The submitted Aboriginal Heritage assessment indicates that the 6,000 dugong remains and stone axes found very close to this area are an isolated find, rather than - as is more likely - being indicative of other archaeological remains in the area. A more detailed Aboriginal Heritage Assessment is required to exclude the possibility that the dugong remains and axes are isolated finds.

The *Sydney Airport Heritage Management Plan 2009* should be made available to Bayside Council for comment to ensure there are no inconsistencies between the plan and the state heritage inventory record. This is particularly important as some items listed in the SHI form are proposed for demolition.

The draft *Sydney Airport Heritage Management Plan 2018* should also be made available to Council for comment, and to ensure the significance of the buildings and structures proposed for demolition have not been revised to have a higher degree of significance.

Response

The Aboriginal cultural heritage assessment (Technical Working Paper 10) does not imply that the dugong remains are an isolated find. The proposed salvage excavation strategy is based on the prediction that similar soil deposits and similar archaeological deposits may be present within the study area. Section 8.2 of the report, which discusses archaeological potential, uses the close proximity of the remains as an indicator that further archaeological material may be present within the study area and is a primary justification for the proposed salvage methodology. One of the aims of the salvage excavations is to explore the extent of Aboriginal archaeological resource areas. Further information is provided in section 18.6.1 of the EIS/preliminary draft MDP and section 14.1 of Technical Working Paper 10.

Provision of the Sydney Airport Heritage Management Plans to Bayside Council is a matter for council to discuss with Sydney Airport Corporation.

4.2.8 Biodiversity

Vegetation

Issue

The Biodiversity technical working paper indicates that the project would remove about 0.91 hectares of native vegetation. It should be noted that Bayside Council has the lowest vegetation canopy within the Sydney Basin and it is therefore recommended that the proponent commit to vegetation projects to increase the biodiversity value of this area. Bayside is committed towards greening the LGA, and encourages the proponent to work with Bayside to develop revegetation projects.

Bayside is already restricted with its ability to increase the vegetation cover due to the presence of Sydney Airport and Port Botany. By developing another road project after two recent completions, it has the potential to further decrease the connectivity and movement of species as well as prevent future greening projects to be considered. Given the overall footprint of this project, and lack of requirement of any offset planting to occur, Bayside is seeking commitment from the proponent to consider greening this project in the final design.

Response

Mitigation measure BD2 commits to limiting vegetation clearing to the minimum necessary to construct the project. The measure also commits to establishing and maintaining exclusion areas around any native vegetation adjoining the project site in close proximity to work locations.

In accordance with mitigation measure LV4 a tree management strategy will be developed, including measures to offset the loss of trees and achieve a net increase in tree canopy. The final location of replacement trees will be confirmed in consultation with Inner West Council and Sydney Airport Corporation.

As described in section 7.12.3 of the EIS/preliminary draft MDP, and in accordance with mitigation measure LV1, an urban design and landscape plan will be prepared for the project. Further information on the contents of the plan is provided in section 7.12.3.

Replacement trees and landscaping will need to consider Sydney Airport's operational constraints, particularly in terms of the airport's prescribed airspace and minimising the risk of wildlife strike. As such, species would be selected to minimise opportunities to attract wildlife at levels likely to present a hazard to aviation operations (as per mitigation measure AS5).

Aquatic biodiversity

Issue

Bayside Council would like to see proactive measures to include regenerating and naturalising waterways as well as use of permeable surfaces.

Response

Section 7.12 of the EIS/preliminary draft MDP describes the approach to landscaping and urban design for the project. The plan would present an integrated urban and landscape design for the project, including landscaping opportunities and finishes/surfaces. Any additional regeneration and naturalisation of waterways is beyond the scope of the project.

In accordance with mitigation measure SW3, further opportunities to incorporate elements of water sensitive urban design into the project would be considered during detailed design.

Terrestrial biodiversity

Issue

Council recognises corridors such as Coastline Corridor, Mill Stream and Botany Wetlands are connections between habitats allowing for species movement, their protection is necessary for ecosystem functions.

Council is in the process of establishing protection mechanisms around the Green Grid enhancing biodiversity and ensuring ecological resilience. The direct impacts on fauna and their habitats, summarised in Table 22.4 Chapter 22 of the EIS, is a setback for Council's future obligations. Council requests the following:

- The proponent provide further information on the alternative measures that will be in place for additional foraging habitat for the Grey-headed flying fox, eastern Bent Wing-Bat, as well as mangroves

- The EIS and relevant Technical Working Papers should be updated to reflect the green grid priority corridors and include objectives which refers to the 'enhancement of surrounding terrestrial biodiversity' in line with District Plan.

Response

As discussed in Section 22.3.2 of the EIS/preliminary draft MDP, vegetation proposed to be removed for the project provides limited habitat resources for native fauna due to its highly modified nature and the surrounding urban environment. The vegetation includes foraging and shelter resources for common native fauna typical of urban environments. Although a small number of food trees for the Grey-headed Flying-fox and foraging habitat for microbats would be removed, the impact is not considered to be significant in the context of available foraging habitat in the study area.

Landscaping and tree replacement would be undertaken in accordance with the urban design and landscape plan (as noted above). Landscaping will need to consider Sydney Airport's airport operational constraints, particularly in terms of the airport's prescribed airspace and minimising the risk of wildlife strike. As such, species would be selected to minimise opportunities to attract wildlife at levels likely to present a hazard to aviation operations (in accordance with mitigation measure AS5) in accordance with *Sydney Airport's Wildlife Management Plan* and other relevant guidelines, including *the National Airports Safeguarding Framework* (Guideline C) (International Birdstrike Committee, 2006a) and *Recommended Practices No. 1 – Standards for Aerodrome Bird/Wildlife Control* (International Birdstrike Committee, 2006b).

Notwithstanding the significant constraints particular to this project from the operational requirements of Sydney Airport, the mitigation measures are seeking to achieve the primary objective of avoiding or minimising the need to remove native vegetation and fauna habitat (mitigation measures BD1 and BD2). Another key mitigation measure aimed at protecting ecosystem function and improving biodiversity outcomes is the proposed tree management strategy. This strategy will aim to achieve a net increase in tree canopy. This measure will also combat the heat island effect and contribute to the sustainability rating of the project.

4.2.9 Flooding

Reducing flood levels

Issue

Options to reduce the current level of flooding have not been explored sufficiently. Comments in the EIS include that the mitigation is 'constrained by the impact this would have on flooding in Sydney Airport due to displacement of floodwater'.

Response

The flooding and drainage related standards that have been established for the project are defined in section 2.4 of Technical Working Paper 6 (Flooding). For the upgrade and modification of Qantas Drive, the following criteria were established:

- As a minimum, changes to existing roads (such as Qantas Drive) need to ensure the existing level of flood immunity is not reduced
- Ideally, local road modifications are to provide a minimum 10 per cent AEP level of flood immunity.

These criteria are consistent with other recent major road projects. The criteria recognise that it is not always feasible to achieve the preferred flood standard when upgrading existing roads due to constraints imposed by existing flooding conditions and the capacity of the existing drainage networks in urban areas.

During the development of the reference design for the project, a number of options were considered to improve flooding conditions along Qantas Drive. As an outcome of this review it was concluded that it would not be appropriate to improve flooding conditions along Qantas Drive at the expense of exacerbating conditions for adjoining development.

Table 6.2 in Technical Working Paper 6 provides a comparison of the predicted conditions along Qantas Drive before and after construction of the project. At the low point in Qantas Drive, located about 300 metres to the east of Alexandra Canal (referred to as Qantas Drive Sag 1 in Technical Working Paper 6), it was found that the flood immunity could be improved from the existing 50 per cent AEP to about 20 per cent AEP once the project is constructed. During a 10 per cent AEP event, the depth of inundation with the project would reduce from one to 0.2 metres. Options considered to further improve flooding conditions at Qantas Drive Sag 1 involved:

- Upgrading the downstream drainage system to improve its capacity – as the downstream drainage system discharges into Alexandra Canal, this option was found to be ineffective in improving flooding conditions at Qantas Drive Sag 1 due to elevated tailwater levels in the canal
- Raising the road level – it was found that it would not be feasible to raise the level of Qantas Drive Sag 1 without adverse flooding impacts at Sydney Airport or along the rail corridor due to the displacement of floodwaters that presently collect within the roadway.

At the low point in Qantas Drive to the west of Robey Street (referred to as Qantas Drive Sag 2 in Technical Working Paper 6), it was found that it would be feasible to provide two westbound lanes outside the extent of inundation during a 50 per cent AEP event, which is the same as the existing conditions. The maximum depth of inundation on the road would also be similar to existing conditions. Options considered to further improve flooding conditions at Qantas Drive Sag 2 involved:

- Upgrading the downstream drainage system to improve its capacity – as the downstream drainage system runs through Sydney Airport, it was found that this would have adverse impacts on airport operations
- Raising the road level – it was found that raising the level of Qantas Drive to improve flooding conditions at Qantas Drive Sag 2 would obstruct the overland flow that collects at the low point and have the potential to adversely impact development to the north (upstream) of Qantas Drive Sag 2. In particular, raising the level of Qantas Drive would have the potential to increase the frequency and rate that flow would discharge into the basement carpark of the Stamford Plaza Hotel.

In accordance with mitigation measure HF1, a flood mitigation strategy will be prepared and relevant measures will be implemented as part of the design and during construction. The strategy will include undertaking additional flood modelling taking into account detailed design and proposed construction planning and methodologies.

Operational flood risk mitigation

Issue

Alternative flood mitigation options should be investigated to reduce the operational flood risk. The impact of future climate conditions is significant and the mitigation measures have been left for future management. This is a short-term view that will limit the options available for flood mitigation in future. If the current flood hazards are mitigated there will be more resilience in the road network to cope for the impacts of climate change.

Response

The constraints to improving the existing flooding conditions along Qantas Drive under existing conditions (noted in the response above) also apply to providing additional flood mitigation considering future climate change. The primary constraint to improving flood conditions along Qantas Drive is the impact that raising the road level would have on flood behaviour at development adjoining Qantas Drive.

Mitigation measure HF5 requires the potential impacts of climate change to be considered during further modelling during the detailed design stage in accordance with relevant procedures.

In accordance with mitigation measure HF5, the potential impacts of climate change on flooding behaviour will be considered during further modelling, in accordance with the procedures set out in *Floodplain Risk Management Guideline: Practical Considerations of Climate Change* (DECC, 2007) and *Australian Rainfall and Runoff* (Geoscience Australia, 2019). This measure has been amended to commit to this being undertaken in consultation with adjoining landholders. This will include identifying the scope of measures that could be implemented to mitigate against the impact of future climate change on flooding across the broader area.

Existing flood issues

Issue

Council is aware of the following serious flood issues:

- At the Robey Street underpass the depth of flooding in is 0.2 to 0.3m in a one EY event (one exceedance per year) and over one metre in a 10 per cent AEP event
- At Qantas Drive sag 2, during a 10 per cent AEP event, the depth of inundation is 0.8 metres. Based on depth alone this is defined in ARR 2016 as hazard category 3 - unsafe for vehicles. Even in a more frequent 50 per cent AEP event (one in two year) the depth is 0.5 metres. This is particularly significant given the long duration of inundation (more than 2.5 hours in a 20 per cent AEP flood).

Response

Flooding issues at Robey Street and Qantas Drive are summarised in Chapter 14 of the EIS/preliminary draft MDP and described in detail in section 4.3 of Technical Working Paper 6. As discussed in the above responses, options to improve existing flooding conditions have been considered. A primary consideration has been to ensure that improvements to existing flooding conditions within the project site are not at the expense of adjoining development.

In accordance with mitigation measure HF1, a flood mitigation strategy will be prepared and relevant measures will be implemented as part of the design and during construction. The strategy will include undertaking additional flood modelling taking into account detailed design and proposed construction planning and methodologies.

Flooding of the active transport link at Nigel Love Bridge

Issue

The active transport link will pass under Nigel Love Bridge and be two metres lower than existing ground levels. An existing low section of the link is already subject to flooding in high tides. The proposed mitigation involves flood barriers on either side of the path, which will result in large walls and an unsafe and unattractive active transport link.

Response

The underpass for the active transport link is required to ensure adequate clearance for cyclists travelling under Nigel Love Bridge. Flood and high tide protection would be provided by the flood barriers and a pump would be installed in the underpass to control local runoff.

The maximum height of the walls either side of the underpass is mainly driven by the clearance required to the underside of the Nigel Love bridge. At the lowest point, the existing ground levels are more than 0.3 metres above the one per cent AEP flood level. As a result, the walls do not need to be raised at this location to provide freeboard against flooding from Alexandra Canal. On either side of the low point the walls would need to be raised by a maximum of 0.7 metres to provide the required clearance of 0.3 metres to the one per cent AEP flood level. This height would not exceed the maximum wall height required to achieve the minimum clearance to the underside of the Nigel Love bridge.

4.2.10 Water – hydrology and quality

Cooks River catchment

Issue

Further information should be provided to address how the proponent is seeking to work with relevant agencies in achieving the long term aspirational goals for the catchments, whether they relate to Cooks River or Georges River, given that they all share Botany Bay and its catchments.

Alexandra Canal is a vital connecting open space between LGAs. This would require increase permeable surfaces in public domain upgrades, particularly those adjacent to these waterways.

Response

As described in section 7.10.9 of the EIS/preliminary draft MDP, the project includes measures to reduce the potential for impacts on water quality. Generally, treatment devices would be installed near connections to the existing drainage network and/or the outlets at Alexandra Canal. These devices would include gross pollutant traps and other separators designed to remove waste matter, hydrocarbons, nutrients and suspended solids from stormwater runoff. The size and type of devices installed would be confirmed during detailed design. The project also incorporates features to control flow velocities within and at outlets from the road drainage system to minimise the potential for erosion and scouring that would increase sediment load in the receiving waterways and disturb and mobilise contaminated sediment and other material from the waterway channels.

The catchments in the study area are highly altered and urbanised. While Transport is supportive of improving environmental values in degraded aquatic ecosystems in the longer term, the project would have limited ability to influence these. Achieving such targets requires a whole of catchment approach and an approach based on scale which is not reflected in the scope of construction works for the project. The design has maximised the ability to contribute to long-term water quality improvement in the wider catchment, by incorporating treatment devices within the operational footprint where practicable. Mitigation measure SW3 commits to considering appropriate treatment measures with the aim of improving water quality within Alexandra Canal and/or achieving the targets provided in the *Botany Bay and Catchment Water Quality Improvement Plan* (SMCMA, 2011).

Transport has developed a conceptual construction water treatment approach with reference to relevant guidelines and with consideration of existing water quality to ensure that any treated water discharge from the project would not result in an adverse impact on water quality and is protective of the receiving environment. The final approach to the treatment and management of water quality would be in accordance with the mitigation measures and conditions of approval.

Water quality

Issue

Regeneration and protection of waterways should be considered in further detail by the applicant.

Council notes that at Table 4.2 the Environmental Protection Authority ‘recognised the highly disturbed nature of the receiving waterway (Alexandra Canal)’. Council would like to highlight that although Alexandra Canal is highly disturbed, this water ends up in Botany Bay, less than two kilometres away, and this fact must be reflected in any water quality controls and treatment requirements of surface water and groundwater discharge from dewatering prior to entering Alexandra Canal, and ultimately Botany Bay.

Response

Section 16.1.4 of the EIS/preliminary draft MDP describes the basis for establishing the ambient water quality in the receiving waters. The process includes identifying the relevant environmental values of the waterway and the default trigger levels as per the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand Governments, 2018) (the Water Quality Guidelines). Setting discharge criteria that are protective of ambient water quality values requires comparison of the default trigger values against values from baseline monitoring of the waterways. Figure 16.2 of the EIS/preliminary draft MDP shows the locations of the water quality sampling locations within Alexandra Canal, Cooks River and Mill Stream where monitoring was conducted during assessment process.

The baseline water quality monitoring has considered water quality in locations both upstream and downstream of where discharges are likely to occur. For example, in the case of Alexandra Canal, this has included locations within Cooks River upstream and downstream of the confluence with Alexandra Canal. In relation to Mill Stream, an additional water quality monitoring location was established further downstream of the existing monitoring sites (towards Botany Bay). This was to determine water quality below an existing tidal barrier where it is more likely that water discharges might occur. As a result, baseline water quality monitoring has taken account of water quality conditions further downstream of the project site towards Botany Bay.

Section 3.3.4 of this report provides an update of the ambient water quality monitoring conducted since exhibition of the EIS/preliminary draft MDP and proposed discharge criteria.

The assessment has considered potential impacts on the downstream environment and has proposed a range of mitigation and management measures to minimise the potential impacts on water quality in watercourse immediately adjacent to the project and downstream.

Implementing the construction management measures would ensure minimal change in the existing water quality. The proposed operation measures will contribute as far as practicable to the long-term aspiration of water quality improvement in Alexandra Canal, Mill Stream and the downstream environment.

Water sensitive urban design

Issue

Section 7.10.9 - Water quality measures, states that ‘all water quality measures would be developed in accordance with the principles of water sensitive urban design and with the aim of achieving the water quality targets in the 'Botany Bay and Catchment Water Quality Improvement Plan - with a disclaimer ‘...subject to feasibility during the detailed design’ which negates the requirement to implement these requirements. Given that the runoff from this will enter Botany Bay, the words ‘subject to feasibility during the detailed design’ need to be deleted so that design aims to meet the 'Botany Bay and Catchment Water Quality Improvement Plan' targets.

Council encourages better construction techniques and stormwater management practices to align with the principles of Water Sensitive Urban Design.

Response

As noted above, the design has maximised the ability to contribute to long-term water quality improvement in the wider catchment, by incorporating as many stormwater treatment devices and erosion control measures as practicable within the operational footprint. However, the land available for stormwater treatment is severely limited and there are also other existing site-specific constraints, such as the former Tempe landfill. The principles of water sensitive urban design have therefore been incorporated into the project as far as practicable.

The modelling results indicate that although the proposed treatment devices would reduce impacts on water quality during operation, the pollution reduction targets would not be achieved for catchments in the study area. Although the pollutant reduction targets would not be met, an overall improvement in the ambient water quality outcomes for Alexandra Canal and Mill Stream is expected.

In addition, in accordance with mitigation measure SW3, the design will include appropriate treatment measures (including water sensitive urban design) with the aim of improving water quality within Alexandra Canal and/or achieving the targets provided in the *Botany Bay and Catchment Water Quality Improvement Plan*.

4.2.11 Contamination – transfer and movement of soils and wastes

Issue

Council requests that any transfer and movement of these soils and waste materials from one site to another within the development footprint meets the applicable requirements of the NSW Waste Classification Guidelines and the Protection of the Environment Operations Act and Regulations requirements at the minimum, in addition to all EPA Guidelines adopted under the Contaminated Land Management Act.

Response

With the exception of excavated material from the former Tempe landfill, other excavated material from within the project site would not be placed within the landfill area. Measures to manage the movement of material within the construction footprint during construction will be in accordance with a detailed conceptual site model, prepared in accordance with the *National Environmental Protection (Assessment of Site Contamination) Measure 1999* and *PFAS National Environmental Management Plan*.

The waste classification guide would be used for material that cannot be reused on the project. Measures to manage the off-site disposal of waste material will be included in the Construction Waste Management Plan, which will be prepared as part of the CEMP and implemented during construction in accordance with mitigation measure WM2. The plan will adopt the waste hierarchy principles contained in the *Waste Avoidance and Resource Recovery Act 2001* and will detail processes, responsibilities and measures to manage waste and minimise the potential for impacts during construction.

Mitigation measure WM4 commits to all waste disposal being undertaken accordance with the *Waste Classification Guidelines* (NSW EPA, 2014).

4.2.12 Air quality

Issue

Any licence controls and environmental criteria for dust control need to consider the cumulative impacts of the project work sites operating at the same dates and times rather than each in isolation.

Odour from dewatering needs to be considered and managed for impacts on potential residential receivers eg dewatering within developments in the area have encountered issues with hydrogen sulfide odours to residential premises. This issue needs to be considered in an Air Quality Management Plan within the Construction Environmental Management Plan.

Council notes that the Department of Planning, Industry and Environment recommended ‘investigating alternative management measures other than discharge into surface water (Alexandra Canal)’.

Response

The results of the air quality assessment are summarised in Chapter 12 of the EIS/preliminary draft MDP and are provided in full in Technical Working Paper 4. Air quality management during construction, across the various work areas, will be defined by the Construction Air Quality Management Plan, which will be prepared and implemented during construction in accordance with mitigation measure AQ2. Dust generation risk is addressed in section 12.4.2 of the EIS/preliminary draft MDP. Measures to manage and mitigate dust impacts will be included in the Construction Air Quality Management Plan. The measures will address the potential for cumulative dust impacts from multiple project work sites.

There is considered to be limited potential for odour to be generated groundwater extraction. This is because works with the potential to intercept groundwater would be undertaken in a progressive manner (to reduce the influx of groundwater) and because detailed design and construction planning would aim to reduce the potential inflows. Any groundwater entering excavations during working hours would be extracted to facilitate construction. It is not anticipated that large volumes of groundwater would be open to the air for prolonged periods.

4.2.13 Sustainability

Carbon offsets

Issue

There is no mention of any carbon offsets from the impact of construction. It is recommended that the proponent consider partnerships with organisations for producing renewable energy to offset this cost.

Response

In accordance with mitigation measure SU1, a sustainability management plan will be developed to ensure that sustainability considerations are implemented during detailed design, construction and operation. The plan will include project-specific initiatives and implementation protocols to support achievement of the project's target 'excellent' Design and As Built ratings using the Infrastructure Sustainability rating tool (v1.2) and to ensure ongoing consistency with the Roads and Maritime Environmental Sustainability Strategy 2019-2023.

The need for any offsets will be considered during development of the sustainability management plan.

4.2.14 Climate change risk

Urban heat island effect

Issue

Given that this project is almost certain to increase the urban heat with increasing temperatures coupled with urbanisation it is likely to have an impact on Bayside's vulnerable community members as well as liveability.

It is requested that consideration is given to heat reduction approaches such as rain gardens, natural cooling systems, heat reflective materials and colours. Best practice design guidelines as well as water sensitive urban design features should be implemented.

Response

In accordance with mitigation measure CC3, the urban design and landscape plan will include consideration of appropriate landscape designs and species to reduce the urban heat island effect. The measure also commits to investigating other measures to mitigate the heat island effect during detailed design, such as light coloured pavements and shading structures for public spaces.

Mitigation measure SW3 commits to confirming appropriate treatment measures, including water sensitive urban design, during detailed design.

4.2.15 General comments in relation to contamination, air quality, noise, ground water and acid sulfate soils

Review of future assessments

Issue

Council acknowledges that the issues of air quality, contaminated land and groundwater and acid sulfate soils have been addressed suitably for this level of report. However, as there are many technical reports for these issues, including odour assessments and remedial action plans, and further investigations for contaminated soil and groundwater that will be provided during the detailed design phase, it is requested that Council be involved in the review of these documents prior to finalisation and approval for use for the construction project.

In addition, some of the affected receptors are strata properties in multi-storey structures, and therefore there are many more potential receivers of dust, odour and noise than indicated as there are multiple units within one affected property, especially around the Wolli Creek area. This needs to be reflected in any environmental assessments, management measures and licensing of night works by the NSW EPA.

Response

Consultation on additional assessments, plans and strategies

Consultation will be undertaken as part of the development of the CEMP and associated plans in accordance with the conditions of approval for the project.

Receivers in multi-storey properties

It is contemporary practice for environmental assessments to be conducted on a 'per property' basis rather than a population basis as suggested by council. Therefore, a high-rise block is considered similarly to a single dwelling for the purposes of assessing potential impacts. Any consideration of at-receiver mitigation would take into account the form of the property eg whether mitigation is required for multiple floors/ apartments, etc and, as relevant, the number of people affected/benefiting from the mitigation.

4.3 City of Sydney

4.3.1 Introduction

Active transport

Issue

Council believes that the design in the EIS fails to adequately address concerns previously raised by Council in July 2019. The design will deter people from walking and riding to and from the airport. The design must be changes to ensure that people have more transport choices and to ensure there is no further deterioration in conditions for walking and cycling.

Response

As stated in section 5.3 of the EIS/preliminary draft MDP, the objectives of the project are to:

- Improve connectivity to Sydney Airport terminals by providing high capacity direct road connections that cater for forecast growth in passenger and air freight volumes
- Support the efficient distribution of freight to and from Sydney Airport and Port Botany to logistic centres in Western Sydney
- Improve the liveability of Mascot town centre by reducing congestion and heavy vehicle movements on the local road network.

The primary objectives of the project are related to improving road (vehicular) capacity and connectivity. Many of the roads that would be upgraded as part of the project are already at or near capacity and traffic demand is expected to grow significantly in the area due to urban growth. Constraints associated with meeting the primary objectives, such as limitations in available space, prevent the provision of more cycling infrastructure and connections in and around the domestic terminals.

Public transport

Issue

Nothing has been done to address the barrier to using public transport created by NSW Government's station access fee at the airport. This misses the major opportunity for the project to better respond to NSW Government policy.

Response

Changes to the station access fee that apply to passengers using the Domestic Airport and International Airport stations on the T8 Airport and South Line are outside of the scope of the project.

To encourage the use of the rail line, the station access was capped in 2014 for customers using the Domestic Airport or International Airport stations more than once a week. The current cap is $30.16.

Transport's Sydney's Bus Future program will provide improved commuter bus access to Sydney Airport, with better east, west and south links. The program includes new bus routes and extra bus services to the airport. The program will introduce substantial improvements to bus travel times around the airport precinct. This program and the proposed new routes are, however, outside the scope of the project.

Transport's More Trains More Services program will continue to provide additional capacity to the rail system over the next ten years. Since 2017, the program has delivered more than 1700 additional weekly services across the rail network. The next stages of the program will focus on delivering improvements for the T8 Airport and South lines.

The proposed ground transport interchange at Terminals 2/3 to be developed by Sydney Airport Corporation will provide direct and efficient access for vehicles and allow for an increase in the number of public transport services to and from Sydney Airport.

Increase in vehicle volumes

Issue

Although the project is not within the City's LGA, the project will result in an increase in vehicle volumes on the street network in the City because of connections to Westconnex and St Peters Interchange.

Response

The project would not result in increases in vehicle volumes on the street network in the City of Sydney. This is because there are no direct road connections proposed other than to the M4-M5 Link and New M5 at St Peters interchange.

4.3.2 The nexus between transport provision and mode choice

NSW Government public transport policy

Issue

The City believes more work should be done, including consideration of the benefits of public transport over roads, before the public transport option is rejected in favour of further road expansion. Council recommends the following:

- Design of Sydney Gateway is amended to ensure that the Sydney Gateway project helps achieve the NSW Government's policy and aims
- Promotion of driving over public transport is explicitly addressed and justified in the EIS documents
- The Sydney Airport station access fee is removed to eliminate this major penalty for travelling by public transport to the airport
- Consideration of strategic alternatives to Sydney Gateway includes comprehensive analysis of potential improvements to public transport, particularly passenger trains, including greater consideration of the benefits of public transport over roads.

Response

Strategic consideration of public transport options was undertaken in section 6.3.1 of the EIS/preliminary draft MDP. Key customer markets for the project include dispersed and long distance passenger movements, air and container freight, and commercial services and businesses. The travel patterns and needs of these customers are highly dispersed and diverse. Potential improvements in public transport might take some strain off the road network and improve congestion in the road network within the terminal precinct and in the surrounding areas. However for freight in particular, improvements in public transport is not a viable solution.

No combination of feasible public transport alternatives, such as heavy or light rail options, bus corridor enhancements and/or additional services, were identified that would meet the diverse range of customer needs and predicted growth for travel associated with Sydney Airport and Port Botany, or address the project objectives as effectively as the project itself.

A response to the station access fee issue is provided in section 4.3.1 of this report.

NSW Government active transport policy

Issue

The project has failed to provide an adequate walking and cycling connection between nearby regional cycleway (along Alexandra Canal) and the airport, which is a major employment area and destination. It is unacceptable that people visiting and working at the airport are not being given a real choice between transport modes. Government policy emphasizes the importance of active transport while the project gives preference to vehicular transport, despite the thousands of people who live within biking or walking distance of the airport.

A cycleway between Alexandra Canal and the domestic terminal is part of the NSW Government's Principal Bicycle Network, the Greater Sydney Commission's Green Grid, and the South East Transport Strategy. This road project should not be approved if it fails to deliver on these plans.

Council recommends that the:

- Project address the key NSW Government transport and land use policies and strategies in relation to active transport
- Proponent make public transport an attractive travel choice for workers and travelers using Sydney Airport
- Proponent deliver an active transport network that provides safe, legible and attractive connections to the airport to provide more sustainable travel choices and the help discourage private vehicle trips to the airport
- NSW Government makes a commitment to reallocate street space to active transport
- The design of Sydney Gateway is amended to ensure that the project helps achieve the NSW Government's policy and aims
- The promotion of driving over cycling access, and failure to provide cycling facilities as part of this major road upgrade, is explicitly addressed and justified in the response to submissions on the EIS.

Response

Additional connections to/in the vicinity of Sydney Airport

Sydney Airport Corporation is committed to improving active transport infrastructure in both of the airport's terminal precincts.

A number of initiatives to improve active transport access and facilities have been implemented over the past six years, including the new footbridge and cycleway connection linking the external cycleway network to the Terminal 1 precinct (removing six vehicle conflict points), and provision of secure bicycle storage facilities and end-of-trip facilities. Additional infrastructure to support active transport has also been installed in the Terminals 2/3 precinct, with three metre wide shared paths extending into the precinct and enhanced crossing facilities at the precinct entry.

Sydney Airport Corporation envisages further improvements as part of the Five-Year Ground Transport Plan (which forms part of the Sydney Airport Master Plan). This includes the proposed ground transport interchange at Terminals 2/3, which will provide direct and efficient access for vehicles and allow for an increase in the number of public transport services to and from Sydney Airport. Details will be further developed and discussed with key stakeholders as the plans are implemented.

The proposed widening of Qantas Drive is driven by the need to safeguard the future performance of the local and wider road network. The widening is, however, significantly constrained by the Botany Rail Line corridor to the north and the Sydney Airport Jet Base to the south. There is insufficient space in between to construct the proposed road infrastructure and provide safe pedestrian and cycle access between the existing Alexandra Canal cycleway and Terminals 2/3.

However, Transport recognises that there is demand for an active transport connection between the Alexandra Canal cycleway and the Terminals 2/3 precinct. Transport is working closely with Sydney Airport Corporation to explore options for active transport connections that could be delivered. The Sydney Airport Active Transport Forum, which includes local councils and bicycle user groups, will be consulted as part of this process.

Other active transport facilities and connections

Further information about the strategic context, background, features, connections and design requirements for the proposed active transport link are provided in section 3.2.1 of this report. In accordance with mitigation measure TT18, Transport and Sydney Airport Corporation will prepare an active transport strategy to integrate and enhance accessibility opportunities. The strategy will be prepared in conjunction with relevant stakeholders, including Inner West and Bayside Councils and provide a guide for future active transport infrastructure provision.

4.3.3 Specific issues to be considered in the EIS

Cycleway along Alexandra Canal

Issue

The EIS fails to indicate the additional time cost for walk and cycle trips. This diversion, in addition to the extra effort, would add eight minutes to the walking trip and two and a half minutes to the cycling trip.

Council recommends that the adverse impact on the regional cycling route near the airport over three years of construction, and the inability to find a solution that reduces this impact by at least 80 per cent, is explicitly addressed and justified in the response to submissions on the EIS.

Response

Section 9.4.7 of the EIS/preliminary draft MDP considers the additional distance and travel time associated with the proposed new active transport link during operation. As noted in section 9.4.7, relocating the Alexandra Canal cycleway to the western side of the canal would increase the length of the cycleway by about 160 metres. This increase in length would result in an additional three to four minutes travel time for pedestrians (and less than one minute for cyclists).

Transport recognises that the proposed diversion of the existing Alexandra Canal cycleway during construction would increase distance and travel times and adversely affect the path amenity for users. Transport has raised this matter with contractors that are currently tendering for the project. Transport has also discussed with contractors the need to provide a safe and direct temporary route, which minimises travel distance, travel times and disruption. Transport is actively working with shortlisted contractors to improve outcomes during construction and provide the relocated permanent active transport link along Alexandra Canal as soon as possible during construction. However, Transport notes that, as a result of the directness of the current alignment, it would not be possible to provide a temporary diversion that does not involve some increase in distance and travel time.

Facilities for active transport customers

Issue

The City believes the following key connections – consistent with the NSW Government's strategic vision *Future Transport 2056* – should be provided:

- A direct, rideable crossing of the Cooks River connecting the South and Sydney City Centre
- Direct connections between the Alexandra Canal Cycleway and the T2 and T3 airport terminals as well as beyond the Bayside Council cycleway network
- A direct cycleway connection between Coward St and Sydenham station
- Safe cycling and walking connections during the construction and operation of the Sydney Gateway.

Council recommends that the:

- Sydney Gateway project provides adequate active transport facilities at all times during both the construction and operation stages of the project
- Project provide key active transport connections to the airport terminals and public transport services, as well as existing walking and cycling networks.

Response

Crossing of the Cooks River connecting the south and Sydney city centre

From Cahill Park, Wolli Creek, cyclists and pedestrian have two options for accessing Tempe Reserve on the northern side of the Cooks River. An existing shared user path connects Cahill Park to Tempe Reserve to the west, using a dedicated shared path bridge over the Cooks River adjacent to the Princes Highway road bridge, and Holbeach Avenue in Tempe. An existing shared user path connects Cahill Park to the Giovanni Brunetti Bridge and on to the Alexandra Canal cycleway. Tempe Reserve can then be accessed over Alexandra Canal via the existing bridge. However, access over the Giovanni Brunetti Bridge is not sufficiently wide to meet current standards for shared paths. Upgrading the bridge so that the path meets current standards for shared use would involve significant structural changes to the bridge. Given that there are already two access routes that can be used by pedestrians and cyclist to access Tempe Reserve from Cahill Park, further improvements are outside the scope of the project. Transport is committed to working with Sydney Airport Corporation to explore ways in which the bridge could be upgraded during delivery of a principle bicycle network that is currently being planned.

Connections to Sydney Airport Terminals 2/3

As noted in section 4.3.2, Transport recognises there is demand for an active transport connection between the Alexandra Canal cycleway and the Terminals 2/3 precinct. Transport is working closely with Sydney Airport Corporation to explore options for active transport connections that could be delivered. The Sydney Airport Active Transport Forum, which includes local councils and bicycle user groups, would be consulted as part of this process.

A direct cycleway connection between Coward St and Sydenham station

A direct cycleway between Coward Street and Sydenham station is outside of the project scope. However, Transport would continue to work with Sydney Airport Corporation, local councils and cycle stakeholders to deliver a shared path between Alexandra Canal and Bellevue Street in the future. A shared path in this location would support a future direct connection between Coward Street and Sydenham Station.

Safe cycling and walking connections during the construction and operation of the Sydney Gateway

Transport is committed to providing safe cycling and walking connections during construction and operation of the project. Transport is working with the shortlisted contractors that are currently tendering for the project to maintain existing pedestrian and cycle connectivity in a safe manner. Transport is also committed to ensuring that all pedestrian and cycle infrastructure delivered by the project is designed and constructed in accordance with applicable safety and design standards, and with consideration of crime prevention through environmental design principles.

Heritage impacts

Issue

Any approval of the project should incorporate the measures outlined under section 10.0 of the statement of heritage impact as conditions of consent to mitigate impacts on the heritage significance of the Alexandra Canal.

Response

The measures recommended by Technical Working Paper 9 (Statement of Heritage Impact) have been incorporated into the mitigation measures for the project (see measures NAH1 to NAH12 in Chapter 11 of this report).

4.4 Sutherland Shire Council

4.4.1 Active transport links

Mapping of active transport links

Issue

The future active transport links to the existing local and regional network should be mapped in more detail to better understand the connectivity and the project’s broader impact and infrastructure requirements and priorities.

Response

The project includes relocating the existing Alexandra Canal cycleway to the western side of Alexandra Canal, providing a new active transport link/shared path along the western side of the canal connecting to the existing regional cycle network. Options to integrate with active transport networks will be further explored during detailed design. Further information about the strategic context, background, features, connections and design requirements for the proposed active transport link are provided in section 3.2.1 of this report.

In accordance with mitigation measure TT18, Transport and Sydney Airport Corporation will prepare an active transport strategy to integrate and enhance accessibility opportunities. The strategy will be prepared in conjunction with relevant stakeholders including Inner West and Bayside Councils and provide a guide for future active transport infrastructure provision.

Planning for future regional connections is being considered by the NSW Government guided by the Greater Sydney Region Plan, District Plans, and the Future Transport Strategy 2056.

4.4.2 Public transport

Impact on rail mode share

Issue

What extent will the cumulative improvements to the local and regional road network have on the 15 per cent of trips that are made to the airport by train? There is a concern that the significant increases made recently in rail passenger trips to the Sydney KSA (which may in part be attributed to increased road congestion), could be countered by the proposed road improvements. It is suggested that further comment around the impact on rail mode share be addressed in the EIS.

Response

Modelling or considering the impact of the project on rail mode share is outside of the scope of the EIS/preliminary draft MDP.

5 NSW Government agencies

This chapter provides responses to issues raised in submissions provided by NSW Government departments and agencies. The approach to analysing submissions and structuring responses is described in section 2.3 of this report. The issues raised in key stakeholder submissions have been summarised broadly according to the order and headings provided in each submission (where such headings were provided). In some instances, related issues have been grouped under a single heading.

5.1 NSW EPA

5.1.1 Noise and vibration

Adequacy of noise monitoring data

Issue

Weather data in noise monitoring graphs appears to show that there were predominately calm winds during the monitoring period. However, the Sydney Airport weather station data for the period appears to indicate that some days, shown as calm in the monitoring graphs, had elevated wind speeds recorded. The proponent is requested to clarify the weather data used to process the noise monitoring data and amend the report accordingly.

Response

Noise monitoring was conducted as part of the noise and vibration assessment during the following periods:

- 19 September 2018 to 30 October 2018
- 22 July 2019 to 11 August 2019.

For the 2018 survey, weather data from the Bureau of Meteorology's Sydney Airport weather station was used to determine the weather conditions during the survey period. Weather data for the 2019 survey was obtained using local weather stations, which were deployed near two of the noise monitoring sites.

The measured noise levels during both survey periods were found to be consistent. Data was excluded where adverse weather events were identified.

The 2019 weather data was incorrectly included in the graphs for the 2018 survey period in Appendix B of Technical Working Paper 2 (Noise and Vibration). Corrected data (ie the 2018 weather data) is provided in Appendix G of this report. It is noted that although the 2019 weather data was provided in the appendix to the technical working paper, the 2018 weather data was used by the assessment.

Validation of operational noise model

Issue

The noise report did not provide a model validation point representative of receivers on Baxter Road. There are some receivers identified as eligible for treatment in this area, and the project is predicted to adversely impact noise levels at receivers as a result of additional traffic movements on Joyce Drive. Whilst some receivers on Baxter Road may be beyond the end of the geometric limit of the proposed changes, they have been assessed and represent the most affected sensitive receivers to the south of the project. The proponent is requested to provide a justification for not validating the noise model in the Baxter Road area.

Response

Six noise monitoring locations were used to validate the operational road traffic noise model used for the EIS/preliminary draft MDP. The locations were chosen to provide a representative sample of the existing road traffic noise levels, various road categories, distances from the road, and to minimise the influence of other noise sources (such as aircraft and train movements and the influence of other land uses).

It is acknowledged that road traffic noise affects receivers near Baxter Road. However, noise at this location is also influenced by other factors including:

- Rail movements on the Botany Rail Line (which is much closer than the nearest source of road traffic noise)
- Aircraft take-offs and landings on the east-west and main north-south runways
- Ground-based aviation activities.

As there are various contributors to noise levels at Baxter Road, this location was not considered appropriate for validating road traffic noise levels.

Ground-based airport noise

Issue

The EPA notes that the removal of several buildings on Commonwealth land may increase noise from airport operations at sensitive receivers. The impacts are caused by activities on a Commonwealth regulated airport and therefore Airservices Australia should manage the potential impacts from increases in noise due to this change.

Response

The potential increase in noise from indicative ground-based airport activities as a result of the proposed removal of buildings at the Sydney Airport Jet Base was assessed by the noise and vibration assessment. The results are provided in Technical Paper 2 and summarised in section 10.5.2 of the EIS/preliminary draft MDP.

In accordance with mitigation measure NV2, reasonable and feasible options will be investigated during detailed design to reduce the propagation of noise from ground-based airport activities following removal of the buildings. Such options include using shipping containers along the boundary to replace the screening provided by existing buildings. The preferred option will be identified in consultation with Sydney Airport Corporation.

The areas that would be affected by increased noise levels due to removal of buildings already experience noise from ground-based airport activities and aviation operations. Reasonable and feasible options would be considered during detailed design to minimise noise from within the Sydney Airport Jet Base as well as other areas.

Transport notes that many of the sensitive receivers impacted by the removal of these buildings (ie those in the Mascot area) are, given their proximity to flight paths, located within Sydney Airport's Australian Noise Exposure Forecast (ANEF) 25 contour. Development approvals for residential development within this contour would have included conditions of consent requiring the installation of noise insulation for aircraft operational noise, to ensure indoor noise levels were reduced to acceptable levels.

While Airservices Australia has a range of responsibilities at Sydney Airport, Sydney Airport Corporation is the airport lessee company and is responsible for managing noise and associated complaints from ground-based airport activities.

Application of the Noise Policy for Industry

Issue

The EPA notes that the application of the *Noise Policy for Industry* (NSW EPA, 2017) in the noise report does not follow the procedures for deriving project noise trigger levels. The project noise trigger level are the lower of the amenity and intrusiveness levels. The policy does not allow cherry picking of one or the other. The duration correction is intended for unusual or one-off events. Engine run ups are not unusual or one-off events, as they are part of normal maintenance activities. The proponent should consider if the *Noise Policy for Industry* is the appropriate guideline to apply in this case.

Response

There is no established guideline for assessing ground-based aircraft noise in NSW. As a result, and as ground-based noise for activities such as engine run-ups tends to be intermittent, using the intrusiveness criteria in the *Noise Policy for Industry* is considered a reasonable approach because it is based on the existing background noise level.

A duration correction was applied on the basis that engine run-ups are not continuous, are completed on an ad-hoc basis, and are expected to generally occur for less than six minutes during any one night. This approach is also described in the *Noise Policy for Industry*. It is also consistent with the approach used to assess the potential for ground-based noise in the *Western Sydney Airport Environmental Impact Statement* which was approved in 2016 (Department of Infrastructure and Regional Development, 2016).

Operational noise assessment

Issue

The operational noise assessment identifies receivers in NCA01 for consideration of at-property mitigation. These receivers are north of the Princes Highway and currently exposed to road traffic noise from the Princes Highway and other roads in the area.

The maps within the noise assessment appear to show that the area adjacent to Hungry Jacks at St Peters has no structures or other buildings on it. The premises at 396 Princes Highway, St Peters has a number of structures and buildings that may provide some acoustic shielding. These do not appear to have been considered in the noise model. Given that there are a number of triggered receivers in this area on George, Yelverton, Frederick and Sutherland streets, the noise model should be reviewed to ensure that it does contain all relevant structures.

It is not clear why Unwins Bridge Road has not been included in the noise model. Unwins Bridge Road is a sub-arterial road and could contribute to noise levels at receivers between Unwins Bridge Road and the Princes Highway. It is acknowledged that the road itself is more than 600 metres from the proposal, however noise from this road has the potential to impact receivers within the assessment area and therefore contribute to the total noise level. The proponent should either include Unwins Bridge Road in the assessment or provide a justification why it should not be included.

Response

As noted by the NSW EPA, a building located at 396 Princes Highway in Tempe was not included in the original noise and vibration assessment.

Subsequent to public exhibition of the EIS/preliminary draft MDP, an additional assessment of the potential construction and operation noise and vibration impacts of the project was undertaken. The assessment was undertaken to assess changes in predicted noise and vibration levels as a result of the proposed design refinement in the vicinity of the Cooks River Intermodal Terminal and to respond to issues and queries in submissions. The additional assessment considered:

- Changes to noise levels as a result of a proposed design refinement of the St Peters interchange connection near the Cooks River Intermodal Terminal
- Potential noise and vibration impacts at the building at 396 Princes Highway

- Screening offered by the building at 396 Princes Highway and the effect on noise levels at other sensitive receivers
- The contribution of noise levels from existing traffic on Unwins Bridge Road where impacts were predicted as a result the project
- Potential noise levels at passive recreation areas, including additional areas of Tempe Recreation Reserve and Tempe Wetlands
- Potential impacts at the new (relocated) Qantas Flight Training Centre, which received planning approval in November 2019
- The waste emplacement mound between Alexandra Canal, Terminal 1 connection and freight terminal access.

Operational road noise levels at residential receivers were predicted for the 2026 and 2036 assessment scenarios. The results of the additional assessment are provided in Appendix B of this report. Relevant findings are summarised below, and include:

- Predicted noise levels at residential receivers are largely consistent with the exhibited EIS/preliminary draft MDP, with the impacts predicted to be greatest in 2036 and during the night-time period.
- Marginally different noise levels were predicted within noise catchment area NCA01 located to the north of the Princes Highway in St Peters. This is due to:
  - Additional screening provided by the commercial building at 396 Princes Highway
  - The revised alignment at the Cooks River Intermodal Terminal
  - Consideration of background traffic noise from Unwins Bridge Road.

  The number of residential receivers in noise catchment area NCA01 predicted to exceed the criteria and be eligible for consideration of at-property treatment has reduced from 78 to 63.
- 18 ‘other’ sensitive receivers are predicted to exceed the criteria, which is an increase of three (from the original 15) documented in the EIS/preliminary draft MDP. The three additional receivers are a small part of Tempe Wetlands (noise catchment area NCA03), the new Qantas Flight Training Centre and the Pullman Sydney Airport Hotel (both in noise catchment area NCA06).

Issue

The NSW EPA provides the following recommendations for noise mitigation:

- The barrier options NW01a and NW01b in Table 57 of the Technical Working Paper should be revisited following inclusion of all appropriate structures and Unwins Bridge Road in the noise modelling.
- Table 57 states: ‘Many of the triggered receivers in this area are also only marginally over the criteria (around 1 to 2 dB), which is within the accuracy limitation of noise modelling.’ It is not clear what is meant by this sentence and what justification it provides for not implementing mitigation. Accuracy limitations mean that noise levels could be higher or lower than the model output, therefore it is not appropriate to use model accuracy limitations in this way as a justification for not applying mitigation.
- The report justifies not implementing a noise barrier at NW03 to protect noise-sensitive receivers on the south side of Baxter Road because it would require removal of billboards, which would impact the billboard owners. The proponent should clarify the justification for not considering a noise barrier for Baxter Road and provide a detailed evaluation of other feasible and reasonable mitigation measures.
- The Botany Rail Duplication EIS (SSI 9714) identified the need for a three metre high noise barrier to protect receivers on Baxter Road from the impact of rail noise from this project. This barrier could also help mitigate noise from road traffic noise arising from the Sydney Gateway road project. The benefits of noise mitigation for receivers affected by both projects in this area should be considered when determining reasonable and feasible mitigation.

Response

Review barrier options for receivers in noise catchment area NCA01

Table 57 of Technical Working Paper 2 (Noise and vibration) included a reasonable and feasible assessment of two possible noise barriers in noise catchment area NCA01 (NW01a and NW01b). The assessment concluded that these barriers would unlikely be considered reasonable. This is because the expected noise benefit was less than 2 dB, which is substantially less than the 5 dB benefit required by the *Noise Mitigation Guideline* (Roads and Maritime, 2015b).

The noise barrier assessment was revisited as part of the updated noise assessment. However, the barriers were still considered unlikely to be reasonable for the same reason.

Justification for not applying mitigation

Consistent with the originally predicted impacts of road traffic noise within noise catchment area NCA01, the updated operational noise assessment (see Appendix B) predicted that noise levels would exceed the operational road traffic noise criteria by 1 to 2 dB.

The predicted marginal exceedance in the noise criteria is not the reason for not proposing a noise barrier at this location. As stated above, noise barriers in this location were found to have a noise benefit of less than 2 dB, which is unlikely to be reasonable.

Further investigation of noise levels at receivers in noise catchment area NCA01, and reasonable and feasible mitigation options, would be undertaken during detailed design in accordance with mitigation measure NV3. All receivers identified as exceeding the operational road traffic noise criteria for the project would be considered for appropriate feasible and reasonable noise mitigation in accordance with the process described in the *Noise Mitigation Guidelines* (Roads and Maritime, 2015b).

Clarify the justification for not considering a noise barrier at Baxter Road (noise catchment area NCA03)

Table 57 of Technical Working Paper 2 (Noise and vibration) provided a reasonable and feasible assessment of a noise barrier in noise catchment area NCA03 (noise barrier NW03) The assessment evaluated two potential options for the barrier – one in the location shown in Figure 47 of Technical Working Paper 2 and one located further to the south, on land between the Botany Rail Line and Joyce Drive.

The assessment concluded that utility infrastructure that traverses this land is a significant constraint to constructing a noise barrier. This infrastructure cannot be practically realigned to accommodate a barrier. A noise barrier in this location would require land acquisition outside the project footprint resulting in additional impacts and costs.

The location of the alternative barrier adjacent to Joyce Drive would also require additional land acquisition outside the project footprint and the removal of large advertising billboards adding significantly to the cost of the barrier.

As described above, while Baxter Road is impacted by road traffic noise from Joyce Drive, there are other significant noise sources that contribute to the existing noise levels in this area. These include noise from:

- Rail movements on the adjacent Botany Rail Line
- Other major roads
- Aircraft noise from the east–west and main north-south runways
- Ground-based aviation activities.

Existing noise levels in noise catchment area NCA03 range from 54 dBA in the daytime to 45 dBA in the evening. During operation, road traffic noise levels at residential receivers on Baxter Road are predicted to increase by up to 3 dB due to traffic increases on Joyce Drive (refer to Table 10.16 and section 10.5.1 of the EIS/preliminary draft MDP).

While a noise barrier in this location would mitigate road traffic noise from Joyce Drive, it would not provide the same noise reduction for the other identified noise sources that affect this area. Therefore, it is likely that overall noise levels at the identified receivers on Baxter Road would remain high following the construction of a noise barrier.

Based on this, noise barrier NW03 was not considered to be a reasonable approach to mitigating noise from the project. Further investigation of noise levels at receivers in noise catchment area NCA03 and reasonable and feasible mitigation options such as at-property treatment, would be considered during detailed design in accordance with mitigation measure NV3. All receivers identified as exceeding the operational road traffic noise criteria for the project would be considered for appropriate reasonable and feasible noise mitigation at that time in accordance with the process described in the *Noise Mitigation Guidelines* (Roads and Maritime, 2015b).

Noise mitigation for receivers affected by both the Botany Rail Duplication and the Sydney Gateway road projects

Section 8.2.3 of Technical Working Paper 2 (Noise and Vibration) notes that the Botany Rail Duplication project is likely to affect similar receivers to those affected by the Sydney Gateway road project. Where elements of both projects occur at the same location, there is potential for operational mitigation to be required for both projects at the same receivers.

Consultation with ARTC is ongoing and the measures that would be used to mitigate the potential impacts of each project would be considered during detailed design to determine the final preferred mitigation strategy. In accordance with new mitigation measure NV4, feasible and reasonable noise mitigation for receivers affected by both the Botany Rail Duplication and the Sydney Gateway projects would be determined in consultation with ARTC. The final operational mitigation measures would consider the impacts of both projects, with the aim of maximising the benefit provided by mitigation in the most pragmatic way.

Presentation of results

Issue

The predicted noise levels presented in Appendix E of the Noise and Vibration technical working paper do not include details for all residential receivers; the change in noise level; the property façade which may be eligible for consideration of architectural noise treatment; the noise levels with and without mitigation; nor the noise contribution from significant non-project roads such as the Princes Highway. The Noise Mitigation Guideline requires the consideration of a number of factors pertinent to this assessment and these should be presented.

The maps in Chapters 6, 7 and 8 that present impacts at receivers are small and low resolution which makes it difficult to identify impacts on specific receivers. The proponent should provide maps which show detailed information in a reasonable size, scale and quality.

Response

Technical Working Paper 2 provides predicted noise levels at all receivers identified as having the potential to experience noise in excess of the operational road traffic noise criteria. The level of detail is consistent with other recent, major transport projects and adequate to assess the potential operational road traffic noise impacts and identify mitigation measures. Further information about the modelling approach, including identification of specific roads as ‘project’ and ‘non-project’, is provided in section 4.4 of Technical Working Paper 2.

The potential operational road traffic noise impacts would be reviewed and further assessed during detailed design. Measures to mitigate operational road traffic noise impacts would be confirmed in accordance with mitigation measure NV3. This would include identifying all receivers that are eligible for mitigation together with the preferred approach to mitigation at each receiver. This would include consideration of noise levels and exceedances at individual facades.

The figures provided in the EIS/preliminary draft MDP showing the predicted impacts at receivers have been updated taking into account the results of the additional noise assessment. Updated figures at a larger scale are provided in Appendix H of this report.

Vibration assessment of proposed dynamic compaction

Issue

Provide an assessment of, and management options for, potential vibration impacts due to dynamic compaction.

Response

Dynamic compaction is one option being considered within the former Tempe landfill to prepare the site for construction of the road infrastructure. Dynamic compaction involves dropping large weights (‘tamper weights’) onto the ground surface to compact the underlying soils. Tamper weights typically range from 10 to 30 tonnes and are dropped from heights of up to 20 metres.

A preliminary assessment of the potential impacts of dynamic compaction has been undertaken to identify the potential impacts of this activity on surrounding receivers. Table 5.1 shows the recommended minimum working distances for dynamic compaction for the upper and lower limits of tamper weights and drop heights typically used. Further information about the vibration criteria used for the project is provided in Technical Working Paper 2.

Table 5.1 Recommended minimum working distances from dynamic compaction

	Minimum working distance (metres)		
Equipment scenario	Cosmetic damage - residential and light commercial	Cosmetic damage – heritage items	Human comfort
10 tonne weight from 10 metres (1MJ)	45	90	200
30 tonne weight from 30 metres (6 MJ)	105	210	500

Figure 5.1 and Figure 5.2 show areas within each of the minimum working distances of the scenarios considered.

Figure 5.1 shows that, for the 1 MJ scenario, the majority of receivers near the project site are located outside the minimum working distances and are therefore considered to be at low risk for cosmetic damage. A small number of receivers (including some residential receivers) are located within the human comfort minimum working distance. These receivers may be able to perceive vibration during the works.

Figure 5.2 shows that, for the 6 MJ scenario, a number of buildings and structures are located within the cosmetic damage minimum working distance. These structures include the Ikea warehouse and other commercial buildings to the north, and a commercial building to the south-east. A larger number of receivers (including residential receivers to the north) are located within the human comfort minimum working distance. These receivers may be able to perceive vibration during the works.

A number of heritage listed items, including Alexandra Canal, Mascot (Shea’s Creek) Underbridge and parts of the Cooks River Intermodal Terminal are located within the indicative cosmetic damage minimum working distances for dynamic compaction.

Relevant mitigation measures would be implemented to minimise the potential for vibration impacts. These include preparing and implementing a Construction Noise and Vibration Management Plan (mitigation measure NV5), preparing location and activity specific noise and vibration impact assessments, and managing and monitoring potential vibration impacts (mitigation measures NV6 and NV12). Other measures that would be considered include the use of smaller tamper weights, appropriate respite and completing building condition surveys before and after the works. Mitigation measures are provided in full in Chapter 11 of this report.

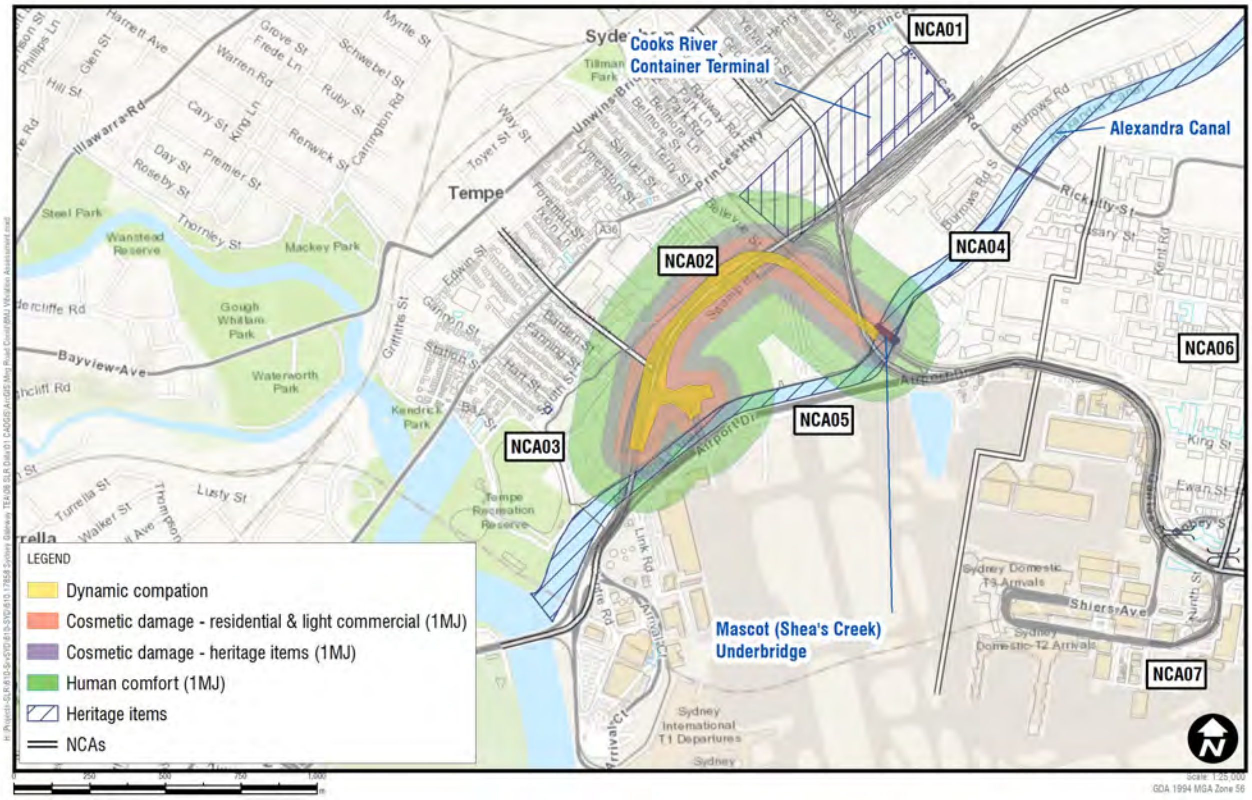

Figure 5.1 Indicative minimum working distances for dynamic compaction (1 MJ)

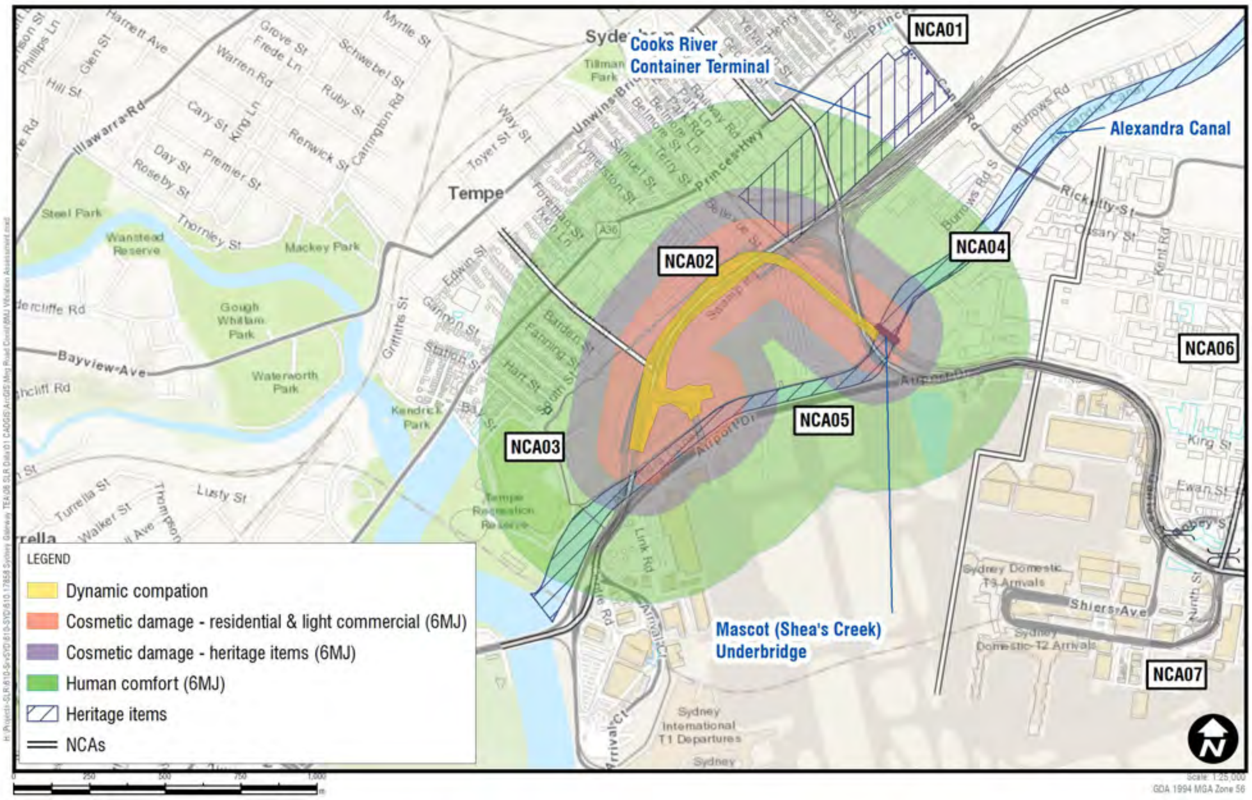

Figure 5.2 Indicative minimum working distances for dynamic compaction (6 MJ)

Engagement with particularly sensitive receivers

Issue

The proponent should engage with particularly sensitive receivers, such as the Qantas Flight Training Centre, to determine appropriate vibration limits for human comfort, particularly sensitive time periods, and other areas of concern.

Response

As described in section 4.2.2 of the EIS/preliminary draft MDP, Transport has consulted, and will continue to consult, with Qantas regarding the potential impacts on both the existing and new Flight Training Centres. An acoustic framework has been developed for the existing Flight Training Centre. The framework defines how construction noise and vibration will be managed to minimise potential impacts at the existing training centre. The framework includes site-specific noise criteria for the various sensitive areas of the centre, monitoring requirements and procedures for notification in the event exceedances occur. In accordance with amended mitigation measure NV8, the potential for noise and vibration impacts on the existing Flight Training Centre will be managed in accordance with the acoustic framework that has been agreed with Qantas.

Works outside standard working hours should be minimised

Issue

The construction assessment states that the majority of the work would occur during standard working hours. The EPA supports this approach and recommends that work outside of standard hours is minimised wherever possible and only takes place where appropriately justified.

Response

Section 8.3.3 of the EIS/preliminary draft MDP describes the proposed working hours for the project. The section notes that the project would include work during recommended standard hours as defined by the *Interim Construction Noise Guideline* (DECC, 2009) and out-of-hours work. As described in section 8.3.3, out-of-hours work would be required at some locations to minimise the potential for aviation and rail safety hazards, and to maintain the operational functionality of the road network. Where exceedances of noise management levels occur, measures such as respite periods would be implemented. Further information on out-of-hours work, including the justification, indicative types of work, and locations that out-of-hours work are proposed, is provided in section 8.3.3 of the EIS/preliminary draft MDP. The extent of out-of-hours work including the number of nights required at specific locations would be confirmed during detailed design and construction planning.

The potential impacts and management approach for out-of-hours work is described in Chapter 10 of the EIS/preliminary draft MDP.

Inappropriate categorisation of noise predictions and terminology

Issue

Table 35 has classified noise predictions compared to noise management levels identified in the *Interim Construction Noise Guideline* (DECC, 2009). It uses subjective terms such as 'marginal' and 'minor' to describe a noise level up to 20 dB above the Rating Background Level. Such a categorisation of subjective response is not appropriate as it does not take into account factors such as the duration or time period in which it occurs. Categorising predicted noise levels in such a manner is potentially misleading and is not consistent with the management actions identified in the ICNG when noise management levels are predicted to be exceeded.

The use of the terms 'marginal' and 'minor' implies that if a noise level is marginally above the NML then it may not require management. Table 53 repeats that 'minor' impacts would be experienced by receivers in Mascot. However, as stated previously, characterising noise levels up to 10 dB above the NMLs as marginal or minor is not considered appropriate and may lead to reduced effort in providing mitigation. The NMLs are the level at which additional mitigation should be considered for implementation, however noise levels should be minimised where ever possible, including when levels are below the NMLs. The assessment should be amended accordingly.

Response

The terms are used to provide a comparative plain English description of the potential impacts in a manner that is easy to understand by readers who do not have a detailed knowledge of the *Interim Construction Noise Guideline*.

The construction assessment uses three exceedance categories (marginal to minor, moderate and high) to describe the predicted noise levels and potential impacts. Technical Working Paper 2 acknowledges that the subjective response depends on the time of day the noise levels occur, as people are generally more sensitive to impacts during the evening and night.

The approach to determining the need for mitigation is a separate process and has been undertaken in accordance with the *Construction Noise and Vibration Guideline* (Roads and Maritime, 2016). This approach has been extensively applied to Transport projects of various sizes, including similarly complex road projects. The required mitigation depends on the extent of exceedance of the noise management levels and the time of day that impacts could occur, with the requirements for evening and night-time works being more onerous.

Mitigation measure NV5 commits to managing construction noise and vibration in accordance with the Construction Noise and Vibration Management Plan, which will be developed based on the *Construction Noise and Vibration Guideline* (Roads and Maritime, 2016).

The implementation of mitigation measures NV5 to N15 seek to minimise noise impact resulting from the project. This would include reduction in noise levels even where levels are predicted to be below the NMLs.

Mitigation to consider consecutive and concurrent project impacts

Issue

The NSW EPA recommends that the proponent assess if the mitigation is reasonable based on the consecutive (and concurrent) infrastructure project impacts, for example at-property treatment may be more likely considered reasonable with consecutive infrastructure projects rather than with a standalone project. Consideration should also be given to other infrastructure projects, other developments, and utility adjustments that may occur consecutively or concurrently to the project.

Response

In relation to operational noise, mitigation measure NV3 commits to identifying noise and vibration mitigation measures during detailed design. Requirements for at-property noise treatments in properties identified as ‘eligible’ in the noise and vibration assessment will be reviewed. The implementation of treatments will be undertaken in accordance with the *At-Receiver Noise Treatment Guideline* (Roads and Maritime, 2017).

In relation to construction noise, and in accordance with measure NV6, location and activity-specific noise and vibration impact assessments will be undertaken prior to those works with the potential to result in impacts. The assessments will confirm predicted impacts at relevant receivers in the vicinity of the activities to assist with the selection of appropriate management measures.

These assessments would consider the potential for cumulative impacts (both consecutive and concurrent) from construction of the project and other major projects in the area, including the Botany Rail Duplication. Appropriate measures will be defined to minimise the cumulative impact on the community as far as practicable. In this regard, new measure NV16 commits to determining feasible and reasonable noise mitigation for receivers affected by both the Botany Rail Duplication and the Sydney Gateway projects in consultation with ARTC.

Transport would consider early installation of at-property treatment for eligible receivers that would also be exposed to high noise levels outside standard construction hours. This would assist in mitigating noise impacts at these receivers during construction.

5.1.2 Water quality

Construction stage wastewater management

Issue

The impact of wastewater discharge is not adequately assessed and the EIS does not provide the information required to consider matters under section 45 of the *Protection of the Environment Operations Act 1997* (POEO Act).

The EIS proposes that intercepted groundwater, and potentially contaminated runoff, would be collected and treated prior to discharge to waterways. The EIS proposes discharge criteria but does not:

- Provide details of the practical measures that could be taken to minimise pollution (e.g. mitigation of groundwater ingress, treatment of groundwater and contaminated runoff); or
- Adequately assess the potential impact of wastewater discharges on the environmental values of the receiving waterway.

Response

Approach to managing extracted groundwater

In accordance with mitigation measure GW1, Transport will seek to minimise impacts on groundwater, wherever practicable by:

- Avoiding the need to extract groundwater
- Minimising groundwater inflows into excavations.

However, as a result of the high water table across the project site and the presence of highly permeable deep soils, it is expected that high volumes of extracted groundwater would need to be managed during the early stages of construction. In addition, many of the measures that are routinely used to prevent groundwater ingress into excavations and avoid the need to dewater (such as sheet piling around deep excavations) are not practicable for this project.

Avoiding the need to dewater has been a key consideration during development of the concept design and construction methodology. For example, the use of sleeves when piling is proposed to prevent water ingress and avoid the need to dewater.

The concept design and construction methodology has been developed to minimise interaction with the groundwater table wherever practicable. However, there are several constraints that limit the extent of elevated structures, and therefore the extent to which interaction with groundwater can be avoided. These include the need to:

- Connect to or pass under existing grade separated roadways
- Comply with the obstacle limitation surface (OLS) for Sydney Airport
- Maintain a minimum clearance above the Botany Rail Line.

In addition, the low-lying nature of the project site provides challenges in ensuring that stormwater and flood management infrastructure has appropriate grades and there is sufficient cover over utilities.

In this context, practical measures to avoid the need to dewater are extremely limited. Therefore, extraction of groundwater would be required during construction.

Approach to managing surface water runoff

Mitigation measure CS9 commits to preparing and implementing a Construction Soil and Water Management Plan in accordance with the requirements of *Managing Urban Stormwater – Soils and Construction*, Volume 1 (Landcom, 2004), Volume 2B Waste landfills (DECC, 2008a) and Volume 2D (DECC, 2008b) (the Blue Book). The Blue Book contains practical management measures to minimise pollution and is used as standard practice across all Transport projects.

Table 27.8 of the EIS/preliminary draft MDP provides the objectives, purpose and requirements for the Construction Soil and Water Management Plan. It provides example measures to achieve the stated objectives, which include avoiding and minimising potential impacts on water quality in surrounding watercourses. The Construction Soil and Water Management Plan would be generally consistent with the intent of these example measures.

Approach to managing surface water within the former Tempe landfill

Waste material from the former Tempe landfill would be excavated and exposed as part of the project. Any surface water that comes into contact with the waste materials has the potential to become contaminated. Contaminated surface water runoff would need to be managed to minimise potential water quality impacts.

The practical measures that would be implemented to minimise potential odour issues from the excavated material (such as covering the emplacement mound at the end of each day) would also minimise potential generation of contaminated surface water runoff. Measures would also be undertaken to isolate the exposed waste areas from other areas, to clearly separate clean and contaminated surface water runoff.

Runoff from exposed waste areas would be captured. Management options for the captured contaminated surface water runoff would depend on water quality but could include disposal to sewer or potential discharge subject to ensuring no environmental harm.

Opportunities for reusing extracted groundwater and surface runoff

Options to limit potential discharges by reusing extracted groundwater and surface runoff include:

- Dust suppression within construction work sites
- Site restoration and landscaping
- Construction processes (subject to meeting relevant water quality requirements)
- Supplementing potable water use at the proposed compounds
- Off-site uses, including supply to the nearby Boral concrete batching plant.

Mitigation measure GW4 commits to developing a dewatering management strategy to confirm the approach to managing dewatering of excavations during construction. The strategy will outline measures to minimise groundwater inflow and identify proposed methods for managing extracted water, which could include reuse, infiltration, reinjection, discharge to stormwater, disposal to the wastewater system, and collection for off-site disposal

Measures to avoid off-site discharges would include:

- Disposal to sewer under a trade waste agreement subject to agreement of Sydney Water and the capacity of the local wastewater system
- Removal from site and disposal at an appropriately licensed waste facility
- Reinjection/infiltration systems.

The disposal of significant volumes of groundwater to sewer would not be practicable due to the limited capacity of the system and suitability of connection points. The most suitable connection point is the sewer line to which the existing leachate management system at the former Tempe landfill is connected. Any additional capacity in this sewer may be needed for increases in leachate during works within the former landfill or for the disposal of surface water runoff that has come into contact with exposed or excavated waste material (refer above).

Due to the expected high volumes of wastewater, removal by sucker truck (or similar) and transport to an appropriately licensed waste facility for disposal is not practicable.

Groundwater reinjection and infiltration systems require a large footprint to achieve the required injection and infiltration rates. The project's construction footprint would be very constrained in many of the areas where dewatering would be required (for example along Airport Drive and Qantas Drive), limiting the feasibility of this option. To be effective, reinjection sites need to be located at a sufficient distance from the excavation. Reinjection sites need to be assessed to ensure the quality of the extracted groundwater does not increase the risk of contamination. These considerations and other options would be considered by the dewatering management strategy (in accordance with mitigation measure GW4).

It is unlikely that reuse, disposal to sewer, disposal to waste facilities, reinjection and infiltration options would avoid the need to discharge extracted groundwater or substantially reduce the volumes that would need to be discharged. As a result, discharge is the most practical management option for extracted groundwater.

Mitigation measure SW8 provides for the consideration of beneficial reuse options for construction water, which could include uses such as dust suppression and irrigation of rehabilitated landscaped areas to minimise the volumes of surface water requiring disposal.

Discharge to receiving waters

Section 16.1.4 of the EIS/preliminary draft MDP describes the proposed approach to developing water quality discharge criteria for the project and provides preliminary criteria. These preliminary criteria were developed with reference to the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018 incorporating ANZECC 2000) and considering existing water quality in Alexandra Canal and Mill Stream.

The preliminary criteria are provided in Table B2 of Appendix B of Technical Working Paper 8 (Surface Water) based on monitoring completed to mid 2019. These have been updated based on the results of further monitoring completed in 2019 and the proposed discharge criteria are provided in Appendix E of this report.

The updated criteria address both dry and wet weather conditions. The criteria aim to ensure that any treated discharge from the project that meets the criteria would not adversely affect the environmental values of the receiving waters and would maintain ecosystem conditions.

Water treatment strategy

Industry experts and service providers have been consulted to help develop a conceptual treatment strategy for the project and confirm the feasibility of meeting the proposed discharge criteria for the expected volumes of extracted groundwater.

The conceptual treatment strategy would involve installing a number of temporary water treatment facilities across the project site at various stages of construction. The strategy is based on identifying the reasonable worst-case dewatering rates and inflows to each facility based on the groundwater modelling undertaken for the EIS/preliminary draft MDP. The capacity of each treatment facility would exceed the reasonable worst case inflow rate, and therefore excess capacity at each facility would be available to treat additional volumes as required.

The treatment facilities would be capable of treating known contaminants within the project site. These include PFAS, heavy metals, nutrients, petroleum hydrocarbons, polycyclic aromatic hydrocarbons and a range of physio-chemical parameters such as pH, turbidity and dissolved oxygen. The facilities would comprise multi-barrier water treatment plants that use a combination of techniques over multiple treatment stages to consecutively reduce contaminant concentrations to acceptable discharge criteria. The treatment techniques are expected to include:

- Primary: pre-treatment, chemical injection, coagulation, flocculation, pH adjustment and settlement
- Tertiary: deep bed media filtration, adsorption, biological assimilation, cation and anion exchange.

It is likely that the types of filtration media and ion exchange resins would be proprietary products selected to suit the discharge water quality criteria and the receiving waterway.

Consideration of matters under section 45 of the POEO Act

The water quality assessment undertaken for the EIS/preliminary draft MDP (Technical Working Paper 8 (Surface Water)) and summarised in Chapter 16 addresses the SEARs. To the extent that they are similar, it also addresses section 45 of the POEO Act. By discharging treated water to the identified watercourses, and meeting the discharge criteria identified in Appendix E of this report over the anticipated construction period, the project would minimise water pollution and protect human health and the environment from harm.

Derivation of site-specific discharge criteria

Issue

The EPA advises that the 80 per cent species protection guideline values are generally not applicable and the proposed site-specific guideline values are not appropriate, as they have not been derived based on data from appropriate reference sites, representative of slightly to moderately disturbed condition. The correct assessment criteria should be used as a basis for considering all reasonable and feasible wastewater management options.

Response

Transport is supportive of improving environmental values in degraded aquatic ecosystems and recognises that setting target environmental values for degraded ecosystems based on the values in reference sites with more desirable water quality and ecosystem health is appropriate. However, such target environmental values are aspirational goals that the project has limited ability to influence achieving.

The catchments in which the project would be located are highly altered and urbanised. Achieving target environmental values in receiving waters based on an appropriate reference site would require a catchment wide approach and response. As the project only affects a very small portion of each catchment, it has limited ability to influence achieving aspirational targets. Setting discharge criteria based on long-term target environmental values developed from an appropriate reference site, rather than based on existing water quality, would therefore have limited benefit in the short and long term.

Furthermore, it is likely that the target environmental values would only be achievable in the long term. The Georges River Water Quality and River Flow Objectives for primary and secondary contact activities recognise short term as less than five years and long term as more than 10 years. With a construction program of about 28 months, most of the predicted wastewater discharges from the project are likely to occur over a 12 to 18 month period. The project is unlikely to affect environmental values over this period. Transport recognises that toxicants that bioaccumulate have the potential to affect water quality and ecosystems health in the long term. Accordingly, Transport proposes discharge criteria that are protective of 95 per cent of species in marine ecosystems for toxicants that bioaccumulate.

The SEARs require an assessment of the significance of any identified impacts including consideration of the relevant ambient water quality outcomes. The assessment approach has met this requirement. Transport has developed water quality discharge criteria (refer to Appendix E) with reference to ANZECC/ANZG guidelines and with consideration of existing water quality in Alexandra Canal and Mill Stream during dry and wet weather. Given the highly disturbed nature of the potential receiving waterways, adopting discharge criteria that are protective of slightly to moderately disturbed systems (typically default guidelines values from ANZECC/ANZG for protection of 95 and 99 percent of species) would provide limited benefit to existing water quality and ecosystems in the short and long term. Similarly, adopting criteria for slightly to moderately disturbed systems is an unrealistic basis for assessing potential discharges over the likely project duration, as they are not reflective of existing water quality.

The proposed discharge criteria have been developed to ensure that any treated discharge from the project that meets the criteria would not result in a material change in existing water quality. This strategy, which would ensure that there is no adverse impact on water quality in the short and long term due to the project, is considered to be appropriate.

Assessment of surface water discharges

Issue

The EPA recommends that, consistent with the environmental assessment requirements, the proponent should assess the impact of discharges. This assessment should:

a) Identify and estimate the quality and quantity of all pollutants that may be introduced into the water cycle by source and discharge point
b) Describe the nature and degree of impact that any discharge(s) may have on the receiving environment, including consideration of all pollutants that pose a risk of non-trivial harm to human health and the environment
c) Assess the potential impact of discharges on the environmental values of the receiving waterway, including average or typical through to worst-case scenarios, with reference to the relevant guideline values consistent with the national Water Quality Guideline
d) Where a mixing zone is required, demonstrate how the national Water Quality Guideline criteria for relevant chemical and non-chemical parameters are met at the edge of the initial mixing zone of the discharge
e) Demonstrate how the proposal will be designed and operated to:
    i. protect the Water Quality Objectives for receiving waters where they are currently being achieved
    ii. contribute towards achievement of the Water Quality Objectives over time where they are not currently being achieved
f) demonstrate that all feasible and reasonable measures to avoid or minimise water pollution and protect human health and the environment from harm are investigated and implemented.

Response

Construction phase

Section 16.3 of the EIS/preliminary draft MDP has estimated the quantity of treated wastewater based on a conceptual construction methodology. The likely quantity of treated wastewater and the quantity of pollutants in the wastewater would depend on the:

- Detailed construction methodology
- Specific management measures adopted to limit wastewater quantities
- Specific options adopted for managing and discharging/disposing of the wastewater.

These details would be developed by the construction contractor, and would include further calculations to estimate quantities of treated wastewater and pollutants. Mitigation measure SW3 commits to considering appropriate treatment measures during detailed design with the aim of improving water quality within Alexandra Canal and/or achieving the targets in the *Botany Bay and Catchment Water Quality Improvement Plan* (SMCMA, 2011).

In relation to the *NSW Water Quality and River Flow Objectives* (DECCW, 2006), the long-term goal for the Cooks River and Georges River catchments is to return the watercourses to a condition where they are suitable for primary contact activities and aquatic food. The watercourses are highly degraded and these activities are either currently not recommended or prohibited. Potential impacts associated with the project would be temporary (over a period of 12 to 18 months) and unlikely to affect achieving the longer term goals (refer 16.1.4 of EIS/preliminary draft MDP).

In relation to the assessment of potential impacts, and as described above, the SEARs require an assessment of the significance of any identified impacts including consideration of the relevant ambient water quality outcomes. The assessment approach has met this requirement. Transport has developed water quality discharge criteria for treated wastewater (see Appendix E). The aim of these criteria is to protect existing environmental values in the receiving waters and minimise the potential for water quality impacts. These criteria are designed to ensure that there would be minimal change in water quality in the receiving waters. As a result, an assessment of the nature and degree of potential impacts to the environmental values and ecosystem condition in the receiving waters, including assessment of mixing zones, is not warranted.

As discharges of treated wastewater to receiving waters would be limited to the construction phase only, the project would have negligible ability to influence achieving aspirational targets for water quality in the receiving waters over time.

Operational phase

Section 16.4.2 of the EIS/preliminary draft MDP summarises the potential impacts on water quality during operation of the project. As the project would increase the total impervious area (such as road pavement) exposed to direct rainfall, there is potential for an increase in runoff volumes, pollutant mobilisation and discharge of higher pollutant loads to receiving environments.

As described in section 7.10.9 of the EIS/preliminary draft MDP, the concept design includes measures to reduce the potential impacts on water quality. Generally, treatment devices would be installed near connections to the existing drainage network and/or the outlets at Alexandra Canal. These devices would include gross pollutant traps and other separators designed to remove waste matter, hydrocarbons, nutrients and suspended solids from stormwater runoff. The size and type of devices installed would be confirmed during detailed design.

Modelling was carried out to assess the performance of the proposed treatment measures against the targets in the *Botany Bay and Catchment Water Quality Improvement Plan* (SMCMA, 2011). A summary of the modelling results is provided in Table 16.7 of the EIS/preliminary draft MDP.

The modelling results indicate that although the proposed treatment devices would reduce impacts on water quality during operation, the pollution reduction targets would not be achieved for stormwater originating from the project site. This is because there is insufficient available space to provide appropriately sized water quality controls. Although the pollutant reduction targets would not be met, an overall improvement in the ambient water quality outcomes for Alexandra Canal and Mill Stream is expected.

Mitigation measure SW3 commits to considering appropriate treatment measures with the aim of improving water quality within Alexandra Canal and/or achieving the targets provided in the *Botany Bay and Catchment Water Quality Improvement Plan* (SMCMA, 2011).

The catchments in the study area are highly altered and urbanised. Transport is supportive of improving environmental values in degraded aquatic ecosystems in the long term. The design has maximised the ability of the project to contribute to future achievement of water quality improvements in the catchment by incorporating as many stormwater treatment devices as possible. However, achieving such targets requires a whole of catchment approach and the project has limited ability to influence this due to the scale of the project compared to the much greater scale of the catchment.

Construction stage stormwater management

Issue

The EIS does not propose construction stage stormwater discharges, but states that the contractor would make the final decision at the design stage. If construction stage stormwater discharges are proposed, a discharge impact assessment consistent with the water pollution risk will be required to inform consideration of matters under section 45 of the POEO Act.

Response

The EIS/preliminary draft MDP does not describe specific construction phase stormwater discharges. This is because these would depend on the detailed construction methodology, which would be developed by the construction contractor post-approval. Accordingly, details of specific measures that might be implemented, such as sediment basins and proposed discharge points, are not available at this time.

Chapter 16 of the EIS/preliminary draft MDP describes potential construction stage stormwater discharges and notes that runoff from disturbed areas would be directed to discharge locations following necessary treatment. Furthermore, mitigation measure CS9 commits to the development of a Soil and Water Management Plan in accordance with the requirements of the relevant volumes of the Blue Book. The Blue Book considers and provides practical management guidance for the management and discharge of stormwater from construction sites to minimise the potential for water pollution. Proposed discharge criteria for stormwater including extracted groundwater are provided in Appendix E of this report.

5.1.3 Contaminated land

Recommended conditions of approval

Issue

The NSW EPA recommended a number of project-specific conditions of approval.

Response

The proposed conditions are noted and Transport considers that most of the proposed conditions are consistent with, or already encompassed by, the proposed mitigation measures (see Chapter 11). However, conditions of approval are a matter for the Department of Planning, Infrastructure and Environment to consider during its assessment of the project. Transport will consider in detail any proposed conditions of approval at an appropriate time in the assessment process.

5.1.4 Odour

Odour impacts

Issue

The odour impacts were modelled using odour emission rates measured from putrescible landfills in NSW (GHD in-house database) and are potentially conservative given the bore log sampling conducted for the former Tempe landfill showed non-putrescible waste at 14 of the 18 bore logs and mixed non-putrescible and putrescible at depth of the other four bore logs.

The EPA recommends the specifications of the odour measurements from the in-house database are provided to assess the validity of the odour modelling.

Response

Transport recognises that uncertainty associated with the potential odour emissions rate likely to be encountered at the former Tempe landfill is a key variable in the odour assessment. A review of bore logs at the former Tempe landfill (refer section 3.5.2 of the Technical Working Paper 17 (Odour Assessment)) identifies that the existing waste material at the site would be expected to be predominately classified as non-putrescible, but both putrescible and non-putrescible wastes are likely to be present.

Odour emission rates calculated from measurements at putrescible and non-putrescible landfills in NSW and recorded in an in-house database were used to inform the assessment. The reference odour emission rates used in the assessment originated from sampling data by Ektimo at the Lucas Heights Resource Recovery Park (GHD, 2014) and Horsley Park Waste Management Facility (GHD, 2018), both of which have been accepted by the NSW EPA in other air quality assessments. Both sampling reports are available in the public domain.

A sensitivity analysis (described in Technical Working Paper 17) was conducted to account for a number of assumptions in the modelling, both conservative and non-conservative. In accordance with mitigation measure AQ1, detailed design will seek to minimise the need to expose waste at the former Tempe landfill in order to eliminate potential odour issues. In accordance with mitigation measure AQ3, odour impacts will be minimised as far as possible by:

- Construction planning to minimise the need to expose waste, and/or the area exposed at any one time and to minimise contact between surface water and exposed waste
- Where there is the potential to generate odour, implementing the odour management strategy (mitigation measure AQ4).

Further modelling will be carried out to demonstrate that the proposed excavation methodology for the former Tempe Landfill can comply with the 2 OU criterion. This will be informed by sampling of the waste to determine the actual waste odour emission rates likely to occur.

Odour assessment does not include leachate

Issue

The EPA recommends the odour assessment must be revised to consider the potential for odour from leachate, including reasonable odour emission rates measured from landfill leachate and justification of base case and worst-case modelling scenarios.

Response

Transport has undertaken further analysis regarding the potential generation and management of leachate at the former Tempe landfill. This included an additional assessment of the potential odour impacts from the generation, storage and disposal of leachate during excavation at the site. The additional assessment is provided in Appendix D of this report.

Consistent with the odour modelling documented in the EIS/preliminary draft MDP, the additional assessment concluded that the 2 OU criterion could be achieved under the realistic base-case scenario, where a maximum of 30 per cent of the total working area is exposed in a progressive manner. This also included three leachate ponds totaling 3.9 ML volume at various locations on the former landfill site.

A sensitivity analysis was performed to cater for best case/ worst case scenarios due to the number of key assumptions used such as odour emission rates from waste and leachate storages. The results provide an “envelope” of emissions which could be expected based on the concept design and indicative construction methodology. The construction contractor(s) would be required to remodel the potential odour impacts based on the preferred construction working methods to demonstrate achievement of the 2 OU criterion as well as the effectiveness of proposed management measures (see mitigation measure AQ3). Odour at the site would be managed in accordance with the odour management strategy (mitigation measure AQ4).

Direct measurement of odour emissions and minimising odour emissions from the site

Issue

The odour impacts in the odour assessment are not based on direct odour measurements at the site. The odour assessment states that odour sampling will be conducted of waste that will be exposed to verify odour emission rates assumed in the odour assessment and odour modelling will be revised to guide detailed construction planning and mitigation measures.

The EPA recommends that construction maximum working area and mitigation strategies be developed to minimise odour emissions from the site.

Response

Section 12.7.1 of the EIS/preliminary draft MDP describes the proposed mitigation approach, which includes:

- Confirming the key assumptions used in the odour assessment to date
- Detailed construction planning to determine the proposed methods and activities that will minimise the potential for emissions of odour. This will include consideration of the extent of the exposed working area and other approaches to manage the generation of odour.

As discussed above, previous odour measurements conducted at putrescible and non-putrescible landfills in NSW were used to inform the assessment in lieu of specific measurements being conducted at the former Tempe landfill as these measurements are representative of the potential odour generated during excavation. To cater for potential uncertainty associated with the actual odour emissions from the landfill, a sensitivity analysis was conducted as part of the assessment.

Mitigation measure AQ3 has been updated to include a requirement to undertake sampling of the waste prior to construction to determine the odour emission rate that is likely to occur. This rate would be adopted in the updated odour modelling to be undertaken (see mitigation measure AQ3).

Odour management and mitigation measures proposed

Issue

The EPA recommends that the proponent develop and provide an odour and leachate management plan that is proactive and reactive, describes how they will manage odour from all potential odour sources (including but not limited to leachate), and how they will manage and mitigate odour during adverse conditions such as leachate following potential heavy rains.

Response

Commitments to proactively and reactively managing odour from all potential odour sources are defined by a number of mitigation measures, including AQ1, AQ2, AQ3, AQ4 and AQ5. In particular, measure AQ4 commits to developing an odour management strategy prior to construction, and implementing the strategy for the duration of works involving ground disturbance at the former Tempe landfill. In accordance with AQ4, contingency and rectification measures (eg use of deodorisers, use of aerators) would be implemented should significant odour issues occur at sensitive receivers in the vicinity of the project site. Odour surveys (mitigation measure AQ5) would be routinely undertaken:

- Daily, for one hour when works commence, and prior to works completing
- If wind conditions drop below three metres per second
- If an odour complaint is received
- Downwind of leachate storage(s).

If significant odour issues are observed in the vicinity of sensitive receptors, or from leachate storage(s), the contingency and rectification measures defined by the odour management strategy would be implemented (see mitigation measure AQ4).

A complaints management process would also be implemented in accordance with mitigation measure SE3.

All mitigation measures proposed in relation to odour and leachate management are provided in full in Chapter 11 of this report.

5.2 Department of Planning, Industry and Environment – Environment, Energy and Science Group

5.2.1 Aboriginal heritage

Conditions of consent

Issue

It is recommended that the mitigation measures included in Technical Working Paper 10 – Aboriginal Cultural Assessment Report be included as conditions of consent.

Response

The key matters raised by the mitigation measures provided in the technical working paper as well as their intent have been included in the proposed Aboriginal heritage mitigation measures for the project (provided in Chapter 11).

The conditions of approval for the project are a matter for the Department of Planning, Infrastructure and Environment. Transport will consider in detail any proposed conditions of approval at an appropriate time in the assessment process.

5.2.2 Flooding

Include evacuation procedures in the flood management strategy

Issue

During detailed design, the flood management strategy should include a range of management measures, especially for evacuation as the roads are inundated in a 10% AEP flood event.

Response

In accordance with mitigation measure HF1, a flood mitigation strategy will be prepared and relevant measures will be implemented during detailed design and construction. The strategy will include undertaking additional flood modelling taking into account detailed design and proposed construction planning and methodologies.

Transport commonly adopts a design flood immunity of one per cent AEP for new roads and a minimum immunity of 10 per cent Annual Exceedance Probability (AEP) for road modifications. However, for this project, based on the various constraints described in Technical Working Paper 6 (Flooding) (and summarised in Chapter 14), this has not been possible in all areas for this project.

The proposed approach to detailed design would include (described in section 8.3 of Technical Working Paper 6 (Flooding)):

- Providing a minimum 10 per cent AEP level of flood immunity for new roads
- Maintaining the current level of flood immunity for existing roads that are to be modified as part of the project (such as Qantas Drive).

In relation to flood evacuation, section 14.4.7 of the EIS/preliminary draft MDP describes the potential impacts of the project on existing emergency management arrangements. It confirms that the project would have a relatively minor impact. The project is not expected to impact existing emergency management arrangements across the majority of the site.

As described in section 14.6.1, and in accordance with amended mitigation measure HF1, the flood mitigation strategy would be prepared in consultation with Sydney Airport Corporation, Sydney Water, ARTC, NSW State Emergency Services and relevant councils. This would ensure that their existing emergency response procedures are taken into consideration. It would also allow them to update their plans of management for flood emergency response, where appropriate, based on the changes to the road network following the construction of the project.

5.2.3 Biodiversity

Avoid/minimise the clearing of native vegetation

Issue

Consistent with the mitigation measures recommended in Table 27.13 of the EIS, EES recommends that disturbance of native vegetation, or planted native species is limited to the minimum extent necessary, and where possible this includes that the development footprint is modified to achieve this.

Response

Mitigation measure BD2 commits to limiting vegetation clearing to the minimum necessary to construct the project. In accordance with measure BD2, micro-siting of infrastructure will be undertaken during detailed design to further minimise or avoid impacts on native vegetation where practicable. Exclusion areas will be established and maintained around any native vegetation adjoining the project site retained in close proximity to work locations.

Microbats

Issue

The BDAR/EIS should consider the possible value of buildings to be demolished as potential habitat for microbats (Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*), Eastern Freetail Bat (*Mormopterus notio/kensis*) as well as the Large-footed Myotis (*Myotis macropus*)), and it is recommended the Response to Submissions report addresses this issue and that searches to confirm the presence or absence of roosting habitat in any bridges or buildings be undertaken prior to approving the project and/or as part of the pre-clearance procedures recommended as a mitigation measure in the BDAR.

Any searches for evidence of microbats roosts should be undertaken using appropriate methods as those described in the 'Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method.

Response

In accordance with mitigation measure BD3, a Construction Biodiversity Management Plan will be developed and implemented as part of the CEMP. Measures to manage the potential for impacts to microbats during construction will be included in the plan, including survey to confirm the presence or absence of roosting habitat. Any further surveys would be undertaken in accordance with the methods outlined in the Biodiversity Assessment Method.

Further information on the requirements for the plan is provided in Table 27.11 of the EIS/preliminary draft MDP.

Mill Stream

Issue

The Response to Submissions report needs to clarify if extracted groundwater will be discharged to Mill Stream as this is not clear, for example:

- Section 16.3.3 of the EIS indicates it does not anticipate discharging extracted groundwater to Mill Stream during construction, but it does not definitely rule this out
- Section 16.6.1 states ‘a new monitoring station would be required on the lower estuarine reach of Mill Stream if groundwater discharge to that watercourse is proposed.

While the reach of Mill Stream that will receive discharge from the project area is a concrete lined channel, and is classified as 'highly disturbed', if discharge of extracted groundwater to Mill Stream is proposed, the submissions report should assess the potential impact of this, given that Mill Stream flows to Botany Bay.

Response

As described in the responses provided in section 5.1.2, it is likely that there would be a need to discharge extracted groundwater. Potential discharge locations will be considered during development of the detailed design and construction methodology. Extracted groundwater would be treated prior to discharge to comply with the water quality criteria for receiving waters (see responses in section 5.1.2). The EIS/preliminary draft MDP assumed that discharge to Mill Stream could occur. Based on the stormwater drainage system in the vicinity of the project site, the most likely discharge location to Mill Stream would be below the existing weir in the lower estuarine reach of the waterway. That location is on Sydney Airport land. The need for a discharge at this location would be confirmed when the preferred construction methodology is advised by the appointed construction contractor.

Since exhibition of the EIS/preliminary draft MDP, baseline water quality monitoring has been conducted at a location downstream of the weir. The monitoring results are documented in Appendix E of this report.

Watercourse crossings

Issue

Comparing Figures 7.3 and 7.4 with Figure 22.2 of the EIS indicates that the footprint of the Terminal 1 connection bridge, the freight terminal bridge and Qantas Drive bridge would result in the clearing of Swamp Oak Floodplain forest. The response to submissions report needs to clarify why it is not possible to move and/or design these bridges to avoid clearing the Swamp Oak Floodplain forest.

The bridge design should maintain and improve riparian/terrestrial connectivity along Alexandra Canal and include the following:

- Bridges are elevated and span the full width of the riparian land to avoid or reduce the need to clear and/or disturb native vegetation
- The design maximises light and moisture penetration under the structure to encourage native plant growth.

Response

As described in section 6.4.1 of the EIS/preliminary draft MDP, the proposed location and design of the project's features (including the bridges) is constrained by a number of factors, including:

- Hazards to aviation operations, including the prescribed airspace (OLS and PAN-OPS), runway approaches, and the potential for turbulence and wind shear impacts
- Alexandra Canal sediment contamination, heritage and flooding issues – the bridge designs have spanned the canal and avoided locating piers in the canal to minimise disturbance of contaminated sediments, minimise impacts on the canal walls and minimise upstream flooding impacts
- Former Tempe Landfill – the bridge types influence pier locations that need to be sited to avoid impacting the existing bentonite cut-off wall, leachate collection system and to avoid increasing excavation requirements
- Botany Rail Line – minimum vertical and horizontal clearances to the rail tracks are required to maintain satisfactory levels of safety and safeguard the line for future expansion. This affects the elevation of bridge crossings as well as the location of bridge piers and clearances in key locations
- Constructability considerations, including minimising potential intrusions into the prescribed airspace by construction equipment (cranes and piling rigs) during bridge construction.

It is difficult to increase span lengths without affecting other constraints. For example, in many locations, it is not possible to increase bridges heights as a result of the presence of the OLS.

Further information about how the design of the bridges was refined, including key constraints and locational considerations, is provided in sections 6.5.1 and 6.5.2 of the EIS/preliminary draft MDP.

As a result of the above, the potential impacts on some areas of Swamp Oak floodplain forest along Alexandra Canal (shown on Figures 22.2 and 22.3 of the EIS/preliminary draft MDP) are considered unavoidable. This potential impact is assessed by Technical Working Paper 14 (Biodiversity) and the results are summarised in Chapter 22 of the EIS/preliminary draft MDP.

The assessment concludes that the areas of Swamp Oak floodplain forest with the potential to be impacted by the project are generally isolated patches within highly disturbed vegetation. This vegetation is not considered to meet the definition of a threatened ecological community (see section 22.2.2 of the EIS/preliminary draft MDP). Mitigation measures are provided to minimise the potential impacts as far as possible. In accordance with mitigation measure BD1, detailed design will avoid or minimise the need to remove and/or disturb native vegetation and fauna habitat. Mitigation measure BD2 commits to limiting vegetation clearing to the minimum necessary to construct the project. Micro-siting of infrastructure will be undertaken during detailed design to further minimise or avoid impacts on native vegetation where practicable.

Opportunities to incorporate design features to maximise opportunities for vegetation growth would be considered as part of the urban design and landscape plan.

5.2.4 Urban tree canopy

Tree removal and replacement trees

Issue

It is unclear how many additional trees may be removed by the project. The proponent should provide the possible maximum total number of trees that could be removed.

The response to submissions report needs to clarify the number of replacement trees and the net loss of trees.

Response

Section 21.3.3 of the EIS/preliminary draft MDP provides an assessment of the potential impacts on trees. The assessment notes that the project currently provides for a total of 551 replacement trees, representing a net loss of 749 trees across the project site. Trees removed by the project would be replaced to achieve a net increase in tree canopy. These numbers are based on the concept design for the project and will be refined and finalised during the detailed design.

In accordance with mitigation measure LV4, the need to remove trees within the project site will be avoided where practicable. For those trees that cannot be reasonably avoided, a tree management strategy will be developed identify how a net increase in tree canopy can be achieved. As described in section 21.6.1 of the EIS/preliminary draft MDP, the strategy will identify:

- Trees and vegetation that can potentially be retained
- Tree replacement locations (including potential locations outside the project site) to provide a net increase in tree canopy, including locations for the translocation of cabbage tree palms
- Opportunities for rapid-growing replacement trees
- Suitable tree species with consideration of Sydney Airport’s wildlife management plan, prescribed airspace and National Airports Safeguarding Framework Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports
- Opportunities for high quality streetscapes
- Relevant on-site processes and tree protection measures.

Tree management strategy

Issue

The inclusion of the mitigation measure to prepare a tree management strategy at the detailed design stage defers the SEARs requirement for the EIS to describe how the proposal will achieve a net increase in tree canopy within or adjacent to the construction footprint. If details are not provided until the detailed design stage, it is recommended a condition of consent is included which requires the tree management strategy to be prepared at the detailed design stage.

Response

Mitigation measure LV4 (tree management strategy) is proposed to be undertaken once all the project details are confirmed through the detailed design process and further consultation is undertaken with relevant stakeholders. Due to the limited space within the project footprint, constraints with the former Tempe landfill, airport operational hazards, etc, the location of replacement trees to achieve a net increase in tree canopy cannot be resolved until the detailed design stage.

Conditions of consent are a matter for the Department of Planning, Infrastructure and Environment to consider during assessment of the project.

Replacement tree locations

Issue

It is unclear where these planting sites are to be located and whether replacement trees are proposed to be planted along the Alexandra Canal riparian corridor. The response to submission report needs to provide details on this.

Response

In accordance with mitigation measure LV4, the final location of replacement trees will be confirmed in consultation with Inner West Council and Sydney Airport Corporation. Opportunities for tree and other plantings along the canal will be considered by the urban design and landscape plan (required by mitigation measure LV1). Further information about the urban design and landscape concept for the project, and an outline of the requirements for the plan, is provided in Technical Working Paper 13 (Urban Design, Landscape Character and Visual Impacts) and section 7.12 of the EIS/preliminary draft MDP.

Urban heat island effect

Issue

To assist mitigate the urban heat island effect, improve urban tree canopy and local biodiversity the project should:

- Avoid removing existing native trees where ever possible. The loss of the existing trees and the many benefits that mature trees provide takes years for a juvenile tree to grow and replace
- Replace any removed trees at a ratio greater than 1:1
- Replace the removed trees with local native provenance species from the vegetation Community that once occurred in this locality rather than plant exotic or non-local natives
- Use advanced trees, preferably with a plant container pot size of 100-200 litres, or greater
- Provide enough area/space to allow the trees to grow to maturity.

Response

Section 26.2.1 of the EIS/preliminary draft MDP includes an assessment of the heat island effect in accordance with the requirements of the SEARs. This includes recognition of the potential impacts of the proposed vegetation removal on the heat island effect. The assessment concludes that the project is located in an urbanised area, with a large portion of the project involving the replacement of existing roadways and sealed surfaces. These surfaces already contain absorptive materials that contribute to the urban heat island effect. As a result, a minor increase is predicted.

In accordance with mitigation measure CC3, the urban design and landscape plan will include consideration of appropriate landscape designs and species to reduce the urban heat island effect. The measure also commits to investigating other measures to mitigate the heat island effect during detailed design, such as light coloured pavements and shading structures for public spaces.

The tree replacement and landscaping requirements for the project would be defined in detail in the urban design and landscape plan (mitigation measure LV1) and the tree management strategy (mitigation measure LV4). The tree management strategy would be prepared to achieve a net increase in tree canopy. Trees that cannot be replaced within the project footprint would be replanted within Sydney Airport land and land subject to the EP&A Act, relative to the number of trees removed. The final location of replacement trees, pot sizes and species would be confirmed in consultation with Inner West Council and Sydney Airport Corporation during detailed design (refer to section 21.6.1 of the EIS/preliminary draft MDP). Larger pot sizes would be considered where appropriate and consistent with Sydney Airport's Wildlife Management Plan.

5.2.5 Landscaping

Landscaping/revegetation should be undertaken along Alexandra Canal

Issue

Landscaping/revegetation should also be undertaken along the Alexandria Canal riparian corridor to mitigate the impacts of the project on riparian land.

Response

As described in section 5.2.4, the tree replacement and landscaping requirements for the project, including along the canal, would be defined in detail in the urban design and landscape plan (mitigation measure LV1) and the tree management strategy (mitigation measure LV4) noting that there are limited opportunities along the riparian corridor due to existing and proposed infrastructure. Species selected for landscaping/replanting would be chosen to take into account the requirements of Sydney Airport's Wildlife Management Plan. Relevant considerations of Sydney Water's Asset Master Plan for Alexandra Canal would also be considered (refer to further information below).

Landscaping recommendations

Issue

EES provides the following landscaping recommendations:

- The open space areas at Tempe Lands and the former Tempe landfill (including the mounds), the roadside areas, and riparian corridor be planted with a diversity of appropriate local native provenance species (grasses, trees, shrubs and groundcover) from the relevant local native vegetation community or communities that once occurred in this locality (rather than plant exotic or non-local natives)
- The proponent commences sourcing local native provenance plant species particularly trees and/or growing local provenance trees as soon as possible, so the trees to be planted are advanced in size to assist improve the urban tree canopy and local biodiversity
- The project includes an additional mitigation measure to salvage and use the native trees that are required to be removed including tree trunks (greater than approximately 25 to 30 centimetres in diameter and three metres in length) and these are placed along the riparian corridor and in the open

space areas to enhance habitat, particularly as the BDAR states the project site contains very little fallen timber and dead trees

- A mitigation measure should be included for post construction for ongoing weed management and maintenance (eg watering) of the landscape areas to ensure the recently planted native plants survive.

Response

Landscaping opportunities would be confirmed during the detailed design stage in accordance with the urban design and landscape plan (mitigation measure LV1). In accordance with mitigation measure AS5, the urban design and landscape plan for the project will include consideration of appropriate landscape designs and species lists to minimise opportunities to attract wildlife at levels likely to present a hazard to aviation operations. The plan will have regard to relevant requirements and species lists under Sydney Airport's Wildlife Management Plan and other relevant guidelines, including the *National Airports Safeguarding Framework Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports* (International Birdstrike Committee, 2006a) and *Recommended Practices No. 1 – Standards for Aerodrome Bird/Wildlife Control* (International Birdstrike Committee, 2006b).

In relation to improving the Alexandra Canal riparian corridor, it is noted that the opportunity to achieve this in the project footprint is limited by the proposed active transport link, Sydney Water requirements for Alexandra Canal, desalination pipeline maintenance requirements and other infrastructure.

The cap of the former Tempe Landfill also limits the height of trees that can be replanted in this area. Sydney Water is also undertaking an asset master plan for Alexandra Canal to identify areas of the canal that require restoration or repair. The repair methods that come from this plan will give special consideration to the heritage sandstone walls, as well as ecology and the recreational use of the waterway and wider area. Where practicable however, the use of removed trees to enhance habitat would be considered as part of the urban design and landscape plan and in accordance with the requirements of mitigation measure AS5.

Maintenance of landscaping would be in accordance with Transport and Sydney Airport Corporation's standard maintenance procedures.

Riparian corridor rehabilitation

Issue

To improve the corridor link between Alexandra Canal and Tempe Wetlands, it is recommended the area of riparian land along the canal that is impacted by the project is rehabilitated with fully structured native vegetation that emulates the relevant local native vegetation community (or communities) that once occurred in this locality, particularly as the EIS states that key areas of ecological importance include Alexandra Canal and its riparian and shore bank zone.

It is recommended a Vegetation Management Plan (VMP) which includes scaled plans is prepared and implemented as part of this project and the VMP includes details on:

- The riparian corridor width proposed to be established along the canal
- The footprint of the proposed development
- The area of riparian land/riparian vegetation that is proposed to be temporarily disturbed or permanently removed by the project
- The area of riparian land that is proposed to be revegetated with fully structured native vegetation
- The local native vegetation community that once occurred in this location
- A list of local provenance plant species from the local native vegetation community that are proposed to be planted in the riparian corridor along the canal.

Response

The concept design has been developed to avoid impact on the riparian zone along Alexandra Canal wherever possible. A number of mitigation measures are proposed to manage the potential impacts of the project on vegetation generally, including small areas of riparian vegetation along the canal.

In accordance with mitigation measure BD1, detailed design will avoid or minimise the need to remove and/or disturb native vegetation and fauna habitat. Mitigation measure BD2 commits to limiting vegetation clearing to the minimum necessary to construct the project. Micro-siting of infrastructure will be undertaken during detailed design to further minimise or avoid impacts on native vegetation where practicable.

Mitigation measure BD3, commits to preparing and implementing a Construction Biodiversity Management Plan. The plan will include measures to manage biodiversity and minimise the potential for impacts during construction. Further on the objectives, purpose and requirements for the plan is provided in Table 27.11 of the EIS/preliminary draft MDP.

In accordance with mitigation measure LV4, the final location of replacement trees will be confirmed in consultation with Inner West Council and Sydney Airport Corporation. Opportunities for tree and other plantings along the canal will be considered by the urban design and landscape plan (required by mitigation measure LV1), noting the comments above regarding the limitations due to existing and proposed infrastructure in this location. Plans for revegetation and landscaping on council-owned land would be developed in consultation with council.

Where revegetation is to be undertaken in small areas of the riparian zone along Alexandra Canal, revegetation would consider the objectives of the Sydney Water Asset Master Plan for the canal.

5.2.6 Recommended conditions

Recommended conditions of consent

Issue

EES recommends a number of conditions of consent as part of any planning approval for the project.

Response

The proposed conditions are noted and Transport considers that most of the proposed conditions are consistent with, or already encompassed by, the proposed mitigation measures (see Chapter 11), with the exception of those outlined below. However, conditions of approval are a matter for the Department of Planning, Infrastructure and Environment to consider during its assessment of the project. Transport will consider in detail any proposed conditions of approval at an appropriate time in the assessment process.

1. A separate vegetation management plan is not considered to be required for the project. Mitigation measure BD3 commits to preparing a Construction Biodiversity Management Plan as part of the CEMP. Mitigation measure LV1 commits to the development of an urban design and landscape plan, which would include landscaping details for the Alexandra Canal riparian corridor. However for the reasons outlined above, there is considered limited opportunities for restoration of the riparian zone.
2. Native trees to be removed are salvaged and used in the riparian corridor to enhance habitat is not practically achievable. As mentioned above, the final location of replacement trees would be confirmed in consultation with Inner West Council and Sydney Airport Corporation (LV3). Opportunities for tree and other plantings along the canal would be considered by the urban design and landscape plan (required by mitigation measure LV1), noting the comments above regarding the limitations due to existing and proposed infrastructure in this location.

5.3 Department of Planning, Industry and Environment – Water Group

5.3.1 Post approval

Water management measures

Issue

The Water Group of the Department of Planning, Industry and Environment provided a number of management measures to be considered.

Response

A response to the suggested management measures is provided in Table 4.1.

Table 5.2 Responses to the Water Group's suggested management measures

Requested management measures	Response
A Construction Groundwater Management Plan should be developed following finalisation of the detailed design and planning stage. This should include all developed and existing criteria for minimising impacts to and from the intersection of groundwater for the different site activities. The Groundwater Management Plan should be forwarded to DPIE Water for review prior to the commencement of development activities.	Groundwater will be managed during construction in accordance with the dewatering management strategy required by mitigation measures GW4 and GW5 respectively.
Update groundwater take estimates after the detailed design and planning is finalised and present in the Groundwater Management Plan as a component of the water balance model. This should be used as a measurable criteria for assessment of impacts of each activity that is predicted to intersect groundwater.	The dewatering management strategy (mitigation measure GW4) includes a requirement to estimate potential groundwater inflow rates and volumes for proposed excavations. This will be undertaken prior to construction. These rates and volumes will be used as the criteria for groundwater monitoring required by mitigation measure GW6.
Continue groundwater monitoring during the detailed design phase and through the construction phase.	Mitigation measure GW6 provides the requirements for groundwater monitoring during construction.
During construction, monitor and record actual volumes of groundwater inflow and pumped extraction during each excavation activity, so these volumes can be compared to the estimated volumes modelled at the final design and planning stage.	As minimal change in groundwater recharge is expected changes to the overall water balance is also expected to be negligible (refer to sections 15.4.3 and 15.4.4 of the EIS/preliminary draft MDP).
Undertake regular assessment of accumulated data against criteria for minimising impacts for each site activity that encounters groundwater.	Mitigation measure GW6, which provides the proposed groundwater monitoring during construction has been updated to include these additional details.
Continue monitoring post-construction for up to 12 months at any sites that encounter contamination to verify plumes distribution and minimal impact criteria are satisfied.	In accordance with mitigation measure SW6, water quality monitoring will continue for a minimum of 12 months following the completion of construction, or until affected watercourses are certified by a suitably qualified and experienced independent expert as being returned to an acceptable condition (or as otherwise required by any project conditions of approval). The RAP(s) (mitigation measure CS3) will define the measures required, including any monitoring requirements, to ensure that existing contamination does not pose a future risk to human health or the environment.
Future updates to the model during detailed design and planning stage should include a 24-hour constant	There has been a reasonable volume of hydraulic parameter testing along the alignment to inform the

Requested management measures	Response
rate pump tests (with associated monitoring bores). Please note this is the DPIE-Water preferred standard for determining hydrogeological parameters.	assessment undertaken for the EIS/preliminary draft MDP. This is expected to sufficiently inform the assessment of impacts and identification of risks needing to be managed by adopting worst case conditions. While it is recognised that pumping tests provide an understanding of bulk formation hydraulic conductivity and effective porosity, for unconsolidated sands such effective porosities are reasonably well documented. A single 24-hour constant rate test would have limited applicability due to the linear nature of the project.

5.4 NSW Health

5.4.1 Socio-economic assessment

Errors in socio-economic status

Issue

Specific errors have been identified in regards to the reporting of socioeconomic status (IRSD) in Mascot and Tempe. In the paper Mascot is identified as having an IRSD within the 9th Decile. On review of ABS data this is actually 7th decile. Tempe is stated to have an IRSD within 8th Decile. On review of the ABS data this is actually 5th decile.

With the understanding that the Mascot and Tempe areas have a higher level of socioeconomic disadvantage than considered in this technical paper a re-evaluation of the magnitude of negative outcomes on these communities may be warranted.

Response

The errors are noted. The corrected rates of disadvantage were considered by the socio-economic specialist who prepared Technical Working Paper 11 (Socio-economic Impact Assessment). It was considered that the assessed level of sensitivity of most residents in Mascot and Tempe would remain the same, given that potential impacts on vulnerable residents are assessed separately. As a result, the higher rate of disadvantage do not change the conclusions in terms of the potential significance of impacts identified.

Impacts on vulnerable populations

Issue

Vulnerable populations are more likely to be disproportionately affected by the extensive capital works. NSW Health suggests that the proponent consider opportunities to better identify the population most at risk and develop mitigation and communication strategies that will minimise short and long term harms including reduced access to outside areas, increased risk of reduced social and community interactions, and likely need to increase commuting by car to adapt to the proposed works.

Response

The project would provide increased capacity and reduced congestion to satisfy predicted demand for passenger and freight access to Sydney Airport and beyond to Port Botany. The project also provides opportunities for improved public transport services and active transport provision. Further information on active transport links provided by the project and future opportunities for additional links is provided in section 3.2.1 of this report.

In accordance with mitigation measure SE3, a communications strategy will be prepared to detail the process of communicating and engaging with the community and stakeholders in the lead up to, and during, construction. The strategy will include protocols to identify and engage with vulnerable persons that might be affected by construction and to mitigate potential impacts arising from the project. The strategy will ensure that:

- The community and stakeholders have a high level of awareness and forewarning of all processes and activities
- Accurate and accessible information is made available
- A timely response is given to issues and concerns raised by the community
- Feedback from the community is encouraged
- Opportunities for input are provided.

5.4.2 Operational noise impacts

Operational noise mitigation

Issue

It is important that all reasonable and feasible measures are taken to reduce the impact of operational noise on identified premises in the area of Tempe north of the former landfill and the area west of the Princes Highway (NCA01), particularly night time noise which would result in sleep disturbance.

Response

As described in section 5.1.1 an updated operational noise assessment has been undertaken following exhibition of the EIS/preliminary draft MDP (see Appendix B). The assessment includes consideration of the potential impacts at receivers in noise catchment areas NCA01 and NCA03, which included the areas raised in the issue.

The updated assessment concluded that fewer receivers would have the potential to experience noise in excess of the operational noise criteria. The total of 63 predicted residential exceedances in the updated assessment in noise catchment area NCA01 compares to the 78 residential receivers identified by the EIS/preliminary draft MDP. Similarly, a total of 116 residential receivers in the updated assessment compares with 119 residential receivers identified in noise catchment areas NCA03 in the EIS/preliminary draft MDP.

In accordance with mitigation measure NV3, operational noise and vibration mitigation measures will be confirmed during detailed design and include consideration of reasonable and feasible measures in accordance with the *Noise Mitigation Guideline* (Roads and Maritime, 2015b). Requirements for at-property noise treatments in properties identified as ‘eligible’ in the noise and vibration assessment will be reviewed. The implementation of treatments will be undertaken in accordance with the *At-Receiver Noise Treatment Guideline* (Roads and Maritime, 2017).

5.4.3 Construction noise impacts

Construction noise mitigation

Issue

It is recommended that all reasonable and feasible noise mitigation measure are considered for the properties in the area north of Tempe landfill (noise catchment area NCA03) area during construction.

Response

In relation to construction noise, and in accordance with mitigation measure NV6, location and activity specific noise and vibration impact assessments will be undertaken prior to works with the potential to result in impacts. The assessments will confirm predicted impacts at relevant receivers in the vicinity of the activities to assist with the selection of appropriate management measures.

Mitigation measure NV5 commits to managing construction noise and vibration in accordance with the Construction Noise and Vibration Management Plan, which will be developed based on the *Construction Noise and Vibration Guideline* (Roads and Maritime, 2016). The guideline sets out the approach for selecting and implementing reasonable and feasible mitigation measures to address noise impacts during the construction of road projects.

5.4.4 Air quality impacts

Dust mitigation

Issue

Dust generated during construction is a potential source of local air pollution. All reasonable and feasible measures should be taken to minimise exposure to dust emissions for local residents during the construction phase.

Response

In accordance with mitigation measure AQ2, a Construction Air Quality Management Plan will be prepared as part of the CEMP and implemented during construction. The plan will detail processes, responsibilities and measures to manage air quality and minimise the potential for impacts during construction.

Table 27.7 of the EIS/preliminary draft MDP provides the objectives, purpose and requirements for the plan, and example measures to achieve the stated objectives.

Transport has substantial experience in managing dust from road construction activities. The detailed methods and procedures for managing dust will be provided in the Construction Air Quality Management Plan, which will be prepared in accordance with relevant legislation, guidelines and standards.

5.4.5 Odour

Odour management

Issue

The project will include construction activities on the former Tempe landfill site and the former landfill site underneath the current Sydney Airport North Lands Car Park. There is a possibility that this activity will release odours, which could affect a significant residential area of Tempe located nearby to the north. Odour management plans and mitigation strategies should be considered to address odour related impacts.

Response

Commitments to managing odour from potential sources are defined by a number of mitigation measures, including AQ1, AQ2, AQ3, AQ4 and AQ5. In particular, mitigation measure AQ4 commits to developing an odour management strategy prior to construction, and implementing the strategy for the duration of works involving ground disturbance at the former Tempe landfill. In accordance with measure AQ4, contingency and rectification measures (eg use of deodorisers, use of aerators) will be implemented should significant odour issues occur at sensitive receivers in the vicinity of the project site.

The mitigation measures are provided in full in Chapter 11 of this report.

5.5 Sydney Water

5.5.1 Sydney Water wastewater and potable water assets

Requirements for wastewater and potable water assets

Issue

Sydney Water notes that a number of its wastewater and potable water assets are located within the project footprint and provides requirements to ensure the protection of these assets including:

- Early consultation and consideration for staging and timing design work and delivery of the project to allow sufficient time for Sydney Water to schedule and program shutdowns and reconnections of assets
- Confirming the availability and volume of potable water requirements during detail design
- Ensuring safe unrestricted access to assets is provided throughout the life of the project to ensure the assets are fully operational at all times
- Any trade waste licence request, most notably for removal of leachate, to meet Sydney Water's requirements
- Adhering to Sydney Water's asset adjustment process for the relocation, adjustment and or protection of Sydney Water assets. Additionally, if assets are required to be changed, the environmental approval will need to cover any works identified that may fall outside of the project boundary, but be a result of the project works
- Adhering to the discharge protocols of chlorinated water due to water main shutdown and reconnection of live Sydney Water assets that will need to be adjusted.

Response

The proposed utility works are described in section 8.7 of the EIS/preliminary draft MDP. Table 8.13 of the EIS/preliminary draft MDP lists Sydney Water wastewater and potable water assets within the project site that would potentially require protection, adjustment or augmentation as part of the project.

In accordance with mitigation measure LU4, the location of all utilities, services and other infrastructure will be identified prior to construction to determine requirements for access to, diversion, protection and/or support. This will include (as required), undertaking utilities investigations, including intrusive investigations, and consultation and agreement with service providers (including Sydney Water).

Further confirmation of the required utility works would be undertaken during detailed design. This would include consultation with Sydney Water in relation to their assets with the potential to be affected. Transport would consult with Sydney Water to ensure that maintenance access is maintained during construction and operation.

Any works requiring water main shutdown and reconnection would be undertaken in accordance with Sydney Water requirements, including discharge protocols for chlorinated water.

As described in section 8.5.3 of the EIS/preliminary draft MDP, the project would require about 87,000 kilolitres of water during construction, comprising a combination of recycled construction water and potable water. Further assessment of potable water needs would be undertaken during detailed design and construction planning, and would discussed with Sydney Water to confirm supply requirements. The project is not expected to require any water during operation.

The need for trade waste agreements would be assessed during detailed design and discussed with Sydney Water.

5.5.2 Sydney Water stormwater assets

Requirements for stormwater assets

Issue

Sydney Water notes that a number of its stormwater assets are located within the project footprint, including Alexandra Canal, and provides requirements for these assets, including:

- Close consultation during the design, construction and operational phases of the project to ensure impacts to stormwater assets, flooding and Alexandra Canal are minimised
- Ensuring that satisfactory steps/measures are taken to protect existing stormwater assets, such as avoiding building over and/or adjacent to stormwater assets. Transport should consider taking measures to minimise or eliminate potential flooding, degradation of water quality, and avoid adverse impacts on any heritage items, and create pipeline easements where required
- Obtaining approval from Sydney Water prior to connections to Sydney Water assets
- Managing and treating stormwater runoff from the project's pavement areas. Out of catchment offset stormwater treatment strategies are not appropriate and are not supported
- Designing any fencing adjacent to its stormwater channels in accordance with Sydney Water's *Stormwater Fencing Policy* (AMQ0135) for fencing
- Sydney Water's stormwater quality targets will apply when a connection to our asset is required
- Stormwater quality monitoring results for stormwater discharges should be provided to Sydney Water throughout including pre, during and post construction of the road (three years)
- Consulting with Sydney Water regarding the remediation of Alexandra Canal bank and the design of the active transport link proposed along western side of Alexandra Canal to allow for Sydney Water maintenance access to the canal
- Ensuring surface runoff is piped into the canal and does not run down the face of the walls of the canal nor infiltrate into the ground immediately behind the wall.

Response

In accordance with mitigation measure LU4, consultation with Sydney Water will be undertaken in relation to connection with, or potential impacts on, its stormwater assets, including Alexandra Canal.

Mitigation measures SW1 to SW4 and SW7 provide commitments in relation to the design of various aspects of the stormwater system to minimise the potential for impacts, particularly at Alexandra Canal.

Mitigation measure SW6 commits to developing and implementing a water quality monitoring program as part of the Construction Soil and Water Management Plan. Water quality monitoring data relevant to Alexandra Canal will be provided to Sydney Water during construction. Mitigation measure SW6 has been updated to confirm this commitment.

Potential impacts on stormwater flows are described in section 16.4.1 of the EIS/preliminary draft MDP. The project would result in an increase in flow volumes. This is due to an increase in the impervious area associated with road pavement and hardstand areas compared to existing conditions. The predicted increase in flow volumes from impervious areas is small compared to existing catchment flows – Alexandra Canal catchment (one per cent) and Mill Stream catchment (four per cent).

Fencing required in the vicinity of stormwater channels would be designed in accordance with Sydney Water's *Stormwater Fencing Policy* (AMQ0135).

Sydney Water would be consulted in relation to the remediation of Alexandra Canal and the design of the active transport link during the detailed design process to ensure maintenance access requirements are considered.

As described in section 7.10.8 of the EIS/preliminary draft MDP, surface water would be captured and piped to nine drainage outlets at Alexandra Canal. These outlets would be situated in the canal wall, and would be designed to ensure that flows do not run down the face of the wall or infiltrate into the ground immediately behind the wall. Consultation has been conducted with Sydney Water on the concept design of the proposed stormwater outlets to Alexandra Canal including mitigation for potential scour impacts. Chapter 16 of the EIS/preliminary draft MDP outlines the results of surface water quality modelling conducted including the net change in pollutant loading. The results have been compared against the stormwater quality targets including the *Botany Bay and Catchment Water Quality Improvement Plan* (SMCMA, 2011).

Out of catchment stormwater treatment strategies are not proposed.

5.5.3 Contamination

Impact on Alexandra Canal sediments

Issue

For impacts on the Alexandra Canal sediments compliance with the NSW EPA's Remediation Order is required.

Sydney Water notes the commitment to prepare a Plan of Management in consultation with Sydney Water, consistent with the requirements of Remediation Order 23004, before submitting to NSW EPA for approval. The Plan of Management should include actions to manage incidents that could impact sediments and water quality.

Response

Mitigation measure CS11 commits to preparing and implementing a plan of management in accordance with the remediation order to manage work within Alexandra Canal and minimise the disturbance and migration of contaminated sediments. The plan will identify specific methodologies to minimise disturbance and dispersion of potentially contaminated sediments and be prepared in consultation with Sydney Water and submitted to the NSW EPA for approval.

Stormwater outlet design

Issue

The proposed stormwater outlets shall be designed to avoid disturbance of sediment. It is noted that initial designs provided by Transport showed a number of outlets with stilling basins to minimise sediment mobilisation by stormwater. Some of these designs appeared likely to act as sedimentation traps and would promote vegetation growth. As well as requiring additional maintenance to maintain drainage performance, it is likely that at least some of the sediment will originate from within the canal and would be classified as contaminated.

Response

Section 7.10.8 of the EIS/preliminary draft MDP notes that the project includes nine drainage outlets at Alexandra Canal. This would consist of:

- Upgrading four existing outlets on the eastern side of the canal
- Providing four new outlets on the western side of the canal
- Providing one new outlet on the eastern side of the canal.

As noted in section 7.10.8, a preliminary study of outlet discharges identified that a number of the outlets would require energy dissipaters to minimise scour in the canal. This would be reviewed during detailed design and the necessary measures at outlets confirmed in conjunction with relevant stakeholders, including Sydney Water. This commitment is captured in mitigation measure SW2.

The concept design has taken into account the results of discussions with Sydney Water. While standard Sydney Water outlet designs have been incorporated for seven of the outlets, two outlets are sufficiently large such that standard designs are not feasible. In these instances, a preliminary design of a stilling basin has been provided for early comment. It is noted that these two outlets would be within the tidal range and may act as a sediment trap for fine material during tidal events. The design and positioning of the outlets is governed by topography, pipe size and the need to provide appropriate drainage grades. Further consultation with Sydney Water would be conducted as part of detailed design to resolve these issues and any other concerns regarding the proposed outlets.

Technical Working Paper 5 (Contamination and Soils)

Issue

Sydney Water requires an independent review of work potentially causing contamination impacts in Alexandra Canal, including acidification, on Sydney Water infrastructure, land and on the ability of Sydney Water work crews to undertake their work safely. This would best be undertaken by a NSW EPA accredited site auditor.

Where appropriate, groundwater and vapour sentinel wells should be installed and monitored. These wells would trigger appropriate contamination mitigation responses in a timely manner.

Response

Acid sulfate soils

Acid sulfate soils may be encountered during piling and excavation works close to Alexandra Canal, including the connection of stormwater outlets and from dewatering for road construction. Further investigations would be undertaken within areas of medium and high acid sulfate soil potential during detailed design. Due to the disturbed nature of the project site, all excavated soil for the project would be subject to the provisions of an Acid Sulfate Soils Management Plan developed in accordance with the *Acid Sulfate Soils Assessment Guidelines* (ASSMAC, 1998). Once acid sulfate soils have been treated, depending on the results of testing, they could either be reused on site, or disposed of at an appropriate facility (refer to section 13.3.3 of the EIS/preliminary draft MDP and mitigation measure CS10). The Construction Soil and Water Management Plan (mitigation measure CS9) would also consider the presence of acid sulfate soils and measures to manage potential impacts.

Monitoring of potential impacts from groundwater dewatering during construction would be undertaken in accordance with mitigation measure GW6 which includes consideration of potential migration of contaminants and if potential acidification of groundwater is occurring due to the exposure of acid sulfate soils.

As outlined in section 13.6.1 of the EIS/preliminary draft MDP, NSW EPA accredited site auditors would be engaged to independently to review contaminated land consultant reports to ensure the methods and interpretation of data are consistent with NSW EPA guidance.

Alexandra Canal bed sediments

The Alexandra Canal bed sediments have been declared a remediation site as a result of historical industrial activities in the area. Due to the type and level of contaminants, the NSW EPA determined that the bed sediments have the potential to present a significant risk of harm to human health and the environment if disturbed. The NSW EPA consequently issued Sydney Water with a remediation order (number 23004) under the NSW *Contaminated Land Management Act 1997* to regulate sediment disturbance.

In accordance with mitigation measure CS11 and the requirements of the remediation order, a plan of management will be developed and implemented to manage work within Alexandra Canal that has the potential to disturb sediments. The management plan will address the requirements of the remediation order to prevent disturbance and dispersion of potentially contaminated sediments. The plan will be prepared in consultation with Sydney Water and submitted to the NSW EPA for approval in accordance with the requirements of the remediation order. The plan of management will consider the need for groundwater and vapour sentinel wells as required. It will also consider safety requirements for Sydney Water work crews.

Remedial Action Plan (RAP) framework

Issue

A NSW EPA accredited site auditor should review all steps in the RAP process for compliance with NSW EPA made or approved guidelines.

Response

In accordance with mitigation measure CS3, a RAP (or multiple RAPs) will be prepared (as required) to describe the remediation strategy to ensure that existing contamination does not pose a risk to human health or the environment during operation. The RAP(s) will be prepared by a suitably qualified and experienced consultant, as defined in Schedule B9 of the *National Environment Protection (Assessment of Site Contamination) Measure 1999*. Measure CS3 requires, for works on land subject to the EP&A Act, that the RAP(s) will be approved by a NSW EPA accredited site auditor.

5.5.4 Groundwater

Groundwater drawdown

Issue

The assessment shows indicative groundwater drawdown areas, some of which intersect with the Alexandra Canal. The assessment is silent on the potential for settlement to impact the canal and other Sydney Water assets, however it indicates modelling will be done during detailed design. Sydney Water should be consulted during detailed design if there is the potential for settlement to impact any Sydney Water assets.

Response

There is not expected to be drawdown or associated settlement within Alexandra Canal or within sediments immediately adjacent to the canal. This is because the canal has a constant supply of water from the Cooks River, which would not be impacted by groundwater extraction during construction. Notwithstanding this, mitigation measure GW2 commits to further modelling of settlement as part of detailed design. Should modelling identify any settlement issues, measures to reduce settlement will be confirmed.

Sydney Water will continue to be consulted if there is the potential to impact any Sydney Water assets. Appropriate management measures will be developed in consultation with Sydney Water.

5.5.5 Biodiversity

Landscape plan

Issue

Sydney Water must be consulted as the urban design and landscape plan is developed to align the outcomes of their master planning process with the proposal’s biodiversity and landscape planning.

Response

Transport is aware of the asset master plan process currently underway by Sydney Water for Alexandra Canal. Transport would consider the outcomes of this process in preparation of the urban design and landscape plan. Mitigation measure SE3 outlines the communications strategy to maintain engagement with stakeholder and community throughout detailed design and construction.

5.5.6 Flooding

Adverse impacts to flooding from the freight terminal bridge

Issue

Sydney Water requires evidence that the freight terminal bridge shown in Figure 7.24 in Chapter 7 will not have adverse impacts to flooding in the area, particularly in relation to Alexandra Canal. This is directly in relation to the bridge and the concrete wall adjacent to the canal illustrated in the render.

Response

The flooding assessment undertaken for the EIS/preliminary draft MDP (Technical Working Paper 6 (Flooding)) took into account the proposed extent of the southern abutment and retaining wall associated with the freight terminal bridge.

Figure 5.3 shows the results presented in Technical Working Paper 6 for the one per cent AEP event during operation. The extent of the southern abutment and retaining wall associated with the freight terminal bridge were overlaid onto flood mapping to demonstrate that the footprint of these structures was incorporated into the flood model. The figure shows that the one per cent AEP flood is contained within the banks of the canal, and that no impact is predicted from the freight terminal bridge or retaining wall to the south.

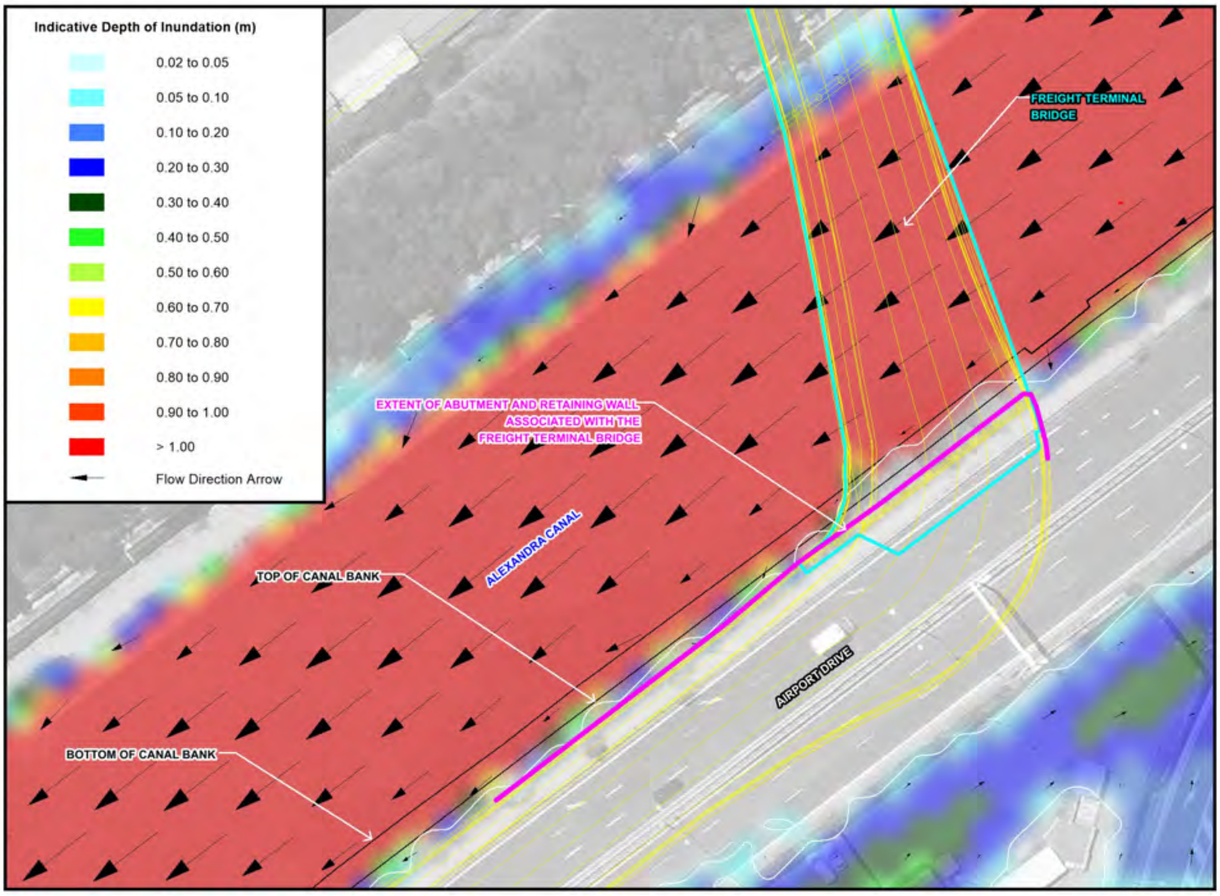

Figure 5.3 Pattern of mainstream flooding and major overland flow under operational conditions – one per cent AEP

Discrepancy in the EIS with stated peak flood levels to Alexandra Canal

Issue

In Chapter 14 there is a discrepancy between what is stated as the potential peak flood level to Alexandra Canal south of the Botany Rail Line. On page 14.17, a peak flood level of 0.04 m is stated and on page 14.13 a peak flood level of 0.02 m is stated. Need to confirm and advise whether these impacts are confined to the Alexandra Canal.

Response

Table 14.2 (on pages 14.12 and 14.13) and Table 14.4 (on pages 14.17 and 14.18) in Chapter 14 of the EIS/preliminary draft MDP describe potential flood impacts at different stages of the project. Table 14.2 describes potential flood impacts during construction. Table 14.4 describes potential impacts during operation.

The 0.04 m increase in peak flood level in Alexandra Canal referred to in Table 14.4 is located in the vicinity of the Botany Rail Line. The potential impacts are mainly located upstream (north) of the line. As noted in Table 14.4, these impacts are confined to the canal.

The 0.02 m increase in peak flood level in Alexandra Canal referred to in Table 14.2 is located to the south of the Botany Rail Line. As noted in Table 14.4, these impacts would also extend into adjoining areas of Airport Drive and Sydney Airport land.

Table 14.2 also describes the following potential flood impacts in the section of Alexandra Canal to the north (upstream) of the Botany Rail Line during construction:

> *Peak flood levels would increase by a maximum of 0.03 metres along Alexandra Canal north of the Botany Rail Line, leading to a minor increase in the depth of inundation at a number of commercial and industrial properties located along the canal's eastern and western banks and the Beaconsfield West Substation. Subject to further hydraulic assessment during detailed design, floor level surveys may be required to confirm whether construction would increase above-floor inundation and flood damages in affected properties.*

5.5.7 Heritage

Recommended heritage conditions

Issue

Sydney Water provides the following recommendations for Alexandra Canal which is listed on the State Heritage Register:

- Works must not adversely impact the fabric of the heritage item or the cultural heritage significance of the item
- If any impacts are likely, then they must be assessed by a qualified heritage practitioner and referred to the NSW Heritage Council
- All fabric assessed as 'high' significance must be conserved in accordance with the Burra Charter
- Fabric assessed as 'moderate', 'little' and 'intrusive' significance (shotcrete, Fabricon and concrete blockwork) is preferred to be replaced with sandstone blocks
- Any Aboriginal or non-Aboriginal archaeology found during the work that relates to the place, the canal and its construction and use, is to be referred to Sydney Water.

Response

The proposed bridges over Alexandra Canal have been designed to avoid direct impacts on the canal and its walls. However, nine drainage outlets in the canal wall would still be required, with three of these affecting the original sandstone fabric that has the highest significance (sandstone and remnant stone). In addition, the proposed bridge crossings potentially impact the visual curtilage of the canal. The overall impact rating for heritage and archaeology is assessed as major (refer to section 17.3.1 and section 17.4.2 of the EIS/preliminary draft MDP).

Sections of the canal are within the minimum working distance for cosmetic damage from vibration.

The following mitigation measures are proposed to address these impacts:

- During detailed design consideration will be given to avoiding impacts on significant fabric of the Alexandra Canal as far as reasonably practical (mitigation measure NAH1)
- The design of the bridges over the canal will involve qualified and experienced heritage design professionals and presented to Sydney Water and the Heritage Council of NSW (mitigation measures NAH3 and NAH4)
- Consideration will be given to reuse of significant fabric at the canal (mitigation measure NAH5)
- Appropriate heritage interpretation will be incorporated into the design (mitigation measure NAH6)
- A heritage management plan will be incorporated into the CEMP (mitigation measure NAH7)
- A Historical Archaeological Research Design and Excavation Methodology will be prepared for intact sections of Alexandra Canal along the western bank of the canal on either side of the existing pedestrian and rail bridges (mitigation measure NAH8)
- Photographic archival recording will be carried out for affected sections of the canal (mitigation measure NAH9)
- Sections of the canal outside the project site will be marked on plans within the CEMP as areas to be avoided during construction where works are within 10 metres of the canal (mitigation measure NAH10)
- Potential vibration impacts will be managed in accordance with the Construction Noise and Vibration Management Plan (mitigation measures NAH11 and NV5)
- Any items of potential heritage conservation significance or human remains discovered during construction will be managed in accordance with the *Unexpected Heritage Items Heritage Procedure 02* (Roads and Maritime, 2015a) (mitigation measure NAH12).

Transport will continue to consult with Sydney Water to minimise the potential impact to Alexandra Canal including during the detailed design and construction of the project.

5.5.8 Cycle/pedestrian shared path

Load limit on shared path

Issue

Sydney Water requests a minimum load limit of 35 tonnes on the shared path to allow for machinery during bank rehabilitation works.

Response

The need for a 35 tonne load limit on the section of active transport link along Alexandra Canal would be considered as part of the detailed design. These requirements would be confirmed in consultation with Sydney Water.

5.5.9 Piling adjacent to Sydney Water assets

Further detailed required to assess impact of bridges on Sydney Water assets

Issue

Further work is required to assess the impact of the project, particularly bridges, on Sydney Water assets. Such work may include (but not be limited to) the following:

- Detailed geotechnical investigations
- Settlement and ground movement predictions from construction works
- Dilapidation surveys of assets, particularly Alexandra Canal
- Vibration limits and trigger levels.

Response

The following geotechnical and hydrogeological investigations would be undertaken as part of the detailed design:

- Settlement and slope stability analysis in relation to the emplacement mounds (mitigation measure CS5)
- Settlement due to groundwater drawdown (mitigation measure GW2)
- The loading that the active transport link has on the Sydney desalination pipeline and the walls of Alexandra Canal (mitigation measure CS12).

The potential for vibration impacts on Sydney Water assets would be managed in accordance with the vibration limits and trigger levels provided in the EIS/preliminary draft MDP, and relevant mitigation measures, including NAH11, NV5, NV6, NV12, NV13 and NV14.

In accordance with measure NV14, building condition surveys will be completed before and after construction works where buildings or structures are within the minimum vibration working distances for cosmetic damage.

5.6 Heritage Council

5.6.1 Recommended conditions

Recommended conditions of approval

Issue

The Heritage Council provides a number of conditions of approval due to impacts on Alexandra Canal (SHR No.04621).

Response

The recommended conditions are noted Transport considers that most of the proposed conditions are consistent with, or already encompassed by, the proposed mitigation measures (see Chapter 11).

In relation to the condition regarding the conduct of Historical Archaeological Assessment and Research Design and Excavation Methodology, as documented in the EIS/preliminary draft MDP, Transport notes that there are existing site constraints, such as potential soil and groundwater contamination and high groundwater inflows, that might constrain the ability to conduct excavation works if required.

Conditions of approval are a matter for the Department of Planning, Infrastructure and Environment to consider during its assessment of the project. Transport will consider in detail any proposed conditions of approval at an appropriate time in the assessment process.

6 Key landholders and businesses

This chapter provides responses to issues raised in submissions provided by key landholders and businesses. The approach to analysing submissions and structuring responses is described in section 2.3 of this report. The issues raised in key stakeholder submissions have been summarised broadly according to the order and headings provided in each submission (where such headings were provided). In some instances, related issues have been grouped under a single heading.

6.1 Sydney Airport Corporation

6.1.1 Aviation operations and safety

Ensuring aviation safety and maintaining operational efficiency

Issue

Sydney Airport Corporation provided the following requirements:

- A robust Method of Works Plan should be developed in consultation with Sydney Airport
- There will be no requirement for any changes to Sydney Airport's operational activities as a result of the project
- There will be no reduction in runway capacity during construction of the project, and no restrictions to runway operations without prior agreement
- There will be no unacceptable or increased risks to aviation, for example from material stockpiling, cranes or other plant
- Design and location of any spoil mounds will fully consider impacts to windshear and turbulence with modelling to be undertaken to the satisfaction of Sydney Airport and other aviation stakeholders
- Dust and debris are managed effectively to reduce the risks to aviation from Foreign Object Debris (FOD)
- Priority is given during design and construction to avoid attracting wildlife (including birds and flying foxes) to the area, for example in choices of landscaping, management of food waste at construction compounds/staff facilities, and decisions regarding land use adjacent to the Airport at Tempe. Recreational activities that involve food, such as BBQs and picnics, should not be encouraged
- In addition, any new land uses, including open space, adjacent to airport land to be compatible with airport operations and public safety, including but not limited to factors such as lighting and activities that create risks of FOD
- Compliance with the National Airports Safeguarding Framework and its guidelines, which the NSW Government has adopted, would ensure these and related matters are appropriately addressed in project delivery.

Response

Sydney Airport operations

Transport is committed to delivering the project in a manner that minimises potential impacts to the operation of Sydney Airport and will comply with the relevant requirements of the Airports (Building Control) Regulations 1996 (Cth) (refer section 3.2.2 of EIS/preliminary draft MDP)

A suite of mitigation measures have been developed for implementation during detailed design (mitigation measures AS1 to AS9), construction (measures AS10 to AS12) and operation (AS13) to ensure the aviation safety issues are identified and addressed as part of the relevant stages of the work.

Transport would design, construct and operate the project to comply with the National Airports Safeguarding Framework. As described in section 11.1.2 of the EIS/preliminary draft MDP, National Airports Safeguarding Framework Guidelines B, C, E, F, G and I are relevant to the project.

Transport would comply with the requirements of the Airports (Protection of Airspace) Regulations 1996 during project delivery to avoid impacting aviation activities and runway operations.

Transport would continue to consider and minimise potential impacts on Sydney Airport operations and aviation safety during detailed design and project delivery in consultation with relevant aviation regulatory authorities (for example the Civil Aviation Safety Authority and Airservices Australia) in accordance with mitigation measure AS1. Transport would also continue to address aviation safety in consultation with Sydney Airport Corporation and the Airport Building Controller as the representative of the Australian Government Department of Infrastructure, Transport, Regional Development and Communications in accordance with the building activity approval processes of the Airports Act.

Design of the proposed emplacement mound

As described in section 7.10.2 of the EIS/preliminary draft MDP, the project would involve excavating about 90,000 cubic metres of waste material from the former Tempe landfill. It was originally proposed to retain and re-emplace some of this material within the boundary of the former Tempe landfill site in the form of two emplacement mounds. The re-emplacement of material within mounds on the site was proposed to reduce the need for off-site disposal and associated truck movements.

As a result of further consideration and consultation with Inner West Council and Sydney Airport Corporation, the proposed arrangement for the emplacement mounds has been refined. Only one mound is now proposed, in the area bounded by the Terminal 1 connection, the freight terminal access and the western side of Alexandra Canal (as originally proposed in the EIS/preliminary draft MDP). A second mound is no longer proposed. Figure 3.3 shows the location of the proposed single mound and further detail is provided in section 3.1.2 of this report.

An additional windshear and turbulence assessment was undertaken following exhibition of the project (see section 6.3.2 of this report). The assessment included consideration of a single mound in accordance with the proposed refinement. In general, the results indicated that:

- One mound would influence turbulence slightly less than two mounds
- The mound would also have significantly less influence on turbulence than the existing containers located on the Tyne Container Services site, which would be removed as part of the project
- There is little difference in the average wind speeds required to exceed the turbulence criterion with and without the mound. The differences are within the margin of error of the modelling method, indicating that the mound would have little influence on turbulence along the northern approach to the main north–south runway.

Foreign Object Debris

In accordance with mitigation measure AQ12, a Construction Air Quality Management Plan will be prepared as part of the CEMP and implemented during construction. The plan will detail processes, responsibilities and measures to manage air quality and minimise the potential for impacts during construction.

To address potential risks arising from foreign object debris, Transport and the appointed construction contractor(s) would consider and minimise potential safety risks during detailed construction planning. The majority of the works in close proximity to the Sydney Airport Jet Base would occur on Sydney Airport land and would be subject to the provisions of the Airports Act. All works on Sydney Airport land require an airport lessee company consent from Sydney Airport Corporation and from the Airport Building Controller if works also require a building, works or demolition permits. Sydney Airport Corporation would include conditions in such consents to maintain the continued operation of the airport and protect the activities and interests of its tenants. This would include specific requirements relating to foreign object debris as required. Transport would comply with these conditions of consent.

Management of wildlife

A number of mitigation measures are proposed to ensure that the potential risk of wildlife strike is minimised during construction and operation. In accordance with mitigation measure AS4, all drainage and flood management infrastructure (including the flood mitigation basin) will be designed in accordance with Sydney Airport's Wildlife Management Plan to minimise the risk of attracting wildlife. Appropriate measures will be developed and implemented, including designing the infrastructure to ensure that water does not pond for more than five days (unless other suitable measures to minimise a the risk of attracting wildlife are in place).

Mitigation measures AS4 and AS5 commit to managing drainage and flood management infrastructure during construction and operation to minimise the risk of attracting wildlife.

In accordance with measure AS5, the urban design and landscape plan for the project will include consideration of appropriate landscape designs and species lists to minimise opportunities to attract wildlife at levels likely to present a hazard to aviation operations (or grow to such a height as to intrude into prescribed airspace). The plan will have regard to relevant requirements and species lists under Sydney Airport's Wildlife Management Plan and other relevant guidelines, including the National Airports Safeguarding Framework Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports (International Birdstrike Committee, 2006a) and Recommended Practices No. 1 – Standards for Aerodrome Bird/Wildlife Control (International Birdstrike Committee, 2006b).

Tempe Lands

Following construction, some of the land required to construct the project in Tempe (including land within Tempe Lands and other areas on the former Tempe landfill previously occupied by Tyne Container Services) would be handed back to Inner West Council. Subject to agreement with council, it is intended to return this land, incorporating the current uses, on a like-for-like basis. This includes the existing off-leash dog exercise area, car park, the grassed open space area and the existing areas of hardstand (repaired where damaged).

Council is developing a master plan to identify how this land could be used, which will consider council's Recreation Needs Study (see section 3.1.2). The future use of this land is outside the scope of the project.

6.1.2 Environmental management

Key environmental management issues for Sydney Airport

Issue

Key issues for Sydney Airport include:

- Management of contamination at the former Tempe Tip including the prevention of the migration of leachate onto Sydney Airport land
- Appropriate spoil management and storage, including nil transfer of spoil from State land to Sydney Airport land
- Management of surface water and groundwater to prevent migration of contamination, and disturbance to receiving environments
- Construction and operational noise management, particularly for Sydney Airport tenants and local residents, including hotels.

Response

The EIS/preliminary draft MDP assessed these matters in the following chapters:

- Chapter 10 – Noise and vibration
- Chapter 13 – Contamination and soils
- Chapter 15 – Groundwater
- Chapter 16 – Surface water.

Relevant mitigation measures were proposed, to ensure the appropriate management of contamination, spoil management, water quality and construction and operation noise during construction and operation.

Management of contamination, including migration of leachate

A number of specific management measures have been proposed to address the potential risk of contamination during works within the former Tempe landfill, including the potential for migration of leachate onto Sydney Airport land. These include mitigation measures CS3 (management of contaminated sites), CS20 (remediation of existing contamination), GW5 (managing leachate within the former Tempe landfill via development and implementation of a leachate management strategy) and GW6 (monitoring of construction impacts, which includes the potential migration of contamination due to groundwater extraction. These measures are in addition to a number of other measures, that will also limit the potential for contamination risks during the works, including the requirement for a Construction Soil and Water Management plan (mitigation measure CS9), a requirement to protect and ensure the continued operation of landfill management infrastructure (measure CS6) as well as other measures for spoil handling and containment (mitigation measures CS13 and CS17), management of acid sulfate soils (mitigation measure CS10), landfill gas (CS14) and management of previously unidentified contaminated material (mitigation measure CS18).

Spoil handling, storage and transfer

Section 8.2.5 of the EIS/preliminary draft MDP describes the process for moving spoil between State land and Sydney Airport land which was developed in consultation with Sydney Airport. Mitigation measures CS16 (works within Sydney Airport land, which includes any material imported and used within Sydney Airport land) and CS17 (stockpile management and handling) are also relevant to the issue raised.

Transport notes that constructing elevated sections of roadway within Sydney Airport land would require the importation of engineering fill. It is likely that the fill material would comprise suitable spoil from active tunnelling projects in Sydney. Transport would ensure that any spoil imported onto Sydney Airport land would comply with relevant regulatory requirements and would not increase the risk profile of the placement location from a contamination perspective. Importation of spoil onto Sydney Airport land for use as engineering fill would be subject to building activity approval in consultation with Sydney Airport Corporation and the Airport Building Controller.

Management of surface water and groundwater

Mitigation measure CS9 commits to preparing and implementing a Construction Soil and Water Management Plan in accordance with the requirements of *Managing Urban Stormwater – Soils and Construction*, Volume 1 (Landcom, 2004), Volume 2B Waste landfills (DECC, 2008a) and Volume 2D (DECC, 2008b) (the Blue Book). The Blue Book contains practical management measures to minimise pollution and is used as standard practice across all Transport projects.

In accordance with mitigation measure GW1, Transport would avoid the need to extract groundwater and minimise groundwater inflows and volumes into excavations wherever practicable with the aim of reducing the amount of groundwater that is extracted and requires management. However, as a result of the high water table across the project site and the presence of highly permeable deep soils, it is expected that high volumes of extracted groundwater would need to be managed during the early stages of construction. In addition, many of the measures that are routinely used to prevent groundwater ingress into excavations and avoid the need to dewater (such as sheet piling around deep excavations) are not practicable for this project. The EIS/preliminary draft MDP provides a methodology for establishing appropriate discharge criteria for extracted groundwater to ensure that it would not result in a material change in receiving water quality should it be discharged. As described in section 3.3.4 of this report, Transport has revised the preliminary discharge criteria taking into account additional baseline monitoring data collected over an 11 month period between April 2019 and February 2020. The revised criteria are provided in Appendix E. Transport would adopt this criteria for any extracted groundwater that is intended to be discharged to Alexandra Canal.

Construction and operational noise management

Potential noise impacts on Sydney Airport land are described in sections 10.4 to 10.6 of the EIS/preliminary draft MDP. The noise assessment predicts high to moderate noise and vibration impacts during construction for receivers such as hotels near Sydney Airport, the Qantas Flight Training Centre and commercial receivers. During operation, noise increases would result from increase in road traffic noise, the removal of several buildings along Qantas Drive, and the removal of containers located at the Tyne Container Services site, which currently provide shielding to off-site receivers.

To address these potential impacts, a number of mitigation measures are proposed. During construction the management of noise and vibration impacts will be addressed by implementing the Construction Noise and Vibration Management Plan (mitigation measure NV5). Operational noise mitigation performance will be documented by the Operational Noise and Vibration Review conducted within 12 months of the commencement of operation (mitigation measure NV16).

In accordance with mitigation measure SE3 (communications strategy during construction), tenants on Sydney Airport land would have a direct complaint mechanism through a 1800 number set up for the project or by contacting Sydney Airport Corporation.

6.1.3 Traffic management

Issue

Maintaining access to Sydney Airport

It is imperative that access to Sydney Airport be maintained at all times during construction. This includes:

- Maintaining existing capacity of Airport Drive
- Continuous monitoring and management of traffic conditions so issues or delays can be acted on immediately
- Construction planning and staging decisions must prioritise access to the airport, including pro-active management and mitigation of potential delays to passengers and commuters, including incentivisation and encouragement to use public rail transport.

Response

All construction activities that may affect arterial roads would be required to submit an application for road occupancy licences issued by the NSW Transport Management Centre, which is responsible for monitoring and managing traffic across the Sydney road network. Sydney Airport Corporation, as part of the Airport Precinct Infrastructure Coordination Operations Group, would be involved in this process for arterial roads on Sydney Airport land or in the vicinity of the airport.

Mitigation measure TT5 commits to preparing construction staging and temporary work plans to ensure access to Sydney Airport is maintained during operational hours. The plans would be developed in consultation with Sydney Airport Corporation. In accordance with mitigation measures TT1 and TT2 the Construction Traffic and Access Management Plan will include proposed road staging of construction works along Airport Drive, Qantas Drive and key accesses to Sydney Airport’s terminals, to ensure these key roads maintain satisfactory capacity.

In accordance with mitigation measure TT4, a travel demand management strategy will be prepared to provide:

- A comprehensive set of travel mode options to minimise use of roads affected by construction
- Communication strategies to reduce the number of people using the road network in the project study area during construction, where practicable.

6.1.4 Cumulative impacts

Assessing and managing cumulative impacts

Issue

The project will be delivered concurrently with a number of other projects in and around the airport precinct. Cumulative impacts must be properly assessed and managed in conjunction with Sydney Airport so risks to the effective operation of the airport are mitigated. This is of particular concern in relation to the Botany Rail Duplication project, to which we also made a submission to DPIE outlining our concerns about the impacts to Sydney Airport of that proposal.

Response

The EIS/preliminary draft MDP included assessment of the potential for cumulative traffic and transport impacts.

Section 9.5.1 of the EIS/preliminary draft MDP describes the potential for cumulative construction impacts to occur as a result of concurrent construction of the Botany Rail Duplication and Sydney Gateway road project. This would occur over the period of construction for the Botany Rail Duplication project (between 2021 and 2023).

The referenced travel time increases are only anticipated to occur during temporary closure of Robey Street or O'Riordan Street which is proposed by ARTC during construction of the proposed Botany Rail Duplication project. Works affecting Robey and O'Riordan streets would be co-ordinated to minimise delays and inconvenience to road users.

The specific potential cumulative impacts from construction of the Botany Rail Duplication and Sydney Gateway road project, and the appropriate actions required to reduce them, would be influenced by the detailed construction methodologies and schedules for both projects, which are not known at this time. In accordance with mitigation measure TT16, the potential for cumulative construction traffic impacts will be reviewed and coordinated with other projects, in consultation with relevant stakeholders. The review will include:

- Considering other projects with the potential to affect access and capacity, particularly in the vicinity of Terminals 2/3
- Detailed reviews of programs for traffic staging, lane and road closures for all projects
- Coordinating works and identifying efficient re-routing options during periods of road and lane closures.

Infrastructure construction projects in the Sydney Airport precinct, and their potential impacts on traffic, are coordinated through the Airport Precinct Infrastructure Coordination Operations Group. This group includes representatives from the Sydney Coordination Office, Transport Management Centre and Sydney Airport Corporation. Through this group, Sydney Airport Corporation is able to consider and advocate for the operational needs of the airport and its tenants.

6.2 Qantas (general)

6.2.1 Critical issues to Qantas’ operational capacity

Suggested conditions of consent

Issue

The listed issues in the EIS/preliminary draft MDP do not cover and understate the critical issues to Qantas' operational capability. Given the potential wider impacts the following measures should be implemented through the EIS and approval process for the SSIA/MDP:

- Condition of consent requiring SACL/Transport to engage directly with Qantas’ on our needs and requirements to ensure that the protection of Qantas' interests is given the highest priority at every level
- Condition of consent requiring SACL/Transport to protect Qantas’ operational capability at all times during construction and operation including but not limited to the acoustic framework as it relates to the existing and new Flight Training Centre dealt with under separate cover.

Response

The conditions of approval for the project on land subject to the EP&A Act are a matter for the Department of Planning, Infrastructure and Environment. The conditions of approval for the project on Sydney Airport land are a matter for the Department of Infrastructure, Transport, Regional Development and Communications as part of the MDP approval process.

Transport has consulted, and will continue to consult, with Qantas during the development of the project. Consultation undertaken to date has included:

- Introductory project briefing to understand needs and to develop mitigation measures to minimise traffic impacts
- Presentations at six Sydney Airport stakeholder forums
- Consultation in relation to the contents of the EIS/preliminary draft MDP
- Consultation during the assessment of potential noise and vibration impacts at the flight simulators and consequential development of the acoustic assessment framework.

Transport continues to work with Qantas to address issues raised during consultation, including:

- Potential impacts during construction, particularly increases in congestion creating potential delays for cabin crew and operations getting to, and moving between, Sydney Airport terminals
- Impacts to existing facilities along Qantas Drive and at the Qantas Flight Training Centre (see section 6.3)
- Changes to traffic conditions at Lancastrian Road.

Transport would continue to consult with Sydney Airport Corporation and relevant aviation regulatory authorities in relation to matters associated with the project that could affect aviation systems, activities and safety, to ensure that all relevant regulatory requirements are met. Transport recognises that Qantas is a key stakeholder in matters relating to aviation operations and safety. Transport and its contractors would liaise with Qantas on material aspects of the project that are of relevance and interest to Qantas, including aviation matters and Qantas’ operational capability, in accordance with the communications strategy for the project (required by mitigation measure SE3). Qantas can continue to discuss aviation matters with Sydney Airport Corporation and the relevant aviation regulatory authorities as required.

Potential impacts associated with the existing and future Qantas Flight Training Centres would be managed in accordance with mitigation measures NV8 and LU7. These measures have been amended (see below) to include reference to the new Qantas Flight Training Centre, which was approved by the Minister for Planning and Public Spaces on 29 November 2019.

In accordance with amended mitigation measure NV8, the acoustic framework for the existing Flight Training Centre, which has been agreed with Qantas, will be implemented during construction. A similar acoustic framework will be developed for the new Qantas Flight Training Centre (once constructed) to minimise potential impacts during construction of the project. The framework will be developed in consultation with Qantas and will include:

- Confirmation of building and simulator cabin acoustic performance and external to internal transfer functions for noise and vibration
- A process for setting external triggers levels for monitoring that are protective of the internal facility training functions from an acoustic perspective
- Monitoring requirements
- Communication protocols.

In accordance with amended mitigation measure LU7, consultation with Qantas will occur throughout construction planning and construction to minimise impacts on the existing Flight Training Centre until the relocation process is complete, and the new Flight Training Centre once it is operational.

In addition, mitigation measure SE4 provides for the business management plans to be prepared and implemented for businesses affected by the project. The plans will be developed on a case by case basis and will detail specific measures, developed in consultation with the business operator. These will include:

- Protocols to identify, in consultation with each affected business, feasible and reasonable measures to maintain vehicular and pedestrian access during business hours, and visibility of the business to potential customers during construction, including alternative arrangements for times when access and visibility cannot be maintained
- Measures to respond to identified impacts as far as possible.

Transport considers that the above measures adequately address Qantas' requirements, and no additional measures or specific conditions of consent are required.

6.2.2 Impacts to Qantas during construction

Impacts to flights during curfew hours

Issue

Some flights occur during curfew hours. There is limited information to understand how the works will be managed to ensure there is no restriction to Qantas' permitted operations during the curfew including:

- Qantas Freight movements
- International passenger movements during the curfew shoulder period (23:00-00:00 and 05:00-06:00)
- Aircraft movements where a Curfew Dispensation has been granted by the Federal Minister for Infrastructure, Transport and Regional Development.

Qantas is seeking clarity on the impact of construction to runway movements and if there will be any restrictions during curfew hours for the above operations.

A communication protocol is required as a mitigation measure to ensure construction does not prevent aircraft movements especially those that have been granted a dispensation during the curfew. We expect this matter will be assessed by CASA and request to be consulted during the process and informed of the outcome.

Response

As described in section 3.2.2 of the EIS/preliminary draft MDP, the Airports Act and the Airports (Protection of Airspace) Regulations 1996 (Cth) (the Airspace Regulations) provide for the definition and protection of the airspace at and around airports, which include the OLS and PANS-OPS. Any activity that intrudes into the prescribed airspace is a ‘controlled activity’. Controlled activities, which need to be approved under the Airports Act, include:

- Permanent structures (such as buildings) that intrude into the prescribed airspace
- Temporary structures or other objects (such as cranes) that intrude into the prescribed airspace
- Any activities causing intrusions into the prescribed airspace through glare from artificial light or reflected sunlight, air turbulence from stacks or vents, smoke, dust, steam or other gases or particulate matter.

The approval conditions for controlled activities typically require that they are carried out during airport curfew hours. The approvals also specify any other requirements relevant to the activity.

In accordance with the Airports Act and Airspace Regulations, the potential intrusions of the OLS that would during construction would, for the most part, be defined as short-term controlled activities (that is, activities occurring for less than three months). Sydney Airport Corporation is the delegate of the Secretary of DITRDC for the approval of short-term controlled activities. As described in section 3.2.2 of the EIS/preliminary draft MDP, long-term controlled activities (more than three months) within the OLS, require approval from the Secretary of DITRDC.

The Civil Aviation Safety Authority and Airservices Australia must be consulted in relation to all controlled activity applications. Where the application relates to a long-term controlled activity the local council must also be consulted. Works that would intrude into the prescribed airspace cannot commence until a controlled activity approval has been obtained. Controlled activity approval applications are considered on case by case basis.

For every controlled activity application, Sydney Airport Corporation would consider any dispensations in place in relation to flights during curfew hours and would ensure that any controlled activity approval is consistent with those dispensations. Sydney Airport Corporation would specify the allowable hours and any other requirements in an approval for the short-term controlled activity. Transport would carry out all intrusions in accordance with the approval conditions.

Potential impacts to aviation operations would be avoided by managing intrusions into the prescribed airspace during construction using this process. Existing communication arrangements between aviation operators, aviation regulatory authorities and Sydney Airport Corporation in relation to controlled activities would continue to apply.

Model of the Obstacle Limitation Surface (OLS) and High Intensity Approach Lighting (HIAL) protected surfaces

Issue

Qantas requests a copy of the 3D model be made available to consider and verify the potential intrusions.

Response

Copies of each of Sydney Airport’s prescribed airspace charts can be downloaded at: *https://www.sydneyairport.com.au/corporate/planning-and-projects/airspace-protection-tile* . The amended HIAL protected airspace surface is not yet part of Sydney Airport’s prescribed airspace, but will be by the time construction commences. Requests for a copy of the 3D model should be made directly to Sydney Airport Corporation.

Contingency planning for the use of cranes on the approach to Runway 16R

Issue

Qantas is seeking to understand what contingencies will be in place in the event that a crane or other such plant and equipment becomes 'stuck' in the elevated position. Qantas recommends that the following contingency plan is required:

- A pre-determined alternative aircraft landing zone (displaced threshold) for situations where the full length of runway is not available due to the project
- The ability to mark the temporary displaced threshold with 'v-bars' in accordance with MOS Part 139
- Provision of a temporary visual approach slope indicator (ie PAPI) to the displaced threshold.

We expect that CASA will seek to be involved in the creation of any contingency plans to ensure safety and compliance with all relevant regulation and legislation.

Response

Transport would consider the need for contingency measures in relation to controlled activities. Transport would work with the construction contractor(s) in consultation with Sydney Airport Corporation to develop appropriate contingency measures to manage unexpected events during controlled activities on a case-by-case basis. The conditions of the controlled activity approval would include any specific requirements regarding contingency measures for that activity. Transport would comply with all approval requirements.

Qantas' recommendations are noted and would be considered during the controlled activity application process in consultation with Sydney Airport and (where required) the Civil Aviation Safety Authority.

Protection of Communication and Navigational Aids

Issue

There is insufficient information to assess whether consultation with Airservices Australia (Airservices) has identified any major issues in relation to communication and navigational aids. Given Qantas is responsible for over 50 per cent of the air traffic at the Airport, Qantas should also be consulted to:

- Understand potential impacts on communication and navigation aids for its aircraft
- Ensure potential impacts will be managed and mitigated so as to not affect operations.

Arrangements with Airservices and Qantas should be agreed and consistent regarding impacts on and communications regarding navigation aids.

Response

Transport has consulted with Airservices during development of the concept design and preparation of the EIS/preliminary draft MDP. Airservices has raised no issues in relation to the project.

In accordance with mitigation measure AS8, Transport would refer the design to Airservices via Sydney Airport Corporation to confirm that there would be no impacts to navigation aids, communications or surveillance equipment. Airservices would consult with other aviation stakeholders as required when assessing the design. Any potential conflicts identified as part of this process would be addressed by Transport to ensure there is no impact to communication and navigational aids.

Construction management practices

Issue

Qantas requests clear and timely communication and consultation from Transport and SACL (Sydney Airport Corporation) on the staging of work, Method of Works Plans, Aeronautical Information Circular and Aeronautical Information Package Supplements where applicable, with a focus on impact to aviation operations.

The CEMP should include requirements about safety during high wind and to ensure works will not impact Qantas operations and staff. This includes managing wind generated dust from stockpiles/pits and the management of foreign object debris.

Response

Communication and consultation

Transport would continue to work with Sydney Airport Corporation and relevant aviation regulatory authorities, in relation to matters associated with the project that could affect aviation systems, activities and safety, to ensure that all relevant regulatory requirements are met. Transport recognises that Qantas is a key stakeholder in matters relating to aviation operations and safety. Transport and its contractors would liaise with Qantas on material aspects of the project that are of relevance and interest to Qantas, including aviation matters and Qantas' operational capability, in accordance with the communication strategy for the project (required by mitigation measure SE1). Qantas can continue to discuss aviation matters with Sydney Airport Corporation and the relevant aviation regulatory authorities as required.

Safety

As described in section 23.1.3 of the EIS/preliminary draft MDP, the assessment does not take into account potential health and safety risks to site workers associated with normal construction operations, as these are regulated by workplace health and safety legislation (including the *Work Health and Safety Act 2011*), and are not relevant to approval of the project under Division 5.2 of the EP&A Act or section 90 of the Airports Act. Site management would be the responsibility of the construction contractor(s), who would be required (under the *Work Health and Safety Act 2011* (NSW)) to manage the site in accordance with relevant regulatory requirements and take all necessary precautions in relation to the health and safety of the workforce.

Transport and the appointed construction contractor(s) would consider and minimise potential safety risks during detailed construction planning. This would include potential safety risks in adjacent areas, such as the Sydney Airport Jet Base, due to project activities. Activities proposed adjacent to the Jet Base would be subject to the building activity approval process under the Airports Act. Sydney Airport Corporation and the Airport Building Controller would consider potential safety risks and the proposed risk minimisation measures as part of that approval process.

Dust and foreign object debris

In accordance with mitigation measure AQ2, a Construction Air Quality Management Plan will be prepared as part of the CEMP and implemented during construction. The plan will detail processes, responsibilities and measures to manage air quality and minimise the potential for impacts during construction.

Table 27.7 in the EIS/preliminary draft MDP provides the objectives, purpose and requirements for the plan. It notes that the plan will be prepared in consultation with Sydney Airport Corporation and relevant government agencies, where relevant. It also notes that the plan will include measures to minimise project and cumulative dust generation from stockpiles, demolition activities, haulage routes, work activities, exposed ground surfaces and ancillary facilities. Example measures provided include stabilising exposed soil and stockpiles of loose materials, visual monitoring for excessive dust generation, dust suppression and ceasing activities with the potential to generate dust during unfavourable weather conditions. These measures are routinely implemented on construction sites to reduce dust generation and emissions.

The majority of construction activities in the vicinity of the Jet Base would occur immediately adjacent to Qantas Drive and Airport Drive. As the construction activities that would occur in these locations would be road widening, the area of exposed soils from which dust generation could occur would typically be relatively small. This would limit the potential for dust generation. Furthermore, dust would need to be controlled effectively in these locations to avoid traffic hazards on the immediately adjacent roadways. With the controls referred to above in place, it is highly unlikely that dust generation from construction would result in soiling of aircraft within the JetBase and additional cleaning costs.

In relation to foreign object debris, Transport and the appointed construction contractor(s) would consider and minimise potential safety risks during detailed construction planning. The majority of the works in close proximity to the Jet Base would occur on Sydney Airport land and would be subject to the provisions of the Airports Act. All works on Sydney Airport land require an airport lessee company consent from Sydney Airport Corporation and from the Airport Building Controller if works also require a building, works or demolition permits. Sydney Airport Corporation would include conditions in such consents to maintain the continued operation of the airport and protect the activities and interests of its tenants. This would include specific requirements relating to foreign object debris as required. Transport would comply with these conditions of consent.

6.2.3 Impacts to Qantas during operation

Windshear and turbulence

Issue

Qantas understands that the preferred location, heights, shapes, landscaping and future uses for the emplacement mounds would be subject to detailed design and consultation. It is requested that Qantas be consulted as a stakeholder for the purposes of developing the design and location of the mounds.

Modelling of the mounds/roadway should be considered against a 'clean' environment with no shipping containers, not against the already less than ideal situation with stacked shipping containers located adjacent to the approach path.

Response

In accordance with mitigation measure AS1 in the EIS/preliminary draft MDP, Transport has carried out a review and refinement process for the road infrastructure and final landforms (including the emplacement mounds) with the aim of reducing the potential influence of the project on windshear and turbulence along the approach to Runway 16R (the main north–south runway) to as low as reasonably practicable.

Transport carried out sensitivity analysis of various design elements using computer modelling (computational fluid dynamics) to understand the individual influence of each element on windshear and turbulence. Transport then refined the design to minimise potential windshear and turbulence influence.

Transport then carried out further wind tunnel testing on the revised design in accordance with the requirements of *National Airport Safeguarding Framework Guideline B: Managing the Risk of Building Generated Windshear and Turbulence at Airports* (see Appendix C). The results indicate that the project, and in particular the proposed emplacement mound at Tempe (see section 3.1.2 of this report), would have minimal influence on windshear and turbulence along the approach to Runway 16R (the main north–south runway). Transport notes that there are other matters for consideration in relation to the emplacement mound, including waste minimisation.

Transport carried out this optimisation and assessment process in consultation with Sydney Airport Corporation and appropriate aviation regulatory authorities, in accordance with mitigation measure AS1. Transport would continue to liaise with Sydney Airport Corporation and the relevant regulatory authorities as required during detailed design.

The additional modelling included assessment of existing and datum test configurations. The existing test configuration included containers at the Tyne Container Services site, which is reported to influence windshear and turbulence along the approach to Runway 16R. The containers were removed in the datum test configuration. Windshear and turbulence results from the proposed design, including the proposed emplacement mound, have been compared to the results for the datum test configuration to ensure that any influence of the project on windshear and turbulence along the approach to Runway 16R would be as low as reasonably practicable.

Transport has briefed Qantas, Civil Aviation Safety Authority and Airservices Australia regarding the additional windshear and turbulence design optimisation, assessment process and outcomes.

Crosswinds

Issue

Given that current aircraft have the capacity to operate at 40 knot crosswinds, the design of the project must not restrict future potential operating capacities. Proposals are being developed to increase the cross-wind tolerance above the 20 knot value. In addition, there are occasions where the cross-wind component is higher than 20 knots for both the main runway and the cross runway.

We are seeking clarification of whether these factors have been included in the assessment.

The project should not impose new limitations on the current and future operations of the airport. Any runway should continue to be able to operate to allow the maximum capabilities of all aircraft.

Response

Transport has assessed windshear and turbulence against the relevant criteria from *National Airport Safeguarding Framework Guideline B: Managing the Risk of Building Generated Windshear and Turbulence at Airports*. The assessment indicates that the project would have minimal impact on windshear and turbulence along the approach to Runway 16R compared to the ideal datum test configuration.

Transport recognises that crosswind component winds from certain key directions experienced at Sydney Airport can exceed 20 knots, and also that Runway 16R can remain the safest and most appropriate runway for landing aircraft under those conditions. However, *National Airport Safeguarding Framework Guideline B: Managing the Risk of Building Generated Windshear and Turbulence at Airport*s does not require an assessment against crosswind tolerance for an airport. Removing the containers and facilities at the Tyne Container Services site would decrease the limitations that exist today. The new infrastructure would have a minimal impact compared with the base case (no containers). Crosswind tolerances and potential future changes are a matter for the relevant aviation regulatory authorities and Sydney Airport Corporation.

Wind directions

Issue

Qantas has commissioned its own assessment of wind directions, which has determined that wind directions in the vicinity of the airport have changed in the past 12 months. It is requested that the modelling of turbulence and windshear be reviewed based on the findings of Qantas' assessment.

Response

The assessment of wind directions referred to by Qantas has not been made available to Transport. Transport has relied on guidance in *National Airport Safeguarding Framework Guideline B: Managing the Risk of Building Generated Windshear and Turbulence at Airports* regarding appropriate wind directions for windshear and turbulence assessment.

Transport has assessed windshear and turbulence in the nine wind directions, selected in accordance with *National Airport Safeguarding Framework Guideline B: Managing the Risk of Building Generated Windshear and Turbulence at Airports*. The guideline requires consideration of pure crosswinds and other wind directions at 22.5 degree intervals, rather than wind directions obtained via statistical analysis of recorded weather events. However, the assessment did include several wind directions from the south-west quadrant that are considered critical wind directions for Runway 16R due to their frequency, strength, variability and the specific operational requirements of Sydney Airport. This included an assessment of wind from 213 degrees, which is roughly equivalent to the 211 degree direction referred to in the submission, where the wind has the same angle of incidence to Runway 16R and Runway 07/25 (the east–west runway). The assessment indicated that the project would have minimal influence on windshear and turbulence along the approach to Runway 16R.

Further consideration of turbulence and windshear would be undertaken during development of the detailed design.

Distraction of pilots by headlights

Issue

The assessment states that a risk assessment by CASA and SACL is necessary to determine the required shielding to diffuse the headlight glare. This assessment is required prior to determination so that impacts and mitigation are quantified. Qantas requests a copy of this assessment to understand the potential risk for its pilots.

Response

The inclusion of shielding for headlight glare into the design would continue to be considered as part of the detailed design in accordance with mitigation measures AS6 and AS7. The design would ensure that any shielding meets the requirements of *National Airport Safeguarding Framework Guideline F: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports*.

Qantas would continue to be consulted on material aspects of the project that are of relevance and interest to Qantas in accordance with mitigation measure SE3.

6.2.4 Management of wildlife

Managing potential for bird strike

Issue

The project proposes to minimise wildlife attraction and potential incidents of bird strike through the implementation of measures as part of a CEMP. It is unclear based on the limited information available what these measures are and if they will be sufficient to avoid the risk of increasing bird strike to aircraft.

Response

A number of mitigation measures are proposed to ensure that the potential risk of wildlife strike is minimised during construction and operation. In accordance with mitigation measure AS4, all drainage and flood management infrastructure (including the flood mitigation basin) will be designed in accordance with Sydney Airport's Wildlife Management Plan to minimise the risk of attracting wildlife. Appropriate measures will be developed and implemented, including designing the infrastructure to ensure that water does not pond for more than five days (unless other suitable measures to minimise a the risk of attracting wildlife are in place).

Mitigation measures AS4 and AS5 commit to managing drainage and flood management infrastructure during construction and operation to minimise the risk of attracting wildlife.

In accordance with measure AS5, the urban design and landscape plan for the project will include consideration of appropriate landscape designs and species lists to minimise opportunities to attract wildlife at levels likely to present a hazard to aviation operations (or grow to such a height as to intrude into prescribed airspace). The plan will have regard to relevant requirements and species lists under Sydney Airport's Wildlife Management Plan and other relevant guidelines, including the *National Airports Safeguarding Framework Guideline C: Managing the Risk of Wildlife Strikes in the Vicinity of Airports* (International Birdstrike Committee, 2006a) and *Recommended Practices No. 1 – Standards for Aerodrome Bird/Wildlife Control* (International Birdstrike Committee, 2006b).

Displaced fauna and insects

Issue

The disruption to local flora and fauna may lead to displaced fauna and insects, such as wasps and microbats, finding new homes in pitot tubes of aircraft and other equipment. These potential impacts have not been addressed and suitable mitigation measures provided.

Response

The ecological surveys carried out to inform the EIS/preliminary draft MDP did not identify any important habitat for fauna, including microbats, in the vicinity of the Sydney Airport Jet Base. It is considered that there is a low risk that fauna disturbed and displaced during construction would impact on operations within the Jet Base and the airport more generally.

Transport would continue to consult with Qantas in accordance with the communications strategy for the project (mitigation measure SE3) and during the development of a business management plan (mitigation measure SE4). Measures to address the potential risks associated with fauna disturbance and displacement, and the measures required to manage them, would be discussed with Qantas as part of those processes.

6.2.5 Impacts to freight operations

Impacts on Qantas Freight

Issue

The following information is required:

- Defined turning circles for multi-combination and heavy-combination vehicles
- Details of weight and height limits that will apply to the new freight bridge over Alexandra Canal and confirmation if the freight terminal access will support B-double trucks
- Modelling to support peak hour demand for the freight terminal precinct and details as to how the new road network will support this demand
- The possible segregation of freight/heavy vehicles from passenger and other vehicles (such as dedicated lanes or transit lanes)
- Nine car spaces will be permanently removed following completion of the project. Ongoing consultation with Qantas is required to ensure that suitable replacement parking for employees and customers is made available.

Response

Turning circles

As described in section 7.2.2 of the EIS/preliminary draft MDP, the concept design has been (and the detailed design will be) prepared in accordance with all relevant standards and design requirements for roads and bridges, including:

- Austroads Guide to Road Design and other relevant publications
- Roads and Maritime supplements to Austroads
- Other Roads and Maritime specifications, standards, guidelines and technical directions
- Australian Standards
- National Airports Safeguarding Framework and Sydney Airport Corporation design standards.

Austroads Guide to Road Design Part 3 was used as the basis of the design, including the turning circles and dimensions for the design vehicles used.

The design would continue to be refined during detailed design in accordance with these requirements.

Weight and height limits of freight terminal access bridge

The freight terminal access bridge would be designed to ensure B-doubles (and smaller trucks) are able to use the bridge. The bridge has been designed to account for vehicles with a maximum height of 4.3 metres to ensure that impacts on prescribed airspace are minimised.

Modelling to support peak hour demand of the freight terminal precinct

Traffic modelling has been undertaken to assess the potential impacts of the project operating as a whole. It has been developed based on a combination of inputs from various landside and airside traffic data and forecasts, as well as input from key project stakeholders (refer Chapter 9 and Technical Working Paper 1 of the EIS/preliminary draft MDP).

Intersection performance in 2026 and 2036 (summarised in Figures 9.20 and 9.21 of the EIS/preliminary draft MDP) indicates that there would be a very slight deterioration in average delay at the Link Road intersection (by two seconds) in 2026 and a major improvement in the morning peak in 2036 (by greater than 40 seconds). In the afternoon peak, in 2036, the average delay at this intersection would deteriorate by two seconds.

Segregation of heavy vehicles

The project does not provide for segregation of heavy vehicles and light vehicles, and dedicated lanes for specific vehicle types are not proposed. As described above, the design of the project has been undertaken in accordance with all relevant standards, including consideration of appropriate lane widths and vehicle paths to reduce the risk of conflicts between heavy and light vehicles.

Need for replacement parking at Qantas Freight

There is an inconsistency between the Business Impact Assessment (Technical Working Paper 12) and Chapter 9 (Traffic, transport and access) in this regard. It is confirmed that the project has been designed to ensure there would be no loss in parking at the mail handling facility following completion of the project.

6.2.6 Impacts to Jet Base operations

Foreign object debris

Issue

The assessment has not considered the potential implications for operation and ongoing maintenance costs if dust, dirt or foreign object debris (FOD) settles on aircraft or the airports hardstand (tarmac) areas. Noting that this is the primary location worldwide where we are able to wash our aircraft.

Discuss in greater detail how FOD and dust will be managed and mitigated to ensure that they do not jeopardise operations at the airport.

Response

A response to this issue is provided in section 6.2.2.

The majority of the infrastructure in close proximity to the airport would occur on Sydney Airport land. Sydney Airport Corporation would include conditions in the airport lessee company consents required for these works to maintain the continued operation of the airport and protect the activities and interests of its tenants. This would include specific requirements relating to the management of foreign object debris during operation as required. Transport would comply with these conditions of consent.

Buildings to be demolished

Issue

Further details of the construction footprint surrounding the buildings to be demolished, including the location of the proposed shipping containers, are required to demonstrate that the project will not impact on aircraft movement areas or roads used to service operational aircraft by passenger access buses.

There is a technical error in the EIS – Building 167 is not vacant as it is currently used by Qantas Link. Any proposed change to Building 167 will require consultation between Qantas and Transport/SACL to agree on a suitable relocation plan and timeline.

Response

The impact assessment undertaken for the EIS/preliminary draft MDP is based on a concept design and preliminary construction methodology. The details of land tenure and timing associated with the proposed works are subject to discussion and agreement with Sydney Airport Corporation. In relation to the buildings proposed to be removed, Transport is considering these matters as part of the ongoing engagement with construction contractor(s) in light of any construction requirements for such removal. Transport is also working with Sydney Airport Corporation to provide minimum areas to avoid impacts on airport operational areas. At the current time, it is not anticipated there would be an impact on aircraft movement areas. The use of shipping containers (or other means) to reduce noise emanating from the airport following the removal of buildings is subject to discussions with Sydney Airport Corporation and relevant aviation regulators.

Transport acknowledges that Building 167 within the Sydney Airport Jet Base is currently used by Qantas Link and is not vacant as identified in section 19.3.3 of the EIS/preliminary draft MDP. Relocation of uses within this building would be undertaken by Qantas and/or Sydney Airport Corporation subject to a separate approval process.

Noise buffer

Issue

The Qantas buildings on the jet base that are proposed to be demolished provide a noise buffer so that the Qantas Link turboprops do not affect residents and other businesses in the surrounding area. If after demolition a replacement noise buffer is required, Qantas' and the airline community should not be expected to pay for this measure and it must be fit for purpose to protect both on and off airport users.

Response

The noise and vibration assessment (see Technical Working Paper 2 (Noise and Vibration)) assesses the potential impacts of ground-based airport activities as a result of the proposed removal of buildings within the Sydney Airport Jet Base. The results are summarised in section 10.5.2 of the EIS/preliminary draft MDP.

Transport will investigate reasonable and feasible options to reduce the potential impacts of ground-based airport activities on surrounding receivers due to the loss of acoustic screening provided by the buildings proposed for removal. This includes investigation of physical screening options or partial removal of Jet Base buildings affected by the project (in accordance with mitigation measure NV2).

It should be noted that the locations that would be most affected by increased noise from ground-based airport activities due to the removal of the buildings are located within the ANEF 25 contour. For any development that has occurred within this contour during the last 25 years, the development approvals for the buildings would have included a requirement to install noise insulation, with the aim being to reduce indoor sound levels to acceptable levels. This includes many of the hotels and serviced apartments, which are recent developments. The potential amenity impacts to sensitive receivers in these buildings due to increases in noise from ground-based airport activities would, therefore, be limited noting that not all buildings constructed before this timeframe may have noise insulation.

Reverberated noise

Issue

What impact will the shipping containers along Qantas Drive have in terms of noise reverberating off the containers into Qantas' aircraft hangers?

Response

Transport is currently investigating the potential use of solid structures, such as shipping containers, on the western side of Qantas Drive to provide acoustic screening to/from the Sydney Airport Jet Base after removal of the buildings. This option would be further developed during detailed design in consultation with relevant stakeholders.

Existing noise levels in the vicinity of the Jet Base are high and require the use of use of hearing protection to reduce noise exposure levels for personnel working in this area. The noise sources include aircraft taxiing, engine run-ups at the nearby testing areas, and other aircraft movements.

Reflected noise from future shielding structures is not considered to be significant contributor to noise levels inside the hangers. It is predicted to be comparable to the existing level of reflected noise from the buildings proposed for removal.

Apron lighting

Issue

Apron lighting is attached to a number of the buildings to be demolished. It is unclear where the new lighting will be installed to ensure regulatory requirements are met.

Response

No changes to existing apron lighting in the vicinity of, or attached to, buildings is proposed by the project. Where lighting is removed by the project, it would be replaced to maintain lighting levels in accordance with relevant standards and requirements.

6.2.7 Airport and business operations – financial costs to Qantas

Costs to Qantas

Issue

The project has the potential to result in a number of financial implications for Qantas. It is unreasonable if these costs are incurred by or imposed on Qantas. Further consultation is required to determine if any of these costs will arise and how Qantas will be compensated.

Response

Transport commits to implementing the mitigation measures, and undertaking the project in accordance with the conditions of approval, to address the identified impacts. The specific matters raised by Qantas in its submissions in relation to potential impacts of the project have been duly considered and addressed in sections 6.2 and 6.3.

It is NSW Government policy that monetary compensation not be paid for construction related impacts as these are temporary and need to be managed in accordance with the management measures identified for the individual projects.

Transport will continue to work with all potentially affected stakeholders to minimise business-related impacts by implementing the communications strategy (mitigation measure SE3) and business management plans (mitigation measure SE4) as relevant.

6.2.8 Traffic impacts

Benefits of the project

Issue

It should be demonstrated that the project will improve traffic conditions around the Airport and Ports, rather than cause them to deteriorate further.

The airline community must not be expected to fund ground transport problems that have not been considered by, and arise from, the project.

Response

Traffic modelling has been undertaken to assess the potential operational benefits and impacts of the project.

The operational traffic modelling considered changes that would occur in the years 2026 and 2036 with and without the project.

The project has been designed to provide high capacity, direct connections between Sydney Airport and the Sydney motorway network, to cater for predicted growth in travel demand to the airport and through traffic to Port Botany. Modelling indicates that the project would provide additional network capacity for up to 60,000 vehicle trips per day in 2036 and that more than half of this capacity would be airport-related. As a result, the road network is predicted to operate with substantially less congestion than it would have without the project being implemented. This would improve access to/from Sydney Airport, with improved travel times and reliability.

The forecast demand for the project would also attract traffic away from other local and arterial roads within the study area, resulting in lower traffic volumes on most roads compared with the volumes predicted without the project. Most of the predicted traffic demand would shift from O'Riordan Street and Botany Road in the Mascot town centre. It is predicted that these roads would carry between 25 to 30 per cent less traffic in 2036 than they would have without the project. As a result, the project would allow vehicles to bypass the surrounding road network, minimising traffic through Mascot and surrounding local roads. The project would also reduce traffic growth on the M5, General Holmes Drive, Southern Cross Drive, and forecast traffic growth along local roads, including in and around Mascot.

For freight traffic, the project would provide an alternative route for heavy vehicles accessing Sydney Airport's freight terminals, reducing the volume of heavy vehicles on Airport Drive. The project would also provide an alternative to the current route via Botany Road/General Holmes Drive through Mascot town centre. The new direct connection with the Sydney motorway network would provide improved access to Foreshore Road and Port Botany, and reduce the volume of heavy vehicles using Gardeners Road and Botany Road.

In accordance with mitigation measure TT17, a review of operational network performance will be undertaken 12 months and five years from the commencement of operation to confirm the operational traffic impacts on surrounding arterial roads and key intersections. The review will identify measures (as required) to address impacts on road network performance including in the vicinity of Sydney Airport.

In short, the project will facilitate access to Sydney Airport to the benefit of the key stakeholders at Sydney Airport.

Future development of Sydney Airport

Issue

The project must not limit the future development of the Airport, in particular the co-location of international and domestic operations and future terminal expansion. Similarly, the development of Qantas' freehold land must not be limited by the project.

Response

The project has been designed in consultation with Sydney Airport Corporation. The EIS/preliminary draft MDP includes an assessment of the project's consistency with the Sydney Airport master plan, with the results of this assessment provided in Chapter 3 and the chapters in Part B of the EIS/preliminary draft MDP. The assessments conclude that the project is consistent with the master plan, and would not restrict future development at Sydney Airport in accordance with the master plan.

The project does not directly affect land owned by Qantas.

Traffic modelling – travel times

Issue

It is difficult to reconcile the travel times under the different scenarios as they are referenced against the 2022 baseline and not the 2018 data. It is also difficult to reconcile level of service data for the different scenarios as they are spread across different tables. The EIS needs to be amended for clarity and consistency to ensure the actual impact is quantified and appropriate mitigation measures are proposed and conditioned.

Response

The 2022 baseline is considered appropriate for modelling construction traffic impacts as it reflects the forecast traffic demand and network performance at the time of construction. In addition, a number of other road infrastructure projects would be completed prior to and over a similar timeframe as the project, and are expected to generally improve traffic conditions. These projects include the New M5 (estimated completion December 2020), Airport North precinct upgrade project (estimated completion January 2021) and the Mascot intersection upgrades project (various throughout 2020 to January 2021).

The EIS/preliminary draft MDP has been prepared based on a reference design and indicative construction methodology, which is appropriate for assessment purposes. The construction contractor would prepare a detailed design and develop appropriate management plans (based on the development mitigation measures and any conditions of approval).

Traffic modelling

Issue

It is not clear what aviation growth assumptions were used for modelling. Did it assume that two million domestic passengers would relocate to Western Sydney Airport as per the Sydney Airport Master Plan?

Does the modelled traffic volumes assume co-location of international and domestic services has occurred?

Response

The traffic modelling described in Chapter 9 and Technical Working Paper 1 of the EIS/preliminary draft MDP considered passenger numbers based on development of the Western Sydney Airport. This was based on government growth predictions for both airports and the proportional shift in growth at Western Sydney International Airport upon opening.

Sydney Airport's co-location plans have evolved over time from co-location of services at Terminal 1 for Qantas to the current proposed co-location of services at Terminals 2/3. As the EIS/preliminary draft MDP is based on approved developments, the latest co-location plan has not been included in the traffic generation assumptions. However, a sensitivity analysis has been carried out to demonstrate that the design can accommodate this arrangement in principle.

Construction scheduling

Issue

Average weekday volumes were used. However, heavy traffic is also experienced on Sundays and fewer trains.

Construction scheduling should take this into consideration.

Response

Section 9.2.2 of the EIS/preliminary draft MDP acknowledges that traffic peaks associated with Sydney Airport operations are different to the general road network. Specifically, the airport traffic peak has the effect of extending the road network peak period. The traffic assessment was based on the road network peak hour with the highest traffic volume. While the traffic volumes are similar, analysis has confirmed that the weekday peak is slightly greater than on weekends.

In accordance with mitigation measure TT2, the Construction Traffic and Access Management Plan will include proposed road staging of construction works along Airport Drive, Qantas Drive and key accesses to Sydney Airport's terminals to ensure these key roads maintain satisfactory capacity and minimum levels of service.

Mitigation measure TT5 commits Transport to developing construction staging and temporary work plans with the aim of minimising conflict with the existing road network as far as possible. The proposed road staging plans and mitigation measures will be developed in consultation with the Airport Precinct Infrastructure Coordination Operations Group and the Traffic and Transport Liaison Group comprising representatives from Transport (various divisions), ARTC, the Transport Management Centre, Sydney Coordination Office, Sydney Airport Corporation, emergency services, and any contractors working in the vicinity of the airport.

The Transport Management Centre will have a key role to play and will be responsible for managing the capacity and functionality of various roads using the road occupancy license process. This process will include considering local peaks and shoulder periods related to different users on different parts of the road network. As part of the process, steps to minimise access disruption and delays will need to be implemented before any approval for works is granted, including undertaking works when traffic volumes are lower wherever possible.

Assumptions with the New M5

Issue

It is unclear what assumptions are being made with the use of the new M5 in 2020. What happens if this traffic shift doesn't occur?

Response

The New M5 is included in the construction and operational traffic modelling with an anticipated opening data of mid 2020. Traffic demands were extracted from the Strategic Motorway Planning Model. This traffic modelling approach has been adopted for all motorway projects in Sydney.

The forecasts from this model provide predictions for the shift of traffic expected for the medium to long term, noting that it is likely that a transition period would occur immediately after opening as drivers become accustomed to the upgraded road network.

As outlined above, ongoing monitoring and management of the local road network will be undertaken by the Transport Management Centre to respond to changes in traffic flows and to optimise the transport performance of the project and surrounding road network. The Transport Management Centre will issue road occupancy licences for works on arterial roads accordingly based on the traffic conditions that are present at the time.

In accordance with mitigation measure TT17, a review of operational network performance will be undertaken 12 months and five years from the commencement of operation to confirm the operational traffic impacts on surrounding arterial roads and key intersections. The review will identify measures (as required) to address impacts on road network performance. The results of the review will be considered in future operational network performance planning carried out by Transport.

Impacts to surrounding intersections

Issue

The project will negatively impact the operation of surrounding intersections (O'Riordan Street/Joyce Drive, Qantas Drive/Seventh Street, O'Riordan Street/Robey Street and O'Riordan Street/King Street) and does not propose to mitigate this impact. This would affect access to and from Qantas facilities and cause permanently longer travel distances and travel times for staff and vehicles.

The intersection of Coward Street/Bourke Street already provides safety issues for our staff and further traffic is likely to make things worse.

Measures should be provided to improve the operation of intersections.

Response

Travel distances for some journeys will be longer due to the changed traffic arrangements with the project. However, this is likely to be offset by predicted improvements in travel times along key routes. Section 9.4.3 of the EIS/preliminary draft MDP describes the potential impacts on intersection performance in the study area. This assessment compares the performance of the intersections noted in the issue, in 2026 and 2036, with and without the project.

In general, intersections within the study area are predicted to continue to operate a level of service of E or F during the morning and afternoon peaks in 2026. However, the project is predicted to substantially reduce the average delays at these intersections. The predicted reductions in traffic delay for the intersections in the morning and afternoon peaks are:

- O'Riordan Street/Joyce Drive – 129 seconds (morning peak) and 189 seconds (afternoon peak)
- Qantas Drive/Seventh Street – 129 seconds (morning peak) and 81 seconds (afternoon peak)
- O'Riordan Street/Robey Street – 73 seconds (morning peak) and 46 seconds (afternoon peak)
- O'Riordan Street/King Street – 99 seconds (morning peak) and 91 seconds (afternoon peak)
- Coward Street/Bourke Street – 152 seconds (morning peak) and 213 seconds (afternoon peak).

As a guide, the typical cycle time for traffic signals in the study area is 120 seconds (two minutes). Therefore, the modelling predicts a reduction in delay equivalent to about one traffic signal cycle at most of the intersections which is a notable improvement.

Additional improvement is predicted for the majority of intersections in 2036. This includes significant improvements at the Coward Street/Bourke Street intersection of 373 seconds and 276 seconds in the morning and afternoon peaks, respectively.

Based on the above results, operation of these intersections is predicted to improve with the project. Due to reduced congestion, these intersections would also be safer for pedestrians and cyclists.

The delivery of Sydney Gateway road project would be coordinated with Transport for NSW's wider infrastructure delivery program. This includes a number of programs, such as the Mascot intersection upgrade program, aimed at delivering a safe and reliable road network around Mascot. Further to this, operational network performance reviews would be carried out following the opening of the New M5 and the M4/M5 Link. Should these reviews identify the need for further traffic management measures on the transport network, a program would be developed to carry out such works. These works are likely to deliver benefits and relief to the network during and after the construction of the Sydney Gateway road project.

The project has been designed to maximise the performance of the overall road network and improve access to/from the Sydney Airport to cater for the forecast growth in passenger demand. However, the project alone cannot solve all congestion generated by excessive forecast traffic demand within the network. Transport will continue to work with Sydney Airport Corporation to optimise the performance of the road network in the vicinity of Sydney Airport.

Increased congestion during construction

Issue

Qantas is very concerned about the implications of increased travel times as a result of congestion during construction. Key issues include:

- Both employees and customers travel to the Airport prior to the terminal opening hours and therefore two vehicle lanes (in each direction) must be made available from at least 4am. Construction traffic must not overlap with the airport peak and commuter peak
- The majority of construction will be undertaken during curfew hours. However, Qantas' key operations are undertaken 24 hours a day seven days of the week, and the peak time for freight is in the lead up to the Airport curfew commencing
- Impact of increased traffic delays on Qantas employees that commute from the south, south-west and west of Sydney. Mitigation strategies will require careful consideration, discussion and approval from Qantas
- Restrictions on access and egress to Link Road (or alternative locations) will need to be considered for both customers and employees to ensure there is no adverse disruption to Qantas' freight operations
- Qantas requests a condition of consent requiring Transport and SACL to consult with relevant stakeholders, including Qantas, to ensure lane closures and restrictions to airport access are avoided during peak travel periods
- The EIS should be amended to identify opportunities for new public transport measures, such as new bus services, shuttle buses from Mascot Railway Station, and waiving the Sydney Airport station access fee to support increased train patronage.

Response

Airport and commuter peaks

Significant parts of the local road network are currently congested during peak periods. It is recognised that there is the potential for overlap with the morning airport peak period and arrival of the construction workforce. The main network morning peak is slightly later. The construction workforce typically leaves before the evening peak period for both the airport and the main network. The Transport Management Centre will take into account local peaks and shoulder peaks and coordinate with the construction contractor(s) in relation to scheduling of works that would affect traffic. All road works would be conducted in accordance with road occupancy licences granted by the Transport Management Centre.

Section 9.3.2 of the EIS/preliminary draft MDP describes the expected impacts on traffic, transport and access from construction of the project. Construction is expected to result in impacts on the road network due to the introduction of additional vehicles and as a result of direct impacts on roadways used to construct the project. The impacts identified in the assessment are based on an indicative construction methodology. Further refinement will be undertaken during detailed construction planning for the project by the construction contractor.

Construction traffic management measures will be detailed in the Construction Traffic and Access Management Plan to be developed prior to commencement of construction (mitigation measure TT1). The plan will include details of staging construction works along Airport Drive, Qantas Drive and other key accesses to Sydney Airport’s terminals to ensure these key roads maintain satisfactory capacity and minimum levels of service (mitigation measure TT2).

The Transport Management Centre will have a key role to play and will be responsible for managing the capacity and functionality of various roads using the road occupancy licence process. This process will include consideration of local peaks and shoulder periods related to different users on different parts of the road network, including the airport and commuter peaks. As part of the process, steps to minimise access disruption and delays will need to be implemented before any approval for works is granted, including undertaking works when traffic volumes are lower wherever possible.

Mitigation measure TT7 commits to modifying, where reasonable and feasible, work areas, activities and construction access arrangements to address any traffic flow issues identified by key stakeholders, including the Sydney Coordination Office, Sydney Airport Corporation and the Transport Management Centre.

Construction work during curfew hours

The majority of construction work would occur outside of Sydney Airport's curfew hours. Work during the curfew hours would be required at discrete locations and would occur at certain times throughout the construction phase. Works within the Qantas campus and in the vicinity of Airport Drive would be undertaken in accordance with construction staging plans and the Construction Traffic Access Management Plan approved by the Transport Management Centre, with consideration of overall traffic network performance. While traffic restrictions are in place to facilitate safe work on the roadways freight-related traffic movements to and from the airport, access to the airport, and in particular Link Road, would be maintained.

Works that require lane occupancy would be undertaken, where practicable, during periods of lower traffic volumes. This is likely to include the period leading up to the airport curfew. As noted above, these works would be undertaken in accordance with approved construction staging plans and the Traffic Access Management Plan and would take into account freight traffic requirements and various peak periods.

Impact of increased traffic delays on Qantas employees that commute from the south, south-west and west of Sydney

As noted above, section 9.3.2 of the EIS/preliminary draft MDP describes the expected impacts on traffic, transport and access from construction of the project during the morning and afternoon peak periods. A range of mitigation measures are proposed to minimise the potential for access related impacts (mitigation measures TT1 to TT10). While proposed management strategies that have the potential to affect Qantas' operations would be discussed with Qantas, Qantas would not have an approval role. Qantas would be consulted in accordance with the project's communication strategy (mitigation measure SE3) and as part of the development of a business management plan relevant to its operations (mitigation measure SE4).

Proposed transport and traffic arrangements during construction are described in section 8.6 of the EIS/preliminary draft MDP. The following principles would be followed to minimise the impact to the road network during construction:

- Construction vehicle movements would be scheduled to occur outside peak periods as far as practicable
- For works on Sydney Airport land, co-ordination would be led by the Airport Precinct Infrastructure Coordination Operations Group comprising representatives from Transport, Sydney Airport and the Transport Management Centre. All road works would be conducted in accordance with road occupancy licences, granted by the Transport Management Centre
- Modifications to the Lancastrian Road intersection with Qantas Drive would occur late in the construction program
- Two lanes would generally be maintained along Qantas Drive in each direction during airport operating hours when traffic volumes are higher
- Three lanes would be maintained in each direction at the Airport Drive and Link road intersection (mitigation measure TT6)
- Three lanes would be maintained into Terminals 2/3 at Sir Reginald Ansett Drive through to Keith Smith Avenue (mitigation measure TT6).

While there might be increases in travel times for Qantas employees that commute to the airport due to the project, the adoption of these principles would reduce the potential impact.

Restrictions on access and egress to Link Road

As noted in section 9.3.8 of the EIS/preliminary draft MDP, impacts on the flow of traffic into and out of Airport Drive/Link Road and the freight terminal adjacent to Terminal 1 are predicted. The results indicate that this intersection would operate with reduced capacity during some construction scenarios. However, this intersection is considered to have sufficient capacity during all scenarios. The detailed construction planning and road staging plans included in the Construction Traffic and Access Management Plan will provide measures to reduce the identified impacts, along with the business management plan (mitigation measure SE4).

Consultation with relevant stakeholders

Consultation with relevant stakeholders, including Qantas, will be ongoing during development of the detailed design and construction of the project in accordance with mitigation measure SE3. This would include consultation about upcoming works on the roadways and potential changes to traffic conditions as required. The conditions of approval for the project are a matter for the Department of Planning, Infrastructure and Environment.

New public transport measures

Identification of measures for new public transport options, and changes to the station access fee that apply to passengers using the Domestic Airport and International Airport stations on the T8 Airport and South Line, are outside of the scope of the project.

To encourage the use of the rail line for regular patrons, the station access fee was capped in 2014 for customers using the Domestic Airport or International Airport stations more than once a week. The current cap is $30.16 per week.

Transport's Sydney's Bus Future program will provide improved commuter bus access to Sydney Airport, with better east, west and south links. The program includes new bus routes and extra bus services to the airport. The program will introduce substantial improvements to bus travel times around the airport precinct.

The proposed ground transport interchange at Terminals 2/3, to be developed by Sydney Airport Corporation, will also provide direct and efficient access for vehicles and allow for an increase in the number of public transport services to and from Sydney Airport.

Transport's More Trains More Services program will continue to provide additional capacity to the rail system over the next ten years. Since 2017, the program has delivered more than 1,700 additional weekly services across the rail network. The next stages of the program will focus on delivering improvements for the T8 Airport and South lines.

Cumulative impacts from construction of Botany Rail Duplication

Issue

The cumulative impacts from the concurrent construction of the Botany Rail Duplication and project has not been adequately addressed.

Qantas requests that a condition of consent that SACL/Transport engage directly with Qantas during preparation of the traffic management strategy to ensure that the protection of Qantas' operation and interests are given the highest priority at every level.

Response

Section 9.5.1 of the EIS/preliminary draft MDP describes the potential for cumulative construction impacts to occur as a result of concurrent construction of the Botany Rail Duplication and Sydney Gateway road project. This would occur over the period of construction for the Botany Rail Duplication project ie between 2021 and 2023. No further road closures for either project are anticipated beyond these dates.

Mitigation measure TT16 is relevant to the management of cumulative impacts and the need for co-ordination. In accordance with this measure the potential for cumulative construction traffic impacts will be reviewed and coordinated with other projects, in consultation with relevant stakeholders. The review will include:

- Considering other projects with the potential to affect access and capacity, particularly in the vicinity of Terminals 2/3
- Detailed reviews of programs for traffic staging, lane and road closures for all projects
- Coordinating works and identifying efficient re-routing options during periods of road and lane closures.

The conditions of approval for the project are a matter for the Department of Planning, Infrastructure and Environment.

Construction projects in the airport precinct, and their potential impacts on traffic, are coordinated through the Airport Precinct Infrastructure Coordination Operations Group. The group includes representatives from the Sydney Coordination Office, Transport Management Centre and Sydney Airport Corporation. Sydney Airport Corporation is able to consider and advocate for the operational needs of the airport and its tenants and stakeholders, including Qantas, through the group. Transport would consult with Qantas during development of the detailed design and construction of the project (mitigation measure SE3) and through the business management plan process (mitigation measure SE4).

Access between Qantas' freehold land and the airport

Issue

Access from Qantas freehold land to the Airport must be maintained and the following must not be impacted:

The Qantas Catering Bridge

Confirm that there will be no impact to the existing operations of the Qantas Catering Bridge (including the pedestrian bridge).

Access from Qantas Drive at Lancastrian Road to Qantas' freehold land

Qantas requests further information and assessment of the impact that the changes to the Lancastrian Road/Qantas Drive intersection will have on broader traffic flow to/from the Qantas Mascot Campus, including SIDRA modelling.

The Qantas Drive/Lancastrian Road intersection is a critical access point used for crew transfers and must be maintained.

Qantas objects to the removal of the existing traffic signals at the intersection of Qantas Drive/Lancastrian Road as they are critical for facilitating time-critical operations that rely on efficient access to and from the Airport and Mascot Campus.

Response

The Qantas Catering Bridge

The project would not impact the Qantas Catering Bridge over Qantas Drive.

Access from Qantas Drive at Lancastrian Road to Qantas' freehold land

The project has been designed to maximise the performance of the overall road network and improve access to/from Sydney Airport to cater for the forecast growth in passenger demand. Traffic modelling demonstrates that removing the traffic signals at Lancastrian Road improves travel times along Qantas Drive, by providing a signal-free journey to/from Terminals 2/3 using the Sydney motorway network and the project. It also reduces delays at the Qantas Drive/O'Riordan Street and Qantas Drive/Robey Street intersections (refer to section 9.4.8 and Table 9.15 of EIS/preliminary draft MDP).

Traffic movements for vehicles entering Lancastrian Road from the east and exiting to the west (left-in, left-out movements) would be unchanged. However, travel distances would increase for vehicles accessing Lancastrian Road from the west or exiting to the east (right-in, right-out movements). As noted above, the increased travel distance is likely to be offset by predicted improvements in travel times resulting from reduced congestion.

The alternative route for vehicles approaching from the west would be via Qantas Drive (eastbound), Robey Street, O'Riordan Street and Qantas Drive (westbound). Vehicles exiting to the east from Lancastrian Road would need to use the Qantas Catering Bridge and exit via the northern campus.

Construction traffic management

Issue

There is the potential for closures to restrict access to the Jet Base and Qantas Catering Bridge.

How will the project ensure that all damage is repaired, especially roads that will be retained by the Airport, such as Qantas Drive/Airport Drive?

Qantas requests a condition of consent requiring SACL/Transport to engage directly with Qantas during the preparation of the traffic management strategy to ensure that the protection of Qantas' interests is given the highest priority at every level.

Response

Effect on access to the Sydney Airport Jet Base and Catering Bridge

Access to the Sydney Airport Jet Base and Qantas Catering Bridge would be maintained during construction. Mitigation measure TT11 commits to maintaining access to properties, including businesses (such as Qantas). In accordance with measure TT11, where disruption to access cannot be avoided, consultation will be undertaken with the owners and occupants of affected properties, to confirm their access requirements and to determine alternative arrangements. Construction works in this area would occur late in the construction program and Qantas would be advised well in advance to minimise disruption.

Damage to roads

All sections of Airport Drive and Qantas Drive that are to be used in the future would be reconstructed as part of the project and would thus be remade by the project in accordance with relevant guidelines and standards. Rectification measures would be implemented as needed during construction.

Engaging with Qantas

A response to this issue is provided in section 6.2.1.

Closure of Qantas Drive bus stops

Issue

Qantas objects to the proposed closure of the two bus stops near the intersection of Qantas Drive/ Lancastrian Road. There has been no assessment of the socio-economic profile of the patrons of those stops and the EIS fails to identify a suitable alternative. To remove them without understanding the implications may unreasonably impact vulnerable individuals who rely on them.

Response

Two indented bus stops on Qantas Drive near Lancastrian Road would be removed as part of the project. This is required to accommodate widening of Qantas Drive from two lanes to three lanes and improve the accessibility and traffic flow on Qantas Drive.

The provision of new indented bus stops was considered as part of the design. However, this not adopted as a result of the additional land take and direct impacts to the Botany rail line to the north and the Sydney Airport Jet Base to the south. Provision of kerbside bus stops was also considered but not adopted due to the potential for traffic disruptions.

A review of Opal ticket data indicates that these bus stops are infrequently used (less than 20 passengers using the stops daily). The bus stops currently serve staff accessing the Sydney Airport Jet Base or Qantas Mascot Campus, via Lancastrian Road bridge. The bus stops may also be infrequently used by people accessing the Stamford Hotel (along a sub-standard footpath connection on the north side of Qantas Drive).

Alternative public transport access to Qantas' Mascot campus, Sydney Airport Jet Base and Stamford Hotel is available by rail via Mascot or the Domestic Airport stations, or by bus along O'Riordan Street.

Active transport link

Issue

The active transport link should be extended to Mascot Station to encourage and facilitate an alternative mode of transport for commuters.

The project should include an active transport connection to the Terminals 2/3 precinct from Coward Street.

The opportunity to increase EOT facilities at the Airport for both staff and customers should be investigated.

Response

Extend active transport link to Mascot Station

This proposed connection is outside the project area and the scope of the project.

Active transport link from Coward Street to the Terminals 2/3 Precinct

An active transport link from Coward Street to the Terminals 2/3 precinct is outside the project area and the scope of the project. However, Transport recognises there is demand for an active transport link between the Alexandra Canal cycleway and the Terminals 2/3 precinct. The existing Alexandra Canal cycleway connects with the existing active transport route on Coward Street. Transport is working closely with Sydney Airport Corporation to explore options for active transport links that could be delivered.

Additional connections and facilities at Sydney Airport

Sydney Airport Corporation is committed to improving active transport infrastructure in both of the airport's terminal precincts.

A number of initiatives to improve active transport access and facilities have been implemented over the past six years, including the new footbridge and cycleway connection linking the external cycleway network to the Terminal 1 precinct (removing six vehicle conflict points), and provision of secure bicycle storage facilities and end-of-trip facilities. Additional infrastructure to support active transport has also been installed in the Terminals 2/3 precinct, with three metre wide shared paths extending into the precinct and enhanced crossing facilities at the precinct entry.

Sydney Airport Corporation envisages further improvements as part of the Five-Year Ground Transport Plan (which forms part of the *Sydney Airport Master Plan 2039*) and the approved T2/T3 Ground Transport

Solutions and Hotel Major Development Plan, details of which will be further developed and discussed with key stakeholders as the plans are implemented.

In accordance with mitigation measure TT18, Transport and Sydney Airport Corporation will prepare an active transport strategy to integrate and enhance accessibility opportunities. The strategy will be prepared in conjunction with relevant stakeholders and provide a guide for future active transport infrastructure provision.

Traffic assessment – attachment to submission

Colston Budd Rogers & Kafes Pty Ltd undertook a review of the project on behalf of Qantas and provided a number of comments. A response to the issues raised is provided below.

Issue

The removal of the traffic signals at Qantas Drive/Lancastrian Road, and the associated removal of the ability for traffic accessing the Qantas facilities to turn right to or from Lancastrian Road, will result in this traffic using the intersections of Qantas Drive/Robey Street, O'Riordan Street/Robey Street, O'Riordan Street/King Street and O'Riordan Street/Joyce Drive. This route involves increased travel distances and times for a significant number of vehicles.

It is also unclear whether the approved flight training centre has been considered in the traffic modelling undertaken for the Sydney Gateway road project.

There are significant traffic volumes, particularly during the morning peak, using the Qantas Drive/Lancastrian Road intersection to access the Qantas facilities. The transfer of this traffic to the other intersections noted above should be assessed, with any consequently required upgrades to these intersections included.

The EIS does not consider the traffic effects during construction on the operation of the intersection of O'Riordan Street/King Street.

The poor operation of these intersections would affect access to and from the Qantas facilities. As noted above, it would result in permanently longer travel distances and travel times for a significant number of vehicles associated with Qantas' operations.

Response

Proposed removal of traffic signals at Qantas Drive/Lancastrian Road

The removal of the signalised intersection (along with the right turn) is an essential element of the project to ensure that the broader network meets traffic performance requirements and that the project benefits are maximised. Although the travel distance for some traffic movements would be increased, this is likely to be offset by predicted improvements in travel time along key routes.

A response to issues raised in relation to alternative access routes is provided above.

Temporary access arrangements for Qantas employees and visitors will be considered in consultation with Sydney Airport Corporation and in accordance with mitigation measures TT7 and SE4.

Consideration of proposed Qantas flight training centre

The existing Qantas Flight Training Centre was included in the traffic modelling at its current location. The intersection upgrades included in the project, and other road upgrade projects already in planning or under construction (such as the Airport North Precinct upgrade), were assessed against the known development applications at the time the modelling work commenced (2018). These committed projects were also included in the strategic model assumptions for the wider traffic network presented in the EIS/preliminary draft MDP (see section 9.4).

As the traffic assessment and modelling for the project commenced in 2018, in advance of the approval process for the new Qantas Flight Training Centre, the modelling could not take into account future conditions with the new Flight Training Centre operating.

Transfer of traffic from Qantas Drive/Lancastrian Road intersection to other intersections

A response to issues raised in relation to alternative access routes is provided above.

As described in section 9.4.3 of the EIS/preliminary draft MDP, the project would reduce delays at a number of intersections within the vicinity of the project site, as a result of the transfer of traffic onto the project.

The delivery of the Sydney Gateway road project would be coordinated with Transport for NSW's wider infrastructure delivery program. This includes a number of programs, such as the Mascot intersection upgrade program, aimed at delivering a safe and reliable road network around Mascot. Further to this, operational network performance reviews would be carried out following the opening of the New M5 and the M4/M5 Link. Should these reviews identify the need for further traffic management measures on the transport network, a program would be developed to carry out such works. These works are likely to deliver benefits and relief to the network during and after the construction of the Sydney Gateway road project.

Potential construction traffic impacts at the O'Riordan Street/King Street intersection

Information concerning the performance of the O'Riordan Street/King Street intersection during operation was presented in the EIS/preliminary draft MDP. Potential impacts on intersection performance during construction would be managed in accordance with mitigation measure TT7.

The Transport Management Centre would have a key role to play and will be responsible for managing the capacity and functionality of various roads using the road occupancy licence process. As part of the process, steps to minimise access disruption and delays will need to be implemented before any approval for works is granted, including undertaking works when traffic volumes are lower wherever possible.

6.2.9 Noise and vibration impacts

Building vibration impacts

Issue

Qantas requests a condition of consent requiring SACL/Transport to undertake a dilapidation survey for all of Qantas buildings to ensure that any damage caused by construction works are repaired at the cost of the project.

Response

The conditions of approval for the project are a matter for the Department of Planning, Infrastructure and Environment.

In accordance with mitigation measure LU8, infrastructure condition surveys for structures and infrastructure at potential risk of damage due to the project will be undertaken prior to the commencement of potentially damaging activities in the vicinity of these structures and infrastructure. Rectification measures will be implemented as needed during construction to address any damage caused by the project. A final condition assessment will be carried out at the completion of construction detailing recommendations for any additional rectification required.

Any Qantas buildings located within the minimum vibration working distances would also be surveyed in accordance with NV14.

Human comfort vibration impacts

Issue

It is not clear what the true impact to Qantas' staff, particularly at the Jet Base and Mascot Campus, will be from the use of vibration intensive equipment. Further investigation on this issue is required together with mitigation measures.

Response

Vibration impacts during construction for the project are described in section 10.4.5 of the EIS/preliminary draft MDP. Figure 10.4 shows buildings located within the minimum working distances for vibration intensive construction equipment. Section 10.4.5 also provides a summary of the potential human comfort impacts and notes that occupants of affected buildings may be able to perceive vibration impacts at times when vibration intensive equipment is in use. However, it should be noted that the assessed impacts are based on a conceptual construction methodology. The final construction methodology adopted and equipment used by the contractor(s) may vary. Mitigation measure NV6 commits to preparing location and activity-specific noise and vibration impact assessments (based on the intended construction methodology) where there is a potential for relevant vibration criteria to be exceeded. Appropriate mitigation measures would be selected based on the predicted impacts and in accordance with *Construction Noise and Vibration Guideline* (Roads and Maritime, 2016), and would be implemented during the relevant activity.

Transport has consulted, and will continue to consult, with Qantas regarding the potential impacts on the existing Flight Training Centre located at the Sydney Airport Jet Base. An acoustic framework for minimising potential noise and vibration impacts for the existing centre has been agreed between Qantas and Transport. The framework defines how construction noise and vibration will be managed to minimise potential impacts at the existing training centre. The framework includes site-specific noise criteria for the various sensitive areas of the centre, monitoring requirements and procedures for notification in the event exceedances occur. In accordance with amended mitigation measure NV8, the potential for noise and vibration impacts on the existing Flight Training Centre will be managed in accordance with the acoustic framework that has been agreed with Qantas.

Relevant mitigation measures would be implemented to minimise the potential for vibration impacts, including potential impacts at the Jet Base and facilities in Mascot. These include preparing and implementing a Construction Noise and Vibration Management Plan (mitigation measure NV5), preparing location and activity specific noise and vibration impact assessments, and managing and monitoring potential vibration impacts (mitigation measures NV6 and NV12). Mitigation measures are provided in full in Chapter 11 of this report.

6.2.10 Contamination

Potential impacts on Qantas' operations

Issue

The Jetbase is listed as a contaminated site. To further understand the potential impacts Qantas highlights the following:

- The EIS relies on previous investigations as noted in TWP 5 - Contamination and Soils. These documents should be made available to the Qantas Group
- The EIS should be amended to include additional groundwater assessment Qantas requests a copy of this assessment

- It is unclear from the documentation how the conclusion that the project would not impede remediation of existing groundwater contamination beneath the Jet Base has been reached and what assurance has been placed on this
- The EIS should be amended to assess potential PFAS impacts and mitigation, and Qantas requests further details of where PFAS-contaminated fill may be re-used in relation to the project and a copy of the HERA once completed.

Response

Previous investigations and making documents available

Requests for copies of project information and documents relevant to Sydney Airport should be made to Sydney Airport Corporation.

Request for additional groundwater assessment

The existing investigation data and concept construction methodology is considered sufficient to inform the assessments undertaken for the EIS/preliminary draft MDP. Additional assessment and groundwater monitoring would be undertaken, based on the preferred construction methodology and detailed design, in accordance with mitigation measure CS1. Additional monitoring may also be conducted as part of any RAP(s) prepared in accordance with mitigation measure CS3.

Transport would provide the results of any additional groundwater investigations to Sydney Airport Corporation. Requests for the results of any additional groundwater investigations should be directed to Sydney Airport Corporation.

Remediation of existing groundwater contamination beneath the Sydney Airport Jet Base

Based on investigation results and monitoring data collated for this project, and the groundwater analysis presented in the EIS/preliminary draft MDP, groundwater capture zones for various work activities are relatively small and are presented in Figure 15.4 in the EIS/preliminary draft MDP.

Temporary groundwater drawdown during construction should not impede remediation beneath the Sydney Airport Jet Base as the Jet Base is located down gradient of the construction works. The project would extract contaminated groundwater as part of the dewatering strategy, which effectively removes some of the contamination. Once the excavation is complete, it is expected that groundwater levels would stabilise quickly.

In accordance with mitigation measure GW1, detailed design and construction will seek to minimise the need to extract groundwater and inflows into excavations. Any groundwater intercepted and extracted would be managed in accordance with the dewatering management strategy (mitigation measure GW4). Given the extent of capture zones indicated on Figure 15.4, any existing contamination which is extracted in groundwater from beneath the Jet Base would be managed in accordance with the agreed treatment and disposal methods outlined in the dewatering strategy.

Mitigation measure GW6 requires that the existing groundwater monitoring program is supplemented as required to monitor the potential migration of contaminants due to groundwater extraction (if it is a credible risk). The EIS/preliminary draft MDP notes that contaminant migration due to construction works is expected to be limited, and the proposed road infrastructure would not impede or alter hydrogeological conditions in the longer term.

Potential PFAS impacts and mitigation

Section 13.2.5 of the EIS/preliminary draft MDP provides a summary of the contamination status for the project area extending south of Alexandra Canal along Airport and Qantas Drive (Project Area 4). This summary is based on information from desktop sources, historic investigations and recent project investigations. Appendix J of Technical Working Paper 5 summarises the hotspots identified during the project investigations identifying contaminants of concern recorded above NEMP and AEPR criteria.

Appendix J, Table J-2 provides further details of the potential transport mechanisms and exposure pathways associated with the identified hotspots which include:

- PFAS in groundwater exceeded NEMP ecological and human health criteria (commercial/industrial) at location GW15s directly beneath project footprint
- PFAS in groundwater exceeded NEMP ecological and human health criteria (commercial/industrial) in Sydney Airport Jet Base (down-hydraulic gradient of the project site).

PFAS concentrations recorded in soil were below the NEMP ecological and human health criteria (commercial /industrial).

The opportunity for beneficial re-use of PFAS-contaminated fill would be determined during detailed design and in accordance with the conceptual site model. In accordance with mitigation measure CS19, if soil and/or water containing PFAS is proposed for reuse, the proposed reuse must not result in an unacceptable or increased risk to human health and/or the environment. A health and environmental risk assessment and consultation with the NSW EPA (and the Airport Environment Officer where the works are on Sydney Airport land) will be required before any reuse of PFAS contaminated soil and/or water.

It is noted that PFAS concentrations in Project Area 4 were recorded below the NEMP ecological and human health criteria (commercial /industrial) during the recent Transport investigations.

Mitigation measure CS19 commits to managing PFAS contaminated materials in accordance with the risk-based framework presented in the *PFAS National Environmental Management Plan* (HEPA, 2018).

6.3 Qantas flight training centre

6.3.1 Stakeholder consultation

Adequacy

Issue

The listed issues in the EIS/preliminary draft MDP do not cover and understate the critical issues to Qantas' operational capability, particularly potential noise and vibration impacts to the existing and new Qantas Flight Training Centres.

Without the project, Qantas would not be moving from the existing Flight Training Centre due to the latent economic value, ongoing functionality and strategic location.

Given the potential wider impacts should Qantas' operational capability be impacted, it is requested that the following measures be incorporated into any approval:

- A condition of consent requiring SACL/Transport to engage directly with Qantas on our needs and requirements, and also reflecting the previous consultation with the parties regarding noise and vibration so that the protection of Qantas' interests and operational requirements are given the highest priority at every level
- EIS/MDP be updated to reflect that Qantas is moving the Flight Training Centre as a direct result of the project, not for any other reason
- A condition of consent requiring SACL/Transport to protect Qantas' operational capability at all times during construction and operation, and the condition to identify mitigation measures to be implemented.

Response

A response to these issues is provided in section 6.2.1.

6.3.2 Noise and vibration

New Flight Training Centre

Issue

The new Flight Training Centre contains sensitive simulation equipment and classrooms and should be classified as a sensitive receiver for construction noise and vibration impacts. The internal criteria applied to the existing Flight Training Centre need to be explicitly conditioned.

An amended EIS should be prepared that identifies the new Flight Training Centre as a Sensitive Receiver and assess the impacts and mitigation measures.

Response

The noise and vibration assessment undertaken for the EIS/preliminary draft MDP did not include the new Qantas Flight Training Centre as a sensitive receiver. The new Flight Training Centre was approved by the Minister for Planning and Public Spaces on 29 November 2019, which was after the EIS/preliminary draft MDP was placed on public exhibition.

Supplementary noise and vibration assessments have been prepared following exhibition of the EIS/preliminary draft MDP. These included consideration of the potential impacts at the new Flight Training Centre (see Appendix B of this report).

Noise impacts

Issue

Qantas requests an amended EIS be prepared where:

- Both the existing and new Qantas Flight Training Centres are identified as sensitive receivers and new noise and vibration assessments are undertaken in consultation with Qantas
- Any approval granted contain explicit conditions that place maximum noise and vibration limits on the project that reflect the internal noise criteria outlined in Table 1 and 2 to protect Qantas' operational requirements specific to Flight Training
- Any approval granted for the project contains conditions requiring real time noise and vibration monitoring within and external to the existing and new Qantas Flight Training Centres
- Transport/SACL and their contractors are required to protect the existing and new Flight Training Centres' operational capacity at all times.

More information is to be provided to confirm the operational noise impacts from the completed project.

Response

New noise and vibration assessments

Transport recognises the sensitivity of the existing Qantas Flight Training Centre to noise and vibration from construction of the project. Accordingly, and consistent with mitigation measure NV5 in the EIS/Preliminary draft MDP, a detailed assessment of the existing Qantas Flight Training Centre has been completed in consultation with Qantas and Sydney Airport Corporation. The assessment included measuring the external to internal transmission loss of the building and investigating the likely noise and vibration impacts in the internal sensitive areas. On the basis of the assessment, a framework for managing potential acoustic impacts to the facility was developed and has been agreed to by both Qantas and Transport. The framework would be implemented during construction and mitigation measure (NV8) has been updated accordingly.

The additional noise and vibration assessment provided in Appendix B of this report includes an assessment of the potential impacts on the new Qantas Flight Training Centre. In relation to potential construction impacts, the assessment concludes:

- High noise impacts (greater than 20 dB above the prescribed noise management levels) are predicted during enabling works for peak construction periods occurring at the closest point to the facility. This is predicted during the use of noise intensive equipment, including rock breakers and concrete saws. Peak enabling work activities are expected to last around three months along Qantas Drive.
- Moderate noise impacts (11 to 20 dB above the noise management levels) are predicted for peak construction activities up to 100 metres from the facility. These would be associated with demolition activities and road works, which could occur for up to 18 and 12 months respectively.
- Minor noise impacts (up to 11 dB above the NMLs) are predicted at other times when works are about 300 metres away.

It is noted that the new Flight Training Centre is located adjacent to the Botany Rail Line and in a location that is already subject to relatively high existing noise levels. The worst-case noise levels and impacts would only be apparent for relatively short periods when noise intensive equipment is being used. There would also be periods when noise levels are lower than predicted and periods when no equipment is being used.

The assessment shows that the noise impacts in the ‘High’ category at the new Qantas Flight Training Centre are predicted only when noise intensive peak enabling works are undertaken nearby. The peak works involve noise intensive equipment such as rock breakers and/or concrete saws. When less noisy typical enabling works are being completed nearby, the impacts are predicted to be reduced to minor.

The impacts for the other scenarios when works are at their nearest location range between moderate and minor for the noisier works, and comply with the noise management levels for works that generate less noise or are located further away.

When works move away from the Flight Training Centre and are around 100 metres away, the worst-case impacts are predicted to be moderate during noise intensive works and minor during other activities. Scenarios which use quieter items of equipment are predicted to comply with the noise management levels.

For works that are around 300 metres away, the worst-case intensive works are predicted to be minor during noise-intensive works. All other scenarios are predicted to comply.

It is noted that the above predictions assume a 10 dB loss in noise levels from outside to inside, which is very conservative. The assessment carried out for the existing Flight Training Centre also suggests the assumed transmission loss is conservative. Further, consultation with Qantas has confirmed the sensitivity of activities that occur within flight training centres to noise and vibration. Given the sensitivity and the high levels of existing noise at the location from road, rail and aviation activities, it is expected that the new building will be well insulated. This would be mean that the predicted impacts as a result of nearby construction activities would be substantially less than reported above, and would potentially comply with relevant internal noise management levels for many of the scenarios. Mitigation measure NV8 has been updated to require an assessment of the acoustic performance of the new Flight Training Centre (once constructed) so that potential noise and vibration impacts on the new facility are minimised.

In relation to potential operation impacts, the assessment concludes that the predicted operational road traffic noise levels at the new Flight Training Centre are predicted to be 72 dBA during the daytime and 71 dBA during the night time in 2036. These noise levels exceed the requirements of the *Noise Mitigation Guideline* (Roads and Maritime, 2015a). The property is therefore eligible for consideration of additional noise mitigation as defined by the guidelines. Transport notes, however, that existing road traffic noise levels on Qantas Drive in the vicinity of the location of the new Flight Training Centre are currently 72 dBA during the daytime and 70 dBA during the night time (see Table 5 in Technical Working Paper 2 (Noise and Vibration) in the EIS/preliminary draft MDP).

Managing potential impacts

In accordance with amended mitigation measure NV8, the acoustic framework for the existing Flight Training Centre, which has been agreed with Qantas, will be implemented during construction. A similar acoustic framework will be developed for the new Qantas Flight Training Centre (once constructed) to minimise potential impacts during construction of the project. The framework will be developed in consultation with Qantas and will include:

- Confirmation of building and simulator cabin acoustic performance and external to internal transfer functions for noise and vibration
- A process for setting external triggers levels for monitoring that are protective of the internal facility training functions from an acoustic perspective
- Monitoring requirements
- Communication protocols.

Measure LU7 commits to consulting with Qantas throughout construction planning and construction to minimise impacts on the existing Flight Training Centre until the relocation process is complete, and the new Flight Training Centre once it is operational.

Commitments to managing the potential operational noise and vibration impacts of the project are defined by mitigation measures NV1, NV2 and NV16. These include commitments to developing and implementing an operational noise mitigation strategy as part of the design; identifying reasonable and feasible noise and vibration measures (including at-property treatments); and undertaking an Operational Noise and Vibration Review to assess operational noise mitigation performance and the need for additional management measures.

Construction vibration impacts

Issue

Given the potential for vibration during the construction phase to exceed CASA's regulatory requirements in relation to the operational requirements of the simulators, the requests outlined in Section 3.2.2 of this submission should be implemented.

Response

Transport is not aware of any specific regulatory requirements of the Civil Aviation Safety Authority in relation to potential noise and vibration levels and the operation of flight training facilities.

A detailed assessment of the existing Qantas Flight Training Centre has been completed. The assessment measured the external to internal transmission loss of the building and investigated the potential noise and vibration impacts to the internal sensitive areas.

As noted above, mitigation measure NV8 commits to implementing the acoustic framework for the existing Flight Training Centre, which has been agreed with Qantas, during construction. The framework includes site-specific criteria for the various sensitive areas of the centre, monitoring requirements and procedures for notification in the event exceedances occur.

A similar acoustic framework will be developed for the new Qantas Flight Training Centre (once constructed) to minimise potential impacts during construction of the project. The framework will be developed in consultation with Qantas.

6.3.3 Business impacts

Assessment rating

Issue

Qantas strongly disagrees with the classification of the magnitude of potential impacts as moderate and the statement: 'The business would be able to continue operation for a period of time while enabling work is underway, and, subject to planning approval, continue operations at the proposed new facility. The change would be clearly noticeable and affect a larger number of receptors. The magnitude of impact is moderate.'

The EIS understates the magnitude of potential business risk to Qantas a result of the project.

Response

Transport acknowledges Qantas' concerns and recognises that Qantas is a key stakeholder for the project. Transport and its contractors would liaise with Qantas on material aspects of the project that are of relevance and interest to Qantas, including Qantas' business and operational capability, in accordance with the communications strategy for the project (required by mitigation measure SE3).

Potential impacts associated with the existing and future Qantas Flight Training Centres would be managed in accordance with mitigation measures NV8 and LU7. These measures have been amended to include reference to the new Qantas Flight Training Centre. In accordance with measure LU7, consultation with Qantas will occur throughout construction planning and construction to minimise impacts on the existing Flight Training Centre until the relocation process is complete, and the new Flight Training Centre once it is operational.

In addition, mitigation measure SE4 provides for the business management plans to be prepared and implemented for businesses affected by the project. The plans will be developed on a case by case basis and will detail specific measures, developed in consultation with the business operator. These will include:

- Protocols to identify, in consultation with each affected business, feasible and reasonable measures to maintain vehicular and pedestrian access during business hours, and visibility of the business to potential customers during construction, including alternative arrangements for times when access and visibility cannot be maintained
- Measures to respond to identified impacts as far as possible.

6.3.4 Traffic and transport

Protection of Qantas Catering Bridge

Issue

Access to the bridge is critical to many of Qantas' operations. Need to provide an assessment of the impacts to the accessibility and useability of the bridge.

The EIS and social impacts assessment should be amended to assess and confirm that there will be no impact to the existing operations of the Qantas Catering Bridge (including the pedestrian bridge. It is requested that the following measures be implemented through the EIS and approval process for the SSIA/MDP to minimise any disruption to Qantas' operational capabilities:

- Condition of consent prohibiting Transport/SACL from undertaking any actions or works that would impact the accessibility and usability of the Qantas Catering Bridge, without prior written consent from Qantas to ensure that the protection of Qantas' interests is given the highest priority at every level.

Response

The project would not impact the Qantas Catering Bridge over Qantas Drive.

The conditions of approval for the project are a matter for the Department of Planning, Infrastructure and Environment.

Modifications to Lancastrian Road/Qantas Drive Intersection

Issue

Qantas objects to the removal of the existing traffic signals at the intersection of Qantas Drive/ Lancastrian Road as they are critical for facilitating timely access to the Flight Training Centre and for broader access and traffic movements across the precinct. The proposal should be amended or conditioned so that:

- The design is updated to retain the existing left in/ left out and right in/ right out access arrangement for the intersection of Qantas Drive/Lancastrian Road.

Response

Removing the traffic signals (along with the right turn) is an essential element of the project to ensure that the broader network meets traffic performance requirements and the project benefits are maximised.

Further information in relation to this issue is provided in section 6.2.8.

Construction traffic management

Issue

There is the potential for closures to restrict access to the existing Qantas Flight Training Centre, noting its 24-hour operation. Qantas requests the following measure be implemented through the EIS and approval process:

- Condition of consent requiring SACL/Transport to engage directly with Qantas during the preparation of the traffic management strategy to ensure that the protection of Qantas' interests is given the highest priority at every level.

Response

In accordance with the requirements of mitigation measure TT11, access to the Flight Training Centre will be maintained during construction. Where disruption to access cannot be avoided, Qantas will be consulted to determine alternative arrangements.

As noted above, potential impacts associated with the existing and future Qantas Flight Training Centres would also be managed in accordance with mitigation measures LU7 and SE4.

Recommended mitigation measures and conditions

Issue

Request an amended EIS to assess impacts and identify mitigation measures, and any approval granted for the project implement the recommended mitigation measures and conditions outlined in this submission.

Response

Responses to issues raised by Qantas have been addressed in this report, in sections 6.2 and 6.3. Preparing an amended EIS is not a requirement of the planning approval process under the EP&A Act.

6.4 Boral Australia

6.4.1 Traffic impacts during the construction stage

Impacts on Princes Highway and Canal Road access routes

Issue

The traffic impact assessment has not adequately assessed the likely traffic impacts during the construction stage, in particular for the Princes Highway and Canal Road access routes.

Additional traffic investigations are required, prior to any development approval being issued, to accurately identify the existing peak hour intersection traffic operations and any adverse construction stage traffic impacts on both the Princes Highway and Canal Road routes.

Response

Measurements of vehicle volumes were recorded at the Princes Highway/Canal Road intersection via traffic flow detectors over the period 3 to 7 February 2020.

The results show that peak traffic flows at this intersection occur between 8am and 9am on Thursday (5,711 vehicles per hour) and between 5pm and 6pm on Tuesday (6,127 vehicles per hour). This is consistent with the weekday peak periods used by the traffic, transport and access assessment.

The construction traffic assessment summarised in section 9.3.1 of the EIS/preliminary draft MDP indicates that traffic volumes on Canal Road could increase by up to 16 per cent in the morning peak and 29 per cent in the afternoon peak, in the westbound direction. These increases are considered manageable given the existing capacity and traffic volumes on these roads.

Impacts on traffic using site compound access points and Canal Road and Burrows Road intersections

Issue

The Princes Highway/Canal Road and Canal Road/Burrows Road/Ricketty Street intersections (and several other intersections in the Sydenham, St Peters and Mascot localities along the Princes Highway and Canal Road/Ricketty Street routes) already have heavily congested traffic conditions during the peak traffic hours on weekdays.

Traffic delays are likely to worsen significantly with the construction traffic and adversely impact on traffic operations for the existing Boral operations and other businesses within the St Peters area.

Further investigation is required, using a linked intersection model such as SIDRA, to identify the existing peak hour intersection traffic operations at the Princes Highway/Canal Road and Canal Road/Burrows Road/Ricketty Street intersections, and the effect of the proposed construction traffic for site compound access points A1, A2, A3, A7 and A8 when it attempts to travel through these intersections.

Detailed maps of additional peak hour intersection traffic movements, for both light and heavy vehicles, shall be required to be prepared by the proponent to clearly show the proposed additional peak hourly construction traffic movements from all the relevant construction compound access points (A1, A2, A3, A7 and A8) which may potentially adversely affect the future traffic operations at these intersections.

Response

Significant parts of the local road network are currently congested during peak periods. It is recognised that there is the potential for overlap with the morning airport peak period and arrival of the construction workforce. The main network morning peak is slightly later. The construction workforce typically leaves before the evening peak period for both the airport and the main network. The Transport Management Centre will take into account local peaks and shoulder peaks and coordinate with the construction contractor(s) in relation to scheduling of works that would affect traffic. All road works would be conducted in accordance with road occupancy licences granted by the Transport Management Centre.

The delivery of the Sydney Gateway road project would be coordinated with Transport for NSW's wider infrastructure delivery program. This includes a number of programs, such as the Mascot intersection upgrade program, aimed at delivering a safe and reliable road network around Mascot. Further to this, operational network performance reviews would be carried out following the opening of the New M5 and the M4/M5 Link. Should these reviews identify the need for further traffic management measures on the transport network, a program would be developed to carry out such works. These works are likely to deliver benefits and relief to the network during and after the construction of the Sydney Gateway road project.

A SIDRA analysis was undertaken to assess the impact of peak construction vehicle activity. The weekday morning peak (6 am – 7 am) and afternoon peak (6 pm to 7 pm) periods were modelled.

The analysis predicted levels of service at the Princes Highway/Canal Road and Burrows Road/Canal Road intersections ranging from level of service B or C for the morning peak period and level of service B or F for the afternoon peak period. Level of service F is predicted at the Princes Highway/Canal Road intersection in the afternoon peak period, reducing from level of service D under existing conditions.

The construction traffic assessment was based on an indicative construction methodology. Mitigation measure TT4 commits to preparing a travel demand strategy to minimise the use of roads affected by construction. The travel demand strategy would be based on the construction methodology proposed by the construction contractor. In accordance with mitigation measure TT7, where reasonable and feasible, work areas, activities and construction access arrangements will be modified to address any traffic flow issues identified by key stakeholders, including the Sydney Coordination Office, Sydney Airport Corporation and the Traffic Management Centre.

Transport will continue to consult with Boral during preparation of the detailed design and construction of the project in relation to matters of interest (mitigation measure SE3).

Traffic delays and impacts on Boral's operations

Issue

Detailed reporting of construction traffic impacts must be provided for Boral and other operating businesses within the St Peters area to fully understand the likely traffic impacts for their businesses.

Response

Section 9.3 of the EIS/preliminary draft MDP provides an analysis of the potential impacts on the road network, travel times and intersection performance during construction. The results of further traffic and access analysis is provided in the above response, together with the relevant mitigation measures.

Potential business impacts were assessed by the EIS/preliminary draft MDP. The assessment concluded that the potential for construction impacts on Boral's concrete facility at St Peters would be moderate to low. In accordance with mitigation measure SE4, business management plans would be prepared and implemented. The plan for Boral's operation would be developed in consultation with Boral and will include measures to respond to identified impacts as far as possible.

Transport will continue to consult with any businesses affected by the project, including in relation to traffic and access impacts, in accordance with the communication strategy developed for the project (mitigation measure SE3).

Managing delays and impacts

Issue

Provide assurances that all identified intersection and route delay traffic impacts will be adequately mitigated by identified intersection capacity improvements during construction and operation.

Likely traffic impacts from all relevant construction compound access points (A1, A2, A3, A7 and A8) on the future traffic operations of key intersections along the Princes Highway and Canal Road routes must be identified and appropriate traffic impact mitigation measures identified (such as re-phasing of the traffic signals at Burrows Road South and Canal Road, no queuing or parking of vehicles in Burrows Road).

Response

The results of the assessment undertaken for the EIS/preliminary draft MDP, together with the information presented in the above responses, indicates the predicted impact of construction traffic on the intersections at Princes Highway/Canal Road and Canal Road/Burrows Road.

The Transport Management Centre will have a key role to play and will be responsible for managing the capacity and functionality of various roads using the road occupancy licence process. This process will include consideration of local traffic peaks and shoulder periods related to different users on different parts of the road network. As part of the process, steps to minimise access disruption and delays will be implemented before any approval for works is granted, including undertaking works when traffic volumes are lower wherever possible.

The business management plan for Boral (mitigation measure SE4) will consider access arrangements during construction.

Traffic management plans

Issue

Boral seeks the opportunity to review and provide input to the construction traffic management plans to ensure that the forecast construction stage traffic impacts are adequately mitigated and do not adversely impact on traffic operations

Traffic impact mitigation measures to ensure acceptable project construction stage traffic operations at key intersections shall be specified in draft construction stage traffic management plans, which shall be made available for review by Boral and other existing businesses.

The traffic management plans should specify that all project construction traffic is prohibited from:

- Using the intersection of Burrows Road and Canal Road between the hours of 7-9am and 4-6pm in line with restrictions placed on the Boral St Peters site
- Traversing or using Boral's property between the above hours.

Response

In accordance with mitigation measure TT1, a Construction Traffic and Access Management Plan will be prepared prior to construction and implemented as part of the CEMP. The plan will detail processes and responsibilities to minimise traffic and access delays and disruptions, and identify and respond to changes in road safety during construction. The Construction Traffic and Access Management Plan will be prepared in consultation with the stakeholders identified in mitigation measure TT2. It would not be provided to Boral for review and input.

As noted above, the Transport Management Centre will have a key role to play and will be responsible for managing the capacity and functionality of various roads using the road occupancy licence process. Based on the conceptual construction methodology developed for the project, no impact on Boral’s current access arrangements is predicted.

As stated above, Transport will consult with Boral regarding their specific access requirements and traffic matters during the development of a business management plan (mitigation measure SE4). Transport and its contractors will liaise with Boral on material aspects of the project that are of relevance and interest, including operational and access requirements, in accordance with the communications strategy for the project (required by mitigation measure SE3).

Mitigation measure TT7 provides that, where reasonable and feasible, work areas, activities and construction access arrangements will be modified to address any traffic flow issues identified by key stakeholders.

The proposed arrangements for the movement of vehicles, haulage routes and hours of operations of construction traffic will be developed by the construction contractor and managed in accordance with mitigation measure TT5, which includes minimising movements of vehicles during peak periods.

6.4.2 Contamination

Effect of works on Boral's railway siding

Issue

The proponent is to clarify if any of the proposed investigation and remediation works are likely to affect the operations of the railway siding within the Boral site, and if so, the timing and methodology proposed for further investigation to identify potential impacts and mitigation measures to be implemented.

Boral seeks input to the planning and management of proposed investigations (and potential remediation) in the railway corridor.

Response

As described in section 8.2.5 of the EIS/preliminary draft MDP, works within the Botany Rail Line corridor would be undertaken during programmed rail closedown periods. Works would also occur outside of rail closedown periods subject to agreement of safety protocols with ARTC. The works would be undertaken in accordance with ARTC requirements. This would include any additional contamination investigations or remediation works required by mitigation measure CS1. During these times, rail access to the Boral siding would not be available.

Any proposed works which could affect the operation of Boral's rail siding would be discussed and documented as part of the business management plan (mitigation measure SE2). The nature of any further investigations and proposed location of works would be confirmed at this time.

Planning and management of proposed investigations on assessment area 3

Issue

Investigation and remediation work on assessment area 3 (AA3)may trigger a requirement for Boral to undertake investigations and/or remediation within the Boral site, with the potential to impact on operations and/or production. Boral seeks:

- Input to the planning and management of proposed investigations (and potential remediation) within AA3
- Assurances that the management plans for works on AA3 include adequate measures proposed for the safety of workers on the Boral site
- The opportunity to review and provide input to the management plans.

Response

Transport would consult with Boral in relation to proposed investigation and remediation work related to the project on land north of the Botany Rail Line corridor (assessment area 3) that has the potential to impact on its operations. This would include any additional contamination investigations, remediation works, monitoring required and measures relating to the health and safety of Boral employees.

It should be noted that remediation works would be restricted to the project footprint and would not be generally located within the Boral site. Boral will be consulted in relation to matters of relevance and importance to Boral in accordance with the communications strategy (see mitigation measure SE3). The management plans would not be provided to Boral for review and input.

Baseline contamination assessment

Issue

The proponent is to carry out a baseline contamination assessment and provide to Boral (and all underlying data) for consideration prior to approval of construction management plans or commencement of construction.

Response

Transport will consult with Boral in relation to proposed investigation and remediation work related to the project on land north of the Botany Rail Line corridor (assessment area 3) that has the potential to impact on its operations.

Dewatering and building impacts

Issue

Appropriate contamination and dewatering management measures are to be specified in construction management plans to prevent mobilisation and potential migration of contaminants and ensure appropriate disposal of extracted groundwater.

Dewatering may also cause impacts to infrastructure on the Boral site, for example, destabilisation or changes in sub-surface conditions (salinity, acidity, etc).

A dilapidation survey of structures, road and rail infrastructure within Boral's site is to be prepared (at the proponent's cost) and provided to Boral.

Response

Managing contaminant migration and appropriate disposal of extracted groundwater during construction

Mitigation measure CS9 commits to preparing a Construction Soil and Water Management Plan, which will include measures to manage the potential impacts associated with the presence of existing contamination.

The assessment of potential groundwater impacts in the EIS/preliminary draft MDP considered the potential for migration of contamination due to groundwater extraction by estimating capture zones around excavations that would intercept the groundwater table (refer to Table 5-1 in Technical Working Paper 7 – Groundwater). The assessment concluded that capture zones would typically be relatively small and that the risk of significant contamination migration as a result of groundwater extraction was low.

Mitigation measure GW4 requires development of a dewatering management strategy, including methods for the management of extracted water and treatment or disposal requirements.

A preliminary assessment of settlement induced by groundwater drawdown is presented in section 15.3.4 (Table 15.4) of the EIS/preliminary draft MDP. Mitigation measure GW2 commits to further modelling of settlement as part of detailed design in accordance with relevant guidelines, based on detailed geotechnical information obtained from the site investigations and the proposed construction approach. Should modelling identify any settlement issues, measures to reduce settlement will be confirmed.

Impacts to infrastructure and dilapidation surveys

In accordance with new mitigation measure LU8, condition surveys for structures and infrastructure at potential risk of damage due to construction of the project will be undertaken prior to commencement of potentially damaging activities in the vicinity of these structure and infrastructure. Rectification measures will be implemented during construction to address any damage caused by the project. A final condition assessment will be carried out at the completion of construction detailing recommendations for any additional rectification required. Transport will continue to consult with Boral in relation to infrastructure and building condition surveys.

Issue

The proponent (and contractors) would remediate any disturbance to any pre-existing contamination and contamination caused during the project.

Response

The approach to managing contamination on the project site is described in section 13.6.1 of the EIS/preliminary draft MDP. Areas of contamination identified by the assessment (described in Chapter 13 of the EIS/preliminary draft MDP) would be managed in accordance with remediation action plan(s) (RAP(s)) required by mitigation measure CS3.

There is extensive soil and groundwater contamination present in the study area associated with a long history of industrial land use. The extent of remediation would be limited to that required for the safe construction and operation of the project.

In accordance with mitigation measure CS18, the discovery of previously unidentified contaminated material will be managed in accordance with an unexpected contaminated finds procedure, as outlined in the *Guideline for the Management of Contamination* (Roads and Maritime, 2013a) and detailed in the CEMP.

6.4.3 Air quality

CEMP

Issue

Boral requests a construction environmental management plan (CEMP) be prepared and include management practices and monitoring locations that are clearly identified, with a construction monitoring location to be established in the vicinity of the Boral site.

Response

Mitigation measure EM1 commits to preparing a CEMP to detail the approach to environmental management during construction, as described in section 27.2 of the EIS/preliminary draft MDP and in accordance with the conditions of approval. As part of the CEMP, and in accordance with mitigation measure AQ2, a Construction Air Quality Management Plan will be prepared and implemented during construction.

The plan will detail processes, responsibilities and measures to manage air quality and minimise the potential for impacts during construction. The plan will include an air quality monitoring program, and will detail the measures that will be implemented to compare the actual performance of construction against the predicted performance. The plan will identify air quality monitoring sites and the selection of these sites will be based on obtaining a representative coverage for the project with consideration of where construction activities likely to result in significant dust emission would occur. Monitoring will be undertaken for the duration of construction.

Odour

Issue

Odour from the Gateway excavation construction activities may result in potential amenity impacts to employees at the Boral site. Boral requests a detailed section relating to odour management practices be contained within the CEMP.

Response

The odour assessment undertaken for the EIS/preliminary draft MDP did not predict the potential for odour at the Boral site above the adopted criterion of 2 odour units.

Commitments to managing odour from all potential odour sources are defined by a number of mitigation measures, including AQ2, AQ3, AQ4 and AQ5. In particular, measure AQ4 commits to developing an odour management strategy prior to construction, and implementing the strategy for the duration of works involving ground disturbance at the former Tempe landfill. In accordance with AQ4, contingency and rectification measures (eg use of deodorisers, aeration of leachate storage(s)) will be implemented should significant odour issues occur at sensitive receivers in the vicinity of the project site. The mitigation measures are provided in full in Chapter 11 of this report.

Boral would have the opportunity to report any odour issues during project delivery using the lines of communication established in accordance with the communications strategy (mitigation measure SE3).

6.4.4 Surface water and flooding

Drainage

Issue

Boral seeks assurances that overflows from the western portion of the Boral site can be connected to the proposed drainage system.

Response

Transport is aware of the issue identified. However, Transport has not received sufficient survey information to incorporate this detail into the concept drainage design. Further survey would be conducted during detailed design to investigate this issue and ensure a connection is provided.

Water use and stormwater harvesting

Issue

The Boral concrete plant is a major water user. There could be mutually beneficial opportunities for Gateway to provide water to Boral:

- During construction – to reduce controlled discharges from the Gateway project
- During operations – via a stormwater harvesting scheme.

A stormwater harvesting arrangement would have environmental benefits through reduced mains water use at the Boral site and lower project discharge volumes.

Boral requests that the proponent investigate potential stormwater harvesting options in consultation with Boral and relevant agencies.

Response

It is acknowledged that there may be opportunities for Boral to reuse stormwater generated by the project and that such mutually beneficial opportunities could be valuable in terms of achieving the targeted project sustainability rating (mitigation measure SU1) and actions within the sustainability management plan for the project (mitigation measure SU2). New mitigation measure SW9 commits to investigating options to reuse construction water, such as for dust suppression and irrigation of rehabilitated and landscaped areas, to minimise the volumes requiring discharge or disposal. Such options could also include third parties. It is noted that proposed water treatment facilities would be designed to treat construction water to a level suitable for release to receiving waters. Boral would need to determine whether the proposed level of treatment and resulting water quality would be satisfactory for its intended use(s).

Transport is open to the idea of harvesting and supplying stormwater from the proposed road infrastructure to Boral. However, the project has not been designed to facilitate stormwater harvesting during operation. Any future stormwater harvesting and supply proposals would be subject to appropriate assessment, including identifying and complying with all applicable legislative and regulatory requirements.

6.4.5 Emergency and pollution incident response

Compliance with Boral's plans

Issue

The proponent (and its contractors) are to comply with the provisions of Boral's Emergency Response Plan, Pollution Incident Response Management Plan and Access Management Plan.

Response

Transport is proposing to acquire an easement over Boral's access road located near to Alexandra Canal to facilitate construction. Transport would consult with Boral in relation to the development of appropriate emergency and pollution incident response plans in relation to any use of Boral land for the purposes of the project.

6.4.6 Damage

Damage to property

Issue

Any damage caused by the proponent or its contractors to Boral's property is to be rectified at the proponent's cost and to Boral's satisfaction.

Response

Any damage to Boral property as a result of construction would be rectified by Transport and/or its construction contractor.

Re-establishment of structures/improvements

Issue

Demolition and re-establishment of any Boral structures/improvements to facilitate the construction of the project is to be at the proponent's cost to Boral's satisfaction.

Response

As described in section 19.3 of the EIS/preliminary draft MDP, a small portion of land located at the north-western corner of the concrete batching plant would be required to construct a pier for the overhead roadway. This area is currently occupied by vehicle wash facilities. The amount of land required and construction access arrangements would be determined during detailed design and construction planning in consultation with Boral. This would include agreeing with Boral fair payment for the land acquired, and any compensation payable, in relation to the possible need to relocate the vehicle wash facilities at this location.

6.4.7 Services

Disruption to the provision of services

Issue

The proponent must commit to there being no disruption to the provision of services (including data and telephony) to Boral's operations.

Response

The concept construction methodology does not include any planned utility outages. Transport and the appointed construction contractor(s) would work with relevant utility services providers in relation to any proposed augmentation of utility infrastructure required to deliver the project, with the aim of maintaining continuity of service at all times. In accordance with mitigation measure HS2, a utility contingency management plan will be developed and will include measures to manage any unexpected utility service disruptions during construction.

6.4.8 Rail

Impacts to rail facilities

Issue

The proponent must commit to:

- No disruptions of any kind, except as agreed in writing with Boral, to Boral’s rail operations other than the four rail track possessions required by the Australian Rail Track Corporation
- No impact to rail signals or impediment to sight lines at any stage
- The rail corridor being kept free of hazards/obstacles at all times
- Not undertaking any works within 3.1 metres on the northern side or 3.5 metres on the southern side of the rail line centre
- Installation of a pedestrian access located approximately 10 metres from the end of the road deck pier on Boral's site that is nearest the rail line centre.

Response

As described in section 8.2.5 of the EIS/preliminary draft MDP, works with the potential to affect operation of the Botany Rail Line would be undertaken during predetermined rail closedown periods, during which the use of Boral’s siding would not be available. Works in the rail corridor might also occur outside of rail closedown periods subject to agreement with ARTC. The works would be undertaken in accordance with safety protocols and other requirements confirmed by ARTC.

Transport will consult with Boral in relation to construction works that may temporarily restrict access to Boral’s siding in accordance with the communications strategy (mitigation measure SE3).

Assessment of rail condition and alignment

Issue

An assessment of the rail condition and alignment is required prior to and after any works or heavy vehicle crossings are undertaken in the rail corridor.

Any impacts to or disturbance of the rail track on and adjoining Boral's land are to be rectified immediately at the proponent's cost.

Response

Transport and its construction contractor would consult with Boral prior to works affecting Boral's property. Any damage to Boral property during construction would be rectified by Transport and/or its construction contractor. In accordance with new mitigation measure LU8, condition surveys for structures and infrastructure at potential risk of damage due to construction of the project will be undertaken prior to the commencement of potentially damaging activities in the vicinity of the these structures and infrastructure.

6.4.9 General

Design requirements

Issue

Boral requires:

- All proposed Sydney Gateway infrastructure/assets are to be constructed at least 1.5 metres clear from Boral's current and approved structures
- Lighting is to be installed and maintained by the proponent (or its contractors) at its cost and to Boral's satisfaction under the elevated road bridge to ensure there is no impairment to the visibility for Boral's operations under the road bridge
- Anti-bird measures are to be installed and maintained by Transport at its cost and to Boral's satisfaction to prevent birds nesting and landing on the road structure.

Response

The Qantas Drive bridge has been designed to provide a minimum clearance of 1.5 metres from infrastructure associated with Boral's concrete plant.

The project would not directly impact existing lighting on Boral's land. As a result, no additional or compensatory lighting is required. The urban design and landscaping plan (required by mitigation measure LV1) would identify the need for additional lighting of structures, beyond that required by Transport and Austroads design standards, in consultation with relevant stakeholders.

The concept design of the Qantas Drive Bridge does not include measures to prevent the nesting and landing of birds on the bridge structure. Standard design practices commonly used on other road project would be implemented during the detailed design of the bridge structure.

6.4.10 Visual/safety

Design of road barriers

Issue

Limited details could be found in relation to the design of road barriers or screens along the road corridor in the vicinity of the Boral site. Clarification is sought on the design of the road barriers along the road corridor in the vicinity of the Boral site. Boral requests these barriers be solid and three metres high along the perimeter of the road bridge for safety and visual reasons and be constructed by Transport at its cost and to Boral's satisfaction.

Response

The Qantas Drive bridge would incorporate a typical roadside concrete barrier on each side of the carriageway with an anti-throw screen attached. The design of the anti-throw screen and proposed materials would be confirmed during detailed design, based on the urban design and landscape plan for the project and with consideration of potential aviation matters.

6.5 NSW Ports

6.5.1 Encroachment on NSW Ports lands

Impacts to the Cooks River Intermodal Terminal

Issue

To respond to the demands of the empty container supply chain, land availability at Cooks River is of vital importance. As such, NSW Ports stresses the need to minimise the amount of land that is resumed or sterilised to construct the project.

It is critical that the alignment of the project does not encroach on or sterilise any part of the Cooks River Intermodal Terminal site and alternate design solutions be finalised to avoid any disturbance to land or operation at the intermodal terminal.

If the project has development options that no longer traverses Cooks River Intermodal Terminal land, revised design plans should be presented. Further, NSW Ports will require the opportunity to review the revised plans for any adverse impacts which may result to the Cooks River Intermodal Terminal as a result of the road alignment.

Response

The original design for the St Peters interchange connection (described in section 7.5 of the EIS/preliminary draft MDP) encroached on the eastern boundary of the Cooks River Intermodal Terminal site. As described in section 3.1.1 of this report, the project design has been refined, and now does not affect the Cooks River Intermodal Terminal site.

In accordance with mitigation measure LU1, the design will continue to be refined to minimise land requirements and potential impacts on existing land uses and properties as far as possible. Consultation with landholders will be ongoing to identify opportunities to minimise impacts on onsite operations where practicable.

6.5.2 Canal Road access ramps

Importance of access ramps taking into account the role of the Cooks River Intermodal Terminal

Issue

Access ramps at Canal Road should be included in the design of Sydney Gateway. The inclusion of ramps at Canal Road would assist in servicing the Cooks River Intermodal Terminal which is a significant hub in the container logistics freight task and is NSW largest empty container storage facility. This will provide the Cooks River Intermodal Terminal with a more direct connection to Port Botany by road, allowing it to play an ongoing role in supporting Port operations.

Further, the ramps at Canal Road would remove truck movements and congestion from local roads, in particular Mascot Town Centre and ensure the Sydney Gateway project properly services Port Botany and the NSW freight task.

The Cooks River Intermodal Terminal acts as a satellite port gate. Efficient empty container return to the Cooks River Intermodal Terminal will be crucial following the removal of the Tyne Empty Container Park at St Peters. To achieve efficient empty container return following the removal of the Tyne ECP, access ramps at Canal Road combined with super-B-double access to and from Port Botany to Cooks River will be paramount.

The Sydney Gateway Road Project has to the opportunity to significantly improve the efficiency, connectivity and productivity of Greater Sydney freight task through the inclusion of ramps at Canal Road. It is advised that the proposal reconsiders the inclusion of the Canal Road ramps to the Sydney Gateway project. The business case for the inclusion of the Canal Road ramps must be assessed and finalised as a critical priority to maximise the success and efficiency of the road connectivity of the project for the NSW freight task.

Response

As part of project development, Transport considered the merits of providing access at Canal Road for vehicles and/or freight and determined that such a connection was not feasible. While such a connection does not form part of the project for which approval is sought, the design provides for such a connection, should it be required in the future.

Further information regarding the feasibility of a connection at Canal Road is provided in section 3.2.5.

6.5.3 Empty container park capacity

Empty container park strategy and addressing loss of capacity at Tyne

Issue

No solution has been put forward to date detailing how Sydney's empty container capacity will be compensated as a result of the resumption of land at St Peters which is considered a critical ECP site.

An empty container park strategy containing key solutions of how ECP capacity will be addressed is required, given the significance of ECPs and their role in supporting the key trade gateway of Port Botany. A feasible relocation solution for the Tyne ECP must be forthcoming and include flexible operation, noise and traffic allowances to reduce the magnitude of the impact of the resumption of this land for the project.

Response

Transport acknowledges the challenges that the freight industry faces in relation to the management and storage of empty containers. An assessment of the empty container sector in Sydney is provided in an appendix to Technical Working Paper 12 (Business Impact Assessment). Transport's Freight Industry Branch commissioned the NSW Empty Container Supply Chain Study in July 2019. The purpose of the study is to identify broader issues associated with managing empty containers, including impacts on the supply chain, and identify short and longer term initiatives to address these issues.

Further information in relation to this issue is provided in section 3.2.6 of this report.

6.5.4 Benefits to Port Botany

How the project will improve the level of service for Port Botany

Issue

NSW Ports recognises that the Sydney Gateway road project may result in some conceivable benefits for Port Botany, however information pertaining to how the project will improve the level of service for Port Botany has not yet been provided.

The Sydney Gateway proposal is a significant road project which will positively benefit the Sydney road network, however, the project could further enhance the NSW container freight task through the inclusion of on/off ramps at Canal Road, St Peters and reallocation of empty storage capacity.

Response

The *NSW Freight and Ports Plan 2018-2023* (Transport for NSW, 2018a) identifies the project as a committed initiative of the NSW Government to increase road freight capacity and improve safety and enhance connectivity to the freight precincts at Port Botany and Sydney Airport.

The project has been designed to provide high capacity, direct connections between Sydney Airport and the Sydney motorway network, to cater for predicted growth in travel demand to the airport and through traffic to Port Botany. Modelling indicates that the project would provide additional network capacity for up to 60,000 vehicle trips per day in 2036 and that more than half of this capacity would be airport-related. As a result, the road network is predicted to operate with substantially less congestion than it would have without the project being implemented. This would improve access to/from Sydney Airport and the Sydney Motorway network at St Peters interchange, with improved travel times and reliability.

The forecast demand for the project would also attract traffic away from other local and arterial roads within the study area, resulting in lower traffic volumes on most roads compared with the volumes predicted without the project. Most of the predicted traffic demand would shift from O’Riordan Street and Botany Road in Mascot town centre. It is predicted that these roads would carry between 25 to 30 per cent less traffic in 2036 than they would have without the project. As a result, the project would allow vehicles to bypass the surrounding road network, minimising traffic through Mascot and surrounding local roads. The project would also reduce traffic growth on the M5, General Holmes Drive, Southern Cross Drive, and forecast traffic growth along local roads, including in and around Mascot.

For freight traffic, the project would provide an alternative route for heavy vehicles accessing Sydney Airport’s freight terminals, reducing the volume of heavy vehicles on Airport Drive. The project would also provide an alternative to the current containerised freight route via Botany Road/General Holmes Drive through Mascot town centre. The new direct connection with the Sydney motorway network would provide improved access to Foreshore Road and Port Botany, and reduce the volume of heavy vehicles using Gardeners Road and Botany Road.

Section 9.4.2 of the EIS/preliminary draft MDP provides an operation travel time analysis of the project. The analysis demonstrates significant reductions in travel time that would improve access to Port Botany. Travel times between St Peters interchange and Foreshore Road would substantially reduce with predicted improvements of up to 17 minutes in 2026 and 20 minutes in 2036. The project would reduce demand for the existing route between Port Botany and the M5 East via Foreshore Road. Travel times along this route are predicted to improve marginally with an improvement of up to 2 minutes expected in 2026 and 2036.

Responses to issues raised in relation to the request for ramps from Canal Road to the project and the management of empty containers is provided in sections 3.2.5 and 3.2.6 respectively.

6.6 Qube Logistics

6.6.1 Background

Acquisition

Issue

In November 2019, RMS further advised Qube Logistics that it would now no longer acquire any land from CRIT with the exception of the land already surrendered as part of the SACL lease. This is after nearly 12 months of advising us there was no way the road could miss us. Despite this advice, the EIS still shows Gateway taking land up land and impinging upon CRIT.

Response

The original design for the St Peters interchange connection (described in section 7.5 of the EIS/preliminary draft MDP) encroached on the eastern boundary of the Cooks River Intermodal Terminal site. As described in section 3.1.1 of this report, the project design has been refined, and now does not directly affect the Cooks River Intermodal Terminal site.

Impacts on Cooks River Intermodal Terminal – rail loading/unloading

Issue

Running the roadway directly along the eastern boundary of CRIT will still have significant operational impacts to the site.

This includes most notably a direct impact to closing down any rail loading and unloading on the Eastern side of the terminal - currently the busiest part of the terminal - thereby decreasing the opportunities for rail within site unless there is a major capital investment to undertake expensive yard reconfiguration to upgrade other track and hardstand. This outcome is directly contrary to the NSW Ports Masterplan to grow capacity at CRIT to cater for growth in container volumes moved by rail.

Response

With the proposed design refinement described above, the project would not affect operation of the rail siding along the eastern side of the terminal.

Proposed rail turn out

Issue

Qube (and its predecessor Maritime Container Services) intended to develop a direct port rail turn out under the project to allow direct port shuttles to and from Port Botany.

This will not be able to be constructed until after the project is built, thereby substantially delaying the project. Accordingly, there is now a major risk that port rail volumes are simply transferred to road and that the terminal becomes a road only facility. Again, when combined with the withdrawal of the ramps, the negative environmental externalities of this combination of outcomes will simply be catastrophic to the local road network and community.

Response

A rail turn out from the Cooks River Intermodal Terminal to the Botany Rail Line is not within the approved funding scope of the project. However, in consultation with relevant stakeholders (including Qube Logistics), the project has been, and would continue to be, designed to not preclude the proposed rail turn out. Discussions between Qube Logistics and Transport will be undertaken to confirm the timing of the availability of the land required for the proposed turnout. The rail turnout would be subject to a separate planning approval and is not related to the project.

Measures to manage construction of the proposed turnout during construction of the project will be identified in consultation with Qube Logistics as planning for the turnout progresses.

Impacts on stacking capacity

Issue

The project will reduce the overall stacking capacity along the whole eastern side of the terminal. Boxes will have to be stacked single high across that area for safety reasons due to the proximity of the roadway. When combined with the loss of capacity at the Tynes St Peters ECP, there is a reduction of some 27 per cent of the total Sydney ECP market capacity.

Response

The project would not directly impact the area where empty containers are stacked within the Cooks River Intermodal Terminal. The stacking of empty containers along the eastern boundary of the Cooks River Intermodal Terminal is expected to occur in safe manner in accordance with all relevant laws including the operator's planning approval.

Impacts on empty container storage

Issue

Further analysis needs to be undertaken on the overall impact of the reduction in empty container park capacity across Sydney as a result of the project and the negative environmental impacts this will ultimately result in for the Port Botany supply chain.

Response

Transport acknowledges the challenges that the freight industry faces in relation to the management and storage of empty containers. An assessment of the empty container sector in Sydney is provided in an appendix of Technical Working Paper 12 (Business Impact Assessment). Transport's Freight Industry Branch commissioned the NSW Empty Container Supply Chain Study in July 2019. The purpose of the study is to identify broader issues associated with managing empty containers, including impacts on the supply chain, and identify short and longer term initiatives to address these issues.

Further information in relation to this issue is provided in section 3.2.6 of this report.

6.6.2 Heavy vehicle access ramps

Proposal to include direct access ramps

Issue

The previously proposed direct access ramps to and from Sydney Gateway to CRIT have been removed from the new roadway design forcing some 1,500 trucks a day, and growing, to continue to travel along now largely residential and already gridlocked streets to and from the port without any effective buffer.

When Qube acquired the MCS business, information provided by RMS was presented as part of the due diligence process which clearly illustrated direct access ramps to and from Sydney Gateway to CRIT. These have been subsequently removed by Roads and Maritime/Transport citing overall project cost concerns and a belief that if the ramps were open to passenger vehicles it would cause unmanageable congestion on Sydney Gateway.

Response

Transport recognises support from the freight industry, including from Qube Logistics, for direct access ramps from Canal Road to the project. Transport has consulted with industry in several forums in relation to this issue.

As part of project development, Transport considered the merits of providing access at Canal Road, for vehicles and/or freight, and determined that such a connection was not feasible. While such a connection does not form part of the project for which approval is sought, the design provides for such a connection, should it be required in the future.

Further information regarding the feasibility of a connection at Canal Road is provided in section 3.2.5.

Impacts of not including ramps, future freight growth

Issue

Making the ramps heavy vehicle only presents an opportunity to improve the efficiency of the Port empty container supply chain as a whole and make it more environmentally sound. This is especially so when the roads in Mascot are already heavily congested and regularly gridlocked.

Failure to have ramps connecting to Sydney Gateway will be a negative environmental impact that is felt by not just the industry as a whole. It will equally be felt by the local community and ultimately the entire NSW economy through the increased inefficiency of the Port Botany supply chain.

Any attempt to curtail or ban heavy vehicle movements in this area will further impinge upon the ability of the NSW logistics industry to service rapidly growing demand for freight and lead to increased negative environmental outcomes as heavy vehicles are forced to take sub optimum routes.

Response

As part of project development, Transport considered the merits of providing access at Canal Road including freight-only access. Further information regarding a connection at Canal Road is provided in section 3.2.5.

While such a connection does not form part of the project for which approval is sought, the design provides for such a connection, should it be required in the future.

There are no current initiatives by Transport to curtail heavy vehicle movements through Mascot.

6.6.3 Community and residential impacts

Conflicts with residents

Issue

Trucks traveling to Port Botany from CRIT do so utilising the initial part of the journey along Canal Road, Kent Street, Coward Street, Bourke Road and then O'Riordan Street in Mascot and the reverse route starting with Robey Street.

To continue to operate heavy vehicles along this route directly adjacent to housing units with no buffer will undoubtedly result in further conflict with residents. It may well lead to a ban on trucks accessing this route with strict curfews as the impact becomes impossible to manage and co-existence unworkable. This will have a cascading impact on the ability of Port Botany as a whole to operate efficiently 24/7 as is required to move the sheer future volume of total containers, unnecessarily delivering more pressure on the local road network to operate within restricted hours.

CRIT sees some 1,500 movements in and out of the Terminal on a daily basis today. The continued growth in container volumes referenced earlier means that heavy vehicle traffic volumes servicing CRIT and Port Botany will continue to increase substantially in future years.

Response

Together with the road works that are underway and recently complete in Mascot (described in the response in section 6.5.2 above and in more detail in section 5.1.4 of the EIS/preliminary draft MDP), the project would reduce congestion on the local road network in Mascot.

Traffic modelling carried out to assess the potential changes in traffic performance as a result of the project took into account population and employment projections, including land use developments, across the Greater Sydney area. The analysis found that the future road network with the project would operate with substantially less congestion and improved travel times than it would have without it.

The changes in traffic volumes on the road network due to the project in 2026 and 2036 highlight a decrease in vehicles along local roads in and around the Mascot Station and town centre precincts. This includes a decrease in total vehicles on Kent Road, Coward Street, Bourke Street, O'Riordan Street and Robey Street in 2036. As noted in the submissions, these roads are used by local traffic and freight vehicles travelling between Cooks River Intermodal Terminal and towards Port Botany.

As described in section 9.4.1 of the EIS/preliminary draft MDP, the forecast demand for the project would attract traffic away from local and arterial roads within the study area, resulting in lower traffic volumes on most roads compared with the volumes predicted without the project. Most of the predicted traffic demand would shift from O'Riordan Street and Botany Road in the Mascot town centre. It is predicted that these roads would carry between 25 to 30 per cent less traffic in 2036 than they would have without the project. As a result, the project would allow vehicles to bypass the surrounding road network, minimising traffic through Mascot and surrounding local roads. The project would also reduce forecast traffic growth along local roads, including in and around Mascot.

A supporting initiative is ARTC's proposed Botany Rail Duplication project, which would increase capacity and efficiency on the Botany Rail Line. This project would assist in meeting the long-term freight demands to Port Botany.

6.6.4 Improving road network productivity

High productivity vehicles

Issue

Higher Productivity Vehicles (HPVs) or Performance Based Standards 2B vehicles (PBS2B) have recently been approved to operate from CRIT to Port Botany and return.

The daytime route is particularly lengthy to go to the Port travelling a circuitous roundabout route and passing a large number of residential areas while the return route for both day and night similarly runs through congested and now largely residential Mascot roads with the same issues as previously described.

By installing ramps at Canal Road from Gateway capable of taking HPVs, the movement of these already significantly more efficient vehicles could be even further improved allowing them direct access to and from the Port day and night via Gateway for rapid continuous 24/7 running of empty returns.

Response

As described in section 6.6.3, the forecast demand for the project would attract traffic away from local and arterial roads within the study area, resulting in lower traffic volumes on most roads compared with the volumes predicted without the project.

The project would be designed to cater for higher productivity or performance based standards 2B vehicles.

As part of project development, Transport considered the merits of providing access at Canal Road for vehicles and/or freight and determined that such a connection was not feasible. While such a connection does not form part of the project for which approval is sought, the design provides for such a connection, should it be required in the future.

Further information regarding the feasibility of a connection at Canal Road is provided in section 3.2.5.

6.6.5 Direct rail turnout from Cooks River Intermodal Terminal

Provision for the proposed future rail connection to Port Botany and delays during construction

Issue

Qube proposes a direct rail turnout for trains to travel directly to and from Port Botany. If the NSW Government is truly committed to growing the mode share of rail to and from Port Botany, then it is absolutely critical that the Sydney Gateway concept design allows for this future rail connection.

There is no consideration by Transport to allow construction of the rail turn out during construction of the project. This means that such rail access is over six years away from actually being constructed (at a minimum).

Without a direct port rail turn out from CRIT, this investment and the overall port rail supply chain will be significantly impaired.

Response

A response to this issue is provided in section 6.6.1.

6.6.6 Sydney empty container park capacity

Empty container park capacity analysis

Issue

While the Gateway EIS documents recognise that additional ECP capacity will need to be created to replace that lost at Tynes St Peters, the assumption that additional capacity may be added at Enfield, Moorebank and St Marys in time is deeply flawed.

No international shipping line has agreed to store containers away from Port Botany and thereby not providing any commercial imperative for the dehire of containers in Western Sydney.

With the number of empty containers forecast to grow, shipping lines will therefore need to play an important role in reforming the way in which empty containers are managed.

Qube formally questions the credibility of the ECP analysis and supporting ECP technical report undertaken for the EIS and believes this needs to be reinvestigated properly by people with actual empty container park operational experience.

Response

The empty container analysis included in Appendix D of Technical Paper 12 (Business Impact Assessment) has been prepared by Neil Matthews, who is a recognised industry expert in supply chain analysis.

Transport acknowledges that the project will reduce the amount of local empty container storage and that there is a broader issue relating to the management and storage of empty containers in the Sydney region. In response, Transport's Freight Industry Branch commissioned the NSW Empty Container Supply Chain Study in July 2019. The purpose of the study is to identify broader issues associated with managing empty containers, including impacts on the supply chain, and identify short and longer term initiatives to address these issues. Transport is currently reviewing the draft report in response to industry comments with a view to finalising it in early 2020.

Further information is provided in section 3.2.6 of this report.

6.7 ARTC

General comments

Issue

ARTC was not invited to review the EIS during the adequacy review process by DPIE.

Response

The adequacy review process is organised by the Department of Planning, Industry and Environment.

Transport has provided ARTC with all reference design documentation during the development of the project. ARTC has been consulted during the project design development and assessment process, including ongoing meetings to support the interface of the Sydney Gateway road project and the Botany Rail Duplication. Consultation has included fortnightly meetings between senior members of both ARTC and Transport’s design and approvals teams.

Issue

ARTC's interest as a stakeholder is not well described in the EIS. ARTC would expect the project to thoughtfully consider impacts to ARTC's operations and business considering the scope of the project in and around ARTC's railway corridor.

Response

Transport recognises ARTC’s role as a key stakeholder, and will continue to consult with ARTC. The importance of ARTC’s role, operations and business will be key considerations during development of the detailed design and construction of the project, particularly in relation to works within the rail corridor. Works for the project will be designed to minimise impacts to ARTC’s operations and the rail corridor generally.

The final mitigation measures for the project (see Chapter 11 of this report) include specific requirements to consult with ARTC in relation to project:

- Mitigation measure NV16 commits to determining reasonable and feasible noise mitigation for receivers affected by both the Botany Rail Duplication and the Sydney Gateway road project in consultation with ARTC
- Mitigation measure HF6 commits to preparing the flood mitigation strategy in consultation with ARTC
- Mitigation measure TT5 commits to developing the proposed road staging plans and mitigation measures in conjunction with ARTC
- Mitigation measure TT16 commits to reviewing and coordinating the potential for cumulative construction traffic impacts in conjunction with ARTC.

In addition, to minimise the potential for impacts on ARTC operations and maintenance, Transport will:

- Utilise existing track possessions to undertake works that have the potential to affect the rail corridor
- Design the project elements with sufficient clearances to allow for both operations and future electrification
- Preserve the alignment for future rail sidings into the Cooks River Intermodal Terminal and Boral land
- Ensure that the function of existing rail services utilities including drainage, lighting, signalling and electrical supply is maintained
- Minimise the project footprint on rail land.

Consultation

Issue

ARTC is listed as a Group 3 stakeholder in the Section 4.1.3 of the EIS which includes peak bodies, local businesses, and interest groups. ARTC disagrees with this classification and requests it be treated as a Group 2 stakeholder (landowners, leaseholders, and utility companies directly impacted) to appropriately reflect its relationship to the project. It is noted that Appendix E- Community and Stakeholder Consultation Report of the EIS classifies ARTC as a Group 2 stakeholder (page 33).

Response

Agreed. The reference in section 4.1.3 of the EIS/preliminary draft MDP is incorrect and Transport considers ARTC to be a Group 2 stakeholder. The stakeholder classification does not affect Transport's commitment to proactively engage with ARTC during ongoing development of the project. The matters raised by ARTC are dealt with in this section of this report.

Issue

Consultation and collaboration with ARTC around key issues such as construction methodology, cumulative impacts, noise and traffic have not been addressed. ARTC requests that further detail on how these issues have been considered in EIS is provided.

Response

Transport has consulted with ARTC throughout the development of both projects, including regular meetings to discuss matters raised. The issues raised by ARTC have been considered during the preparation of EIS/preliminary draft MDP and supporting technical studies. Transport is happy to respond to specific issues or concerns raised by ARTC in relation to the assessments mentioned.

Traffic, transport and access

Issue

This section identifies that the proponent would co-ordinate with ARTC and the Botany Rail Duplication contractor, for works in the vicinity of Robey and O'Riordan streets to minimise the potential for cumulative impacts. ARTC supports this approach.

Response

Noted. This issue will form part of the ongoing engagement between Transport and ARTC.

As noted above, mitigation measure TT5 commits to developing the proposed road staging plans and mitigation measures in conjunction with ARTC. Mitigation measure TT16 commits to reviewing and coordinating the potential for cumulative construction traffic impacts in conjunction with ARTC.

Noise and vibration

Issue

This section identifies that RMS would ensure the construction contractor(s) for the Sydney Gateway Road Project consult with the contractors for the Botany Rail Duplication Project, to coordinate out of hours work and ensure appropriate respite is provided to affected receivers as far as possible. ARTC supports this approach.

Response

Noted. This issue will form part of the ongoing engagement between Transport and ARTC. In particular, new mitigation measure NV16 commits to determining reasonable and feasible noise mitigation for receivers affected by both the Botany Rail Duplication and the Sydney Gateway road project in consultation with ARTC.

Issue

Transport has committed to developing the Construction Traffic and Access Management Plan in consultation with ARTC. ARTC supports this approach.

Response

Transport commits to proactively engage with ARTC during ongoing detailed design and construction planning.

Noise impact

Issue

The current alignment of the noise attenuation structures does not run adjacent to the rail corridor. If the updated design changes this alignment, it is requested ARTC be directly consulted in relation to acoustic considerations from rail noise reflection.

Response

Transport would consult with ARTC in relation to any noise attenuation structures proposed as part of the project in the vicinity of the Botany Rail Line.

Light spill

Issue

Visibility of lights from the rail corridor (for train drivers) can impact operations, particularly for red or green lights similar to signals.

Where there is the potential for lighting including but not limited to headlights, brake lights, street lighting or visual messaging signs, to be visible from the train driver's cabins during rail operation, it is requested that ARTC be directly consulted on the design approach to manage potential impacts.

Response

Transport would consult with ARTC during development of the detailed design in relation to project lighting to avoid impacts from light spill on train operations.

6.8 Viva Energy Australia

6.8.1 Pipelines Act and Regulations / Workplace Health and Safety Regulations

Restrictions on construction near licensed pipelines

Issue

The Viva Energy Mascot Pipeline operates under licence No. 4 (Clyde to Mascot Pipeline). It should be noted that in the same easement is the Botany Bay to Clyde pipeline operating under licence No. 5.

The Pipelines Act contains a number of restrictions on building/construction activities on land adjacent to pipelines, digging near pipelines and does not allow the obstruction of pipeline operations.

In addition, the Work Health & Safety Regulation 2011, Division 9 part 389 (2) states: "The owner of a pipeline used to transfer hazardous chemicals must ensure, so far as reasonably practicable, that an activity, structure, equipment or substance that is not part of the pipeline does not affect the hazardous chemicals or the pipeline in a way that increases risk."

Response

Noted. These details would be considered during development of the detailed design and construction of the project. Table 8.13 of the EIS/preliminary draft MDP provides details of key utility treatment proposed during construction of the project. Sydney Airport fuel lines owned by Viva Energy and Caltex would be retained and protected. A cathodic protection point would need to be relocated. Transport would continue to consult with Viva Energy in relation to the project to avoid impacts to its assets.

6.8.2 Engineering design – proposed treatment

Proposed treatment of the Viva Energy pipelines

Issue

Within chapter 8 of the EIS, it is noted that the Viva Energy pipelines proposed treatment is to retain and protect. To date there has been no engineering design completed or presented to Viva Energy to consider, and accordingly Viva Energy would like to reiterate that the proposed treatment is only indicative and was proposed by RMS without involvement by Viva Energy. As a result, it is likely the construction footprint, time line and costs involved as described in the EIS will require review and amendment.

Response

Further detailed consideration of utilities would be undertaken during detailed design and construction planning for the project. Transport and its construction contractor would continue to engage with Viva Energy including details of measures to retain and protect its assets.

In accordance with mitigation measure LU4, the location of all utilities, services and other infrastructure will be identified prior to construction to determine requirements for access to, diversion, protection and/or support. This will include (as required), undertaking utilities investigations, including intrusive investigations, and consultation and agreement with service providers.

6.9 Kentucky Fried Chicken Pty Ltd

Impacts on the ability of passing trade to access KFC

Issue

KFC does not object to the proposed improvements to traffic circulation and travel times within the vicinity of the Sydney airport precinct, however wish to request DPIE consider the impacts of the proposal to the existing KFC operation at Sydney Airport, at 565 Ross Smith Avenue, Mascot.

Of particular note to the KFC is the proposed changes to traffic circulation and flow in and around the Ross Smith Avenue precinct. The lodged application contains no assessment of the predicted changes to the vehicular access to the Ross Smith Avenue precinct, nor does it propose any mitigation measures to ensure that customers will continue to have convenient and logical access to the KFC site.

The Sydney Gateway Road Project will impact the ability for passing trade to access KFC.

It is anticipated that the proposed traffic circulation changes will have a detrimental impact to the existing KFC, as it would significantly restrict the ability for passing trade to access the KFC.

KFC request that the proposal be amended to address the matters listed in the submission.

Response

The project has been designed to maximise the performance of the overall road network and improve access to/from Sydney Airport to cater for the forecast growth in passenger demand. Removing the right turn from Qantas Drive to Sir Reginald Ansett Drive has substantial benefits for the overall intersection performance in the future when traffic demand at this intersection would substantially increase. Providing the proposed Terminals 2/3 access and maintaining the right turn would not maximise the benefits of the project.

Two alternative routes are available to access Ross Smith Avenue eastbound on Qantas Drive – via Robey Street and O'Riordan Street or via the new right turn from Joyce Drive about 600 metres to the east of Sir Reginald Ansett Drive. Signage would be provided to inform drivers of these alternate routes. The travel time and distance increases associated with these alternate routes are considered minor.

The existing turning arrangements at Sir Reginald Ansett Drive offer limited opportunity for pass-by trade in an eastbound direction, as drivers would need to make the decision to access Ross Smith Avenue before they have sighted the premises. However, the recently provided right turn to the east of Sir Reginald Ansett Drive offers drivers the opportunity to access the Ross Smith Avenue precinct after drivers have driven past.

The predicted increases in traffic along Joyce Drive as a result of the project, combined with the new right turn from Joyce Drive, would increase the potential for passing trade at the KFC operation at Sydney Airport.

6.10 McDonald's Australia Pty Ltd

Impacts on the ability of passing trade to access McDonald's

Issue

McDonald's Australia does not object to the proposed improvements to traffic circulation and travel times within the vicinity of the Sydney airport precinct, however wish to request DPIE consider the impacts of the proposal to the existing McDonald's operation at Sydney Airport, at 9 Ross Smith Avenue, Mascot.

Of particular note to McDonald's is the proposed changes to traffic circulation and flow in and around the Ross Smith Avenue precinct. The lodged application contains no assessment of the predicted changes to the vehicular access to the Ross Smith Avenue precinct, nor does it propose any mitigation measures to ensure that customers will continue to have convenient and logical access to the McDonald's site.

The Sydney Gateway Road Project will impact the ability for passing trade to access McDonald's.

It is anticipated that the proposed traffic circulation changes will have a detrimental impact to the existing McDonald's, as it would significantly restrict the ability for passing trade to access the McDonald's.

McDonald's requests that the proposal be amended to address the matters listed in the submission.

Response

Given McDonalds is accessed from Ross Smith Avenue about 130 metres east of KFC, the issue is the same as identified by KFC. A response to this issue is provided in section 6.9.

6.11 Tyne Container Services

6.11.1 Impacts on business

Impacts on business and no alternative suitable site

Issue

The acquisition of the Tempe site will result in the closure of the Tempe business as there is no alternative site close to Port Botany available for Tyne to relocate to.

The closure of the Tempe site will result in a substantial reduction in Tyne's business activity resulting in approximately 14 employees to become redundant. Tyne's other sites at Punchbowl and Molineux Point are running at capacity and it will not be possible to redeploy all staff to the other sites.

Response

Transport recognises the limited industrial land available near Port Botany that can readily accommodate empty container storage. This issue was also acknowledged in the report on the empty container sector contained in Appendix D of Technical Working Paper 12 (Business Impact Assessment) of the EIS/preliminary draft MDP.

Potential impacts associated with the closure of the business were assessed in section 6.1 of Technical Working Paper 12 and summarised in Chapter 20 of the EIS/preliminary draft MDP. The assessment considered a worst-case scenario based the business being unable to relocate, including the loss of employment. Potential impacts on employees associated with the loss of employment are assessed in section 6.1.3 of Technical Working Paper 11 (Socio-economic Impact Assessment).

6.11.2 Empty container park shortage

Empty container park shortages and flow on effects if Tyne is closed

Issue

Tyne is concerned about the flow on effects that will come about from the closure of the Tempe site, as the Sydney Gateway Project will result in the loss of about 25% of Sydney's empty container park supply. It may contribute to further monopolisation of the storage of empty container parks resulting ultimately in higher prices. Whilst the improvement of the road network is welcomed, it is regrettable that the project has been designed in a way which will extinguish the smaller player in this industry, benefiting the larger corporates.

The shortage of container storage areas is broader than the Ports district alone. Tyne sub-leases part of its Punchbowl site to a third party (ANL Container Hire and Sales Pty Ltd). ANL has indicated that they have no alternative site to relocate to, which highlights the land shortage faced by the industry.

Response

Transport acknowledges the challenges that the freight industry faces in relation to the management and storage of empty containers. Assessment of the empty container sector in Sydney was provided in Technical Working Paper 12 (Business Impact Assessment) as part of the EIS/preliminary draft MDP. The assessment notes that since 2017, trade imbalances and the drought have caused a substantial build-up of empty containers in Sydney with empty container parks reported to be 85 to 95 per cent of capacity and overflow storage of empty containers at more than 20 transport depots.

The assessment noted that the empty container park sector has reached a critical situation where growth in the empty container task has exhausted the available capacity of existing empty container parks in Sydney. The closure of Tyne Container Services empty container park at Tempe would exacerbate current issues associated with empty container capacity to a degree. There is a lack of available industrial land close to Port Botany onto which the business could relocate. However, the assessment also noted there are underlying challenges facing the sector that also need to be addressed irrespective of the project.

New intermodal terminals, that are currently being delivered, and changes in mode share towards rail would eventually address capacity constraints faced by the industry in general. However, there are operational and commercial changes required across the sector to facilitate these changes.

Recognising the challenges currently facing the empty container supply chain in Sydney, Transport's Freight Industry Branch commissioned the *NSW Empty Container Supply Chain Study* in July 2019. The study considers the potential loss of empty container storage capacity if Tyne Container Services' empty container park at Tempe closes, but notes that recent and current development associated with intermodal terminals in Sydney should address the loss in capacity. However, changes would be required in the logistics of managing empty containers to realise the additional capacity that the intermodal terminals can provide. The study identifies a range of recommendations to address commercial, operational and data sharing issues currently faced by the industry. The recommendations are largely actions for industry to implement. The recommendations include Transport establishing an empty container working group, with assistance from the Port Transport and Logistics Taskforce, to facilitate the implementation of recommendations by industry.

The draft report was completed in late 2019. In December 2019 the freight industry was engaged for comment via the Port Transport and Logistics Taskforce. Transport's Freight Industry Branch is currently reviewing the draft report, including comments from industry, with a view to finalising it in 2020 and facilitating implementation of the key recommendations.

Further information is provided in section 3.2.6 of this report.

6.11.3 Adequacy of assessment

The project should be assessed on there being no site to relocate to

Issue

The EIS is uncertain as to whether Tyne's Tempe site will relocate or become extinguished as a result of the Sydney Gateway Project (see for example, sections 6.1.2.4 and page 55 of Technical Working Paper 11 - Socio-Economic Impact Assessment prepared jointly by WSP and GHD, and pages 20.18 and 20.31 of the EIS).

The EIS should be assessed on the basis that there is no available site for Tyne to relocate to.

Response

As discussed above, potential impacts associated with the closure of the business were assessed in section 6.1 of Technical Working Paper 12 (Business Impact Assessment) and summarised in Chapter 20 of the EIS/preliminary draft MDP. The assessment considered a worst-case scenario based on the business being unable to relocate. Potential impacts on employees associated with the loss of employment are assessed in section 6.1.3 of Technical Working Paper 11 (Socio-economic Impact Assessment).

Incorrect assertion about alternative site description

Issue

Tyne is concerned with the assertion made at page 60 of Technical Working Paper - 12 Socio-Economic Impact Assessment (prepared by Hill PDA) regarding discussions concerning an alternative site for Tyne's relocation. This assertion infers that Tyne did not take up an available opportunity to relocate the Tempe site after RMS put a suitable relocation site forward.

RMS (or any of its agents) has not raised an alternative site with Tyne at any time in this acquisition process. Tyne has made clear to RMS on many occasions that its preference has always been to relocate Tyne's Tempe operation to a suitable alternative site.

The only alternative site was raised by NSW Ports at 1 Bumborah Point Road, Port Botany - which is currently operated as a TfNSW bus depot. Further discussions about the site did not progress as TfNSW advised that TfNSW was not open to relocating the bus depot to facilitate Tyne's relocation.

Response

Transport acknowledges that the Port Botany bus depot was suggested by NSW Ports as being a potential site for Tyne Container Services' business. However, the Port Botany bus depot is critical to the State Transit Authority's current and future operations. The bus depot services one of the fastest growing regions in terms of patronage. A suitable alternative site for the bus depot is not available. Capacity and safety constraints prevent the bus depot being shared with Tyne Container Services for empty container storage. Also, the land on which the depot is located is not zoned appropriately for empty container storage, with limited suitably zoned land (ie industrial) being located in the surrounding area. As a result, it is not a feasible site for the potential relocation of the Tyne Container Services empty container park at Tempe.

Further information is provided in section 3.2.6 of this report.

Insufficient assessment of impact on Tyne

Issue

The EIS does not sufficiently describe the impact of the Sydney Gateway Project on Tyne, and the company and the container industry generally will suffer as a result of the project beyond what is canvassed in the EIS.

Response

The impact of the project on Tyne Container Services' operation is summarised in chapters 19 and 20 of the EIS/preliminary draft MDP.

The impact on Tyne Container Services' operation is summarised in Table 20.4 which acknowledges that if the business were to close, this would affect the container freight industry at a time when land for empty container storage is at a critical level.

As discussed above, Transport acknowledges the challenges that the freight industry faces in relation to the management and storage of empty containers. An assessment of the empty container sector in Sydney is provided in Appendix D to Technical Working Paper 12 (Business Impact Assessment).

Transport's Freight Industry Branch has commissioned the NSW Empty Container Supply Chain Study in July 2019. The purpose of the study is to identify broader issues associated with managing empty containers, including impacts on the supply chain, and identify short and longer term initiatives to address these issues. The study considers the potential loss of empty container storage capacity if the Tyne Container Services empty container park at Tempe closes.

Further information on this issue is provided in section 3.2.6 of this report.

6.11.4 Acquisition timeframe and viable alternate site

Time frame for vacating the site

Issue

Achieving vacant possession of Tyne's Tempe site by June 2020 is a logistically complicated exercise that cannot be reasonably achieved without incurring significant cost and disruption.

Tyne require 12 months to vacate the site in the event the acquisition goes ahead. Constraints have limited Tyne's ability to relocate by 30 June 2020. There could still be approximately 4000-5000 containers remaining on the site by 30 June 2020.

In order to meet the requirement for vacant possession by June 2020 Tyne would need to fast-track their departure from the site, and set up and run a temporary storage solution for the remaining containers. Given the Sydney empty container park shortage and the fact that there is no spare capacity to accommodate these containers at a site with reasonable proximity to the Port, it is likely that these remaining containers will need to be moved to areas such as south-west Sydney. This would involve significant cost, more logistical complexity, and stress on the road network with approximately 4000-5000 truck movements each way.

Tyne are disappointed that this constraint has not been considered in the EIS and encourage a more collaborative approach to addressing this issue and reaching an outcome.

Response

At the time of writing EIS/preliminary draft MDP, it was not determined whether Tyne Container Services' business in Tempe could relocate or whether it would need to close. Transport acknowledges there is currently limited additional capacity at existing empty container parks, and there is also limited industrial land available near Port Botany that can readily accommodate empty container storage.

Transport recognises the challenge for Tyne Container Services' to relocate its business to accommodate the project within the original requested timeframe. Accordingly, Transport has continued to consult with Tyne Container Services regarding the ability for empty containers to be removed from the site.

Tyne Container Services has advised that half of the approximately 10,000 Twenty-Foot Equivalent Units (TEU) currently stored at its Tempe facility will be relocated to its Punchbowl and Molineux Point sites between April and September 2020. To offset the remaining 5,000 TEU in the short term, Transport is working with industry participants and Tyne Container Services to explore options for additional storage at alternative facilities.

As part of recent discussions with Tyne Container Services, and in light of the existing constraints on the empty container market, Transport has extended the timeframe for containers to be removed from the site from 30 June 2020 to 30 September 2020.

Bus depot is a viable relocation site

Issue

The bus depot remains a viable relocation site for Tyne's Tempe operation, and the relocation of a bus depot should not be too complicated. Tyne therefore submits that the NSW Government should consider the empty container park storage crisis and the impact to the Tyne staff and use its powers to move its bus depot and relocate Tyne's Tempe operation into that location.

Response

As described above, Transport acknowledges the suggested bus depot as the relocation option for Tyne Container Services' business. However, this option is not considered feasible as the Port Botany bus depot is critical to the State Transit Authority's current and future operations, and a suitable alternative site for it is not available.

7 Peak bodies and community groups

This chapter provides responses to issues raised in submissions provided by peak/representative bodies and community groups. The approach to analysing submissions and structuring responses is described in section 2.3 of this report. The issues raised in key stakeholder submissions have been summarised broadly according to the order and headings provided in each submission (where such headings were provided). In some instances, related issues have been grouped under a single heading.

7.1 Cooks River Alliance

7.1.1 Catchment boundary mapping

Catchment boundary errors for the flood and surface water assessments

Issue

Catchment boundaries are incorrectly referenced within the flood and surface water assessment(s). Although some catchment mapping may designate this area as Georges River Catchment, this delineation is inconsistent with the majority of the existing body of contemporary research and literature regarding the Cooks River and Georges River watersheds.

Response

The catchment boundaries used by the surface water assessment (Technical Working Paper 8 (Surface Water)) are based on the boundaries defined by the NSW Water Quality and River Flow Objectives, which were established by the (then) Department of Environment, Climate Change and Water. For the purposes of setting water quality objectives relevant to the watercourses that are potentially affected by the project, the study area is located in the Georges River and Cooks River catchments (see *www.environment.nsw.gov.au/ieo/CooksRiver/map* and *www.environment.nsw.gov.au/ieo/GeorgesRiver/map*).

The catchment boundary for the flooding assessment (Technical Working Paper 6 (Flooding)) is based on the topography within the study area.

7.1.2 Water quality impacts and assessment

Assessment guidelines

Issue

The surface water quality assessment used the ANZECC guidelines (2000) to benchmark water quality impacts. However, these guidelines have since been superseded by the 2018 Water Quality Guidelines for Fresh and Marine Water Quality (ANZG guidelines (2018)). The assessment should include of comparison against the subsequent revision ANZG guidelines (2018) or provide a robust justification of why the superseded guidelines have been used.

Response

In 2018 the ANZECC guidelines were superseded by the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand Governments (ANZG), 2018) (the Water Quality Guidelines). As noted in section 16.1.4 of the EIS/preliminary draft MDP, the default trigger values for various pollutants published in the Water Quality Guidelines were the same as those in the ANZECC guidelines. However the Water Quality Guidelines were not comprehensive for all pollutants addressed by ANZECC. As a result, for those pollutants where the Water Quality Guidelines did not recommend default trigger values, ANZECC default trigger values were adopted.

In the EIS/preliminary draft MDP, the discussion of guideline trigger values and levels of protection are referenced to the ANZECC guidelines as the original source document for these parameters. However, the trigger values did include relevant values from the Water Quality Guidelines where these were published at the time the assessment was undertaken. As the assessment was based on Water Quality Guidelines as well as ANZECC), the assessment was valid and remains current. No comparison is therefore required.

Further information about the proposed water quality objectives for the project is provided in the following response.

Impact of gross pollutants

Issue

The assessment indicates the final receiving waterways of Alexandra Canal and Mill Stream do not achieve any of the relevant Botany Bay Water Quality Improvement Program targets for operational pollutant load reductions.

The comparison against these targets is incomplete as gross pollutants have not been included. Further detail and assessment regarding change in loads of gross pollutants should be undertaken.

Response

Section 7.10.9 of the EIS/preliminary draft MDP describes the measures which would be incorporated into the project to reduce the potential impacts on water quality. These measures include gross pollutant traps and other separators designed to remove waste matter, hydrocarbons, nutrients and suspended solids from stormwater runoff. In other locations, alternative drainage measures may be possible, such as grassed swales. The size and type of devices installed would be confirmed during detailed design. Further detail is provided in section 6.4.1 of Technical Working Paper 8 (Water Quality).

Operational pollutant loads from the project were modelled using MUSIC to determine whether the incorporated measures would be sufficient to meet the targets in the *Botany Bay and Catchment Water Quality Improvement Plan* (SMCMA, 2011). The parameters modelled included total suspended solids, total phosphorus and total nitrogen.

For Alexandra Canal, there is predicted to be a negligible increase in pollutant loading compared with existing conditions for total suspended solids, and a minor increase in total phosphorus, indicating a small impact. For Mill Stream, the modelling indicates a reduction in pollutant loading compared to existing conditions. However, for both Alexandra Canal and Mill Stream, the pollutant load reductions are less than the targets in the *Botany Bay and Catchment Water Quality Improvement Plan* (SMCMA, 2011). This is due to the limited available space in the project area to provide appropriately sized water quality controls.

Although the pollutant reduction targets would not be met, an overall improvement in the ambient water quality outcomes for Alexandra Canal and Mill Stream is expected due to the project. In accordance with mitigation measure SW3, water quality treatment measures would be confirmed during detailed design in accordance with the principles of water sensitive urban design and with the aim of improving water quality within Alexandra Canal and/or achieving the targets outlined in the *Botany Bay and Catchment Water Quality Improvement Plan* (SMCMA, 2011).

Water sensitive urban design

Issue

Given the potential space constraints, alternative measures should consider the feasibility and inclusion of integrated or individual water sensitive urban design (WSUD) elements such as permeable pavers and/or bio-retention tree pits as a potential solution. Incorporating WSUD within the required biodiversity offsets should also be considered.

Response

The design has sought to meet the water quality objectives by maximising the area available within the project site to treat runoff from the road corridor. The proposed permanent water quality management measures include numerous gross pollutant traps with fine sediment removal and swales as well as features to control flow velocities within and at outlets from the road drainage system. The principles of water sensitive urban design have been incorporated into the concept design as far as practicable.

Mitigation measure SW3 commits to considering appropriate treatment measures during detailed design, including water sensitive urban design. Potential elements such as permeable pavers and/or bio-retention tree pits would be considered in conjunction with the urban design and landscape plan (required by mitigation measure LV1).

As described in section 22.6.3 of the EIS/preliminary draft MDP, the project would not require biodiversity offsets.

7.1.3 Construction methodology for Alexandra Canal works

Use of coffer dams and timing of works

Issue

Further consideration should be given to the use of coffer dams, or additional controls should be included, based on a precautionary and best-practice approach within the acid sulfate soil (ASS) management plan to ensure localised removal, treatment and disposal of oxidised sediments and ASS material via an appropriate facility.

Intrusive works in Alexandra Canal should be carefully planned in accordance with construction programming to avoid sensitive ecological windows. Additional details of the timing of these works to avoid sensitive ecological windows should also be provided.

Response

Acid sulfate soils

Works within Alexandra Canal would include constructing new stormwater outlets and upgrading existing outlets (see section 7.10.9 of the EIS/preliminary draft MDP). The concept construction methodology described in section 8.2.3 of the EIS/preliminary draft MDP for constructing drainage outlets would require the installation of silt curtains at each location to mitigate potential impacts. Where works are required below the water level in the canal the works would generally involve:

- Establishing coffer dams, within the area protected by silt curtains, to provide a dry working environment and minimise mobilisation of disturbed sediments
- Constructing the new outlets and scour protection in the canal wall within the area protected by the coffer dams
- Removing the coffer dams once outlets are constructed.

Mitigation measure CS10 commits to preparing and implementing an Acid Sulfate Soils Management Plan. The plan would be prepared in accordance with the *Acid Sulfate Soils Assessment Guidelines* (ASSMAC, 1998). It would define the process and measures to manage actual and potential acid sulfate soil and sediment disturbed during construction. The plan would identify any further soil/water analysis required as a precursor to implementing the management plan. Measure CS10 also commits to disposing acid sulfate soils off site (where required) in accordance with the *Waste Classification Guidelines - Part 4: Acid sulfate soils* (NSW EPA, 2014).

Sensitive ecological windows

As discussed in section 22.2.4 of the EIS/preliminary draft MDP, Alexandra Canal does not provide habitat for any known threatened species. Furthermore, no threatened aquatic or migratory species were recorded during field surveys. Despite its highly disturbed and artificial form, the canal is mapped as key fish habitat. The narrow mud flats within the canal also provide limited habitat for oysters, mangroves and Swamp Oak.

The concept construction methodologies described in chapter 8.2.3 of the EIS/preliminary draft MDP including the use of silt curtains would minimise the potential impacts on water quality and associated impacts on aquatic habitat. For works below the water level, the proposed coffer dams would limit the area of disturbance below the mean water mark to the smallest area required to undertake the work.

All works within Alexandra Canal would be undertaken in accordance with a management plan prepared in consultation with Sydney Water and approved by the NSW EPA (see mitigation measure CS11). The plan will identify specific methodologies to minimise disturbance and dispersion of potentially contaminated sediments.

7.2 Australian Logistics Council

7.2.1 Freight and the NSW economy

Direct heavy vehicle access at St Peters

Issue

Growth in freight volumes will place enormous pressure on road infrastructure in and around the Port Botany/Sydney Airport precinct.

The needs of freight logistics operators remain a core consideration in the design, so that the environmental benefits that flow from doing so can be fully achieved.

The failure to incorporate direct, dedicated connections for heavy vehicles travelling to and from the Cooks River Intermodal Terminal and adjacent freight depots will jeopardise the overall ability of the project to achieve its objectives in terms of reducing traffic congestion in and around the Port Botany/Sydney Airport precinct.

Dedicated heavy vehicle access ramps should be reinstated at St Peters for trucks wishing to access the CRIT and Port Botany, as per the original planning design.

Response

Without infrastructure investment, forecast freight demand in and around Sydney Airport and the Port Botany precinct is expected to place pressure on the existing road infrastructure. The project helps alleviate these pressures by providing direct, new high capacity road connections to the airport, and improved connection towards Port Botany. Traffic heading from south-west and western Sydney to these destinations would use the new road connections and bypass Mascot.

Freight vehicles travelling to Port Botany from the Cooks River Intermodal Terminal would be required to continue to travel through Mascot. It is noted that there is predicted to be an improvement in travel times along the route through Mascot compared to 'without the project' due to the transfer of some traffic that currently travels through Mascot onto the project.

Analysis of the Strategic Motorway Planning Model for the project indicates that about 50 per cent of heavy vehicles accessing Port Botany would divert to the project daily from existing roads by 2036. In the reverse direction, about 40 per cent of heavy vehicles egressing from Port Botany daily would use the project in 2036 in preference to existing routes. As a result, the project would attract traffic away from other arterial roads allowing reduced traffic growth on the M5, General Holmes Drive, Southern Cross Drive and Botany Road, which are key routes for the movement of freight.

The delivery of the Sydney Gateway road project would be coordinated with Transport for NSW's wider infrastructure delivery program. This includes a number of programs, such as the Mascot intersection upgrade program, aimed at delivering a safe and reliable road network around Mascot. Further to this, operational network performance reviews would be carried out following the opening of the New M5 and the M4/M5 Link. Should these reviews identify the need for further traffic management measures on the transport network, a program would be developed to carry out such works. These works are likely to deliver benefits and relief to the network during and after the construction of the Sydney Gateway road project.

As part of project development, Transport considered the merits of providing access at Canal Road, for vehicles and/or freight, and determined that such a connection was not feasible. While such a connection does not form part of the project for which approval is sought, the design provides for such a connection, should it be required in the future.

Further information regarding the feasibility of a connection at Canal Road is provided in section 3.2.5.

7.2.2 Cooks River Intermodal Terminal

Role in the NSW supply chain

Issue

The Cooks River Intermodal Terminal (CRIT) has a critical role in the NSW supply chain. Ensuring heavy vehicles can continue to access the facility in the most efficient manner possible is an imperative for Sydney Gateway and the overall port supply chain.

Hundreds of empty containers travelling to and from the facility each day via road transport. Empty containers always travel by road. Calls for empty containers come at short notice, and empty containers are carried on trucks to the port via a continuous 'stack run'.

Currently, trucks undertaking such a task utilise Kent Street, Coward Street and Bourke Road in Mascot.

The continued growth in container volumes means that heavy vehicle traffic volumes servicing CRIT and Port Botany will continue to grow in the years ahead.

During rail closures at Port Botany all freight trains terminate at CRIT and all export freight is carried on rail.

Response

Transport acknowledges the challenges that the freight industry faces in relation to the management and storage of empty containers. An assessment of the empty container sector in Sydney is provided in Technical Working Paper 12 (Business Impact Assessment). The assessment notes that 'Since 2017, trade imbalances and the drought have caused a substantial build-up of empty containers in Sydney with empty container parks reported to be 85-95 per cent of capacity and with overflow storage of empty containers at more than 20 transport depots.'

Transport recognises the role of the Cooks River Intermodal Terminal in the container supply chain. As identified in the empty container assessment, empty container parks serviced by road include the management of stack runs of surplus empty containers by road to the port. Empty container parks and intermodal terminals with rail services operate with a similar functionality, noting that the stack runs are undertaken by rail.

Traffic modelling described in section 9.4.1 of the EIS/preliminary draft MDP predicts a significant reduction in local traffic through Mascot as a result of the project. The forecast demand for the project would attract traffic away from other local and arterial roads resulting in lower traffic volumes on most roads compared with the volumes predicted without the project. Most of the predicted traffic demand would shift from O'Riordan Street and Botany Road in the Mascot town centre. It is predicted that these roads would carry between 25 to 30 per cent less traffic in 2036 than they would have without the project. As a result, the project would allow vehicles to bypass the surrounding road network, minimising traffic through Mascot and surrounding local roads. Travel time improvements along key routes would be in the range of 30 to 70 per cent.

Analysis of the Strategic Motorway Planning Model for the project indicates that about 50 per cent of heavy vehicles accessing Port Botany would divert to the project daily from existing roads by 2036. In the reverse direction, about 40 per cent of heavy vehicles leaving Port Botany daily would use the project in 2036 in preference to existing routes. As a result, the project would attract traffic away from other arterial roads allowing reduced traffic growth on the M5, General Holmes Drive, Southern Cross Drive and Botany Road, which are key routes for the movement of freight.

A supporting initiative is ARTC's proposed Botany Rail Duplication project, which would increase capacity and efficiency on the Botany Rail Line. This project would assist in meeting the long-term freight demands to Port Botany.

Other initiatives, including new intermodal terminals being developed by the private sector, such as Pacific National's proposed St Marys Freight Hub in Western Sydney, together with terminals at Enfield and Moorebank, are designed to facilitate the operation of more efficient rail shuttles to Port Botany. These would provide a more cost effective rail operation to move empty containers to the port.

All these initiatives will increase the rail mode share for container transport, consistent with the NSW Freight Strategy. This will, over time, lead to a shift in heavy vehicles away from roads in Mascot.

Impacts on empty container storage

Issue

The reduction in total capacity of the Sydney empty container storage market as a result of the project has not been addressed. This scenario may result in further aggravating traffic congestion in and around Cooks River.

The loss of storage capacity at Tyne and CRIT in terms of the overall port supply chain should be considered, reducing the impact on the latter being the largest empty container park in Sydney.

The overall loss of empty container storage capacity in the Sydney market and its impact on the Port Botany chain as a result of Gateway has not been addressed adequately in the EIS.

Response

As described in section 20.3.4 of the EIS/preliminary draft MDP, the supply of empty containers requiring storage in Sydney has increased in recent years due a reduction in agricultural exports and the drought, together with increased container trade. The supply of empty containers in Sydney is expected to increase. The volume of containers handled at Port Botany is forecast to grow to 2.9 million twenty-foot equivalents (TEUs) by 2021, almost 3.4 million TEUs by 2026, and four million TEUs by 2031. Noting the predicted increases in container supply, empty container storage capacity in Sydney has remained largely unchanged since 2015.

The reduction in empty container capacity would be exacerbated by the project due to the proposed land requirements. This includes land currently occupied by Tyne Container Services, which would mean that the business would no longer be able to operate at its current site. Subject to property acquisition negotiations, relocating the business to another location close to Port Botany is constrained by the lack of available industrial land.

Transport's Freight Industry Branch commissioned the NSW Empty Container Supply Chain Study in July 2019. The purpose of the study was to identify broader issues associated with managing empty containers, including impacts on the supply chain, and identify short and longer term initiatives to address these issues.

Detailed discussion of this issue is provided in section 3.2.6 of this report.

Tyne Containers Services has advised that half of the approximately 10,000 TEUs (equating to around 6,500 containers) currently stored at their Tempe facility will be relocated to their Punchbowl and Molineux Point sites between April and September 2020. To offset the remaining 5,000 TEU in the short term, Transport is working with industry participants including NSW Ports and Tyne Container Services to explore options for additional storage at alternative facilities or for containers to be moved offshore by the shipping lines to ease capacity for the whole market.

Options to move a higher proportion of empty containers by rail are also being explored. Other initiatives include new intermodal terminals being pursued by the private sector. These include Pacific National's St Marys Freight Hub in Western Sydney, and intermodal terminals at Enfield and Moorebank. These facilities are designed to enable more efficient rail shuttles to Port Botany, which may provide a more cost effective rail operation to move empty containers to the port.

Impacts on Cooks River Intermodal Terminal

Issue

Need further analysis of the impact of the project on CRIT and widespread negative environmental outcomes across the entire port supply chain.

Response

The potential impacts on the Cooks River Intermodal Terminal are considered in Chapter 19 of the EIS/preliminary draft MDP. Table 19.3 notes that a small portion (about 7.2 per cent) of the Cooks River Intermodal Terminal site is currently required to construct the project. However, as described in section 3.1.1 of this report, the design has been refined to avoid direct impacts on the Cooks River Intermodal Terminal. The refinement removes the requirement for land at the Cooks River Intermodal Terminal and reduces the project's impact on land used for empty container storage.

A response to issues regarding the port supply chain is provided above.

7.2.3 Residential growth

Impacts of road congestion in Mascot

Issue

The changing character of Mascot is also placing pressure on the road network, particularly on Kent Street, Coward Street and Bourke Road. This slows road freight movements to and from the port.

Sydney Gateway is intended to alleviate some of these pressures. However, without the provision of dedicated ramp access for heavy vehicles accessing CRIT and Port Botany, trucks will be forced to continue using the current route along local streets in Mascot to travel between the two facilities.

This will undermine the core goal of Sydney Gateway to reduce road congestion and improve the efficiency of freight movement, which will in turn engender poorer environmental outcomes through heavy vehicle congestion. It will also have a deleterious impact on community amenity.

Response

The project would result in the transfer of a large proportion of local traffic to the project and would improve the local amenity for residents as well as lead to increased capacity in the local road network in Mascot. The.

Traffic modelling carried out to assess the potential changes in traffic performance as a result of the project took into account population and employment projections, including land use developments, across the Greater Sydney area. The analysis found that the future road network with the project would operate with substantially less congestion and improved travel times than it would have without it.

The change in traffic volumes on the road network due to the project in 2026 and 2036 highlight a decrease in vehicles along local roads in and around the Mascot Station and town centre precincts. This includes a decrease in total vehicles on Kent Road, Coward Street, Bourke Street, O'Riordan Street and

Robey Street in 2036. As noted in the submission, these roads are used by local traffic and freight vehicles travelling between Cooks River Intermodal Terminal and towards Port Botany.

As described in section 9.4.1 of the EIS/preliminary draft MDP, the forecast demand for the project would attract traffic away from local and arterial roads within the study area, resulting in lower traffic volumes on most roads compared with the volumes predicted without the project. Most of the predicted traffic demand would shift from O'Riordan Street and Botany Road in the Mascot town centre. It is predicted that these roads would carry between 25 to 30 per cent less traffic in 2036 than they would have without the project. As a result, the project would allow vehicles to bypass the surrounding road network, minimising traffic through Mascot and surrounding local roads. The project would also reduce forecast traffic growth along local roads, including in and around Mascot.

7.2.4 Improved rail access to and from Port Botany

Cooks River Intermodal Terminal rail connectivity with Port Botany

Issue

CRIT is looking to enhance its rail connectivity with Port Botany for shuttle trains either travelling directly to and from CRIT to the Port, or for regional trains. As part of this strategy, Qube Logistics has proposed a direct rail turn-out to and from the Port, which would cross directly underneath the proposed concept design of Sydney Gateway, close to where the roadway crosses the main line at elevation.

The project team must give consideration to the building of the rail turnout concurrently with the roadway construction to maximise environmental outcomes from a port rail perspective.

The potential inability to develop a direct port rail access turnout at CRIT until after Gateway has been fully constructed would inhibit port rail mode share growth and lead to a further increase in road congestion, particularly if the terminal moves away from port rail shuttles as a direct result.

Response

Transport is aware of the proposed rail turnout design proposed by Qube Logistics and the project concept design has future-proofed an area for a turnout. However, the development of a rail turnout from the Cooks River Intermodal Terminal to the Botany Rail Line is not part of the project for which approval is being sought and would therefore be subject to a separate planning approval.

Measures to manage construction of the proposed turnout during construction of the project, if required, would be identified in consultation with Qube Logistics in accordance with mitigation measure SE3.

7.2.5 The solution

Capacity constraints on General Holmes Drive, connectivity from Foreshore Road to the M5 East

Issue

To fully realise the potential benefits of the project, it will also be important to further enhance connectivity to Port Botany by dealing with current capacity constraints on General Holmes Drive, as well as connectivity from Foreshore Road to the M5 East.

Response

Transport has completed the Port Botany Access Study to consider options for additional traffic improvements that may be required around the port in the short, medium and long-term. Transport is working closely with NSW Ports, Sydney Airport Corporation on these options.

Planning approval and delivery of these works will be taken forward by Transport once more detailed assessments and funding has been secured. These works are not part of the project.

The Airport East Precinct Upgrade project, which was recently completed by Transport, included works to address some of the capacity constraints on General Holmes Drive. Further works on General Holmes Drive, and works to improve the connectivity from Foreshore Road are outside the scope of the project.

As described in section 9.4.5 of the EIS/preliminary draft MDP, the project would improve road network performance and would benefit the movement of freight via the road network, including freight travelling to Sydney Airport and Port Botany. The project would become the preferred direct access to Sydney Airport, reducing heavy vehicle traffic on other roads, including the M5, General Holmes Drive, Southern Cross Drive, O’Riordan Street and Botany Road.

7.3 Shipping Australia Limited

7.3.1 Comments on concept design

Heavy vehicle access to CRIT

Issue

The published plan does not provide reasonable heavy vehicle access from the project to CRIT, which is the largest empty container facility in Sydney and essential for international trade. The current design would increase truck traffic through Qantas Drive, Robey Street, O’Riordan Street, Bourke Street, and Coward Street to Canal Road and create a congestion bottleneck, with all truck traffic to the intermodal terminal being forced to travel this route in both directions. This congestion will significantly increase truck noise, CO2 emissions and risk to local residents in a high density residential area.

The facility will remain a strategically important facility to support all shipping lines, especially for the management of empty containers for export through Port Botany.

To meet the stated vision and minimise the environment impacts, it is essential to include on and off ramps for heavy vehicles from the St Peters interchange to Canal Road.

Response

Traffic modelling described in section 9.4.1 of the EIS/preliminary draft MDP predicts a significant reduction in local traffic through Mascot as a result of the project. The forecast demand for the project would attract traffic away from other local and arterial roads resulting in lower traffic volumes on most roads compared with the volumes predicted without the project. Most of the predicted traffic demand would shift from O’Riordan Street and Botany Road in the Mascot town centre. It is predicted that these roads would carry between 25 to 30 per cent less traffic in 2036 than they would have without the project. As a result, the project would allow vehicles to bypass the surrounding road network, minimising traffic through Mascot and surrounding local roads. Travel time improvements along key routes would be in the range of 30 to 70 per cent. The transfer of a portion of local traffic to the project would also improve the local amenity for residents.

Analysis of the Strategic Motorway Planning Model for the project indicates that about 50 per cent of heavy vehicles accessing Port Botany would divert to the project daily from existing roads by 2036. In the reverse direction, about 40 per cent of heavy vehicles leaving Port Botany daily would use the project in 2036 in preference to existing routes. As a result, the project would attract traffic away from other arterial roads allowing reduced traffic growth on the M5, General Holmes Drive, Southern Cross Drive and Botany Road, which are key routes for the movement of freight.

Freight vehicles travelling to Port Botany from Cooks River Freight Terminal would continue to travel through Mascot. However, as traffic would be attracted away from the local road network and onto the project, there is predicted to be an improvement in travel times along this route compared to without the project. The project would also reduce the volume of heavy vehicles on Gardeners Road and reduce traffic growth on General Holmes Drive and Southern Cross Drive. These traffic reductions would take pressure of the local road network, ease congestion, and improve the efficiency of empty container deliveries from the Cooks River Intermodal Terminal to Port Botany.

Transport recognises support from the freight industry, including from Shipping Australia, for direct access ramps from Canal Road to the project. Transport has consulted with industry in several forums in relation to this issue.

Following feedback from the freight industry, Transport has been working with the industry stakeholders throughout 2019 to further consider dedicated heavy vehicle access onto and off the project at Canal Road. While the ramps are not part of the project's scope or funding package approved by the NSW Government, the project team has refined the design of the project to ensure future construction of the ramps is not precluded.

Further information regarding the feasibility of a connection at Canal Road is provided in section 3.2.5.

7.4 Container Transport Alliance Australia

7.4.1 Heavy vehicle access at Canal Road

Issue

CTAA fully supports the submission made by the Australian Logistics Council (ALC) regarding the need for a direct, dedicated connection for heavy vehicles travelling to and from the Cooks River Intermodal Terminal (CRIT) in Canal Road and adjacent freight depots.

Without efficient access to Sydney Gateway from CRIT, container trucks will continue to use local roads such as Canal Road, Ricketty Street, Kent Road, Coward Street, Bourke Road and O'Riordan Street to access Port Botany.

To avoid the negative environmental and amenity impacts in the Mascot area, the truck only ramps at St Peters should be reinstated.

Response

Transport recognises support from the freight industry, including from the Container Transport Alliance Australia, for direct access ramps from Canal Road to the project. Transport has consulted with industry in several forums in relation to this issue.

Following feedback, Transport has been working with the freight industry throughout 2019 to further consider dedicated heavy vehicle access onto and off the project at Canal Road. While the ramps are not part of the project's scope or funding package approved by the NSW Government, the project team has refined the design of the project to ensure future construction of the ramps is not precluded.

Further information regarding the feasibility of a connection at Canal Road is provided in section 3.2.5.

7.5 Westconnex Action Group

7.5.1 Project objection

Issue

The Westconnex Action Group objected to the Sydney Gateway EIS as it would not provide a basis for the approval of the project.

The Westconnex Action Group were opposed to the whole Westconnex project because it would not contribute to a solution to traffic congestion in Sydney.

Response

The Westconnex Action Group's objections and concerns are noted. It is noted that the project does not form part of WestConnex and only provides access between WestConnex and Sydney Airport.

The project is needed to ease congestion on the road network serving Sydney Airport and Port Botany, enhance network capacity, improve access for passengers and freight, and remove heavy vehicle traffic from Mascot's local streets, by providing new direct connections to the Sydney motorway network. It would:

- Provide high capacity road connections to Sydney Airport terminals catering to an estimated 60,000 vehicles per day in 2036
- Support the efficient distribution of freight to and from Sydney Airport, Port Botany and logistic centres in Western Sydney via Sydney's motorway network
- Improve the liveability of Mascot town centre by reducing traffic congestion and heavy vehicle movements on local roads.

7.5.2 Insufficient detail

Detail and response period

Issue

There is insufficient detail about impacts and how they will be dealt with to enable the community to meaningfully respond, especially within the timeframe of one month. It is unreasonable to have a deadline for feedback so close to the end of the year. The difficulty of dealing with the EIS are increased because significant details are buried in the EIS Technical reports.

In various points in the EIS, the authors say that important details will be clarified at the 'detailed design stage'. Our group knows from experience that either this detail will never be made public or if it is made public, the community has no meaningful opportunity to respond.

Response

The assessment presented in the EIS/preliminary draft MDP is based on a concept design and indicative construction methodology and is considered sufficient to inform the risks and issues potentially associated with the proposed works. The further development of measures to respond to the identified issues and risks is a matter for detailed design and construction planning, which would be undertaken in accordance with the mitigation measures (see Chapter 11 of this report) and the conditions of approval. This is consistent with current practice for major project assessments in NSW and elsewhere.

The project would be designed, constructed and operated in accordance with the conditions of approval and all other relevant legislative requirements and approvals.

The technical working papers that support the main EIS/preliminary draft MDP document provide the detailed results of the assessments undertaken in accordance with the SEARs. The chapters in the main EIS/preliminary draft MDP provide a summary of the main findings of these assessments. It is not possible to fully replicate the detailed results in the summary chapters. As a result, some of the detail is conveyed in the technical working papers.

Under the EP&A Act, the Secretary of the Department of Planning, Industry and Environment is responsible for determining the timing and duration of public exhibition periods for environmental impact statements. In the case of the project, the Secretary decided to publicly exhibit the EIS for the minimum statutory period of 28 days.

As described in section 2.1 of this report, consultation activities continued during the exhibition period, including community information sessions and stakeholder meetings, to assist the community and key stakeholders understand the EIS/preliminary draft MDP. If the project is approved, future consultation would be undertaken with regard to construction activities and the management of impacts.

Cumulative assessment of WestConnex

Issue

In our early submissions to WestConnex, our group called for a cumulative assessment of WestConnex. At this stage WestConnex included the Gateway. These calls were ignored. This stage by stage assessment project hides the overall impacts or dismisses the onerous cumulative impacts on communities, such as St Peters.

Response

The traffic, transport and access assessment undertaken for the EIS/preliminary draft MDP included a cumulative impact assessment taking into account other major road projects (including the M4 East, New M5 and M4-M5 Link – see Table 9.1 of the EIS/preliminary draft MDP).

Other assessments undertaken for the EIS/preliminary draft MDP also included cumulative impact assessments undertaken in accordance with the SEARs.

7.5.3 Socio and economic factors

Assessment adequacy

Issue

The Westconnex Action Group considers that the Social and Economic Impact statement for this EIS is completely inadequate and formulaic. This follows the pattern of previous major road project EISs.

Response

The socio-economic assessment was prepared by a team of qualified professionals and presents a factual, balanced assessment in accordance with the SEARs, MDP requirements and other relevant legislation and guidelines (listed in section 20.1.1 of the EIS/preliminary draft MDP). These guidelines include the *Environmental Impact Assessment Practice Note: Socio-economic assessment* (Roads and Maritime Services, 2013). The practice note provides a framework for assessing social and economic impacts to ensure assessments are carried out consistently, to a high standard, and are properly integrated with other environmental assessments, design development and management processes.

The EIS/preliminary draft MDP (including Technical Working Paper 11 (Socio-economic Impact Assessment)) was reviewed by the NSW Department of Planning, Industry and Environment, the Australian Department of Agriculture, Water and the Environment, and the Australian Department of Infrastructure, Transport, Regional Development and Communications, to confirm that it addressed the SEARs and MDP requirements prior to it being finalised and placed on public exhibition.

Comments on the final business case summary

Issue

The submission provides comments on the summary business case for the project and a number of key assumptions considered to be questionable or optimistic. These include:

a) doubling of container-based freight by 2036 and Port Botany remaining the principal sea freight dock

b) asserting that air travel and air freight will increase through Sydney Airport, notwithstanding the opening of Western Sydney Airport in 2026

c) duplicating the existing single freight rail line would not be sufficient to deal with the anticipated growth in freight.

Response

The Final Business Case Summary for the project was published in July 2019 by Infrastructure NSW. The summary was prepared by Infrastructure NSW, the NSW Government's independent infrastructure advisory agency, based on a business case developed by Transport and submitted to the NSW Government in October 2018.

In relation to the key assumptions mentioned above (refer to section 5.1.2 of the EIS/preliminary draft MDP):

- Port Botany handles 99 per cent of NSW's container demand, moving more than 6,000 containers on average every day. The amount of container freight handled by Port Botany is predicted to significantly increase over the next 15 years or so – from 14.4 million tonnes in 2016 to 25.5 million tonnes in 2036 (77 per cent increase).
- The opening of Western Sydney Airport has been considered in assessments prepared for the EIS/preliminary draft MDP. Notwithstanding the additional capacity that will be provided by Western Sydney Airport, by 2039, Sydney Airport's passenger numbers are forecast to grow by 51 per cent, from 43.3 million trips in 2017, to 65.6 million in 2039. The Australian Government has indicated that the Western Sydney Airport at Badgerys Creek will open by 2026; however, Sydney Airport will continue to be the major airport for both passengers and freight. This will place increasing demands on the roads surrounding Sydney Airport.
- The Botany Rail Line duplication is a separate and complementary project to Sydney Gateway road project and will contribute to addressing the growth in freight. Both road and rail capacity needs to be increased to address the overall freight transport task.

Preparing a business case is part of NSW Government policy. It is noted that projections of future growth in air travel and freight were collated from across a number of NSW and Australian Government agencies and other bodies, including NSW Ports, Transport (freight division), Sydney Airport Corporation and the Australian Department of Infrastructure, Transport, Regional Development and Communications.

Traffic modelling for the EIS/preliminary draft MDP has taken account of the predicted changes in freight and air travel associated with development of the Western Sydney Airport.

Addressing detailed comments on the business case is not within the scope of this Response to Submissions report.

7.5.4 Air quality

Construction impacts – adequacy of assessment

Issue

The assessment is 'desk based' and even then is not adequate. Despite the fact that there have now been three full years of experience with construction of WestConnex, no reference is made to a huge documentation of impacts.

Response

The air quality assessment was prepared by air quality assessment specialists with experience conducting assessments of road projects. It was undertaken in accordance with the SEARs, MDP requirements and other relevant legislation and guidelines (listed in section 12.1.1 of the EIS/preliminary draft MDP). The assessment was reviewed by relevant government agencies and deemed to be adequate.

The desktop approach undertaken is considered best practice given that the EIS/preliminary draft MDP assessed a conceptual construction methodology. Further consideration of construction air quality impacts would be undertaken during detailed construction planning for the project. Mitigation measures, safeguards and monitoring would be documented in the Construction Environmental Management Plan.

Individual projects should be assessed on a case-by-case basis. As such, the construction requirements for the project are different in many respects to those of other projects, such as the New M5 and M4-M5 Link.

Air quality monitoring data is used to characterise the existing environment in which a project would be constructed. This data has been considered for the air quality assessment, and it was used to determine the sensitivity of the study area as described in the assessment. This includes the specific sensitivities of receptors, the proximity and number of receptors, and the local background concentrations of various pollutants.

The knowledge built up from other infrastructure projects is routinely shared within Transport, and guidelines updated as required, to capture best practice and ensure continuing improvement. A similar process occurs within the specialist resources engaged by construction contractors and the assessment officers employed by the Department of Planning, Infrastructure and Environment. As a result, it is not unreasonable to expect that best-practice management and continuous improvement would be demonstrated on this and other major infrastructure projects.

Prior evidence of construction impacts

Issue

The authors of this EIS had available to them all the monthly reports on the monitoring at St Peters School. The Westconnex Action Group refers to the 2018 St Peters Pacific Environment reports in which analysts could only explain exceedances as a result of construction. These conclusions do not seem to have had any impact on the RMS. While 2016 monitoring results for the St Peters School monitor have been included in the assessment for the operation of the project, other results from this monitor have been ignored.

Response

The main monitoring stations used for the air quality assessment are described in section 12.3.1 of the EIS/preliminary draft MDP and Appendix D of Technical Working Paper 4 (Air Quality). These included monitoring undertaken by various background and roadside stations, including monitoring station New M5:01 at St Peters Public School, Church Street, operated by Sydney Motorway Corporation. Results from individual monitors were used to undertake the assessment as required.

Data from different monitors was used in the assessment of different pollutants, depending on a range of factors including the quality and duration of the data available as well as the measurement parameters recorded. Further information is provided in Appendix D of Technical Working Paper 4.

The air quality assessment for the EIS/preliminary draft MDP was prepared between 2018 and 2019. Air quality data for 2018 and 2019 was not available at the time the assessment was prepared. The year 2016 was selected as the baseline year because the meteorological data was more complete for the main air quality monitoring stations compared to 2017 which included some gaps in the data (about 20 per cent of data was not available). In addition, more data from sites near roads were available for model evaluation in 2016 compared to 2017. Monitoring data for 2016 was also used to coincide with the meteorological and vehicle emissions information available for the assessment for that same year.

Report absolute levels of $PM_{2.5}$ pollution not changes

Issue

The EIS acknowledges that the national goal of $PM_{2.5}$ is not likely to be attained. This is worrying but even more worrying for the community is that they are likely to be higher than predicted on the basis of all available evidence. Actual levels of pollution should be included in the EIS report as they were in the possession of RMS. Instead actual levels are obscured in an exercise that focuses on changes as a result of this project (a complex and uncertain issue) - the public needs to know the actual levels of pollution they are likely to experience and how this compares to the National Standard, with or without the project.

Response

The existing levels of $PM_{2.5}$ in Sydney already exceed the annual criterion from time to time. This is not dependent on whether or not the project is approved.

The absolute levels of pollutants predicted are summarised in section 12.5.2 and provided in detail for each modelling scenario in section 6.2.2 of Technical Working Paper 4. For each pollutant, a graph is provided showing the absolute levels of each pollutant and the change in pollutant concentrations relative to the 'without project' scenario. Additional figures show the contribution by source, maximum (absolute) concentration at each receptor, and the change in concentration for each pollutant.

'Blue' contour plots throughout section 6.2.2 are also provided to indicate the geographical extent of each pollutant (in absolute terms). As the changes in pollutant concentration are so small and the geographical area large, using contour plots and graphs to show 'differences' is a much more effective way of illustrating the results.

Basis for predicted fall of $PM_{2.5}$ emissions from 2016 to 2026

Issue

There needs to be a clearer explanation of the fall in emissions predicted from 2016 to 2026. On what is this based? Has the dramatic fall already begun for $PM_{2.5}$ emissions? From existing results, this would seem to be unlikely. Little decrease or increase in air quality as a result of emissions is predicted between 2026 and 2036.

Response

The fall in emissions is associated with improvements in vehicle emission technology and this trend has been occurring over the last few decades. For example, since the introduction of unleaded petrol and catalytic converters in 1985, peak carbon monoxide concentrations in central Sydney have plummeted, and the last exceedance of the air quality standard for carbon monoxide in NSW was recorded in 1998. The air quality assessment conducted for the project demonstrates that the improvements in vehicle emission standards more than offset the predicted traffic growth (refer to sections 12.3.1 and 12.5.1 of the EIS/preliminary draft MDP).

It is noted that emissions and predicted impacts are not the same thing. An emission is the source of the pollutant (such as a vehicle) and the predicted impact is the resulting pollutant concentration at a receptor from a combination of sources plus the existing background air quality. These two things do not have a linear relationship. For example, an increase or decrease in emission does not automatically translate to an increase or decrease in pollutant concentrations.

A decrease in the total emissions from vehicles can be the result of either a reduction in the number of vehicles or a reduction in the emissions from each of those vehicles. Improvements in vehicle emission technology reduces emissions from individual vehicles and can therefore result in significant reductions in total emissions, even though the number of vehicles increases.

This is generally the case for all emissions as shown in Figure 6-6 of Technical Working Paper 4. Even though the total number of vehicles is estimated to increase, the total traffic emissions are estimated to reduce considerably. This due to proposed improvements in technology. For $PM_{2.5}$, the reductions are smaller because there is currently no anticipated regulation of non-exhaust particles, which form a substantial fraction of the total.

Impacts should be based on actual levels of $PM_{2.5}$ above the national goals not the increase

Issue

The Westconnex Action Group reject the idea that a project should be approved simply because it only increases pollution by no more than 1.8 $\mu g/m^3$ at any receptor. The impact of this should be considered in the light of the actual levels, including how far they are above the national goal at the current time.

Response

The air quality assessment presented in the EIS/preliminary draft MDP was prepared in accordance with the SEARs and relevant state and Commonwealth legislation and standards. It assesses air quality due to the project and other relevant projects both locally and regionally. The assessment compares the predictions for key pollutants to existing and predicted air quality (relative changes due to the projects) and to the relevant guideline values (absolute levels). The assessment is documented in Chapter 12 and Technical Paper 4 of the EIS/preliminary draft MDP.

While there are predicted to be increases in annual $PM_{2.5}$ concentrations at 44 per cent of the residential, workplace and recreational receptors, these increases are very small, and unlikely to be measureable in the existing environment. The increases would be experienced almost exclusively by industrial and commercial receivers. The highest increase at a residential receiver is predicted to be less than 0.25 $\mu g/m^3$. Only 0.4 per cent of all increases are greater than 0.5 $\mu g/m^3$. In other words, the project is unlikely to result in increases that are detectable above the existing background levels.

Overall, improvements in vehicle emission technology is expected to lead to reductions in emission volumes and more than offset the predicted growth in traffic. For $PM_{2.5}$, total emissions in the study area are predicted to reduce from 90 tonnes per year in 2016 to 72 tonnes per year in 2036 (refer to Table 12.6 of the EIS/preliminary draft MDP).

Report on current actual levels of air quality in St Peters

Issue

There are currently three Ecotech monitors in St Peters. One is near Canal Road, one on the corner of Campbell and Church Street (near the Princes Highway) and one on the premises of St Peters public school. These monitors which have been operating all year, confirm residents' own assessments that the impact of construction and traffic is severe. They have been ignored altogether. The proponent should be required to comment on and explain the data that is available to the community. The monitor results suggest that the 2016 results are not necessarily representative of current air quality, let alone a good guide to the future.

Response

Background air quality results from the New M5:01 air quality monitoring station at St Peters Public School was used, together with other monitors, to characterise existing (background) air quality conditions.

The air quality assessment for the EIS/preliminary draft MDP was prepared between 2018 and 2019. Air quality data for 2018 and 2019 was not available at the time the assessment was prepared. The year 2016 was selected as the baseline year because the meteorological data was more complete for the main air quality monitoring stations compared to 2017. In addition, more data from sites near roads were available for model evaluation in 2016 compared to 2017. Monitoring data for 2016 was also used to coincide with the meteorological and vehicle emissions information available for the assessment for that same year.

The data was used to model a base case against which future modelling years could be compared. Background data required for an assessment like this are, by necessity, retrospective, as a full 12 month period is required and this is only available once that year is over.

Ineffective dust control on construction sites

Issue

On many occasions, the dust at St Peters Interchange and Kingsgrove has gone out of control, recording levels of 300 or 400 PM_{10}. This has impacts on the community. These events do not just occur on poor air quality days in the rest of Sydney. These spikes contribute to many daily exceedances and are reflected in the overall annual average levels.

Response

The issue raised does not identify the period over which the measurement was taken, which is required to enable comparison with relevant air quality criteria. It is unlikely that levels of this magnitude refer to 24-hour averages (relevant to the 24-hour average criteria). The only time these levels are likely to have been recorded in recent times in Sydney is during the bushfire episodes at the end of 2019 when levels reached in the order of 200 to 300 µg/m^3 in a 24-hour period. It is more likely that these values refer to much shorter time periods. While these short peaks can cause annoyance and should be controlled, they are not generally associated with health risks or necessarily, exceedances of regulatory criteria.

Basis of percentage change in total traffic emissions

Issue

With reference to Table 12.8 - Percentage changes in total traffic emissions in the study area. Who are the authors of these tables? On what research and assumptions is this based. The base year is 2016 but we are already nearly in 2020. What do current trends suggest? It is not clear who has done the studies to supply this information. The community needs this information.

Response

The values in Table 12.8 of the EIS/preliminary draft MDP are calculated based on the estimated vehicle emissions for each modelled year and the estimated size of the fleet. Calculations are first made for the base year 2016 and then estimated for future years, with and without the project, so comparisons can be made. The comparison shows that even without the project, total emissions are estimated to reduce significantly between 2016 and 2026 due to improvements in vehicle emissions standards.

The air quality assessment for the EIS/preliminary draft MDP was prepared between 2018 and 2019. Air quality data for 2018 and 2019 was not available at the time the assessment was prepared. The year 2016 was selected as the baseline year because the meteorological data was more complete for the main air quality monitoring stations compared to 2017. In addition, more data from sites near roads were available for model evaluation in 2016 compared to 2017. Monitoring data for 2016 was also used to coincide with the meteorological and vehicle emissions information available for the assessment for that same year.

The process of the emissions modelling is described in detail in Annexure C of Technical Working Paper 4.

Receptors predicted to experience increases in $PM_{2.5}$

Issue

The report states: 12.5.2 ‘Only a very small proportion of receptors were predicted to have larger increases and these were near proposed new sections of road.’ These receptors need to be more clearly identified and considered much more closely than they have been in this report.

Response

Figures 12.2 and 12.4 in the EIS/preliminary draft MDP show the locations of receptors used for the operational air quality assessment. It can be seen from Figure 12.11 that the areas of greatest increase (purple) reflect the location of the new surface roads proposed. The increases are predicted to be on and adjacent to surface roads, predominantly in industrial and commercial areas. Any increases at residential, workplace and recreational receptors are very small, generally less than 0.8 µg/m^3. Most of the modelled domain shows either no change due to the project, or small decreases in concentration along some surface roads.

No validation for the GRAL model

Issue

The Westconnex Action Group could find no validation research for the GRAL model in the Air Quality Technical Paper. PM2.5 is dangerous and one of our greatest concerns.

Response

Annexure G of Technical Working Paper 4 contains a detailed evaluation of the model. It notes that the GRAMM/GRAL system has been validated in numerous studies, as documented by Öttl (2018). These studies have used data sets for:

- Multiple countries (USA, Norway, Denmark, Germany, Sweden, Austria, Japan, Finland)
- Multiple source types (power plant stacks, elevated tracers, ground-level tracers, urban roads, street canyons, parking lots and tunnel portals)
- Different terrain types
- Varying meteorological conditions (high/low wind speeds, stable/unstable conditions, etc).

Pacific Environment (2017) also examined the performance of the GRAMM-GRAL system in an urban area of Sydney. GRAMM (version: July 2016) and GRAL (version: August 2016) were assessed against meteorological measurements and air quality measurements respectively. GRAMM and GRAL were also compared against other models that are commonly used in Australia: CALMET for meteorology, and CAL3QHCR for dispersion. The study provided recommendations regarding the configuration and application of GRAMM and GRAL to the assessment urban road networks in Australia.

The study showed that the combination of GRAMM and GRAL is capable of giving good average predictions, which reflect the spatial distribution of concentrations near roads with reasonable accuracy. The model chain gives results that are at least as good as those produced by other models that are currently used in Australia.

The project does not meet the national goals for daily average PM_{10}

Issue

The maps appear to show mauve or purple colouring in the areas near St Peters, suggesting that hundreds of residents and workers will experience even worse air quality as a result of the Sydney Gateway project. The scenarios with and without the project will not meet national goals for daily averages of PM_{10}.

Response

Figure 12.9 of the EIS/preliminary draft MDP shows the changes in maximum 24-hour PM_{10} concentrations in 2036. The purple colouring on the figure is over the St Peters area and along Qantas Drive. The figure also shows that the magnitude of the changes are very low and unlikely to be detectable above background levels. Exceedances of PM_{10} criteria are due to elevated background values rather than the project.

7.5.5 Odour

Odour assessment criterion

Issue

It is impossible to tell in the technical description in the TWP, eg the ‘2 OU assessment criterion’, whether the allowable volume of offensive odours are reasonable or not.

Response

Assessment criteria for odour are applied at the nearest existing, or likely future, off-site sensitive receptor. Odour assessment criteria take into account the frequency of exposure (set at the 99th percentile) and the intensity of the odour (set at between two to seven odour units).

The 99th percentile level is a prediction of the odour level that may occur 99 per cent of the time or, expressed differently, 99 hours in 100 hours are below these levels. Odour performance criteria are designed to be precautionary so that impacts on sensitive receivers can be minimised.

The most stringent criterion of two odour units at the 99th percentile was adopted for the assessment as this is considered acceptable when there is the potential to affect large populations (more than 2,000 people) as are present in the study area.

Section 12.2 of the EIS/preliminary draft MDP provides an overview of how the odour criteria was defined. Further information on the derivation of air quality criteria is provided in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW EPA, 2016) (the Approved Methods).

Representative sensitive receptor locations incomplete

Issue

The Westconnex Action Group note that the representative sensitive receptor locations' (Table 4.1, p 26) do not include the Tempe High School nor the St Peter's School and childcare centre. The discussion seems more concerned about odours being detectable at Sydney Airport.

Response

In accordance with the Approved Methods, the assessment considers the potential odour impacts at the nearest sensitive receptors to the site. These are considered the worst-case impacts. The sensitive receptors identified in the submission are not included in the odour assessment as they are not the closest receptors to the site. Potential air quality and odour impacts during construction of the project decrease with increasing distance from the project and therefore if compliance is predicted at a sensitive receptor closer to the works, then it is also usually expected at receptors located further away.

Treatment of leachate to prevent odour impacts

Issue

The EIS should recommend that leachate found on the Tempe landfill site should be pumped out with care as soon as it is found to prevent odours escaping. It should be treated as any other contaminant found on site.

Response

A revised odour assessment, which includes surface water runoff coming into contact with the waste (termed surface leachate) as an additional odour source, is provided in Appendix D of this report. The assessment was undertaken to consider potential odour impacts from surface leachate and how these can be managed to ensure that impacts are not generated by the project. The assessment concluded that surface leachate could be successfully managed on site, without resulting in odour impacts at the nearest sensitive receivers.

Commitments to manage odour from all potential odour sources, including surface leachate, are defined by a number of mitigation measures, including AQ1, AQ2, AQ3, AQ4 and AQ5. In particular, measure AQ4 commits to developing an odour management strategy prior to construction, and implementing the strategy for the duration of works involving ground disturbance at the former Tempe landfill. In accordance with measure AQ4, contingency and rectification measures (eg use of deodorisers, aeration of surface leachate storage(s)) would be implemented should significant odour issues occur at sensitive receivers in the vicinity of the project site. Surface leachate will be managed during construction in accordance with mitigation measure SW10.

Pumping of leachate to the existing and/or supplemented leachate treatment plant would be undertaken during construction to manage leachate within the waste mass. This would ensure that any increase in leachate as a result of rainwater ingress following the removal of the landfill cap would not overflow into Alexandra Canal. Technical Working Paper 16 (Former Tempe Landfill Assessment) outlines the analysis of potential leachate generation during construction and implications for pumping rates. Pumping of leachate would be undertaken in accordance with the leachate management strategy (mitigation measure GW5).

NSW EPA stop work powers

Issue

It is strongly recommended that the State Significant Infrastructure provision of EPA Act (S.5.12) be amended to empower the EPA to stop work where an odour is detected until the source is identified and dealt with. If it is discernible then it is an exceedance. There are no reasonable levels for an offensive odour.

Given that experience with the St Peters Interchange over several months in 2017, the Westconnex Action Group is very concerned about the management of odours at the old Tempe Landfill. It is disturbing that even when foul, nauseating odours permeated a whole region, the NSW EPA did not have the powers to stop work. The Westconnex Action Group proposes that the EPA Act should be amended to restore these powers to the NSW EPA, even in projects which are classified as Critical State Significant Infrastructure.

Response

Changes to legislation are not within the scope of the project.

As noted above, commitments to manage odour from all potential odour sources, including leachate, are defined by a number of mitigation measures, including mitigation measures AQ2, AQ3, AQ4 and AQ5. These include a requirement to develop and implement an odour management strategy, which will define management, contingency and rectification measures.

7.5.6 Climate change and its local impact

Emissions

Issue

The project will itself add to carbon emissions, from the concrete structures and from the anticipated, increased vehicle traffic. Since the whole point of the project is to accommodate the increased amount of road traffic – instead of looking for alternatives – it is not possible to assert on the basis of traffic speeds alone that this will reduce emissions.

Response

The EIS/preliminary draft MDP included an evaluation of greenhouse gas emission sources to identify key sources (see Chapter 26). The key emission sources were considered to be road-user emissions and construction emissions.

Commitments to manage climate change and greenhouse gas emissions are provided by mitigation measures CC1, CC2, CC3, GHG1, GHG2 and GHG3. The measures are provided in full in Chapter 11 of this report.

Road-user emissions were assessed at a metropolitan scale, both with and without the project. The improvement in fuel consumption of heavy vehicles was found to be more significant than the effects of increased traffic demand as a result of the project. On this basis, it was concluded that road user emissions would reduce over the long term.

Greenhouse gases

Issue

The basis for anticipating that GHGs and urban heat will be reduced or mitigated lies in the ‘detailed design stage’, a strategy familiar from the EISs for the three stages of WestConnex. The Business Case Summary refers to ‘environmental savings’ without any supporting detail. It is impossible not to be quite cynical about claims of reduction in emissions.

Twenty-four hectares of vegetation will be lost. Intensified development is anticipated and factored in for the suburb of Mascot with an estimated four-fold increase in number of dwellings.

Response

Mitigation measures CC3 and GHG1 commit to investigating and incorporating a range of measures to reduce the project’s contribution to greenhouse gases and the urban heat island effect. In accordance with measure GHG1, the sustainability management plan (required by measure SU1) will include measures and targets to reduce greenhouse gas emissions during construction and operation.

As outlined in chapter 26 of the EIS/preliminary draft MDP, it is estimated that during operation of the project, a reduction of greenhouse gas emissions would occur due to an increase in the average speed of vehicles across the network. The estimated volumes are:

- Up to 142,000 tCO2-e would be saved annually during the first few years of operation
- Up to 180,000 tCO2-e would be saved annually in the future.

As described in section 22.3.1 of the EIS/preliminary draft MDP, the project would mainly impact existing cleared and hardstand areas with limited biodiversity values. During construction, about 24 hectares of vegetation would be removed, which includes 18.29 hectares of highly disturbed areas with no or limited native vegetation, 4.85 hectares of urban exotic / native landscape plantings, and 0.91 hectares of native vegetation.

In accordance with mitigation measure BD1, detailed design would avoid or minimise the need to remove and/or disturb native vegetation and fauna habitat. Mitigation measure BD2 commits to limiting vegetation clearing to the minimum necessary to construct the project. Micro-siting of infrastructure would be undertaken during detailed design to further minimise or avoid impacts on native vegetation where practicable.

Heat island affect

Issue

Climate change will continue for the foreseeable future and will exacerbate the impact of the urban heat with no new vegetation able to mitigate this impact for a decade at least. The additional GHGs and PM pollution and heat impact this project will cause at a minimum in the construction phase should not be discounted.

Without a dramatic change in building standards to reduce heat and emissions, without a substantial percentage change in the vehicle fleet from petrol and diesel vehicles to electric vehicles, anticipating the addition of more commercial, industrial, freight and storage facilities coupled with a large surface road project it is impossible to believe the urban heat island effect and the amount of GHG gas emissions will not increase.

Response

Chapter 26 of the EIS/preliminary draft MDP acknowledges that the project will generate greenhouse gas emissions during construction and operation and is expected to result in a minor change to the urban heat island effect during operation. The measures described above would be implemented to minimise this potential impact. In accordance with mitigation measure CC3, the urban design and landscape plan will include consideration of appropriate landscape designs and species to reduce the urban heat island effect. This measure also commits to investigating other measures to mitigate the heat island effect during detailed design, such as light coloured pavements and shading structures for public spaces. Replanting trees in accordance with the tree management strategy (mitigation measure LV4) would ensure that there is a net increase in tree canopy.

The future makeup of vehicles on the road network is outside the scope of the project. It is noted that the greenhouse gas assessment used existing vehicle fuel types to predict future greenhouse gas emission (see section 26.2.2 of the EIS/preliminary draft MDP), which is considered to be a conservative approach.

Project alternatives

Issue

The Westconnex Action Group oppose this project because it fails to seriously consider alternatives that would have less impact on the community, improve air quality in Sydney and be more appropriate in a time of global warming.

Response

The assessment of alternatives provided in Chapter 5 of the EIS/preliminary draft MDP was undertaken in accordance with the SEARs. SEAR 2.1(e) requires ‘an analysis of any feasible alternatives to the proposal’. The SEARs define ‘alternatives to the proposal’ as ‘… different proposals which would achieve the same proposal objective(s) including the consequences of not carrying out the proposal. For example, alternatives to a road proposal may be a rail proposal in the same area and alternate routes for the road.’

Six potential strategic alternatives were considered:

1. Improvements to public transport
2. Improvements to the road network
3. Improvements to rail freight
4. Demand management
5. Do nothing/do minimum
6. New high capacity road link/s (the project).

The assessment concluded that the project would best meet the nominated objectives when compared to all other alternatives considered. It would:

- Provide high capacity road connections to Sydney Airport terminals catering to an estimated 60,000 vehicles per day in 2036
- Support the efficient distribution of freight to and from Sydney Airport, Port Botany and logistic centres in Western Sydney via Sydney’s motorway network
- Improve the liveability of Mascot town centre by reducing traffic congestion and heavy vehicle movements on local roads.

The project would ease congestion on the road network serving Sydney Airport and Port Botany, enhance network capacity, improve access for passengers and freight, and remove heavy vehicle traffic from Mascot’s local streets, by providing new direct connections to the Sydney motorway network.

7.5.7 Ground movement in Tempe landfill

Issue

Satellite imagery has already shown that movement occurred on Sydney Airport land during the tunnelling for the New M5. This movement could continue in the future. The Westconnex Action Group would have expected this issue to be considered in the assessment of landfill and gas issues on or near Sydney Airport.

Response

The project is outside the zone of influence associated with settlement for the New M5 tunnels. Therefore, the settlement for these tunnels is not expected to affect the former Tempe landfill and does not need to be considered in relation to the project and proposed construction work on the surface of the landfill and near Sydney Airport.

The issues and risks associated with working within the former Tempe landfill are assessed by the EIS/preliminary draft MDP and supporting technical working papers. In particular, the potential soil and contamination issues are assessed in Technical Working Paper 5 (Contamination and Soils) and summarised in Chapter 13.

7.5.8 Noise

Issue

Hundreds of residents will be exposed to significant rises in noise levels. All noise mitigation should be put in place before construction begins. This will be costly and the Westconnex Action Group would anticipate that RMS will try to avoid spending money on mitigation wherever possible.

Response

Transport recognises the benefits of early installation of measures to reduce noise (and other impacts) on the community. However, there are a number of limitations in doing so, including the staged manner in which works need to be conducted, as well as the additional constraints that measures such as noise barriers can place on work site access and construction more generally. Also, it is not always the case that areas of construction noise impact align with locations where operational noise barriers are proposed. Operational noise barriers require further analysis and assessment to be undertaken during detailed design before their detailed specification is confirmed.

Transport notes also that many of the areas that would be affected by increased road traffic noise due to the project are already subject to high ambient noise levels. In many cases, the predicted road traffic noise levels due to the project are comparable with existing ambient noise levels.

7.5.9 Loss of open space and income for local government

Open space

Issue

The Westconnex Action Group is dismayed that RMS could be considering resuming recreation and income producing lands from the Inner West Council. The Westconnex Action Group objects strongly to both these removal of lands. There is already a shortage of open space in this area.

Response

As described in sections 7.12.4 and 19.4.3 of the EIS/preliminary draft MDP, it is expected that some of the land required to construct the project in Tempe (about eight hectares of land, including land within Tempe Lands and other areas on the former Tempe landfill) would be returned to council. This land could be made available for future uses in accordance with the priorities of local and regional strategic planning and Inner West Council. The future use of this land would be subject to a separate assessment and approval process.

As described in section 3.2.2 of this report, as agreed with Inner West Council, the following amenities would be provided at the completion of the project:

- For the open space areas located west of the Terminal 1 connection:
  - An off-leash dog exercise area
  - A car parking area
- Grassed open space for the remainder of this area affected by the project

- For land east of the Terminal 1 connection:
  - A handstand area
  - A new path linking the car park area (noted above) with the proposed section of active transport link located adjacent to the freight terminal access.

Transport notes that Inner West Council is preparing a master plan for the residual lands, which will confirm future land uses and internal access arrangements. In accordance with mitigation measure LU3, Transport would continue to consult with Inner West Council regarding the future use of residual land in the Tempe Lands and adjoining area, including development of council's master planning process for these areas as appropriate.

In accordance with mitigation measure LU1, the design will continue to be refined to minimise land requirements and potential impacts on existing land uses and properties as far as possible.

Loss of container business

Issue

The loss of the container business could lead to significant cuts to services in the Inner West. Should this occur, the Westconnex Action Group expects that the Council will be fully compensated.

Removal of the containers could also increase noise levels in an already noisy area. This is very unwise and will add to health impacts from the project.

Response

As described in section 19.3 of the EIS/preliminary draft MDP, it is anticipated that 8.7 hectares of land owned by the Inner West Council would be permanently required for the project. Acquisitions and leases on land owned by local government, would be carried out in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW), the Land Acquisition Information Guide (NSW Government, 2014), and the land acquisition reforms announced by the NSW Government in 2016, which can be viewed online at *https://www.finance.nsw.gov.au/land-property/land-acquisition-reform-2016*.

Mitigation measure LU1 commits to continuing to refine the design to minimise land requirements and potential impacts on existing land uses and properties as far as possible.

The operational noise assessment took account of the future conditions in the study area. It included the consideration of the effect of removing containers on future noise levels with the project. As a result, the noise impact predictions are not underestimated, and the proposed mitigation measures have been developed on this basis.

The EIS/preliminary draft MDP included a human health assessment. The results of the assessment are provided in Technical Working Paper 15 (Human Health) and summarised in Chapter 23. As described in section 23.4.1 of the EIS/preliminary draft MDP, the guidelines used to assess potential noise impacts are based on levels that are protective of the potential health effects. Hence where the project complies with the relevant noise guidelines, community health will also be protected.

7.6 Bicycle NSW

Deliver improved connectivity to local destinations

Issue

The project needs to deliver improved connectivity to local destinations in order to enable more community members and airport staff to travel using active transport. This includes:

- A north–south link through Tempe Reserve, Alexandra Canal to Sydney Park
- Extending the link east-west Mill Pond to Sydenham Metro Station
- Connecting the Alexandra Canal shared path to Domestic (T2) link from the west
- Linking Wentworth Avenue to Domestic (T2) from the east
- Improving the Cooks River crossing from Cahill Park to Tempe Reserve
- An Alexandra Canal to Mascot link via Coward and Ricketty Streets.

Response

As stated in section 5.3 of the EIS/preliminary draft MDP, the objectives of the project are to:

- Improve connectivity to Sydney Airport terminals by providing high capacity direct road connections that cater for forecast growth in passenger and air freight volumes
- Support the efficient distribution of freight to and from Sydney Airport and Port Botany to logistic centres in Western Sydney
- Improve the liveability of Mascot town centre by reducing congestion and heavy vehicle movements on the local road network.

Achieving the objectives requires consideration of the road network as a whole and the need to maintain and improve capacity. The road corridors that would be upgraded are significantly constrained in terms of available space. The majority of available space is required to provide the additional capacity (lanes) needed to support the efficient distribution of traffic (including freight) to and from Sydney Airport and towards Port Botany. This would leave insufficient space for additional active transport links between the airport terminals. Suitable connections and infrastructure are included in the project design wherever practicable.

The project includes relocating the existing Alexandra Canal cycleway to the western side of Alexandra Canal, providing a new active transport link/shared path along the western side of the canal connecting to the existing regional cycle network. Any additional local connections within the project site will be defined by the active transport strategy, to be prepared in accordance with mitigation measure TT18. The purpose of the strategy will be to provide a guide for future active transport infrastructure provision.

Further information about the strategic context, background, features, connections and design requirements for the proposed active transport link is provided in section 3.2.1 of this report.

Planning for future regional connections is currently being considered by the Transport in accordance with the Greater Sydney Region Plan, District Plans, and the Future Transport Strategy 2056.

Comments regarding the suggested connections are provided below.

A north–south link through Tempe Recreation Reserve, Alexandra Canal to Sydney Park

Transport considered a shared user path from Tempe Recreation Reserve to shared paths being provided at the St Peters interchange. However, there was concern regarding the safety of the route due to the isolation and lack of appropriate passive surveillance. Furthermore, consultation with cycle stakeholders indicated a strong preference for shared user paths along the banks of Alexandra Canal, which could connect with Sydney Park, rather than a path immediately adjacent to the road infrastructure that would be constructed as part of the project. Transport updated the project to include relocation of the existing shared user path on Airport Drive to the opposite side of Alexandra Canal in response to this feedback.

Transport notes that continuing the existing cycleway along the canal north towards Sydney Park requires a coordinated approach involving Sydney Water, Bayside, Inner West and City of Sydney councils, and the landowners along the canal. Transport is committed to working with these stakeholders to extend the existing shared user path along Alexandra Canal.

Extending the link east-west between Mill Pond and Sydenham Station

There are currently no pedestrian or cyclist facilities in the vicinity of Mill Pond that Transport could connect to as part of the project. Any such connections are outside of the project area and scope. However, Transport is working closely with Sydney Airport Corporation to explore options to provide active transport connections between the Terminals 2/3 precinct and the existing Alexandra Canal cycleway. Such a connection could assist with any future plans to provide pedestrian and cyclist connections between the Mill Pond area and Sydenham Station.

Additional connections to Sydney Airport Terminals 2/3

Sydney Airport Corporation is committed to improving active transport infrastructure in both of the airport's terminal precincts.

A number of initiatives to improve active transport access and facilities have been implemented over the past six years, including the new footbridge and cycleway connection linking the external cycleway network to the Terminal 1 precinct (removing six vehicle conflict points), and provision of secure bicycle storage facilities and end-of-trip facilities. Additional infrastructure to support active transport has also been installed in the Terminals 2/3 precinct, with three metre wide shared paths extending into the precinct and enhanced crossing facilities at the precinct entry.

Sydney Airport Corporation envisages further improvements as part of the Five-Year Ground Transport Plan (which forms part of the *Sydney Airport Master Plan 2039*) and the approved T2/T3 Ground Transport Solutions and Hotel Major Development Plan, details of which will be further developed and discussed with key stakeholders as the plans are implemented.

The proposed widening of Qantas Drive is driven by the need to safeguard the future performance of the local and wider road network. The widening is significantly constrained by the Botany Rail Line corridor to the north and the Sydney Airport Jet Base to the south. There is insufficient space in between to construct the proposed road infrastructure and provide safe pedestrian and cycle access between the existing Alexandra Canal cycleway and Terminals 2/3.

However, Transport recognises that there is demand for an active transport connection between the Alexandra Canal cycleway and the Terminals 2/3 precinct. Transport is working closely with Sydney Airport Corporation to explore options for active transport connections that could be delivered. The Sydney Airport Active Transport Forum, which includes local councils and bicycle user groups, would be consulted as part of this process.

Improving the Cooks River crossing from Cahill Park to Tempe Recreation Reserve

From Cahill Park (in Wolli Creek) cyclists and pedestrians have two options to access Tempe Recreation Reserve, which is located on the northern side of the Cooks River:

- An existing shared user path connects Cahill Park to Tempe Recreation Reserve to the west, using a dedicated bridge over the Cooks River adjacent to the Princes Highway road bridge and Holbeach Avenue in Tempe
- An existing shared user path connects Cahill Park to the Giovanni Brunetti Bridge and on to the Alexandra Canal cycleway. Tempe Recreation Reserve can then be accessed over Alexandra Canal via the existing bridge. However, access over the Giovanni Brunetti Bridge is not sufficiently wide to meet current standards for shared paths. Upgrading the bridge so that the path meets current standards for shared use would involve significant structural changes to the bridge.

As there are already two access routes that can be used by pedestrians and cyclists to access Tempe Recreation Reserve from Cahill Park, further improvements are outside the scope of the project.

Transport is committed to working with Sydney Airport Corporation to explore ways in which the Giovanni Brunetti Bridge could be upgraded during delivery of the principal bicycle network (which is currently under development by Transport).

An Alexandra Canal to Mascot link via Coward and Ricketty Streets

This proposed connection is outside the project area and outside the scope of the project.

Enhancing walking and cycling connections

Issue

So little of the plans, assessments and studies were devoted to cycling and active transport and the opportunities it offers to improve health, liveability, community amenity and congestion.

On this basis, as well as in light of the stated intention of the project to reduce congestion, incorporate sustainability principles and improve safety, Bicycle NSW recommends enhancing walking and cycling connections.

Delivering the walking and cycling connections within the study area, and adding the enhancements recommended, will help ‘future-proof’ this project from anticipated population increases and 60,000 vehicle movements per day by providing people with safe, rideable alternatives and helping to reduce road congestion.

Response

Transport is working closely with Sydney Airport Corporation to explore options for active transport connections that could be delivered. The Sydney Airport Active Transport Forum, which includes local councils and bicycle user groups, would be consulted as part of this process. As noted in the above response, suitable active transport connections and infrastructure are included in the project design wherever practicable. In accordance with mitigation measure TT18, Transport and Sydney Airport Corporation will prepare an active transport strategy to integrate and enhance accessibility opportunities. The strategy will be prepared in conjunction with relevant stakeholders and provide a guide for future active transport infrastructure provision.

Further information about the strategic context, background, features, connections and design requirements for the proposed active transport link is provided in section 3.2.1 of this report.

Design of shared paths for safety and accessibility

Issue

Bicycle NSW recommends the development of separated facilities for walking and cycling to accommodate increased demand and, where this is not possible, that shared paths be built at least five metres wide. This conforms with the Austroads Guide to Road Design.

Bicycle NSW is also concerned that infrastructure be built of a suitable standard. Our ‘Build it for Everyone’ policy pillar articulates the need for infrastructure standards to meet the needs of children and elders to ride on independently. When it does, this changes travel behaviour enabling more people to change their transport mode, and reducing congestion on roads and public transport.

Response

The proposed active transport link has been designed in accordance with:

- *Guide to Road Design Part 6A: Paths for Walking and Cycling* (Austroads, 2017b)
- Relevant Australian Standards, including *AS 1428.1-2009 Design for access and mobility*
- The requirements of the *Disability Design Act 1992*
- Relevant CPTED principles.

The design would address the following minimum requirements:

- A minimum clear width of 3.5 metres
- Horizontal and vertical clearances to structure and adjacent obstacles
- A crossfall that considers the suitability for all users.

The design is constrained by the proximity of the Sydney desalination pipeline and the need to provide maintenance access for Sydney Water. There is insufficient room to provide separate cycle and pedestrian paths. As noted above, the proposed 3.5 metre width of the path meets the requirements of the *Guide to Road Design Part 6A: Paths for Walking and Cycling* (Austroads, 2017b).

Connections to Sydney's bicycle network

Issue

Transport has shared with councils the plan for Sydney's new principle bicycle network. Whilst Bicycle NSW has yet to see this, it is recommended that this project connects to it seamlessly to maximise travel by bicycle and reduce road congestion.

Response

The plans for a principal bicycle network in Sydney are under development. The draft network has been considered during the development of the project. The active transport link that would be provided as part of the project is consistent with the draft network.

The development of the proposed active transport link has also taken into account other relevant strategic plans and policies, including the Priority Cycleways Program, the Greater Sydney Region Plan, Eastern City District Plan, and the Future Transport Strategy 2056.

Safety and use of temporary connections

Issue

Bicycle NSW is concerned that safe, direct, rideable connections are maintained during the works. Bicycle NSW has seen the negative impacts of a failure to plan for this on other major projects, such as the Rozelle Interchange and the Sydney Light Rail. Detours should be, safe, direct, well signed, lit at night, have clear lines of sight, smooth surfaces, utilise widths and gradients specified in the Austroads *Guide to Road Design Part 6a: Paths for Walking and Cycling*.

Response

Transport is committed to providing safe cycling and walking connections during construction and operation of the project. Transport is working with shortlisted contractors that are currently tendering for the project to maintain existing pedestrian and cyclist connectivity in a safe manner. Transport is also committed to ensuring that all pedestrian and cyclist infrastructure delivered by the project is designed and constructed in accordance with applicable safety and design standards and with consideration of relevant crime prevention through environmental design principles.

Mitigation measure SE2 commits to designing temporary and operational active transport links in accordance with crime prevention through environmental design principles.

7.7 BIKEast

Alignment with NSW Government policies and plans

Issue

BIKEast objects to the Sydney Gateway project and propose that the project should not be approved, until it is strongly aligned with current NSW Government policies and plans, to meet its stated goal 'making journeys from west and south-west Sydney to Sydney Airport, the M5, Eastern Distributor and Port Botany easier, faster and safer', for all customers.

Response

As described in the responses provided in section 7.6, the project has been designed to meet the objectives stated in section 5.3 of the EIS/preliminary draft MDP, which are to:

- Improve connectivity to Sydney Airport terminals by providing high capacity direct road connections that cater for forecast growth in passenger and air freight volumes
- Support the efficient distribution of freight to and from Sydney Airport and Port Botany to logistic centres in Western Sydney
- Improve the liveability of Mascot town centre by reducing congestion and heavy vehicle movements on the local road network.

Suitable active transport connections and infrastructure are included in the project design wherever practicable. Transport is working closely with Sydney Airport Corporation to explore options for active transport connections that could be delivered. The Sydney Airport Active Transport Forum, which includes local councils and bicycle user groups, would be consulted as part of this process. In accordance with mitigation measure TT18, Transport and Sydney Airport Corporation will prepare an active transport strategy to integrate and enhance accessibility opportunities. The strategy will be prepared in conjunction with relevant stakeholders and provide a guide for future active transport infrastructure provision.

Further information about the strategic context, background, features, connections and design requirements for the proposed active transport link is provided in section 3.2.1 of this report.

Missing integration to surrounding active travel network

Issue

BIKEast urges the Sydney Gateway project to work closely with Bicycle NSW and surrounding local governments to improve and facilitate future connection and integration to Sydney's existing and future active travel network. Four specific missing links in the active travel network are missing from the EIS:

1. A connection from St Peters Interchange to the Alexandra Canal cycleway
2. A direct, crossing of the Cooks River from the South towards the CBD
3. Direct connections from the Alexandra Canal cycleway to T2, T3 and beyond, to the Bayside Council network
4. A direct connection between Coward Street and Sydenham station (and future Metro).

Response

Comments regarding the suggested connections are provided below.

A connection from St Peters Interchange to the Alexandra Canal cycleway

Transport considered a shared user path from Tempe Recreation Reserve to shared paths currently under construction at the St Peters interchange. However, there was concern regarding the safety of the route due to the isolation and lack of appropriate passive surveillance. Furthermore, consultation with cycle stakeholders indicated a strong preference for shared user paths along the banks of Alexandra Canal, which could connect with Sydney Park, rather than a path immediately adjacent to the road infrastructure that would be constructed as part of the project. Transport updated the project to include the relocation of the existing shared user path on Airport Drive to the opposite side of Alexandra Canal in response to this feedback.

Transport notes that continuing the existing cycleway along the canal north towards Sydney Park requires a coordinated approach involving Sydney Water, Bayside, Inner West and City of Sydney councils, and the landowners along the canal. Transport is committed to working with these stakeholders to extend the existing shared user path along Alexandra Canal. Transport has consulted with all interest groups (including local councils and user groups) during the development of the active transport link and will continue to work closely with these groups during detailed design.

A direct, crossing of the Cooks River from the south towards the CBD

From Cahill Park (in Wolli Creek) cyclists and pedestrians have two options to access Tempe Recreation Reserve, which is located on the northern side of the Cooks River:

- An existing shared user path connects Cahill Park to Tempe Recreation Reserve to the west, using a dedicated bridge over the Cooks River adjacent to the Princes Highway road bridge and Holbeach Avenue in Tempe
- An existing shared user path connects Cahill Park to the Giovanni Brunetti Bridge and on to the Alexandra Canal cycleway. Tempe Recreation Reserve can then be accessed over Alexandra Canal via the existing bridge. However, access over the Giovanni Brunetti Bridge is not sufficiently wide to meet current standards for shared paths. Upgrading the bridge so that the path meets current standards for shared use would involve significant structural changes to the bridge.

As there are already two access routes that can be used by pedestrians and cyclists to access Tempe Recreation Reserve from Cahill Park, further improvements are outside the scope of the project.

Transport is committed to working with Sydney Airport Corporation to explore ways in which the Giovanni Brunetti Bridge could be upgraded during delivery of the principal bicycle network (which is currently under development).

Direct connections from the Alexandra Canal cycleway to T2, T3 and beyond, to the Bayside Council network

Transport recognises that there is demand for an active transport connection between the Alexandra Canal cycleway and the Terminals 2/3 precinct. Transport is working closely with Sydney Airport Corporation to explore options for active transport connections that could be delivered. The Sydney Airport Active Transport Forum, which includes local councils and bicycle user groups, would be consulted as part of this process.

A direct connection between Coward Street and Sydenham station

A direct connection between Coward Street and Sydenham station is outside of the project scope. Transport would, however, continue to work with Sydney Airport Corporation, local councils and cycle stakeholders to explore options for a shared path between Alexandra Canal and Bellevue Street in the future. A shared path in this location would support a future direct connection between Coward Street and Sydenham Station.

Upgrade and maintain temporary route to a permanent route

Issue

The Sydney Gateway has proposed a north / south temporary route that traverses through the project site. An option to maintain a north / south active travel corridor would be to upgrade and maintain this proposed temporary route as a permanent route through this land space.

Response

The temporary route through the project site described in the EIS/preliminary draft MDP would ultimately be severed by the roads constructed as part of the project. Consultation with cycle stakeholders indicated a preference for a more direct shared user path directly along Alexandra Canal. This permanent route would provide the same connectivity in a more direct manner than the proposed temporary route through the construction site. Transport is currently investigating if the permanent shared path can also be used during the construction phase.

Upgrade walking and cycling accessibility in Airport East precinct

Issue

Lack of walking and cycling integration and connectivity from the Airport East precinct project needs to be rectified in the future.

Response

There are currently no shared paths or cycle facilities in Wentworth Avenue at the intersection with Joyce Drive or under the Botany Rail Line that the project can connect with. Due to the high traffic volumes on Joyce Drive, active transport connections between Wentworth Avenue and the Terminals 2/3 precinct are more appropriate on the northern side of the rail corridor along streets like Baxter Street and Robey Street where traffic volumes are significantly lower. This area is outside the footprint and scope of the project but is an issue that could be considered by Transport.

NSW Government policies

Issue

Other details regarding the NSW Government policy and missing links were outlined in detail in our submission to the Concept Design earlier this year. Rather than repeat the content, a copy has been attached to the end of this submission.

Response

A response to the issues raised in the concept design submission is provided in Table 4.1.

Table 7.1 Responses to issues raised by BIKEast's concept design submission

Issue (from concept design submission)	Response
BIKEast understands that the connection around the rail bridge near Coward Street is quite low and will require management for flooding issues, including a pump. BIKEast urges that this facility be designed well to include adequate maintenance and ensure safe community access all year round, including when the canal water level is high.	Short sections of the proposed active transport link are located in areas adjacent to Alexandra Canal where overbank flooding occurs during flood events less frequent than the one percent annual exceedance probability event. Mitigation measures HF1 and HF2 commit to further flood modelling and development of a flood mitigation strategy for all temporary and permanent project components, including confirming the extent of any potential changes to predicted flood impacts.
Ensure these safe connections are developed and maintained during construction. Safety factors to be managed include minimal gradient changes, smooth and good quality surfacing, adequate lighting, minimal path obstructions and flooding provision.	Transport is committed to providing safe cycling and walking connections during construction and operation of the project. Transport is working with shortlisted contractors that are currently tendering for the project to maintain existing pedestrian and cyclist connectivity in a safe manner. Transport is also committed to ensuring that all pedestrian and cyclist infrastructure delivered by the project is designed and constructed in accordance with applicable safety and design standards and with consideration of the of crime prevention through environmental design principles.

Issue (from concept design submission)	Response
The active travel connections outlined in the Westconnex New M5 - B51 - Pedestrian and Cycle Implementation Strategy are currently lacking, and the concept design does not provide any additional or alternative connections to the Westconnex New M5 infrastructure and surrounding destinations.	As noted above, Transport considered a shared user path from Tempe Recreation Reserve to shared paths currently under construction at the St Peters interchange. This option was not adopted due to space constraints within the project corridor.
Future Transport 2056 The Greater Sydney Principal Bicycle Network clearly states bicycle connections between Sydney Airport, Sydenham (Metro coming soon) and Wolli Creek.	The plans for a principal bicycle network in Sydney are under development. The draft network has been considered during the development of the project. The active transport link that would be provided as part of the project is consistent with the draft network. The development of the proposed active transport link has also taken into account other relevant strategic plans and policies, including the Priority Cycleways Program, the Greater Sydney Region Plan, Eastern City District Plan, and the Future Transport Strategy 2056.
Alexandra Canal masterplan It is important that the space around Alexandra Canal is maintained as open community space, suitable for active travel.	The project includes relocating the existing Alexandra Canal cycleway to the western side of Alexandra Canal, providing a new active transport link/shared path along the western side of the canal connecting to the existing regional cycle network. The northern side of the canal provides a more pleasant user experience than the existing path, which is adjacent to traffic on Airport Drive. It would also enhance and improve access to the open space along the canal.
Sydney Green Grid Alexandra Canal has been identified as a Green Grid Project opportunity in the Central District, as part of the Hydrological Grid. It is important that the space around Alexandra Canal is maintained as open community space, suitable for active travel.	The long term vision for the Green Grid in the Eastern City District (within which the project is located) identifies Alexandra Canal as one of the 'other Green Grid opportunities' in the Eastern City. This vision, the potential role of the project's landscaping, and opportunities for connections to and along the Alexandra Canal, would be considered as part of the urban design and landscape plan for the project. The Greater Sydney Region and District Plans also recognise the important role that cycle ways and other active transport connections provide in terms of the Green Grid. The proposed active transport link along Alexandra Canal would be consistent with the long-term vision of Alexandra Canal as a Green Grid corridor.
Greater Sydney Commission The Sydney Gateway concept design not only removes existing connectivity used by people walking and cycling around Sydney Airport, but also removes the future potential active travel corridor along Qantas Drive to connect to T2/T3.	Transport recognises that there is demand for an active transport connection between the Alexandra Canal cycleway and the Terminals 2/3 precinct. Transport is working closely with Sydney Airport Corporation to explore options for future active transport connections that could be delivered. The Sydney Airport Active Transport Forum, which includes local councils and bicycle user groups, would be consulted as part of this process.
Sydney Airport Masterplan The concept design does not currently improve support for local workers, in particular those at Sydney Airport, by providing safe and convenient active transport facilities.	Sydney Airport Corporation is committed to improving active transport infrastructure in both of the airport's terminal precincts. A number of initiatives to improve active transport access and facilities have been implemented over the past six years, including the new footbridge and cycleway connection linking the external cycleway network to the Terminal 1 precinct (removing six vehicle conflict points), and provision of secure bicycle storage facilities and end-of-trip facilities. Additional infrastructure to support active transport has also been installed in the Terminals 2/3 precinct, with three metre wide shared paths extending into the precinct and enhanced crossing facilities at the precinct entry. Sydney Airport Corporation envisages further improvements as part of the Five-Year Ground Transport Plan (which forms part of the Sydney Airport Master Plan 2039) and the approved T2/T3 Ground Transport Solutions and Hotel Major Development Plan, details of which will be further developed and discussed with key stakeholders as the plans are implemented.

Issue (from concept design submission)	Response
The project is missing four major active transport links.	A response to this issue is provided above the table, under the heading 'Missing integration to surrounding active travel network'.

Safe active transport connections during construction

Issue

The conditions of consent must be phrased to provide specific commitment that "walking and cycling access routes during construction must be safe, direct, convenient and consistent in travel time and distance with the existing routes".

From other transport projects in Sydney it has been observed that contractors are not willing to provide alternative routes that are convenient and consistent in travel time and distance with existing routes. These oversights have placed heavy and hazardous impact on vulnerable path users such as those with mobility and accessibility requirements, as well as inexperienced and less confident bicycle riders.

Response

Transport is committed to providing safe cycling and walking connections during construction and operation of the project. Transport is working with shortlisted contractors that are currently tendering for the project to maintain existing pedestrian and cyclist connectivity in a safe manner. Transport is also committed to ensuring that all pedestrian and cyclist infrastructure delivered by the project is designed and constructed in accordance with applicable safety and design standards and with consideration of the of crime prevention through environmental design principles.

7.8 Walk Sydney

Shared path design

Issue

Sydney Gateway aims to meet the forecast growth to access Sydney Airport and to do this the proposed shared path beside the canal needs to cater for future growth in active transport by providing path widths of at least six metres and with physical separation between people walking and cycling. The paths need to provide safety and amenity for people walking and cycling with the installation of lighting, landscaping and CCTV.

Response

The proposed active transport links have been designed in accordance with:

- *Guide to Road Design Part 6A: Paths for Walking and Cycling* (Austroads, 2017b)
- Relevant Australian Standards, including *AS 1428.1-2009 Design for access and mobility*
- The requirements of the *Disability Design Act 1992*
- Relevant CPTED principles.

The design would address the following minimum requirements:

- A minimum clear width of 3.5 metres
- Horizontal and vertical clearances to structure and adjacent obstacles
- A crossfall that considers the suitability for all users.

The alignment is constrained by the proximity of the Sydney desalination pipeline and the need to provide maintenance access for Sydney Water. There is insufficient room to provide separate cycle and pedestrian paths. As noted above, the proposed 3.5 metre width meets the requirements of the *Guide to Road Design Part 6A: Paths for Walking and Cycling* (Austroads, 2017b).

Urban design and landscaping along and in the vicinity of the active transport link would be defined by the urban design and landscape plan for the project, which will be prepared in accordance with mitigation measure LV1.

Design of pedestrian crossings

Issue

Pedestrian crossings must be provided on all approaches of all proposed signalised intersections as specified by Part 2.4 of Section 2 (Warrants) of the Traffic Signal Design guide. Failure to again implement this policy would impose unacceptably long time and distance costs on your walking customers in this location.

Response

The project includes modifications to an existing intersection and a new signalised intersection.

The new intersection of the freight terminal access and Terminal 1 connection project components would include pedestrian crossings on the eastern and southern legs of the intersection to link pedestrian paths provided along the road. No additional crossings are proposed as there is not considered to be sufficient demand at this location.

The intersection at Qantas Drive/Robey Street/Seventh Street would include pedestrian crossings on all legs of the intersection except the eastern approach (see section 3.1.4 of this report for further information). This arrangement maintains the existing conditions. Additional pedestrian crossings would detrimentally effect traffic flow.

Closure of the path for future road maintenance

Issue

The proposal to carry out future road maintenance with closure of the canal path is unacceptable. Road maintenance can take place without notice and for extended periods of time potentially resulting in lengthy diversions for people walking and cycling. Driving is an undemanding transport option, the impact of diversions on drivers is negligible by comparison with people walking, and ongoing road maintenance needs to be carried out without closure of the canal path.

Response

The temporary closure of the shared path may be required in order to perform certain road maintenance activities. The area of greatest constraint is the section between the southern end of the Terminal 1 connection and the unnamed pedestrian bridge across Alexandra Canal. Potential maintenance works in the eastern most lane may require plant and equipment to be located on the proposed path. There may be limited room to divert the path because of the proximity to the canal.

Where practicable, Transport would provide an alternative access arrangement in the event that maintenance requirements necessitate closure of the active transport link.

Suitability of diversions and temporary routes

Issue

Too often construction of these major infrastructure projects requires people to walk significantly longer distances resulting enormous delays and unmanageable distances.

To overcome this with Sydney Gateway, the conditions of consent associated with the active transport links during construction must specify the provision of routes which are consistent in travel time and distance with the existing routes. Parties preparing bids for construction of the project must be required to budget for temporary access routes which are safe, direct, with maximum gradients of 5 per cent and consistent in travel time and distance with the existing routes.

Response

Transport recognises that the proposed diversion of the existing shared user path during construction would increase distance and travel times, and has the potential to adversely affect user amenity. Transport has raised this matter and the need to minimise distance, travel times and disruption with the contractors that are currently tendering for the project. Transport is actively working with shortlisted contractors to improve outcomes during construction and provide the relocated permanent shared user path along Alexandra Canal as soon as possible during the construction phase. However, Transport notes that, due to the directness of the current alignment, it would not be possible to provide a temporary diversion that does not involve some increase in distance and travel time.

Transport is committed to providing safe cycling and walking connections during construction, and is working with shortlisted contractors that are currently tendering for the project to maintain existing pedestrian and cyclist connectivity in a safe manner.

Mitigation measure SE2 commits to designing temporary and operational active transport links in accordance with crime prevention through environmental design principles.

7.9 Bicycle user groups

A response to issues raised by ARTcycle Erskineville, Bike Leichhardt and Bike Marrickville is provided below.

Active transport and habitat corridor trails

Issue

ARTcycle Inc., is actively promoting the full implementation of two active transport and habitat corridor trails (Sydney Green Ring and Botany Bay / Kai Mia Trail). The implementation of both of these projects relies on a moratorium of development of the green transport corridor around the perimeter of the existing airport. Or the provision of better than equivalent options for bicycle use in and around the airport.

Response

Achieving the objectives of the project requires consideration of the road network as a whole and the need to maintain and improve capacity. The road corridors that would be upgraded are significantly constrained in terms of available space. The majority of available space is required to provide the additional capacity (lanes) needed to support the efficient distribution of freight to and from Sydney Airport and towards Port Botany. This would leave insufficient space for additional active transport links between the airport terminals, public transport services and existing pedestrian and cycling infrastructure. Suitable connections and infrastructure are included in the project design wherever practicable.

The project includes relocating the existing Alexandra Canal cycleway to the western side of Alexandra Canal, providing a new active transport link/shared path along the western side of the canal connecting to the existing regional cycle network. Any additional local connections within the project site will be defined by the active transport strategy, to be prepared in accordance with mitigation measure TT18.

Enhancing the off-road and separated bicycle network

Issues

Road transport accounts for a large proportion of Australia's GHG emissions and IS counted in the statistics.

Public money would be better directed enhancing the off-road and separated bicycle network. In linking greenspaces to form a cohesive Green Web as per the Cumberland Plan, to create islands of urban development ringed by greenspace or criss-crossed by green lattices.

Response

The primary objectives of the project are related to improving road (vehicular) capacity and connectivity. Many of the roads that would be upgraded as part of the project are already at or near capacity and traffic demand is expected to grow significantly in the area due to urban growth. Constraints associated with meeting the primary objectives, such as limitations in available space, prevent the provision of more cycling infrastructure and connections in and around the domestic terminals.

Transport has undertaken a preliminary study of the existing cycling infrastructure and opportunities for future connections in the study area. As noted above, mitigation measure TT18 commits Transport and Sydney Airport Corporation to prepare an active transport strategy to integrate and enhance active transport opportunities. The strategy would be prepared in conjunction with relevant stakeholders, including Inner West and Bayside Councils.

Further information about the strategic context, background, features, connections and design requirements for the proposed active transport link is provided in section 3.2.1 of this report.

Walking and cycling connectivity

Issue

This project fails to address walking and cycling connectivity:

- North / South - from Sydney Park to Wolli Creek (including a direct bicycle crossing of Cook's River), and also to connect to Marsh Street and the Botany Bay cycle route (upgrade of the Brunetti Bridge)
- East / West - from Sydenham (upcoming Metro station) to Wentworth Ave / Botany
- To the Mascot centre precinct
- To Sydney Airport Terminals and between terminals (T1 to T2).

Sydney Airport is a major destination and employer in this area, and current planning of this road project ignores local movement and place, and prioritises motorway speeds and access at the expense of local amenity and connectivity for major cycling routes. The Government is urged to take this possibly last opportunity to provide direct and safe bicycle infrastructure across this area.

Response

A response to these additional connectivity requests is provided in section 7.6 under the heading ‘deliver improved connectivity to local destinations’.

Cycle connections to the domestic terminal and eastern suburbs

Issue

The project increases access to Sydney Airport for motor vehicle traffic using a roadway which excludes people riding bicycles. The project as proposed promotes the highest per person greenhouse emission transport mode while excluding one of the lowest. This major roadworks project is a rare opportunity to provide a separated cycle path into the domestic terminal yet it fails to do so.

Need to reject the current proposal and to work with SACL to include separated cycleways to the domestic terminal from the Alexandra Canal Cycleway and also connecting to the Eastern Suburbs.

Response

As noted in section 7.6, Transport recognises that there is demand for an active transport connection between the Alexandra Canal cycleway and the Terminals 2/3 precinct. Transport is working closely with

Sydney Airport Corporation to explore options for active transport connections that could be delivered. The Sydney Airport Active Transport Forum, which includes local councils and bicycle user groups, would be consulted as part of this process.

Future connections to Sydney's eastern suburbs are outside the footprint and scope of the project.

Part C

Part C

Response to community submissions

8. Project background and assessment issues

This chapter provides responses to issues raised in community submissions in relation to the project development and assessment process. These include the strategic context and need for the project, alternatives considered, consultation undertaken and adequacy of the EIS/preliminary draft MDP. Issues beyond the scope of the EIS/preliminary draft MDP are also acknowledged.

8.1 Strategic context and project need

Economic justification and need for the project

Summary of issues raised

Submitters raised concerns that the project is a waste of money as it would not resolve the traffic and transport issues around Sydney Airport and Port Botany and would not benefit the local community in the short or long term. Other concerns were raised regarding the use of public money to fund an extension for a for-profit toll road and that the money should be spent on improving public transport links to and from the airport.

Submitters raised concern that more public transport and modern/efficient freight rail services are needed and not more roads. Concerns were also raised that the project is not needed as it would only be a greenhouse gas contributor and would only result in environmental effects for the community, especially for people living close to the project.

Response

The cost of the project is considered to be justified based on the need for the project, and the anticipated benefits.

The strategic context and project need is described in Chapter 5 of the EIS/preliminary draft MDP. In summary, the project need was identified in 2012 in the NSW State Infrastructure Strategy. Sydney Airport and Port Botany are two of Australia's most important infrastructure assets, providing essential domestic and international connectivity for people and goods. The Sydney Airport and Port Botany precinct is also the largest employment area in Sydney after the Sydney central business district, with high concentrations of airport and port related businesses that are important to the economy. As a result, high volumes of traffic access Sydney Airport and Port Botany from all over Sydney and NSW. Many of the existing roads surrounding Sydney Airport and Port Botany are already operating near or at capacity in peak periods.

Over the next 20 years, air travel, air freight, container freight and general traffic in and around the Sydney Airport and Port Botany precinct are all expected to grow significantly. This will put more pressure on roads and other infrastructure and impact local communities.

Without significant infrastructure investment, existing transport constraints and challenges will worsen. The project has been proposed to put in place the necessary infrastructure to address these challenges and keep Sydney moving and growing. Air freight vehicle movements at Sydney Airport will continue to rely on the road network, with no connection for rail freight at the airport. The movement of sea-based freight to and from Port Botany will also continue to require access to the arterial road network as not all container freight can be transported via rail. The numerous businesses located in the vicinity of Sydney Airport and Port Botany that require access to these gateways depend on a road network which provides efficient connections to each of these gateways. Roads also provide point to point connections which are essential for businesses and trades, which rail cannot provide. A significant proportion of passengers will continue to rely on road transport to and from the airport. Due to current and future freight requirements, improvements in rail and public transport alone cannot address the broader traffic and transport issues facing this location and the wider road network.

The project has been developed in the context of the strategic plans and strategies listed in section 5.1.3 of the EIS/preliminary draft MDP; and complements other projects (summarised in section 5.1.4 of the

EIS/preliminary Draft MDP) proposed or being carried out to respond to the identified issues and demands. The project is needed to address these issues, respond to future demands, and meet the nominated project objectives (see response below). It has not been proposed to extend an existing tolled road.

The project, together with the Botany Rail Duplication project, the development of the Sydney motorway network (eg M4 East, New M5 and M4-M5 Link), and other key infrastructure projects would expand capacity and support connections to Sydney Airport and Port Botany. This would assist with meeting the predicted growth in passenger, freight and employee traffic movements. It will enable improved public and active transport links as well and enhance further the benefits of the NSW Government's investment in the Sydney Motorway network.

The project would also result in an improvement in traffic conditions for the local community, particularly for Mascot as heavy vehicles would be diverted away from the local road network. The improved capacity and connectivity the project would provide, together with the wider changes to the Sydney motorway network, would create potential options for new road-based public transport routes and options for connecting to the airport. The project would introduce a range of improvements to bus travel times along the existing routes that service the airport.

Transport's Sydney's Bus Future program will provide improved commuter bus access to Sydney Airport, with better east, west and south links. The program includes new bus routes and extra bus services to the airport. The program will introduce substantial improvements to bus travel times around the airport precinct.

The proposed ground transport interchange at Terminals 2/3, to be developed by Sydney Airport Corporation, will also provide direct and efficient access for vehicles and allow for an increase in the number of public transport services to and from Sydney Airport.

Transport's More Trains More Services program will continue to provide additional capacity to the rail system over the next ten years. Since 2017, the program has delivered more than 1,700 additional weekly services across the rail network. The next stages of the program will focus on delivering improvements for the T8 Airport and South lines.

The project would reduce congestion on local and arterial roads, and improve traffic flow generally, resulting in lower greenhouse gas emissions compared to the future scenarios without the project.

The purpose of the EIS/preliminary draft MDP is to assess the potential environmental effects of the project, in accordance with legislative requirements and the SEARs for the project (see response in section 8.3.1). Mitigation measures have been developed (see final list in Chapter 11 of this report) to respond to the potential impacts identified.

Objectives, goals and purpose

Summary of issues raised

A submitter raised concern that none of the project objectives related to impacts on residents.

Response

The project has been designed to meet the stated objectives provided in section 5.3 of the EIS/preliminary draft MDP, which are to:

- Improve connectivity to Sydney Airport terminals by providing high capacity direct road connections that cater for forecast growth in passenger and air freight volumes
- Support the efficient distribution of freight to and from Sydney Airport and Port Botany to logistic centres in Western Sydney
- Improve the liveability of Mascot town centre by reducing congestion and heavy vehicle movements on the local road network.

Direct community benefits would include enhanced local amenity through a reduction in traffic congestion and heavy vehicles using local streets in Mascot. The project would also provide the opportunity to enhance public open space and upgrade active transport links. These improvements in road access would also indirectly affect residents by supporting the economy through travel time savings, improved freight efficiency and improved traveler and visitor experience. The third objective identified above is directly applicable to residents, particularly those in Mascot.

8.2 Project alternatives and options

8.2.1 Alternatives

Sustainable alternatives to the project

Summary of issues raised

Submitters raised concerns the project fails to consider more sustainable alternatives that would have less impacts on the community, air quality and global warming such as acquiring the Airport Line, removing the station access fee at Sydney Airport, improving public transport and providing cheap transport to reduce road traffic to Sydney Airport.

Response

Alternatives to the project are considered in Chapter 6 of the EIS/preliminary draft MDP. The following alternatives were considered:

1. Improvements to public transport
2. Improvements to the road network
3. Improvements to rail freight
4. Demand management
5. Do nothing/do minimum
6. New high capacity road link/s (the project).

The assessment concluded that key customer markets for the project include dispersed and long distance passenger movements, air and container freight, and commercial services and businesses. The travel patterns and needs of these customers are highly dispersed and diverse. Potential improvements in public transport might take some strain off the road network and improve congestion in the road network within the terminal precinct and in the surrounding areas. However for freight in particular, improvements in public transport is not a viable solution.

No combination of feasible public transport alternatives, such as heavy or light rail options, bus corridor enhancements and/or additional services, were identified that would meet the diverse range of customer needs and predicted growth for travel associated with Sydney Airport and Port Botany, or address the project objectives as effectively as the project itself.

Changes to the station access fee that apply to passengers using the Domestic Airport and International Airport stations on the T8 Airport and South Line are outside of the scope of the project.

To encourage the use of the rail line, the station access fee was capped in 2014 for customers using the Domestic Airport or International Airport stations more than once a week. The current cap is $30.16 per week.

The project would also introduce a range of improvements to bus travel times along the existing routes that service the airport. The project would also substantially improve bus travel times for at least 15 different bus routes within the Sydney Airport area by 30 to 50 per cent. These changes would make the use of existing bus services in the locality more attractive to existing and potential future patrons.

Transport’s Sydney’s Bus Future program will provide improved commuter bus access to Sydney Airport, with better east, west and south links. The program includes new bus routes and extra bus services to the airport. The program will introduce substantial improvements to bus travel times around the airport precinct.

The proposed ground transport interchange at Terminals 2/3, to be developed by Sydney Airport Corporation, will also provide direct and efficient access for vehicles and allow for an increase in the number of public transport services to and from Sydney Airport.

Transport's More Trains More Services program will continue to provide additional capacity to the rail system over the next ten years. Since 2017, the program has delivered more than 1700 additional weekly services across the rail network. The next stages of the program will focus on delivering improvements for the T8 Airport and South lines.

Freight movements at Newcastle Port during design development

Summary of issues raised

A submitter raised concern there is also no consideration of freight movements at Newcastle Port which could alleviate pressure off Port Botany and reduce the need for trucks travelling north of Sydney.

Response

The strategic context and project need is considered in Chapter 5 of the EIS/preliminary draft MDP. One of the key demands the project is responding to is the predicted growth in Port Botany freight. Regardless of future growth at Newcastle Port, the amount of container freight handled by Port Botany is predicted to significantly increase over the next 15 years or so – from 14.4 million tonnes in 2016 to 25.5 million tonnes in 2036 (77 per cent increase) (Transport for NSW, 2018b).

Similar to the growth in air freight, transporting container freight to and from Port Botany will place additional demands on the road network in the study area. Increased use of rail for freight transport, supported by a range of projects including the Botany Rail Duplication project, will assist in managing the growth in truck volumes. However, arterial roads will continue to be an important means of moving freight between Port Botany and the industrial areas in Sydney and beyond.

As described in Chapter 5 and Appendix F of the EIS/preliminary draft MDP, the project is consistent with national and NSW strategic planning for freight, as described in the *Infrastructure Priority List* (Infrastructure Australia, 2019), *National Ports Strategy* (Infrastructure Australia and the National Transport Commission, 2011), *Future Transport Strategy 2056* (Transport for NSW, 2018a), *NSW Freight and Ports Plan 2018–2023* (Transport for NSW, 2018b) and *Navigating the Future: NSW Ports' 30 Year Master Plan* (NSW Ports, 2015).

The strategic alternatives and options assessment described in Chapter 6 (Project alternatives and options) of the EIS/preliminary draft MDP meets the Secretary's environmental assessment requirements and the requirements of the Airports Act. This included consideration of the consequences of not proceeding with the project (or the do-nothing option). The consequences of not proceeding with the project include:

- As a result of population, employment and urban growth, Sydney can expect worsening road network and traffic conditions if nothing is done. Doing nothing would also mean the full benefits of the WestConnex program of works and other projects to enhance Sydney's motorway network would not be realised. These benefits include linking major employment centres in the 'global economic corridor' to each other and to the wider city. Linking these employment and business centres is critical in supporting the ongoing creation of jobs. Sydney Airport and Port Botany are both key locations in this important economic corridor.
- Not addressing Sydney's future transport requirements is not a feasible alternative, as Sydney is home to two-thirds of NSW's manufacturing sector, with many of the state's major aviation, pharmaceuticals, biotechnology, electronics and automotive industries based in Western Sydney. These businesses and the State economy require efficient road network connectivity between the Sydney Airport and Port Botany precincts and Western Sydney.
- A do nothing or do minimum alternative would lead to worsening congestion and would not address existing and future transport needs or the project objectives.

8.2.2 Options

Concerns regarding options considered

Summary of issues raised

Submitters raised concern about the options selection process in the EIS/preliminary draft MDP and noted options were not considered, including constructing either all the project or part of the project underground to minimise impacts on residents and the environment, or removing the station access fee.

Response

Constructing the project underground

Surface and tunnel options were considered (see section 6.4.3 of the EIS/preliminary draft MDP). As described in section 6.4.3, there are many challenges associated with tunnelling in the study area. Due to the very deep sandy sediments and high groundwater table, geotechnical conditions are not ideal for tunnelling and geotechnical risks would be significant. Open cut excavation would be required causing significant surface disruption along the full tunnel length during construction. Extensive land acquisition would also be required, increasing the likelihood of substantial business disruption.

Environmental impacts of cut and cover tunnelling would include impacts on Alexandra Canal, excavation, transport and disposal of large volumes of excavated spoil material, and the need to treat and dispose of large volumes of potentially contaminated groundwater. Tunnels would also be significantly more expensive, and require more energy to construct and operate over the life of the infrastructure.

On balance, tunnel options are not preferred for the following reasons:

- The short length and comparatively steep gradients required to pass under Alexandra Canal would result in sub-optimal road gradients
- The soft sands and high groundwater table present in the area provide poor geological conditions for tunnelling
- Parts of the area are flood prone area making it difficult to protect tunnels from flooding during construction and operation
- Shallow open cut tunnelling in poor ground conditions would require acquisition of significant land for tunnel construction and management of large volumes of soil and groundwater
- Achieving optimal vertical and horizontal alignment connections to St Peters interchange and into the existing road network would be difficult
- The comparatively high cost, higher risk (compared to surface construction) and long term energy use required to operate a tunnel
- The potential environmental and heritage impacts associated with open cut excavation across Alexandra Canal.

Removing the station access fee

As described in section 8.2.1, changes to the station access fee that apply to passengers using the Domestic Airport and International Airport stations on the T8 Airport and South Line are outside of the scope of the project.

8.3 Assessment and consultation

8.3.1 Adequacy of the EIS/preliminary draft MDP

Concern regarding difficulty understanding EIS/preliminary draft MDP

Summary of issues raised

Submitters raised concern about the adequacy of the EIS/preliminary draft MDP, including that the document is too technical for the general public and too long.

Response

The EIS/preliminary draft MDP was prepared in accordance with the requirements of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act), the Environmental Planning and Assessment Regulation 2000, the *Airports Act 1996* (Cth) and associated regulations, and the Secretary's environmental assessment requirements (SEARs). Details of how the relevant provisions of these Acts and the SEARs have been met are provided in Appendices A, B and C of the EIS/preliminary draft MDP.

The primary purpose of an EIS/preliminary draft MDP is to support an application for project approval. It must address the SEARs, the abovementioned statutory requirements and relevant guidelines. In doing so, it needs to comprehensively address a wide range of technical assessment requirements, while also providing information to explain the project, its potential impacts, and management of these impacts to the community and other stakeholders. The full results of these assessments are provided in the form of the supporting technical reports to provide transparency in relation to the assessments undertaken.

In order to make this information more available to the general public, the main EIS/preliminary draft MDP chapters have been simplified as much as possible, while still conveying the outcomes of the technical assessments. The EIS/preliminary draft MDP contains an executive summary, which provides an overview of the project components, the potential impacts and the approach to managing these. A summary guide to the EIS/preliminary draft MDP was also produced to provide the community with easy to understand information from the EIS/preliminary draft MDP based on key topics identified from previous community and stakeholder engagement on the project.

The project website (*www.nswroads.work/sydneygatewayportal*) contains other information about the project. The website includes a link to an interactive project portal that includes information about the project via an interactive map, provides the individual chapters of the EIS/preliminary draft MDP and other project information, including summaries of issues.

8.3.2 Consultation prior to exhibition

Adequacy of consultation

Summary of issues raised

Submitters raised concern about the adequacy of consultation undertaken prior to exhibition of the EIS/preliminary draft MDP. A submission noted they were unable to attend the allocated consultation sessions and did not receive a door knock. Concern was also raised that the consultation process did not provide transparency or answers to specific questions from residents directly affected by the project and that the EIS/preliminary draft MDP did not provide answers to specific concerns that were previously advised.

Response

Consultation with the community and key stakeholders commenced in late 2018. As described in section 4.2 of the EIS/preliminary draft MDP, engagement with the community and key stakeholders was carried out during the following two periods of consultation prior to exhibiting the EIS/preliminary draft MDP:

- Preliminary design and project announcement (September to October 2018)
- Concept design display (May to June 2019).

During this period, the following consultation activities were undertaken:

- 609 residents and businesses were door knocked
- Seven information sessions were held welcoming over 200 attendees
- Nine information booths were hosted in Mascot, Tempe, Wolli Creek and Sydney Airport
- 49,000 community updates were distributed in areas around the project site
- Interactive portal and social media pages were launched reaching over 100,000 people.

A project information phone line and email address were also established to receive and respond to enquiries.

The purpose of consultation was to raise awareness of the project, understand community and stakeholder questions and concerns, and obtain important feedback to help shape the design of the project and the environmental assessment.

The consultation contributed to the project team’s understanding of the potential impacts, and has enabled the design to respond to and minimise potential impacts as far as possible. Measures to minimise and manage impacts that cannot be avoided have been developed as an outcome of the environmental assessment process, as described in Part B of the EIS/preliminary draft MDP. Impacts would continue to be minimised through the detailed design and construction planning phases, taking into account the input of stakeholders and the local community, and in accordance with the mitigation measures and conditions of approval (if approved).

The corridor selection process included consideration of environmental and social issues, including issues raised during early consultation. Further information on the options considered and key design refinements undertaken in response to the identified issues is provided in Chapter 6 of the EIS/preliminary draft MDP.

The concept design evolved over a period of about 18 months and involved many iterations and refinements, incorporating a range of considerations at each stage. Key environmental issues were examined throughout the design development process. Consultation has been carried out with affected stakeholders to identify key potential impacts at an early stage. Where possible, impacts have been avoided or appropriate mitigation measures developed in response to this input. This has resulted in a number of design changes that have mitigated some of the potentially significant impacts.

Examples of design refinements and construction commitments that have been adopted for the project based on feedback received include:

- Refining the concept design for the new shared cycle and pedestrian pathway (the active transport link) to provide a shared path on the western side of Alexandra Canal
- Reducing the amount of waste material excavated from the former Tempe landfill by keeping the new section of road as high as possible
- Considering potential increases in noise from ground-based aviation activities due to removal of the Tyne empty container park
- Avoiding direct impacts on the Cooks River Intermodal Terminal.

A summary of issues raised on the environmental impact assessment process is provided in Table 4.2 of the EIS/preliminary draft MDP. More information on the issues raised by individual stakeholders, including detailed responses, is provided in Appendix E (Community and Stakeholder Consultation Report) of the EIS/preliminary draft MDP.

8.3.3 Consultation during exhibition

Exhibition of EIS/preliminary draft MDP

Summary of issues raised

Submitters raised concerns about the adequacy of the exhibition of the EIS/preliminary draft MDP, noting the exhibition period was too close to public holidays and/or the document was not centrally located in convenient locations for the community.

Response

Consultation undertaken during exhibition is described in section 2.1 of this report. A comprehensive range of consultation activities was undertaken, and a range of materials was made available.

The EIS/preliminary draft MDP was placed on public exhibition by the Department of Planning, Industry and Environment for a period of four weeks from 20 November to 19 December 2019.

The EIS/preliminary draft MDP and accompanying technical papers were made available on the Department of Planning and Environment's website (www.majorprojects.planning.nsw.gov.au) and on the project website. Hard copies of the EIS/preliminary draft MDP were available at 10 locations.

To support public exhibition and provide opportunities for the community and stakeholders to ask questions and find out more before making a submission, a range of consultation tools were used, including:

- Dedicated phone number, email address and project website
- An interactive portal on the project website
- Provision of a detailed project overview and fact sheets with key environmental and project information
- Stakeholder briefings
- Community information sessions and information booths
- Doorknocks of properties in streets identified as being closer to the impacted areas on the project route
- Distribution of community and business updates, in hard copy and electronically
- Media releases and advertising
- Social media.

8.4 Issues beyond the scope of the EIS/preliminary draft MDP

8.4.1 Issues relating to other projects

Summary of issues raised

Submitters raised concerns about other projects or works required in addition to or instead of the project. These included:

- There is no reference to the future use of the Princes Highway or surrounding areas following this project.
- There is supposedly a 'gateway' project for the Princes Highway and King Street as part of the WestConnex project. There has been no further mention of projects designed to disincentivise heavy traffic from the area.
- There has been no expenditure on community related projects that were originally included in relation for improvement works, including a park redevelopment at Bedwin Road and May Street in St Peters.

- Constructing a yard for semi-trailers and containers at the Port Botany site that would have direct access to all major road links and better service the future increase of freight movement.
- Considering investment in Tempe Oval surface upgrades.

Response

These projects are not in the scope for this project.

Although there is a preference for empty container storage parks to be near Port Botany, there is limited industrial land available close to Port Botany to store empty containers and semi-trailers. A summary of the broader effects on the freight management industry as a result of the project is provided in Chapter 20 (Socio-economic impacts) of the EIS/preliminary draft EIS.

Inner West Council prepared a Recreational Needs Study which identified a range of planned works for the Tempe area. In addition, Council is developing a master plan for the Tempe lands to identify how the residual land could be used which will consider Council's Recreation Needs Study. In accordance with mitigation measure LU3, Transport will continue to consult with Inner West Council regarding the future use of residual land in the Tempe Lands and adjoining area; will support and assist Inner West Council with the master planning process for these areas as appropriate; and ensure that the urban design and landscape plan for the project is consistent with the outcomes of this process.

8.4.2 Other issues

Summary of issues raised

Business case

Submitters raised concerns relating to the business case for the project including:

- The business case does not take climate change into account as a risk nor does it adequately assess alternatives to a massive road project.
- The business case assumes business growth will return to the trends of previous decades. It does not take into account trends that will affect the volumes of trade or the impact of climate change, or other projects (such as opening up Newcastle Port to container freight movement and opening of Western Sydney Airport).

Response

Business case

The Final Business Case Summary for the project was published in July 2019 by Infrastructure NSW. The summary was prepared by Infrastructure NSW, the NSW Government's independent infrastructure advisory agency, based on a business case developed by Transport and submitted to the NSW Government in October 2018 in accordance with the NSW Treasury's *Guidelines for Capital Business Cases*.

Preparing a business case is part of NSW Government policy. It is noted projections of future growth in air travel and freight are relatively consistent across a number of NSW and Australian Government agencies and other bodies, including NSW Ports, Transport (freight division) and the Australian Department of Infrastructure, Transport, Regional Development and Communications. The business case was prepared based on funded and committed projects at the time and included Western Sydney Airport.

Addressing detailed comments on the business case is not within the scope of this report. Alternatives to project are discussed in section 8.2.1.

9. Project description issues

This chapter provides responses to issues raised in relation to the proposed design features, infrastructure, scope and how the project would be constructed.

9.1 Design features and scope

9.1.1 Active transport

Alignment with NSW Government policies and plans

Summary of issues raised

Submitters raised concerns the project isn't consistent with the NSW Government's strategic planning policy/plans regarding cycling, active transport, regional connections and the green grid. This included that the current design does not focus and/or commit to detailed strategies for encouraging active travel, and that the proposed active transport link should be integrated with the NSW Government's principal bicycle network.

Response

The project includes relocating the existing Alexandra Canal cycleway to the western side of Alexandra Canal, providing a new active transport link/shared path along with western side of the canal connecting to the existing regional cycle network. Further information about the strategic context, background, features, connections and design requirements for the proposed active transport link are provided in section 3.2.1 of this report.

The development of the proposed active transport link has taken into account relevant strategies and policies, including the Priority Cycleways Program, the *Greater Sydney Region Plan* (Greater Sydney Commission, 2018a), *Eastern City District Plan* (Greater Sydney Commission, 2018b) and the *Future Transport Strategy 2056* (Transport for NSW, 2018a) In addition, plans for a principal bicycle network in Sydney are under development. The draft network was considered during development of the project. The proposed active transport link is consistent with the draft network. The new link would maintain the connection along Alexandra Canal provided by the existing route, which also forms part of the regional cycle network.

Planning for future regional cycle connections is currently being considered by Transport in accordance with the above plans.

The Sydney Green Grid is a long-term vision for a network of high quality green spaces, which connect communities to the natural landscape throughout Sydney. The Green Grid includes tree-lined streets, waterways, bushland corridors, parks and open spaces; linked to centres, public transport, and public places. The Green Grid forms part of the Greater Sydney Region and associated District Plans.

As noted in the *Eastern City District Plan* councils will lead delivery of the Greater Sydney Green Grid through land use planning and infrastructure investment mechanisms, such as development and land use controls, agreements for dual use of open space and recreational facilities, direct investment in open space, and other funding mechanisms such as local development contributions and Voluntary Planning Agreements.

The long term vision for the Green Grid in the Eastern City District (within which the project is located) identifies Alexandra Canal as one of the 'other Green Grid opportunities' in the Eastern City.

This vision, the potential role of the project's landscaping, and opportunities for connections to and along the Alexandra Canal, would be considered as part of the urban design and landscape plan for the project. Transport is collaborating with Sydney Water and local councils on the development of the Alexandra Canal Master Plan. The Greater Sydney Region and District Plans also recognise the important role cycleways and other active transport connections provide in terms of the Green Grid. The proposed active transport link along Alexandra Canal would be consistent with the long-term vision of Alexandra Canal as a Green Grid corridor.

Alignment with project goal

Summary of issues raised

Submitters raised concern the project does not meet the stated goal of ‘making journeys from west and south-west Sydney to Sydney Airport, the M5, Eastern Distributor and Port Botany easier, faster and safer’, particularly for cyclists and pedestrians accessing the airport.

Response

The project has been designed to meet the objectives stated in section 5.3 of the EIS/preliminary draft MDP, which are to:

- Improve connectivity to Sydney Airport terminals by providing high capacity direct road connections that cater for forecast growth in passenger and air freight volumes
- Support the efficient distribution of freight to and from Sydney Airport and Port Botany to logistic centres in Western Sydney
- Improve the liveability of Mascot town centre by reducing congestion and heavy vehicle movements on the local road network.

Suitable active transport connections and infrastructure are included in the project design wherever practicable. In accordance with mitigation measure TT18, Transport and Sydney Airport Corporation will prepare an active transport strategy to integrate and enhance accessibility opportunities. The strategy will be prepared in conjunction with relevant stakeholders and provide a guide for future active transport infrastructure provision.

Further information about the strategic context, background, features, connections and design requirements for the proposed active transport link is provided in section 3.2.1 of this report.

Need for more connectivity and facilities

Summary of issues raised

Submitters raised concerns the project does not provide sufficient connections to other local active transport networks and destinations, or connections to Sydney Airport. Recommendations to improve active transport included:

- A north–south link between Tempe Recreation Reserve, St Peters Interchange and Sydney Park
- Connections between Alexandra Canal Cycleway and Sydney Airport and provision of end of trip facilities at Sydney Airport
- East-west links from Alexandra Canal, the CBD and the east (including Bayside Council network) towards Sydenham
- Extension of links between Alexandra Canal and Mascot
- Connections to/from the west at Marsh Street and crossing of the Cooks River.

Response

As stated in section 5.3 of the EIS/preliminary draft MDP, the objectives of the project are to:

- Improve connectivity to Sydney Airport terminals by providing high capacity direct road connections that cater for forecast growth in passenger and air freight volumes
- Support the efficient distribution of freight to and from Sydney Airport and Port Botany to logistic centres in Western Sydney
- Improve the liveability of Mascot town centre by reducing congestion and heavy vehicle movements on the local road network.

Achieving the objectives requires consideration of the road network as a whole and the need to maintain and improve capacity. The road corridors that would be upgraded are significantly constrained in terms of available space. The majority of available space is required to provide the additional capacity (lanes) needed to support the efficient distribution of freight to and from Sydney Airport and towards Port Botany. This would leave insufficient space for additional active transport links between the airport terminals, public transport services, and existing pedestrian and cycling infrastructure. Suitable connections and infrastructure are included in the project design wherever practicable.

Further information about the strategic context, background, features, connections and design requirements for the proposed active transport link is provided in section 3.2.1 of this report.

Planning for future regional connections is currently being considered by the Transport in accordance with the Greater Sydney Region Plan, District Plans, and the Future Transport Strategy 2056.

Comments regarding the suggested connections are provided below.

A north–south link between Tempe Recreation Reserve, St Peters Interchange and Sydney Park

Transport considered a shared user path from Tempe Recreation Reserve to shared paths being provided at the St Peters Interchange. However, there was concern regarding the safety of the route due to the isolation and lack of appropriate passive surveillance. Furthermore, consultation with cycle stakeholders indicated a strong preference for shared user paths along the banks of Alexandra Canal, which could connect with Sydney Park, rather than a path immediately adjacent to the road infrastructure that would be constructed as part of the project. Transport updated the project to include relocation of the existing shared user path on Airport Drive to the opposite side of Alexandra Canal in response to this feedback.

Transport notes that continuing the existing cycleway along the canal north towards Sydney Park requires a coordinated approach involving Sydney Water, Bayside, Inner West and City of Sydney councils, and the landowners along the canal. Transport is committed to working with these stakeholders to extend the existing shared user path along Alexandra Canal.

Connections between Alexandra Canal Cycleway and Sydney Airport and provision of end of trip facilities at Sydney Airport

Sydney Airport Corporation has implemented a number of initiatives to improve active transport access and facilities over the past six years, including the new footbridge and cycleway connection linking the external cycleway network to the Terminal 1 precinct (removing six vehicle conflict points), and provision of secure bicycle storage facilities and end-of-trip facilities. Additional infrastructure to support active transport has also been installed in the Terminals 2/3 precinct, with three metre wide shared paths extending into the precinct and enhanced crossing facilities at the precinct entry.

Sydney Airport Corporation envisages further improvements as part of the Five-Year Ground Transport Plan (which forms part of the *Sydney Airport Master Plan 2039*) and the approved T2/T3 Ground Transport Solutions and Hotel Major Development Plan, details of which will be further developed and discussed with key stakeholders as the plans are implemented.

The proposed widening of Qantas Drive is driven by the need to safeguard the future performance of the local and wider road network. The widening is significantly constrained by the Botany Rail Line corridor to the north and the Sydney Airport Jet Base to the south. There is insufficient space in between to construct the proposed road infrastructure and provide safe pedestrian and cycle access between the existing Alexandra Canal cycleway and Terminals 2/3.

However, Transport recognises there is demand for an active transport connection between the Alexandra Canal cycleway and the Terminals 2/3 precinct. Transport is working closely with Sydney Airport Corporation to explore options for active transport connections that could be delivered, including the provision of any end of trip facilities. The Sydney Airport Active Transport Forum, which includes local councils and bicycle user groups, would be consulted as part of this process.

Mitigation measure TT18 commits Transport and Sydney Airport Corporation to preparing an active transport strategy to integrate and enhance active transport opportunities. The purpose of this strategy will be to provide a guide for future active transport infrastructure provision. The strategy would be prepared in conjunction with relevant stakeholders, including Inner West and Bayside councils.

Links from Alexandra Canal, the CBD and the east (including Bayside Council network) towards Sydenham

There are currently no pedestrian or cyclist facilities in the vicinity of Mill Pond that Transport could connect to as part of the project. Any such connections are outside of the project area and scope. However, Transport is working closely with Sydney Airport Corporation to explore options to provide active transport connections between the Terminals 2/3 precinct and the existing Alexandra Canal cycleway. The Sydney Airport Active Transport Forum, which includes local councils and bicycle user groups, would be consulted as part of this process. Such a connection could assist with any future plans to provide pedestrian and cyclist connections between the Mill Pond area and Sydenham Station.

An active transport link between the Sydney central business district and Sydenham Station would be well outside the areas potentially affected by the project. Such a link is outside the scope of the project.

A direct connection between Alexandra Canal cycleway at Coward Street and Sydenham station is outside of the project scope. Transport would, however, continue to work with Sydney Airport Corporation, local councils and cycle stakeholders to deliver a shared path between Alexandra Canal and Bellevue Street in the future. A shared path in this location would support a future direct connection between Coward Street and Sydenham Station.

Additional local connections within the project site will be defined by the active transport strategy, to be prepared in accordance with mitigation measure TT18. The purpose of this strategy will be to provide a guide for future active transport infrastructure provision. Other local connections and facilities are outside the scope of the project.

Extension of existing links between Alexandra Canal and Mascot

This proposed connection is outside the project area and outside the scope of the project.

Connections to/from the west at Marsh Street and crossing of the Cooks River

From Cahill Park (in Wolli Creek) cyclists and pedestrians have two options to access Tempe Recreation Reserve, which is located on the northern side of the Cooks River:

- An existing shared user path connects Cahill Park to Tempe Recreation Reserve to the west, using a dedicated bridge over the Cooks River adjacent to the Princes Highway road bridge and Holbeach Avenue in Tempe.
- An existing shared user path connects Cahill Park to the Giovanni Brunetti Bridge and on to the Alexandra Canal cycleway. Tempe Recreation Reserve can then be accessed over Alexandra Canal via the existing bridge. However, access over the Giovanni Brunetti Bridge is not sufficiently wide to meet current standards for shared paths. Upgrading the bridge so that the path meets current standards for shared use would involve significant structural changes to the bridge.

As there are already two access routes that can be used by pedestrians and cyclists to access Tempe Recreation Reserve from Cahill Park, further improvements are outside the scope of the project.

Transport is committed to working with Sydney Airport Corporation to explore ways in which the Giovanni Brunetti Bridge (Marsh Street) could be upgraded during delivery of the principal bicycle network (which is currently under development).

Additional regional and local connections

As described in section 9.4.7 of the EIS/preliminary draft MDP, a number of connectivity gaps exist in the current active transport network of the area. In accordance with mitigation measure TT18, Transport and Sydney Airport Corporation will prepare an active transport strategy to integrate and enhance accessibility opportunities. The strategy will be prepared in conjunction with relevant stakeholders and provide a guide for future active transport infrastructure provision. The active transport strategy will include consideration of:

- Opportunities for additional connections to and around the Sydney Airport terminals
- Integration with planning for future facilities in accordance with the Sydney Airport Master Plan
- Need for additional end of trip facilities at Sydney Airport.

In addition, the NSW Government is delivering cycleway network improvements through the Priority Cycleways Program and the Connecting Centres cycling partnership program. Transport is also establishing a principal bicycle network in collaboration with councils.

Planning for future regional connections is currently being considered by the Transport in accordance with the *Greater Sydney Region Plan*, associated district plans, and the *Future Transport Strategy 2056*.

Removal of the existing active transport link

Summary of issues raised

Submitters raised concern about disruption to active transport links as a result of the project, and the reason for the removal of the existing cycleway along Airport Drive and Alexandra Canal.

Response

As described in section 3.2.1 of this report, a new active transport link is required because the project would impact the existing cycleway adjacent to Airport Drive along the eastern side of Alexandra Canal. This cycleway is part of a popular regional cycle route extending from Wolli Creek Station to Coward Street, Mascot, where it connects to shared paths on Bourke Street, Bourke Road and Gardeners Road which provide access to other areas of Sydney including the Sydney CBD along Bourke Street.

Construction of the project would impact the existing cycleway at a number of locations. In addition, the Sydney Airport Master Plan proposes to close Airport Drive to non-airport traffic, which would also necessitate relocation of the existing cycleway.

Due to the acknowledged importance of the existing cycleway, it was identified that an alternate route was required following completion of the project.

Further information is provided in section 3.2.1 of this report.

Option selection

Summary of issues raised

Submitters raised concern about the removal of the cycling path alongside Alexandra Canal and Airport Drive and request for a review of the proposed new active transport link.

Response

Constructing the project would impact the existing cycleway adjacent to Airport Drive along the eastern side of Alexandra Canal. Due to the acknowledged importance of the existing cycleway, it was identified that an alternative safe route was required following completion of the project.

As described in section 6.5.5 and shown on Figure 6.10 of the EIS/preliminary draft MDP, an options development and assessment process for a new active transport link was undertaken by Transport (then Roads and Maritime Services) in 2018 and 2019. The process involved consultation with stakeholders, including bike groups, local councils, residents and community groups. A range of options for new connections were considered.

Each of the options was assessed against the constraints and functional requirements. This included discussion of each option in a forum, which was attended by local councils, Sydney Airport Corporation and Transport (then Roads and Maritime Services).

The outcome of the assessment was option 1 (located along the western side of Alexandra Canal) being selected as the preferred route. This option would provide the shortest, flattest route, and a similar level of amenity to the existing route. This route would be suitable for both commuters and leisure users, and maximise the experience of canal views, which was strongly advocated by all user groups and stakeholders.

Further information about the proposed active transport link, strategic context and options selection process is provided in section 3.2.1 of this report.

Impacts to active transport links during construction and temporary active transport provision

Summary of issues raised

Submitters raised concerns regarding impacts to bike paths during construction and requested that existing paths be maintained during construction of the project.

Other concerns included the safety and accessibility of the temporary link (is not direct, too hilly and not suitable for many people), longer travel times and communication about the temporary link.

Response

The existing cycleway would be impacted during construction and is not able to be maintained for continued use. Due to the acknowledged importance of the existing cycleway, it was identified that an alternate safe route was required during the three-year construction period.

Transport is committed to providing safe cycling and walking connections during construction, and is working with shortlisted contractors currently tendering for the project to maintain existing pedestrian and cyclist connectivity in a safe manner.

As described in section 3.2.1, the proposed temporary active transport link would cross Alexandra Canal via the existing pedestrian and cycle bridge located west of Link Road. The link would then generally follow or be located adjacent to the existing access road along the eastern edge of Tempe Recreation Reserve and along the southern edge of the Tempe Wetlands. The temporary active transport link would turn south-east and cross the work area for the Terminal 1 connection, the Sydney Airport high intensity approach lights and the Sydney Airport employee car park, before crossing Alexandra Canal at the Nigel Love bridge and re-join the existing cycleway.

Due to the steep gradient to Tempe Lands, it may not be possible to provide ideal grades on the temporary active transport link.

Transport recognises proposed diversion of the existing shared user path during construction would increase distance and travel times, and has the potential to adversely affect user amenity. Transport has raised this matter and the need to minimise distance, travel times and disruption with the contractors that are currently tendering for the project. Transport is actively working with shortlisted contractors to improve outcomes during construction and provide the relocated permanent shared user path along Alexandra Canal as soon as possible during the construction phase. However, Transport notes, due to the directness of the current alignment, it would not be possible to provide a temporary diversion that does not involve some increase in distance and travel time.

Transport would ensure acceptable levels of user safety are maintained along the temporary active transport link throughout construction

Mitigation measure TT12 commits to maintaining safe pedestrian and cyclist access around or through work areas. Where disruptions to access cannot be avoided, alternative routes that comply with relevant accessibility standards and guidelines will be provided (where reasonable and feasible), signposted and communicated.

Design issues

Summary of issues raised

Submitters raised concern regarding the design of the proposed active transport link including design issues/requirements for permanent connections, width, separation, grade, accessibility; compliance with NSW infrastructure guidelines, and need for safety and amenity for people walking and cycling.

Response

The proposed active transport link along Alexandra Canal has been, and would continue to be, designed in accordance with *Austroads Guide to Road Design: Part 6A Requirements for a Shared Path* and other relevant design standards and guidelines. The design requirements are described in section 3.2.1.The path and all connections to it would be fully accessible in accordance with the *Disability Discrimination Act* 1992 (Cth). The path would be designed with reference to the principles of crime prevention through environmental design (CPTED). Lighting would be integrated for safety and to improve passive surveillance.

Urban design and landscaping along and in the vicinity of the active transport link including any opportunities for connections to the surrounding network, would be defined by the urban design and landscape plan for the project, which will be prepared in accordance with mitigation measure LV1.

Planning for future regional connections is currently being considered by Transport in accordance with the Greater Sydney Region Plan, District Plans, and the *Future Transport Strategy 2056*.

Transport is committed to providing safe cycling and walking connections during construction as described above.

Mitigation measure SE2 commits to designing temporary and operational active transport links in accordance with crime prevention through environmental design principles.

Closures during maintenance

Summary of issues raised

A submitter raised concern a potential closure of the Alexandra Canal path during future road maintenance works would result in long diversions for users of the pathway.

Response

The temporary closure of the shared path may be required in order to perform certain road maintenance activities. The area of greatest constraint is the section between the southern end of the Terminal 1 connection and the unnamed pedestrian bridge across Alexandra Canal. Potential maintenance works in the eastern most lane may require plant and equipment to be located on the proposed path. There may be limited room to divert the path because of the proximity to the canal.

Where practicable, Transport would provide an alternative access arrangement in the event that maintenance requirements necessitate closure of the active transport link.

9.1.2 Public transport

Public transport provision

Summary of issue raised

Submitters raised concern the project does not provide adequate public transport including bus infrastructure options to the airport. Submitters also noted the project does not align with NSW Government policies due to the lack of public transport options provided.

Response

Achieving the project objectives requires consideration of the road network as a whole and the need to maintain and improve capacity. The road corridors that would be upgraded are significantly constrained by both the freight rail corridor to the north and the Sydney Airport jet base to the south. The majority of available space is required to safeguard the future performance of the local and wider road network. This would leave insufficient available space for additional bus only lanes. Adding bus only lanes would constrain road capacity for all other vehicles and be inconsistent with the objectives of the project.

The improved capacity and connectivity the project would provide, together with the wider changes to the Sydney motorway network, would create potential options for new road-based public transport routes and options for connecting to the airport.

The project would introduce a range of improvements to bus travel times along the existing routes that service the airport. The project would also substantially improve bus travel times for at least 15 different bus routes within the Sydney Airport area by 30 to 50 per cent. These changes would make the use of existing bus services in the locality more attractive to existing and potential future patrons.

Transport's Sydney's Bus Future program will provide improved commuter bus access to Sydney Airport, with better east, west and south links. The program includes new bus routes and extra bus services to the airport. The program will introduce substantial improvements to bus travel options to and around the airport precinct.

Providing additional public transport options along the new corridor is outside the scope of the project. The proposed ground transport interchange at Terminal 2/3 (to be developed by Sydney Airport Corporation) will provide direct and efficient access for vehicles and allow for an increase in the number of public transport services to and from Sydney Airport.

Transport's More Trains More Services program will continue to provide additional capacity to the rail system over the next ten years. Since 2017, the program has delivered more than 1700 additional weekly services across the rail network. The next stages of the program will focus on delivering improvements for the T8 Airport and South lines.

9.1.3 Direct freight connections, including at Canal Road

Removal of Canal Road access ramps from the original design

Summary of issue raised

Submitters raised concern the current design does not include access ramps for heavy vehicles from Canal Road to provide access between the Cooks River Intermodal Terminal and Port Botany. Particular concern was raised regarding the removal of these access ramps from the original design.

Submitters noted a design solution that would deliver direct freight access to and from the project should be provided as part of the project.

Response

As described in section 3.2.5 of this report, Transport recognises the important role of the Cooks River Intermodal Terminal in the container supply chain. However, only a proportion of the heavy vehicle movements in the local area travel directly between the Cooks River Intermodal Terminal and Port Botany. The former Roads and Maritime Services considered an early concept for access ramps on and off the project at Canal Road. Options for both tolled and untolled ramps were modelled. The results of modelling indicated that the ramps would lead to an increase in vehicles accessing the Princes Highway and Canal Road from outside the local area network, which would reduce capacity and traffic performance along these key routes.

This analysis informed the decision that the future transport and general traffic benefits of including ramps at Canal Road as part of the project would be low compared to the estimated costs of constructing the ramps and acquiring additional land from Sydney Airport Corporation and the Australian Government.

Following feedback, Transport has been working with the freight industry throughout 2019 to further consider dedicated heavy vehicle access onto and off the project at Canal Road. While the ramps are not part of the project's scope or funding package approved by the NSW Government, the project team has refined the design of the project to ensure future construction of the ramps is not precluded. Future ramps would be subject to funding approval, land agreements and planning approvals.

Further information related to the Canal Road ramps is provided in section 3.2.5.

Consistency with project objectives

Summary of issue raised

A submitter raised concern that not including Canal Road ramps as part of the project would require heavy vehicles to use the local road network to travel between Port Botany and the Cooks River Intermodal Terminal, resulting in 1,600 additional heavy vehicle movements a day between the two locations and up to 3000 vehicle movements a day when other freight operations in the area are taken into consideration. This would run counter to the objectives of the project, to reduce traffic congestion in and around Sydney Airport and Port Botany and to remove heavy vehicles from local roads.

Response

The project has been designed to achieve the objectives stated in the section 5.3 of the EIS/preliminary draft MDP. The new road infrastructure would provide high capacity, direct connections between Sydney Airport and the Sydney motorway network, and would support efficient distribution of freight to and from Sydney Airport and Port Botany by reducing congestion in the network.

As described in section 3.2.5, modelling indicates that the project would provide additional network capacity for up to 60,000 vehicle trips per day in 2036. In relation to the routes used by heavy vehicles travelling between the Cooks River Intermodal Terminal and Port Botany, predicted traffic demand would shift from O'Riordan Street and Botany Road in the Mascot town centre. It is predicted that these roads would carry between 25 to 30 per cent less traffic in 2036 than they would have without the project, as vehicles use the project to bypass the surrounding road network. Heavy vehicles travelling from south-west and western Sydney would be able to use the Sydney motorway network and the project to travel to and from Port Botany, bypassing the local road network in Mascot.

The delivery of the Sydney Gateway road project would be coordinated with Transport for NSW's wider infrastructure delivery program. This includes a number of programs, such as the Mascot intersection upgrade program, aimed at delivering a safe and reliable road network around Mascot. Further to this, operational network performance reviews would be carried out following the opening of the New M5 and the M4/M5 Link. Should these reviews identify the need for further traffic management measures on the transport network, a program would be developed to carry out such works. These works are likely to deliver benefits and relief to the network during and after the construction of the Sydney Gateway road project.

Analysis of the Strategic Motorway Planning Model for the project indicates that about 50 per cent of heavy vehicles accessing Port Botany would divert to the project daily from existing roads by 2036. In the reverse direction, about 40 per cent of heavy vehicles egressing from Port Botany daily would use the project in 2036 in preference to existing routes. As a result, the project would attract traffic away from other arterial roads allowing reduced traffic growth on the M5, General Holmes Drive, Southern Cross Drive and Botany Road, which are key routes for the movement of freight.

Providing direct access between the project and Canal Road or the Cooks River Intermodal Terminal would remove a proportion of trucks from the Mascot area. However, the ramps are not needed to reduce congestion and heavy vehicle movements on the local road network and improve the liveability of Mascot town centre.

Further information related to the Canal Road ramps is provided in section 3.2.5.

Rail turnout at Cooks River Intermodal Terminal

Summary of issue raised

Submitters requested a direct rail turnout, or space for a turnout, be included in the project to allow increased freight movement to and from Port Botany by rail.

Response

Transport has been working with the freight industry (including Qube Logistics) regarding the provision for a rail turnout from the Cooks River Intermodal Terminal to the Botany Rail Line. While a rail turnout is not part of the project's scope approved by the NSW Government, the project team has refined the design of the project to ensure future construction of the rail turnout is not precluded. Discussions between Qube Logistics and Transport would be undertaken to confirm the timing of the availability of the land required for the proposed turnout.

Measures to manage construction of the proposed turnout during construction of the project, if required, would be identified in consultation with Qube Logistics in accordance with mitigation measure SE3.

In accordance with mitigation measure LU1, the design would continue to be refined to minimise land requirements and potential impacts on existing land uses and properties as far as possible. Consultation with landholders would be ongoing to identify opportunities to minimise impacts on operations where practicable.

9.1.4 Urban design and landscaping

Concerns and recommendations for urban design and landscaping

Summary of issues raised

Submitters raised concerns regarding urban design and provided recommendations for landscaping to enhance the visual amenity of the local area, including:

- Bridge and overpass designs not being sympathetic to the canal
- Using native species to improve visual amenity, reduce noise and create habitat for wildlife
- Opportunities for art installations
- Opportunity to rehabilitate Alexandra Canal and create green space in Airport Drive.

Response

As described in section 7.12.3 of the EIS/preliminary draft MDP and required by mitigation measure LV1, an urban design and landscape plan will be prepared. The plan will present an integrated urban and landscape design for the project and include:

- Design objectives, principles and standards, including for bridges
- A description of the project's design features

- Landscaping and structural design opportunities to mitigate the visual impacts of road infrastructure and operational fixed facilities
- Details of proposed landscaping
- Details of disturbed areas (including compounds) and the strategies to progressively rehabilitate, regenerate and/or revegetate these areas
- The timing for implementation
- Monitoring and maintenance procedures for built elements, vegetation and landscaping.

The provision of landscaping would be a key element in achieving the overall urban design visual and objectives for the project. The design of landscaping would consider:

- Landscaping features to provide a generous landscape curtilage for vegetation (including tree cover), landform and public art installations to create a memorable landscape setting for the motorway
- Visual separation to the Botany Rail Line, including a green interface, where practicable, to replace existing mature vegetation that would need to be removed to construct the project
- Using appropriate native species
- Opportunities for green space, including along Alexandra Canal
- Consider Sydney Airport's airport operational constraints, particularly in terms of the airport's prescribed airspace and minimising opportunities to attract wildlife at levels likely to present a hazard to aviation operations (in accordance with mitigation measure AS5).

Although all construction work areas would be rehabilitated as works are complete, broader rehabilitation of Alexandra Canal is not within the project scope.

Sydney Water is working to produce an asset plan that will be used to guide restoration, protection and renewal of Alexandra Canal embankments. Transport will continue to consult with Sydney Water in relation to restoration of parts of the canal walls that would be impacted during construction of the project. Transport would consider the outcomes of this process in the preparation of the urban design and landscape plan (mitigation measure LV1). Transport notes that any woks that could disturb the bed sediments in the canal would need to be carried out in accordance the remediation order for Alexandra Canal (number 23004) issued by the NSW EPA.

Mitigation measure SE3 outlines the communications strategy to maintain engagement with stakeholder and community throughout detailed design and construction.

Mitigation measure CS21 commits to preparing a rehabilitation strategy to guide the approach to rehabilitation of areas disturbed by construction.

9.1.5 Other project scope issues

Continuing to use Airport Drive to connect Terminals 1 and 2/3

Summary of issue raised

A submitter questioned why Airport Drive could no longer be used to directly connect between Terminal 1 and Terminals 2/3.

Response

Airport Drive would be closed to the public in the future with the project providing the road link between Terminal 1 and Terminals 2/3. Providing the required additional road capacity between the St Peters Interchange and Airport Drive in its current location would result in a need for additional land from Sydney Airport, which would impact on existing airport operations. The proposed alignment for the Terminal 1 connection and the eastbound and westbound terminal links therefore maintains the existing connectivity between the terminals and provides an optimised outcome from an airport operations perspective, compared to the existing situation.

Additional land requirements

Summary of issue raised

A submitter requested clarification about the area where the intermodal terminal ends and if this will mean further land grab in Tempe between Swamp Road and the Alexandra Canal which will be pitched as a missing link, resulting in further impacts on biodiversity and green space.

Response

The estimated permanent land requirements associated with the project's operational footprint are described in 7.11.2 of the EIS/preliminary draft MDP. Changes to land requirements are described in Chapter 3 of this report. No additional land requirements are anticipated.

Direct access to Terminal 1 via Marsh Street

Summary of issue raised

A submitter requested that direct road access from Tempe to Terminal 1 continue via Marsh Street during and following construction of the project.

Response

The project would not affect access to Terminal 1 via Marsh Street.

Off-leash dog exercise area

Summary of issues raised

A submitter requested the project consider improved facilities and an interim solution within walking distance of the current one (such as at Tempe Oval with times allowing off-leash or a new temporary fenced off area away from the construction area).

Response

Section 8.4.2 of the EIS/preliminary draft MDP notes that a temporary off-leash dog exercise area would be provided to mitigate the impacts on the existing off-leash dog exercise area due to the establishment of construction compound C3. The exact location of the temporary area would be confirmed in consultation with Inner West Council.

As described in section 7.12.4 of the EIS/draft MDP and as required by mitigation measure LU3, a new off-leash dog exercise areas would be included in the redevelopment of the residual lands in accordance with Inner West Council's Master Plan. The design of the new off-leash dog exercise area would be developed in consultation with Inner West Council.

Better integration required

Summary of issues raised

A submitter raised concern the project only caters for motor vehicles, requires better integration with the natural and urban environment, and should be designed by multi-disciplinary teams.

Response

The concept design of the project evolved over a period of about 18 months and involved many iterations and refinements, incorporating a range of considerations at each stage. The approach to design development included a focus on avoiding or minimising the potential for impacts during all key phases of the process. A feedback process enabled findings from a multidisciplinary team including various technical specialists. This contributed to a collective understanding of the receiving environment to be built up, and resulted in elements of the design being refined or changed to respond to these findings.

Engineering and environmental constraints considered during the design process included the extremely tight operational project boundary, existing land uses and ownership, sensitive receivers, large areas of historically contaminated and saline soils, and Sydney Airport operational issues. Much of the project is located in existing disturbed areas to minimise impacts on existing sensitive receivers, existing urban renewal areas (particularly in Mascot) and urban amenity.

The concept design for the project has also been developed taking into account the urban design vision and objectives (presented in Figure 7.8 of the EIS/preliminary draft MDP) and the urban design and place making strategy (see chapter 6 of Technical Working Paper 13 (Urban Design, Landscape Character and Visual Impact Assessment)). A summary of how key urban design and place making issues have been addressed during the concept design process are described in section 7.12.2 of the EIS/preliminary draft MDP.

A key consideration of the urban design and landscape plan for the project will be integration with the surrounding environment where possible.

Incentives for heavy vehicles

Summary of issues raised

Concern was raised that the project does not include an incentive for trucks to use the road, or disincentives to avoid other areas (such as Princes Highway or other main roads). The NorthConnex project included fines for trucks using the surface road, it is not proposed to include any similar mechanism to ensure trucks are using this taxpayer funded road.

Response

The project would be a toll-free road that comprises new and upgraded sections of road linking the Sydney motorway network at St Peters interchange with Sydney Airport's terminals. Direct un-tolled and free flowing connections to the Sydney motorway network would be more attractive options to heavy vehicle drivers than the alternative routes that involve local road networks and heavily signalised arterial roads, the project would result in a reduction of through traffic volumes in Mascot, as well as along the Princes Highway. No further incentives are therefore considered required to encourage heavy vehicles to use the project.

9.2 Construction

9.2.1 Haulage routes

Summary of issues raised

Access via Holbeach Avenue

Submitters raised concern regarding access to compound C3 via Holbeach Avenue, noting that at the community information session confirmation was provided that no construction traffic would be accessing the site via Holbeach Avenue.

A submitter also requested no thoroughfare traffic via South Street, Barden Street, Smith Street, Hope Street, Wentworth Street, Fanning Street and Station Street as a result of the project.

Response

As described in section 3.2.3 of this report, construction traffic proposed along Holbeach Avenue (construction access A8) will be limited to light vehicles movements only, with all heavy vehicles access to the work area via Bellevue Street (construction access A7).

Haulage routes to access the project site are described in section 8.6.1 and shown on Figure 8.16 of the EIS/preliminary draft MDP. No haulage routes are proposed via South Street, Barden Street, Smith Street, Hope Street, Wentworth Street, Fanning Street and Station Street.

10. Potential impacts of the project

This chapter provides responses to issues raised in community submission in relation to the potential impacts of the project.

10.1 Traffic, transport and access

10.1.1 Construction traffic, transport and access

Road and intersection performance

Summary of issues raised

Submitters raised concerns about traffic impacts at the Holbeach Avenue signalised intersection with the Princes Highway as a result of the increase in construction vehicles.

A submitter raised concern regarding the use of the existing access road to Tempe Recreation Reserve for construction vehicle access. The use of the road by 250 workers vehicles entering and leaving the compound every day would impact users of the reserve.

Response

It is noted that Holbeach Avenue is one of the key roads used to access Tempe Recreation Reserve. Holbeach Avenue intersects with the Princes Highway about 150 metres from the northern end of the reserve.

As described in section 3.2.3 in this report, following consideration of issues raised by a number of stakeholders regarding the suitability of the proposed haulage routes, indicative traffic volumes and proposed access points, Transport has determined that Holbeach Avenue and associated access point A8 are no longer required to be used by heavy construction vehicles. Heavy vehicle access to construction work areas within Tempe Lands would be from Airport Drive via the Nigel Love bridge and from the Princes Highway via Bellevue Street. Further review of the estimated construction traffic volumes predicted to access work areas and compounds in Tempe Lands via Holbeach Avenue has resulted in a reduction in the number of light vehicle movements predicted during peak periods. About 100 light vehicles are estimated to access the construction work area via Holbeach Avenue during the morning and evening peaks (reduced from 250 as noted in the EIS/preliminary draft MDP). The locations of these compounds, construction work areas and access points are shown on Figures 8.15 and 8.16 in Appendix A of this report.

It is recognised that significant parts of the local road network in the study area are currently congested during peak periods. Traffic congestion along the Princes Highway during peak periods is known to be affected by queues from downstream intersections. The key criteria for performance of these intersections during peak hours is the right turn queue length. The construction workforce, however, typically arrives at site before the main network morning peak and leaves before the evening peak, minimising the potential for impacts on these intersections during peak times. In accordance with mitigation measure TT4, a travel demand strategy will be prepared to provide a comprehensive set of travel mode options to minimise use of roads affected by construction, and communication strategies to reduce the number of people using the road network in the project study area during construction, where practicable

Transport, traffic and access will be managed during construction in accordance with the Construction Traffic and Access Management Plan (mitigation measure TT1). The plan will include measures to manage traffic at compound access points. In accordance with mitigation measure TT7, where reasonable and feasible, construction access arrangements will be modified to address any traffic flow issues identified by key stakeholders.

Construction haulage routes

Summary of issues raised

Submitters raised concerns regarding the impact of extra heavy vehicle movements on the overall performance of the local road network and safety of other road users. This included a concern that the proposed haulage route through the Mascot Station precinct passes onto already congested roads.

Response

The traffic, transport and access assessment (Technical Working Paper 1 (Transport, Traffic and Access)) concluded that construction would result in unavoidable changes to the configuration and capacity of existing road connections. The assessment identified that the latter stages of construction would result in moderate impacts on the local road network, particularly in the vicinity of Terminals 2/3.

The proposed haulage routes are shown on Figure 8.19 of the EIS/preliminary draft MDP. The closest haulage route to Mascot Station is O'Riordan Street, located about 330 metres to the east of the station. Based on the indicative haulage routes and estimated construction vehicle volumes, the largest increases in vehicle volumes are expected along Canal Road, particularly at its western extent near the Princes Highway, and on Qantas Drive and Airport Drive.

A range of mitigation measures are proposed to minimise the potential traffic, transport and access impacts during construction (see mitigation measures TT1 to TT16 in Chapter 11 of this report). In particular, measure TT1 commits to preparing and implementing a Construction Traffic and Access Management Plan. The plan will detail processes and responsibilities to minimise traffic and access delays and disruptions, and identify and respond to changes in road safety during construction. Further information on the CEMP, including the requirements for the Construction Traffic and Access Management Plan, is provided in Chapter 27 of the EIS/preliminary draft MDP. In relation to construction haulage, measure TT15 commits to managing haulage vehicles to:

- Adhere to the nominated haulage routes and speeds identified in the Construction Traffic and Access Management Plan
- Minimise idling and queuing on public roads
- Minimise movement of vehicles during peak periods.

Cumulative impacts

Summary of issue raised

A submitter raised concern about cumulative traffic, access and parking impacts associated with construction activities with the opening of the new Bunnings in Tempe.

Response

The site for the proposed Bunnings development in Tempe is located at 728-750 Princes Highway. The proposed development was approved in June 2019. Traffic impacts associated with the project along this section of the highway were assessed in Technical Working Paper 1 (Transport, Traffic and Access) and summarised in Chapter 9 of the EIS/preliminary draft MDP. The assessment found that construction traffic using the Princes Highway would be a very small percentage of the existing overall traffic volumes on the highway. As such, and given the small percentage of construction traffic, construction is not expected to noticeably affect travel times on the Princes Highway even considering traffic associated with the proposed Bunnings development.

The project is also not expected to impact access to areas adjacent to the proposed Bunnings development or parking as no construction parking is proposed within the vicinity of the store.

Few (if any) cumulative traffic, access and parking impacts are therefore likely associated with the new Bunnings at Tempe and the project.

Parking impacts

Summary of issues raised

A submitter raised a concern regarding the temporary loss of on-street parking, such as within Tempe Recreation Reserve and residential areas in Tempe and Mascot resulting in reduced parking spaces for residents and people accessing the reserve, airport or other nearby businesses.

Clarification was also requested regarding the locations of where parking is likely to be impacted.

Response

Section 8.6.3 of the EIS/preliminary draft MDP notes the number of parking spaces that would be provided within the construction footprint (which includes all compounds), to cater for the estimated workforce. It is estimated that about 980 parking spaces would be provided within the construction footprint.

The potential impacts on parking during construction are described in section 9.3.7 of the EIS/preliminary draft MDP. This section notes that there may be a shortfall of about 110 spaces during the peak construction period. This would be managed in accordance with mitigation measure TT13, which requires a worker parking strategy to be developed and implemented. The worker parking strategy will include measures to encourage workers to use alternative transport arrangements, such as public transport, and promote the use of shuttle buses to move workers between compounds and work areas where capacity in one parking area is limited but other parking areas have capacity. The number of workers required for the project would be confirmed by the construction contractor.

Impacts on on-street parking is expected to be limited as no on-street parking is available along roads that would be directly affected by construction (such as Airport Drive, Qantas Drive, Joyce Drive and impacted sections of Robey Street and O'Riordan Street). Local roads within walking distance of some construction compounds, particularly near compound C4 (located off Qantas Drive in the Terminals 2/3 precinct), have on-street parking available. However, the on-street parking is generally restricted to up to three-hour parking, limiting the ability for construction workers to use these spaces.

The worker parking strategy prepared in accordance with mitigation measure TT13 would reduce potential parking impacts in Tempe Recreational Reserve due to the project.

Other impacts

Summary of issue raised

A submitter raised concern about the disruption and inconvenience of the project in terms of road closures, damaged footpaths, and difficulty accessing properties, as per other major road projects.

Response

The traffic, transport and access assessment concluded that the project can be constructed without substantial reconfiguration of the existing road network. However, there would be substantial works on Airport Drive, Qantas Drive and Sir Reginald Ansett Drive to facilitate construction and connection of the new road links.

To minimise the potential for traffic and access impacts, short-term closures would be undertaken during night-time hours as far as possible. However, major crane lifts might require full weekend closures of certain roads, with detours established to maintain access to Sydney Airport's terminals, Port Botany and operation of the road network. All closures would be managed in accordance with a Construction Traffic and Access Management Plan (mitigation measure TT1). This plan would define the traffic management measures and communications required to manage traffic through or adjacent to work areas to ensure that access and road functionality is maintained and that road users are informed.

The Transport Management Centre is responsible for managing traffic along major arterial roads. All work associated with the project that could affect traffic flow on major arterial roads would be undertaken in accordance with conditions stipulated in a Road Occupancy Licence issued by the Transport Management

Centre. This would be implemented in conjunction with a detailed communications strategy to notify drivers of construction work, potential delays, detours and other relevant information (mitigation measure TT3).

Transport confirms that the project would not involve a significant amount of work in the road corridor directly adjacent to properties, or in a manner that would affect access to these properties. In accordance with mitigation measure TT11, access to properties not required for construction would be maintained at all times. Where disruption to access cannot be avoided, consultation will be undertaken with the owners and occupants of affected properties to confirm their access requirements and to determine alternative arrangements.

In accordance with new mitigation measure LU8, condition surveys for structures and infrastructure at potential risk of damage due to construction of the project will be undertaken prior to commencement of potentially damaging activities in the vicinity. Rectification measures will be implemented during construction to address any damage caused by the project. A final condition assessment will be carried out at the completion of construction detailing recommendations for any additional rectification required.

10.1.2 Operational traffic, transport and access

Travel time

Summary of issue raised

A submitter raised a concern regarding travel times and congestion experienced by Tempe residents accessing Sydney Airport with the closure of Airport Drive. Currently, residents can access the airport in under 20 minutes depending on the time of day.

Response

The closure of Airport Drive and diversion of traffic onto the proposed Terminal 1 connection and terminal links (refer to Figure 7.2 in the EIS/preliminary draft MDP) would increase the travel distance between Terminal 1 and Terminal 2/3 by about one kilometre. This is not expected to result in a noticeable change in travel time as a result of the reduction in congestion and increase in average speed expected during operation.

In relation to travel by Tempe residents to Sydney Airport, mitigation measure TT17 commits to undertaking a review of operational network performance 12 months and five years from the commencement of operation to confirm the operational traffic impacts on surrounding arterial roads and major intersections. The review will identify any measures required to address impacts on road network performance. The results of the review will be considered in future operational network performance planning carried out by Transport.

10.2 Noise and vibration

10.2.1 Assessment method

Noise modelling

Summary of issue raised

A submitter questioned if modelling for noise pollution considered local wind conditions, as wind conditions affect noise from the airport.

Response

Two noise models (one each for construction and operation) were used to predict the noise impacts from the project at surrounding receivers. The models incorporated local wind conditions as part of the prediction process, in accordance with standard procedures.

10.2.2 Construction impacts

Noise impacts during construction

Summary of issues raised

Submitters raised concerns about construction noise impacts, including concerns related to heavy vehicle movements, extensive night work close to residential areas, associated sleep disturbance impacts and whether the duration of night works would increase once construction starts.

Response

Road traffic noise

The project site is located in close proximity to a number of arterial roads. As a result, heavy vehicles associated with construction would mostly use the existing arterial road network, which includes designated heavy vehicle routes. The proportion of construction heavy vehicles compared to the existing heavy vehicle volumes on these roads would be small. Therefore, heavy vehicles associated with construction are unlikely to result in a noticeable increase in road traffic noise.

The potential noise impacts from construction traffic were considered by the noise and vibration assessment, and the results are summarised in section 10.4.4 of the EIS/preliminary draft MDP. The assessment concludes that construction traffic, including heavy vehicle movements, is unlikely to generate noise levels in excess of the noise criteria. This is mainly due to the existing high volumes of traffic (including heavy vehicles) that use these roads.

Out-of-hours work

Section 8.3.3 of the EIS/preliminary draft MDP provides information on the need and justification for out-of-hours (including night) work. Construction would be undertaken during recommended standard hours wherever possible. Out-of-hours work would typically only be justified when it cannot occur during standard daytime hours or where the work would not result in noise impacts on sensitive receivers. Out-of-hours work would be required for activities that may impact on critical infrastructure and operations, including the operation of Sydney Airport, arterial roads and the Botany Rail line.

Out-of-hours work would be timed, where practicable, to occur in parallel with other such work and in the evening period, to minimise activity durations and potential for sleep disturbance as far as possible. However, due to the nature of the work, not all activities can be undertaken in this manner. The estimated duration of out-of-hours work for each activity would be confirmed during detailed construction planning and programming undertaken by the appointed construction contractor(s).

Section 10.4.2 of the EIS/preliminary draft MDP describes the predicted noise levels for each noise catchment area. Tables 10.19 to 10.21 indicate the number of receivers with predicted noise exceedances during out-of-hours work. The highest impacts are generally predicted for the ‘peak’ scenario, with the worst-case impacts predicted during enabling works, compound establishment, site establishment, bridge construction and roadworks. Peak activities are proposed to be undertaken intermittently over shorter periods. Impacts associated with ‘typical’ activities are predicted to be substantially lower but would occur over a longer period.

Construction work would be required near the following residential areas:

- Residences located to the north-west of the Princes Highway, including parts of Sydenham and St Peters (noise catchment area NCA01)
- Residences located to the south-east of the Princes Highway in Tempe (noise catchment area NCA03)
- Residences in Mascot located to the north of the railway line and east of O’Riordan Street (noise catchment NCA08).

Residences north-west of the Princes Highway (noise catchment area NCA01) are not expected to be impacted by noise from out-of-hours work.

Noisy construction activities near residences located south-east of the Princes Highway (noise catchment area NCA03) would not typically be justified outside recommended standard hours. The exceptions would be work on or adjacent to Airport Drive, work within the rail corridor and work in the northern portion of the former Tempe landfill that are constrained by airport operations. However, these areas are some distance from residences, which would minimise potential noise impacts during night works. Out-of-hours work may also be required if a piled pavement solution is needed through the former Tempe landfill to support the road. This would be confirmed during detailed design in accordance with mitigation measures NV1 and NV6.

Out-of-hours work that may result in exceedances of the nose criteria for residences in Mascot to the north of the railway line and east of O'Riordan Street (noise catchment area NCA08) include:

- Enabling work along Robey Street, O'Riordan Street and Joyce Drive
- Bridge works associated with the Terminals 2/3 access.

Elevated noise levels would be associated with the use of noise intensive equipment such as rock breakers and concrete saws. This would only be required at certain times during the construction phase. When these items are not used, noise levels would be significantly less and construction noise goals would be exceeded at much fewer residences, if at all (depending on the work location).

Sleep disturbance

Table 10.22 of the EIS/preliminary draft MDP provides noise impact information in relation to sleep disturbance. The table indicates that the residential area located in Tempe to the south-east of the Princes Highway (noise catchment area NCA03) is expected to contain the highest number of affected receivers. As described above, noisy construction activities close to this area would typically not be justified at night. Table 10.22 also indicates exceedances of the sleep disturbance criteria at residences located north of the railway line and east of O'Riordan Street in Mascot (noise catchment NCA08). These exceedances are typically associated with the use of noisy equipment, such as rock breakers and concrete saws. These items of equipment would only be used at certain times. When they are not used the potential for sleep disturbance would be greatly reduced.

The assessment of potential noise impacts associated with construction in the EIS/preliminary draft MDP was based on a conceptual construction methodology and the construction contractor may develop a different construction methodology. The durations of, and noise levels associated with, activities required outside recommended standard hours may change as a result. The potential for noise impacts would be managed by implementing mitigation measures NV5 to NV15. Further information is provided in the response below.

All noisy works that have the potential to affect the amenity of residents would be managed in accordance with the *Construction Noise and Vibration Guideline* (Roads and Maritime, 2016), which includes measures to limit the number of nights per week during which noisy works can occur and to provide affected residents with appropriate respite.

Proposed mitigation measures

Summary of issues raised

Submitters requested clarification about the measures that would be implemented during construction to manage the potential for impacts. Issues raised included:

- Concern that the construction noise and vibration management plan hasn't been developed yet
- Concern regarding proposed mitigation during night works to alleviate health impacts of increased noise and sleep disturbance.

Response

The construction noise assessment was based on a concept design and indicative construction methodology, which is appropriate for the assessment and approval process. However, it is likely that following detailed design and construction planning, the construction contractor may propose different methods, activities and timing of activities to undertake the project. Therefore, it is appropriate that details of particular management measures and approaches are developed at a later stage, for example when the amount of night works has been determined.

The potential for noise impacts during construction would be managed by implementing mitigation measures NV5 to NV15. In particular, in accordance with measure NV5, a Construction Noise and Vibration Management Plan will be prepared prior to construction commencing. As outlined in Table 27.6 of the EIS/preliminary draft MDP, the plan will detail processes, responsibilities and measures to manage noise and vibration and minimise the potential for impacts during construction. The measures will include notifications and consultation with potentially affected residents. As noted above, the plan can only be developed once the construction contractor(s) are engaged, and the construction methodology is finalised.

Mitigation measure NV6 provides for location and activity-specific noise and vibration impact assessments to be undertaken for works, including those that need to occur outside standard construction hours and are likely to result in noise levels greater than the relevant noise management levels. The assessments will confirm the receivers that would be impacted by the works and predicted impacts at those receivers to assist with the selection of appropriate management measures, including respite. Noise monitoring will be carried out at the start of new noise and vibration intensive activities to confirm that actual levels are consistent with the predictions.

Mitigation measure NV10 provides for noisy work and vibration intensive activities to be scheduled during standard construction hours as far as possible. Works or activities that cannot be undertaken during standard construction hours will be scheduled as early as possible during the evening and/or night-time periods. Construction activities that intrude into the prescribed airspace would need to be undertaken during airport curfew periods. Similarly, works that have the potential to adversely affect the operation of the road network would need to be undertaken at night when traffic volumes are low. Works within the rail corridor would typically be limited to rail possessions when the line is not operational. This would include works at night.

In accordance with measure NV10, respite measures will be implemented for noisy work and vibration intensive activities in a manner consistent with the *Construction Noise and Vibration Guideline* (Roads and Maritime, 2016). This guideline contains measures to limit the number of nights per week on which noisy works can occur, to provide affected residents with appropriate respite.

Potential health impacts associated with predicted noise impacts are summarised in section 23.3.1 of the EIS/preliminary draft MDP. No exceedances of noise guidelines protective of community health are predicted for most areas surrounding the project site. However, for some receivers, the sleep disturbance criteria is likely to be exceeded during the night-time period for noise intensive construction activities. Some receivers are also located within the minimum working distance for human comfort. Where impacts are perceptible, it is likely that they would only be apparent during relatively short times when vibration-intensive equipment such as rock breakers or vibratory rollers are used. The mitigation measures noted above would seek to mitigate these impacts. Where construction noise impacts occur over more extended periods, respite periods would be provided.

Pre-inspection reports

Summary of issue raised

A submitter requested that Transport confirms the homes that will be provided with pre-construction inspection reports.

Response

The construction vibration assessment undertaken as part of the noise and vibration assessment (see Technical Working Paper 2) found that most buildings are unlikely to suffer cosmetic damage as a result of the distance between work areas and the nearest receivers. However, some buildings and structures are within the recommended minimum working distances, particularly those in the eastern section of the study area near Airport Drive and Qantas Drive (see Figure 10.4 of the EIS/preliminary draft MDP). These include buildings located north of the rail corridor in Mascot (noise catchment areas NCA06 and NCA08), in the Jet Base and the Terminals 2/3 precinct (noise catchment area NCA07). A number of buildings/items are also located within the cosmetic damage minimum working distances near Burrows Road South in St Peters (noise catchment area NCA04), in the Terminal 1 precinct (noise catchment area NCA05), and in Tempe and St Peters to the south-east of the Princes Highway adjacent to the Botany Rail Line (noise catchment area NCA02).

Mitigation measure NV6 provides for location and activity-specific noise and vibration impact assessments to be undertaken for works, including those with the potential to exceed relevant criteria for vibration. These assessments would consider the detailed construction methodology and confirm potential vibration levels at buildings and other structures in the vicinity.

Mitigation measure NV14 commits to completing building condition surveys before and after construction works where buildings or structures are within the minimum vibration working distances for cosmetic damage. These predictions would be informed by the activity-specific noise and vibration impact assessments prepared in accordance with mitigation measure NV6.

10.2.3 Operational impacts

Increase in noise during operation

Summary of issues raised

Submitters raised a range of concerns about the increase in operational noise as a result of the project. These included:

Noise assessment methodology and noise sources

- The removal of the shipping containers would increase noise to previously shielded properties
- The combination of the proposal and airport noise in a southerly and south-easterly wind pattern would affect residents well-being even more.

Noise levels and sources

- Tempe residents already have noise pollution from Sydney Airport, which will increase with the project
- Significant noise pollution for Tempe residents, and users at the Tempe Wetlands, Tempe Reserve, Tempe Recreation Reserve, Robyn Webster Sports Centre and Tempe dog park
- The noise impact on property would be much higher than what is described in the assessment as the property is currently not impacted by road noise but will be impacted by the proposal
- The diversion of a large volume of heavy vehicles from Mascot local streets to Tempe would result in considerable noise impacts in Tempe.

Response

Noise assessment methodology and noise sources

An assessment of operational noise and vibration impacts from the project was provided in Technical Working Paper 2 (Noise and Vibration), and the results summarised in section 10.4 of the EIS/preliminary draft MDP. The assessment was prepared in accordance with all relevant assessment and modelling guidelines, and addresses the SEARs and MDP requirements.

The assessment included consideration of additional noise from Sydney Airport following the proposed removal of the stacked containers. The operational noise model incorporated consideration of wind conditions in accordance with standard computer algorithms. The operational noise assessment predicted future noise levels from road traffic in 2026 and 2036.

Following exhibition of the EIS/preliminary draft MDP, an additional operational noise assessment was undertaken to assess changes to predicted noise levels as a result of proposed design refinements (refer to section 3.1) and to respond to issues and queries in submissions. The full results of the additional assessment are provided in Appendix B of this report.

Noise levels and sources

Many residential receivers in the study area are subject to relatively high existing noise levels, including from major roads and the movement of trains on the Botany rail line.

The operational noise assessment found that there would be an increase in noise levels in some areas, resulting from a combination of road traffic (which includes heavy vehicles) as well as ground-based activities at Sydney Airport.

The areas mentioned in the submissions (such as Tempe Wetlands, Tempe Recreation Reserve, Robyn Webster Sport Centre, and the off-leash dog exercise area) form part of noise catchment NCA03. This area is located south and west of the Princes Highway and Smith Street. It should be noted that the off-leash dog exercise area would not remain in its current location following completion of the project.

Construction and operation of the Terminal 1 connection would result in an increase in traffic (including heavy vehicle) through residential areas in Tempe, east of the Princes Highway. This area does not currently experience significant road traffic noise levels. The operational noise assessment found that the worst-case noise levels would be experienced in 2036 and during the night-time. In this scenario, road traffic noise is predicted to increase by up to 13 dB at some receivers. The highest increases are predicted for residences closest to the proposed roadway (ie those in the vicinity of the Tempe Wetlands).

Noise monitoring undertaken at 1 Fanning Street, Tempe during the preparation of the EIS/preliminary draft MDP indicated that the predicted worst-case road traffic noise levels at that location would be similar to existing average ambient noise levels.

Regardless of the existing ambient noise levels, about 116 residential buildings and three other areas in NCA03 would experience noise levels above the adopted criteria. These would be eligible for consideration of mitigation (refer to Appendix B).

Transport's *Noise Mitigation Guideline* (Roads and Maritime, 2015) defines the process for selecting feasible and reasonable noise mitigation measures for operational noise impacts associated with road projects. Noise barriers are generally not considered reasonable to construct where open spaces alone are impacted by road projects. However, it is noted that a five metre high noise barrier is proposed to provide mitigation to residential receivers in Tempe east of the Princes Highway. The proposed noise barrier would reduce increases in road traffic noise by about 5 dB at the most affected residences. The noise barrier would also reduce predicted road traffic noise levels in the Tempe Wetlands resulting from the project. The details of the noise barrier, and the level of noise attenuation it would achieve, would be confirmed during detailed design.

In accordance with mitigation measure NV3, further consideration of noise mitigation would be undertaken during detailed design for properties identified as being eligible for consideration of mitigation. The implementation of any at-property treatments would be undertaken in accordance with the *At-Receiver Noise Treatment Guideline* (Roads and Maritime, 2017).

The assessment of potential changes in noise to the removal of the shipping containers indicated that noise levels from ground-based aviation activities at Sydney Airport would increase by less than 3 dB at residential receivers in Tempe (catchment NCA03). The proposed noise wall through the Tempe Lands would provide some attenuation of noise from ground-based aviation activities at Sydney Airport.

Managing operational noise impacts

Summary of issues raised

Submitters requested clarification about the measures that would be implemented to manage the potential for noise during operation, and requested additional mitigation. Issues raised included:

- The effectiveness of the proposed noise wall on South Street (Tempe) to mitigate noise from the roadway and the additional noise generated by removing the containers that currently shield some of the noise from Sydney Airport
- The process for noise mitigation for houses and if mitigation would be provided before construction commences, the eligibility for treatment and the types of treatment that will be provided

- Inadequate consultation with the community regarding the noise wall.

Response

Transport's *Noise Mitigation Guideline* (Roads and Maritime, 2015a) defines the process for selecting feasible and reasonable noise mitigation measures for operational noise impacts associated with road projects. Measures to mitigate operational road traffic noise impacts would be confirmed in accordance with mitigation measure NV3. This would include identifying all receivers that are eligible for mitigation together with the preferred approach to mitigation at each receiver. Receivers qualifying for 'additional noise mitigation' once the project is built, would be considered in the following order of preference:

- At-source mitigation (such as quieter road pavement surfaces)
- In-corridor mitigation (such as noise mounds and/or barriers)
- At-receiver mitigation (such as screening walls, ventilation systems, window glazing).

Noise barriers can provide significant noise reductions and also reduce both external and internal noise levels. Noise barriers are typically most effective when they are located either near the road or near the receiver. The noise barriers at Tempe would be located immediately adjacent to the roadway to maximise its effectiveness.

A five-metre high noise barrier is proposed to provide mitigation to residential receivers in NCA03, south of Smith Street. The proposed noise barrier would reduce the predicted increases road traffic noise levels at the most affected residences by about 5 dB.

As design progresses, the project would be further refined where practicable to reduce the potential operational impacts. Road traffic noise would be reviewed and further assessed during detailed design, including investigating the feasibility of low noise pavements, noise barriers and at-property treatment (in accordance with mitigation measure NV1).

Where residual impacts remain after the use of at-source and/or in-corridor mitigation, or if a noise barrier is not considered feasible or reasonable, the final option available is to use at-property mitigation. This typically involves using architectural treatments such as sealing air gaps, providing thicker glazing and doors, or upgraded facade constructions to achieve appropriate internal noise levels. The appropriate treatment depends of the noise predictions and the nature of construction in the vicinity of the residence to be treated. Where receivers are eligible for at-property treatment during operation, and are predicted to be subject to high construction noise impacts outside standard construction hours, Transport would consider early installation of such treatments to assist with mitigating the impacts during construction.

Community preferences regarding the choice of a noise barrier or mound to provide mitigation in the vicinity of Tempe were sought during the concept design display in mid-2019 (consultation undertaken during this period described in section 4.2 of the EIS/preliminary draft MDP). Based on feedback received, a noise mound was favoured by those who attended. However, a five-metre high mound would have a very large footprint, in excess of 30 metres wide, which would decrease the amount of residual land and opportunities for future use when the project is complete.

Transport would continue to consult with the community and relevant councils during the detailed design phase to develop the urban design and landscape plan for the project (as described in section 7.12 of the EIS/preliminary draft MDP). This would include confirming the appearance of noise barriers and collecting community feedback. Potentially affected communities would be notified about the engagement process and invited to participate in the development of the urban design and landscape plan. People on the contact list would also be informed of the consultation process and provided with an opportunity and provide input to the process.

In accordance with mitigation measure NV16, operational noise mitigation performance will be assessed in an Operational Noise and Vibration Review conducted within 12 months of the commencement of operation. The need for additional mitigation or management measures to address identified operational performance issues and meet relevant operational noise criteria will be assessed and implemented where feasible and reasonable.

10.3 Air quality and odour

10.3.1 Assessment method

Air quality assessment – data used

Summary of issue raised

A submitter questioned why the air quality assessment is based on 2016 data, which is under the 2018 and 2019 results for $PM_{2.5}$ and excludes bushfire pollution.

Response

The air quality assessment presented in Technical Working Paper 4 was prepared over the period 2018 to 2019. Monitoring data from 2016 was used in the assessment as it was the most recent representative year of data available.

The 2016 data was used as a base case against which future modelling years could be compared. Background data required for an assessment like this are, by necessity, retrospective, as a full 12 month period is required and this data is available only after that year is complete. The meteorological data for the main air quality monitoring station sites was also more complete in 2016 than in 2017. In addition, more monitoring stations could be used and more data from near-road sites were available for model evaluation in 2016 than in 2017, which makes the assessment more robust.

Historical data from 2004 to 2017 was used to gather information about trends in the study area and to understand whether the chosen modelling year (2016) is representative. Monitoring data for 2016 was also used to coincide with the meteorological and vehicle emissions information available for the assessment for that same year.

Calibrated air quality monitoring data for the recent 2018 to 2019 bushfire season is not yet available for comparison. Given the extreme nature of the bushfires and associated particulate pollution, it is unlikely to be representative of typical background conditions. As a result, it would not be an appropriate data set for assessing the impacts of the project.

The background concentrations for the assessment were based on measurements from air quality monitoring stations at urban background locations. The approaches used to determine long-term and short-term background concentrations are explained in Annexure D of the technical working paper.

Odour assessment

Summary of issues raised

Submitters raised concerns regarding the odour assessment, including the following issues:

- There is no mention of odour impacts within the former Tempe landfill site or impacts to workers in Technical Working Paper 17
- The representative sensitive receptor locations in Technical Working Paper 17 do not include the Tempe High School nor the St Peters School and childcare centre
- It is unclear from the technical description if the allowable volume of offensive odours (such as 2 OU) are reasonable or not.

Response

The odour impact assessment is summarised in Chapter 12 with the detailed assessment presented in Technical Working Paper 17 (Odour Assessment) of the EIS/preliminary draft MDP. The majority of the area encompassed by the former Tempe landfill would be within the construction footprint of the project and is therefore not considered a sensitive receiver for the purposes of the assessment. The locations of sensitive receivers assessed by the odour assessment are shown on Figure 12.3.

The welfare and safety of workers, including within the former Tempe landfill, would be a fundamental obligation of the contractor and would be managed in accordance with relevant occupational health and safety regulations and guidelines. Detailed measures to ensure the health and safety of construction workers would be incorporated in various management plans proposed to be developed prior to construction commencing, including the implementation of mitigation measures AQ1 to AQ5 which address the management of odour during construction. Chapter 23 of the EIS/preliminary draft MDP also provides an assessment of health and safety-related risks of the project.

In accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW EPA, 2016a) (the Approved Methods), the assessment considers the potential worst-case odour impacts at the nearest sensitive receivers to the site (shown on Figure 12.3 of the EIS/preliminary draft MDP). Tempe High School and St Peters School and childcare centre were not identified as representative receptors in the odour assessment as they are not the closest sensitive receivers to the project. If compliance is predicted at a sensitive receiver closer to the works, then it is also expected at receivers located further away.

Section 2.2 of Technical Working Paper 17 outlines the odour assessment criteria published in the Approved Methods and describes how the criteria was applied at the nearest sensitive receiver. Odour assessment criteria are measured in odour units. The odour assessment criteria (nose response odour certainty units at 99th percentile) is a prediction of the odour level that may occur 99 per cent of the time. Odour assessment criteria are designed to be precautionary, so that impacts on sensitive receivers can be minimised.

The Approved Methods states that seven odour units at the 99th percentile would be acceptable to the average person, but as the number of exposed people increases, there is a chance that more sensitive individuals would be encountered. The odour assessment in the EIS/preliminary draft MDP adopted the most stringent odour criterion of two odour units which is considered to be acceptable for large populations (more than 2,000 people).

10.3.2 Construction impacts

Duration of air quality impacts

Summary of issue raised

A submitter raised concern that air quality impacts during construction are not short-term, particularly in St Peters, as they have already been felt for several years.

Response

There are a number of major infrastructure projects being undertaken in close proximity to the project site, including the New M5 and M4-M5 Link. The New M5, which includes works at St Peters interchange and the Alexandria landfill site, is scheduled to be completed prior to commencement of the Sydney Gateway road project. The M4-M5 Link is located farther away; however, it would be under construction at the same time as the Sydney Gateway road project for a period of about two years. The potential for cumulative impacts with the M4-M5 Link are not considered to be high, largely because of the separation distance between the two projects.

Transport acknowledges that construction impacts in the St Peters area may result in impacts being experienced for longer durations by the local community due to construction works associated with other major road projects. The proposed measures provided in section 12.7 of the EIS/preliminary draft MDP would assist to address this risk.

Potential air quality impacts during construction, including dust and emissions from construction plant, would be managed in accordance with a project-specific Construction Air Quality Management Plan, which would be implemented as part of the CEMP (mitigation measure AQ2). The plan will detail processes, responsibilities and measures to manage air quality, odour and landfill gas and minimise the potential for impacts during construction. The plan will include an air quality, odour and landfill gas monitoring program, and will detail the measures that will be implemented to compare the actual performance of construction against the predicted performance. Monitoring will be undertaken for the duration of construction.

Managing the potential for odour impacts

Summary of issues raised

Submitters raised concerns about how odour and leachate at the former Tempe landfill would be managed during construction, including:

- Measures proposed to mitigate odour from the former Tempe landfill
- That work ceases if odour is identified on site or at receptors until the source is identified and dealt with
- That there needs to be a method for identifying potential emission sources and management measures
- An odour management strategy needs to be developed in advance of construction
- Leachate from the site be pumped out to prevent odours and should be treated as any other contaminant found on-site
- The State Significant Infrastructure provision of EPA Act (s5.12) should be amended to empower the EPA to stop work where an odour exceeding an allowable level is detected until the source is identified and dealt with.

Response

A project-specific Construction Air Quality Management Plan would be implemented as part of the CEMP (mitigation measure AQ2). The plan will detail processes, responsibilities and measures to manage air quality, odour and landfill gas and minimise the potential for impacts during construction. The plan will include an air quality, odour and landfill gas monitoring program, and will detail the measures that will be implemented to compare the actual performance of construction against the predicted performance. Monitoring will be undertaken for the duration of construction. The Construction Air Quality Management Plan will be prepared prior to construction commencing. The odour management strategy (mitigation measure AQ4) will be prepared prior to any activities that could remove the capping layer at the former Tempe landfill and expose waste materials.

Odour would be generated on site when the existing landfill cap is removed to facilitate construction of the project. For this reason, the EIS/preliminary draft MDP undertook an assessment of the odour likely to be experienced at the nearest adjacent receivers. The assessment has been revised in response to project submissions and the updated assessment provided in Appendix D of this report.

Commitments to managing odour from potential sources (including exposed waste materials within the former Tempe landfill and surface leachate) are defined by a number of mitigation measures, including measures AQ1, AQ3, AQ4 and AQ5. These measures detail a commitment to plan the work to minimise the need to expose waste and generate leachate (and thus generate odour) and to conduct sampling and additional odour modelling, based on proposed construction work methods, to demonstrate that odour can be controlled to within agreed criteria (mitigation measure AQ3).

Measure AQ4 commits to developing an odour management strategy and implementing the strategy for the duration of works involving ground disturbance at the former Tempe landfill.

The strategy will include:

- Proposed work methods and mitigation measures that aim to limit odour at sensitive receptors to no more than the 2 OU criterion
- Routine observation of weather conditions
- Regular odour surveys at receptor locations by appropriately qualified professionals to confirm the existing of odour and identify likely sources (mitigation measure AQ5)
- Measures to minimise the generation of odour
- Mechanisms for investigating odour complaints, including conduct of additional odour surveys

- Contingency and rectification measures (eg use of deodorisers, aeration of leachate storage(s)) should significant odour issues occur at sensitive receivers or from leachate storages.

Leachate from within the former landfill would be managed during construction in accordance with the leachate management strategy (mitigation measure GW5). As the existing leachate management system does not currently generate any odour, it is not anticipated that it would generate any odour during construction. Any pumping proposed would be carefully managed in accordance with relevant work health and safety requirements. All leachate would be disposed of in accordance with the agreed management strategy.

Construction works for major road projects are typically carried out in accordance with the requirements of an environmental protection licence issued under the *Protection of the Environment Operations Act 1997*. Fines can be imposed for non-compliance with licence requirements, which includes criteria for air, noise and water pollution. Amendments to legislation are outside the scope of the project and a matter for the NSW Government.

10.3.3 Operation impacts

Operational air quality concerns

Summary of issues raised

Submitters raised concern for reduced air quality as a result of the project. Issues raised included:

- The project will increase the level of air pollution in an area that already experiences poor air quality, and nothing is included to improve air quality
- Questions the location of the receptor where the highest predicted concentration in any scenario was predicted (13.6 μg/m^3)
- Concern the $PM_{2.5}$ annual mean is predicted to get worse in up to 44 per cent of receptors depending on the scenario. This is very disturbing given the high levels currently observed
- Concern the scenarios with and without the project will not meet national goals for daily averages of PM_{10}.

Response

A summary of background air quality conditions for each pollutant within the study area, compiled across a number of monitoring stations over the period 2004 to 2017, is presented in Table 12.2 of the EIS/preliminary draft MDP. The table shows a number of the pollutant levels are below or well below the relevant criteria. In relation to $PM_{2.5}$ concentrations in the study area between 2013 and 2017 were already very close to or above the standard in the National Environmental Performance Measure (NEPM) of 8 μg/m^3, and above the long term goal of 7 μg/m^3.

The key outcomes of the operational air quality assessment at receptors, summarised in section 12.5.2 of the EIS/preliminary draft MDP, showed that:

- The predicted total concentrations of all modelled pollutants were usually dominated by the existing background contributions, although for NO_2 a significant contribution was predicted to be generated from the modelled road traffic
- For several air quality metrics (notably annual mean $PM_{2.5}$ and 24-hour PM_{10} and $PM_{2.5}$), exceedances of the criteria were predicted to occur both with and without the project. This was because of existing high background concentrations. In other words, the background levels already exceed the relevant criteria without the project
- Where increases in pollutant concentrations at receptors were predicted, these were mostly small. Only a very small proportion of receptors were predicted to have larger increases and these were generally in close proximity to proposed new sections of road.

The absolute levels of all pollutants are summarised in section 12.5.2 of the EIS/preliminary draft MDP and provided in detail for each modelling scenario in section 6.2.2 of Technical Working Paper 4. For each pollutant, a graph is provided showing the absolute levels of each pollutant and the change in pollutant concentrations relative to the 'without project' scenario. Additional figures show the contribution by source, maximum (absolute) concentration at each receptor, and the change in concentration for each pollutant.

The highest predicted $PM_{2.5}$ annual mean concentration at any receptor in any scenario was 13.6 µg/m^3 and the road traffic contribution was 4.2 µg/m^3. The location of this receptor is immediately adjacent to General Holmes Drive and Mill Pond Drive at Mascot.

Figure 12.10 shows the change in annual mean $PM_{2.5}$ in 2036. The predictions for annual mean $PM_{2.5}$ were highly dependent on the assumptions on background values which already exceeded the NSW criterion of 8 µg/m^3 at all receptors. There was a predicted increase in concentration at between 37 to 44 per cent of modelled receptors. Where there was a predicted increase, this was greater than 0.1 µg/m^3 at only around two to four per cent of receptors. No receptors had an increase in annual mean $PM_{2.5}$ that was above the acceptable threshold of 1.8 µg/m^3 (refer to Annexure B in Technical Working Paper 4 (Air Quality)).

Figure 12.9 of the EIS/preliminary draft MDP shows the changes in maximum 24-hour PM_{10} concentrations in 2036. The purple colouring on the figure is over the St Peters area and along Qantas Drive. The figure also shows that the magnitude of the changes are very low and unlikely to be detectable above background levels. Based on the established trend of background air quality conditions, exceedances of PM_{10} criteria are due to elevated background values, rather than resulting from the project.

10.4 Contamination and soils

10.4.1 Construction impacts

Work within the former Tempe landfill site

Summary of issue raised

A submitter raised concern with the migration of contaminants during work within the former Tempe landfill site. Other submitters questioned what measures would be implemented to manage contamination impacts associated with excavating within the former landfill.

Response

An assessment of the potential contamination issues and risks associated with construction within the former Tempe landfill was undertaken in Technical Working Paper 5 (Contamination and Soils) and 16 (Former Tempe Landfill Assessment). The results of the assessments are summarised in chapters 13 and 15 of the EIS/preliminary draft MDP. Odour is considered in Technical Working Paper 17.

Design and construction planning has included a focus on avoiding or minimising potential contamination and soil impacts. A range of measures have been proposed to minimise potential migration of contaminants during construction within the former Tempe landfill including the preparation of remedial action plan(s) (mitigation measure CS3).

A Construction Soil and Water Management Plan will be prepared as part of the CEMP and implemented during construction (mitigation measure CS9). The plan will include measures to manage stockpiles to prevent cross-contamination of clean soil with contaminated soil, appropriate sediment and erosion controls and measures to manage leachate at the former Tempe landfill.

In accordance with mitigation measure GW5, a leachate management strategy will be developed to manage leachate at the former Tempe landfill during construction. This will include monitoring to ensure the project does not cause leachate impacts beyond the construction boundary requiring new or additional controls.

Mitigation measure CS6 requires that the location of all existing landfill management infrastructure is confirmed and (if required) the design will be further refined to avoid impacts. Measures will be developed and included in the remedial action plans(s) (if required) to protect the landfill management infrastructure or reinstate the infrastructure such that it continues to operate effectively after construction is finished.

10.5 Land use and property

10.5.1 Compensation

Lodgement of claims

Summary of issue raised

A submitter noted that the process for lodging damage claims is not transparent and is slow, noting issues with delayed responses from Transport on damage claims caused by WestConnex.

Response

Property damage claims would be subject to assessment by the project contractors on behalf of Transport, through processes to be developed by the project contractor and Transport. Claims would be addressed as soon as possible. In the unlikely event of damage caused by construction, consultation would be undertaken with the affected landowner to determine rehabilitation requirements in order to restore the property to its pre-construction condition. Measures would be taken to 'make good' or to manage the impact.

10.5.2 Residual land

Tempe Reserve Plan of Management

Summary of issue raised

A submitter requested close consultation with Inner West Council about adopting the measures included in the Tempe Reserve Plan of Management. The Former Tempe Landfill Assessment includes only a small proportion of the parkland and community resources proposed in the Tempe Reserve Plan of Management. These public spaces are used by many people from across the Inner West and South Sydney so all the investment will be heavily used and appreciated.

Response

As described in sections 7.12.4 and 19.4.3 of the EIS/preliminary draft MDP, it is expected that some of the land required to construct the project in Tempe (about eight hectares of land, including land within the Tempe Lands and other areas on the former Tempe landfill) would be returned to council in a similar condition as received following completion of construction. This would include rectification of any damage caused as a result of construction. As agreed with Inner West Council, the following amenities would be provided at the completion of the project:

For the open space area located west of the Terminal 1 connection:

- An off-leash dog exercise area on a like for like basis with the existing off-leash dog exercise area
- Reinstatement of the existing car park area
- Grassed open space for the remainder of this area affected by the project

For the land east of the Terminal 1 connection:

- A handstand area
- A new path would also be provided, linking the above car park with the proposed shared path on the freight terminal access roundabout.

In accordance with mitigation measure LU3, Transport will continue to consult with Inner West Council regarding the future use of residual land in the Tempe Lands and adjoining area in accordance with the master planning process for these areas; and will ensure that the urban design and landscape plan for the project does not inhibit the outcomes of this process.

Given the proximity of the residual land to the airport, any future use in this location would also need to take into consideration aviation matters.

10.6 Socio-economic impacts

10.6.1 Construction impacts

Management of impacts on the community

Summary of issues raised

Submitters raised concern about impacts on the community and how these would be managed during construction. These included amenity impacts such as noise and dust. Issues raised included:

- Impacts on locals in Tempe on the eastern side of the Princes Highway while these works are undertaken will be immense
- Alleviation of resident impact in addition to mitigation for businesses
- Impacts on the community (noise, dust, pollution etc) is discounted as ‘temporary’, noting that a three year construction period is not temporary
- The mitigation measures to be implemented to minimise noise (particularly night work) and air quality impacts on residents.

Response

In accordance with the SEARs, a comprehensive range of specialist technical assessments was undertaken to consider the potential impacts of the project on the community, including impacts on traffic, transport and access, noise and vibration, air quality and visual impacts. These individual potential impacts were acknowledged, integrated and assessed by the socio-economic impact assessment (Technical Working Paper 11) and the results were summarised in chapter 20 of the EIS/preliminary draft MDP.

The socio-economic assessment concluded that the extent, duration and magnitude of impacts on local communities would vary between locations within the study area and the nature of works at individual locations.

Section 20.6 describes the approach to managing impacts on the community. The section notes that comprehensive and appropriate communication and consultation with the community and other key stakeholders will play a key role in managing the potential for socio-economic impacts during construction and operation. Effective communication and engagement are fundamental to reducing risk and minimising potential impacts. Identifying, engaging and effectively communicating with stakeholders is critical to the successful delivery of the project. Consistent with, and in accordance with mitigation measure SE3, a communications strategy will be prepared to detail the process of communicating and engaging with the community and stakeholders in the lead up to, and during, construction. Further information on the strategy is provided in the following response.

In addition, the construction environmental management framework for the project includes a comprehensive range of management and mitigation measures and strategies that will be developed and implemented to manage the potential impacts on the community. The management of environmental impacts during construction would be documented in the CEMP and associated sub-plans, including:

- Construction Traffic and Access Management Plan
- Construction Noise and Vibration Management Plan

- Construction Air Quality Management Plan
- Construction Visual Amenity Management Plan.

Further information on the sub-plans and environmental management approach is provided in Chapter 27 of the EIS/preliminary draft MDP. The implementation of the mitigation measures (see Chapter 11 of this report) would minimise identified impacts on the community.

Consultation with the community

Summary of issues raised

Submitters raised concerns about how residents and the community would be consulted during construction and in relation to potential impacts.

Response

If the project is approved, a construction contractor(s) would be engaged to carry out detailed design and construct the project. Transport, Sydney Airport Corporation and the construction contractor(s) would continue to engage with stakeholders and the community in the lead up to, and during, construction.

In accordance with mitigation measure SE3, a communications strategy will be prepared to detail the process of communicating and engaging with the community and stakeholders in the lead up to, and during, construction. It will ensure that:

- The community and stakeholders have a high level of awareness and forewarning of all processes and activities
- Accurate and accessible information is made available
- A timely response is given to issues and concerns raised by the community
- Feedback from the community is encouraged
- Opportunities for input are provided.

The strategy will include:

- Communication with potentially impacted residents, other community members, businesses and key stakeholders to provide information about the project, and the likely nature, extent and duration of amenity and access changes during construction
- Protocols to identify and engage with vulnerable persons that might be affected by construction
- Protocols for communicating information about potential access delays in and around Sydney Airport and other relevant project information.

The project 1800 phone number and project email address would continue to be available during construction, along with a 24-hour construction response line. Other communication tools and activities that would be used in the lead up to and during construction include:

- Notifications regarding work outside standard working hours and work that might impact residents, businesses and stakeholders
- Email/SMS updates
- Newsletters, information brochures and fact sheets to provide regular community and business updates on the progress of the construction program
- Meetings with key stakeholders as needed
- Traffic alerts
- Sydney Gateway portal updates and enhancements
- Site signage around construction and ancillary facilities
- Media including media releases, social and advertisements

- Community Engagement Managers who would act as a single point of contact for the community
- Translator interpreter services.

In addition, the construction contractor(s) would be required to implement a community complaints and response management system. This procedure would be defined within the communication strategy (measure SE3), which the contractor(s) would prepare and have approved by appropriate regulatory authorities as set out in the conditions of approval.

10.6.2 Impacts to community facilities

Impacts on community facilities

Summary of issues raised

Submitters raised concern regarding the impact to the dog exercise area and Tempe Wetlands, including noting that the facilities need to be protected and preserved, as greenspaces are diminishing in the city.

Response

Impacts on the off-leash dog exercise area

Section 8.4.2 of the EIS/preliminary draft MDP notes that a temporary off-leash dog exercise area would be provided to mitigate the impacts on the existing off-leash dog exercise area due to the establishment of construction compound C3.

In accordance with mitigation measure LU3, Transport will continue to consult with Inner West Council regarding the future use of residual land in Tempe Lands and adjoining area in accordance with the master planning process for these areas, and will ensure that the urban design and landscape plan for the project does not inhibit the outcomes of this process.

Impacts on Tempe Wetlands

The project would not directly impact Tempe Wetlands.

The potential for indirect impacts will be managed by implementing a range of mitigation measures, including the Construction Biodiversity Management Plan (mitigation measure BD3) and the Construction Soil and Water Management Plan (mitigation measure CS9).

10.7 Landscape character and visual amenity

10.7.1 Construction impacts

Summary of issues raised

Lighting impacts

Submitters raised concern in relation to the disruption and inconvenience caused by the project in terms of lack of sleep due to lights during frequent night work.

Response

The use of lighting for works outside standard working hours may result in light spill and associated impacts on neighbouring properties. The majority of locations where night works would be required are not close to residences. As described in section 21.3.2 of the EIS/preliminary draft MDP, Sydney Airport and the surrounding road network is generally well lit at night, and additional lighting should not result in a significant increase in light spill. In addition, directional lighting would be used to minimise the potential for light spill. As per mitigation measure LV10, lighting of work areas, compounds and work sites will be oriented to minimise glare and light spill impact on adjacent receivers.

10.7.2 Operation impacts

Summary of issue raised

Visual impacts

A submitter raised concern that the proposal would result in significant visual impacts for Tempe residents, and users of Tempe Wetlands, Tempe Reserve, Tempe Recreation Reserve, Robyn Webster Sports Centre and Tempe dog park.

Response

Technical Working Paper 13 (Urban Design Landscape Character and Visual Impacts) included a visual impact assessment of the project. The findings of the assessment are summarised in section 21.4.2 and included an assessment of views from 26 representative viewpoints (refer to Figure 21.3 of the EIS/preliminary draft MDP) including Tempe Recreation Reserve, Tempe Lands and Wentworth Street, Tempe. The extent to which the project would be visible from the identified viewpoints would vary depending on existing topography, vegetation, buildings and land uses, as well as the form of the project when viewed from each viewpoint.

Although the project would result in substantial changes to the landscape and visual character of the surrounding area, some of the changes would reduce in severity over time as proposed vegetation establishes and matures. The project is also proposed in the context of land use changes and other projects planned for the area, including the New M5, M4-M5 Link and the Botany Rail Duplication. In the context of this landscape, it is anticipated that the long-term landscape character changes as a result of the project would be consistent with the future character and use of the area. As a result, long-term landscape character and visual impacts as a result of the project are not expected to be significant.

Mitigation measures have been provided to minimise the adverse visual impacts as far as possible. This includes the preparation of an urban design and landscape plan to provide a consistent approach to project design and landscaping (mitigation measure LV1). Further information on the approach and indicative contents of the urban design and landscape plan is provided in section 7.12.3 of the EIS/preliminary draft MDP. The provision of landscaping would be a key element in achieving the overall urban design vision and objectives for the project.

10.8 Health, safety and hazards

10.8.1 Assessment approach

Compliance with relevant requirements and inclusion of active transport connection

Summary of issues raised

Submitters raised concern that the health assessment was not undertaken in accordance with the Health Impact Assessment Guideline and did not comply with the SEARs, which requires an assessment on physical activity, including walking and cycling to be considered.

Concerns were also raised about the proposal’s failure to include an active transport connection to the airport, which constitutes a failure to encourage walking and cycling. The lack of active transport connection to the airport is a disadvantage and danger for people who currently cycle or walk to the airport

Response

The human health assessment, documented in Technical Working Paper 15 (Human Health) was undertaken in accordance with the SEARs, MDP requirements and other relevant legislation and guidelines, as summarised in section 23.1.1 of the EIS/preliminary draft MDP. The effects of the project on other relevant determinants of health (such as level of activity and access to social infrastructure) are described in sections 9.3.5, 9.5 and 9.6 of the technical working paper.

Responses to issues raised by the community in relation to the proposed active transport infrastructure, including the request for connections to Sydney Airport, are provided in section 9.1.1 of this report.

10.8.2 Construction impacts

Construction fatigue

Summary of issues raised

Submitters raised concern on extended impacts on the local community and construction fatigue as these communities have already been subjected to three years of construction impacts from other major projects (WestConnex, Sydney Metro etc). Concern that the project will subject communities to a further three years of noise, offensive odours, dust, air pollution, more heavy traffic on local roads, construction disruption, night work, and stress.

Response

Construction fatigue can occur when people experience impacts from projects over an extended period of time with few or no breaks between construction periods. Cumulative and consecutive construction activities have the potential to affect the health and wellbeing of the community as a result of air quality impacts, noise and vibration impacts, traffic and transport impacts, and visual amenity impacts.

The potential for construction fatigue impacts was assessed by the human health assessment (Technical Working Paper 15). The potential contributions of noise impacts associated with the project to construction fatigue were considered by the noise and vibration assessment (Technical Working Paper 2 (Noise and Vibration)).

The assessment of construction fatigue considered the potential cumulative and/or consecutive construction impacts of the project together with other major projects in the study area, such as the Botany Rail Duplication, New M5 and M4-M5 Link projects.

The potential for construction fatigue would generally be limited to the eastern part of the study area in Mascot (noise catchment areas NCA06, NCA07 and NCA08) where projects may overlap. The majority of this area is commercial with some residential properties. Receivers in these areas have been impacted by construction works since 2016 (Airport East and North roadworks) and would potentially be impacted by a number of successive projects in the future (such as the Sydney Gateway road project, Botany Rail Duplication and Sydney Airport ground access solutions and hotel project).

Measures to minimise potential impacts associated with noise, air quality, contamination, visual amenity and socio-economic impacts would assist in minimising the potential for community and health impacts (including construction fatigue. These measures are provided in Chapter 11 of this report.

During construction, Transport would continue to liaise with the teams responsible for other projects, to identify stakeholders or community members who may be susceptible to construction fatigue, and to put in place appropriate responses in accordance with the mitigation measures.

Health impacts

Summary of issues raised

Submitters raised concern about potential health impacts during construction, including the health impacts of:

- Increased noise during out of hours work and sleep disturbance
- Increased traffic.

Response

The human health impact assessment (Technical Working Paper 23) considered the potential for impacts on human health and the contributions of noise and traffic impacts. As described in section 23.4.1 of the EIS/preliminary draft MDP, the guidelines used to assess potential noise impacts are based on levels that are protective of the potential health effects on the community. Hence where the project complies with the relevant noise guidelines, community health will also be protected.

The implementation of the mitigation measures NV5, NV6 and NV10 would minimise the potential for construction noise and vibration to adversely impact community health. However, there may still be some short-term noise impacts, where annoyance and potentially sleep disturbance occurs on some occasions.

Exhaust emissions from on-site plant and construction traffic during construction are unlikely to substantially impact local air quality (see 12.4.3 of the EIS/preliminary draft MDP), and therefore is not considered to result in any health impacts on the public.

Adverse impacts may occur as a result of traffic changes during construction, changes to active transport and changes in access/cohesion of local areas. These may result in reduced opportunities for physical activity and social interaction and/or increased levels of stress and anxiety. In many cases, the impacts identified are either short-term (associated with construction only) and/or mitigation measures have been identified to minimise the impacts on the community.

Mitigation measures provided to minimise the potential for traffic impacts during construction would also assist in minimising the potential for health impacts.

Risks to safety and health during works within former Tempe landfill

Summary of issues raised

Submitters raised concern regarding health impacts associated with works in the former Tempe landfill including:

- Gases, contaminated soil as well as the odour are health hazards from which the workers on site and the surrounding residents and other workforces should be protected
- Respiratory problems for children as residents adjacent to the St Peters landfill site construction works have been exposed to health hazard from poor fumes and dust
- The approach described in the environmental impact assessment does not consider the site as having significant hazards for workers and others potentially at risk.

Response

An assessment of the potential contamination issues and risks associated with constructing the project at the former Tempe landfill was undertaken for the EIS/preliminary draft MDP. The results of the assessment are detailed in Technical Working Papers 5 (Contamination and Soils) and 16 (Former Tempe Landfill Assessment), and are summarised in Chapters 13 and 15 of the EIS/preliminary draft MDP.

The risks to public safety associated with contamination and landfill gas and odour are summarised in Table 23.1 in Chapter 23 of the EIS/preliminary draft MDP. There would be no hazards or risks with the potential to impact public safety following implementation of the proposed mitigation measures. Occupational health and safety aspects for workers and contractors involved in the construction and operation of the project are outside the scope of the EIS/preliminary draft MDP. However, such matters would be a fundamental requirement of the construction contractor. Transport will require that compliance with relevant workplace health and safety legislation and guidelines is achieved.

In relation to the potential health hazards associated with odour from the former Tempe landfill, the impact assessment criteria in the Approved Methods have been designed to take into account the range of sensitivity to odours within the community and provide additional protection for individuals with a heightened response to odours. This is achieved by using a statistical approach dependent upon population size. The criteria adopted for the project are the most stringent recommended and appropriate to the population of Tempe. Based on the modelling conducted, impacts are predicted to be within the adopted criteria.

In accordance with mitigation measure EM1, a CEMP will be prepared to detail the approach to environmental management during construction. The CEMP will include detailed management plans that will include measures for the effective management of contaminated soil, landfill gas and odour.

Mitigation measures CS4 to CS15 address issues and risks associated with landfill gas and soil contamination during construction within the former Tempe landfill.

Commitments to proactively and reactively managing odour from all potential odour sources are defined by a number of mitigation measures, including measures AQ2, AQ3, AQ4 and AQ5. In particular, measure AQ4 commits to developing an odour management strategy prior to construction, and implementing the strategy for the duration of works involving ground disturbance at the former Tempe landfill. In accordance with measure AQ4, contingency and rectification measures (eg use of deodorisers, aeration of leachate storages) will be implemented should significant odour issues occur at sensitive receivers in the vicinity of the project site.

10.8.3 Operation

Health and wellbeing impacts

Summary of issues raised

Submitters noted that the project would result in health impacts during operation, including the following concerns related to air quality and increased traffic:

- Mitigation measures that would be implemented to manage dust pollution and associated health impacts in areas around South Street, Tempe
- The project is likely to increase congestion, locally and across the network, as it induces more car travel over time, thereby adding to stress and fatigue health impacts
- The project would encourage more people to drive, creating more traffic and emissions, which contributes to increases in the frequency and severity of bush fires. The smoke, plus the additional emissions, would cause significant health risks to the community, particularly children
- How the project would mitigate potential health effects of air quality with increased traffic within the area once the project is completed.

Response

Impacts to human health during operation were assessed in Technical Working Paper 23 (Human Health) and summarised in section 23.4.1 of the EIS/preliminary draft MDP. The human health assessment did not identify any significant impacts on health during operation of the project.

The operational traffic assessment for the EIS/preliminary draft MDP concluded that, while total traffic volumes in the study area would marginally increase, the road network overall would operate with substantially less congestion than without the project. The forecast demand for the project would also attract traffic away from other local and arterial roads within the study area, resulting in lower traffic volumes on most roads compared with the volumes predicted without the project. In addition, the project would result in an increase in average vehicle speeds of between 26 and 47 per cent.

Section 26.2.2 of the EIS/preliminary draft MDP notes that the project would result in a net saving in greenhouse gas emissions. This is largely a result of an improvement in the average speed of vehicles across the network. Ongoing improvement in vehicle emission standards and the uptake of electric cars will also contribute to a lowering of emissions over time.

The air quality assessment considered potential emissions from road traffic associated with the project's operation. The assessment involved a quantitative assessment of exposure and risk. The assessment considered short-term (acute) exposures as well as long-term (chronic) exposures to pollutants derived from vehicle emissions. The assessment evaluated the total exposure that may occur in the community (ie existing air quality with the addition of the project) as well as the change in air quality as a result of the project, which may either increase or decrease, depending on location.

The project is expected to result in a redistribution of impacts associated with vehicle emissions, specifically in relation to emissions from vehicles using surface roads. The health assessment provided in Technical Working Paper 15 found that the changes to air quality would generally result in no measurable change or a small improvement (ie decreased concentrations and health impacts) for most of the community. However, for some areas located near key surface roads, an increase in pollutant concentrations may occur. These were assessed and determined to be low and not considered to be of significance (ie measurable) or of concern in relation to community health. Where the various changes were considered over the population as a whole, a small benefit to health outcomes was observed.

10.9 Sustainability and climate change

10.9.1 Policy and strategy

Sustainable development

Summary of issue raised

A submitter noted that the project is not sustainable development.

Response

Section 28.2.3 of the EIS/preliminary draft MDP provides the justification for the project with regard to the principles of ecologically sustainable development (as defined by clause 7(4) of Schedule 2 of the EP&A Regulation):

- The precautionary principle
- Intergenerational equity
- Conservation of biological diversity and ecological integrity
- Improved valuation and pricing of environmental resources.

The project would be designed, constructed and operated to maximise sustainability outcomes. An Infrastructure Sustainability Council of Australia target rating level of 'excellent' has been identified for the project. The construction contractor(s) would be required to propose project-specific sustainability initiatives and implementation protocols to support achievement of the project's target excellent 'Design' and 'As Built' rating. This will ensure ongoing consistency with the *Environmental Sustainability Strategy 2019–2023* (Roads and Maritime, 2019).

Mitigation measure SU1 commits to preparing a holistic sustainability management plan to ensure the sustainability considerations are embedded during the detailed design, construction and operation. The plan will include project-specific sustainability initiatives and implementation protocols to support achievement of the project's target rating.

10.9.2 Heat island effect

Potential increases in the heat island effect

Summary of issue raised

A submitter raised concern that the project would increase the urban heat island effect with further built development and loss of vegetation.

Response

Chapter 26 of the EIS/preliminary draft MDP acknowledges that the project would generate greenhouse gas emissions during construction and operation, and is expected to result in a minor change to the urban heat island effect during operation. Mitigation measures CC3 and GHG1 commit to investigating and incorporating a range of measures to reduce the project's contribution to greenhouse gases and the urban heat island effect. In accordance with measure GHG1, the sustainability management plan (required by mitigation measure SU1) will include measures and targets to reduce greenhouse gas emissions during construction and operation. In accordance with measure CC3, the urban design and landscape plan will include consideration of appropriate landscape designs and species to reduce the urban heat island effect. This measure also commits to investigating other measures to mitigate the heat island effect during detailed design, such as light coloured pavements and shading structures for public spaces.

As described in section 22.3.1 of the EIS/preliminary draft MDP, the project would mainly impact existing cleared and hardstand areas with no biodiversity values. In accordance with mitigation measure BD1, detailed design will avoid or minimise the need to remove and/or disturb native vegetation and fauna habitat. Mitigation measure BD2 commits to limiting vegetation clearing to the minimum necessary to construct the project. Mitigation measure LV4 commits to developing a tree management strategy to offset the loss of trees and achieve a net increase in tree canopy.

10.9.3 Climate change risk and greenhouse gas

Increase in greenhouse gas emissions

Summary of issues raised

Submitters raised concerns in regards to greenhouse gas emissions, including:

- That the project would contribute to more greenhouse gas emissions from concrete structures and increased vehicle traffic during both construction and operation
- That it is not possible to assert that the traffic speeds alone will reduce emissions as the purpose of the project is to accommodate the increasing volume of road traffic
- The assessment incorrectly assumes that the changes in emissions would be much smaller than the reductions in emissions over time as a result of improvements in emission-control technology. This ignores recent research that suggests that emission-reduction advances are being cancelled out by the increase in larger and less fuel efficient vehicles.

A submitter also requested that emissions calculations from road construction and ongoing vehicle use be compared to the emissions from construction and on-going use of formalised cycle and pedestrian ways.

Response

The EIS/preliminary draft MDP included a greenhouse gas assessment that identifies the key sources that would contribute to the release of greenhouse gases due to the project (see section 26.2.2). The greenhouse gas assessment was conducted in accordance with the SEARs and relevant guidelines. The greenhouse gas assessment included estimating emissions for each source (carbon dioxide equivalent emissions) and the total greenhouse gas emissions attributable to the project, in accordance with the *Greenhouse Gas Assessment Workbook for Road Projects* (TAGG, 2013) and a qualitative assessment in relation to NSW's annual greenhouse gas emissions.

The largest emission source during construction (see Table 26.3 of the EIS/preliminary draft MDP) is associated with the embodied emissions within structures required to build the project. Table 26.5 provides the results of the annual greenhouse gas emissions of Sydney's road network with and without the project and confirms that emissions associated with road users is the largest source of operational emissions.

Road-user emissions were assessed at a metropolitan scale, both with and without the project. Whilst there is an increase in the number of vehicle kilometres travelled across the road network as a result of the project, there is also an increase in average speed reducing congestion and wait times. In accordance with the methodology outlined in the *Guide to Project Evaluation* (Austroads, 2005), the increase in average speed would result in improved fuel efficiency and therefore result in a net annual saving in greenhouse gas emissions across the Sydney road network.

As outlined in section 26.2.2 of the EIS/preliminary draft MDP, the estimate of greenhouse gas emissions from road users does not include any changes in fuel efficiency or type of vehicle fuel used. It further notes that future improvements in fuel efficiency and vehicle type may result in further reductions in greenhouse gas emissions. However as the makeup of the vehicle fleet in the future is unknown, the assessment was based on current vehicle data gathered from the Australian Bureau of Statistics.

A comparison of the estimated vehicle emissions relative to the construction and on-going use of formalised cycle and pedestrian paths is not required by the project SEARs and was therefore not undertaken.

Commitments to manage climate change and greenhouse gas emissions are provided by mitigation measures CC1, CC2, CC3, GHG1, GHG2 and GHG3. The measures are provided in full in Chapter 11 of this report.

Part

D

Part D

Mitigation measures and conclusion

11. Mitigation measures

11.1 Updated mitigation measures

The EIS/preliminary draft MDP identified the proposed approach to environmental management and the mitigation measures that would be adopted to avoid or reduce the potential impacts of the project. These measures were summarised in section 27.3 of the EIS/preliminary draft MDP.

After consideration of the issues raised in the submissions, the mitigation measures have been updated to:

- Make additional commitments based on design refinements and the findings of further assessments as described in Chapter 3
- Make additional commitments to response to issues raised in the submissions
- Modify the wording so that the intent of the measure is clearer.

Where new measures have been added or new text has been added to an existing measure, it appears as **red bold text**. Where a measure has been deleted or text has been deleted, it appears as strikethrough text.

Table 11.1 to Table 11.3 provide a compilation of the measures proposed to mitigate and manage the potential impacts of the project, as detailed in Part B. Table 11.1 provides those measures relevant to the design of the project, which would be implemented as part of the detailed design stage to guide how the project is designed. Table 11.2 provides those measures relevant to construction, including construction planning and the development of the recommended strategies and plans that would be implemented during construction – some of which would be developed pre-construction.

Table 11.3 provides those measures relevant to operation, which would be implemented during the operational stage and would guide how the project is operated and maintained in the long-term.

The measures are broadly grouped according to the main stage of implementation and apply to an issue or impact rather than specific jurisdictions (land subject to either the Airports Act or EP&A Act). It is noted that the implementation of some measures may occur across a number of stages. The majority of measures will apply to the project as a whole (ie to those elements of the project that are located on Sydney Airport land as well as those located on land subject to the EP&A Act). The exceptions to this are those measures that relate to specific features such as Alexandra Canal and the former Tempe landfill.

Table 11.1 Compilation of mitigation measures for detailed design

EIS/pdMDP ID	New ID	Issue	Mitigation measures – detailed design
Noise and vibration			
NV3	NV1	*Potential operational noise impacts*	An operational noise mitigation strategy will be developed and implemented as part of the design, including investigating the need for low noise pavements, noise barriers and at-property mitigation.
NV14	NV2	*Noise impacts due to ground-based airport activities*	Investigate reasonable and feasible options to reduce the propagation of noise from ground-based airport activities following removal of buildings as part of the project. This will include options to retain screening provided by existing buildings.

EIS/pdMDP ID	New ID	Issue	Mitigation measures – detailed design
NV15	NV3	*Operational noise and vibration impacts of the project*	Operational noise and vibration mitigation measures will be identified during detailed design. Requirements for at-property noise treatments in properties identified as 'eligible' in the noise and vibration assessment will be reviewed. The implementation of treatments will be undertaken in accordance with the *At-Receiver Noise Treatment Guideline* (Roads and Maritime, 2017b).
NV16	NV4	*Cumulative noise impacts with the Botany Rail Duplication project*	**Reasonable and feasible noise mitigation for receivers affected by operational noise from both the Botany Rail Duplication and the Sydney Gateway road project would be considered in consultation with ARTC.**
Airport operations			
AS1	AS1	*Windshear and turbulence*	The road infrastructure and final landforms (including the emplacement mound~~s~~) will be reviewed and refined during detailed design to: ▪ Address aviation matters ▪ Minimise the volume of material excavated from the former Tempe landfill ▪ Maximise open space and community use opportunities ▪ Avoid disturbance outside the project boundary. **Any changes to road infrastructure and final landforms will reviewed with consideration of the *National Airports Safeguarding Framework* (Guideline B), and in consultation with Sydney Airport Corporation and relevant aviation regulatory agencies.** ~~To achieve the above requirements, alternative mound locations, heights and shapes will be considered. With respect to aviation, Any changes to road infrastructure and final landforms will be assessed in relevant wind directions, in accordance with the *National Airports Safeguarding Framework* (Guideline B), to identify an optimal design.~~ ~~The optimisation process will address Sydney Airport operational requirements, and will occur in consultation with Sydney Airport Corporation, aviation stakeholders, and Australian, NSW and local government agencies.~~
AS2	AS2	*Runway public safety areas*	A risk assessment in accordance with the principle of 'as low as reasonably practicable' (ALARP) will be undertaken to confirm the risk associated with operating the project within the public safety area to the north of the main north–south runway. The assessment will include consideration of the *National Airports Safeguarding Framework* (Guideline I). The results of the assessment will inform the design of the project.
AS3	AS3	*Permanent intrusions of Sydney Airport's prescribed airspace*	The project will continue to be designed to avoid intrusions of Sydney Airport's prescribed airspace by permanent project infrastructure.
AS4	AS4	*Wildlife attraction*	All drainage and flood management infrastructure (including the flood mitigation basin) will be designed in accordance with Sydney Airport's Wildlife Management Plan to minimise the risk of attracting wildlife. Appropriate measures will be developed and implemented, including designing the infrastructure to ensure that water does not pond for more than five days **(unless other suitable measures to minimise a the risk of attracting wildlife are in place).**

EIS/pdMDP ID	New ID	Issue	Mitigation measures – detailed design
AS5	AS5		The urban design and landscape plan for the project will include consideration of appropriate landscape designs and species lists to minimise opportunities to attract wildlife at levels likely to present a hazard to aviation operations. The plan will have regard to relevant requirements and species lists under Sydney Airport's Wildlife Management Plan and other relevant guidelines, including the *National Airports Safeguarding Framework* (Guideline C) and *Recommended Practices No. 1 – Standards for Aerodrome Bird/Wildlife Control* (International Birdstrike Committee, 2006).
AS6	AS6	*Pilot distraction as a result of street lighting and headlight glare*	Lighting will continue to be designed in accordance with *AS/NZS 1158.1.1:2005 Lighting for roads and public spaces Part 1.1: Vehicular traffic (Category V) lighting – Performance and design requirements.*
AS7	AS7		The project will continue to be designed to minimise the risk of headlight glare and pilot distraction. This will include providing glare screens in those locations where there is an unacceptable risk of pilot distraction.
AS8	AS8	*Interference with communication, navigation and surveillance equipment*	The detailed design will be referred to Airservices Australia to confirm that there will be no impacts to navigations aids, communications or surveillance equipment.
AS9	AS9		The utilities contingency management plan (measure HS2) will include measures to respond to any unplanned outages of services to critical Sydney Airport infrastructure, including navigations aids, communications and surveillance equipment.
Air quality			
AQ2	AQ1	*Avoiding odour impacts*	**The** detailed design **of the project** will seek to minimise **the need to expose waste** at the former Tempe landfill **in order to eliminate potential odour issues during construction.**~~by:~~ ▪ ~~the need to expose waste, and/or the area exposed at any one time.~~ ▪ ~~Where there is the potential to generate odour, managing this in accordance with the odour management strategy.~~
Contamination and soils			
CS1	CS1	*Investigation of data gaps and potential for unidentified asbestos containing materials*	Additional soil and groundwater investigations will be undertaken to inform detailed design, construction planning, and preparation of remediation action plan(s) (RAP(s)). The investigations will include: ▪ Further characterising the existing contamination status of the project site, including the potential for unidentified asbestos containing materials ▪ Groundwater investigations for all assessment areas and any indirectly affected areas ▪ Soil and groundwater testing to address data gaps for land north of the rail corridor and Sydney Airport land.
CS2	CS2	*High salinity potential*	Soil salinity will be considered in the design of subsurface structures.

EIS/pdMDP ID	New ID	Issue	Mitigation measures – detailed design
CS3	CS3	*Management of contaminated sites*	Where the project has the potential to affect the remediation systems in the former Tempe landfill and Sydney Airport northern lands car park, the controls and protocols outlined in the existing EMP will be implemented such that the systems continue to operate effectively during operation. A RAP (or multiple RAPs) will be prepared (as required) to describe the remediation strategy to be implemented to ensure that existing contamination does not pose a future risk to human health or the environment during operation. The RAP(s) will be prepared by a suitably qualified and experienced consultant, as defined in Schedule B9 of the *National Environment Protection (Assessment of Site Contamination) Measure 1999*. The RAP(s) will be prepared and implemented in accordance with the following requirements: ▪ The **objectives of the** voluntary remediation proposal and EMP ~~and any RAPs in place for the former Tempe landfill~~ ▪ The requirements of the existing Sydney Airport RAP and EMP (if applicable) ▪ *National Environment Protection (Assessment of Site Contamination) Measure 1999* ▪ Airports (Environment Protection) Regulations 1997 (for Sydney Airport land) ▪ *Environmental Guidelines: Solid waste landfills* (NSW EPA, 2016a) (for ~~reinstatement of the capping layer and/or design of the new capping layer and final road pavement at~~ the former Tempe landfill) ▪ ***Contaminated Land Guidelines: Assessment and management of hazardous ground gases* (NSW EPA, 2019).** The RAP(s) will be: ▪ Prepared in consultation with the Airport Environmental Officer **(in relation to the airport site) and Inner West Council** ~~and NSW EPA (as relevant~~**in relation to the former Tempe landfill**) ▪ For works on land subject to the EP&A Act – approved by a ~~n~~ **NSW EPA accredited**~~independent~~ site auditor ~~accredited under the site auditor scheme under the CLM Act~~ ▪ For works on Sydney Airport land – approved by Sydney Airport Corporation and endorsed by the Airport Environment Officer. If Sydney Airport Corporation and/or the Airport Environment Officer consider a site assessor is required, the site assessor will be nominated by the Secretary (as defined by Regulation 6.10 of the Airports (Environment Protection) Regulations 1997) and will endorse the RAP(s).
CS8	CS4	*Impacts on the former Tempe landfill*	An assessment will be undertaken of the potential hazards associated with landfill gas during construction and operation. The assessment will consider the potential for ingress and build-up of gases that may pose a risk to safety. Where the need for measures to manage landfill gases post-construction is identified, such measures will be described in the RAP(s) (measure CS3) **which will be developed in accordance with the *Contaminated Land Guidelines: Assessment and Management of Hazardous Ground Gases* (NSW EPA, 2019).** ~~Measures could include the design and installation of a landfill gas management system to provide a preferential flow path for landfill gas below the road infrastructure and emplacement mounds.~~

EIS/pdMDP ID	New ID	Issue	Mitigation measures – detailed design
CS9	CS5		A settlement and slope stability analysis will be undertaken to ensure that the emplacement mound~~s~~ are designed to suitable engineering standards such that the long-term stability of the capping layer is maintained. The design and construction of the emplacement mound~~s~~ will be described in the RAP(s) (measure CS3) and will be in accordance with *Environmental Guidelines: Solid waste landfills* (NSW EPA, 2016a). The design will be prepared in consultation with **a** ~~the~~ NSW EPA **accredited site auditor**.
CS10	CS6		The location of all existing landfill management infrastructure, including the bentonite wall, leachate collection system and passive gas collection system, will be confirmed and (if required) the design will be further refined to avoid impacts on this infrastructure. Measures will be developed, and included in the RAP (if required) to protect the landfill management infrastructure during construction, or reinstate the infrastructure such that it continues to operate effectively after construction is finished.
CS11	CS7	*Protection of adjacent infrastructure*	**A geotechnical assessment will be undertaken to determine the loading that the active transport link has on the Sydney desalination pipeline and the walls of Alexandra Canal. Appropriate mitigation will be implemented for any identified impacts.**
Flooding			
HF1	HF1	*Management of the potential for flooding impacts during construction*	A flood mitigation strategy will be prepared and relevant measures will be implemented as part of the design and during construction. The strategy will include undertaking additional flood modelling taking into account detailed design and proposed construction planning and methodologies. **The flood mitigation strategy will be prepared in consultation with Sydney Airport Corporation, Sydney Water, NSW State Emergency Services and relevant councils.**
HF2	HF2	*Impacts on flood behaviour from construction*	Hydrologic and hydraulic assessments will be carried out for all temporary and permanent project components (including ancillary facilities) that have the potential to affect flood levels in the vicinity of the project. The results of the assessment will inform the preparation of the flood mitigation strategy (measure HF1) as well as the design of temporary construction facilities and design development.
HF3	HF3	*Impacts on property*	Where flood levels in the one per cent AEP event are predicted to increase at any residential, commercial and/or industrial buildings as a result of construction or operation of the project, a floor level survey will be carried out. If the survey indicates existing buildings would experience above floor inundation during a one per cent AEP event **as a result of the project**, further refinements will be made (as required) to the design of temporary and permanent project components to minimise the potential for impacts.

EIS/pdMDP ID	New ID	Issue	Mitigation measures – detailed design
HF4	HF4	*Impacts on drainage systems*	Further modelling will be undertaken based on the detailed design to determine the ability of the receiving drainage systems to effectively convey drainage discharges from the project once operational. The modelling will be undertaken in consultation with Sydney Airport Corporation and relevant council(s). It will include, but not be limited to: ▪ Confirming the location, size and capacity of all receiving drainage systems affected by operation ▪ Assessing the potential impacts of drainage discharges from the project drainage systems on the receiving drainage systems ▪ Identifying all feasible and reasonable mitigation measures to be implemented where drainage from the project is predicted to adversely impact on the receiving drainage systems.
HF5	HF5	*Potential impacts of climate change on flooding*	The potential impacts of climate change on flooding behaviour will be considered during further modelling, in accordance with the procedures set out in *Floodplain Risk Management Guideline: Practical Considerations of Climate Change* (DECC, 2007) and *Australian Rainfall and Runoff* (Geoscience Australia, 2019) **and in consultation with the directly affected landowners**. An approach to integrating the identified effects into the design and operation of the infrastructure will be determined and implemented.
Groundwater			
GW1	GW1	*Avoiding impacts on groundwater*	Detailed design and construction planning will seek to minimise impacts on groundwater by: ▪ Avoiding the need to extract groundwater ▪ Minimising groundwater inflows and volumes into excavations.
GW2	GW2	*Settlement of unconsolidated sediments*	Modelling of settlement induced by groundwater drawdown will be undertaken in accordance with relevant guidelines, based on detailed geotechnical information obtained from the site investigations and the proposed construction approach. Should modelling identify any settlement issues, measures to reduce settlement will be confirmed.
GW3	GW3	*Impacts on existing groundwater well*	A survey of GW024036 will be undertaken to confirm the use of this bore. If this bore is in use, alternative water sources will be considered to ensure ongoing water supply as required.
Surface water			
SW1	SW1	*Sedimentation and scour protection at Alexandra Canal*	The potential for scour at bridge abutments will be considered for flow events up to and including the one per cent annual exceedance probability event. Scour protection will be included in the detailed design as required.
SW2	SW2		Discharge outlets will be designed with appropriate energy dissipation and scour protection measures to minimise the potential for scour. Scour protection will be developed in consultation with relevant stakeholders, including Sydney Water.
SW4	SW3	*Water sensitive urban design*	Appropriate treatment measures, including water sensitive urban design, will be considered in the detailed design with the aim of improving water quality within Alexandra Canal and/or achieving the targets outlined in the *Botany Bay and Catchment Water Quality Improvement Plan* (Sydney Metropolitan Catchment Management Authority, 2011).

EIS/pdMDP ID	New ID	Issue	Mitigation measures – detailed design
SW5	SW4		Surface water drains and associated infrastructure will be designed to prevent scour of soil, erosion and associated sedimentation impacts.
Non-Aboriginal heritage			
NAH1	NAH1	*Avoiding impacts on heritage*	The design will avoid impacts on non-Aboriginal heritage items, significant heritage fabric, locally and State significant archaeological remains and landscapes (including mature trees) as far as reasonably practicable. This includes significant fabric associated with Alexandra Canal and the Sydney (Kingsford Smith) Airport Group.
NAH2	NAH2	*Minimising impacts on heritage*	The design will be prepared in accordance with the urban design and landscape plan **and Statement of Heritage Impact** for the project. The design will minimise the potential for visual impacts on heritage items by incorporating sympathetic fabric, colour and form in the design.
NAH3	NAH3	*Design of the bridges over Alexandra Canal*	The bridges over Alexandra Canal will be designed to: ▪ Be sympathetic to the heritage sensitivity and industrial landscape of the canal ▪ Minimise physical impacts on the canal ▪ Incorporate a high quality architectural design using suitable material and forms ▪ Integrate with the bridges for the New M5 ▪ Retain the open character of the canal as far as possible ▪ Have regard to the Alexandra Canal Conservation Management Plan. **Appropriately qualified and experienced heritage design professionals will be involved in the development of the designs for the bridges over Alexandra Canal. The proposed designs, including the elements of heritage interpretation incorporated into the designs, will be presented to the Heritage Council of NSW and Sydney Water. Feedback from the Heritage Council of NSW and Sydney Water will be considered and adopted in the designs where reasonable and feasible.** ~~An appropriately qualified and experienced heritage architect or engineer will provide independent review of the designs, and the Heritage Council of NSW and Sydney Water will be consulted.~~
NAH4	NAH4	*Design of the drainage outlets at Alexandra Canal*	The drainage outlets at Alexandra Canal will be designed to: ▪ Minimise impacts on significant original fabric and highly visible areas ▪ Be sympathetic to the industrial landscape of the canal and its existing fabric ▪ Use suitable material and forms ▪ Have regard to the Alexandra Canal Conservation Management Plan. An appropriately qualified and experienced heritage architect or engineer will provide independent review of the designs, and the Heritage Council of NSW and Sydney Water will be consulted.
NAH5	NAH5	*Reuse of significant fabric at Alexandra Canal*	Where significant fabric is to be removed, consideration will be given to reusing the fabric for interpretation or repair and maintenance of other sections of the canal, in consultation with Sydney Water.

EIS/pdMDP ID	New ID	Issue	Mitigation measures – detailed design
NAH6	NAH6	*Heritage interpretation*	Appropriate heritage interpretation will be incorporated into the design in accordance with the *NSW Heritage Manual* (NSW Heritage Office and Department of Urban Affairs and Planning, 1996), *Interpreting Heritage Places and Items: Guidelines* (NSW Heritage Office, 2005), and the NSW Heritage Council's Heritage Interpretation Policy. This will focus on recognising the historical significance of the following items: ▪ Alexandra Canal ▪ Sydney (Kingsford Smith) Airport Group ▪ Cooks River Container Terminal ▪ Mascot (Shea's Ck) Underbridge ▪ Botany Rail Line. **Elements of heritage interpretation that will be incorporated into the design will be described in the urban design and landscape plan.**
Aboriginal heritage			
AH1	AH1	*Archaeological investigation areas impacted by the project*	Detailed design and construction planning will avoid direct impacts on Investigation Area 1 and Investigation Area 2 where practicable.
AH3	AH2	*Aboriginal heritage interpretation*	An Aboriginal heritage interpretation strategy will be developed in consultation with registered Aboriginal parties and other relevant stakeholders. The interpretation strategy will have regard to *Sydney Airport Master Plan 2039* and the Sydney Airport Heritage Management Plan. Appropriate Aboriginal heritage interpretation will be incorporated into the project design in accordance with the interpretation strategy.
Land use and property			
LU1	LU1	*Impacts on property and land use*	The design will continue to be refined to minimise land requirements and potential impacts on existing land uses and properties as far as possible. Consultation with landholders will be ongoing to identify opportunities to minimise impacts on onsite operations where practicable.
LU2	LU2	*Impacts on advertising structures*	The approach to mitigating impacts on advertising structures (including adjusting, relocating or providing new structures at locations along project infrastructure) will be confirmed during detailed design.
LU3	LU3	*Use of residual land*	**Transport** ~~Roads and Maritime~~ will continue to consult with Inner West Council regarding the future use of residual land in the Tempe Lands and adjoining area. This will include opportunities for open space and recreation uses, and provision for a new off-leash dog exercise area and council depot. **Transport** ~~Roads and Maritime~~ will support and assist Inner West Council with the master planning process for these areas as appropriate, and will ensure that the urban design and landscape plan for the project is consistent with the outcomes of this process.

EIS/pdMDP ID	New ID	Issue	Mitigation measures – detailed design
LU4	LU4	*Impacts on utilities*	The location of all utilities, services and other infrastructure will be identified prior to construction to determine requirements for access to, diversion, protection and/or support. This will include (as required), undertaking utilities investigations, including intrusive investigations, and consultation and agreement with service providers.
Socio-economic			
SE3	SE1	*Permanent land requirements at Tempe Lands*	**Transport** ~~Roads and Maritime~~ will continue to consult with Inner West Council to ensure: ▪ Impacts on open space and recreational facilities in Tempe Lands will be offset ▪ Consistency between the project's urban design and landscape plan and Council's master plan for Tempe Lands.
SE4	SE2	*Safety of active transport links*	Temporary and operational active transport links will be designed ~~to ensure the safety of the users~~ in accordance with crime prevention through environmental design principles.
Landscape character and visual amenity			
LV1	LV1	*General visual impacts*	An urban design and landscape plan will be prepared to provide a consistent approach to project design and landscaping.
LV2	LV2		Further design refinements of structures including bridges and the Terminals 2/3 access viaduct will be undertaken to minimise visual impacts as far as possible.
N/A	LV3	*Urban design*	**The Director for the Centre for Urban Design at Transport will convene and facilitate an urban design review panel. The panel will comprise the Government Architect, Director Bridges Technical Services (Transport), and an urban design-qualified representative from Sydney Airport Corporation.**
LV3	LV4	*Managing the loss of trees*	**The need to remove trees within the project site will be avoided where practicable. For those trees that cannot be reasonably avoided,** a tree management strategy will be developed, including measures to offset the loss of trees and achieve a net increase in tree canopy. The final location of replacement trees will be confirmed in consultation with Inner West Council and Sydney Airport Corporation. The strategy will also include on-site processes and protective measures to ensure trees identified for retention are appropriately protected during construction.
LV4	LV5	*Noise barriers*	Where feasible and reasonable, the proposed noise barrier in the Tempe Lands will be designed to provide new active transport connectivity across the Terminal 1 connection and between the western and eastern portions of open space, and maximise passive surveillance of open space from the road.
LV5	LV6		Noise barriers will be designed to minimise their visual prominence as much as possible.
LV6	LV7	*Minimising light spill*	Lighting for the project will be designed in accordance with *AS 4282 Control of the Obtrusive Effects of Outdoor Lighting*. Lighting will be designed to minimise glare and light spill into adjoining areas.

EIS/pdMDP ID	New ID	Issue	Mitigation measures – detailed design
Biodiversity			
BD1	BD1	*Avoiding impacts on biodiversity*	Detailed design will avoid or minimise the need to remove and/or disturb native vegetation and fauna habitat, including impacts on mapped areas of mangrove forest and Tempe Wetlands.
BD2	BD2		Vegetation clearing will be limited to the minimum necessary to construct the project. Micro-siting of infrastructure will be undertaken during detailed design to further minimise or avoid impacts on native vegetation where practicable. Exclusion areas will be established and maintained around any native vegetation adjoining the project site **to be retained** in close proximity to work locations ~~to be retained~~.
Waste management			
WM1	WM1	*Waste generation and recycling*	Detailed design will include measures to minimise excess spoil generation. This will include a focus on optimising the design to minimise spoil volumes, and the reuse of material on site.
Sustainability			
SU1	SU1	*Achieving the target sustainability rating*	A sustainability management plan will be developed to ensure that sustainability considerations are implemented during the detailed design, construction and operation phases of the project. The plan will include project-specific sustainability initiatives and implementation protocols to support achievement of the project's target excellent 'Design' and 'As Built' rating under the Infrastructure Sustainability rating tool (v1.2) and to ensure ongoing consistency with the *Environmental Sustainability Strategy 2019–2023* (Roads and Maritime, 2019b).
Climate change and greenhouse gas			
CC1	CC1	*Climate change risk assessment*	A detailed climate change risk assessment, considering both direct and indirect risks, will be undertaken during detailed design in accordance with *AS 5334-2013 Climate change adaptation for settlements and infrastructure – A risk based approach* and the draft *Technical Guide: Climate Change Adaptation for the Road Network* (Roads and Maritime, 2015c). Adaptation measures will be confirmed and actions implemented to address extreme and high risks where reasonable and feasible. Adaptation measures for medium risks will be considered and implemented where reasonable and feasible. Progress against implementation of confirmed adaptation measures and actions will be tracked. The assessment will include further modelling to optimise the design and reduce the impacts of climate change scenarios.
CC2	CC2	*Climate change related flood risks*	The flood mitigation strategy (measure HF1) will include consideration of future climate change related flood risks, the potential impacts of future climate change on flooding, and adaptive measures for implementation.

EIS/pdMDP ID	New ID	Issue	Mitigation measures – detailed design
CC3	CC3	*Urban heat island effect*	The urban design and landscape plan for the project will include consideration of appropriate landscape designs and species to reduce the impacts of urban heat island effect. Other measures to mitigate the impacts of the urban heat island effect will be investigated during detailed design and included in the urban design and landscape plan. Measures **could** ~~will~~ include using light coloured pavements and shading structures for public spaces.
GHG1	GHG1	*Greenhouse gas emissions*	The sustainability management plan (measure SU1) will include measures and targets to reduce greenhouse gas emissions during construction and operation. The plan will include targets to reduce the project's carbon footprint during construction and operation considering scope 1, scope 2 and scope 3 emissions.
GHG2	GHG2		The final design will incorporate LED lighting in preference to fluorescent fittings or high-pressure sodium lights where fit for purpose, feasible and cost-effective.
GHG3	GHG3		The surface road network will be designed for long term performance and durability of materials, increasing asset design lives and reducing the frequency of maintenance activities.

Table 11.2 Compilation of mitigation measures for construction

EIS/pdMDP ID	New ID	Issue	Mitigation measures – construction (including pre-construction)
Environmental management			
EM1	EM1	*Construction environmental management*	A CEMP will be prepared to detail the approach to environmental management during construction~~, as described in section 27.2.1~~ and in accordance with the conditions of approval.
Traffic, transport and access			
TT1	TT1	*Potential for traffic, transport and access impacts during construction*	A Construction Traffic and Access Management Plan will be prepared prior to construction and implemented as part of the CEMP. The plan will detail processes and responsibilities to minimise traffic and access delays and disruptions, and identify and respond to changes in road safety during construction.
TT2	TT2		The Construction Traffic and Access Management Plan will include proposed road staging of construction works along Airport Drive, Qantas Drive and key accesses to Sydney Airport's terminals to ensure these key roads maintain satisfactory capacity and minimum levels of service. ~~The proposed road staging plans and mitigation measures will be developed in conjunction with Transport for NSW (various divisions), ARTC, the Transport Management Centre, Sydney Coordination Office, Sydney Airport Corporation, emergency services, and any contractors working in the vicinity of the airport.~~
TT3	TT3		The communications strategy (measure SE3) will include a mechanism to inform the community of the dates and durations of specific phases within the project, including information about specific lane and road closures and the times of day and night when works will be carried out.

EIS/pdMDP ID	New ID	Issue	Mitigation measures – construction (including pre-construction)
TT4	TT4	*Alternative transport modes*	A travel demand management strategy will be prepared to provide: ▪ A comprehensive set of travel mode options to minimise use of roads affected by construction ▪ Communication strategies to reduce the number of people using the road network in the project study area during construction, where practicable.
TT5	TT5	*Impacts on road network performance (delays) and safety*	Construction staging and temporary work plans will be prepared to: ▪ Ensure access to Sydney Airport is maintained at all times during operational hours ▪ Stage the construction works on key parts of the network, such as Qantas Drive, Airport Drive and access to Sydney Airport terminals, to enable these roads to continue to function with as minimal impact as possible ▪ Minimise conflict with the existing road network ▪ Maximise spatial separation between work areas and travel lanes. **The proposed road staging plans and mitigation measures will be developed in consultation with the Airport Precinct Infrastructure Coordination Operations Group and the Traffic and Transport Liaison Group comprising representatives from Transport for NSW (various divisions), ARTC, the Transport Management Centre, Sydney Coordination Office, Sydney Airport Corporation, emergency services, and any contractors working in the vicinity of the airport.**
TT6	TT6		Further consideration of the construction phase road geometry and construction area operations will be undertaken with the aim of optimising road performance during construction. This will include the following considerations: ▪ Maintain a posted speed of 50 to 60 km/h along the construction zones ▪ Maintain three lanes in each direction at the Airport Drive and Link Road intersection ▪ Provide three lanes into Terminals 2/3 at Sir Reginald Ansett Drive through to Keith Smith Avenue.
TT7	TT7		Where reasonable and feasible, work areas, activities and construction access arrangements will be modified to address any traffic flow issues identified by key stakeholders, including the Sydney Coordination Office, Sydney Airport Corporation and the Transport Management Centre.
TT8	TT8		A mechanism will be provided for the community to report incidents and delays, such as a project phone number. The contact mechanism will be communicated in accordance with the project's communication strategy (measure SE3).

EIS/pdMDP ID	New ID	Issue	Mitigation measures – construction (including pre-construction)
TT9	TT9	*Impacts on access to Terminals 2/3*	Further traffic management in the vicinity of the Qantas Drive/Seventh Street/Robey Street intersection will be planned and undertaken with consideration of the following potential re-routing options: ▪ Divert westbound traffic from General Holmes Drive (via Joyce Drive) onto Robey Street (via the new Wentworth Avenue link provided by the Airport East Upgrade project) and Botany Road instead of using the right turn from Qantas Drive to Robey Street ▪ Consolidate and support the function of the left turn from Qantas Drive onto Robey Street and traffic out of Seventh Street through the re-allocation of signal green time taken away from the diverted or banned right turn movement (from Qantas Drive to Robey Street) during peak periods or potentially ban the right turn movement in the peak periods ▪ Introduce an additional left turn lane into Robey Street from Qantas Drive to improve traffic flows based on traffic modelling analyses.
TT10	TT10		Access to Sydney Airport will be maintained at all times during the airport's operational hours. Any temporary changes in access arrangements will be developed, communicated and implemented in consultation with Sydney Airport Corporation.
TT11	TT11	*Property, cyclist and pedestrian access*	Access to properties, including residences, businesses and community infrastructure, will be maintained. Where disruption to access cannot be avoided, consultation will be undertaken with the owners and occupants of affected properties, to confirm their access requirements and to determine alternative arrangements.
TT12	TT12		Safe pedestrian and cyclist access will be maintained around or through work areas. Where disruption to access cannot be avoided, alternative routes that comply with relevant accessibility standards and guidelines will be provided, signposted and communicated.
TT13	TT13	*Impacts on the availability of parking on streets surrounding construction work areas*	A worker parking strategy will be developed to identify measures to minimise worker parking on local streets. Measures to be implemented during construction will include provision of designated parking areas within the project site, encourage use of public transport and implement shuttle bus arrangements.
TT14	TT14	*Impacts on bus stops and passengers*	Where required, changes to existing bus stops and/or changes to bus service patterns will be undertaken in accordance with the following requirements: ▪ Changes will be designed and implemented in consultation with Transport for NSW and bus operators ▪ The community will be informed in advance of changes.
TT15	TT15	*Impacts of construction haulage vehicles*	Construction haulage vehicles will be managed to: ▪ Adhere to the nominated haulage routes ~~and speeds~~ identified in the Construction Traffic and Access Management Plan **and posted speed limits** ▪ Minimise idling and queuing on public roads ▪ Minimise movement of vehicles during peak periods.

EIS/pdMDP ID	New ID	Issue	Mitigation measures – construction (including pre-construction)
TT16	TT16	*Cumulative construction traffic impacts*	The potential for cumulative construction traffic impacts will be reviewed and coordinated with other projects, **in consultation with the Airport Precinct Infrastructure Coordination Operations Group and the Traffic and Transport Liaison Group**. The review will include: ▪ Considering other projects with the potential to affect access and capacity, particularly in the vicinity of Terminals 2/3 ▪ Detailed reviews of programs for traffic staging, lane and road closures for all projects ▪ Coordinating works and identifying efficient re-routing options during periods of road and lane closures.
Noise and vibration			
NV1	NV5	*Managing the potential for noise and vibration impacts during construction*	A Construction Noise and Vibration Management Plan will be prepared as part of the CEMP and implemented during construction. The plan will detail processes, responsibilities and measures to manage noise and vibration and minimise the potential for impacts during construction, consistent with the management approach and mitigation measures in the ~~Roads and Maritime's~~ *Construction Noise and Vibration Guideline* **(Roads and Maritime, 2016).**
NV2	NV6		Location and activity specific noise and vibration impact assessments will be undertaken prior to those works (as a minimum): ▪ With the potential to result in noise levels above 75 dBA at any receiver ▪ That need to occur outside standard construction hours and are likely to result in noise levels greater than the relevant noise management levels ▪ With the potential to exceed relevant performance criteria for vibration. The assessments will confirm predicted impacts at relevant receivers in the vicinity of the activities to assist with the selection of appropriate management measures. Monitoring will be carried out at the start of new noise and vibration intensive activities to confirm that actual levels are consistent with the predictions.
NV4	NV7	*Potential impacts at hotels*	The facades of hotels likely to be affected by construction will be assessed to confirm existing façade performance (external to internal noise transmission) in consultation with the hotel operators. Location and activity-specific noise and vibration impact assessments undertaken for works in the vicinity of hotels will adopt the results of the assessment for each affected hotel to assess potential internal noise levels within the hotel rooms more accurately (see Technical Working Paper 2).

EIS/pdMDP ID	New ID	Issue	Mitigation measures – construction (including pre-construction)
NV5	NV8	*Potential impacts on the Qantas Flight Training Centre*	**The potential for impacts on the existing Flight Training Centre will be managed in accordance with the acoustic framework that has been agreed with Qantas.** **A similar acoustic framework will be developed for the new Qantas Flight Training Centre and implemented (once constructed) to minimise potential impacts during construction. The framework will be developed in consultation with Qantas and will include:** ▪ **Confirmation of building and simulator cabin acoustic performance and external to internal transfer functions for noise and vibration** ▪ **A process for setting external triggers levels for monitoring that are protective of the internal facility training functions from an acoustic perspective** ▪ **Monitoring requirements** ▪ **Communication protocols**. ~~A construction strategy will be developed in consultation with Qantas to minimise potential impacts on training operations at the Qantas Flight Training Centre in its current location. It will include:~~ ▪ ~~Confirming appropriate internal noise criteria for sensitive areas in the facility~~ ▪ ~~Confirming building and simulator cabin acoustic performance~~ ▪ ~~External criteria for noise and vibration~~ ▪ ~~Working distances for noise and vibration intensive plant and activities~~ ▪ ~~Alternative work methods that generate less noise and vibration and minimise vibration transmission~~ ▪ ~~Real-time monitoring requirements.~~
NV6	NV9	*Construction management and scheduling*	Investigate and implement alternative methods of demolition to avoid hydraulic/pneumatic hammering where high noise impacts are anticipated. Alternative methods could include shears, pulveriser or ripper attachments fitted onto the excavators.
NV7	NV10		Noisy work and vibration intensive activities (those activities that exceed the vibration criteria) will be scheduled during standard construction hours as far as possible. Works or activities that cannot be undertaken during standard construction hours will be scheduled as early as possible during the evening and/or night-time periods. Respite measures will be implemented for noisy work and vibration intensive activities in a manner consistent with the ~~Roads and Maritime~~'s *Construction Noise and Vibration Guideline* **(Roads and Maritime, 2016)**.
NV8	NV11		Hoarding, or other shielding structures, will be used **for construction compounds and** ~~where receivers are impacted near~~ fixed works areas **where construction noise would exceed relevant noise management levels at nearby sensitive receivers**. The barriers should be of solid construction with minimal gaps.

EIS/pdMDP ID	New ID	Issue	Mitigation measures – construction (including pre-construction)
NV9	NV12	*Management of the potential for vibration impacts during construction*	Vibration generating activities will be managed to minimise the potential for impacts on structures and sensitive receivers, including maximising minimum working distances where practicable, or alternate methods to minimise vibration where minimum working distances cannot be achieved. **Prior to the commencement of vibration-intensive works within the minimum working distances for cosmetic damage, the potential for damage will be assessed. Where there is potential for damage, alternative methods that generate less vibration will be investigated and substituted where practicable.** **Where residual risks remain, condition surveys will be carried out and vibration monitoring will be undertaken. Vibration monitors will provide real-time notification of exceedances of levels approaching cosmetic damage and human comfort criteria. Any identified vibration-related damage ~~to the items~~ will be rectified.** ~~Where alternatives cannot be implemented, vibration monitoring will be undertaken and receptors notified in advance of works. Vibration monitors will provide real-time notification of exceedances of levels approaching cosmetic damage and human comfort criteria.~~
NV10	NV13	*Potential vibration impacts on pipelines*	Prior to vibration intensive works in the vicinity of pipelines, the owners of each potentially affected pipeline will be consulted to confirm the potential for impacts from vibration and any appropriate criteria. Management protocols to protect the integrity of each affected pipeline, including monitoring requirements, will be developed in consultation with each asset owner as required, and implemented for all vibration intensive works in the vicinity of pipelines.
NV11	NV14	*Potential impacts on buildings and structures*	Building condition surveys will be completed before and after construction works where buildings or structures are within the minimum vibration working distances for cosmetic damage.
~~NV12~~		~~*Potential vibration impacts*~~	~~Prior to the commencement of vibration-intensive works within the minimum working distances for cosmetic damage, for heritage items, the potential for damage to the item will be assessed. Where there is potential for damage, alternative methods that generate less vibration will be investigated and substituted where practicable.~~ ~~Where residual cosmetic damage risks remain, condition surveys will be carried out and vibration monitoring with real-time notification of exceedance will occur during the activity. Site activities will be modified where practicable to avoid exceeding the cosmetic damage criteria. Any identified vibration-related damage to the items will be rectified.~~
NV13	NV15	*Cumulative noise and vibration impacts*	The likelihood of cumulative and consecutive construction noise impacts, particularly when undertaken outside standard construction hours, will be reviewed prior to construction and coordinated with other nearby projects to minimise impacts, where possible.
Airport operations			
AS10	AS10	*Wildlife attraction as a result of drainage and flooding management infrastructure*	Drainage and flood management infrastructure will be managed during construction to minimise the risk of attracting wildlife.

EIS/pdMDP ID	New ID	Issue	Mitigation measures – construction (including pre-construction)
AS11	AS11	*Construction lighting*	Construction lighting will be selected and located to meet Sydney Airport's restricted lighting zone requirements. For locations where it is not possible to achieve the required intensity levels, works requiring lighting will be undertaken in accordance with the requirements of Sydney Airport Corporation, which may involve restricting the timing of works to outside Sydney Airport's operational hours. Construction lighting will comply with section 9.21 of the Manual of Standards (CASA 2017) and the *National Airports Safeguarding Framework* (Guideline E).
AS12	AS12	*Temporary intrusions of Sydney Airport's prescribed airspace*	Construction planning will ensure that intrusions of Sydney Airport's prescribed airspace are minimised as far as practicable. Where temporary intrusions of the prescribed airspace cannot be avoided, works likely to result in intrusions will be undertaken in accordance with the requirements of Sydney Airport Corporation (for short-term works less than three months) or the Department of Infrastructure, Transport, ~~Cities and~~ Regional Development **and Communications** for long-term works (more than three months) and any controlled activity approvals for these works. This will include timing works to avoid **intrusions during** Sydney Airport's operational hours.
Air quality			
AQ1	AQ2	*Managing air quality impacts during construction*	A Construction Air Quality Management Plan will be prepared as part of the CEMP and implemented during construction. The plan will detail processes, responsibilities and measures to manage air quality, odour and landfill gas and minimise the potential for impacts during construction. The plan will include an air quality, odour and landfill gas monitoring program, and will detail the measures that will be implemented to compare the actual performance of construction against the predicted performance. Monitoring will be undertaken for the duration of construction.
AQ2	AQ3	*Avoiding odour impacts during construction*	Odour impacts at the former Tempe landfill will be minimised as far as possible by: ▪ Construction planning to minimise the need to expose waste, ~~and/or~~ the area exposed at any ~~one~~ time **and to minimise contact between surface water and exposed waste** ▪ Where there is the potential to generate odour, **implementing** ~~this will be managed in accordance with~~ the odour management strategy (measure AQ4). Further modelling will be carried out to demonstrate that the proposed excavation methodology for the former Tempe Landfill can comply with the 2 OU criterion. **This will be informed by sampling of the waste to determine the actual waste odour emission rates likely to occur.**

EIS/pdMDP ID	New ID	Issue	Mitigation measures – construction (including pre-construction)
AQ3	AQ4	*Monitoring and controlling odour at the former Tempe landfill*	An odour management strategy will be developed ~~prior to construction~~ and implemented for the duration of works involving ground disturbance at the former Tempe landfill. The strategy will include: ▪ Proposed work methods and mitigation measures that aim to limit odour at sensitive receptors to no more than the 2 OU criterion ▪ Routine observation of weather conditions ▪ Regular odour surveys at receptor locations by appropriately qualified professionals (see AQ5) ▪ Measures to minimise the generation of odour ~~at the end of each work day/shift~~ ▪ Mechanisms for investigating odour complaints, including conduct of additional odour surveys ▪ Contingency and rectification measures (eg use of deodorisers, **aeration of leachate storage(s)**) should significant odour issues occur at sensitive receivers in the vicinity of the project site.
AQ4	AQ5		Odour surveys will be undertaken at downwind receptors for the duration of works involving ground disturbance at the former Tempe landfill **generally** in accordance with *Determination of odorants in ambient air by field inspection* (VDI 3940, 1993). The odour surveys will be undertaken: ▪ Daily, for one hour when works commence, and prior to works completing ▪ If wind conditions drop below three metres per second ▪ If an odour complaint is received ▪ **Downwind of leachate storage(s)**. If significant odour issues are observed in the vicinity of sensitive receptors **or from leachate storage(s)**, the contingency and rectification measures defined by the odour management strategy will be implemented (see AQ4).
AQ5	AQ6	*Impacts on air quality as a result of demolition*	Demolition activities, including removal of hazardous building materials, will be planned and carried out in a manner that minimises the potential for dust generation.
AQ6	AQ7	*Cumulative dust impacts arising from concurrent construction of the Gateway road project and the Botany Rail Duplication project*	The detailed construction program will be developed in consultation with the contractors constructing the Botany Rail Duplication project. Consultation will be maintained over the duration of both projects to plan activities in a manner that reduces the potential for air quality-related impacts. Where practicable, activities with a high potential to generate dust will be programmed so that they do not occur at the same time.
Contamination and soils			
CS4	CS8	*Demolition of structures containing hazardous substances*	Hazardous materials surveys will be undertaken to inform construction planning, including demolition activities and utility adjustments.

EIS/pdMDP ID	New ID	Issue	Mitigation measures – construction (including pre-construction)
CS5	CS9	*Potential impacts of soil disturbance*	A Construction Soil and Water Management Plan will be prepared as part of the CEMP and implemented during construction. The plan will detail processes, responsibilities and measures to manage potential soil and water quality impacts during construction, including potential impacts associated with the presence of existing contamination, stockpile management, saline soils and acid sulfate soils. The Construction Soil and Water Management Plan will be prepared in accordance with relevant guidelines and standards, including *Managing Urban Stormwater – Soils and Construction*, Volume 1 (Landcom, 2004) Volume 2B Waste landfills (DECC, 2008a) and Volume 2D (DECC, 2008b) (the Blue Book).
CS6	CS10	*Acid sulfate soils*	An Acid Sulfate Soils Management Plan will be prepared as part of the Construction Soil and Water Management Plan in accordance with the *Acid Sulfate Soils Assessment Guidelines* (ASSMAC, 1998). The plan will define the process and measures to manage actual and potential acid sulfate soil and sediment disturbed during construction. The plan will include a summary of available acid sulfate soil information relevant to the project site and identify any further soil/water analysis required as a precursor to implementing the management plan. Acid sulfate soils will be disposed off site (where required) in accordance with the *Waste Classification Guidelines* - ~~*Part 1 and*~~ *Part 4: Acid sulfate soils* (NSW EPA, 2014).
CS7	CS11	*Impacts on sediments in Alexandra Canal during construction*	A plan of management will be developed in accordance with the remediation order and implemented to manage work within Alexandra Canal and minimise the disturbance and migration of contaminated sediments. The plan will identify specific methodologies to minimise disturbance and dispersion of potentially contaminated sediments. The plan will be prepared in consultation with Sydney Water Corporation and submitted for the NSW EPA's approval in accordance with the remediation order requirements.
CS11	CS12	*Works at the former Tempe landfill*	The potential for settlement will be considered as part of the siting and layout of construction compounds and work areas in the former Tempe landfill. Where required, ground treatment (eg foundation layers or sheet piling) will be provided to minimise this risk.
CS12	CS13		Landfill material **excavated during the project** will be appropriately handled and stockpiled, to ensure minimal impact to the surrounding community, on-site workers and the environment. ▪ ~~Managed in accordance with the requirements of *Environmental Guidelines: Solid waste landfills* (NSW EPA, 2016a).~~ Excavated landfill waste to be disposed of will be classified in accordance with the *Waste Classification Guidelines Part 1: Classifying waste* (NSW EPA, 2014) before being disposed of at an appropriately licensed waste facility.
CS13	CS14	*Landfill gas intrusion*	Protocols to address and manage landfill gases within the construction footprint in the former Tempe landfill and Sydney Airport northern lands car park will be developed and implemented during construction. The protocols will consider confined and/or enclosed spaces and appropriate controls as required (eg forced ventilation), and will include appropriate occupational monitoring.
CS14	CS15		Hot works within the former Tempe landfill and Sydney Airport northern lands car park will be restricted where there is a potential for fire or explosion. Monitoring for potentially flammable gases will occur during all hot works.

EIS/pdMDP ID	New ID	Issue	Mitigation measures – construction (including pre-construction)
CS15	CS16	*Works within Sydney Airport land*	Any material imported and used within Sydney Airport land will be tested prior to use to ensure it does not exceed the acceptable limits in the PFAS National Environmental Management Plan (HEPA, 2018) and Schedule 3 of the *Airports (Environment Protection) Regulations* 1997.
CS16	CS17	*Stockpile management and handling*	Storage and containment systems for the stockpiling of contaminated material during construction will be designed to be impervious to the materials stored, resistant to fire (where required), covered to prevent contact with rainfall, and managed and maintained to prevent any release of liquids and contaminated run-off to stormwater drains, waters and land.
CS17	CS18	*Management of previously unidentified contaminated material*	The discovery of previously unidentified contaminated material will be managed in accordance with an unexpected contaminated finds procedure, as outlined in the *Guideline for the Management of Contamination* (Roads and Maritime, 2013b) and detailed in the CEMP. Awareness training will be provided for all on-site staff to assist in the identification of potentially contaminated material as per the unexpected contaminated finds procedure. In the event that unexpected indicators of contamination are encountered during construction (such as odours or visually contaminated materials), work in the area will cease, and the finds will be managed in accordance with the unexpected contaminated finds procedure.
CS18	CS19	*PFAS impacted soil and groundwater*	PFAS contaminated materials will be managed in accordance with the risk-based framework presented in the *PFAS National Environmental Management Plan* (HEPA, 2018). If soil and/or water containing PFAS is proposed for reuse, the proposed reuse must not result in an unacceptable or increased risk to human health and/or the environment. A health and environmental risk assessment and consultation with the NSW EPA (and the Airport Environment Officer where the works are on Sydney Airport land) will be required before any reuse of PFAS contaminated soil and/or water.
CS19	CS20	*Remediation/ management of existing contamination*	Validation of remediation will be undertaken during construction and a validation report prepared by a suitably qualified environmental consultant as defined in Schedule B9 of the NEPM to confirm the requirements of the RAP(s) have been met. For works on land subject to the EP&A Act, the validation report will be reviewed by a **NSW EPA accredited** site auditor ~~accredited in accordance with the site auditor scheme under the CLM Act~~. For works on Sydney Airport land, Sydney Airport Corporation and the Airport Environmental Officer will review the report.
CS21	CS21	*Rehabilitation of disturbed areas*	A rehabilitation strategy will be prepared to guide the approach to rehabilitation of disturbed areas following the completion of construction.
CS22	CS22	*Condition of the former Tempe landfill cap*	**A condition assessment of the integrity of the landfill cap will be carried out by a suitably qualified specialist prior to any works with the potential to affect the cap. In areas where the landfill cap is retained, visual inspections and rectification measures will be implemented as needed during construction.** **A final condition assessment will be carried out at the completion of construction detailing recommendations for any additional rectification required.**

EIS/pdMDP ID	New ID	Issue	Mitigation measures – construction (including pre-construction)
Flooding			
HF1	HF6	*Management of the potential for flooding impacts during construction*	A flood mitigation strategy will be prepared and relevant measures will be implemented as part of the design and during construction. The strategy will include undertaking additional flood modelling taking into account detailed design and proposed construction planning and methodologies.
HF2	HF7	*Impacts on flood behaviour from construction*	Hydrologic and hydraulic assessments will be carried out for all temporary and permanent project components (including ancillary facilities) that have the potential to affect flood levels in the vicinity of the project. The results of the assessment will inform the preparation of the Flood Mitigation Strategy (measure HF1) as well as the design of temporary construction facilities and design development.
HF6	HF8	*Potential flood impacts on ancillary construction facilities*	As a minimum, site facilities will be located outside high flood hazard areas based on a one per cent AEP flood. For site facilities located within the floodplain, the flood mitigation strategy will identify how risks to personal safety and damage to construction facilities and equipment will be managed.
Groundwater			
GW4	GW4	*Dewatering of excavation*	A dewatering management strategy will be developed to confirm the approach to managing dewatering of excavations during construction. The strategy will: ▪ Outline measures to minimise groundwater inflow ▪ Describe likely groundwater quality based on sampling data ▪ Estimate potential groundwater inflow rates and volumes for proposed excavations ▪ Identify proposed methods for managing extracted water, which could include reuse, infiltration, reinjection, discharge to stormwater, disposal to the wastewater system, and collection for off-site disposal ▪ Include a feasibility assessment of each proposed management option for extracted groundwater ▪ Identify any ~~groundwater~~ treatment requirements and methods for any of the proposed management options ▪ Describe any applicable monitoring requirements.
GW5	GW5	*Managing leachate within the former Tempe landfill*	A leachate management strategy will be developed to manage leachate at the former Tempe landfill during construction and ensure that the objectives of the site's voluntary remediation agreement continue to be met. The strategy will: ▪ Identify predicted changes in leachate volumes due to the project, based on the detailed construction methodology ▪ Identify any required changes to the existing leachate management system due to predicted changes in leachate volume and concentration and any other changes due to the project ▪ Describe a framework for monitoring leachate levels and **water** quality to ensure that no leachate migrates into Alexandra Canal **as a result of the project**. The strategy will be developed in consultation with ~~relevant stakeholders, including~~ Inner West Council, Sydney Water and the NSW EPA.

EIS/pdMDP ID	New ID	Issue	Mitigation measures – construction (including pre-construction)
GW6	GW6	*Monitoring of construction impacts*	The existing groundwater monitoring program will continue during construction, and will be supplemented as required, to: ▪ Confirm groundwater quality to inform the selection management options for extracted groundwater, including treatment requirements for discharge ▪ Monitor potential migration **of** contaminants due to groundwater extraction (if it is a credible risk) ▪ Confirm if acidification of groundwater is occurring due to exposure of acid sulfate soils ▪ Confirm local groundwater levels to inform estimation of potential inflows and dewatering rates ▪ Monitor drawdown levels and radii of influence **as well as extraction rates** to allow comparison against predictions. ▪ ~~Confirm any changes to groundwater levels due to the cumulative impacts of other projects.~~
N/A	GW7	*Condition of the leachate treatment plant*	**A condition assessment of the leachate collection, monitoring and treatment system will be carried out by a suitably qualified specialist prior to project activities that could affect leachate generate and management.** **A final condition assessment will be carried out at the completion of construction to ensure the leachate collection, monitoring and treatment system is returned to council with the same functionality and condition, subject to fair wear and tear.**
Surface water			
SW3	SW5	*Sedimentation and scour protection at Alexandra Canal*	All works within or adjacent to Alexandra Canal will be managed in accordance with **the principles outlined in** *Guidelines for Controlled Activities on Waterfront Land – Riparian corridors* (Department of Industry, 2018).
SW6	SW6	*Monitoring water quality*	A water quality monitoring program will be developed and implemented as part of the Construction Soil and Water Management Plan to monitor potential surface water quality impacts. The program will define: ▪ Monitoring parameters ▪ Monitoring locations ▪ Frequency and duration of monitoring. The monitoring program will include ongoing baseline monitoring to determine the water quality of potential receiving waters prior to commencement of construction. ~~Proposed discharge will be updated as required prior to construction based on the baseline data at the time.~~ Water quality monitoring will continue for a minimum of 12 months following the completion of construction, or until affected watercourses are certified by a suitably qualified and experienced independent expert as ~~being~~ **returned** ~~rehabilitated~~ to an acceptable condition (or as otherwise required by any project conditions of approval). **All surface water data related to Alexandra Canal will be provided to Sydney Water for the duration of the monitoring program.**
SW7	SW7	*Discharge to surface water*	The performance of treatment systems required to treat construction water before discharge will be verified in relation to the established discharge criteria.

EIS/pdMDP ID	New ID	Issue	Mitigation measures – construction (including pre-construction)
N/A	SW8		**The discharge criteria specified in Appendix E would be met for any extracted groundwater or surface water that has come into contact with excavated waste materials prior to discharge into Alexandra Canal and connected stormwater systems.**
N/A	SW9		**Options to reuse construction water, such as for dust suppression and irrigation of rehabilitated and landscaped areas, would be investigated and adopted where practicable to minimise the volumes requiring discharge or disposal.**
SW8	SW10	*Release of sediment-laden water during works in northern ponds*	Construction planning will ensure that operation of the sluice gate at the northern ponds outlet to Alexandra Canal is not affected by the works.
N/A	SW11	*Management of surface water runoff within the former Tempe landfill*	**The management of surface water runoff for works within the former Tempe landfill will adopt the following principles:** ▪ **Isolate exposed waste from surface water runoff from other areas** ▪ **Minimise contact between rainfall and surface water runoff and exposed waste** ▪ **Capture and store (temporarily) surface water runoff from areas of exposed waste (leachate)** ▪ **Size leachate storage(s) based on updated water balance modelling to reflect the proposed construction methodology and to minimise the risk of the capacity being exceeded.**
Non-Aboriginal heritage			
NAH7	NAH7	*Managing heritage impacts during construction*	A Heritage Management Plan will be prepared prior to construction and implemented as part of the CEMP. It will include measures to manage non-Aboriginal heritage and minimise the potential for impacts during construction. The plan will take into account relevant conservation and heritage management policies in the Alexandra Canal Conservation Management Plan and the Sydney Airport Heritage Management Plan.
NAH8	NAH8	*Impacts on archaeology*	A Historical Archaeological **Assessment and** Research Design and Excavation Methodology will be prepared for, and implemented at, the following locations within the project site: ▪ Intact sections of Alexandra Canal along the western bank of the canal on either side of the existing pedestrian and rail bridges ▪ ~~Vacant land at 30 Canal Road (Lot 4 DP 555771 and Lot 3 DP 825649)~~ ▪ Land located north of Canal Road that is currently used for the construction (stockpiling) of the New M5 (Lot A DP 391775, Lot B DP 394647 and Lot 2 DP1168612) ▪ Sydney Airport land considered to contain low or moderate archaeological potential ▪ Land along Qantas Drive considered to contain low or moderate archaeological potential ▪ Sydney Airport land located east of Sydney Airport northern lands car park and west of Botany Rail Line (Lot 1 DP 826101) ▪ Land to the west of Boral's St Peters facility and east of the Botany Rail Line. The Historical Archaeological Assessment and Research Design and Excavation Methodology will identify the specific features of archaeological significance that could be present at these locations, provide a scope for further investigations to confirm and specify appropriate archaeological management for any remains identified.

EIS/pdMDP ID	New ID	Issue	Mitigation measures – construction (including pre-construction)
NAH9	NAH9	*Archival recording*	Photographic archival recording will be carried out for affected sections of the following items: ▪ Alexandra Canal ▪ Sydney (Kingsford Smith) Airport Group ▪ Cooks River Container Terminal ▪ Mascot (Shea's Ck) Underbridge ▪ Botany Rail Line. Photographic archival recording will be carried out prior to works commencing in the vicinity of the item, and in accordance with *How to Prepare Archival Records of Heritage Items* (NSW Heritage Office, 1998) and *Photographic Recording of Heritage Items Using Film or Digital Capture* (Heritage Office, 2006b). Once complete, a report will be prepared detailing the history and significance of the item, relevant findings from the archival recording and an overview of the project. This document would subsequently be held by the appropriate local council(s), local library, local historical society and the owner of the asset.
NAH10	NAH10	*Avoiding impacts during construction*	Heritage items and landscaping located outside the project site and associated with the following items will be marked on site plans contained within the CEMP as areas to be avoided during construction, where works are proposed within 10 metres of: ▪ Alexandra Canal (significant fabric and gazetted curtilage as detailed in the conservation management plan for Alexandra Canal) ▪ Sydney (Kingsford Smith) Airport Group – fabric of high significance (as identified in the Sydney Airport Heritage Management Plan), trees and plantings ▪ Cooks River Container Terminal – fabric of high significance, trees and plantings ▪ Mascot (Shea's Ck) Underbridge – fabric associated with the bridge. Protective barriers will be established prior to works at these locations.
NAH11	NAH11	*Potential vibration impacts on heritage items*	Potential vibration impacts on features of heritage significance will be managed in accordance with the Construction Noise and Vibration Management Plan (measure **NV5**) and noise and vibration mitigation measure **NV12.**
NAH12	NAH12	*Unexpected finds*	Any items of potential heritage conservation significance or human remains discovered during construction will be managed in accordance with the *Standard Management Procedure Unexpected Heritage Items* (Roads and Maritime, 2015e).
Aboriginal heritage			
AH2	AH3	*Archaeological investigation areas impacted by the project*	Archaeological salvage excavation will be undertaken prior to construction within those parts of Investigation Area 1 and Investigation Area 2 where deep sediments would be directly impacted by the project. Archaeological salvage excavation ~~(including post-excavation analysis and reporting)~~ will be completed prior to any activities that may result in harm to Aboriginal objects in these areas.
AH4	AH4	*Managing heritage impacts during construction*	An Aboriginal Heritage Management Plan will be prepared prior to construction and implemented as part of the CEMP. The plan will include measures to manage Aboriginal heritage and minimise the potential for impacts during construction. It will include the proposed salvage methodology, unexpected find procedure (see measure AH6) and process for additional consultation with Aboriginal stakeholders.

EIS/pdMDP ID	New ID	Issue	Mitigation measures – construction (including pre-construction)
AH5	AH5	*Aboriginal consultation*	Aboriginal stakeholder consultation will continue to be undertaken in accordance with the *Procedure for Aboriginal cultural heritage consultation and investigation* (Roads and Maritime, 2011b) and *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010c).
AH6	AH6	*Unexpected finds*	If suspected Aboriginal heritage items or human remains are uncovered during construction they will be managed in accordance with the *Standard Management Procedure: Unexpected Heritage Items* (Roads and Maritime Services, 2015e).
Land use and property			
LU5	LU5	*Impacts on privately-owned land or land owned by the NSW or local government*	Acquisition will be undertaken in accordance with: ▪ *The Land Acquisition (Just Terms Compensation) Act 1991* (NSW) ▪ *Determination of compensation following the acquisition of a business* (NSW Government, undated).
LU6	LU6	*Impacts on Commonwealth-owned land subject to a lease with Sydney Airport Corporation*	Sydney Airport, as the leaseholder of the land, will notify tenants that their sub-lease agreements will be concluded. Termination of leases will be undertaken in accordance with the contract terms with Sydney Airport Corporation and the tenant. Sydney Airport will provide support to manage the return of lands and handover to **Transport** ~~Roads and Maritime~~.
LU7	LU7	*Impacts on Qantas Flight Training Centre*	Consultation with Qantas will occur throughout construction planning and construction to minimise impacts on the: ▪ **Existing** ~~Qantas~~ Flight Training Centre until the relocation process is complete ▪ **New Flight Training Centre once it is operational.**
N/A	LU8	*Damage to properties and infrastructure*	**Condition surveys for structures and infrastructure at potential risk of damage due to construction of the project will be undertaken prior to commencement of the proposed activity. Rectification measures will be implemented during construction to address any damage caused by the project. A final condition assessment will be carried out at the completion of construction detailing recommendations for any additional rectification required.**

EIS/pdMDP ID	New ID	Issue	Mitigation measures – construction (including pre-construction)
Socio-economic			
SE1	SE3	*Potential social and community impacts during construction*	A communications strategy will be prepared to detail the process of communicating and engaging with the community and stakeholders in the lead up to, and during, construction. It will ensure that: ▪ The community and stakeholders have a high level of awareness and forewarning of all processes and activities ▪ Accurate and accessible information is made available ▪ A timely response is given to issues and concerns raised by the community ▪ Feedback from the community is encouraged ▪ Opportunities for input are provided. In relation to the potential for socio-economic impacts, the strategy will include: ▪ Communication with potentially affected residents, other community members, businesses and other key stakeholders to provide information about the project, and the likely nature, extent and duration of amenity and access changes during construction ▪ Protocols to identify and engage with vulnerable persons that might be affected by construction ▪ Protocols for communicating information about potential access delays in and around Sydney Airport and other relevant project information.
SE2	SE4	*Potential impacts on businesses*	Business management plans will be prepared and implemented for businesses affected by the project. The plans will be developed on a case by case basis and will detail specific measures, developed in consultation with the business operator. These will include: ▪ Protocols to identify, in consultation with each affected business, feasible and reasonable measures to maintain vehicular and pedestrian access during business hours, and visibility of the business to potential customers during construction, including alternative arrangements for times when access and visibility cannot be maintained ▪ Measures to respond to identified impacts as far as possible.
SE5	SE5	*Impacts on the off-leash dog exercise area*	~~A temporary off-leash dog exercise area will be provided. Access to this area will be maintained throughout construction, and temporary parking spaces will be provided. The location of the off-leash dog exercise area and the number of temporary parking spaces will be confirmed in consultation with Council. The condition of the temporary off-leash dog exercise area will be regularly monitored and maintained.~~ **Transport will continue to consult with Inner West Council to provide a temporary off-leash dog exercise area in the vicinity of the project during construction.**
SE6	SE6	*Impacts on community facilities and infrastructure*	Access to community facilities and infrastructure will be maintained during construction. Where alternative access arrangements need to be made, these will be developed in consultation with relevant service providers and communicated to users. Any changes to access arrangements will be managed in accordance with the Construction Traffic and Access Management Plan.

EIS/pdMDP ID	New ID	Issue	Mitigation measures – construction (including pre-construction)
Landscape character and visual amenity			
LV7	LV8	*Visual impacts during construction*	The design and maintenance of construction compound hoardings will aim to minimise visual amenity and landscape character impacts.
LV8	LV9		The selection of materials and colours for hoardings will aim to minimise their visual prominence.
LV9	LV10		Lighting of work areas, compounds, and work sites will be oriented to minimise glare and light spill impact on adjacent receivers.
LV10	LV11	*Tree protection during construction*	Trees to be retained will be protected prior to the commencement of construction in accordance with *AS4970-2009 Protection of trees on development sites* and the project's tree management strategy. Any tree pruning will be undertaken in accordance with the project's tree management strategy **and carried out** ~~guided by a tree report prepared~~ by a qualified arborist.
LV11	LV12	*Site rehabilitation*	Following completion of construction, site restoration will be undertaken in accordance with the rehabilitation strategy (measure CS23). Temporary impacts on public open space will be rehabilitated in consultation with the relevant local council and/or landowner.
Biodiversity			
BD3	BD3	*Managing the potential for biodiversity impacts during construction*	A Construction Biodiversity Management Plan will be prepared prior to construction and implemented as part of the CEMP. It will include measures to manage biodiversity and minimise the potential for impacts during construction. The plan will be prepared in accordance with relevant legislation, guidelines and standards.
Health, safety and hazards			
HS1	HS1	*Spill response*	A spill response procedure will be developed as part of the project's incident management protocols. The procedure and incident management protocols will detail processes, responsibilities and measures to manage hazardous substances and dangerous goods, including storage, handling and spill response, in accordance with legislative requirements.
HS2	HS2	*Utility management*	A utilities contingency management plan will be prepared and will include measures to manage any utility service disruptions during construction. This will include procedures to respond to ~~and~~ **any** unplanned outages of services, particularly for critical Sydney Airport infrastructure.
HS3	HS3	*Alterations to the ethylene pipeline*	A safety management study will be prepared for any proposed alterations to the ethylene pipeline in accordance with *AS 2885 Pipelines – Gas and liquid petroleum*. The outcomes of the safety management study will be incorporated in construction planning.
HS4	HS4	*Emergency response*	An emergency response plan will be prepared and will include measures to manage emergency situations during construction, including those associated with fires, flooding or other threats to public safety.
HS5	HS5	*Fire risk*	All works involving potential ignition sources within the former Tempe landfill will be subject to a risk assessment or ban on total fire ban days.
HS6	HS6	*Transport of dangerous goods and hazardous materials*	The transport of dangerous goods will be undertaken in accordance with the Dangerous Goods (Road and Rail Transport) Regulation 2009 and the *Australian Code for the Transport of Dangerous Goods by Road & Rail* (National Transport Commission, 2017).

EIS/pdMDP ID	New ID	Issue	Mitigation measures – construction (including pre-construction)
Waste management			
WM2	WM2	*Construction waste and spoil management*	A Construction Waste Management Plan will be prepared as part of the CEMP and implemented during construction. The plan will adopt the waste hierarchy principles contained in the *Waste Avoidance and Resource Recovery Act 2001* and will detail processes, responsibilities and measures to manage waste and minimise the potential for impacts during construction.
WM3	WM3		Construction waste will be minimised by accurately calculating materials brought to the site and limiting materials packaging where possible.
WM4	WM4		All waste disposal will be in accordance with the *Waste Classification Guidelines* (NSW EPA, 2014).
WM5	WM5	*Attraction of wildlife at the former Tempe landfill*	The following measures would be implemented during works at the former Tempe landfill to avoid attracting wildlife: ▪ Staging the excavation to minimise the amount of exposed waste at any one time ▪ Minimising the size and area of exposed stockpiles ▪ Ensuring material that has been disturbed, uncapped, or temporarily stockpiled is suitably covered at the end of each day.
WM6	WM6	*Management of unexpected waste materials*	Suitable areas will be identified to allow for contingency management of unexpected waste materials, including contaminated materials. Areas will be hardstand or lined areas that are appropriately stabilised and bunded, with sufficient space for stockpile storage.
Climate change and greenhouse gas			
GHG4	GHG4	*Greenhouse gas emissions*	**A minimum of 20 per cent** ~~An appropriate portion~~ of construction phase **electricity** ~~energy~~ will be purchased from an accredited GreenPower product.

Table 11.3 Compilation of mitigation measures for operation

EIS/pdMDP ID	New ID	Issue	Mitigation measures – operation
Traffic, transport and access			
TT17	TT17	*Operational road network performance including potential increased traffic on some parts of the network*	A review of operational network performance will be undertaken 12 months and five years from the commencement of operation to confirm the operational traffic impacts on surrounding arterial roads and major intersections. The review will identify measures (as required) to address impacts on road network performance. The results of the review will be considered in future operational network performance planning carried out by **Transport** ~~Roads and Maritime~~.
TT18	TT18	*Active transport opportunities*	**Transport** ~~Roads and Maritime~~ and Sydney Airport Corporation will prepare an active transport strategy to integrate and enhance accessibility opportunities. The strategy will be prepared in conjunction with relevant stakeholders and provide a guide for future active transport infrastructure provision. **This will include exploring options for active transport connections between the Alexandra Canal cycleway and the Terminals 2/3 precinct.**

EIS/pdMDP ID	New ID	Issue	Mitigation measures – operation
Noise and vibration			
NV16	NV16	*Operational noise and vibration impacts of the project*	Operational noise mitigation performance will be documented in an Operational Noise and Vibration Review conducted within 12 months of the commencement of operation. The need for additional mitigation or management measures to address identified operational performance issues and meet relevant operational noise criteria will be assessed and implemented where feasible and reasonable.
Airport operations (hazards and risks)			
AS12	AS13	*Wildlife attraction as a result of drainage and flooding management infrastructure*	Drainage and flood management infrastructure will be managed during operation to minimise the risk of attracting wildlife.
Contamination and soils			
CS20	CS23	*Remediation/ management of existing contamination*	The requirements for ongoing monitoring and maintenance of any installed or reinstated remediation systems will be documented in EMP(s) prepared for the respective areas. The EMP(s) will be prepared and implemented in accordance with the following requirements: ▪ The voluntary remediation proposal, EMP and any RAPs in place for the former Tempe landfill, including requirements for ongoing gas monitoring ▪ The requirements of the Sydney Airport RAP and EMP (if applicable) ▪ *National Environment Protection (Assessment of Site Contamination) Measure 1999* ▪ *Environmental Guidelines: Solid waste landfills* (NSW EPA, 2016a) (for ~~reinstatement of the capping layer and/or design of the new capping layer and final road pavement at~~ the former Tempe landfill). The EMP(s) will be: ▪ Prepared in consultation with the Airport Environmental Officer, **Inner West Council** and NSW EPA (as relevant) ▪ For works on land subject to the EP&A Act – approved by a ~~n independent~~ **NSW EPA accredited** site auditor ~~accredited under the site auditor scheme under the CLM Act~~ ▪ For works on Sydney Airport land – approved by Sydney Airport Corporation and endorsed by the Airport Environment Officer Following implementation and validation of the RAP(s) (if required by the existing EMP), and approval of the EMP(s), the site auditor will prepare a Site Audit Statement confirming the suitability of the project site for the proposed development (for works on land subject to the EP&A Act). For works on Sydney Airport land, the Airport Environmental Officer will confirm the objectives of the remediation have been met.
CS22	CS24	*Contamination during operation*	Spills and leaks of vehicles or maintenance plant and equipment will be managed in accordance with **Transport's** ~~Roads and Maritime's~~ standard operating procedures.
CS23	CS25		Ongoing management measures will be implemented for any areas where contamination remains following construction, and has the potential to cause an ongoing risk to maintenance works, the community and/or the receiving environment. These management measures will be documented in the EMP(s).

EIS/pdMDP ID	New ID	Issue	Mitigation measures – operation
Flooding			
HF7	HF9	*Adaptive management of infrastructure*	**Transport** ~~Roads and Maritime~~ and Sydney Airport Corporation will review measures to maintain or improve over time the flood immunity of the infrastructure resulting from the effects of climate change.
Land use and property			
LU8	LU9	*Future management of residual land*	The ongoing management of residual land, and **Transport's** ~~Roads and Maritime's~~ role in this process, will be confirmed in consultation with Inner West Council.
Waste management			
WM7	WM7	*Operational waste management*	Operational waste, including general litter clean up, will be managed in accordance with existing operational maintenance requirements for the project and the waste hierarchy principles contained in the *Waste Avoidance and Resource Recovery Act 2001*.
Sustainability			
SU2	SU2	*Sustainability management plan*	Prior to the commencement of operation, the sustainability management plan and sustainability initiatives will be reviewed and updated.
Climate change and greenhouse gas			
CC4	CC4	*Emergency management planning*	Operational procedures for emergency planning and management will be prepared to consider the increased risk of flooding and storm surges on the road and active transport link.
CC5	CC5		Emergency management planning will be undertaken in consultation and collaboration with other key agencies and surrounding stakeholders, including Sydney Airport Corporation.
GHG5	GHG5	*Greenhouse gas emissions*	A minimum of six per cent of operational phase ~~energy~~ **electricity** will be purchased from an accredited GreenPower product.

12. Conclusion

12.1 Concluding statement

This report documents and considers the issues raised in community, government agency, organisation and other submissions received by the NSW Department of Planning, Industry and Environment, during public exhibition of the EIS/preliminary draft MDP, in accordance with section 5.17(6)(a) of the NSW *Environmental Planning and Assessment Act 1979*. Transport has carefully considered the content of the submissions and has prepared responses to the issues raised, with the responses provided in this report.

The report provides additional information and clarification about some design features and information presented in the EIS/preliminary draft MDP. It also provides a summary of the results of design refinements and investigations, undertaken since exhibition commenced, to further reduce the potential impacts of the project and/or respond to issues raised.

The report presents a final set of mitigation measures (see Chapter 11), in response to issues raised in submissions and during consultation and to take into account additional information and project refinements

The project has been developed to avoid and minimise impacts on the local and regional environment, and impacts on the local community and businesses, as far as practicable. Measures to minimise the identified potential impacts would be implemented throughout the detailed design and construction planning phases.

A project of this scale and location in a heavily urbanised environment would inevitably have some impacts on the local environment and community. The project's environmental performance would be managed generally in accordance with the approach described in Chapter 27 of the EIS/preliminary draft MDP.

Provided the approach to environmental management described in the EIS/preliminary draft MDP is applied and the final set of mitigation measures presented in this document are effectively implemented during the design, construction and operational phases, the identified environmental impacts are considered to be acceptable and manageable.

12.2 The next steps

The NSW Department of Planning, Industry and Environment will review the EIS/preliminary draft MDP and this response to the submissions report on behalf of the NSW Minister for Planning and Public Spaces. After the Department completes its assessment, a draft Environmental Assessment Report will be prepared for the Planning Secretary of the Department, which may include recommended conditions of approval for those parts of the project that are State significant infrastructure in accordance with the EP&A Act.

The Planning Secretary's Environmental Assessment Report will be provided to the NSW Minister for Planning and Public Spaces. The Minister will then approve the project (with any conditions considered appropriate) or refuse to give approval to the project.

The Minister's determination, including any conditions of approval and the Environmental Assessment Report, will be published on the Department's Major Projects website following determination.

If the project is approved, the detailed design and construction methods would be developed to minimise potential impacts on the local and regional environment and the community. The design and construction methods would continue to be developed with this overriding objective in mind, taking into account the input of stakeholders and the local community, and the conditions of approval.

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Appendices

List of Appendices

Appendix A
Updated project description

7. Project description

7.1 Overview

7.1.1 The project and its alignment

The project would comprise new and upgraded sections of road linking the Sydney motorway network at St Peters interchange with Sydney Airport's terminals. It would also provide improved links to the surrounding road network, including Marsh Street, O'Riordan Street, Joyce Drive and beyond. Overall, about 6.6 kilometres of road would be constructed or upgraded as part of the project.

The project provides a number of linked road connections to facilitate the movement of traffic between the Sydney motorway network, Terminal 1 (the International Terminal) and Terminals 2/3 (the Domestic Terminals). The project would connect Terminal 1 and Terminals 2/3 with each other and with the Sydney motorway network (ie the New M5 and M4-M5 Link) at St Peters interchange. The project would also facilitate the movement of traffic towards Port Botany via Joyce Drive and General Holmes Drive.

The project would provide three main routes for traffic:

- Between the Sydney motorway network and Terminal 1, and towards the M5 motorway and the Princes Highway
- Between the Sydney motorway network and Terminals 2/3, and towards General Holmes Drive, Port Botany and Southern Cross Drive
- Between Terminal 1 and Terminals 2/3.

Figure 7.1 provides an overview of the primary connections the project would provide as well as the secondary connections the project would also facilitate.

The project would also provide access to Sydney Airport land on both sides of Alexandra Canal.

Key features

For the purpose of the impact assessment, the project has been divided into key components or features based on the location and functionality of each. The key components or features include:

- Road links to provide access between the Sydney motorway network and Sydney Airport's terminals, consisting of the following components:
  - St Peters interchange connection – a new elevated section of road extending from St Peters interchange to the Botany Rail Line, including an overpass over Canal Road
  - Terminal 1 connection – a new section of road connecting Terminal 1 with the St Peters interchange connection, including a bridge over Alexandra Canal and an overpass over the Botany Rail Line
  - Qantas Drive upgrade and extension – widening and upgrading Qantas Drive to connect Terminals 2/3 with the St Peters interchange connection, including a high-level bridge over Alexandra Canal
  - Terminal links – two new sections of road connecting Terminal 1 and Terminals 2/3, including a bridge over Alexandra Canal
  - Terminals 2/3 access – a new elevated viaduct and overpass connecting Terminals 2/3 with the upgraded Qantas Drive

- Road links to provide access to Sydney Airport land:
  - A new section of road and an overpass connecting Sydney Airport's northern lands on either side of the Botany Rail line (the northern lands access)
  - A new section of road, including a signalised intersection with the Terminal 1 connection and a bridge, connecting Sydney Airport's existing and proposed freight facilities on either side of Alexandra Canal (the freight terminal access)
- An active transport link, about 1.3 kilometres long and located along the western side of Alexandra Canal, to maintain connections between Sydney Airport, Mascot and the Sydney central business district
- Intersection upgrades or modifications at:
  - Link Road/Airport Drive
  - Lancastrian Road/Qantas Drive
  - Robey Street/Seventh Street/Qantas Drive
  - Qantas Drive/O'Riordan Street/Joyce Drive/Sir Reginald Ansett Drive
  - Ross Smith Avenue/Sir Reginald Ansett Drive
  - Shiers Avenue/Sir Reginald Ansett Drive
- Operational ancillary infrastructure, including maintenance bays, new and upgraded drainage infrastructure, signage and lighting, retaining walls, noise barriers, flood mitigation basin, utility works and landscaping.

The key features of the project are shown on Figure 7.2 to Figure 7.7 and described in sections 7.3 to 7.10.

As part of the above, the project includes four new bridges over Alexandra Canal and six overpasses over roads and the Botany Rail Line (the rail corridor). The proposed bridges and overpasses are described in sections 7.3 to 7.8. The names used in those sections are indicative reference names applied for the purposes of the impact assessment.

Preparatory investigations, surveys and notifications

The project would not include some preliminary works, including surveys, test drilling, test excavations, geotechnical or contamination investigations or other tests, sampling or investigations undertaken for the purposes of the design or assessment of the project.

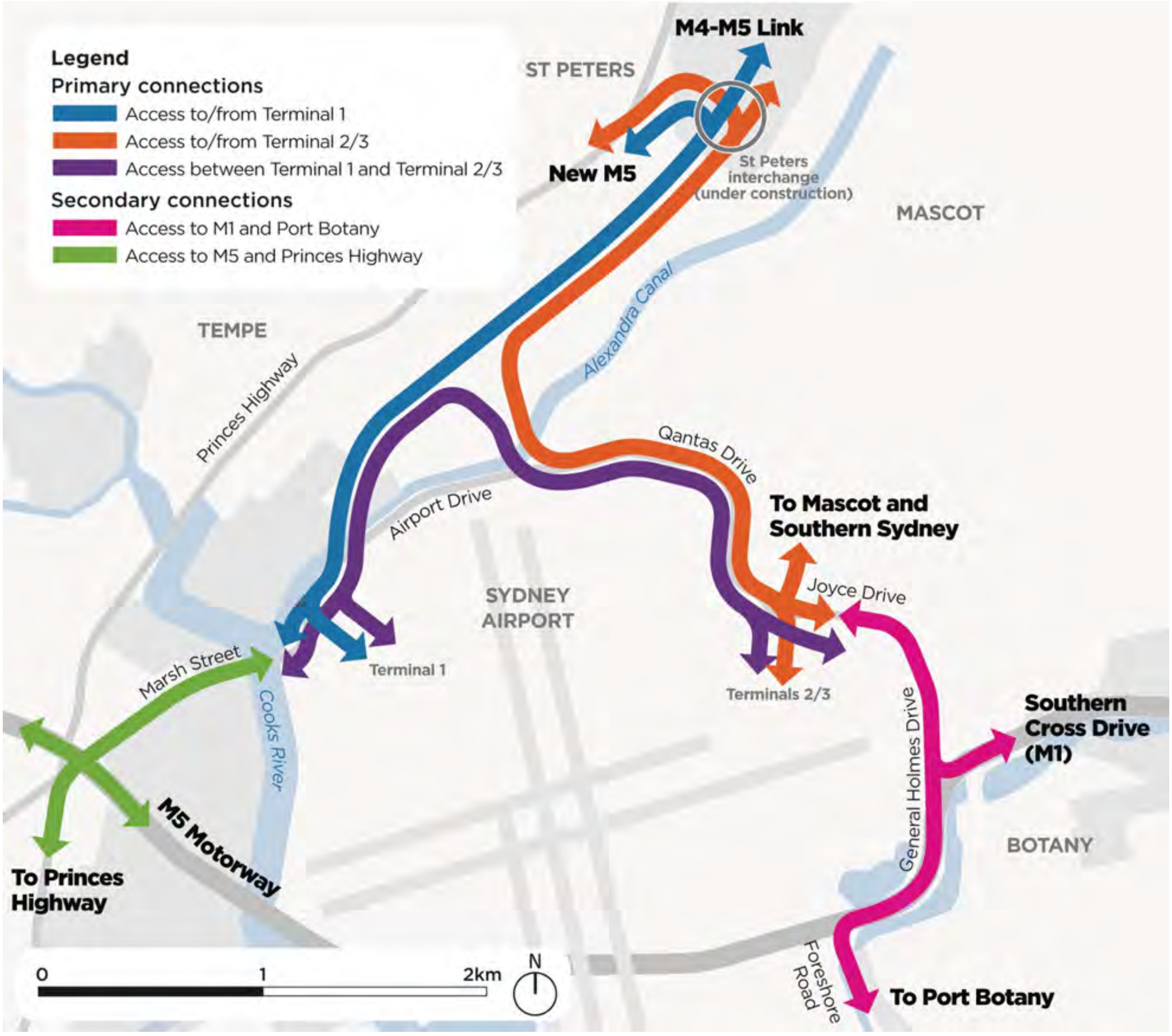


Figure 7.1 Connectivity provided by the project

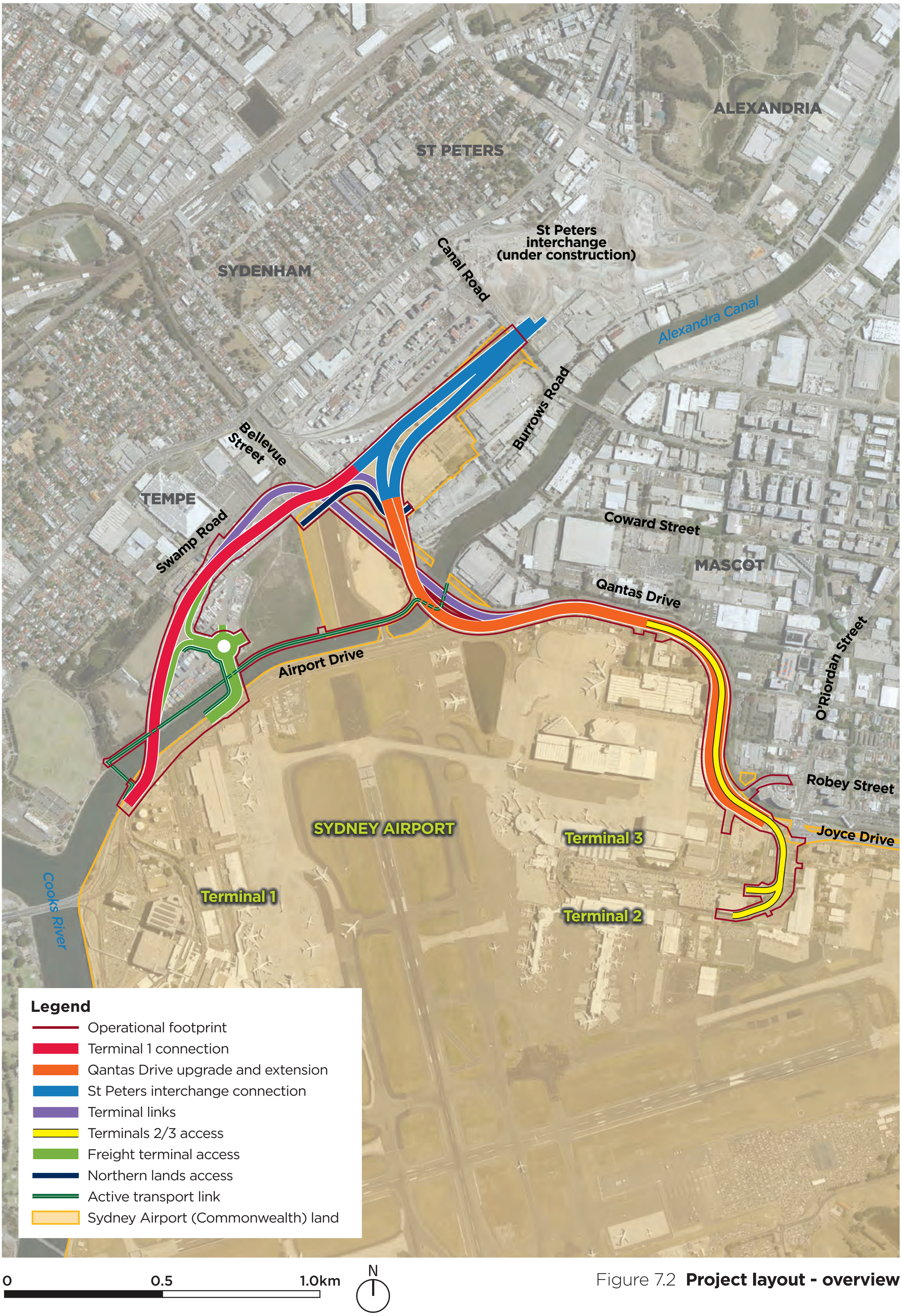


Figure 7.2 **Project layout - overview**

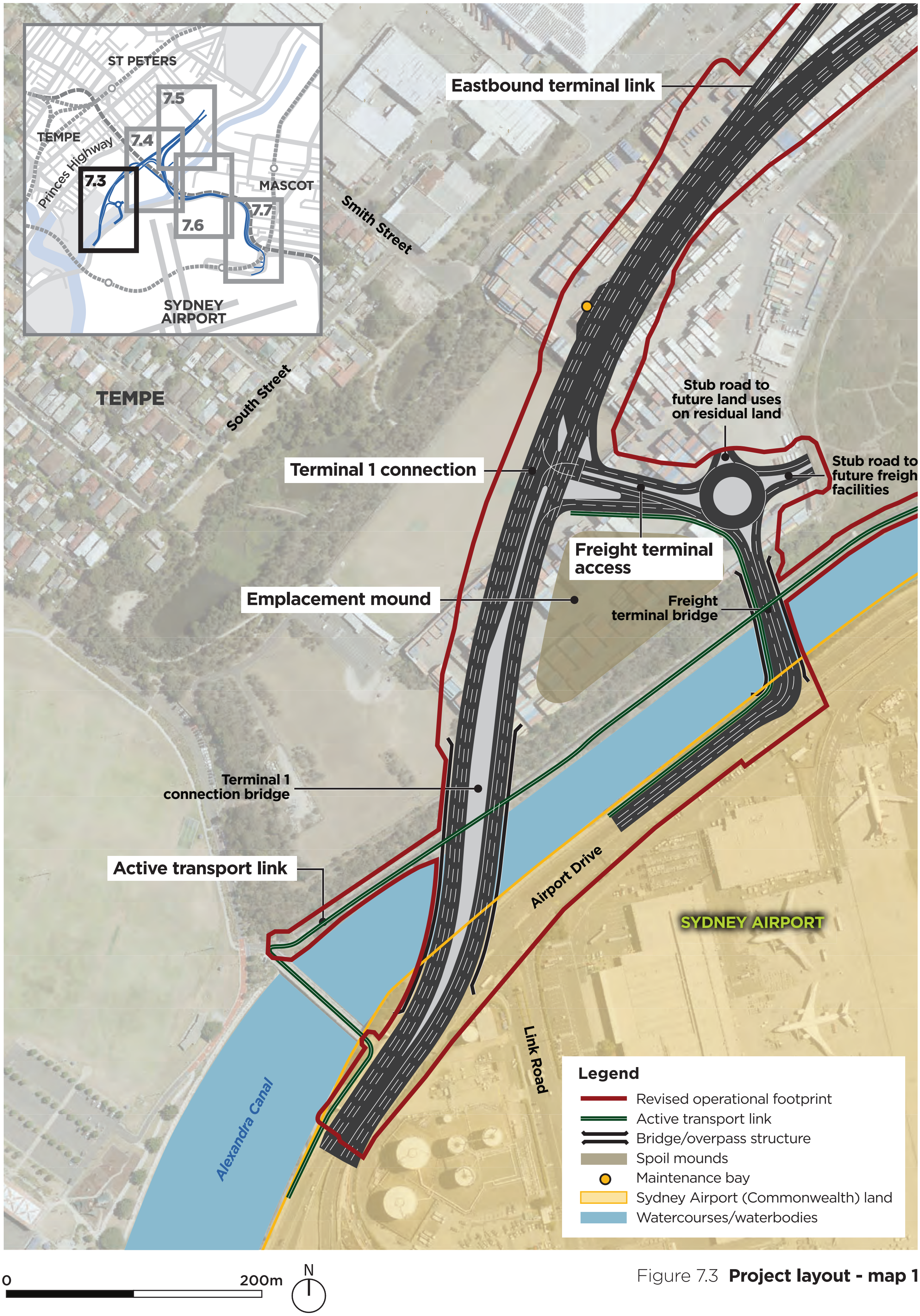


Figure 7.3 **Project layout - map 1**

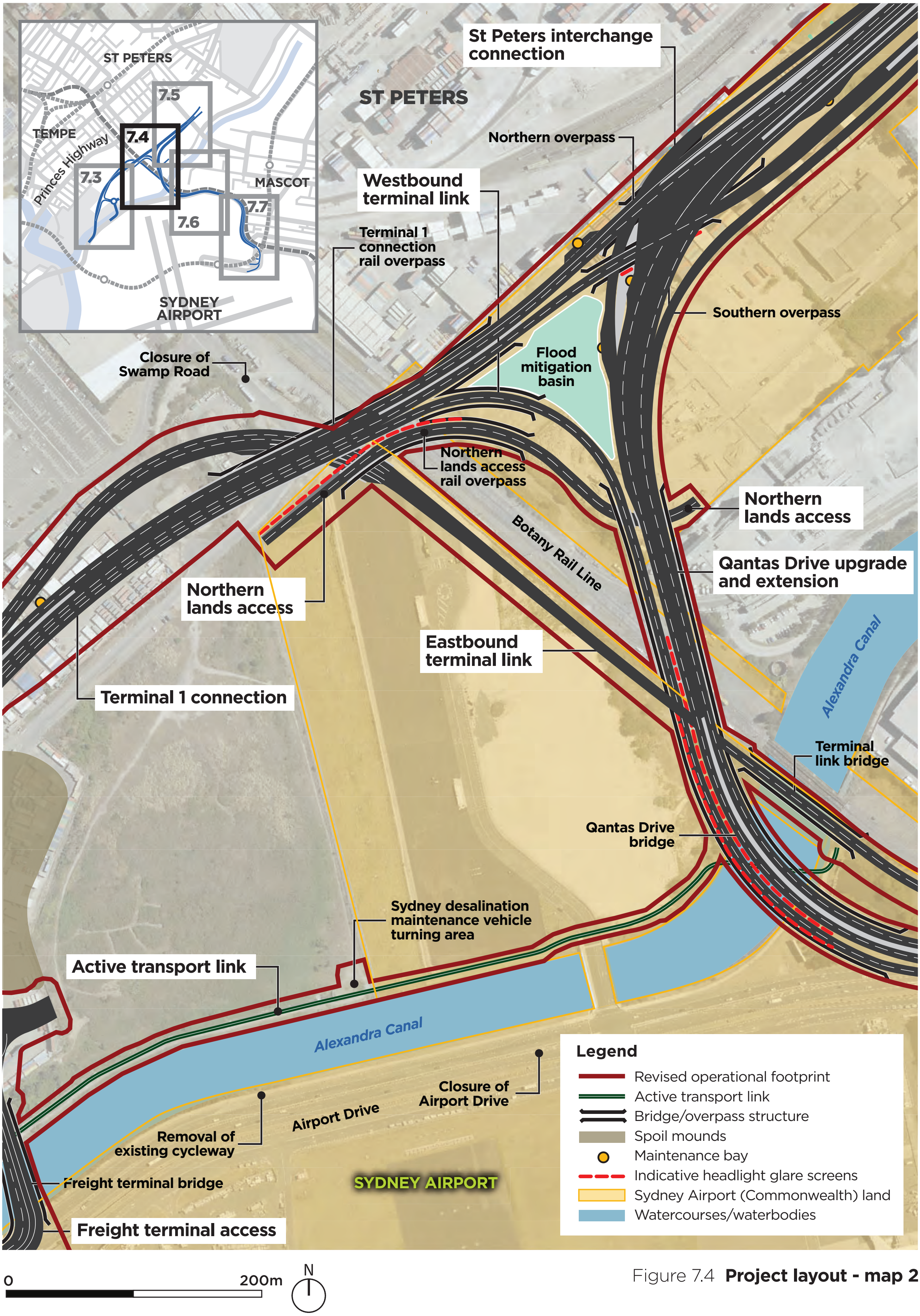


Figure 7.4 **Project layout - map 2**

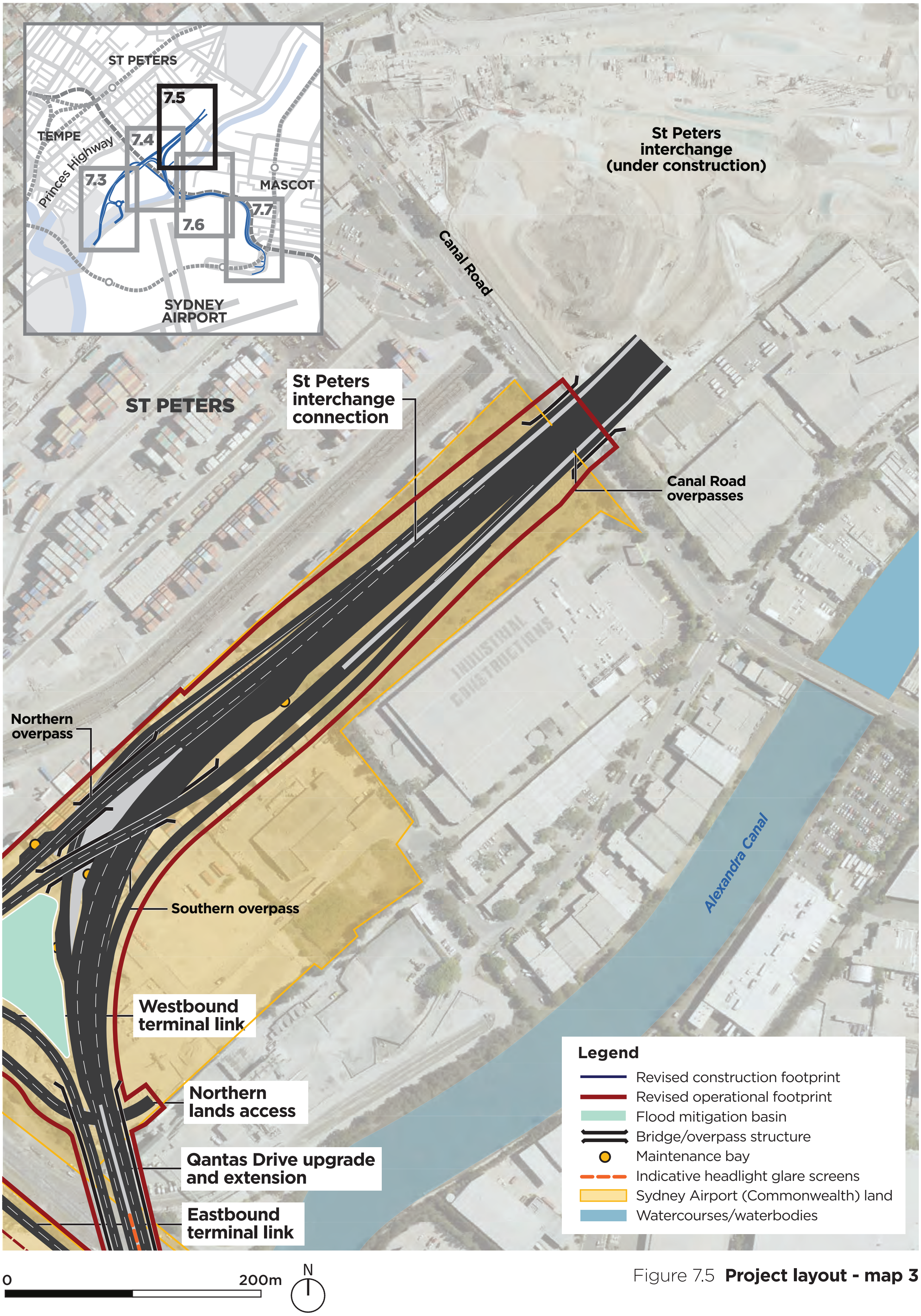


Figure 7.5 **Project layout - map 3**

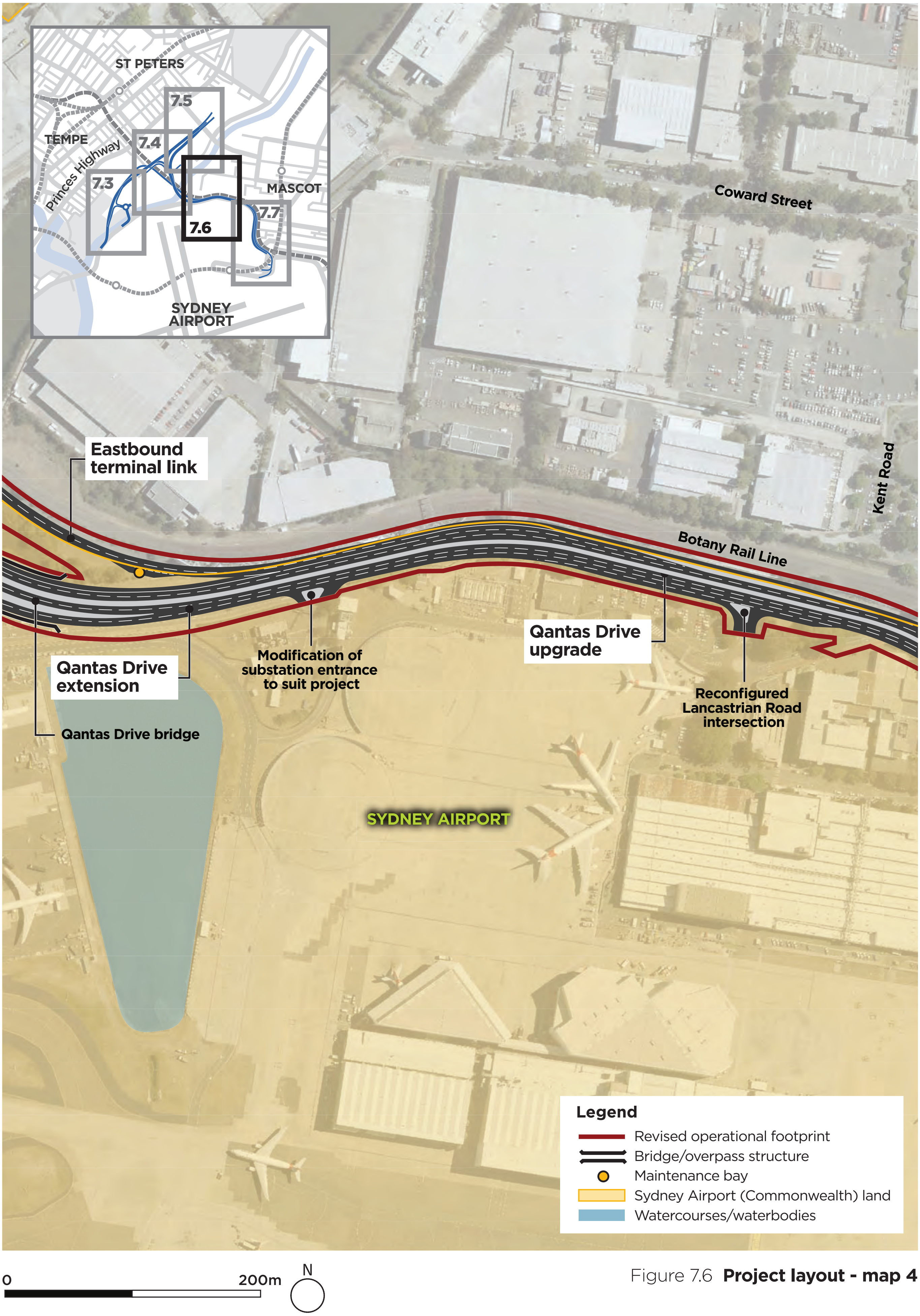


Figure 7.6 **Project layout - map 4**

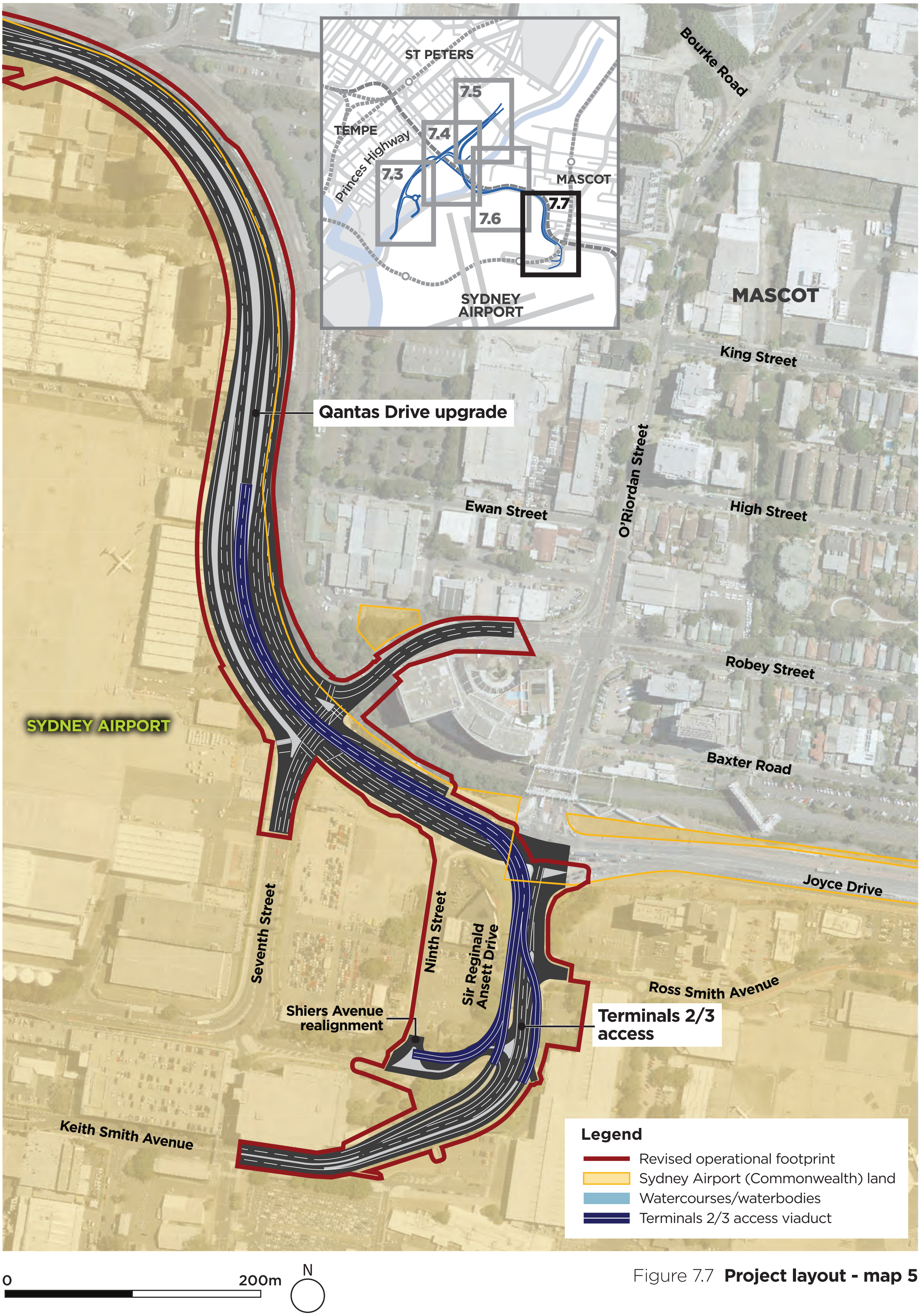


Figure 7.7 **Project layout - map 5**

Project alignment

The following sections describe the project's alignment along the main travel routes (as shown on Figure 7.1), according to the main routes and features described above.

Between the Sydney motorway network and Terminal 1

The project would extend south from its tie-in with St Peters interchange, cross Canal Road and continue south-west across industrial land adjacent to the Cooks River Intermodal Terminal. It would then split into two separate alignments – the western alignment, which would provide access to Terminal 1, and the eastern alignment, which would provide access to Terminals 2/3.

The access to Terminal 1 would cross the rail corridor and the eastbound terminal link via a new overpass. About 400 metres south of the rail corridor, the alignment would turn to the south, and would continue across industrial land and open space, where it would connect with the freight terminal access via a three-way intersection. The alignment would continue south from this intersection across industrial land and would cross Alexandra Canal via a new bridge. East of the canal, the alignment would continue to the south-west and would tie into Airport Drive near the access to Terminal 1 (to the east of Link Road).

Between the Sydney motorway network and Terminals 2/3

The project would extend south from its tie-in with St Peters interchange, cross Canal Road and continue south-west across industrial land adjacent to the Cooks River Intermodal Terminal. It would then turn to the south-east and cross the rail corridor, the eastbound terminal link and Alexandra Canal via a new bridge. The project would continue to the east along the existing Qantas Drive corridor, with Qantas Drive upgraded and widened.

Between Lancastrian Road and Seventh Street, the alignment would continue along the existing alignment of Qantas Drive, with the road widened to the south within Sydney Airport land. In the vicinity of King Street, the eastbound and westbound carriageways would move to the outside edge of the road corridor to allow the Terminals 2/3 access to be constructed between the two carriageways.

The project would provide access to Terminals 2/3 via a new elevated road structure (the Terminals 2/3 access). From the west, the alignment would commence near Ewan Street and extend generally in an easterly direction along the centre of the widened Qantas Drive (generally along the alignment of the existing central road median). Near the existing intersection of Qantas Drive, O'Riordan Street, Joyce Drive and Sir Reginald Ansett Drive, the alignment would extend south into the Terminals 2/3 precinct along Sir Reginald Ansett Drive. North of the intersection at Ross Smith Avenue, the alignment would split into a western and eastern viaduct.

The western viaduct would connect with the proposed Sydney Airport ground transport interchange (to the west) and would tie into Sir Reginald Ansett Drive's western lane providing access to the Terminals 2/3 departures road located on the upper deck of the grade-separated Keith Smith Avenue. The eastern viaduct would cross over Sir Reginald Ansett Drive and tie into Sir Reginald Ansett Drive's eastern lane providing access to the Terminals 2/3 arrivals road located on the lower deck of the grade-separated Keith Smith Avenue. The two central lanes of Sir Reginald Ansett Drive would continue to provide access from the Qantas Drive/O'Riordan Street/Joyce Drive/Sir Reginald Ansett Drive intersection to the Terminals 2/3 departure and arrival roads.

The viaduct would provide an overhead clearance of about 5.4 metres above Qantas Drive and Sir Reginald Ansett Drive and would gradually descend to meet Sir Reginald Ansett Drive and Keith Smith Avenue.

Between Terminal 1 and Terminals 2/3

From the north-western side of the Terminal 1 connection the project would continue to the north (via the eastbound terminal link) towards the rail corridor and across industrial land near the existing corridor for Swamp Road. It would continue to the east below the Terminal 1 connection and northern lands access overpasses and adjacent to the rail corridor, and would cross Alexandra Canal via a new bridge. The eastbound terminal link would merge with Qantas Drive to the east of Alexandra Canal.

The westbound terminal link would commence from the Qantas Drive upgrade and extension on the western side of Alexandra Canal to the north of the rail corridor. From here, it would continue across the rail corridor and merge with the northern end of the Terminal 1 connection.

Access to Sydney Airport land east and west of Alexandra Canal

The freight terminal access would connect with the Terminal 1 connection about 200 metres north of Alexandra Canal via a three-way signalised intersection. The alignment would extend about 100 metres east of the intersection with the Terminal 1 connection to the proposed roundabout (as the western leg of roundabout). One leg of the roundabout would extend to the east, a short stub road would be constructed to provide access to freight facilities proposed on Sydney Airport land. Another short stub road would be constructed on the northern side of the roundabout to provide access to land owned by Inner West Council. The southern leg of the roundabout would cross Alexandra Canal via a new bridge.

On the southern side of the canal, the road would turn west where it would tie into the existing alignment of Airport Drive near the existing Link Road intersection.

The alignment of the northern lands access would commence about 80 metres north of the rail corridor, on the north-eastern side of the proposed Qantas Drive bridge. The alignment would continue below the Qantas Drive bridge, and would extend to the north across industrial land and then turn to the south-west to cross the rail corridor and the eastbound terminal link via the northern lands access rail overpass. From here, it would continue to the south-west into the northern lands to provide access to the proposed future freight facilities on Sydney Airport land.

7.1.2 Parts of the project subject to the Airports Act and the EP&A Act

The project is located on land subject to the Airports Act as well as land subject to the EP&A Act. The parts of the project located on Sydney Airport land (as shown on Figure 1.3 and in more detail on Figure 7.3 to Figure 7.7) are subject to the assessment and approval process of the Airports Act. Other parts of the project, which are not located on Sydney Airport land (as shown on Figure 1.3 and in more detail on Figure 7.3 to Figure 7.7), are subject to the assessment and approval process of the EP&A Act. For completeness and readability, the project is described as a whole in this chapter.

7.1.3 Operational footprint

The operational footprint forms part of the overall project site described in Chapter 2 (Location and setting). It consists of land that would be occupied by permanent project infrastructure. The operational footprint has an area of about 35.7 hectares and includes about 20.9 hectares of Sydney Airport land. The operational footprint is shown on Figure 7.3 to Figure 7.7.

7.2 Design development

7.2.1 Design process

The concept design evolved over a period of about 18 months and involved many iterations and refinements, incorporating a range of considerations at each stage. Key considerations included:

- Environmental features and constraints, surrounding land use and key infrastructure, including Sydney Airport and the Botany Rail Line (described in Chapter 2 (Location and setting))
- Sydney Airport's prescribed airspace (described in Chapter 2)
- Urban design and place making considerations
- The needs and objectives of Sydney Airport Corporation, ARTC and other stakeholders
- The ability to construct the project, including the indicative construction methodology
- Design issues and constraints, including opportunities to safeguard future expansion and flexibility

- Potential alternative design solutions and innovations
- Cost and program.

The approach to design development has included a focus on avoiding or minimising the potential for impacts during all key phases of the process. In this regard, a feedback process has enabled findings from the various technical specialist studies to be captured and shared, allowing a collective understanding of the receiving environment to be built up, and leading to elements of the design being refined or changed to respond to these findings (see Chapter 6 (Project alternatives and options)).

As described in Chapter 6, the multi-criteria assessments carried out during the option selection and design process for corridor locations and key pieces of infrastructure included consideration of environmental and social issues. The options assessment process also included assessment of opportunities and risks. Further information on the options considered and key design refinements is provided in Chapter 6.

Prior to construction commencing, a detailed design process would be undertaken to prepare designs suitable for construction based on the concept design and project approval conditions.

7.2.2 Design standards

The design has been prepared in accordance with all relevant standards and design requirements for roads and bridges, including the following:

- Austroads Guide to Road Design and other relevant publications
- Roads and Maritime supplements to Austroads
- Other Roads and Maritime specifications, standards, guidelines and technical directions
- Australian Standards
- National Airports Safeguarding Framework and Sydney Airport Corporation design standards
- ARTC's Code of Practice for track and civil infrastructure
- CASA Manual of Standards
- Utility authority design standards.

Additional legislation and guidelines that have been used to ensure equality of access is integrated into the design of footpath upgrades and the provision of the active transport link:

- *Disability Discrimination Act 1992*
- Building Code of Australia
- Relevant Australian Standards.

7.2.3 Urban design and place making

Urban design and place making were key considerations in the design process. This is consistent with the NSW Government's policy directions, recognising the importance of good design in making cities and towns appealing, liveable and successful for the communities that live there. It is also consistent with Roads and Maritime's urban design policy, *Beyond the Pavement* (Roads and Maritime, 2014), which requires the design process to incorporate urban design and achieve quality design outcomes for the community.

The design was developed recognising that integration of urban design and place making considerations into the design process assists in maximising the benefits of new infrastructure, ensuring it improves existing places and spaces, and delivers greater returns for the community. The quality of built outcomes in the public domain is important and incorporating design methodologies early in the process will support well-considered and integrated outcomes. By commencing the urban design and place making assessment early in the project development process, potential impacts can be identified early and resolved through appropriate design to optimise project outcomes.

The urban design vision and objectives for the project (see Figure 7.8) were framed consistent with key guidelines and policies, including *Beyond the Pavement*. The project described in the following sections (7.3 to 7.10) has been developed in line with this vision and objectives.

Further information about how the design presented in the following sections has been, and will continue to be, developed taking into account urban design and place making principles is provided in section 7.12.

The urban design and place making concept for the project is described in Technical Working Paper 13 (Urban Design, Landscape Character and Visual Impact Assessment).

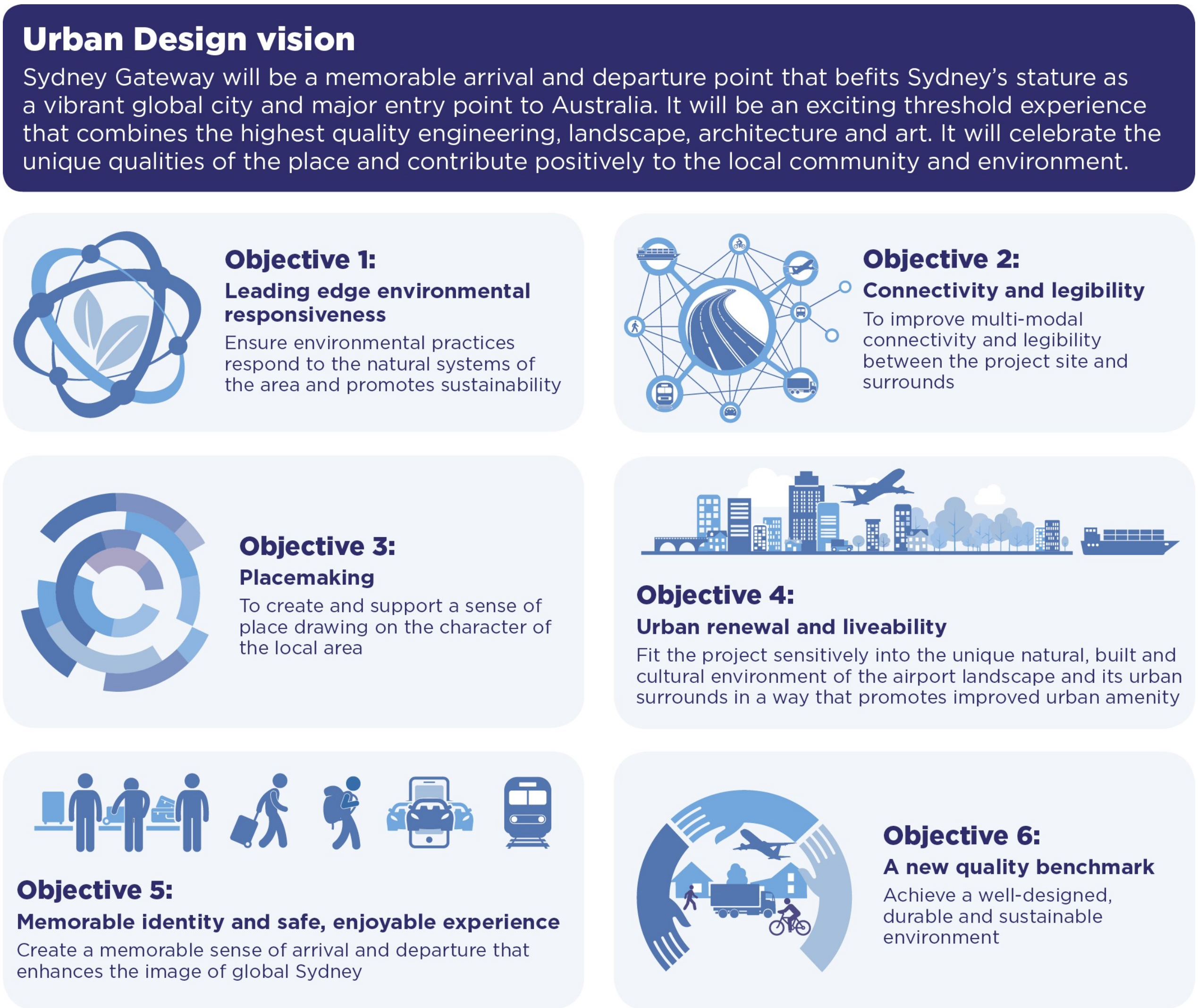


Figure 7.8 Design vision and objectives for the project

7.3 Terminal 1 connection

7.3.1 Overview

The Terminal 1 connection would consist of a new section of road to connect Terminal 1 with the Sydney motorway network. It would also connect Terminal 1 to Terminals 2/3 via the terminal links and the Qantas Drive upgrade and extension.

This new road would replace the existing access to Terminal 1 from the east via Airport Drive. Once the project is operational, Airport Drive would be closed to the east of the freight terminal access.

The Terminal 1 connection would include:

- Two carriageways with generally four lanes in each direction
- A tie-in to Airport Drive just north of the existing access to Terminal 1
- A new bridge over Alexandra Canal (see section 7.3.3)
- An overpass over the rail corridor (see section 7.3.4)
- An intersection with the freight terminal access (see section 7.8.1).

The Terminal 1 connection and its location with respect to land type (Sydney Airport land or land subject to the EP&A Act) is shown on Figure 7.3 and Figure 7.4.

7.3.2 Lane configuration

The Terminal 1 connection would generally comprise four lanes in each direction. The lanes would generally be 3.5 metres wide, with outside shoulder widths of about one metre, and inside shoulder widths of about 0.5 metres. A typical cross-section is shown on Figure 7.9.

North of the starting point for the eastbound terminal link (see section 7.6), the northbound carriageway of the Terminal 1 connection would comprise two lanes (see Figure 7.3 and Figure 7.4). Additional lanes would be provided on both carriageways at the intersection with the freight terminal access to facilitate turning movements into the freight terminal access.

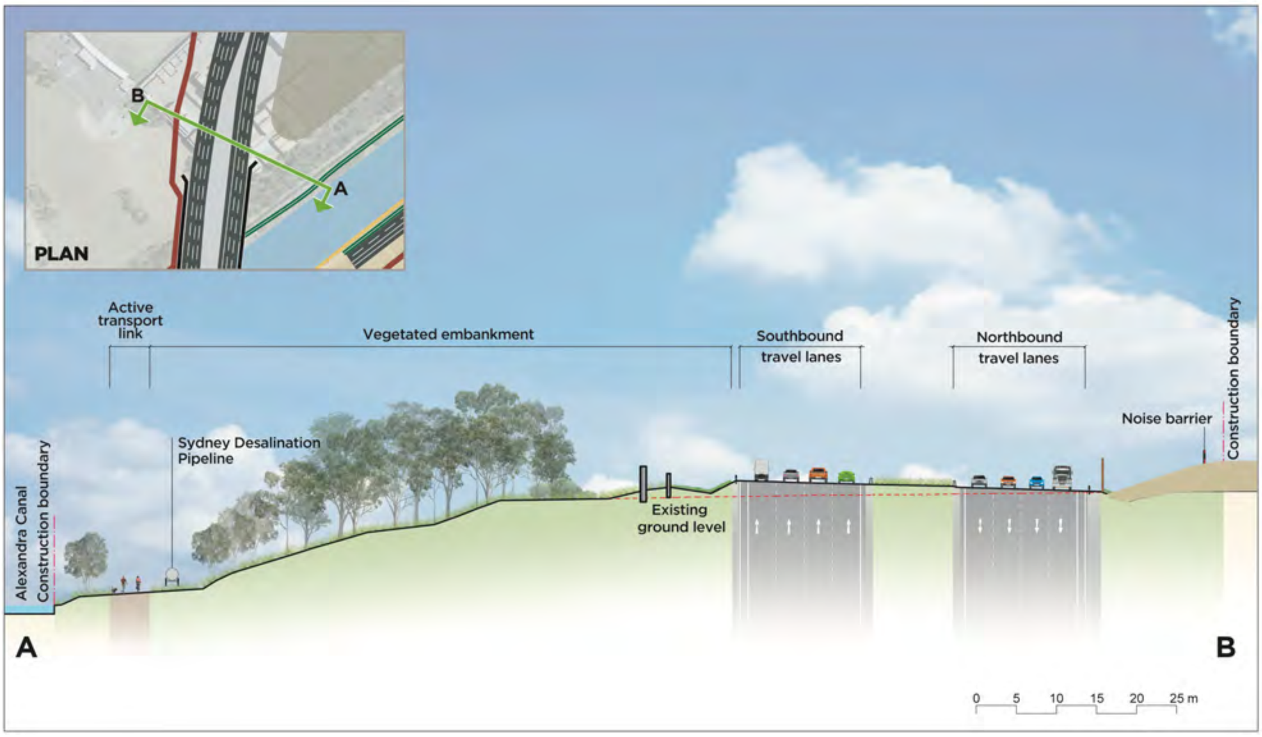


Figure 7.9 Terminal 1 connection – typical cross-section (looking south)

7.3.3 Terminal 1 connection bridge

The Terminal 1 connection bridge would cross Alexandra Canal about 500 metres north of the Giovanni Brunetti Bridge. It would consist of twin balanced cantilever concrete structures, located adjacent to each other. Both structures would be about 17 metres wide, consist of three spans, and have a total length of about 180 metres. The central span, which would cross the canal, would be about 90 metres long. The bridge structure would be elevated to about 13 metres above the canal. The bridge piers would be set back from the top of the banks of the canal to minimise impacts on the canal wall. The alignment of the bridge is shown on Figure 7.3. A visual representation is shown on Figure 7.10.

Figure 7.10 Terminal 1 connection bridge from Link Road – visual representation

7.3.4 Terminal 1 connection rail overpass

The Terminal 1 connection rail overpass would cross over the rail corridor, the existing alignment of Swamp Road and the eastbound terminal link (see Figure 7.4). The overpass would comprise six spans and have a total length of about 190 metres. As a result of the length, existing infrastructure and land use constraints, a set of bridge piers would need to be located within the rail corridor.

The height of the overpass structure would be about six metres above ground level, which would achieve the minimum 5.4 metre high clearance required over the Botany Rail Line whilst remaining below Sydney Airport's prescribed airspace at this location. The maximum height would be about 7.5 metres above ground level including roadside barriers and anti-throw screens.

7.4 Qantas Drive upgrade and extension

7.4.1 Overview

The Qantas Drive upgrade and extension would consist of a new and upgraded section of road and a bridge to connect Terminals 2/3 with the Sydney motorway network. It would also connect:

- Terminals 2/3 and Terminal 1 (via the terminal links and the Terminal 1 connection)
- The Sydney motorway network (at St Peters interchange) and Port Botany (via Joyce Drive, General Holmes Drive and Foreshore Road).

Qantas Drive would be upgraded from about 220 metres east of Alexandra Canal (about 400 metres west of Lancastrian Road) to the intersection of O'Riordan Street, Sir Reginald Ansett Drive and Joyce Drive. This would include:

- Widening the road to provide three lanes in each direction (compared with the existing two lanes)
- Realigning the eastbound and westbound carriageways to provide space for the Terminals 2/3 access viaduct between the two carriageways
- Modifying the intersections with Lancastrian Road, Robey and Seventh streets, O'Riordan Street, Sir Reginald Ansett Drive and Joyce Drive
- Tie-ins to the existing sections of Joyce Drive, Robey Street and O'Riordan Street at the eastern end.

A new section of road would extend across Alexandra Canal, over the eastbound terminal link and rail corridor, to the St Peters interchange connection. This would include:

- Three carriageways with two lanes in each direction, providing four lanes in the northbound direction and two lanes in the southbound direction
- A new bridge over Alexandra Canal (see section 7.4.3).

The Qantas Drive upgrade and extension, and its location with respect to land type, is shown on Figure 7.3, Figure 7.6 and Figure 7.7. A visual representation is shown on Figure 7.11.

7.4.2 Lane configuration and intersection upgrades

Westbound lanes

West of the O'Riordan Street/Sir Reginald Ansett Drive intersection, three westbound lanes would extend along Qantas Drive and two westbound lanes would extend from the left turn out of Seventh Street. To the west of the Robey Street/Seventh Street intersection, the three westbound lanes along Qantas Drive would merge to become two lanes and the two lanes out of Seventh Street would merge to one lane (see Figure 7.7). In addition to the three westbound lanes between the O'Riordan Street/Sir Reginald Ansett Drive and Robey Street/Seventh Street intersections, two right turn lanes would be provided into Robey Street (see Figure 7.15).

There would be three westbound lanes until about 400 metres west of Lancastrian Road. At this location (see Figure 7.6), the lanes would diverge, and an additional lane would be added, to form two dual-lane carriageways. The two carriageways would cross the canal via the Qantas Drive bridge (see Figure 7.4). The eastern carriageway would extend to the north to St Peters interchange. The western carriageway would extend to the west towards Terminal 1 via the westbound terminal link.

Eastbound lanes

East of Alexandra Canal, the two eastbound lanes from the St Peters interchange connection would merge with the two lanes from the eastbound terminal link to form four lanes (see Figure 7.6). The four eastbound lanes would then converge to become three lanes at about Lancastrian Road.

Further to the south-east (see Figure 7.7), one lane would diverge onto the Terminals 2/3 viaduct and two lanes would continue east. A third lane would be added to the two eastbound lanes, and the three lanes would continue to the east. Two left turning lanes into Robey Street would be provided, which would diverge from the eastbound lanes. An additional left turning lane would be added, and the three lanes would turn left into Robey Street.

All lanes would generally be a minimum of 3.3 metres wide.

Typical cross-sections are shown on Figure 7.12 to Figure 7.14.

Intersection upgrades

The following intersection works would be undertaken:

- Qantas Drive/Lancastrian Road – existing traffic signals would be removed and turning movements would be limited to left-in and left-out from the westbound carriageway of Qantas Drive (shown on Figure 7.6)
- Qantas Drive/Robey Street/Seventh Street – the intersection would be upgraded with the addition of a left turn lane into Robey Street northbound and a left turn out of Seventh Avenue westbound (shown on Figure 7.15)
- Qantas Drive/O'Riordan Street/Sir Reginald Ansett Drive – the existing median would be removed and an additional through lane provided to Joyce Drive in the eastbound direction. The right turn lanes into Sir Reginald Ansett Drive would be removed (shown on Figure 7.7).

Figure 7.11 Qantas Drive upgrade and extension west of King Street – visual representation

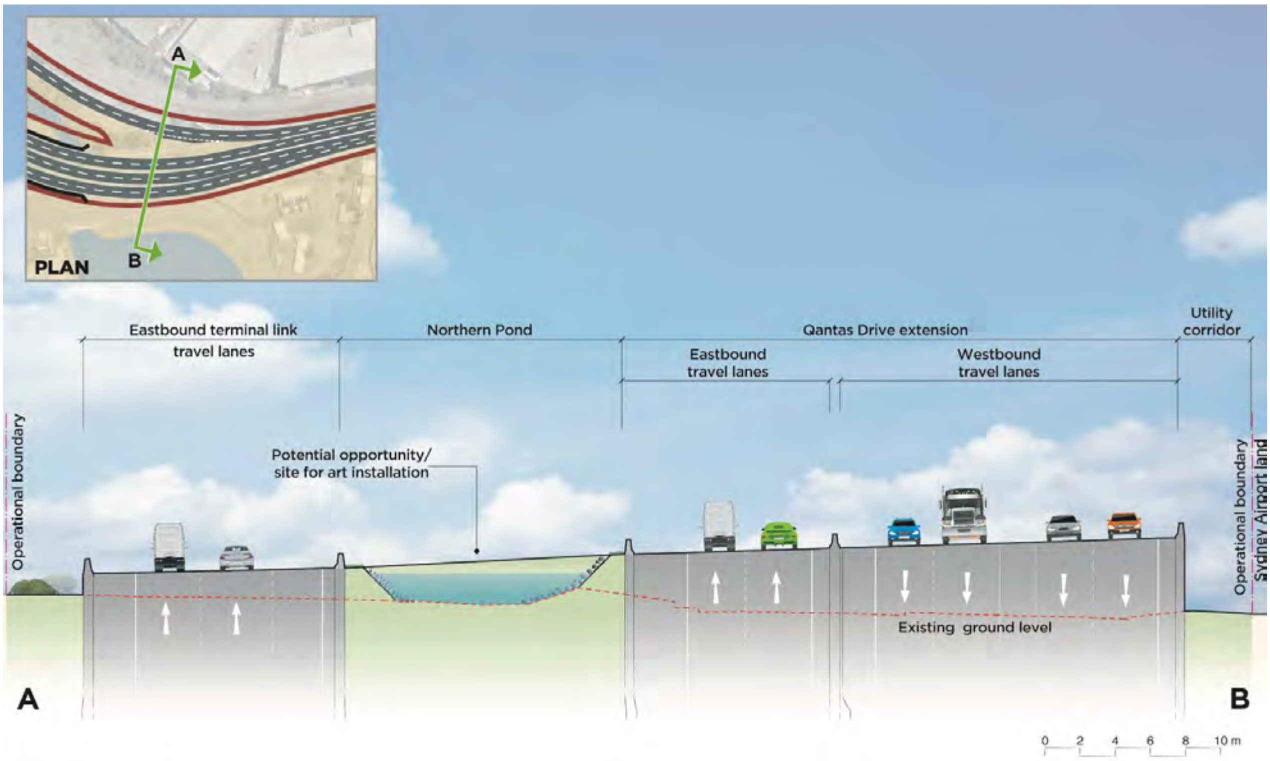


Figure 7.12 Qantas Drive upgrade and extension east of Alexandra Canal – typical cross-section (looking south)

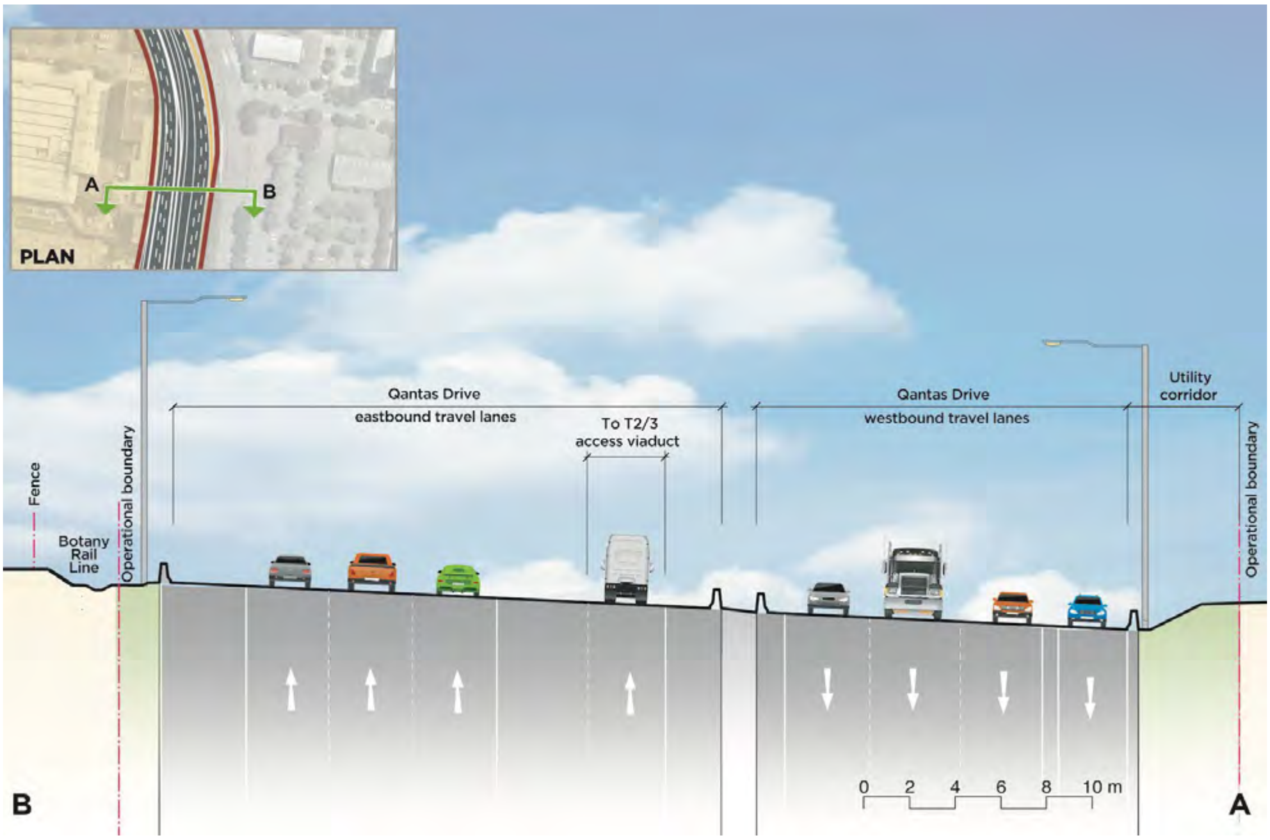


Figure 7.13 Qantas Drive upgrade and extension between King Street and Ewan Street – typical cross- section (looking south)

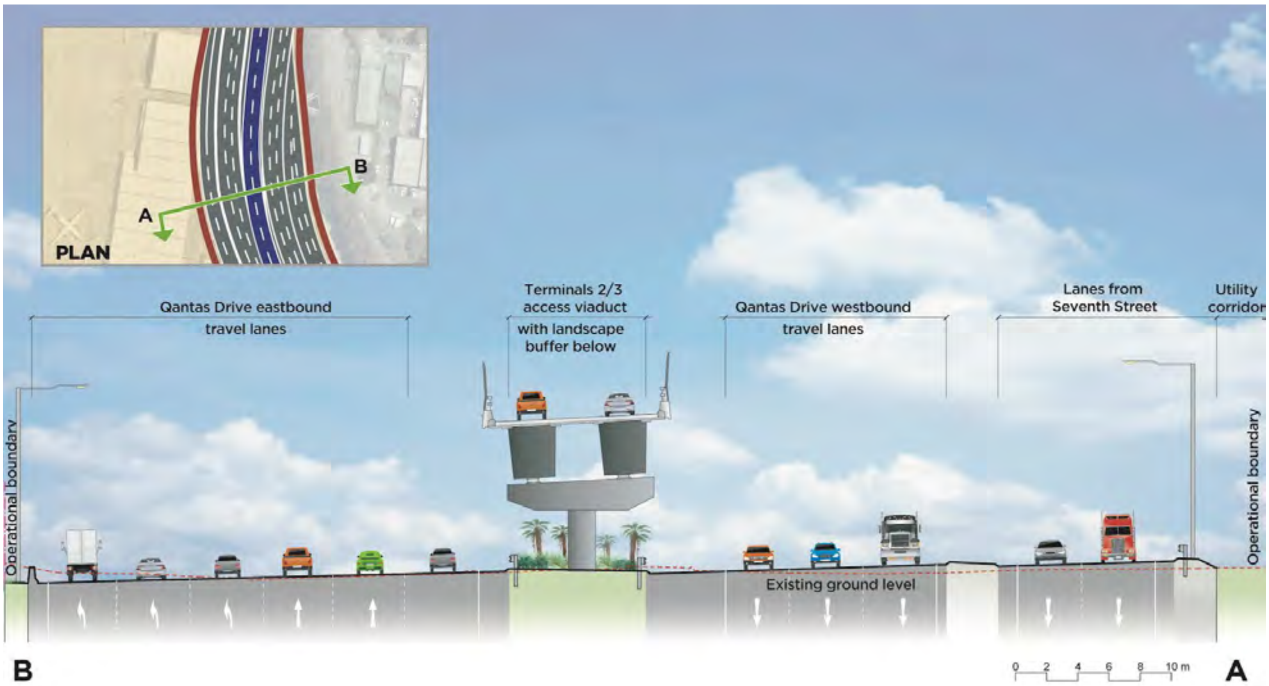


Figure 7.14 Qantas Drive upgrade and extension with Terminals 2/3 viaduct west of Robey Street – cross- section (looking south)

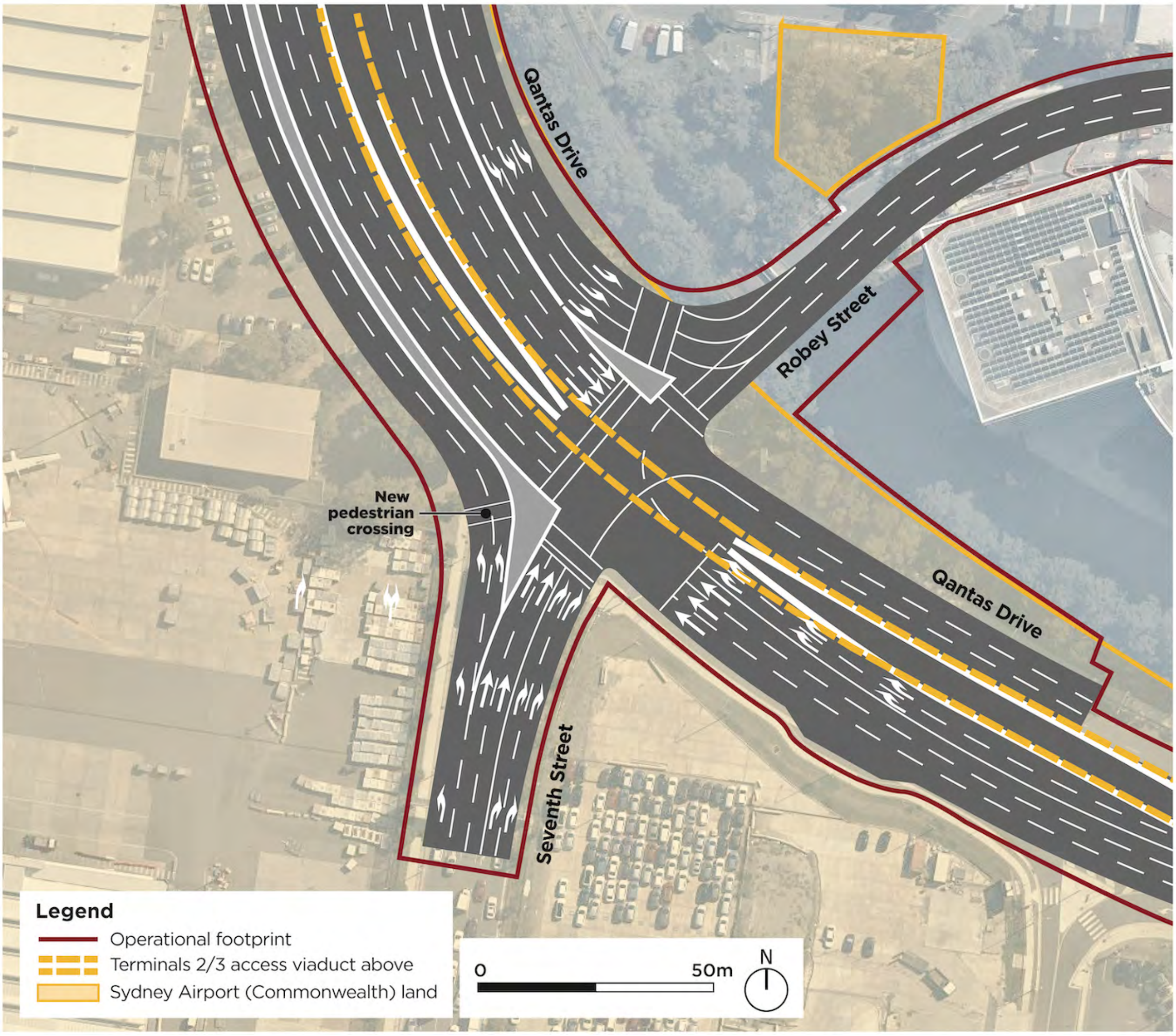


Figure 7.15 Qantas Drive/Robey Street/Seventh Street intersection upgrade and lane configuration

7.4.3 Qantas Drive bridge

The new bridge would cross Alexandra Canal about 70 metres south of the existing rail bridge. It would consist of twin box girder structures located adjacent to each other. The northern structure would carry the lanes providing access to and from St Peters interchange, while the southern structure would carry the lanes connecting towards Terminal 1 via the westbound terminal link.

The structures would have a total length of about 410 metres and would consist of eight spans. A single span, about 90 metres long, would cross Alexandra Canal. This span would be supported on piers set back from the banks of the canal. Piers would also be located within the Botany Rail Line corridor. These would be set back from the rail lines in accordance with ARTC's requirements.

The bridge structure would be elevated about 12 metres above the canal.

The alignment of the bridge is shown on Figure 7.3. A visual representation is shown on Figure 7.16.

Figure 7.16 Qantas Drive bridge – visual representation

7.5 St Peters interchange connection

7.5.1 Overview

The St Peters interchange connection would comprise a number of multi-lane road carriageways that would facilitate movements from the Sydney motorway network at St Peters to either Terminal 1 or Terminals 2/3 (as shown on Figure 7.1). The number of carriageways/lanes would vary moving southward away from the interchange. The carriageways would be grade-separated to provide the various connections required.

The St Peters interchange connection and its location with respect to land type is shown on Figure 7.4 and Figure 7.5.

The majority of the St Peters interchange connection would be constructed on fill about eight metres above the existing ground level.

7.5.2 Lane configuration

The carriageways would generally consist of one or two lanes, with the lanes and carriageways merging or diverging depending on the location and connections provided. The carriageway and lane configurations are shown on Figure 7.18. The configuration of lanes within the St Peters interchange connection allows specific carriageways (ie those travelling to the New M5 or M4-M5 Link) to connect directly into the corresponding lanes within St Peters interchange.

The lanes would be generally about 3.5 metres wide. A typical cross-section is shown on Figure 7.17.

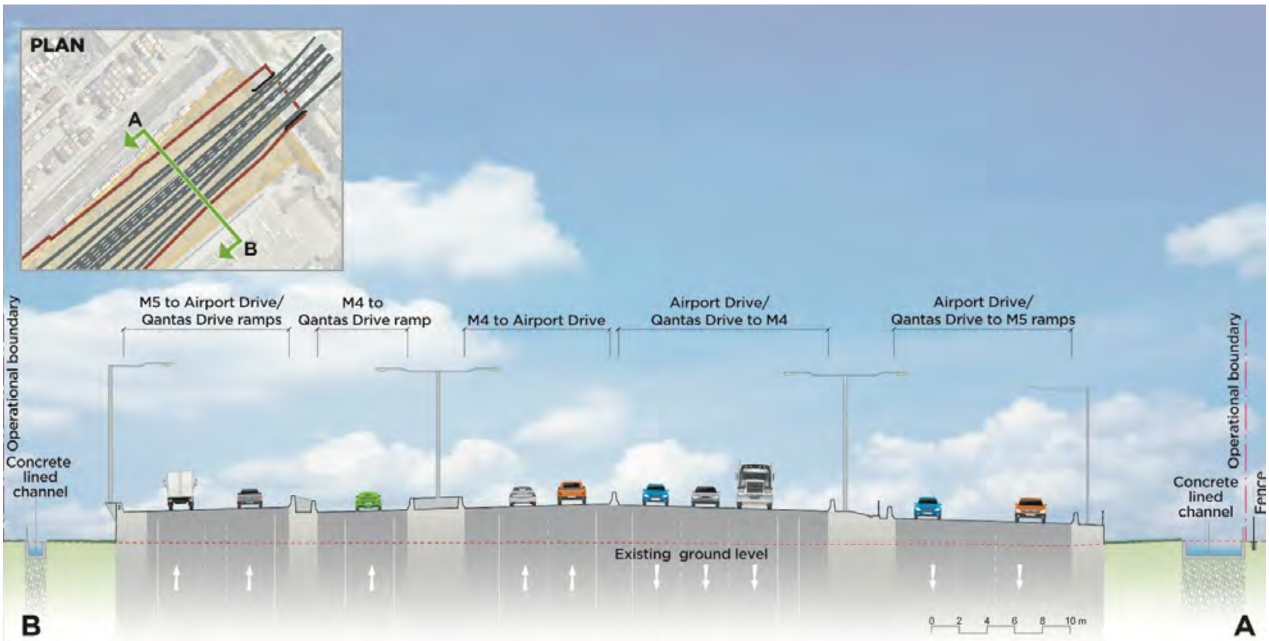


Figure 7.17 St Peters interchange connection south of Canal Road – typical cross-section (looking south)

7.5.3 Canal Road overpasses

Four overpasses about 35 metres long would be used to convey traffic from St Peters interchange over Canal Road. The total width of the structures would be up to about 51 metres. A clearance of 5.4 metres above Canal Road would be provided.

The alignment of the overpasses is shown on Figure 7.5.

7.5.4 Northern and southern overpasses

Two overpass structures would be used to carry two of the carriageways providing access to/from Terminal 1 over the carriageways providing access to/from Terminals 2/3. Both of these structures are located north of the Botany Rail Line, with the alignment of the overpasses shown on Figure 7.5.

The northern overpass would be a single span about 20 metres long and 45 metres wide, supported on retaining walls located on either side of the carriageways below. It would be about 4.5 to eight metres above ground level, and would allow for a minimum clearance of 5.4 metres over the carriageways below.

The southern overpass would consist of a five-span structure, which would be about 150 metres long and between 9.5 and 14 metres wide. The maximum height of the overpass deck would be about eight metres above the road below (or 12 metres above existing ground level). This would provide the required minimum clearance of 5.4 metres over the carriageways below while remaining below the OLS at this location. The overall height would be about 13 metres above the road below, including roadside barriers and anti-throw screens.

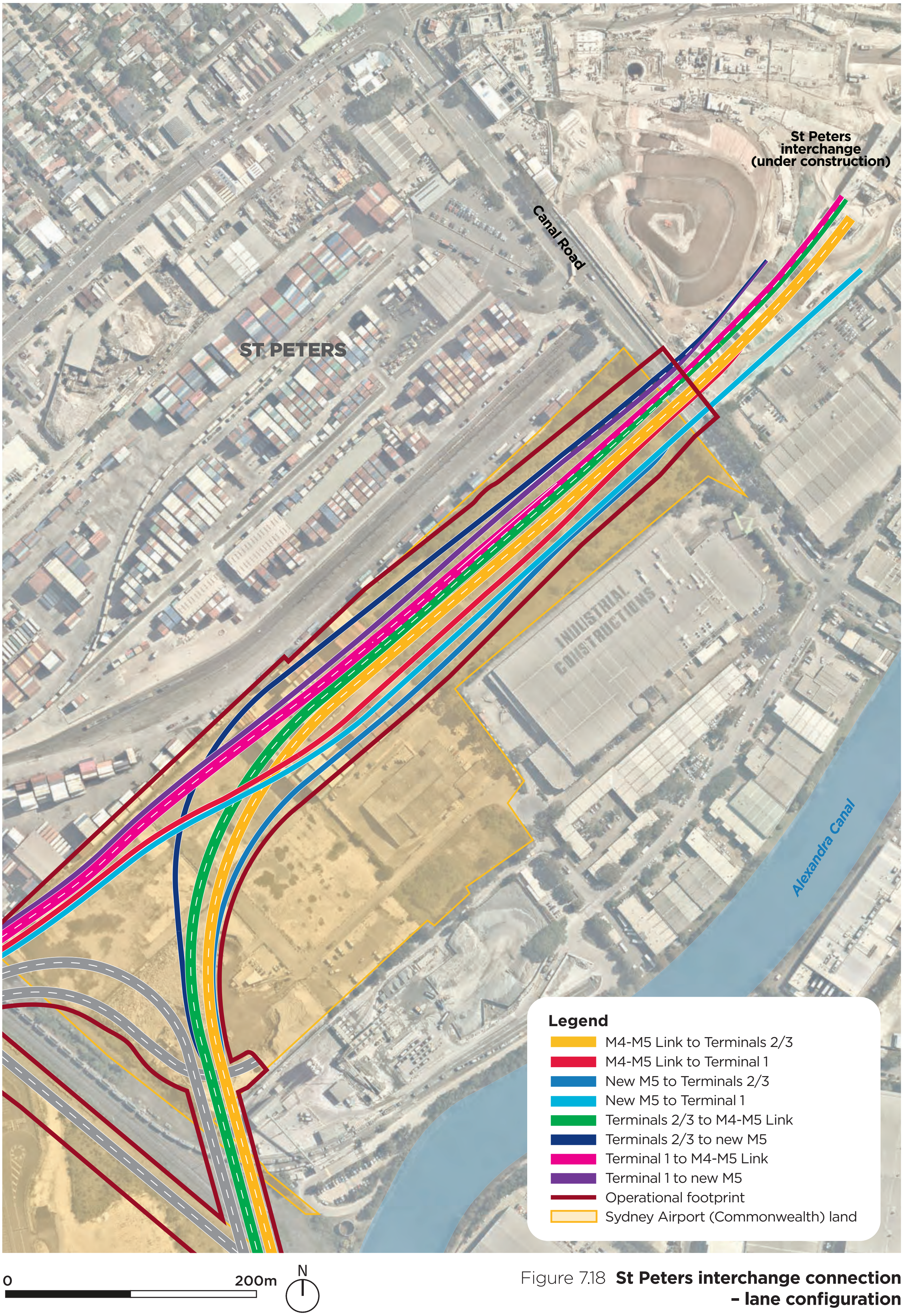


Figure 7.18 **St Peters interchange connection – lane configuration**

7.6 Terminal links

7.6.1 Overview

The terminal links would consist of two new sections of road to facilitate access between Terminal 1 and Terminals 2/3. The westbound terminal link would facilitate access to Terminal 1 from Terminals 2/3. It would consist of a short, one-way section of road, which would extend between the north-western end of the Qantas Drive upgrade and extension and the north-eastern end of the Terminal 1 connection rail overpass.

The eastbound terminal link would facilitate access to Terminals 2/3 from Terminal 1. It would diverge from the north-western side of the Terminal 1 connection and would merge with the north-eastern side of the Qantas Drive upgrade and extension. The eastbound terminal link would include a new bridge over Alexandra Canal (see section 7.6.3).

The terminal links and their locations are shown on Figure 7.3, Figure 7.4 and Figure 7.6.

7.6.2 Lane configuration

The terminal links would generally consist of two lanes about 3.5 metres wide each. Road shoulders would vary from about 0.5 to one metre wide. The eastbound terminal link would include a three-lane section of roadway near Bellevue Street in Tempe.

7.6.3 Terminal link bridge

A new bridge would carry the eastbound terminal link over Alexandra Canal. It would be located about 10 metres south of the existing rail bridge and about 60 metres north of the proposed Qantas Drive bridge. The bridge would comprise a single-arch steel structure with one span. It would be about 90 metres long and about 12 metres wide.

The bridge deck would be about 7.5 metres above the canal. The overall height of the bridge would be about 20 metres above the canal.

A visual representation of the bridge is shown on Figure 7.19.

Note: The piers shown near the proposed terminal link bridge are those that support the existing Botany Rail Line bridge

Figure 7.19 Terminal link bridge – visual representation

7.7 Terminals 2/3 access

7.7.1 Overview

The Terminals 2/3 access would consist of a new elevated road (viaduct) structure providing access from Qantas Drive to Terminals 2/3. It would separate eastbound traffic travelling to Terminals 2/3 from through traffic, including east–west traffic travelling along Joyce Drive and Qantas Drive, and north–south traffic accessing and leaving Terminals 2/3 via Sir Reginald Ansett Drive and Seventh Street respectively.

The Terminals 2/3 access would extend from Qantas Drive (opposite the western end of Ewan Street) into Terminals 2/3. It would include:

- A new ramp from the western-most eastbound lane connecting to an elevated viaduct structure into the Terminals 2/3 precinct
- Adjustments to intersections along Sir Reginald Ansett Drive at Ross Smith Avenue and at Shiers Avenue (see section 7.7.2).

The new viaduct structure would be about 660 metres long and provide a clearance of 5.4 metres to Qantas Drive and Sir Reginald Ansett Drive. A visual representation is shown on Figure 7.20.

The Terminals 2/3 access is shown on Figure 7.7.

Figure 7.20 Terminals 2/3 access from Qantas Drive at O'Riordan Street – visual representation

7.7.2 Lane configuration and road adjustments

Viaduct structure

The majority of the new section of road would consist of two lanes. A third lane would be added where it turns to the south into the Terminals 2/3 precinct. North of the intersection at Ross Smith Avenue, the structure would split into a western and eastern viaduct. The western viaduct would then split into two lanes, with one lane turning west into the proposed ground transport interchange and the other crossing Shiers Avenue and descending via a ramp to merge with Sir Reginald Ansett Drive. At this location it would provide access to the departures ramp at Terminals 2/3. The ramps on Sir Reginald Ansett Drive are shown on Figure 7.22.

The eastern viaduct would consist of one single lane, which would merge with Sir Reginald Ansett Drive towards the arrivals road at ground level on Keith Smith Avenue.

The lanes would be about 3.3 metres wide. A typical cross-section is shown on Figure 7.21.

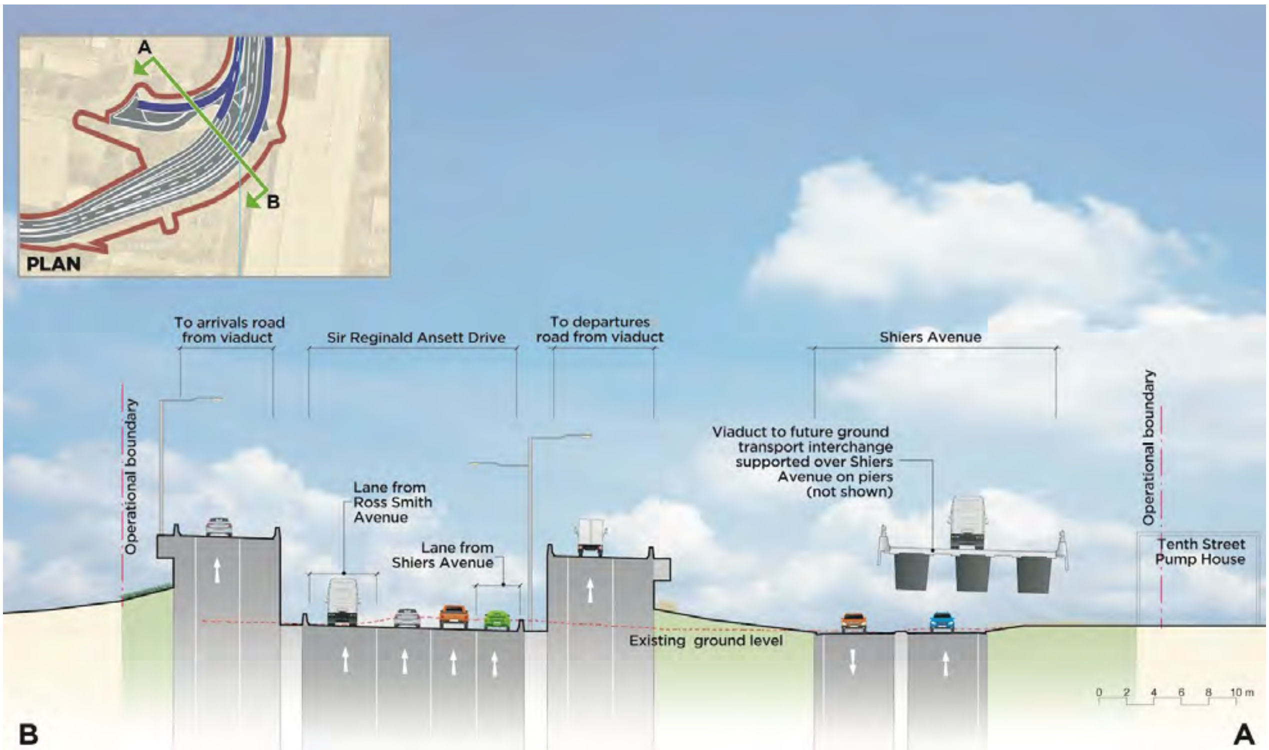


Figure 7.21 Terminals 2/3 access and ramp structure along Sir Reginald Ansett Drive north of Shiers Avenue – typical cross-section (looking south)

Sir Reginald Ansett Drive and Shiers Avenue adjustments

Sir Reginald Ansett Drive would comprise two lanes at the intersection with Qantas Drive and O'Riordan Street, with in-bound traffic coming from O'Riordan Street and Joyce Drive.

South of the turning lanes from Joyce Drive to Sir Reginald Ansett Drive, a third lane would be provided along the eastern edge of Sir Reginald Ansett Drive. This lane would provide access into and out of Ross Smith Avenue, where it would then merge with the lanes located between the ramps from the Terminals 2/3 access viaduct. An additional lane would diverge from this lane south of Ross Smith Avenue to access the taxi staging area.

An additional lane would diverge off the western edge of Sir Reginald Ansett Drive at Shiers Avenue. This lane would provide access into Ninth Avenue via an adjusted alignment of Shiers Avenue with a new intersection from Sir Reginald Ansett Drive. The existing eastbound Shiers Avenue lane, which provides for internal circulation, would be realigned north. A merge lane would also be provided from the eastbound Shiers Avenue lane onto Sir Reginald Ansett Drive, where it would merge with the two Sir Reginald Ansett Drive lanes located between the ramps from the Terminals 2/3 access viaduct. The proposed arrangement at Shiers Avenue is shown on Figure 7.22.

As part of the works along Sir Reginald Ansett Drive, the intersection at Ross Smith Avenue would be modified with the existing signals removed. The intersection would be reconfigured to suit the changes along Sir Reginald Ansett Drive while maintaining the existing movements and pedestrian crossing.

Figure 7.23 shows the lane configuration of Sir Reginald Ansett Drive including the location of the Terminals 2/3 access viaduct.

Figure 7.22 Terminals 2/3 access along Sir Reginald Ansett Drive (at the adjusted Shiers Avenue intersection) – visual representation

7.8 Accesses to Sydney Airport land

7.8.1 Freight terminal access

The freight terminal access would consist of a new section of road and a bridge to provide access to Sydney Airport's existing and proposed air freight facilities on either side of Alexandra Canal. It would extend between the Terminal 1 connection, land proposed (by the *Sydney Airport Master Plan*) for future freight facilities on the western side of Alexandra Canal, and existing freight facilities at Link Road near Terminal 1 on the eastern side of the canal. The new access would include:

- A single carriageway with two lanes in each direction
- A signalised intersection with the Terminal 1 connection
- A roundabout east of the Terminal 1 connection
- A stub road off the eastern side of the roundabout to provide access to future freight facilities
- A stub road off the northern side of the roundabout to provide access to land owned by Inner West Council
- A tie-in to Airport Drive to the east of the Terminal 1 connection
- Adjustments to the existing intersection of Airport Drive and Link Road
- A new bridge over Alexandra Canal (described below)
- A shared pedestrian and cycle path (see section 7.9).

The freight terminal access is shown on Figure 7.3 and Figure 7.4.

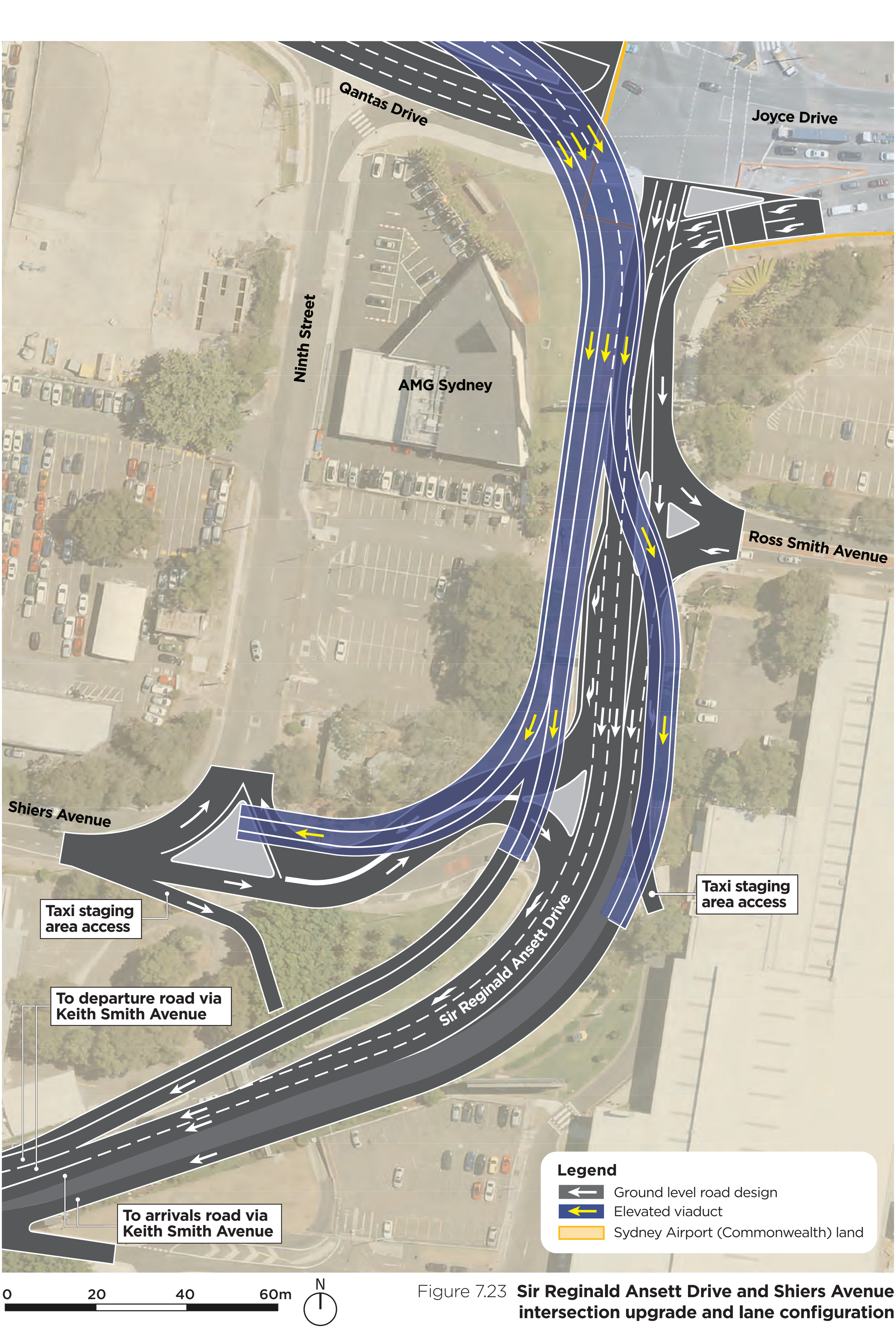


Figure 7.23 **Sir Reginald Ansett Drive and Shiers Avenue intersection upgrade and lane configuration**

Lane configuration

At the intersection with the Terminal 1 connection, two lanes would be provided. The lanes would be about 3.5 metres wide; however, the width would change at some locations to provide space for heavy vehicles to make turning movements. Two lanes would be provided in both directions (including on the roundabout).

As part of the works for the freight terminal access, the existing traffic signals at Airport Drive and Link Road would be removed to provide free flow from the freight terminal access into and out of Link Road.

Freight terminal bridge

The new bridge would cross Alexandra Canal about 250 metres to the north of the proposed Terminal 1 connection bridge. It would consist of a single structure with two spans, including a short back span to cross the desalination water pipeline, and a total length of about 80 metres. One span would cross the canal and would be about 55 metres long. The piers on either side of this span would be set back from the banks of the canal to minimise impacts on the canal and adjacent infrastructure. The maximum height of the bridge would be about 15 metres above the canal.

A visual representation of the bridge is shown on Figure 7.24.

Figure 7.24 Freight terminal bridge from proposed active transport link – visual representation

7.8.2 Northern lands access

The northern lands access would consist of a new section of road and overpass to provide access between Sydney Airport land located on either side of the rail corridor to the west of Alexandra Canal. The new access would extend between land accessed from Burrows Road on the northern side of the rail corridor and land on the southern side of the corridor. It would include:

- A single carriageway with two lanes in each direction
- A new overpass over the rail corridor.

The northern lands access is shown on Figure 7.4.

Lane configuration

Two 3.5 metre wide lanes would be provided, with one lane in each direction.

Northern lands access rail overpass

The new overpass would cross over the rail corridor and the eastbound terminal link about 40 metres to the east of the proposed Terminal 1 connection rail overpass (see section 7.3.4).

The maximum height of the overpass deck would be about eight metres above ground level. This would provide for the required minimum clearance of 5.4 metres over the Botany Rail Line and the eastbound terminal link, while remaining below the OLS and high intensity approach lighting surfaces at this location. The overall height would be about 12 metres above ground level including roadside barriers and anti-throw screens.

7.9 Active transport link

A new active transport link would be provided along the western side of Alexandra Canal in the form of a shared pedestrian and cycle path. The proposed alignment is shown on Figure 7.3 and Figure 7.4.

The new link would be about 160 metres longer than the existing and would replace the existing shared path located along the eastern side of Alexandra Canal adjacent to Airport Drive. The new link would maintain access for cyclists between existing cycle paths and areas to the south, Tempe, Mascot and towards Alexandria and the Sydney central business district. The existing path needs to be closed to:

- Maintain a safe route for cyclists and pedestrians during construction, which includes work areas along Airport Drive (described in Chapter 8 (Construction))
- Maintain the connectivity and function of the existing route which in the future, will become unavailable and part of Sydney Airport’s future operating area.

The south-western end of the new active transport link would connect to the existing shared path on the eastern side of Alexandra Canal, near the southern end of the proposed Terminal 1 connection bridge. The link would cross to the western side of Alexandra Canal near Tempe Recreation Reserve via the existing (unnamed) pedestrian/cyclist bridge, which is located near the intersection of Link Road and Airport Drive. The alignment would then head to the north-east along the western side of Alexandra Canal adjacent to the desalination pipeline (see Figure 7.3).

The alignment would continue along the western edge of the canal, passing under the proposed Terminal 1 connection bridge, the freight terminal bridge and the existing Nigel Love bridge. The link would then cross to the eastern side of the canal, passing over the canal via a new bridge, which would be located beneath the proposed Qantas Drive bridge. On the eastern side of the canal the link would connect to the existing cycle path near the proposed Terminal link bridge (see Figure 7.4).

A new section of shared path would also be provided as part of the freight terminal access. The path would extend from Airport Drive to the Terminal 1 connection, passing over Alexandra Canal via the freight terminal bridge (see Figure 7.3).

The active transport link and shared path would be about three metres wide and would have a grade of no more than five per cent. The proposed new route has been designed to ensure suitable gradients are achieved. The new route would also provide separation from adjacent roadways and improved air quality compared to that experienced along the existing route. The link has also been designed with reference to the principles of crime prevention through environmental design (CPTED) (see section 7.12).

Roads and Maritime are continuing consultation with local councils, Sydney Airport and Transport for NSW about cyclist and pedestrian connections to Sydenham and St Peters interchange, and further enhancements around Sydney Airport. However, these are not included in the current design and do not form part of the project for which approval is being sought.

A maintenance vehicle turning area would be provided adjacent to land used for the high intensity approach lights to facilitate access for maintenance vehicles. The location of this turning area is shown in Figure 7.4.

7.10 Other (ancillary) infrastructure

7.10.1 Maintenance bays

Maintenance bays would be provided near infrastructure that would require regular access for maintenance purposes, such as drainage channels, gross pollutant traps and variable message signs. Eight maintenance bays are proposed in various locations. Four of the proposed maintenance bays would also function as breakdown bays. The maintenance bays are shown on Figure 7.3 to Figure 7.7.

7.10.2 Waste emplacement mound

The project would involve excavating about 90,000 cubic metres of waste material from the former Tempe landfill. It is proposed to retain and re-emplace some of this material within the boundary of the former Tempe landfill site (see Figure 7.3). This would reduce the need for disposal at an off-site location and associated truck movements, although some material may still need to be moved off site if it is not able to be reused.

A waste emplacement mound is proposed in the area bounded by the Terminal 1 connection, the freight terminal access and the western side of Alexandra Canal.

The mound would have a maximum height of 13.6 metres above the existing ground surface and would occupy an area of about 1.2 hectares. The mound would be integrated into the capping and underlying waste materials in accordance with the *Environmental Guidelines: Solid waste landfills* (NSW EPA, 2016a).

The design of the emplacement mound would need to:

- Address aviation hazard issues according to the ‘as low as reasonably practicable’ principle
- Minimise the volume of material excavated from the former Tempe landfill
- Avoid disturbance outside the project boundary
- Not be located on Sydney Airport land.

The proposed mound would be designed to ensure compliance with the *National Airports Safeguarding Framework Guideline B: Managing the Risk of Building Generated Windshear and Turbulence at Airports* (Department of Infrastructure, Regional Development and Cities, 2018b) and other relevant aviation guidelines (see Chapter 11 (Airport operations)). This would include locating and optimising the mound to minimise the effects of windshear and turbulence on aircraft (see section 11.4.2). The optimisation process would address Sydney Airport’s operational requirements, and would occur in consultation with Sydney Airport Corporation, aviation stakeholders, and relevant Australian, NSW and local government agencies.

The design, landscaping and future uses for the mound would be co-ordinated with relevant stakeholders and would be refined as part of the landscaping for the project.

7.10.3 Gas collection and venting

A new gas collection and venting system would be installed as required below the mound (and road infrastructure excavated into the former landfill) to allow landfill gas to be collected and vented. The gas collection system would also include bentonite seals around any other perforations of the capping layer (eg for bridge piles or other structures) to minimise preferential pathways for gas movement. The gas collection and venting system and capping layer would be designed in accordance with the requirements of the *Environmental Guidelines: Solid waste landfills*. Further information on the potential impacts of the project on the former Tempe landfill is provided in Chapter 13 (Contamination and soils).

7.10.4 Landscaping

Landscaping would be provided in two main areas:

- Open space areas at Tempe Lands and the former Tempe landfill, including the emplacement mound described above

- Roadside landscaping.

Landscaping would consist of a range of elements and vegetation, and would be confirmed during detailed design, guided by the master plan for open space areas at Tempe Lands and the urban design and landscape plan for the project.

The provision of landscaping would be a key element in achieving the overall urban design objectives for the project. Further information is provided in section 7.12.

7.10.5 Retaining walls

Retaining walls would be required in a number of locations, generally to support the road across elevation changes and at bridge abutments. The majority of retaining walls are needed to support:

- The southern end of the Terminal 1 connection and freight terminal access at Airport Drive
- The St Peters interchange connection
- The terminal links.

The walls would generally consist of reinforced soil, with a maximum height ranging from about two to eight metres, depending on location.

The final treatment used on the outside surface of the walls would be confirmed during detailed design in accordance with the project’s urban design and landscape plan (see section 7.12.3).

The indicative locations and heights of retaining walls are shown on Figure 7.25.

7.10.6 Noise attenuation

The project would require measures to minimise the levels of operational road traffic noise experienced at residences and other sensitive receivers.

Based on preliminary noise modelling undertaken, a noise attenuation barrier is proposed as part of the project. Figure 7.25 shows the proposed location of the barrier. The noise attenuation barrier would be located adjacent to the Terminal 1 connection (near South Street) would be about five metres high and about 400 metres long.

The location and height of this barrier would be confirmed during detailed design.

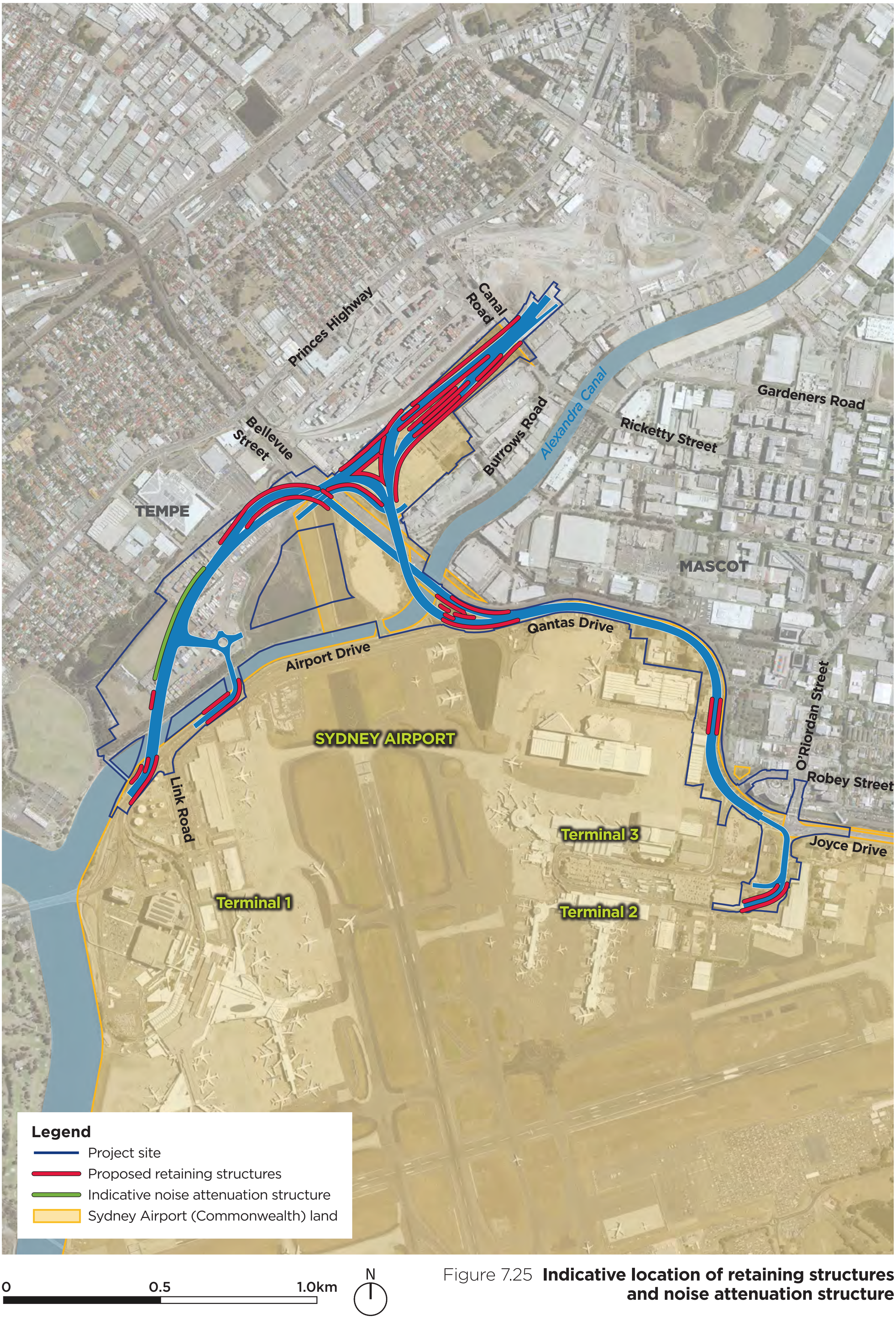


Figure 7.25 **Indicative location of retaining structures and noise attenuation structure**

7.10.7 Headlight glare and anti-throw screens

Anti-glare screens would be installed at the following locations to minimise headlight glare from vehicles:

- Qantas Drive bridge
- Southern overpass
- Northern lands access on the southern side of the Botany Rail Line.

The screens would be typically between 1.4 and 3.3 metres high. The height and location of the screens would be confirmed during detailed design. Indicative locations of headlight glare screens are shown on Figure 7.4.

Anti-throw screens would generally to be attached to all bridges and overpasses constructed as part of the project. The screens would have a height of about three metres above the roadway.

7.10.8 Drainage

An overview of the main drainage infrastructure proposed is provided below. The design of the drainage infrastructure would continue to be developed during detailed design. Other drainage works (including some adjustment to existing drainage systems) are proposed and would be developed further during detailed design.

Road drainage

To the east of Alexandra Canal, existing drainage infrastructure would be reused as far as possible. In some locations, existing infrastructure would need to be upgraded to ensure it can manage the changes in stormwater flows that would occur as a result of the project. In general, upgrades to existing infrastructure would include replacing existing pipes with larger pipes or minor adjustments to pipe alignments to improve efficiency. Where existing infrastructure cannot meet the project's drainage needs, new infrastructure would be constructed. In general, this would involve providing new drainage pipes that would connect to the surrounding drainage network.

West of Alexandra Canal, the key drainage infrastructure would comprise a cut-off channel to collect surface water upstream from the Cooks River Intermodal Terminal around the St Peter interchange connection. This channel would connect with an existing open channel along the northern side of the rail corridor before entering culverts and discharging into Alexandra Canal. A second channel would collect surface water flows from the corner of Swamp Road and Bellevue Street running east along the southern side of the Botany Rail corridor into Alexandra Canal.

The majority of drainage infrastructure would consist of pipes and stormwater channels generally located on either side of the new or upgraded roadways. Drainage infrastructure would include new stormwater channels/culverts to which the road drainage systems would generally drain. The drainage network would generally drain to the proposed channels/culverts; however, some piped drainage would discharge directly to the receiving waters (including Alexandra Canal) or discharge off site to existing drainage infrastructure, such as the existing infrastructure located along Qantas Drive. Areas located along Sir Reginald Ansett Drive would connect to existing drainage, which drains to Mill Stream.

The Terminals 2/3 access would have its own drainage system, which would drain to either end of the viaduct structure where it would connect with existing and proposed drainage systems.

Water would be captured from the base of retaining walls and emplacement mound by catch drains. It would then be diverted to the project's drainage system, existing drainage infrastructure, or directly to receiving waters.

For parts of the project elevated above the ground, drainage in the form of bridge 'scuppers' would be used to intercept the flow of water from the road pavement and convey it to the proposed discharge locations described below.

Alexandra Canal outlets

Based on the concept design, the project includes nine drainage outlets at Alexandra Canal. As shown on Figure 7.26, this would consist of:

- Upgrading four existing outlets on the eastern side of the canal
- Providing four new outlets on the western side of the canal
- Providing one new outlet on the eastern side of the canal.

A preliminary study of outlet discharges has identified that a number of the outlets would require energy dissipaters to minimise scour in the canal. This would be reviewed during detailed design and the necessary measures at outlets confirmed in conjunction with relevant stakeholders, including Sydney Water.

Flood mitigation basin

A flood mitigation basin is proposed between the lanes of the St Peters interchange connection and Botany Rail line as shown on Figure 7.26. This basin would capture any stormwater flows upstream of the St Peters interchange connection to minimise the flooding impacts of stormwater flows on downstream areas. The basin would be designed to be ‘dry’ under normal conditions (to minimise attracting birds), and would only operate during large storm events.

Further information on the management of flooding is provided in Chapter 14 (Hydrology and flooding).

Adjustment of Sydney Airport northern ponds

The northern ponds are two ponds which are located either side of Qantas Drive and provide flood mitigation and stormwater detention functions for Sydney Airport.

Constructing the piers for the Qantas Drive bridge would result in a small loss of storage in the northern most of these ponds located immediately adjacent to Alexandra Canal. The project includes enlargement of the pond to ensure this storage loss is offset. The volume of offset required would be confirmed during detailed design in consultation with Sydney Airport Corporation. The southern pond would not be affected.

7.10.9 Water quality measures

The project includes measures to reduce the potential for impacts on water quality. Generally, treatment devices would be installed near connections to the existing drainage network and/or the outlets at Alexandra Canal. These devices would include gross pollutant traps and other separators designed to remove waste matter, hydrocarbons, nutrients and suspended solids from stormwater runoff. The size and type of devices installed would be confirmed during detailed design. A preliminary sizing of these devices has been undertaken based on a three month design storm event.

In other locations, alternative drainage measures may be possible such as grassed swales. All water quality measures would be developed in accordance with the principles of water sensitive urban design and with the aim of achieving the water quality targets in the *Botany Bay and Catchment Water Quality Improvement Plan* (Sydney Metropolitan Catchment Management Authority, 2011) subject to feasibility during the detailed design stage.

Figure 7.26 **Drainage infrastructure**

7.10.10 Lighting and road signs

Lighting

Lighting would be provided as part of the project, including along roadways, at interchanges, ramps, intersections and along the active transport link. Lighting would be designed in accordance with *AS/NZS 1158.6 – Lighting for roads and public spaces* and CASA's requirements as defined by the *Manual of Standards Part 139 – Aerodromes* (CASA, 2017).

Aviation hazard lighting would be provided in accordance with the *Manual of Standards Part 139 – Aerodromes*.

Signs

Traffic, locational, directional, warning and variable message signs would be provided across the project. Directional signs would be installed in accordance with Austroads and Roads and Maritime standards, with a focus on providing clear and unambiguous directions to motorists.

Variable message signs (see Figure 7.27) would be mounted on gantries along roads and would be used to advise motorists of prevailing traffic conditions. These signs would generally display the regulatory speed limit and would be modified where required to display variable speed limits in response to incidents and congestion.

Variable message and integrated speed and lane use signs would be sized and located to achieve a safe and well guided road environment, while minimising impacts on existing land uses and visual amenity, and avoiding intrusions into protected airspace. Final locations would be determined during detailed design.

Some signage (including variable message signs) may need to be located outside the project site to provide information about movements and incidents within the project site. The location of this signage would be confirmed during detailed design.

Figure 7.27 Typical variable message sign

7.10.11 Utility connections

Utilities and services located within and close to the project site may need to be protected, adjusted or augmented during construction, particularly where excavation is required as part of the project. These services include electricity, telecommunications, sewer, water and gas services.

The locations of existing utility services and any changes required would be confirmed by the construction contractor during detailed design, in consultation with the relevant utility providers.

The project would also involve connections to existing electricity, water and wastewater/sewer utilities.

Further information is provided in section 8.7.

7.11 Access changes and permanent land requirements

7.11.1 Access changes

The proposed changes to existing access arrangements are outlined in Table 7.1. Further information, including an assessment of the potential impacts of the proposed changes, is provided in Chapter 9 (Traffic, transport and access) and Technical Working Paper 1 (Transport, Traffic and Access).

Table 7.1 Proposed changes to access arrangements

Location	Proposed changes
Airport Drive	Airport Drive would be closed to the public between the freight terminal access and Qantas Drive upgrade and extension, with access between Terminal 1 and Terminals 2/3 as described in section 7.1.1.
Northern lands – Sydney Airport employee car park	The closure of the section of Airport Drive mentioned above would remove the existing access to Sydney Airport's staff car park located west of Alexandra Canal from the surrounding road network (and the Nigel Love bridge). Access to this car park would be adjusted by Sydney Airport as part of a separate approval.
Swamp Road and Bellevue Street	Swamp Road would be closed, and access to properties in this area (including the northern lands and those to be acquired as part of the project) would be via the northern lands access and the freight terminal access. A cul-de-sac would be installed at the southern end of Bellevue Street to the north of the project site.
Lancastrian Road	Access to Lancastrian Road would be left-in and left-out via the upgraded Qantas Drive.
Freight terminal at Terminal 1	The freight terminal at Terminal 1, which is currently accessed via Airport Drive and Link Road, would be accessed via the freight terminal access.
Active transport link	Closure of the existing active transport link along eastern side of Alexandra Canal, with a new link provided on the western side of Alexandra Canal (see section 7.9).

7.11.2 Permanent land requirements

The anticipated permanent land requirements associated with the project's operational footprint are listed in Table 7.2. In total, it is anticipated that about 35.7 hectares of land within the project site would be permanently required for the project. The permanent land requirements are anticipated to include:

- 20.9 hectares of Commonwealth-owned land
- 14.1 hectares of land owned by the NSW or local government
- 0.7 hectares of privately-owned land.

No residential land would be required.

Land acquisition (for land other than Commonwealth-owned land) would be undertaken in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW), the *Land Acquisition Information Guide* (NSW Government, 2014), and the land acquisition reforms announced by the NSW Government in 2016, which can be viewed online at: *https://www.finance.nsw.gov.au/land-property/land-acquisition-reform-2016.*

Commonwealth-owned land required for the project would be leased by the NSW Government under a long-term lease agreement, subject to compliance with any requirements of relevant Australian Government agencies.

Relocation and some other categories of expenses would be claimable under the *Land Acquisition (Just Terms Compensation) Act 1991* and related policies.

Further information about the project's land requirements, including property details, is provided in Chapter 19 (Land use and property).

Table 7.2 Anticipated permanent land requirements

Location	Property title	Ownership	Estimate of area (hectares) and proportion of lot required[1]
Private land			
25 Burrows Road, St Peters	Lot 1 DP 866946	Private	0.1 (2%)
Swamp Road, Tempe	Lot 725 DP 48012	Private	0.2 (4%)
	Lot 2 DP 869306	Private	0.3 (35%)
	Lot 723 DP 48012	Private	0.1 (2%)
Private total			**0.7 hectares**
Commonwealth-owned land			
Sydney Airport, Mascot	Lot 8 DP 1050923	Commonwealth of Australia	11 (2%)
30 Canal Road, St Peters	Lot 4 DP 555771	Commonwealth of Australia	1.8 (85%)
	Lot 3 DP 825649	Commonwealth of Australia	0.5 (45%)
6-10 Burrows Road, St Peters	Lot 3 DP 555771	Commonwealth of Australia	1.3 (100%)
	Lot 2 DP 802342	Commonwealth of Australia	3.8 (48%)
Swamp Road and Bellevue Street, St Peters	Lot 1 DP 186164	Commonwealth of Australia	0.2 (20%)
	Lot 2 DP 830952	Commonwealth of Australia	0.2 (22%)
	Lot 1 DP 830952	Commonwealth of Australia	<0.1 (93%)
Swamp Road, St Peters (car park)	Lot 12 DP 825649	Commonwealth of Australia	0.4 (52%)
	Lot 643 DP 727045	Commonwealth of Australia	0.2 (9%)
	Lot 2 DP 790186	Commonwealth of Australia	0.1 (12%)
	Lot 1 DP 826101	Commonwealth of Australia	1.1 (27%)
Swamp Road, St Peters (HIAL)	Lot 5 DP 107811	Commonwealth of Australia	<0.1 (100%)
	Lot 724 DP 481012	Commonwealth of Australia	0.2 (35%)
	Lot 1 DP 869306	Commonwealth of Australia	<0.1 (9%)
Commonwealth-owned land total			**20.9 hectares**
Land owned by the NSW or local government			
Various (rail corridor)	Lot 1 DP 1063121	NSW Government	<0.1 (87%)

Location	Property title	Ownership	Estimate of area (hectares) and proportion of lot required[1]
	Lot 2 DP 1054373	NSW Government	0.3 (31%)
	Lot 1 DP 450245	NSW Government	<0.1 (9%)
	Lot 2 DP 963240	NSW Government	0.1 (32%)
	Lot 21 DP 1069118	NSW Government	0.1 (15%)
	Lot 5 DP 1184446	NSW Government	<0.1 (34%)
	Lot 1 DP 621535	NSW Government	0.1 (21%)
	Lot 11 DP 213317	NSW Government	0.5 (26%)
	Lot 17 DP 217443	NSW Government	<0.1 (2%)
	Lot 95 DP 1157632	NSW Government	0.2 (41%)
	Lot 6 DP 209847	NSW Government	<0.1 (29%)
	Lot 9 DP 747022	NSW Government	0.1 (9%)
	Lot 1 DP 1054373	NSW Government[2]	0.1 (100%)
1-3 Swamp Road, Tempe	Lot 202 DP1097238	Local Government	0.8 (83%)
2 and 5-15 Swamp Road, Tempe	Lot 303 DP 1136081	Local Government	3.2 (67%)
	Lot 304 DP 1136081	Local Government	3.7 (60%)
South Street, Tempe (open space)	Lot 25 DP 227132	Local Government	1.9 (23%)
South Street, Tempe (golf driving range)	Lot 305 DP 1136081	Local Government	0.9 (32%)
Alexandra Canal, Mascot/St Peters/ Tempe	Lot 11 DP 1050464	NSW Government[2]	0.1 (61%)
	Lot 6 DP 1184447	NSW Government	0.1 (22%)
	Lot 13 DP 1050464	NSW Government	1.9 (8%)
5 and 5A Canal Road, St Peters	Lot A DP 391775	NSW Government	<0.1 (2%)
	Lot 14 DP 606737	NSW Government	<0.1 (<1%)
Holbeach Avenue, Tempe	Lot 400 DP 1233792	NSW Government	<0.1 (<1%)
Other publicly-owned land total			**14.1 hectares**

Notes: 1. The estimate of land required is based on a concept design that is subject to refinement during detailed design, and the final area required may vary from that shown

2. The Commonwealth of Australia has aerial title above some of the lots identified

7.12 Urban design and place making

7.12.1 Urban design and place making strategy and concept for the project

As discussed in section 7.2.3, an urban design and place making strategy and concept was developed as part of the project concept design and is described in Technical Working Paper 13 (Urban Design, Landscape Character and Visual Impact Assessment).

The strategy and concept identifies four main project elements and includes guiding principles for each:

- Structures (bridges and viaducts, retaining walls, noise walls)

- Place making elements (eg feature lighting, pedestrian and active transport connections, heritage interpretation features, public art opportunities, indigenous design approach)
- Landscape elements (public open space, roadside landscaping, vegetation, drainage structures)
- Roadside elements (headlight screens, signage gantries, other roadside furniture).

Key recommendations of the strategy have been incorporated into the project's concept design and/or will be investigated further as part of detailed design.

7.12.2 Consideration of key urban design and place making issues in the concept design

The concept design for the project has been developed taking into account the urban design vision and objectives (see Figure 7.8) and the urban design and place making strategy (see chapter 6 of Technical Working Paper 13 (Urban Design, Landscape Character and Visual Impact Assessment)). A summary of how key urban design and place making issues have been addressed during the concept design process is provided below.

Considering urban renewal areas and existing issues and constraints

As described in chapter 6, the project has been developed with regard to a range of engineering and environmental constraints, including an extremely tight operational project boundary, existing land uses and ownership, sensitive receivers, large areas of historically contaminated and saline soils, and Sydney Airport operational issues. Much of the project is located in existing brownfield areas to minimise impacts on existing sensitive receivers, existing urban renewal areas (particularly in Mascot) and urban amenity.

Alexandra Canal is one of the major heritage items in the area and links Mascot with the Wolli Creek urban renewal areas, which are located in close proximity to the project site. The landscape and urban design concept plan integrates the canal as a central element of the urban design and place making strategy and ensures continued community access to and along the canal, strengthening existing linkages. It also identifies opportunities for meaningful interpretation experiences, such as a heritage interpretive trail and locations for site-specific artworks to complement and reinforce the indigenous heritage of the area. The strategy includes an art strategy that provides opportunities for cultural expression by a wide range of artists. Both the artworks and process of creating the artworks would contribute to fostering a sense of local community cohesion and inclusiveness.

Infrastructure has been located to minimise impacts on sensitive receivers within the constraints of the project site. Much of the project is located in commercial and industrial areas, or within existing road corridors.

Sensitive areas that were not able to be avoided include existing open space within Tempe lands and Alexandra Canal. The project impacts on areas in and around Tempe Lands and the canal. This affects existing open space and the landscape setting of the heritage-listed Alexandra Canal. These sensitive areas were not able to be avoided, due to the need to incorporate areas east of Alexandra Canal, including the existing Airport Drive, into Sydney Airport land. Both of these are areas are proposed to be a focus of future design development and master planning processes.

Reduction of traffic in and around commercial and community centres

Commercial and community centres surrounding the project include Mascot, St Peters, Tempe and Wolli Creek. They include employment, warehousing, light industrial, bulky goods retailing areas, hospitality and other commercial businesses, as well as residential communities. Open space areas are also important community destinations.

By providing a direct connection to the Sydney motorway network, the project would result in a reduction of through traffic volumes in Mascot, as well as along the Princes Highway, benefiting local centres in Mascot, Tempe and Wolli Creek. This will improve the amenity of these centres and improve safety for pedestrians and active transport users wanting to access community facilities and areas of open space in Tempe. The project would provide for ongoing pedestrian and cyclist connectivity, wayfinding and amenity, with facilities fully integrated with the project. This will include ensuring continued access to open space and local footpaths in Mascot accessed via the relocated active transport link along Alexandra Canal.

High quality design, including enhancement of healthy, cohesive and inclusive communities

The urban design and landscape concept plan (see Technical Working Paper 13) has sought to maximise high quality design of the landscape, streetscape and project elements by:

- Promoting the use vegetation as a unifying element, and to provide visual relief and reduce heat, to deliver a memorable arrival and departure experience supporting the project's 'gateway' function
- Creating new open space beyond the project's operational boundary, which would be experienced by recreational users from surrounding communities, as well as by motorists
- Integrating the design of all project elements, to ensure that:
  - Forms and detailed resolution are elegant and refined to create a unified and well composed journey experience that sets a new quality benchmark
  - The night-time experience is considered and integrated, as many visitors will view the project at night and during dawn and dusk
  - Engineering, architecture and art are fully integrated.

In conjunction with the above, the project's residual land (see section 7.12.4) would provide opportunities for future areas of open space/recreation in accordance with community needs, including the need for inclusive facilities and accessibility by all community members. Future new areas of open space would contribute to an open space link from inner city areas via Sydney Park, St Peters interchange and the former Tempe landfill to connect to Botany Bay through existing open space south of the Cooks River. Due to its location immediately adjoining existing open space in Tempe Recreation Reserve and its proximity to residential areas, potential use of residual land as public open space would be consistent with the existing and desired future character of the area.

Future new open space areas and the proposed active transport link would contribute to achieving healthy, cohesive and inclusive communities.

The design of the project's hard and soft urban design elements would seek to ensure consistency with the existing and desired future character of the area. Key strategies to realise a meaningful, unique and cohesive experience of arriving and departing from Sydney Airport are:

- Ensuring that the forms and detailed resolution of the built elements are elegant, refined and work together to create a unified and well composed journey experience
- Designing road elements to provide legible and self-explanatory wayfinding to reduce visual clutter
- Responding to identified heritage values and providing meaningful interpretation at appropriate locations
- Integrating art and interpretation with the design of project elements
- Using a palette of materials and finishes that respond to and celebrate the landscape, urban and historical context
- Framing views to the surrounding landscape and landmarks to provide a unique travel experience steeped in the sense of place and to foster a sense of anticipation
- Preparing a master plan in conjunction with Inner West Council for the residual land adjacent to the Terminal 1 connection and open space areas as outlined above.

Crime prevention through environmental design

The project would also provide for ongoing pedestrian and cyclist connectivity, through the relocated shared path along the western side of Alexandra Canal, including continued access to open space as part of the master planning process to be undertaken with Inner West Council for the Tempe Lands area.

Reflecting the consideration of crime prevention through environmental design principles, and in accordance with the requirements of the *Disability Discrimination Act 1992* (Cth), integrating lighting with the proposed active transport link would create a more memorable active transport experience as well as improving passive surveillance and safety. All new shared paths and connections would be fully accessible and meet relevant design standards and guidelines.

7.12.3 Urban design and landscape plan

An urban design and landscape plan would be prepared during detailed design in accordance with the urban design and place making strategy and concepts presented in Technical Working Paper 13. The plan would present an integrated urban and landscape design for the project and would include:

- Design objectives, principles and standards based on:
  - Local environmental and heritage values
  - Urban design context
  - Sustainable design and maintenance
  - Community safety, amenity and privacy
  - Relevant design standards and guidelines
  - Minimising the footprint of the project
- A description of the project's design features, including graphics such as sections, perspective views and sketches
- Landscaping and structural design opportunities to mitigate the visual impacts of road infrastructure and operational fixed facilities
- Details of proposed landscaping (as described below)
- Details of disturbed areas (including compounds) and the strategies to progressively rehabilitate, regenerate and/or revegetate these areas
- The timing for implementation
- Monitoring and maintenance procedures for built elements, vegetation and landscaping.

The plan would be prepared in consultation with relevant stakeholders, including local councils and the community.

Landscaping

The provision of landscaping would be a key element in achieving the overall urban design visual and objectives for the project (see Figure 7.8). Areas available to be landscaped would be landscaped where there is the opportunity to do so. The design of landscaping areas would:

- Maximise retention of existing mature trees where possible
- Replace trees that would need to be removed with new trees as far as possible, including planting mature vegetation to provide a more immediate effect at project completion
- Provide a generous landscape curtilage for vegetation (including tree cover), landform and public art to create a memorable landscape setting for the motorway
- Create a continuous 'green edge' to the roadway, comprised vegetation at differing heights
- Take into consideration important views and sight line requirements

- Take into consideration Sydney Airport's airport operational constraints, particularly in terms of the airport's prescribed airspace and minimising the risk of wildlife strike
- Install trees in verges wherever possible to minimise the visual scale of the road infrastructure, mitigate heat generated by large pavements, and assist in the absorption of dust and noise to enhance the amenity of both the road corridor and adjoining areas
- Provide shade and maximise amenity for users of the active transport link
- Investigate opportunities for feature landforms to create visual interest and provide deep soil to support the growth of feature trees (subject to Sydney Airport's operational requirements)
- Provide visual separation to the Botany Rail Line, including a green interface to replace existing mature vegetation that would need to be removed to construct the project (see Chapter 21 (Landscape character and visual amenity)).

Preparing the plan

The urban design and landscape plan would be prepared by a suitably qualified consultant, in consultation with relevant stakeholders (including Inner West Council, the community and Sydney Airport Corporation), and with consideration of:

- The concept plans for the project
- The master plan being developed by Inner West Council for land located within the Tempe Lands (including former industrial lands located on Inner West Council land)
- The urban design and place making principles described in Technical Working Paper 13 (Urban Design, Landscape Character and Visual Impact Assessment)
- Relevant mitigation measures (particularly those in Chapters 11 (Airport operations), 17 (Non-Aboriginal heritage), 21 (Visual amenity) and 22 (Biodiversity))
- The tree replacement strategy (see Chapter 21)
- The conditions of approval for the project
- Relevant guidelines and policies (see below).

The plan would be approved by the Secretary of the Department of Planning, Industry and Environment.

Design guidelines

The plan will be prepared in accordance with relevant guidelines, policies and strategies, including:

- *Beyond the Pavement: Urban design policy, procedures and design principles* (Roads and Maritime, 2014)
- *Bridge Aesthetics: Design guideline to improve the appearance of bridges in NSW* (Roads and Maritime, 2019a)
- *Better Placed. An integrated design policy for the built environment of New South Wales* (Government Architect New South Wales, 2017)
- *Crime Prevention through Environmental Design* (Queensland Government, 2007)
- *Technical Guidelines for Urban Green Cover in NSW* (OEH, 2015a)
- *Sustainable Design Guidelines Version 4.0* (Transport for NSW, 2017)
- *Australian Standard AS4282-1997 Control of the obtrusive effects of outdoor lighting*
- *Sydney Airport Master Plan 2039* (SACL, 2019a)
- *Sydney Airport Environment Strategy 2019-2024* (SACL, 2019b)
- *Landscape Guideline: Design guideline to improve the quality, safety and cost effectiveness of green infrastructure in road corridors* (Roads and Maritime, 2018a)

- *Noise wall design guideline. Design guideline to approve the appearance of noise walls in NSW* (Roads and Maritime, 2016a)
- *NSW Bicycle Guidelines* (Roads and Traffic Authority, 2005)
- *Water Sensitive Urban Design Guideline* (Roads and Maritime, 2017a).

Urban design refinements

Additional opportunities for enhancement of the concept plan and design refinements to be explored during detailed design would include:

- Increasing the horizontal setback of all bridge abutments from the top edge of Alexandra Canal to maintain the integrity of the heritage curtilage and allow for public enjoyment of the canal within a safe and attractive environment set in the landscape
- Maximising ‘openness’ under the bridges through slender bridge design to maintain clear sight lines along the canal
- Retaining uncluttered views along Alexandra Canal and maximising retention of the ‘big sky’ landscape of Sydney Airport, including sweeping views across the open airport landscape and of aircraft movements
- Additional connectivity measures and opportunities to strengthen links between communities surrounding the project site
- Opportunities for additional vegetation, in particular tree cover in open space areas, to ensure user amenity through thermal comfort and provide spatial definition and interest
- Innovative responses to the design of ‘under viaduct’ spaces
- Design refinements of major project elements, including bridges and the Terminals 2/3 access viaduct, to achieve a high standard of architectural design and finish
- Emphasising the nightscape environment.

7.12.4 Residual land

Following construction, it is expected that some of the land required to construct the project in Tempe (including land within the Tempe Lands and other areas on the former Tempe landfill) would be available for other uses. This land is referred to as ‘residual land’ for the purpose of this document. Potential future uses of residual land could include open/space recreation, or other future uses in accordance with the priorities of local and regional strategic planning documents, Inner West Council (the landowner) and the community.

Council is developing a master plan to identify how this land could be used, which will consider council’s Recreation Needs Study (Cred Consulting, 2018). The future use of this land would be subject to a separate assessment and approval process.

Roads and Maritime would provide support to Inner West Council with the master planning process for these areas and ensure that the urban design and landscape plan for the project is consistent with the outcomes of this process.

Further information on residual land is provided in section 19.4.3.

8. Construction

8.1 Overview

8.1.1 Construction overview

Construction would generally involve four main phases of work:

- Enabling works
- Site establishment
- Main construction works
- Finishing and post-construction rehabilitation.

The indicative approach to construction during these work phases is described in section 8.2. Detailed construction planning, including timing, staging and work sequencing, would be confirmed once construction contractors have been engaged. Further information on the construction program and timing is provided in section 8.3.

Ancillary facilities and compounds required to support construction are described in section 8.4. Indicative construction resources, workforce, transport and access arrangements, and utility works are described in sections 8.5 to 8.6.4.

This chapter provides an indicative construction methodology that retains flexibility for the successful contractor(s) to refine and optimise aspects of the approach. A final construction methodology and program would be developed by the construction contractor(s) based on the conditions of approval and the mitigation and management measures provided in this document.

General principles of the construction strategy

The approach to construction has been developed based on the following general principles:

- Design and plan efficient site layouts that ensure the safety of the workforce and community
- Minimise the potential for community and environmental impacts
- Eliminate potential aviation safety hazards by undertaking works with the potential to intrude into the prescribed airspace (such as the use of cranes and piling equipment) outside Sydney Airport's operational hours
- Minimise potential impacts on access to Sydney Airport terminals for passengers, visitors and employees
- Minimise potential impacts on the safe operation of the Botany Rail Line by primarily undertaking works within/over the rail corridor during possession periods
- Maintain the safety and operation of the road network for all users, including freight transport to Port Botany
- Make construction staging and sequencing as safe and efficient as possible, providing a simplified construction process (where practicable), minimising the duration and significance of impacts on nearby receivers
- Minimise the length of the overall construction period and the duration of individual construction activities to minimise potential noise impacts on nearby receivers during construction
- Locate construction compounds and other temporary facilities in areas which are already cleared or disturbed
- Provide safe, efficient and convenient access for construction vehicles, plant and equipment, while minimising impacts on the road network and surrounding land uses.

8.1.2 Parts of the project subject to the Airports Act and the EP&A Act

The project consists of infrastructure and components located on land subject to the Airports Act as well as on land subject to the EP&A Act. The parts of the project located on Sydney Airport land (as shown on Figure 1.3 and in more detail on Figure 8.2 to Figure 8.6) are subject to the assessment and approval process of the Airports Act. Other parts of the project (as shown on Figure 1.3 and in more detail on Figure 8.2 to Figure 8.6) are subject to the assessment and approval process of the EP&A Act. For completeness and readability, construction is described as a whole in this chapter.

8.1.3 Construction footprint and work areas

The land required to construct the project (the construction footprint) is shown on Figure 8.1 to Figure 8.6. The construction footprint has an area of about 69 hectares, including about 37.4 hectares of Sydney Airport land. The areas of Sydney Airport land within the footprint are shown on Figure 8.2 to Figure 8.6.

The construction footprint includes land required to construct the proposed roadways, bridges and ancillary infrastructure, and land required for the proposed construction compounds. Utility and drainage works to support the project, and works to implement the temporary active transport link (see section 8.6.4), would generally occur within the construction footprint. However, some works, such as connections to existing infrastructure, may be required outside the footprint.

For the purposes of preliminary construction planning, the construction footprint has been divided into six work areas to facilitate construction of the main infrastructure:

- St Peters interchange connection work area
- Terminal 1 connection and western bridges work area
- Eastern bridges work area
- Airport Drive work area
- Qantas Drive work area
- Terminals 2/3 access work area.

The work areas are shown on Figure 8.1.

8.2 Indicative construction methodology

8.2.1 Enabling works

Enabling works for major infrastructure are typically carried out before the start of substantial construction to manage specific features and issues within the project site (such as access requirements). The following enabling works are proposed:

- Utility works, including the protection, adjustment and augmentation of utilities within the project site (see section 8.7 for further detail of these works)
- Adjustments to existing transport networks, including active transport links and intersections, to ensure that existing networks are able to operate during construction.

Works to be undertaken as enabling works would be confirmed by the construction contractor as part of detailed design and construction planning.

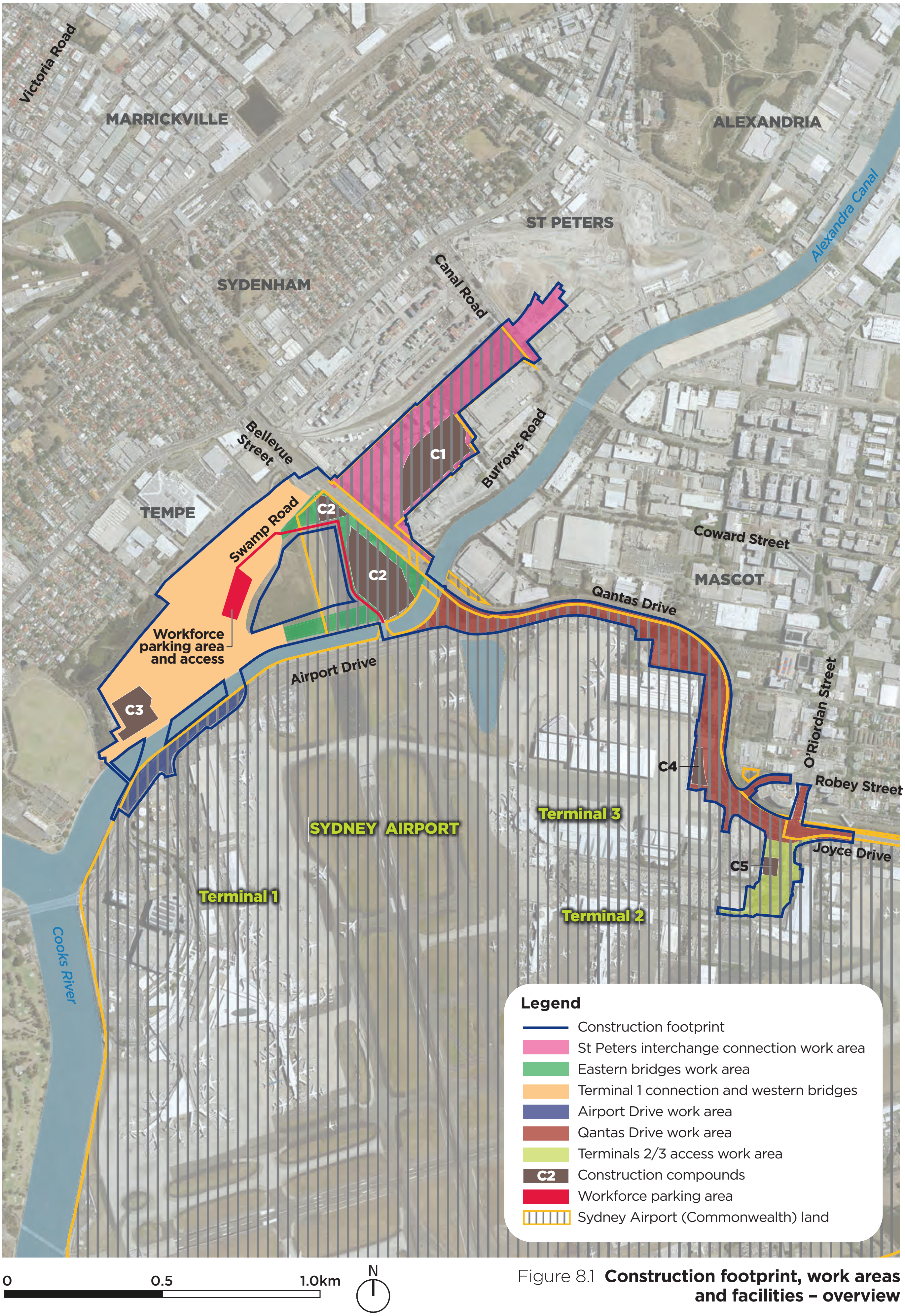


Figure 8.1 **Construction footprint, work areas and facilities – overview**

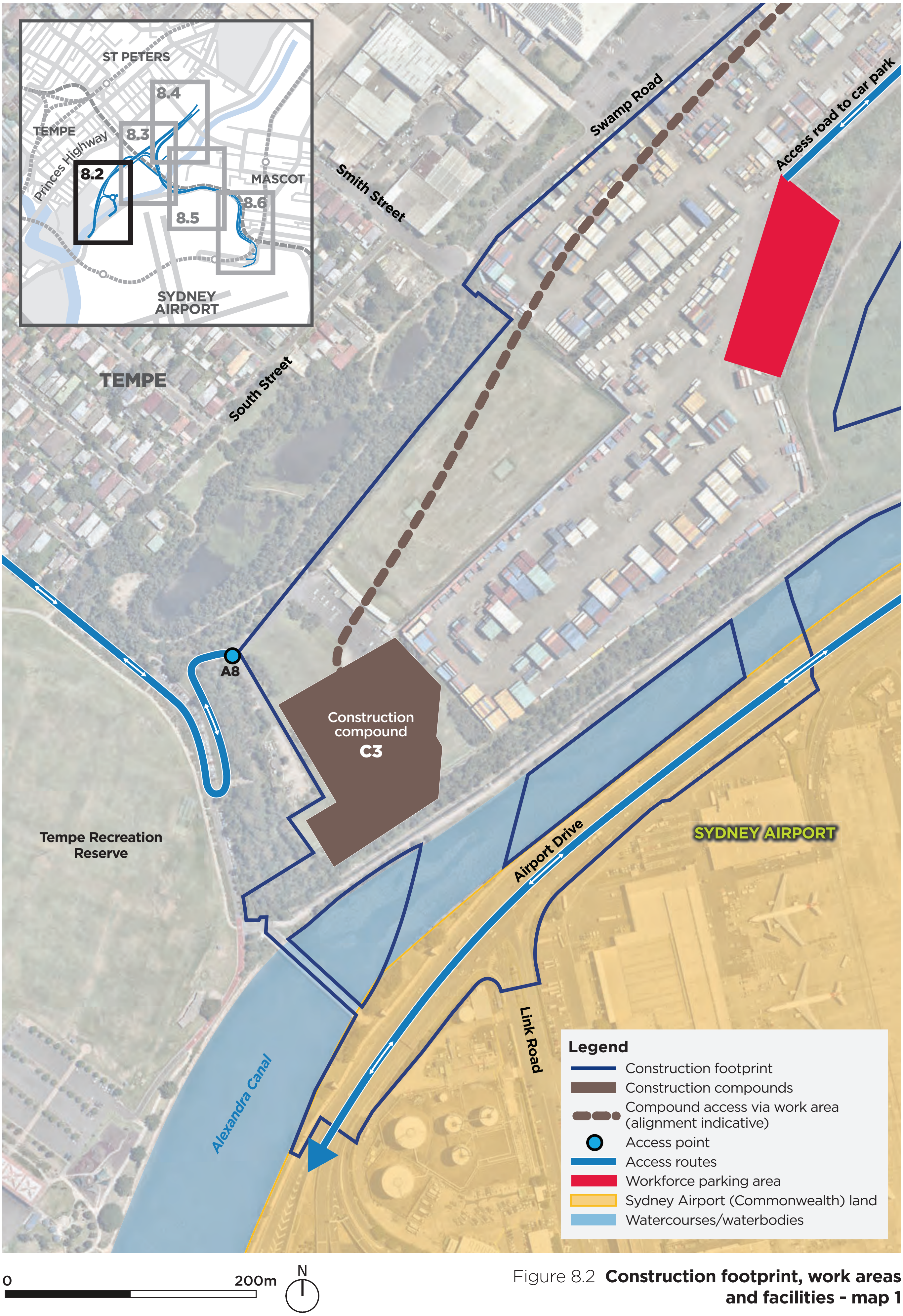


Figure 8.2 **Construction footprint, work areas and facilities - map 1**

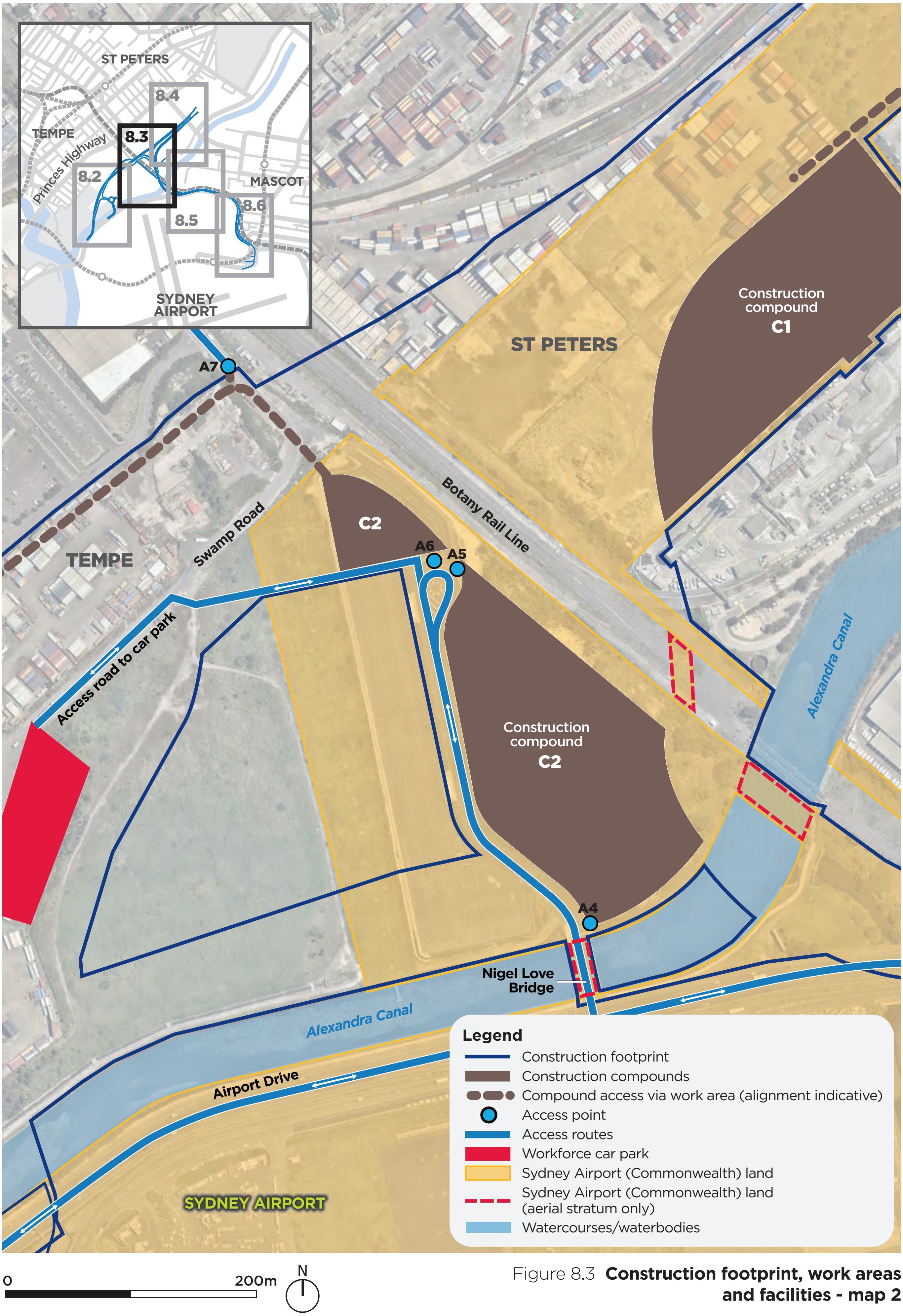


Figure 8.3 **Construction footprint, work areas and facilities - map 2**

Figure 8.4 **Construction footprint, work areas and facilities - map 3**

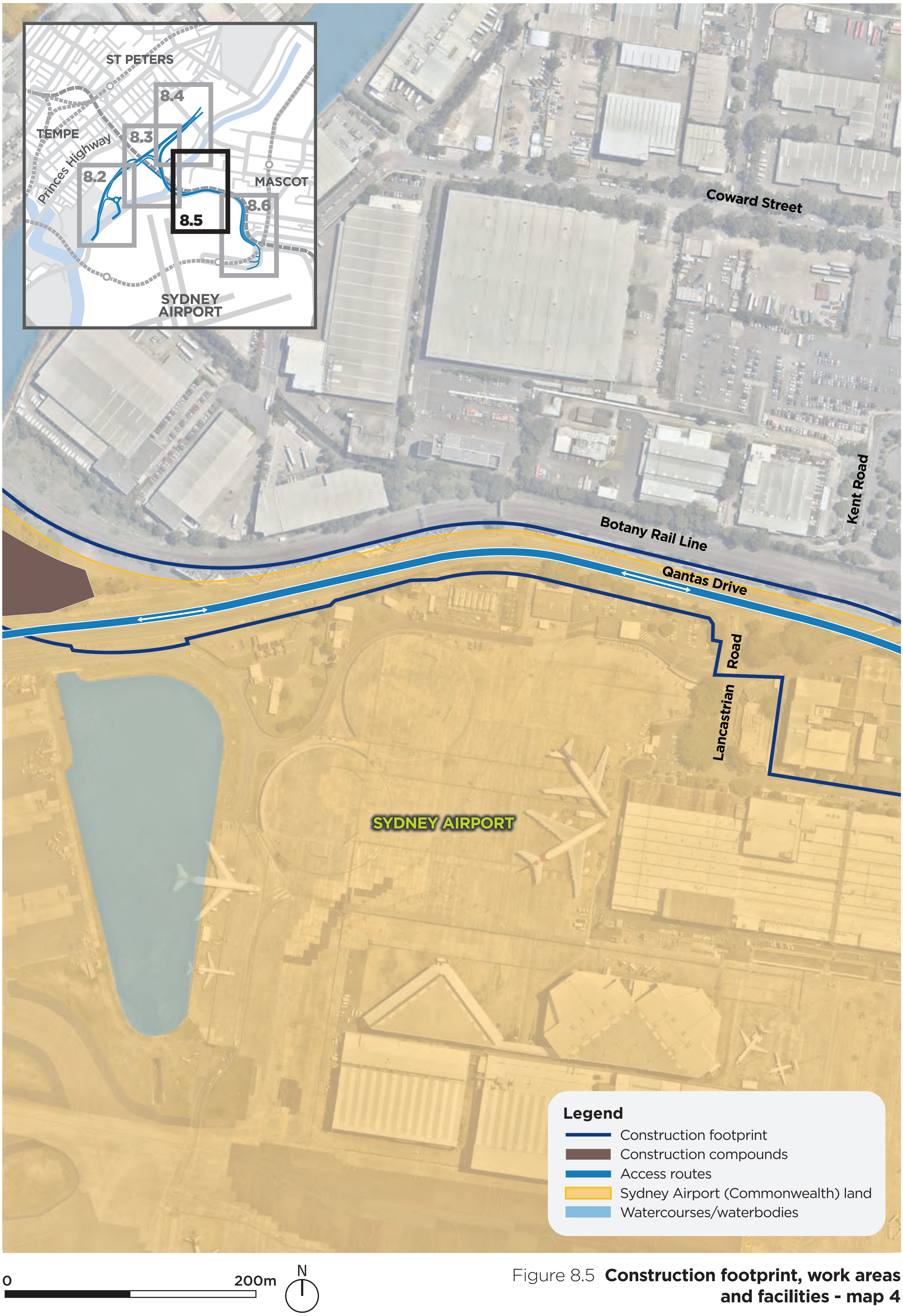


Figure 8.5 **Construction footprint, work areas and facilities - map 4**

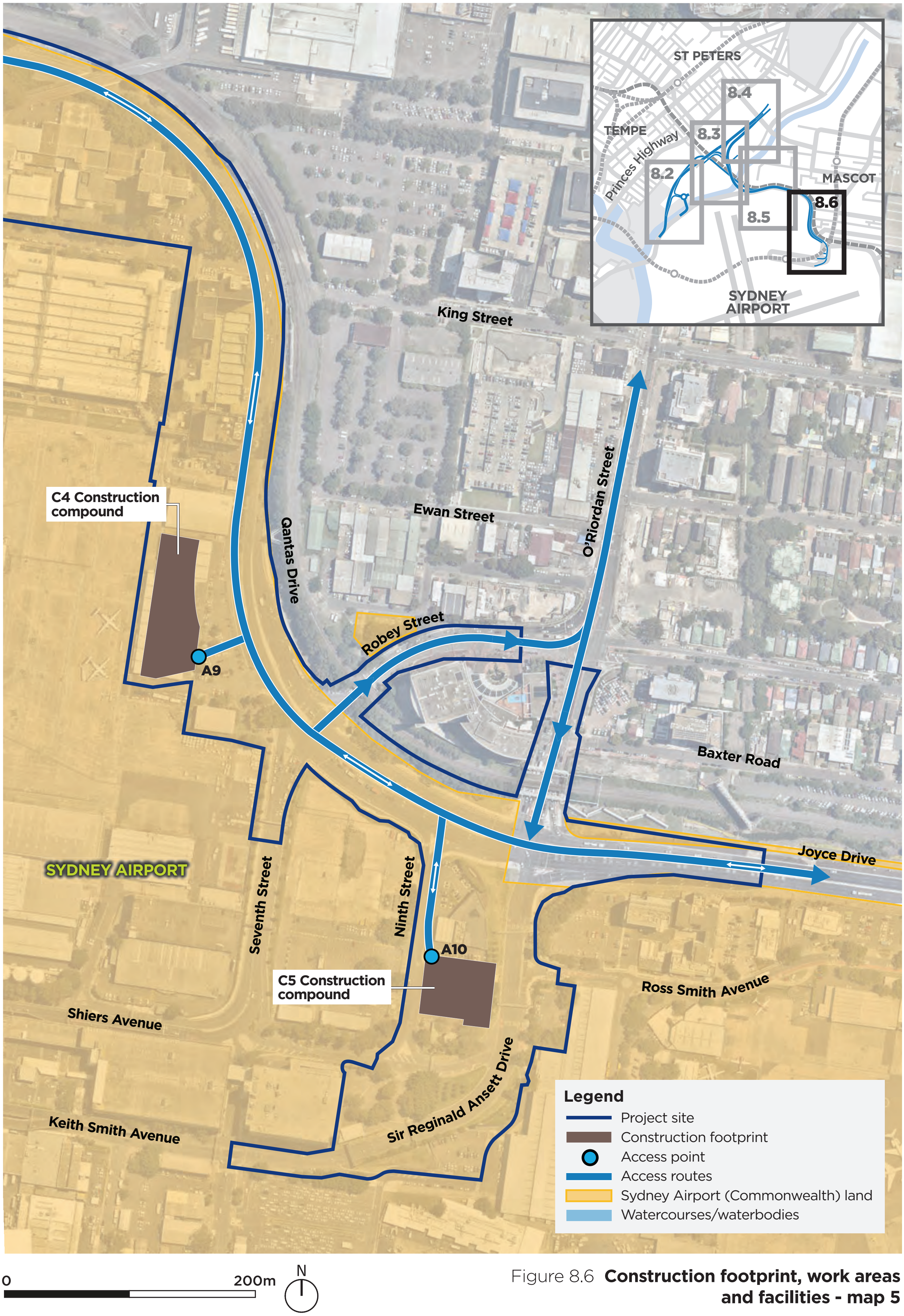


Figure 8.6 **Construction footprint, work areas and facilities - map 5**

8.2.2 Site establishment

Site establishment would generally include the following activities:

- Installing site fencing, hoarding and signage
- Installing site environment management controls, including sediment and erosion control, screening and noise attenuation
- Adjusting the Sydney Airport airside fence and other security fences
- Installing traffic management measures
- Establishing work areas, construction compounds and site access arrangements
- Establishing workforce parking areas
- Clearing/trimming of vegetation
- Providing services (including power and water) to construction compounds and work areas
- Establishing temporary road, pedestrian and cyclist diversions where required.

8.2.3 Main construction works

Removing buildings and structures

A number of existing buildings and structures would need to be fully or partially removed to facilitate construction. Table 8.1 provides an indicative list of the buildings and structures proposed to be removed.

Further information about potential property impacts is provided in Chapter 19 (Land use and property).

Table 8.1 Indicative list of buildings and structures proposed for removal

Location	Building/structure type
Sydney Airport land	
Northern lands (at Burrows Road South)	Visy recycling facility structures
	Boral concrete recycling facility structures
Jet Base	Workshops 171 and 167
	Services control plant/boiler house (buildings 151/203)
	Administration building 2 (AB2) (building 133)
	Pump house and water storage tank (backup reservoir) (building 166)
	Administration building 1 (AB1) (building 217)
	Qantas flight training centre building 148 (northern training and classrooms)
	Hazmat store and flammable liquids store (building 272 annex) along northern edge of building
	Substation C (building 155 and adjacent liquids pump station)
	Store shed (building 601)
	Fuel store office (building 311)
Qantas Drive, Airport Drive and Sir Reginald Ansett Drive	Advertising and wayfinding structures and gantries

Location	Building/structure type
Land subject to the EP&A Act	
Boral Concrete St Peters	Sheds and vehicle wash facilities located at the south-western corner of the site
Cooks River Intermodal Terminal	Part of warehouse and minor shed located at the south-eastern corner of the site
Tyne Container Services	All structures and containers at the Tyne Container Services site
Tempe Lands	Office and driving range netting and lighting structures at the Tempe Golf Driving Range and Academy
Inner West Council depot	Removal of all material and any structures
Qantas Drive	Advertising structures

The process for removing buildings or other structures would typically involve:

- A hazardous materials survey
- Installing hoarding, scaffolding and protection barriers around the perimeter of the site or building
- Adjusting the Sydney Airport airside security fence
- Decommissioning/terminating building services
- Temporary propping and/or waterproofing to ensure the structural integrity of adjacent structures
- Removing materials inside buildings
- Demolishing the main structure using an excavator, bobcat, cranes or other conventional methods, following a 'top-down' approach, with no use of explosive demolition techniques
- Removing materials from the site for recycling or disposal.

Hazardous materials would be removed and disposed of in accordance with relevant legislation, codes of practice and Australian Standards. Where practicable, materials such as bricks, tiles, concrete, timber, plastics and metals would be sorted and sent to a waste facility with recycling capabilities.

Earthworks

Earthworks would be required to construct key project infrastructure, including:

- Piling for bridge and overpass abutments
- Roadways and the active transport link, including excavation and filling to the required level
- Drainage infrastructure
- Retaining walls
- Utility works.

The estimated quantities of materials associated with earthworks are provided in Table 8.2. These estimates indicate that fill material would need to be imported to the project site, which is consistent with the elevated nature of many of the project's features.

Of the quantities shown, about 67,000 cubic metres of material would need to be removed from Sydney Airport land, and about 459,000 cubic metres of clean fill would need to be imported onto Sydney Airport land. This material would be subject to testing prior to importation to confirm its suitability for use on the site.

The majority of fill material is needed at the St Peters interchange connection work area for the elevated roadways crossing this area. The importation of fill is required early in the construction program to consolidate the underlying alluvial soil layers. Other ground improvement methods may also be used, in the form of dynamic compaction or concrete injected columns to ensure a stable foundation for the proposed roadway.

Table 8.2 Estimated quantities of materials generated/required for earthworks

Key feature	Amount to be removed (m^3)[1]	Amount to be imported (m^3)[1]
Terminal 1 connection (includes emplacement mound)	119,000	213,000
Freight terminal link	4,000	22,000
St Peters interchange connection	7,000	280,000
Qantas Drive upgrade and extension	50,000	36,000
Terminal links	34,000	46,000
Terminal 2/3 access	3,000	14,000
Northern lands access	1,000	30,000
Allowance for unsuitable material[2]	-	65,000
Total for project as a whole	**218,000**	**706,000**
Total for Sydney Airport land	**67,000**	**459,000**

Notes: 1. Numbers rounded to the nearest 1,000 cubic metres
2. This allows for additional material that may need to be imported to compensate for material that cannot be reused on site (eg contaminated material)

The following hierarchy would be applied to the management of excavated materials:

- Material with suitable engineering properties that meets soil quality requirements (including no contamination) would be reused within the project site as fill
- Waste material excavated from the former Tempe landfill would be re-emplaced within the boundary of the site in the form of an emplacement mound, reducing the need to dispose of this material off site (see section 7.10.2)
- Excess material that is unable to be reused within the project site (eg contaminated material and excess landfill waste) would be transported off site for reuse, recycling or disposal at an appropriately licensed facility (to be determined based on the waste classification).

Further information on waste management is provided in Chapter 24 (Waste management).

Road construction and widening

The project includes construction of new sections of road and upgrading/widening an existing section of Qantas Drive. These works would be undertaken using conventional road construction/widening processes and would include the activities listed below.

Preparatory works

- Clearing any vegetation
- Removing and stockpiling topsoil
- Removing existing kerbs and other road elements/furniture (for road upgrade/widening)
- Earthworks
- Managing contaminated material where it is encountered, including material from within the former Tempe landfill site
- Adjusting adjacent properties and accesses where required.

Road works

- Constructing retaining walls to design levels
- Installing new or adjusting existing drainage and other utilities
- Constructing new pavement, including placing and compacting select fill, sub-base and asphalt wearing surface
- Installing new kerb and gutter
- Installing new concrete medians
- Finishing work, including line marking, installing safety barriers, lighting, signage and landscaping.

Bridge and overpass construction

As described in Chapter 7 (Project description), three main types of bridge structure are proposed - balanced cantilever, super-T or box girder and steel tied arch. The indicative construction methods for these structure types are summarised in Table 8.3. Following construction of the bridge structures, each bridge would be fitted out with decking and road pavement, drainage scuppers, edge barriers, anti-throw and headlight glare screens (as required), lighting, signage and line marking.

Construction of bridge abutments and piers would be common for all bridge types. Crane pads would potentially be required at a number of bridge work areas to ensure that material can be safely lifted.

To minimise the potential for aviation hazards, activities involving the use of tall machinery and equipment (such as cranes) would be subject to approval by Sydney Airport Corporation. The use of this equipment would generally be undertaken when flights are not operating; this would generally occur during Sydney Airport's curfew hours. Further information is provided in section 8.2.5.

Table 8.3 Indicative construction methods for bridge/overpass superstructures

Type	Applicable bridges/overpasses	Indicative construction method
Balanced cantilever	Terminal 1 connection bridge Qantas Drive bridge	Two alternative methods are available: lifting pre-cast concrete segments into place using a crane; or casting sections in situ using mobile formwork. By constructing the bridge outwards in both directions from each pier at the same rate, each structure maintains an overall load 'balance' until it meets the opposite structure in the middle of the span. Figure 8.7 shows the typical process used to construct a balanced cantilever bridge.
Super-T or box girder (overpass/ viaduct)	Canal Road overpasses St Peters interchange connection overpasses Terminal 1 connection rail overpass Northern lands access rail overpass Terminal 2/3 access viaduct Freight terminal bridge	Precast concrete and/or steel beams would be lifted onto piers using cranes. Figure 8.8 shows the typical process used to construct an overpass/viaduct.
Steel tied arch	Terminal link bridge	The steel arch would be launched from one side of the canal using a launching gantry and counterweights to offset the load as the arch is pushed across Alexandra Canal. Once the arch is in place, other beams and deck slabs would be cast on temporary formwork and post-tensioned.

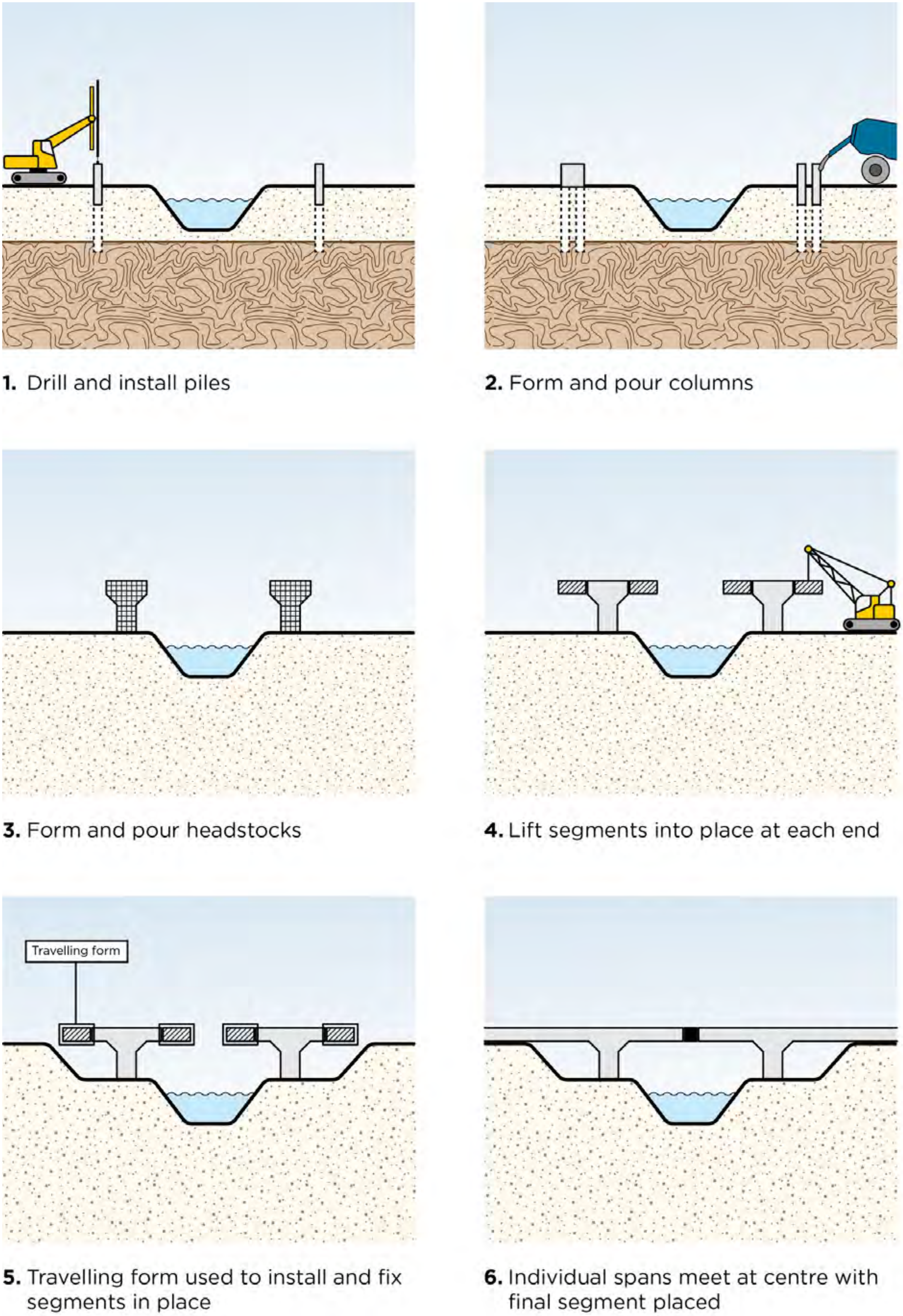


Figure 8.7 Typical construction process for a balanced cantilever concrete bridge

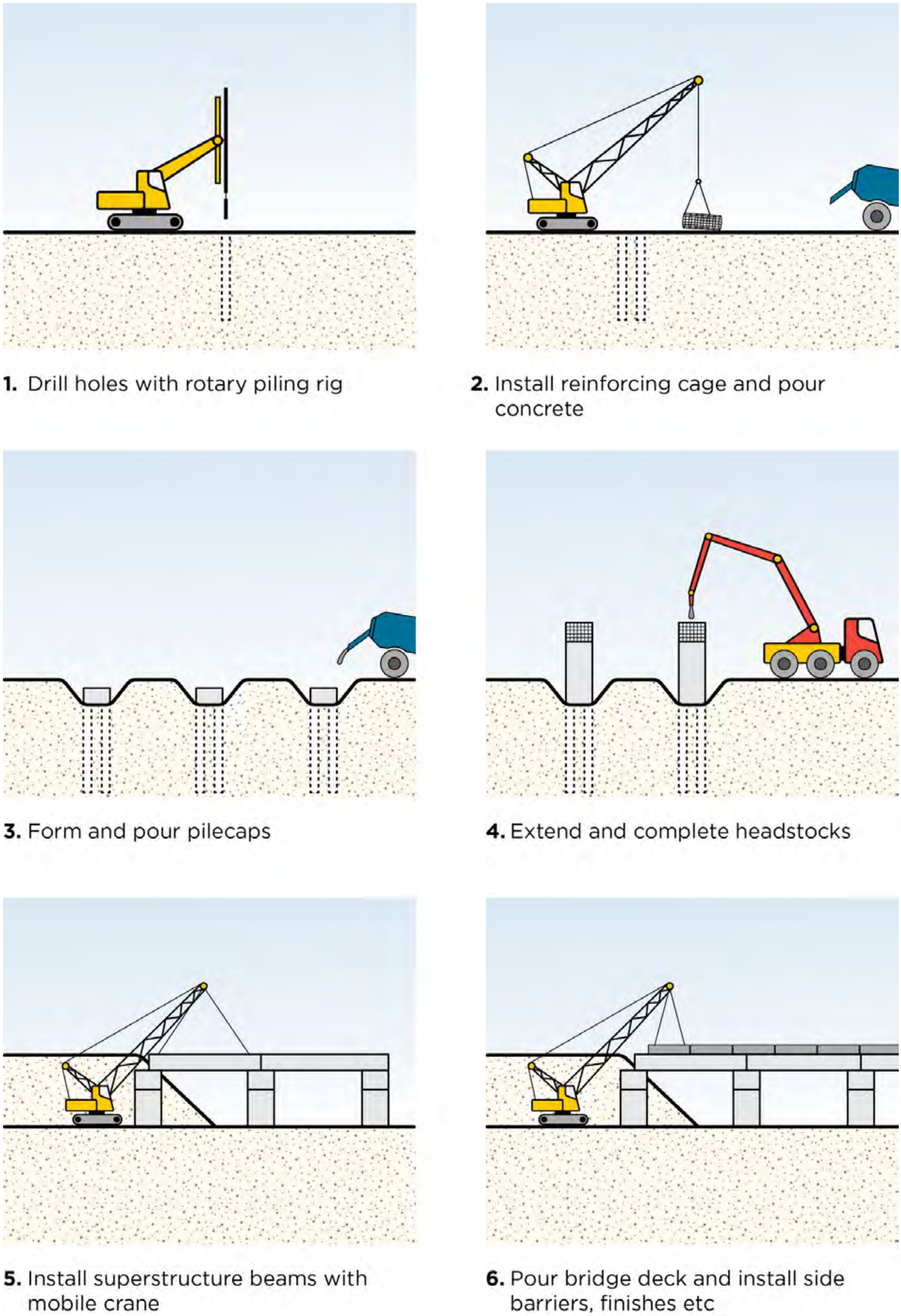


Figure 8.8 Typical construction process for a concrete overpass/viaduct

Working platform at the part of Sydney Airport's northern ponds located at Alexandra Canal

A temporary working platform would be constructed over that part of the northern ponds that is located adjacent to Alexandra Canal. The working platform would be used mainly to facilitate construction of the new section of Qantas Drive and the Qantas Drive and terminal link bridges. To minimise impacts on the function of the pond and wider flooding impacts, the platform would be constructed above the five per cent annual exceedance probability flood level and would not impact the capacity or operation of the pond. The temporary working platform would be removed at the completion of construction.

Retaining walls

The methodology for constructing retaining walls would generally involve:

- Excavating below the existing ground surface for foundations
- Installing drainage
- Installing steelwork/formwork and concrete pouring (for cast in situ walls)
- Installing precast segments and retaining straps for reinforced earth retaining walls
- Backfilling and compacting soil behind the retaining wall panels
- Installing capping or edge beams for the retaining wall panels.

Figure 8.9 shows the typical process used to construct a reinforced soil retaining wall.

Drainage

Constructing the proposed drainage infrastructure would generally involve:

- Removing and reconstructing/altering existing pits and pipes
- Installing new pits and pipes
- Connecting new drainage infrastructure to the existing drainage network
- Constructing new drainage outlets and scour protection at Alexandra Canal
- Constructing the flood detention basin for use during construction and operation.

New drainage outlets

Constructing the drainage outlets at Alexandra Canal would require installation of silt curtains around each outlet location. Where works are required below the water level in Alexandra Canal, works would generally involve:

- Establishing coffer dams, within the area protected by silt curtains, to provide a dry working environment and minimise mobilisation of disturbed sediments
- Constructing the new outlets and scour protection in the canal wall within the area protected by the coffer dams
- Removing the coffer dams once outlets are constructed.

As a result of the presence of contaminated sediments and the existing remediation order for Alexandra Canal, all works associated with the outlets would be undertaken in accordance with a management plan approved by Department of Planning, Industry and Environment in consultation with the NSW EPA and Sydney Water (the owner of the canal). Further information on potential contamination and water quality impacts during construction is provided in Chapters 13 (Contamination and soils) and 16 (Surface water).

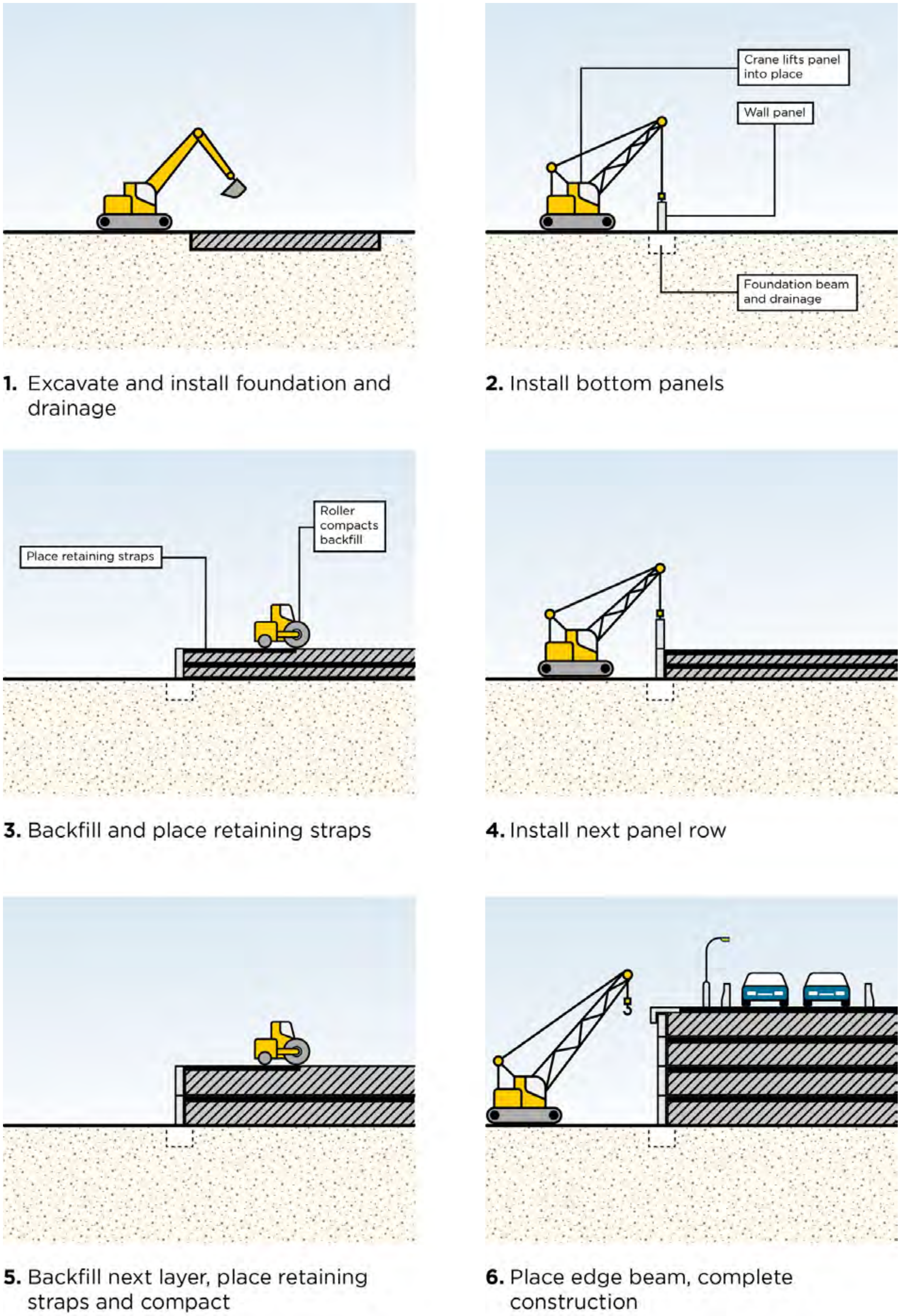


Figure 8.9 Typical construction process for a reinforced soil wall

8.2.4 Finishing and post-construction rehabilitation

Finishing works would be undertaken at the completion of construction and would generally include:

- Erecting directional and other signage, and roadside furniture such as street lighting
- Landscaping and revegetation
- Site demobilisation
- Removing site fencing and construction compounds
- Rehabilitating work and construction compound areas.

8.2.5 Key site-specific construction requirements

Specific construction approaches are required at a number of locations to manage the constraints associated with existing site conditions. These approaches are outlined below.

Sydney Airport's prescribed airspace

Sydney Airport's prescribed airspace, which is described in Chapter 2 (Location and setting), extends over much of the project site. Construction activities involving the use of tall plant and equipment (such as piling rigs used to construct piles and cranes used to lift bridge segments) would require temporary intrusions into the prescribed airspace. The location of activities with potential to intrude into the prescribed airspace are shown on Figure 8.10.

Works with the potential to intrude into the prescribed airspace would need to be undertaken during periods when aircraft are not operating. Generally, such works would be undertaken during Sydney Airport's curfew hours (ie between 11pm and 6am).

The approval requirements for works that may affect the prescribed airspace are described in section 3.2.2. Proposed working hours are outlined in section 8.3.3.

Botany Rail Line corridor

Constructing the Qantas Drive upgrade and extension (including the Qantas Drive bridge), the Terminal 1 connection rail overpass, and the northern lands access rail overpass would involve works within and over the corridor for the Botany Rail Line (the rail corridor). The Botany Rail Line and sidings associated with the Cooks River Intermodal Terminal and Boral Concrete St Peters are generally used 24 hours a day, seven days a week. The exceptions to this are during rail maintenance possession periods, which are generally scheduled on four weekends each year. Each possession period starts around 2am on Saturday and ends at 2am on Monday.

Any works that encroach into the rail corridor's 'danger zone' can only be undertaken during the scheduled possession periods (or between train movements under worksite protection as agreed by ARTC). The danger zone is defined as those areas within three metres of the nearest rail and includes the airspace above and the land below the corridor in this zone. Works that may enter the danger zone include:

- Site establishment activities such as erection of barrier fencing within the rail corridor
- Construction of bridge foundations and piers
- Moving large components (such as bridge/overpass girders) into place above the rail corridor
- Drainage and service and utility crossings of the rail corridor (eg lighting and low voltage electrical services).

The programming of works within the possession periods would be confirmed in conjunction with ARTC.

Further information on working hours and out-of-hours work is provided in section 8.3.3.

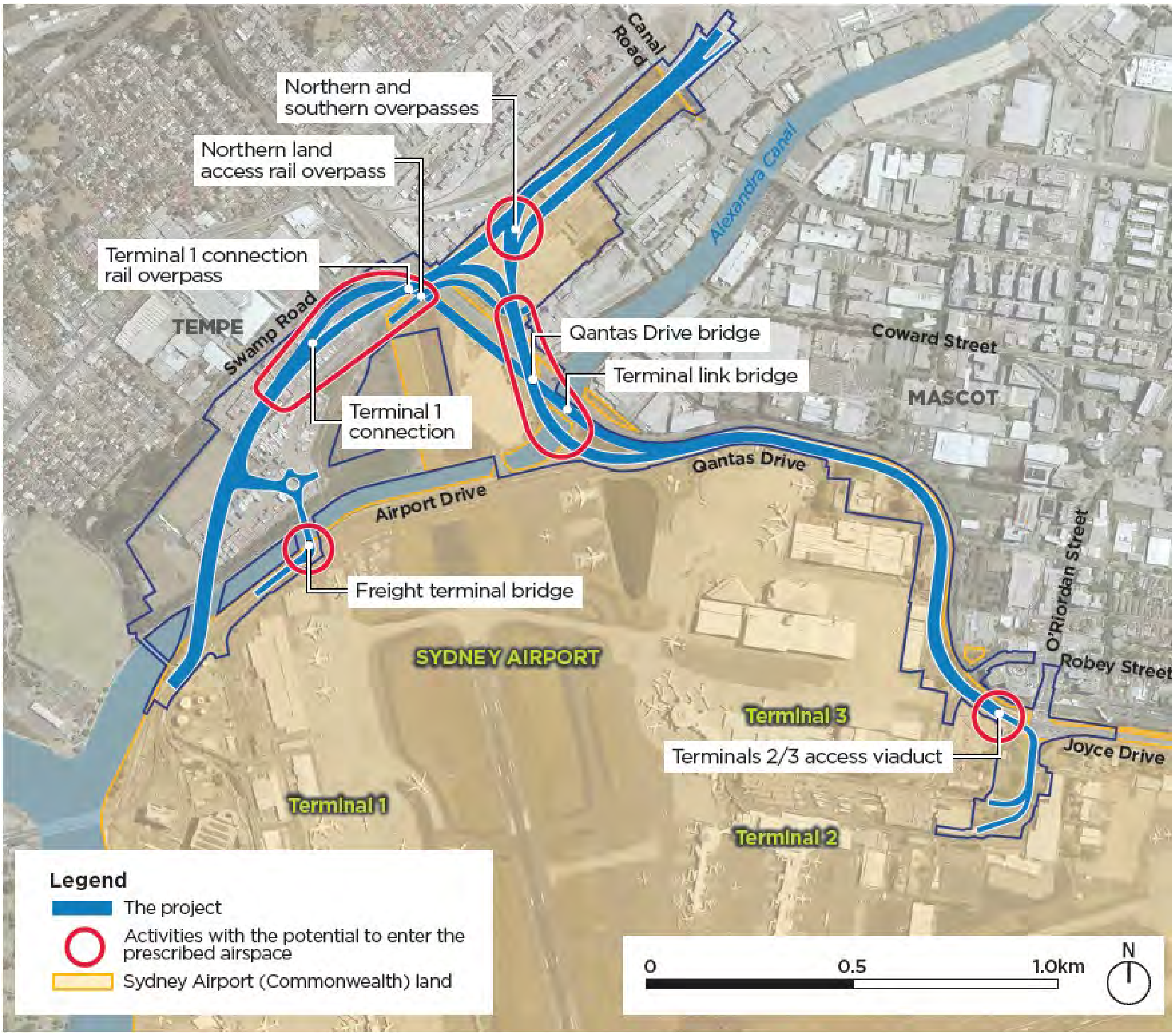


Figure 8.10 Location of intrusions into the prescribed airspace at Sydney Airport

T8 Airport and South Line tunnels

Constructing the Terminals 2/3 access would involve works over the T8 Airport and South Line tunnels, including piling works, which would be located within the protection zone for the tunnels. Consultation with Sydney Trains (as operator of the line) would be undertaken to seek details of specific requirements and any approvals required before works commence to ensure the rail tunnels are protected.

The former Tempe landfill

Although the project has been designed to minimise disturbance at the former Tempe landfill, construction would involve excavating some of the waste materials at the site. It is proposed to retain some of the excavated waste material on site where possible, encapsulated with new capping, in the form of an emplacement mound (see section 7.10.2). Some waste material would also need to be disposed off site.

The former Tempe landfill comprises various waste management infrastructure, which includes a leachate collection system, a bentonite cut-off wall around the perimeter of the site, and a gas venting system. The project would seek to avoid impacts on this infrastructure as far as possible. However, should this not be achievable, new infrastructure would be installed. Details of any changes necessary to these existing systems would be confirmed during detailed design.

The existing landfill capping layer, which forms a seal between the buried waste and the surrounding environment, would need to be removed within the construction footprint and replaced following construction. The location of compounds within the former Tempe landfill area would consider the potential for ingress of landfill gas and related work, health and safety issues (eg confined spaces).

Construction at the former Tempe landfill, and any changes to existing waste management infrastructure, would be undertaken in accordance with any requirements in the existing Environmental Management Plan for the site, the *Environmental Guidelines: Solid waste landfills* (NSW EPA, 2016a) and any license conditions that apply to the site. Further information is provided in Chapter 13 (Contamination and soils).

Transfer of excavated contaminated material across jurisdictional boundaries

During construction, excavated material would be temporarily stockpiled at its point of origin, wherever practicable. In the event material excavated from land subject to the EP&A Act (State jurisdiction) needs to be temporarily stockpiled on Sydney Airport land (Commonwealth jurisdiction), or vice versa, the following would occur:

- A conceptual site model would be developed in accordance with the National Environmental Protection (Assessment of Site Contamination) Measure and the *PFAS National Environment Management Plan* (HEPA, 2018) to assess potential soil characteristics prior to excavation. The conceptual site model would inform the sampling to be undertaken, and the assessment of potential risks that would determine if the excavated material is suitable for reuse
- Excavated material would be placed back into the excavation where the conceptual site model indicates that replacing the material would not exacerbate existing contamination and would not pose an ongoing risk to human or environmental receptors
- Excavated material would be disposed of off site at an appropriately licensed waste facility where the conceptual site model indicates reusing the excavated material would exacerbate existing contamination.

When excavated material from one jurisdiction (State or Commonwealth) needs to be stored temporarily in the other jurisdiction, the excavated material would be:

- Segregated from any other excavated material and appropriately identified
- Isolated from underlying soil and surface water runoff, and protected from erosion, to prevent cross-contamination of soil and water and prevent potential exposure to human or environmental receptors.

8.3 Construction program and timing

8.3.1 Program

It is anticipated that construction would start in mid-2020 and take about 3.5 years to complete. The indicative timing of the main work phases is shown on Figure 8.11.

Figure 8.11 Indicative construction program

8.3.2 Phased delivery

The project would be delivered in phases as shown on Figure 8.12. The phased delivery approach is proposed to:

- Maintain access to Sydney Airport, Port Botany and surrounding areas (particularly along Airport Drive)
- Facilitate construction in existing roadway areas where there is limited space.

Traffic would be diverted onto new sections of roadway at each phase, which would allow access and work to be undertaken in other areas while maintaining traffic flows.

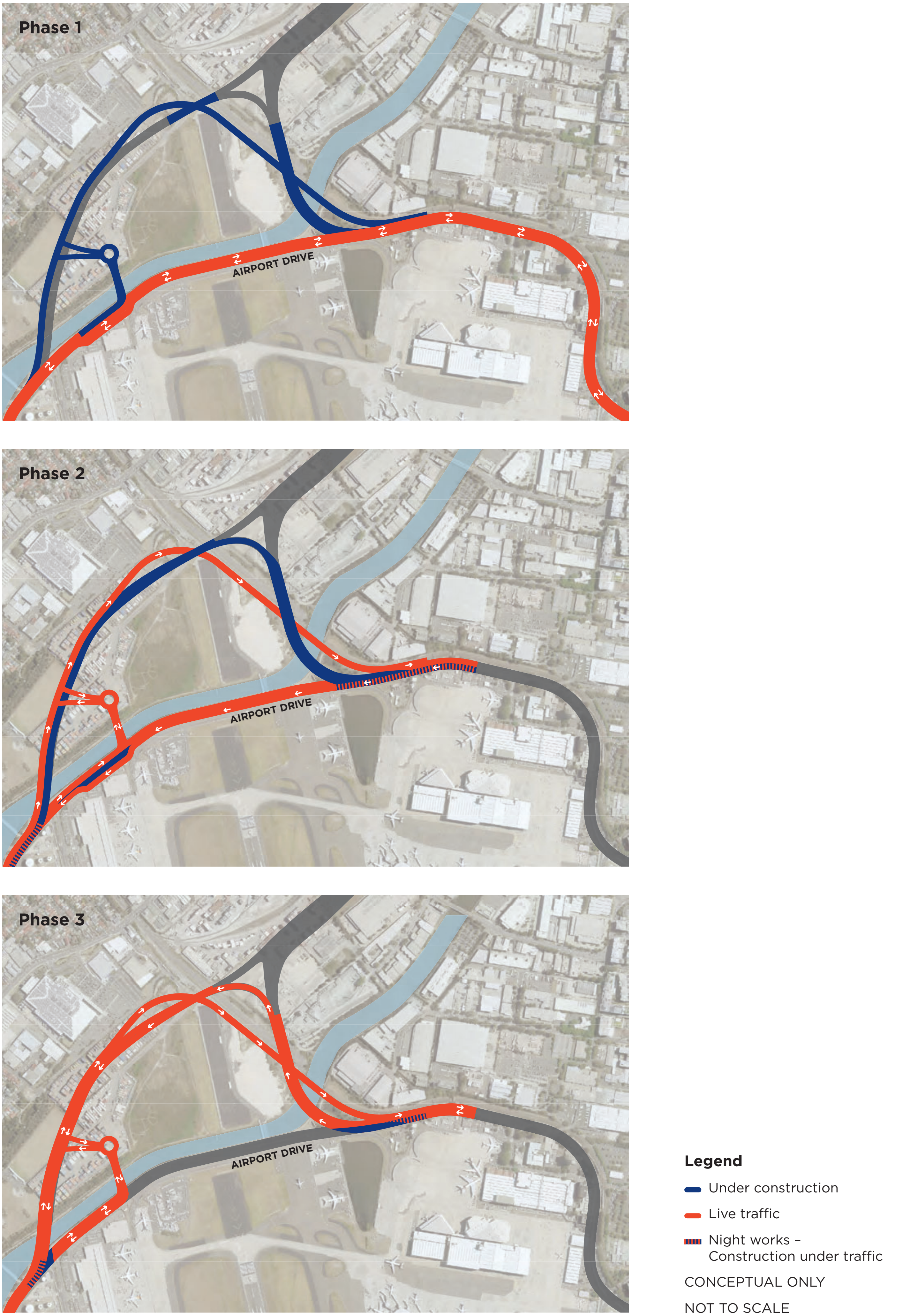


Figure 8.12 **Phased delivery of the project**

8.3.3 Working hours and out-of-hours work

The project would include work undertaken during recommended standard hours as defined by the *Interim Construction Noise Guideline* (DECC, 2009):

- Monday to Friday: 7am to 6pm
- Saturday: 8am to 1pm
- Sundays and public holidays: no work.

It would also include work outside these hours (out-of-hours work), described below.

Out-of-hours work

Out-of-hours work would be required at some locations to eliminate the potential for aviation and rail safety hazards. The following work would need to be undertaken out of hours:

- Works with the potential to intrude into Sydney Airport's prescribed airspace (such as the use of cranes and piling rigs in certain locations) would need to be undertaken during the Sydney Airport curfew (11pm to 6am)
- Works with the potential to affect the rail corridor danger zone would need to be undertaken during scheduled weekend maintenance possession periods (24 hours a day during these periods).

Out-of-hours work would also be required to maintain operation of the existing road network and minimise disruptions of access to Sydney Airport, including consideration of the extended peak periods that occur on roads in the vicinity of Sydney Airport.

Table 8.4 provides an indicative list of the proposed out-of-hours work and the justification for these works, including an estimate of the number of nights that out-of-hours works would be required. The locations where out-of-hours work are proposed are shown on Figure 8.13. Out-of-hours works would be timed, where possible, to occur in parallel with other such works to minimise the total number of nights that would be required. However, due to the nature of the works, some activities would not be able to be undertaken in parallel. The estimated number of nights may change as the detailed construction methodology is developed.

Out-of-hours work would need to be completed by 5am unless specific exemptions have been granted by Sydney Airport Corporation.

In addition, the following activities may also need to occur outside standard working hours:

- Activities authorised by an environment protection licence
- Emergency or directed activities, such as activities directed by a relevant authority and activities required to prevent loss of life or environmental damage
- Alteration of traffic management arrangements on active roads
- Utility works that require carriageway closures
- Delivery of oversized plant or structures in accordance with the requirements of police or other authorities.

The potential impact of out-of-hours work, and the measures that would be implemented to manage these impacts, are described in Chapter 10 (Noise and vibration).

Table 8.4 Indicative list of proposed out-of-hours works

Project feature/location	Works required	Reason for out-of-hours work			Estimated number of nights
		Sustain operation of road network	Aviation safety	Rail safety	
Qantas Drive upgrade and extension – along Qantas Drive	Drainage and pavement works	✓			60
Qantas Drive upgrade and extension – west of Lancastrian Road	Drainage and utility works	✓			80
Qantas Drive upgrade and extension – general	Traffic switches	✓			30
Qantas Drive upgrade and extension – Sir Reginald Ansett Drive	Drainage, utility and pavement works	✓			100
Qantas Drive upgrade and extension – works in Robey Street, O'Riordan Street and Joyce Drive	Drainage, utility and pavement works	✓			60
Qantas Drive bridge	Bridge works		✓		110
Qantas Drive upgrade and extension – work within the rail corridor	Drainage works			✓	10
Terminal link bridge	Bridge works		✓		60
St Peters interchange connection, Canal Road	Utility works	✓			30
St Peters interchange connection, Canal Road overpasses	Bridge works		✓		6
St Peters interchange connection, northern overpass	Bridge works		✓		4
Northern lands access rail overpass	Bridge works		✓	✓	145
Terminal 1 connection, Airport Drive	Drainage and pavement works	✓			30
Terminal 1 connection rail overpass	Bridge works		✓		145
Freight terminal access (eastern side of Alexandra Canal)	Temporary roadway construction	✓			30
	Road works (including retaining wall and drainage works)	✓			50
	Tie-in works	✓			30
Freight terminal access bridge	Bridge works		✓		6

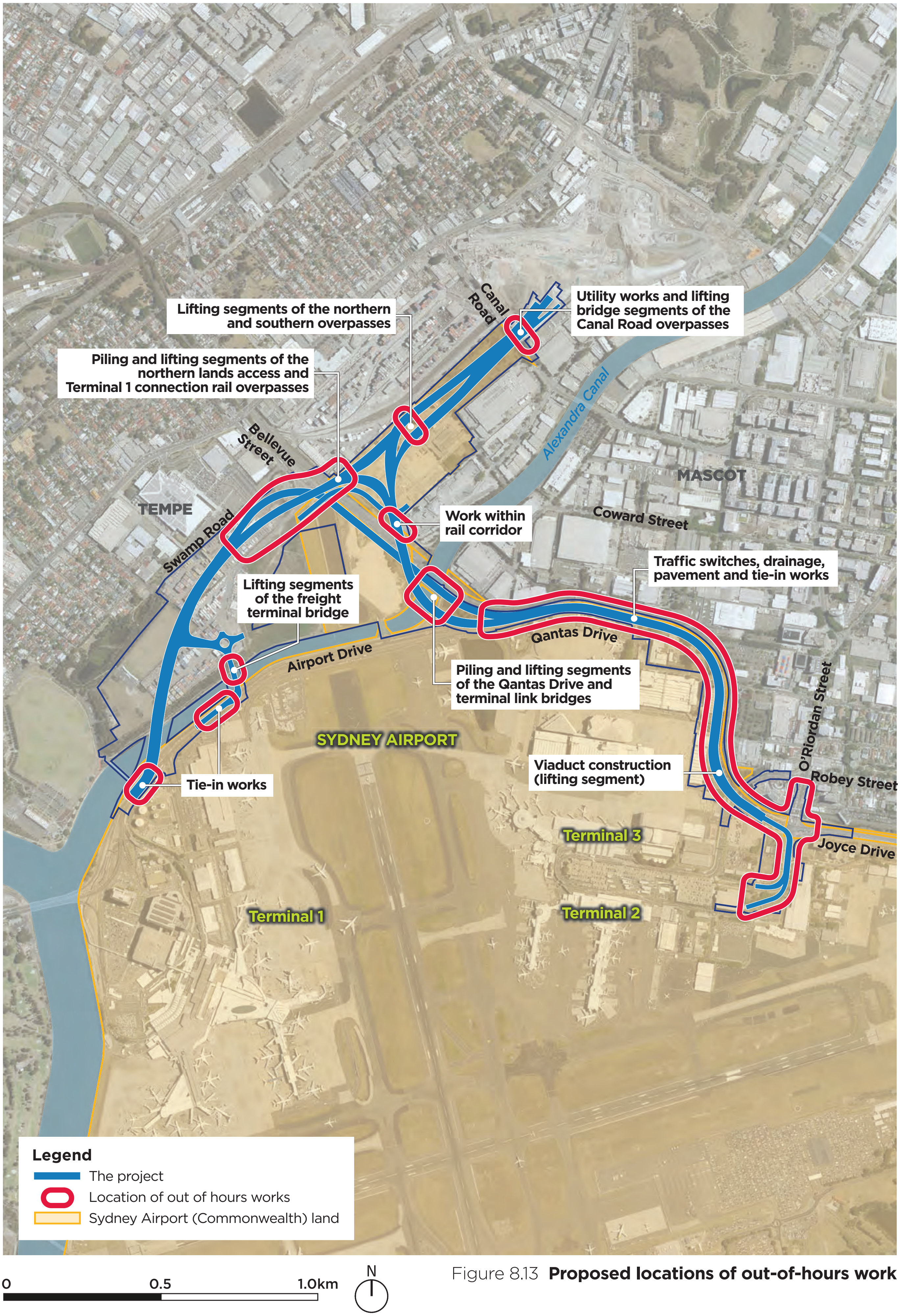


Figure 8.13 **Proposed locations of out-of-hours work**

8.3.4 Integration with construction of the Botany Rail Duplication project

The western extent of the proposed Botany Rail Duplication project is located in the vicinity of Qantas Drive, with the western end of the project site for the Botany Rail Duplication located to the west of the Lancastrian Road overbridge. This directly adjoins the eastern extent of the project site for the Sydney Gateway road project, with the eastern end of the project site located in Joyce Drive to the east of the intersection with Qantas Drive, O'Riordan Street and Sir Reginald Ansett Drive. The two projects would be constructed adjacent to one another over a distance of about 950 metres.

Based on the indicative programs for both projects, it is likely that construction activities would be undertaken concurrently over a period of about 36 months.

Works in the Qantas Drive area would be coordinated by Roads and Maritime, Transport for NSW, ARTC and the Airport Precinct Infrastructure Coordination Group (consisting of the Transport Management Centre, Sydney Coordination Office, Sydney Airport Corporation, emergency services, and any contractors working in the vicinity of the airport)). Coordination would be undertaken to minimise potential impacts on road network operations, access to Sydney Airport, through traffic (including traffic to Port Botany), and cumulative construction impacts on the operation of the road network.

8.4 Construction ancillary facilities

8.4.1 Temporary land requirements

In addition to the project's anticipated permanent land requirements (see section 7.11.2), the temporary use of land would be required to construct the project. It is estimated that around 33.6 hectares of land would be required temporarily. The temporary land requirements are anticipated to include:

- 16.8 hectares of Commonwealth-owned land
- 13.2 hectares of land owned by the NSW or local government (Inner West Council)
- 3.6 hectares of privately owned land.

These areas, which are listed in Table 8.5, would be required for construction compounds, to provide access to construction work areas, and to facilitate the manoeuvring of construction plant and machinery.

All areas required during construction would be subject to lease agreements to be developed following further consultation with landowners. Further information on the project's land requirements is provided in Chapter 19 (Land use and property).

Table 8.5 Anticipated temporary land requirements

Location	Property title	Ownership	Estimate of area (hectares) and proportion of lot required[1]
Private land			
25 Burrows Road, St Peters	Lot 1 DP 866946	Private	<0.1 ha (0.9%)
Swamp Road, Tempe	Lot 725 DP 48012	Private	0.8 ha (22%)
	Lot 2 DP 869306	Private	0.5 ha (65%)
	Lot 723 DP 48012	Private	2.3 ha (89%)
Robey Street, Mascot	Lot 201 DP 777213	Private	<0.1 ha (2%)
241 O'Riordan Street, Mascot	Lot 1 DP1039806	Private	<0.1 ha (0.6%)

Location	Property title	Ownership	Estimate of area (hectares) and proportion of lot required[1]
241a O'Riordan Street, Mascot	Lot 2 DPa1039806	Private	<0.1 ha (2%)
Private total			**3.6 hectares**
Commonwealth-owned land			
Sydney Airport, Mascot	Lot 8 DP 1050923	Commonwealth of Australia	5.8 ha (1%)
30 Canal Road, St Peters	Lot 3 DP 825649	Commonwealth of Australia	0.6 ha (55%)
	Lot 4 DP 555771	Commonwealth of Australia	0.3 ha (15%)
6-10 Burrows Road, St Peters	Lot 2 DP 802342	Commonwealth of Australia	3.9 ha (52%
Swamp Road, St Peters (car park)	Lot 12 DP 825949	Commonwealth of Australia	0.3 ha (49%)
	Lot 643 DP 727045	Commonwealth of Australia	0.9 ha (45%)
	Lot 2 DP 790186	Commonwealth of Australia	0.8 ha (59%)
	Lot 1 DP 826101	Commonwealth of Australia	3 ha (73%)
1008C Botany Road, St Peters	Lot 15 DP787029	Commonwealth of Australia	0.2 ha (2%)
Swamp Road, St Peters (HIAL)	Lot 724 DP 48012	Commonwealth of Australia	0.2 ha (34%)
	Lot 1 DP 869306	Commonwealth of Australia	0.2 ha (53%)
Swamp Road and Bellevue Street, St Peters	Lot 1 DP 186164	Commonwealth of Australia	0.2 ha (80%)
	Lot 2 DP 186164	Commonwealth of Australia	<0.1 ha (100%)
	Lot 1 DP 830952	Commonwealth of Australia	<0.1 ha (7%)
	Lot 2 DP 830952	Commonwealth of Australia	0.3 ha (44%)
Commonwealth-owned land total			**16.8 hectares**
Land owned by the NSW or local government			
1-3 Swamp Road, Tempe	Lot 202 DP 1097238	Local government	0.2 ha (17%)
2 and 5-15 Swamp Road, Tempe	Lot 303 DP 1136081	Local government	1.6 ha (33%)
	Lot 304 DP 1136081	Local government	2.4 ha (40%)
South Street, Tempe (open space)	Lot 25 DP 227132	Local government	2.6 ha (32%)
South Street, Tempe (golf driving range)	Lot 305 DP 1136081	Local government	1.9 ha (68%)
Holbeach Avenue, Tempe	Lot 400 DP 1233792	NSW Government	<0.1 ha (0.02%)
Alexandra Canal, Mascot/ St Peters/Tempe	Lot 13 DP 1050464	NSW Government	0.3 ha (1%)
5 and 5A Canal Road, St Peters	Lot A DP 391775	NSW Government	0.4 ha (7%)
	Lot 14 DP 606737	NSW Government	0.3 ha (6%)
	Lot X DP 421363	NSW Government	0.1 ha (10%)
9 Canal Road, St Peters	Lot 2 DP 1168612	NSW Government	0.6 ha (0.4%)
Various (rail corridor)	Lot 1 DP 1063121	NSW Government	<0.1 ha (12%)
	Lot 2 DP 1054373	NSW Government	0.7 ha (69%)
	Lot 1 DP 450245	NSW Government	0.2 ha (91%)
	Lot 2 DP 963240	NSW Government	0.2 ha (68%)

Location	Property title	Ownership	Estimate of area (hectares) and proportion of lot required[1]
	Lot 21 DP 1069118	NSW Government	<0.1 ha (8%)
	Lot 5 DP 1184446	NSW Government	<0.1 ha (66%)
	Lot 1 DP 621535	NSW Government	<0.1 ha (15%)
	Lot 11 DP 213317	NSW Government	<0.1 ha (0.4%)
	Lot 17 DP 217443	NSW Government	<0.1 ha (6.7%)
	Lot 95 DP 1157632	NSW Government	<0.1 ha (0.6%)
	Lot 6 DP 209847	NSW Government	<0.1 ha (71%)
	Lot 9 DP 747022	NSW Government	<0.1 ha (2%)
	Lot 55 DP 648871	NSW Government	0.1 ha (100%)
	Lot 57 DP 648871	NSW Government	<0.1 ha (2%)
Alexandra Canal, Mascot/St Peters/Tempe	Lot 11 DP 1050464	NSW Government[2]	<0.1 ha (39%)
	Lot 12 DP 1050464	NSW Government[2]	<0.1 ha (69%)
	Lot 13 DP 1050464	NSW Government	1 ha (8%)
Other publicly-owned land total			**13.2 hectares[3]**

Notes: 1. The estimate of land required is based on a concept design that is subject to refinement during detailed design, and the final area required may vary from that shown

2. The Commonwealth of Australia has aerial title above some of the lots identified

3. Total has been calculated based on actual impacts on lots less than 0.1 hectares, the total therefore made not add due to rounding

8.4.2 Construction compounds

Overview

Five construction compounds are proposed to support construction works in surrounding work areas. All compounds would include the following facilities:

- Site offices
- Staff and workforce amenities
- Stores and laydown areas
- Workshops and maintenance facilities
- Workforce parking.

The proposed locations of the compounds are shown on Figure 8.1 to Figure 8.6. All compounds would be located on Sydney Airport land with the exception of compound C3. Further information on each compound, including indicative layouts, is provided below.

St Peters interchange connection compound (C1)

The St Peters interchange connection compound (C1) would support construction within the St Peters interchange connection work area. It would be located within Sydney Airport land north of the rail corridor at the western end of Burrows Road South, and would have an area of about 35,000 square metres. In addition to the facilities outlined above, the compound may also contain a crushing and grinding facility to process materials sourced from both with and outside the project site to ensure they are suitable for potential use. An indicative site layout is shown on Figure 8.14.

Access to the compound would be provided via A1 at Canal Road and A3 at Burrows Road South. Access from Canal Road would be limited to left in/left out movements with vehicles required to access the compound via an access road located within the work area. Vehicles leaving the compound would exit via A1 (to Canal Road and the Princes Highway) or A3 to Canal Road towards either the Princes Highway or Gardeners Road.

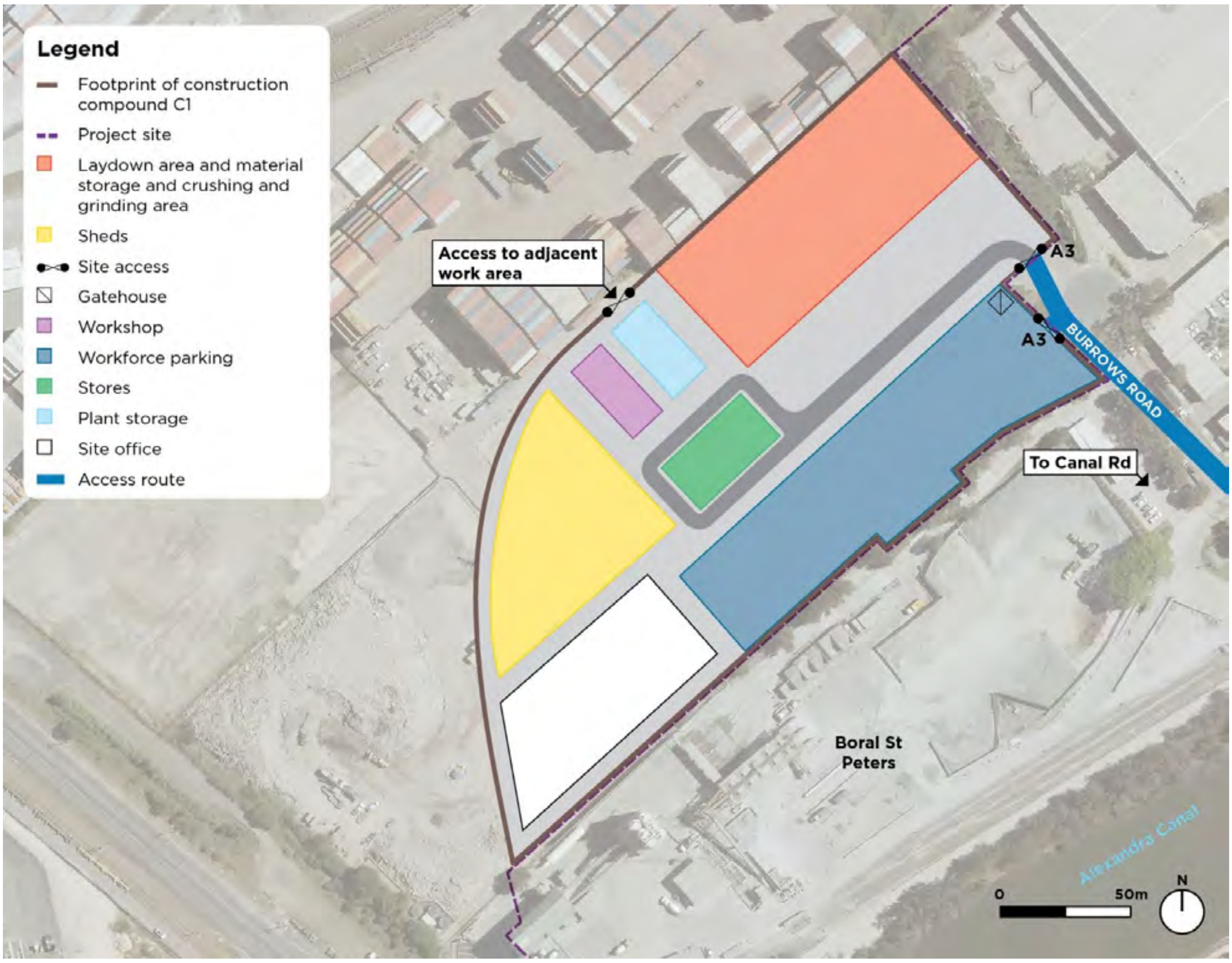


Figure 8.14 Indicative layout of the St Peters interchange connection compound (C1)

Eastern bridges compound (C2)

The eastern bridges compound (C2) would support construction within the eastern bridges work area. It would be located within Sydney Airport land between the road to the east of the Sydney Airport employee car park and the rail corridor, and would have an area of about 39,000 square metres. An indicative site layout is shown on Figure 8.15.

Access to the compound would be generally via the Nigel Love bridge from Airport Drive and would share use of the Northern Precinct Road with traffic utilising the employee car park. Access would be available from both the eastbound and westbound directions along Airport Drive via existing turning facilities.

Temporary access for vehicles would also be available from Bellevue Street (at access point A7) until the commencement of phase 2 as outlined in section 8.3.2. A temporary access route would be provided from A7 to the compound via the work area, as shown on Figure 8.3 and Figure 8.15.

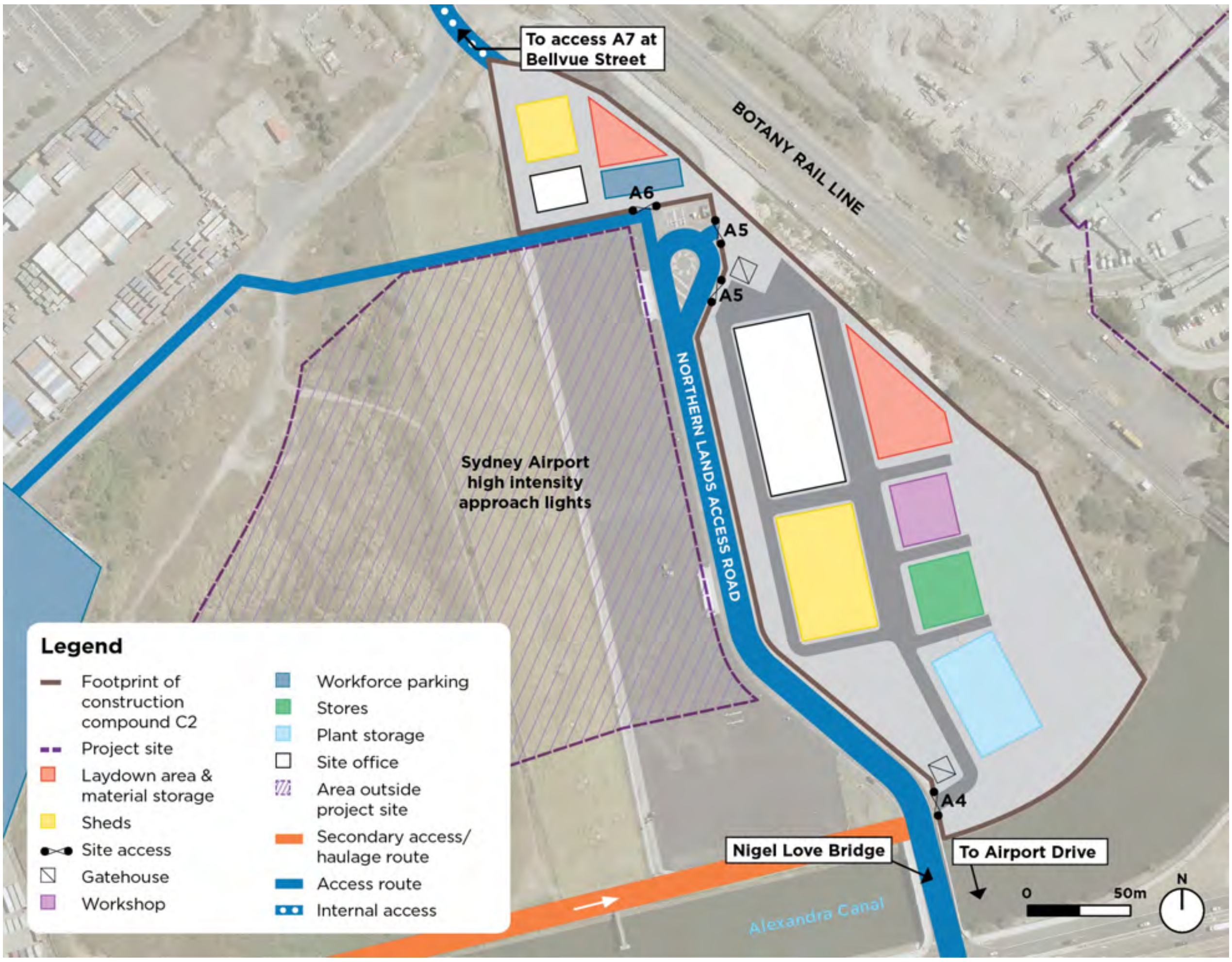


Figure 8.15 Indicative layout of the eastern bridges compound (C2)

Western bridges compound (C3)

The western bridges compound (C3) would support construction within the Terminal 1 connection and western bridges work area. It would be located within the Tempe Lands north of Alexandra Canal. The compound would have an area of about 17,000 square metres. An indicative site layout is shown on Figure 8.16.

Access to the compound would primarily be through the Terminal 1 connection work area via an internal access road from access point A7 located on Bellevue Street (show on Figure 8.3). Access via access A7 would be the primary access for both heavy and light vehicles. Light vehicle access would also be available via access point (A8) from the local road network (as shown in Figure 8.16).

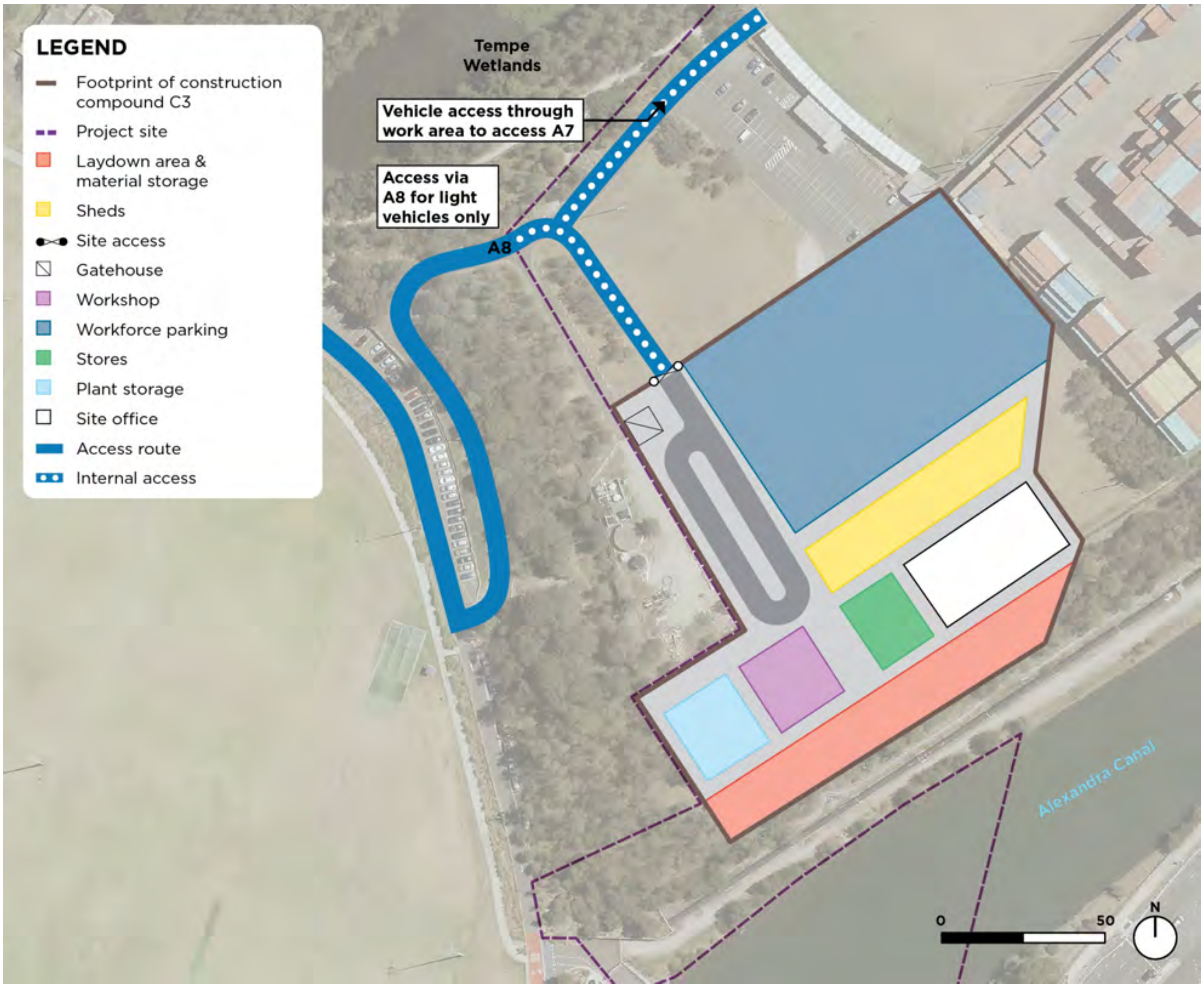


Figure 8.16 Indicative layout of the western bridges compound (C3)

Qantas Drive compound (C4)

The Qantas Drive compound (C4) would support construction activities for the Qantas Drive upgrade and extension and the Terminals 2/3 access. It would be located within Sydney Airport land west of Qantas Drive within land currently occupied by part of the Sydney Airport Jet Base. The buildings that are currently in this location would be removed as part of the project. The compound would have an area of about 5,000 square metres. An indicative site layout is shown on Figure 8.17.

Access to the compound would be via access point (A9) off Qantas Drive. All vehicles accessing this compound would be required to approach the compound from the east via the westbound carriageway of Qantas Drive. All vehicles leaving the compound would need to turn left onto Qantas Drive.

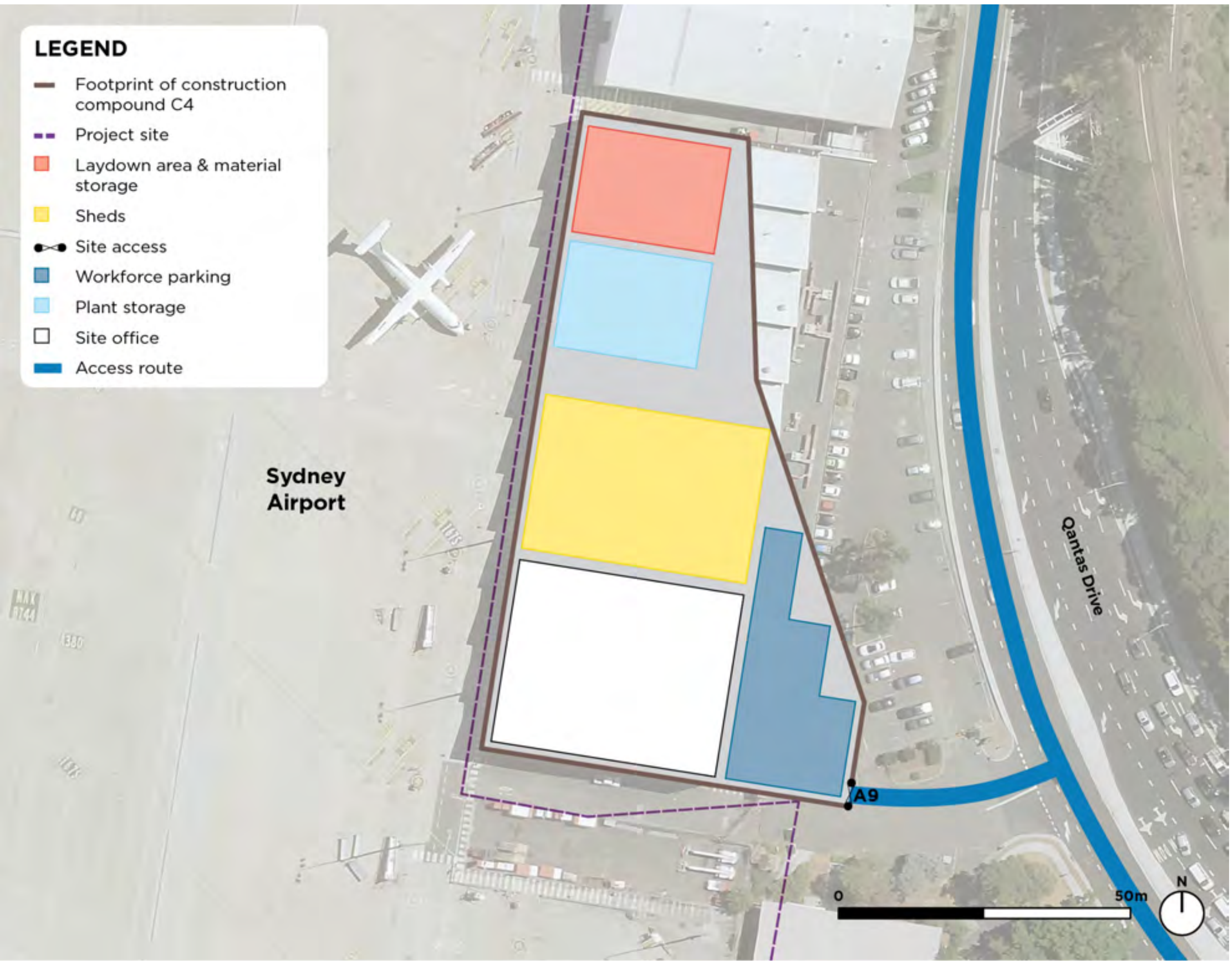


Figure 8.17 Indicative layout of the Qantas Drive compound (C4)

Ninth Street compound (C5)

The Ninth Street compound (C5) would mainly support construction within the Terminals 2/3 access work area. It would also provide support for works along Qantas Drive. The compound would be located within Sydney Airport land between Sir Reginald Ansett Drive and Ninth Street in an existing car park area. It would have an area of about 2,500 square metres. An indicative site layout is shown on Figure 8.18.

Access to the compound would be via an access point (A10) on Ninth Street. Access to and from this compound via Ninth Street at Qantas Drive would be left-in and left-out movements (as shown on Figure 8.19).

Figure 8.18 Indicative layout of the Ninth Street compound (C5)

Other support facilities and additional construction compounds

In addition to the proposed compounds, other construction support facilities would also be required, including laydown areas, worker parking (as required), mobile site sheds/offices, toilets and storage facilities.

Although every endeavour has been made to identify the land areas likely to be required for construction, the construction contractor(s) may require additional compounds and/or support facilities. Alternative or additional sites (if required outside the construction footprint) may be added, and would be subject to further assessment and approval.

The following criteria would be considered for any additional compounds:

- Ready access to the road network – located to minimise the need for heavy vehicles to travel on local streets and/or through residential areas
- Located on relatively level land
- Separated from the nearest residences by at least 200 metres, unless feasible and reasonable noise and light spill mitigation measures are implemented
- Not requiring native vegetation clearing beyond that already required
- Minimise impacts (eg noise and dust) on any adjacent properties, in particular residential dwellings
- Above the 20 year average recurrence interval flood level, unless a contingency plan to manage flooding is prepared and implemented
- Sufficient space to store construction materials to minimise the number of deliveries required
- Avoid impacts on the operation of Sydney Airport.

8.5 Construction workforce and resources

8.5.1 Estimated workforce

The construction workforce requirements would vary over the construction period in response to the activities underway and the number of active work areas. The workforce is expected to peak at about 1,090 workers for a period of about 13 months, indicatively from the fourth quarter of 2021. Either side of this peak, workforce numbers are expected to reduce by about a third. A smaller start-up/close-out workforce (fewer than 400 workers) would be on site for the initial and final months of the program. Final construction workforce requirements would be confirmed by the construction contractor(s).

8.5.2 Plant and equipment

A variety of plant and equipment, typical of road construction projects, would be used during construction. This would include a range of large machinery, such as trucks, cranes, piling rigs, concrete trucks and pumps, excavators, compactors, sprayers, and sweepers. Smaller plant and equipment would include generators, welding equipment, jackhammers and personal tools. A full list of plant and equipment is provided in Technical Working Paper 2 (Noise and Vibration).

8.5.3 Materials and resources

A variety of materials would be required to construct the project. The main materials and indicative quantities required are listed in Table 8.6.

Table 8.6 Indicative material requirements

Material	Quantity required	Indicative source
Concrete	121,000 cubic metres	Local suppliers (Sydney)
Precast concrete (bridge components)	16,000 tonnes	NSW suppliers
Precast concrete (roadway components)	19,000 square metres	NSW suppliers
Structural steel	17,000 tonnes	Manufactured within Australia
Reinforcing steel	15,000 tonnes	Manufactured within Australia
Asphalt	91,000 tonnes	Local suppliers (Sydney)
Road base	32,000 cubic metres	Local suppliers (Sydney)

Material	Quantity required	Indicative source
Water	87,000 kilolitres	Recycled construction water and mains water
Petrol	38 kilolitres	Local suppliers (Sydney)
Diesel	35,000 kilolitres	Local suppliers (Sydney)

8.6 Transport and access

An outline of the proposed transport and access arrangements during construction is provided below. The potential impacts on traffic, transport and access during construction, and the measures and traffic management arrangements that would be implemented as part of the CEMP, to manage these impacts, are described in Chapter 9 (Transport, traffic and access).

8.6.1 Haulage routes

Route identification and scheduling of movements

Preliminary routes for the movement of construction vehicles, including heavy vehicles, have been proposed and are shown on Figure 8.19. Construction would result in additional movements of the following vehicle categories on the road network:

- Heavy vehicles associated with the transport (import or export) of excess soil, fill or waste materials
- Heavy vehicle deliveries of construction plant, supplies and infrastructure components
- Light vehicle movements, typically associated with workers and general construction activities.

Haulage routes have been proposed to allow these vehicles to access and egress the arterial road network in a safe and efficient manner and, wherever possible, to avoid or minimise impacts on local roads and residential areas. The access arrangements for each work compound (see Figure 8.14 to Figure 8.18) have been developed to minimise the number of heavy vehicles travelling through Mascot and other residential areas. The majority of the proposed routes are restricted access vehicle routes, which are suitable for the movement of heavy vehicles (including B-doubles). The proposed haulage routes would be subject to confirmation by the construction contractor(s).

Construction vehicle movements would be scheduled to occur outside peak periods as far as practicable. Scheduling would take into account the peak period associated with both the operation of Sydney Airport and the road network peak, with these peaks generally be as follows:

- Morning – between 5am and 10am along Airport Drive, Qantas Drive and Sir Reginald Ansett Drive
- Afternoon – between 3pm and 10pm along Airport Drive and Qantas Drive, and between 3pm and 11pm along Sir Reginald Ansett Drive.

Work force shifts would be scheduled to avoid workers arriving and departing along these roads during these peak periods as far as practicable. Details of the planning of workers accessing the compounds and work sites would be outlined in the worker transport strategy to be developed by the construction contractor(s). Over-sized loads and activities immediately adjacent to arterial roads where would be delivered/undertaken outside peak traffic periods.

The movement of workers to and around the project site would be defined by a worker transport strategy to be prepared by the contractor(s). One of the objectives of the strategy would be to minimise movements during peak traffic periods. The transport of over-sized loads and works immediately adjacent to arterial roads would need to be delivered/undertaken outside peak traffic periods.

Changes to access points during construction

The proposed site access points are shown on Figure 8.19.

Figure 8.19 **Preliminary site accesses and haulage routes**

West of Alexandra Canal, access to work areas would be via the indicated access points, while east of Alexandra Canal, the project would be built within the existing road corridor and access would be directly from the adjacent roadways. Where possible, designated access points to work areas along Qantas Drive, Airport Drive and Sir Reginald Ansett Drive would be established.

The proposed access points and haulage routes would be used for the majority of the construction period; however, the phased delivery of the project (see section 8.3.2) would necessitate some changes.

Following the closure of the Bellevue Street access point (A7), construction vehicles would be required to access the site from the west (ie via Marsh Street/Airport Drive and the new Terminal 1 connection bridge) and use the proposed freight terminal bridge to access land on the western side of Alexandra Canal. At the same time, the secondary access proposed via Tempe Recreation Reserve would not be available anymore, and light vehicles would be required to use the Nigel Love bridge to access the area.

Management and co-ordination

Works in the Tempe and St Peters areas would be co-ordinated with the Sydney Co-ordination Office and Transport Management Centre, and with relevant councils.

For road works on Sydney Airport land, co-ordination would be led by the Airport Precinct Infrastructure Co-ordination Group comprising representatives from Transport for NSW, Sydney Airport and the Transport Management Centre. All road works would be conducted in accordance with road occupancy licenses, granted by the Sydney Co-ordination Office.

8.6.2 Construction traffic volumes

General construction movements

Construction traffic would include heavy and light vehicles associated with material and equipment deliveries, and the arrival and departure of the construction workforce. Table 8.7 provides estimated vehicle volumes for each work area during the morning and afternoon peaks, excluding earthworks movements. Vehicle movements would be via the haulage routes described in section 8.6.1.

Table 8.7 Indicative construction traffic volumes

Work area	Access points	Morning peak vehicle volumes (vehicles per hour)		Afternoon peak vehicle volumes (vehicles per hour)	
		Light	Heavy	Light	Heavy
St Peters interchange connection, including compound C1	A1	0	20	330	20
	A2	10	10	10	10
	A3	330	20	0	20
Eastern bridges, including compound C2	A4, A5, A6 and A7	330	20	330	20
Terminal 1 connection and western bridges, including compound C3	A7	10	20	10	20
	A8	100	0	100	0
Qantas Drive, including compound C4	A9 for access to compound	50	20	50	20

Work area	Access points	Morning peak vehicle volumes (vehicles per hour)		Afternoon peak vehicle volumes (vehicles per hour)	
		Light	Heavy	Light	Heavy
Terminals 2/3 access, including compound C5	A10	100	20	100	20
Airport Drive	A11	10	10	10	10
	A12	10	10	10	10
Qantas Drive	A13	30	20	30	15

Earthworks movements

The project would also include truck movements to transport fill and unsuitable material to and from the project site. Such movements would generally only be required for specific periods during construction. Table 8.8 provides the estimated vehicle volumes associated with earthworks movements. These movements would be in addition to those outlined in Table 8.7. Vehicle movements would be via the haulage routes described in section 8.6.1.

Table 8.8 Indicative earthworks traffic volumes

Work area	Access points	Direction of movement	Total movements
St Peters interchange connection, including compound C1	A1 or A3	Inbound	27,600
Terminal 1 and western bridges, including compound C3	A7	Inbound	9,800
		Outbound	6,900
Terminals 2/3 access, including compound C5	Off Sir Reginald Ansett Drive or A10	Inbound	1,700
		Outbound	300

8.6.3 Construction workforce parking

Parking for the construction workforce would be provided within the construction footprint. Table 8.9 lists the indicative amount of parking that would be provided at each construction compound, based on the estimated workforce. As indicated by the table, there would be an estimated shortfall in parking of 110 spaces in the worst case.

The location of proposed workforce parking is shown on Figure 8.14 to Figure 8.18. Shuttle buses would also be used to transfer workers between areas where required. The provision of parking would be reviewed by the construction contractor(s) prior to work commencing.

In addition, a worker parking strategy would be developed to include measures to encourage staff to use alternative transport arrangements, including public transport.

Potential traffic and access impacts and measures to manage and minimise these impacts are considered in Chapter 9 (Transport, traffic and access).

Table 8.9 Indicative workforce parking provision

Compound	Indicative workforce parking numbers
St Peters interchange connection (C1)	250
Eastern bridges (C2)	330
Western bridges (C3)	250
Qantas Drive (C4)	50
Terminals 2/3 access (C5)	100
Total	**980**

8.6.4 Temporary active transport link

To minimise potential safety impacts during construction, and as a result of the proposed closure of Airport Drive, the existing cycle route along Airport Drive would be closed.

A temporary active transport link would be provided on the western side of Alexandra Canal to maintain connectivity for pedestrians and cyclists while the permanent link is being constructed. Proposed routes for the temporary active transport link are shown on Figure 8.20. Only one of the routes shown would be used at any one time. The route used would vary according to the stage of construction.

The temporary active transport link would cross Alexandra Canal via the existing pedestrian and cycle bridge located west of Link Road. The link would then follow or be located adjacent to the existing access road along the eastern edge of Tempe Recreation Reserve and along the southern edge of the Tempe Wetlands. The temporary active transport link would turn south-east and cross the work area for the Terminal 1 connection, the Sydney Airport high intensity approach lights and the Sydney Airport employee car park, before crossing Alexandra Canal at the Nigel Love bridge and rejoining the existing cycleway.

User safety along the link would be maintained by using box culverts. The link would pass through these culverts where works above the link are required.

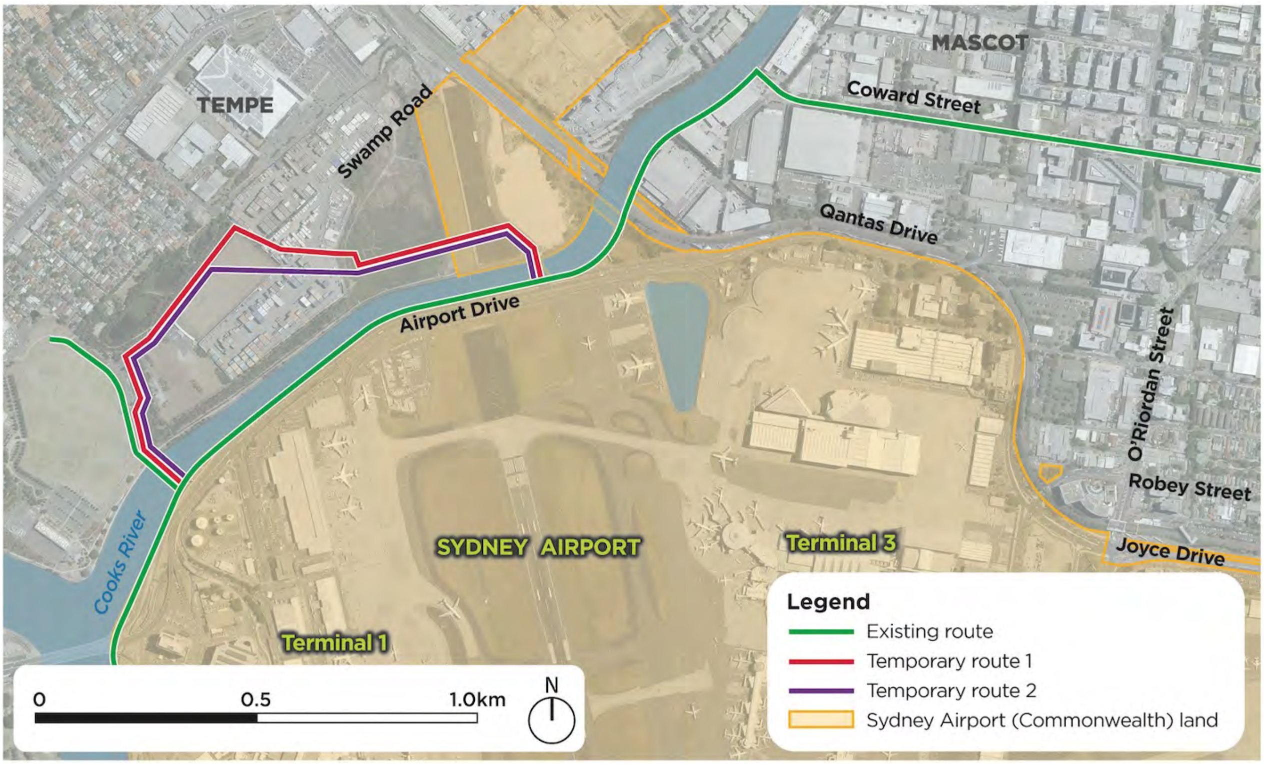


Figure 8.20 Temporary active transport link

8.6.5 Changes to transport networks during construction

The following sections outline indicative changes to pedestrian/cyclist, road and public transport networks in the vicinity of the project site during construction. These changes, and any others identified, would be addressed in the Construction Traffic and Access Management Plan (see Chapter 9 (Traffic, transport and access). The need for any additional assessment would be identified at this time.

Pedestrian/cycle traffic

The majority of the project site is located away from existing pedestrian and cycle facilities and therefore limited impact on existing facilities is expected. Table 8.10 outlines the indicative changes to pedestrian and cyclist networks in the vicinity of the project site during construction. All pedestrian and cyclist facilities and adjustments would be conducted in accordance with relevant accessibility requirements and legislation, including the *Disability Discrimination Act 1992*.

Table 8.10 Indicative changes to pedestrian and cyclist networks

Location	Changes
Canal Road	Short-term closures to footpaths on both sides of the road to facilitate construction. Closures would only occur on one side of the road at a time, with pedestrians redirected to the other side during each closure.
Alexandra Canal cycleway	Permanent closure of the existing cycleway on the eastern side of Alexandra Canal, between the existing pedestrian bridge and the Nigel Love bridge. During construction, a temporary alternate route would be used, as described in section 8.6.4.
	Temporary short-term closures of the shared path/cycleway east of Nigel Love bridge during some construction activities (such as major crane lifts for the Qantas Drive and terminal link bridges).
Qantas Drive	Permanent removal of the pedestrian crossing at Lancastrian Road.
	Permanent removal of the concrete path (informal footpath) located on the northern side of Qantas Drive between Robey Street and west of Lancastrian Road.
	Temporary removal of the pedestrian footpath located on the northern side of Qantas Drive, between Robey and O'Riordan streets, to facilitate construction of the Terminals 2/3 access viaduct.
Robey Street	Adjustment of the pedestrian footpath on the northern side of Robey Street (extending north from Qantas Drive) to facilitate revised kerb alignment.
Link Road	Removal of the pedestrian crossing at Link Road, with access to the freight facilities provided by existing paths located within the Terminal 1 area.

Road traffic

Some changes to the surrounding road network and public transport facilities would be required during construction to facilitate access to compounds, to occupy lanes during some works, or as a result of construction works generally. The proposed adjustments to the road network and public transport facilities are outlined in Table 8.11. These and other closures would be confirmed during detailed construction planning with the potential for additional closures identified.

In addition to the changes in Table 8.11, traffic management measures would be implemented to manage traffic through or adjacent to work areas to ensure that the functionally of roads is not affected and access is maintained.

Table 8.11 Changes to roads and public transport facilities

Location	Changes
Canal Road	Short-term lane closures to establish new left-in, left-out access and egress lanes, and new entry points on both sides of the road. Lane closures would only occur on one side of the road at a time.
	Temporary road closures to allow the new overpass structures to be lifted into place.
Airport Drive	Carriageway modifications to retain two lanes during construction, extending from Lancastrian Road to west of Link Road.
	Short-term lane closures to tie in the new sections of roadway to the existing roadway.
	Nightly closures of a single lane in each direction to facilitate establishment of work sites for bridges and installation of utilities and drainage.
Qantas Drive	Nightly closures of a single lane of traffic in each direction to facilitate widening of Qantas Drive and the installation of utilities and drainage.
	Closure of lanes at the Lancastrian Road intersection to facilitate modifications along the widened Qantas Drive, including removal of existing traffic signals.
	Removal of bus stops either side of the Lancastrian Road entry to the Jet Base.

The night time closures outlined in Table 8.11 would require traffic diversions onto adjacent carriageways at different stages of construction. This would be undertaken to maintain capacity along Qantas Drive and Airport Drive while providing space for construction. A summary of the proposed traffic changes along Qantas Drive is provided in Table 8.12.

Table 8.12 Indicative traffic changes along Qantas Drive

Location	Overview of traffic staging
Qantas Drive west of Seventh Street	During the early stages of construction, traffic along Qantas Drive would remain on its existing alignment while additional new westbound lanes are constructed on the western side of Qantas Dive to the south of King Street. Once the additional new westbound lanes are completed, westbound traffic would be moved to this new alignment, to provide space to construct the Terminals 2/3 viaduct approach ramp between the two carriageways. Once the existing Flight Training Centre is vacated, the remainder of the westbound carriageway would be constructed. Once this is complete, all westbound travel would be moved to the new sections of roadway.
Qantas Drive between Robey and O'Riordan streets	Similar to the above, new eastbound lanes would be constructed to enable eastbound traffic to be moved to a temporary alignment to facilitate construction of the viaduct between the two carriageways. Following construction of the viaduct, the eastbound lanes would be relocated to their final alignment.

8.7 Utility works

Utilities infrastructure, such as water supply, stormwater drainage, wastewater, electricity, gas, fuel and telecommunications, are located within the project site. These utilities may need to be protected, adjusted or augmented based on the final design and in accordance with the requirements of the relevant asset owner.

Broadly, there are three areas with a high density of utilities where works would be required (shown on Figure 8.21):

- Airport Drive/Qantas Drive
- Sir Reginald Ansett Drive and Shiers Avenue
- Sydney Airport internal services.

Figure 8.21 **Key utility work areas**

Table 8.13 provides an overview of key utilities identified to date, and the proposed treatment of these utilities during construction. The majority of these utilities are located underground; however, some have above ground components. Consultation with utility providers has been carried out and is ongoing. The nature and extent of utility changes would be confirmed during detailed design in consultation with the utility providers. This might identify the need to carry out utility works outside the construction footprint.

Table 8.13 Indicative key utility treatment during construction

Utility	Location	Proposed treatment
Jemena primary gas main	Airport Drive and Qantas Drive	Relocation
Jemena primary gas main	Robey Street	Protection
Jemena secondary gas main	Qantas Drive	Relocation
Qenos ethylene pipeline	Qantas Drive	Possible relocation
Ausgrid 33kV cables	Qantas Drive, Airport Drive	Protection and relocation
Ausgrid 11kV cables	Rail corridor, Canal Road and Airport Drive	Relocation
Ausgrid low voltage cables	Canal Road	Relocation
Telstra and other communications carrier cables	Qantas Drive, Airport Drive & Canal Road	Relocation
Sydney Airport fuel lines (Caltex and Viva Energy)	Airport Drive	Retained and protected, relocate cathodic protection point
Sydney Airport water supply pipeline	Airport Drive west of Link Road	Protection and relocation
Sydney Airport internal communications, gas, water and power, sewer	T2/T3 Terminal and Jet Base precinct, Airport Drive, Link Road	Protection and relocation
Sydney desalination pipeline	Western side of Alexandra Canal	Retained and protected, relocate air valve
Sydney Water sewer and potable water	Qantas Drive and Swamp Road	Relocation

The general methodology for relocating and protecting utilities is as follows:

- Excavate to expose the utility (for protection works or new trench for relocation works)
- Install appropriate bedding material and pipeline/conduit/utility (for relocation works)
- Undertake remedial works on existing utilities if required (for protection works)
- Excavate and install pits at cutover locations, including any new infrastructure (for relocation works)
- Backfill and compact trenches and pits
- Install protection slab or other infrastructure (for protection works)
- Undertake testing and commissioning.

Before works begin, utility owners would be consulted to confirm the location of their assets and the appropriate management and treatment strategy. Investigations such as electronic tracing, ground penetrating radar and/or potholing would also be undertaken to confirm the location of utilities on site.

Appendix B
Additional noise and vibration assessments

Memorandum

To:		**At:**	Gateway to Sydney Joint Venture
From:	Antony Williams	**At:**	SLR Consulting Australia Pty Ltd
Date:	27 March 2020	**Ref:**	610.17858-Subs Report_Construction-v0.7
Subject:	Sydney Gateway road project Submissions Report Revised Construction Assessment		

1 Introduction

Technical Working Paper 2 – Noise and Vibration assessed the potential construction impacts from the Sydney Gateway road project ('the project') based on the design in the exhibited EIS/preliminary draft MDP. The construction noise assessment has been updated to include:

- A commercial building at 396 Princes Highway (located in Noise Catchment Area 01)
- Additional outdoor passive receivers in Tempe for the nearest part of Tempe Wetlands and an additional area of Tempe Recreation Reserve. It is noted that the sporting fields at Tempe Recreation Reserve were assessed in the exhibited EIS/preliminary draft MDP
- Potential impacts to the new Qantas Flight Training Centre, which was approved in November 2019
- An assessment of potential vibration impacts from dynamic compaction within Tempe landfill

The additional areas assessed in Tempe are shown in **Figure 1**. The location and layout of the new Qantas Flight Training Centre is shown in **Figure 2**.

Figure 1 Additional Assessed Receivers

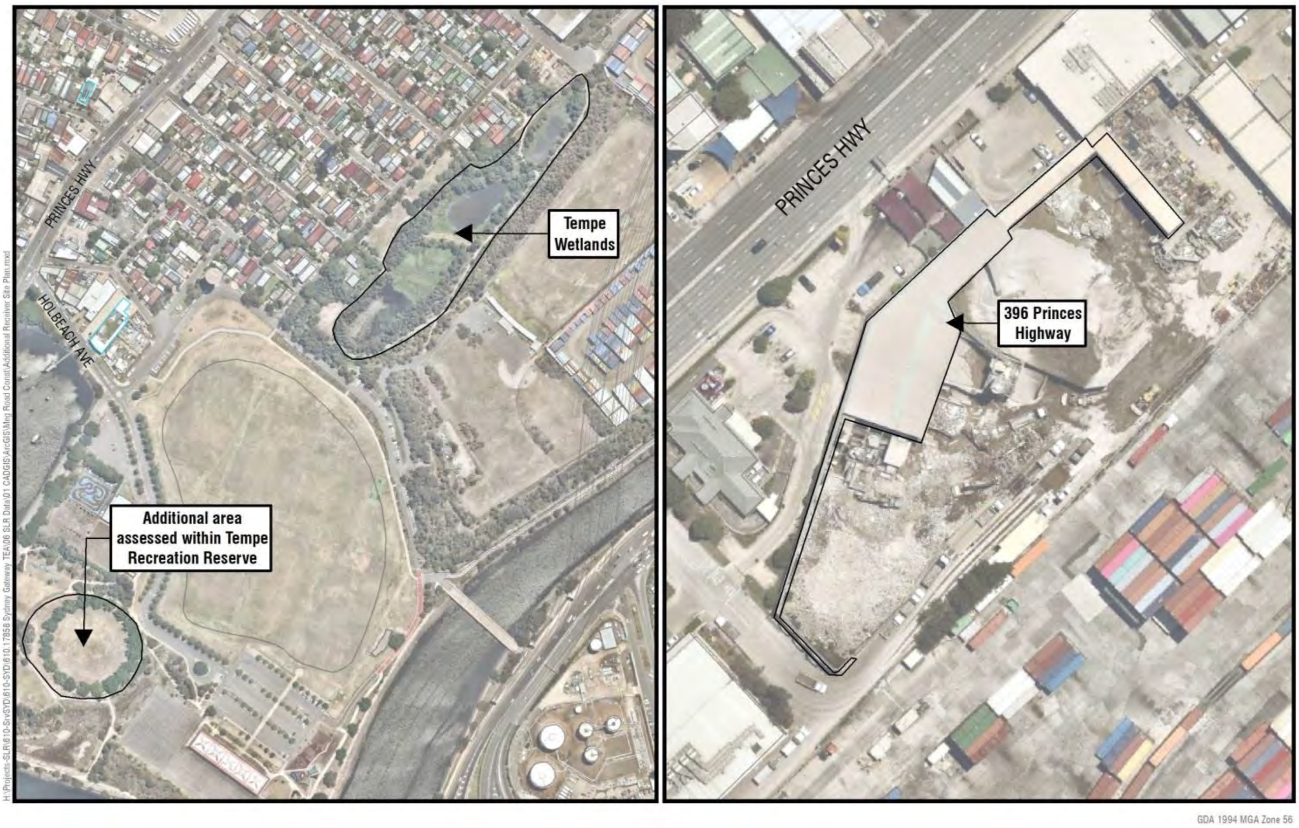
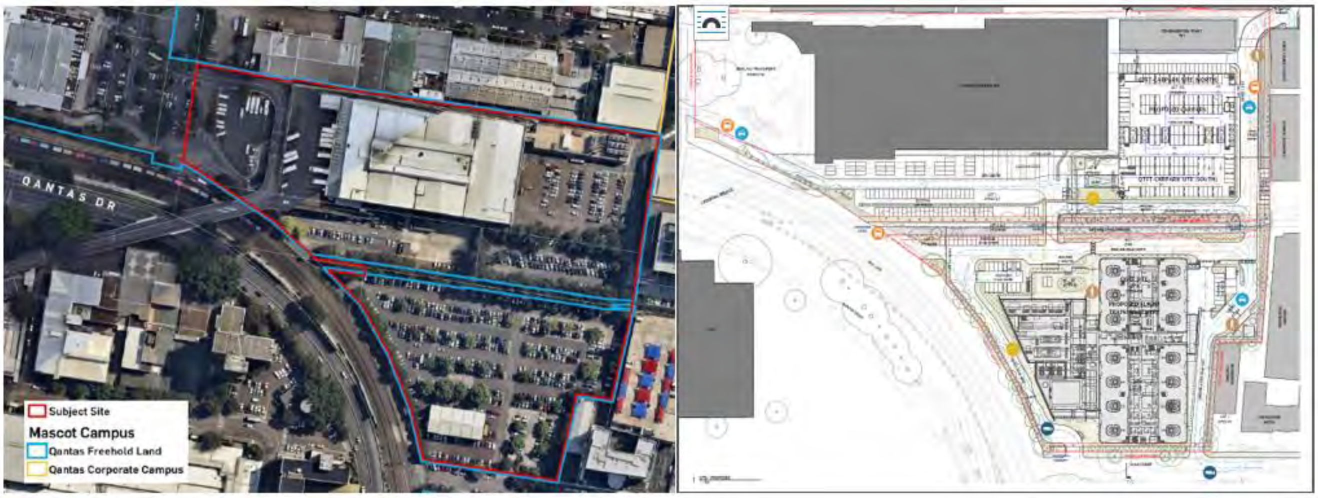


Figure 2 New Qantas Flight Training Centre



Note: Taken from *Assessment of Noise and Vibration Emissions (SEARs) – Qantas Flight Training & Simulator Centre*.

2 Additional Construction Noise Assessment

This assessment uses criteria and methodology consistent with those defined in *Technical Working Paper 2 – Noise and Vibration*, which should be reviewed if further information is required.

The following assessment shows the predicted noise impacts based on the exceedance of the Noise Management Level (NML), as per the categories in **Table 1**. The indicative subjective response of people affected by the impacts is also shown in the table, noting that the subjective response would vary and depends on the period in which the impacts occur (ie people are generally less sensitive to impacts during the daytime and more sensitive in the evening and night-time).

Table 1 NML Exceedance Bands and Corresponding Subjective Response to Impacts

Exceedance of NML	Symbol	Likely Subjective Response
Compliance	•	Barely perceptible
1 to 10 dB	●	Marginal to minor
11 dB to 20 dB	◆	Moderate
>20 dB	■	High

2.1 Assessment Results

2.1.1 Additional Commercial Receiver at 396 Princes Highway in NCA01

Construction noise levels at the commercial building at 396 Princes Highway are predicted to comply with the relevant management levels due to the relatively large distance from the project to this receiver (over 200 m), combined with high existing noise levels in this area.

Similarly, while this commercial building may provide some additional screening of construction noise from the project site, the decreases in construction noise at the residential receivers to the north are predicted to be marginal and the impacts are generally consistent with predictions in the exhibited EIS/preliminary draft MDP.

2.1.2 Tempe Outdoor Passive Receivers

The predicted construction noise impacts on the additional outdoor passive receivers in Tempe in NCA03 are shown in **Table 2**.

Table 2 Overview of 'Other Sensitive' Receiver NML Exceedances

ID	Scenario	Activity	Additional area within Tempe Recreation Reserve (Outdoor Passive)			Tempe Wetlands (Outdoor Passive)		
			Daytime			Daytime		
			1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
1a	Enabling Works (inc. utilities)	Peak	-	-	-	-	-	-
1b		Typical	-	-	-	-	-	-
2a	Compound Establishment	Peak	-	-	-	-	-	-
2b		Typical	-	-	-	-	-	-
2c	Compound Operation		-	-	-	-	-	-
3a	Site Establishment		-	-	-	●	-	-
4a	Demolition	Peak	-	-	-	-	-	-
4b		Typical	-	-	-	-	-	-
5a	Bridges	Peak	-	-	-	-	-	-
5b		Typical	-	-	-	-	-	-
6a	Road Works	Peak	-	-	-	-	-	-
6b		Typical	-	-	-	-	-	-
6c		Dynamic Compaction	-	-	-	-	-	-
7a	Finishing Works		-	-	-	-	-	-

The assessment shows the following:

- A 'minor' impact is predicted at Tempe Wetlands when *Site Establishment* works are being completed nearby. Noise levels during the other scenarios, which are generally further away from this receiver, are predicted to be compliant with the NMLs.
- Noise levels at the additional area within Tempe Recreation Reserve are predicted to comply the appropriate criteria, due to the large distance from the works to this receiver being sufficient to reduce construction noise levels to below NML for all works.

2.1.3 New Qantas Flight Training Centre

The relocation of the Qantas Flight Training Centre to the eastern side of the Qantas Drive and the Botany Rail Line (see **Figure 2**) was approved on 29 November 2019.

Construction noise levels have been predicted to the new flight training centre and a summary of the predictions is shown in **Table 3** with detailed noise level predictions provided in **Appendix A**. The following three works areas have been assessed:

- Works when they are at their closest point to the flight training centre
- Works around 100 metres away from the flight training centre
- Works around 300 metres away from the flight training centre.

Table 3 Predicted Impacts to the new Qantas Flight Training Centre[1,2]

Period	ID	Scenario	Activity	Nearest (works opposite centre)	Moderate (works ~100 m away)	Far (works ~300 m away)
When in Use	1a	Enabling Works (inc. utilities)	Peak	■	●	●
	1b		Typical	●	·	·
	2a	Compound Establishment	Peak	◆	◆	●
	2b		Typical	·	·	·
	2c	Compound Operation		●	·	·
	3a	Site Establishment		◆	●	·
	4a	Demolition	Peak	◆	◆	●
	4b		Typical	●	·	·
	5a	Bridges	Peak	●	·	·
	5b		Typical	·	·	·
	6a	Road Works	Peak	◆	●	●
	6b		Typical	●	·	·
	6c		Dynamic Comp.	·	·	·
	7a	Finishing Works		●	·	·
	Key to	● Marginal to minor (1 to 10 dB)		◆ Moderate (11 dB to 20 dB)	■ High (>20 dB)	

Note 1: Assessed as an educational receiver with an internal noise criterion of 45 dBA and assuming a conservative 10 dB difference between internal and external noise levels, consistent with the assessment of the existing centre in *Technical Working Paper 2 – Noise and Vibration*. The actual facade performance would be much higher than this, meaning above predicted construction impacts are conservative.

Note 2: Exceedances are based on L_{Aeq} noise levels. L_{max} noise predictions are provided in **Appendix A**.

The above assessment shows that the only 'high' worst-case impact at the new Qantas Flight Training Centre is predicted when noise intensive 'Peak' *Enabling Works* are being undertaken nearby. The 'Peak' works involve noise intensive equipment such as rockbreakers and/or concrete saws. When less noisy 'Typical' *Enabling Works* are being completed nearby the impacts are predicted to be reduced to 'minor'.

The impacts in other scenarios when works are at their nearest location range between 'moderate' and 'minor' for the nosier works, and compliant with the NMLs for works which generate less noise or are further away.

When works move away from the flight training centre and are around 100 m away, the worst-case impacts are predicted to be 'moderate' during noise intensive works and 'minor' during other activities. Scenarios which use quieter items of equipment are predicted to be compliant with the NMLs.

For works that are around 300 m away, the worst-case impacts are predicted to be 'minor' during noise intensive works. All other scenarios are predicted to be compliant.

It is noted, however, that the above predictions assume only a 10 dB loss in noise levels from outside to inside, which is very conservative. Consultation with Qantas has confirmed the sensitivity of activities that occur within flight training centres to noise and vibration. Given the sensitivity and the high levels of existing noise at the location from road, rail and aviation activities, it is expected that the new building will be well insulated. This would be mean that the predicted impacts due to nearby construction activities would be substantially less than reported above and would potentially be compliant with relevant internal noise management levels for many of the scenarios.

2.2 Mitigation

The construction mitigation requirements for the project are discussed in detail in the exhibited *Technical Report 2 – Noise and Vibration Impact Assessment*. The recommended measures are considered appropriate for the additional assessment presented in this report.

Consultation with Qantas regarding the potential impacts to the new and existing Qantas Flight Training Centre is ongoing. A framework to manage the potential construction impacts has been developed in consultation with Qantas and would be used to manage and control the potential impacts. The framework includes site specific criteria for the various sensitive areas of the existing centre, monitoring requirements and procedures for notification in the event of exceedances. A similar framework should be developed in consultation with Qantas for the new flight training centre (when built), based on the actual acoustic performance of the building and the detailed construction methodology for the Sydney Gateway road project.

Consultation with Qantas would be ongoing throughout the duration of construction of the project and the finalised approach to controlling the impacts at the existing and new centre would be defined in the project's Construction Noise and Vibration Management Plan.

3 Dynamic Compaction

Dynamic compaction is proposed within the former Tempe landfill. Dynamic compaction involves dropping of large weights ('tamper weights') onto the surface in order to densify the underlying soils. Tamper weights typically range from 10 t to 30 t and are dropped from heights of up to 20 m.

The potential energy (product of mass, height and gravitation constant) of a raised tamper can be linked to resulting peak particle velocities (PPVs) at different offsets from the impact location. An assessment of the potential vibration impacts that may occur during dynamic compaction is based on the empirical relationship provided in BS 5228-2:2009.

The following assumed parameters have been used in this preliminary study:

- Tamper weight 10 t, dropped from 10 m (energy 1 MJ)
- Tamper weight 30 t, dropped from 20 m (energy 6 MJ).

Indicative minimum working distances for the assumed dynamic compaction parameters have been calculated and are summarised in **Table 4** and shown in **Figure 3** and **Figure 4**, noting that:

- The relationship recommended in BS 5228-2:2009 is judged to be conservative (based on Paul W. Mayne 'Ground vibrations during dynamic compaction')
- No coupling loss between the layer of compacted soils and underlying soils has been included
- Minimum energy to be imparted by dynamic compaction has not been considered.

Table 4 Indicative Minimum Working Distances from Dynamic Compaction

Plant Item	Rating/Description	Minimum Distance		
		Cosmetic Damage		Human Response (NSW EPA Guideline)
		Residential and Light Commercial (BS 7385)	Heritage Items (DIN 4150, Group 3)	
Dynamic compaction	1 MJ	45 m	90 m	200 m
	6 MJ	105 m	210 m	500 m

Figure 3 Indicative Minimum Working Distances from Dynamic Compaction (1MJ)

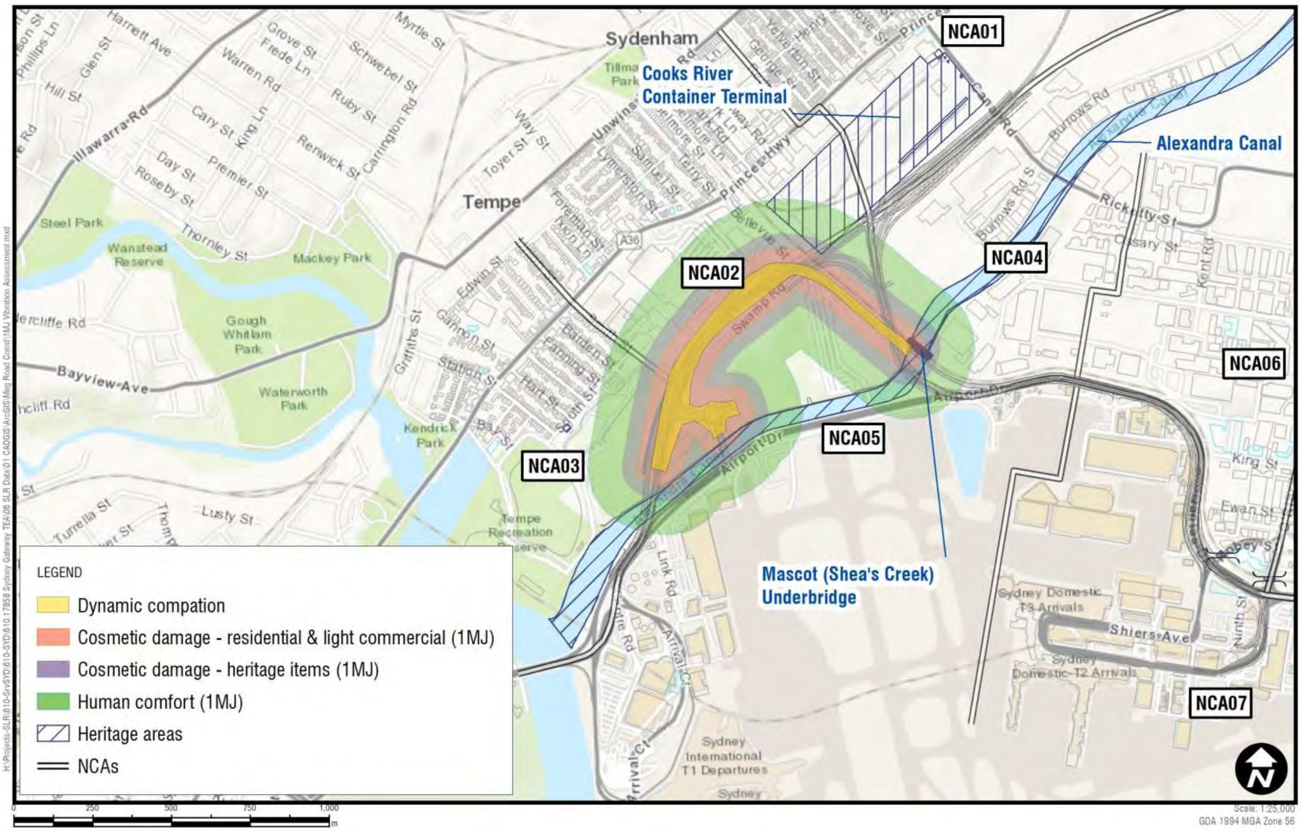
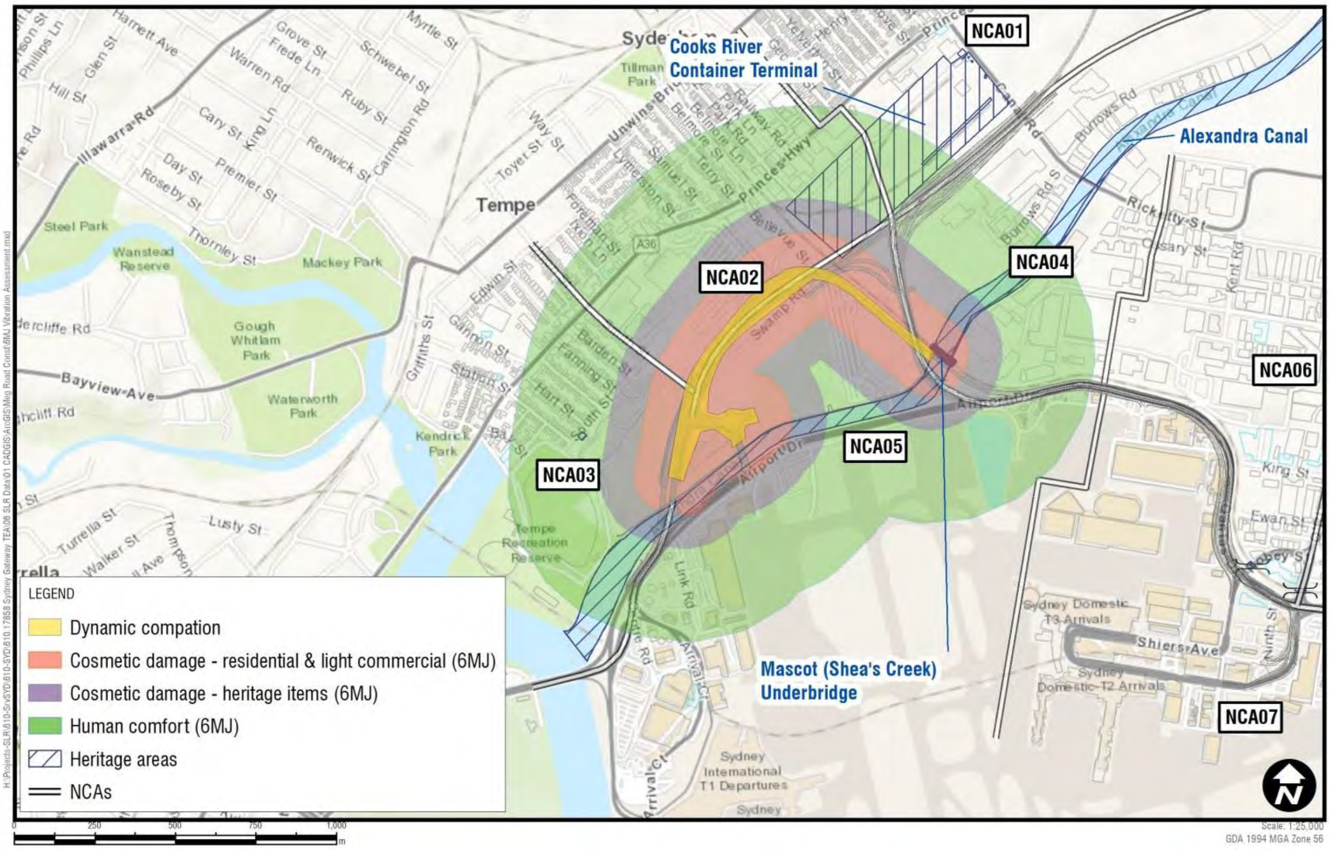


Figure 4 Indicative Minimum Working Distances from Dynamic Compaction (6MJ)



Cosmetic Damage Assessment Summary

The above figures show that the distance between the construction works and the nearest receivers is generally sufficient for most buildings to be outside the nominated minimum working distances and are therefore indicated to be at low risk of cosmetic damage in the 1 MJ scenario.

Some of the adjacent buildings and structures are, however, within the indicative cosmetic damage minimum working distance in the 6 MJ scenario, including Ikea and other commercial buildings to the north, and a commercial building to the south-east.

Human Comfort Vibration Assessment

Receivers near the works are within the indicative human comfort minimum working distances in both the 1 MJ and 6 MJ scenarios meaning occupants of affected buildings may be able to perceive vibration impacts at times during the works.

Heritage Structures

The Alexandra Canal, Mascot (Shea's Creek) Underbridge and parts of the Cooks River Container Terminal are within both the 1 MJ and 6 MJ indicative minimum working distances for dynamic compaction.

3.1 Mitigation during Dynamic Compaction

As there is potential for impacts at the nearest receivers the following measures should be considered:

- Use of a smaller tamper weight and/or drop height when works are near to adjacent receivers or sensitive features
- Use of appropriate respite to minimise human comfort impacts
- Completion of building condition surveys before and after the works
- Attended vibration monitoring to check the actual level of vibration are within the expected range.

The potential vibration levels from dynamic compaction should be reviewed as the project progresses in consultation with a geotechnical engineer when detailed construction information is available.

Checked/
Authorised by: RH

APPENDIX A

Construction Information

Table 1 Predicted NML Exceedances, All Receiver Types – NCA00

ID	Scenario	Activity	Number of Receivers																
			Total	HNA[1]	With NML Exceedance[2]														
					Standard Daytime			Out of Hours Works[3]											
								Daytime OOH			Evening			Night-time			Sleep Disturbance		
					1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
1a	Enabling Works (inc. utilities)	Peak	41	-	-	-	-	-	-	-	8	-	-	32	-	-	29	-	-
1b		Typical	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2a	Compound Establishment	Peak	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2b		Typical	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2c	Compound Operation		41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3a	Site Establishment		41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4a	Demolition	Peak	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4b		Typical	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5a	Bridges	Peak	41	-	-	-	-	-	-	-	-	-	-	9	-	-	-	-	-
5b		Typical	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6a	Road Works	Peak	41	-	-	-	-	-	-	-	4	-	-	31	-	-	31	-	-
6b		Typical	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6c		Dynamic Compaction	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7a	Finishing Works		41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note 1: Highly Noise Affected, based on ICNG definition (ie predicted noise at residential receiver is 75 dBA or greater).
Note 2: Based on worst-case predicted noise levels.
Note 3: OOH = Out of hours.

Table 2 Predicted NML Exceedances, All Receiver Types – NCA01

ID	Scenario	Activity	Number of Receivers																
			Total	HNA[1]	With NML Exceedance[2]														
					Standard Daytime			Out of Hours Works[3]											
								Daytime OOH			Evening			Night-time			Sleep Disturbance		
					1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
1a	Enabling Works (inc. utilities)	Peak	890	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1b		Typical	890	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2a	Compound Establishment	Peak	890	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2b		Typical	890	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2c	Compound Operation		890	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3a	Site Establishment		890	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4a	Demolition	Peak	890	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4b		Typical	890	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5a	Bridges	Peak	890	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5b		Typical	890	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6a	Road Works	Peak	890	-	1	-	-	1	-	-	1	-	-	-	-	-	-	-	-
6b		Typical	890	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6c		Dynamic Compaction	890	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7a	Finishing Works		890	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note 1: Highly Noise Affected, based on ICNG definition (ie predicted noise at residential receiver is 75 dBA or greater).
Note 2: Based on worst-case predicted noise levels.
Note 3: OOH = Out of hours.

Table 3 Predicted NML Exceedances, All Receiver Types – NCA02

ID	Scenario	Activity	Number of Receivers																
			Total	HNA[1]	With NML Exceedance[2]														
					Standard Daytime			Out of Hours Works[3]											
								Daytime OOH			Evening			Night-time			Sleep Disturbance		
					1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
1a	Enabling Works (inc. utilities)	Peak	569	-	1	-	-	1	-	-	-	-	-	16	-	-	4	-	-
1b		Typical	569	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2a	Compound Establishment	Peak	569	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2b		Typical	569	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2c	Compound Operation		569	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3a	Site Establishment		569	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4a	Demolition	Peak	569	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4b		Typical	569	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5a	Bridges	Peak	569	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
5b		Typical	569	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6a	Road Works	Peak	569	-	2	-	-	2	-	-	1	-	-	18	-	-	18	-	-
6b		Typical	569	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6c		Dynamic Compaction	569	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7a	Finishing Works		569	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note 1: Highly Noise Affected, based on ICNG definition (ie predicted noise at residential receiver is 75 dBA or greater).
Note 2: Based on worst-case predicted noise levels.
Note 3: OOH = Out of hours.

Table 4 Predicted Worst-case Construction Noise Levels (L_{Aeq} dBA) – New Qantas Training Facility

Period	ID	Scenario	Activity	Nearest (works opposite centre)	Moderate (works ~100 m away)	Far (works ~300 m away)
When in Use	1a	Enabling Works (inc. utilities)	Peak	76	65	58
	1b		Typical	61	50	43
	2a	Compound Establishment	Peak	69	67	58
	2b		Typical	54	52	43
	2c	Compound Operation		56	54	45
	3a	Site Establishment		68	57	50
	4a	Demolition	Peak	69	67	58
	4b		Typical	56	54	45
	5a	Bridges	Peak	57	-	-
	5b		Typical	50	-	-
	6a	Road Works	Peak	74	63	56
	6b		Typical	60	49	42
	6c		Dynamic Comp.	<30	-	-
	7a	Finishing Works		61	50	43

Table 5 Predicted Worst-case Construction Noise Levels (L_{Amax} dBA) – New Qantas Training Facility

Period	ID	Scenario	Activity	Nearest (works opposite centre)	Moderate (works ~100 m away)	Far (works ~300 m away)
When in Use	1a	Enabling Works (inc. utilities)	Peak	84	73	66
	1b		Typical	72	61	54
	2a	Compound Establishment	Peak	77	75	66
	2b		Typical	65	63	54
	2c	Compound Operation		65	63	54
	3a	Site Establishment		74	63	56
	4a	Demolition	Peak	77	75	66
	4b		Typical	65	63	54
	5a	Bridges	Peak	63	-	-
	5b		Typical	57	-	-
	6a	Road Works	Peak	84	73	66
	6b		Typical	68	57	50
	6c		Dynamic Comp.	31	-	-
	7a	Finishing Works		72	61	54

Memorandum

To:		**At:**	Gateway 2 Sydney Joint Venture
From:	Antony Williams	**At:**	SLR Consulting Australia Pty Ltd
Date:	27 March 2020	**Ref:**	610.17858-Subs Report_Op Road Traffic-v0.7
Subject:	Sydney Gateway road project Submissions Report Revised Operational Modelling		

1 Introduction

Technical Working Paper 2 – Noise and Vibration assessed the potential operational impacts from the Sydney Gateway road project ('the project') based on the design in the exhibited EIS/preliminary draft MDP. The operational noise assessment has been updated to include:

- The revised project alignment at Cooks River Intermodal Terminal
- A commercial building at 396 Princes Highway (located in Noise Catchment Area 01)
- Noise from traffic on Unwins Bridge Road
- Additional outdoor passive receivers in Tempe for the nearest part of Tempe Wetlands and an additional area of Tempe Recreation Reserve. It is noted that the sporting fields at Tempe Recreation Reserve were assessed in the exhibited EIS/preliminary draft MDP
- Potential impacts to the new Qantas Flight Training Centre, which was approved in November 2019

The additional areas assessed in Tempe are shown in **Figure 1**. The location and layout of the new Qantas Flight Training Centre is shown in **Figure 2**.

Figure 1 Additional Assessed Receivers

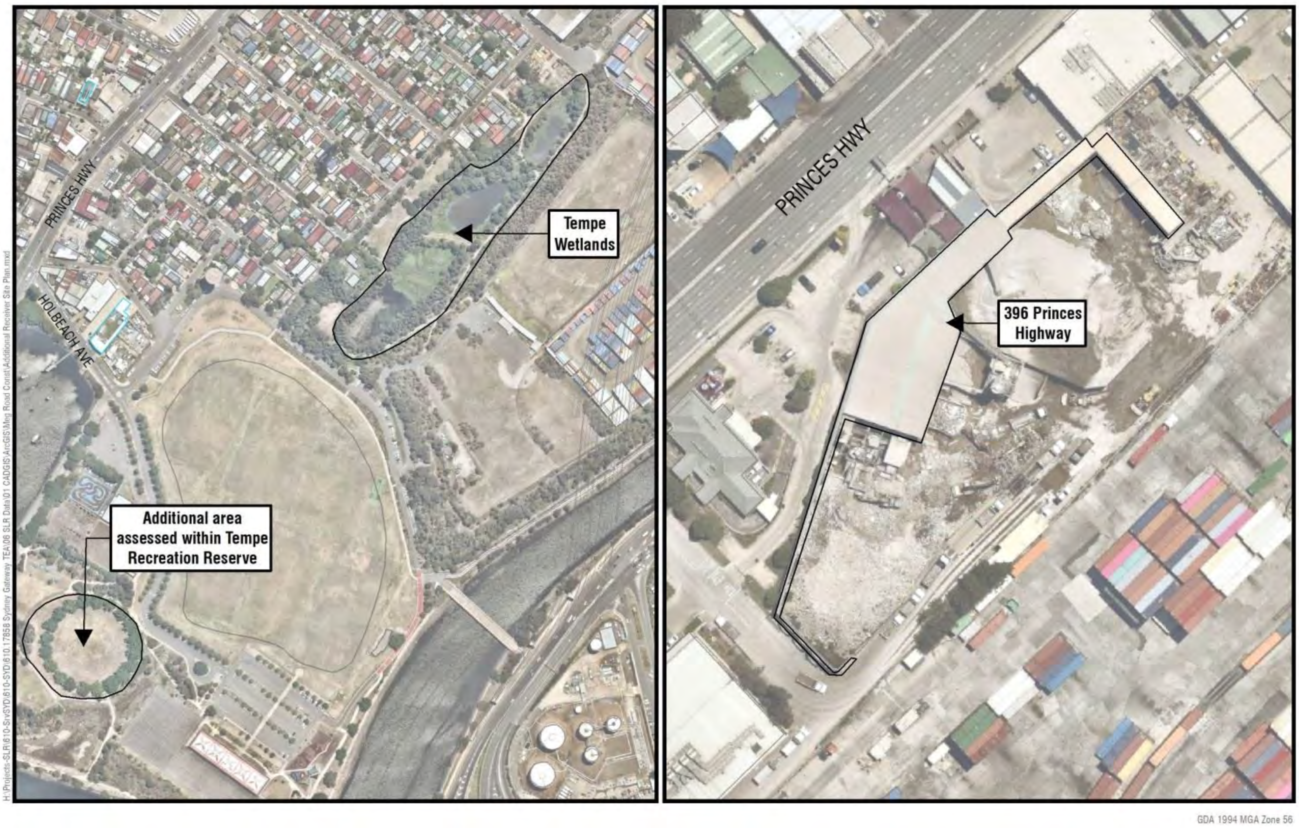


Figure 2 New Qantas Flight Training Centre

Note: Taken from *Assessment of Noise and Vibration Emissions (SEARs) – Qantas Flight Training & Simulator Centre*.

2 Revised Operational Noise Assessment

This assessment uses criteria and methodology consistent with those defined in *Technical Working Paper 2 – Noise and Vibration*, which should be reviewed if further information is required.

The operational road traffic noise impacts 'without mitigation' have been predicted for all sensitive receivers in the assessment area for the project, as per *Technical Working Paper 2*, with the inclusion of the additionally identified elements and revised design.

2.1 Residential Receivers

The predicted operational road noise levels at residential receivers are summarised in **Table 1** for the 2026 at-opening and 2036 future design scenarios. The table shows the worst-case impacts in each Noise Catchment Area (NCA), which are typically for receivers nearest to the project site.

Consistent with the exhibited EIS/draft MDP, the impacts from the project are predicted to be greatest in the 2036 future design scenario due to this timeframe generally having higher traffic volumes than in 2026 at project opening. Receivers are generally more sensitive in the night-time period in 2036 and this scenario is considered to control the assessment.

The predicted noise levels for the 2036 night-time scenario are shown in **Figure 3** and the predicted change in noise levels (Build (with project) minus No Build (without project)) for the same scenario is in **Figure 4**.

Detailed noise predictions at triggered receivers are in **Appendix A** together with operational road traffic noise contours.

Table 1 Predicted Road Traffic Noise Levels at Most Affected Residential Receivers in each NCA

NCA	Predicted Noise Level (dBA)[1]								Number of Triggered Buildings[2]				
	At Opening (2026)				Future Design (2036)								
	No Build (without project)		Build (with project)		No Build (without project)		Build (with project)						
	Day	Night	Day	Night	Day	Night	Day	Night	Trigger 1 >2.0 dB	Trigger 2 Cumulative	Trigger 3 Acute	Total	*EIS/draft MDP*
NCA00	76	73	76	73	77	73	76	73	-	1	8	9	*9*
NCA01	59	55	60	56	59	55	60	57	58	11	-	63	*78*
NCA02	63	59	64	60	63	59	64	61	2	2	-	2	*2*
NCA03	51	47	61	57	51	48	62	58	116	14	-	116	*119*
NCA04[3]	-	-	-	-	-	-	-	-	-	-	-	-	-
NCA05[3]	-	-	-	-	-	-	-	-	-	-	-	-	-
NCA06	63	60	65	62	64	61	67	64	1	1	1	1	*1*
NCA07[3]	-	-	-	-	-	-	-	-	-	-	-	-	-
NCA08	67	64	69	66	67	64	70	67	22	-	-	22	*22*
											Total	**213**	***231***

Note 1: Daytime and night-time are $L_{Aeq(15hour)}$ and $L_{Aeq(9hour)}$ noise levels, respectively.

Note 2: The triggers are discussed in *Technical Working Paper 2 – Noise and Vibration*.

Note 3: NCA does not contain residential receivers.

Figure 3 Worst-case Predicted Operational Noise Levels (2036 Night-time, Build)

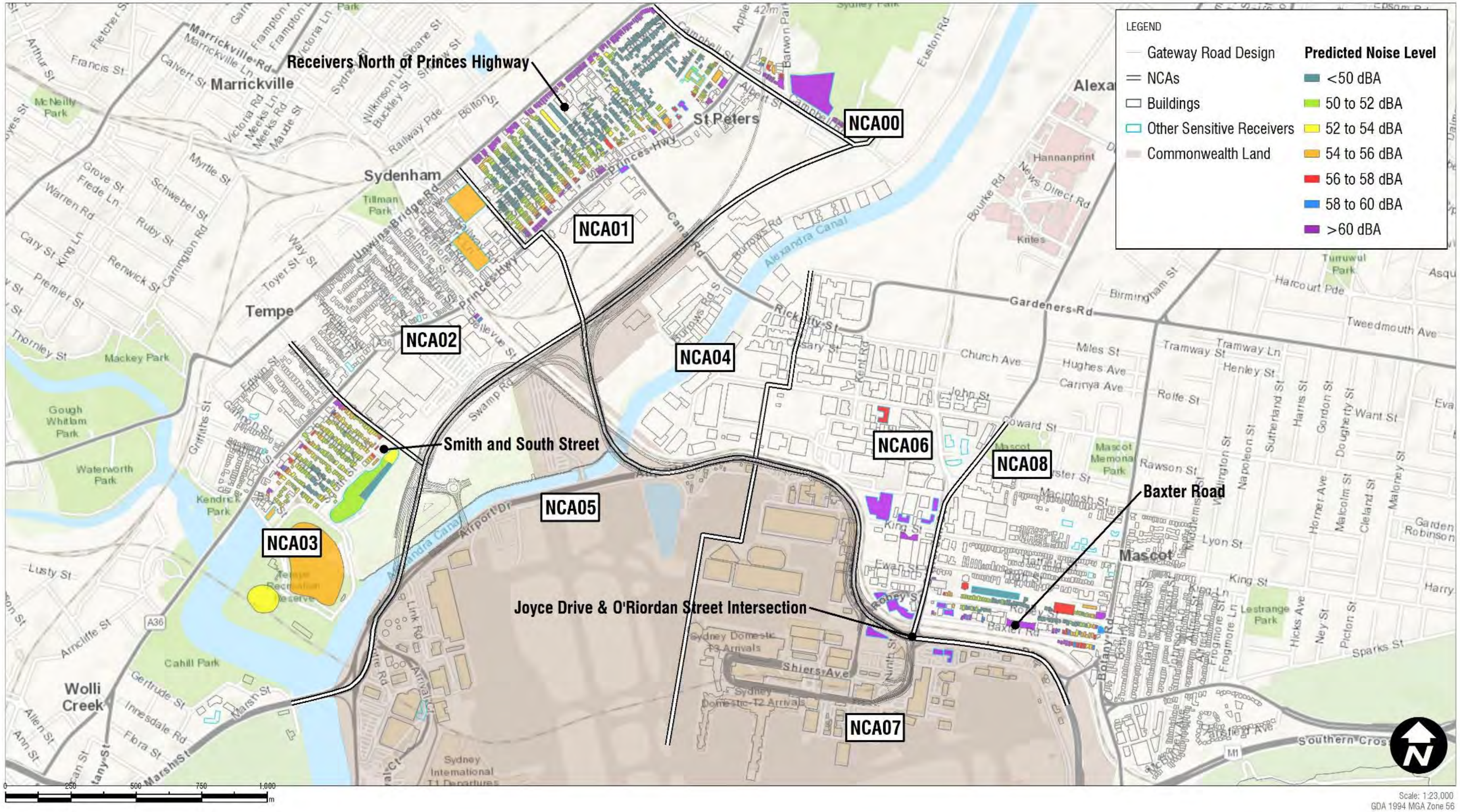
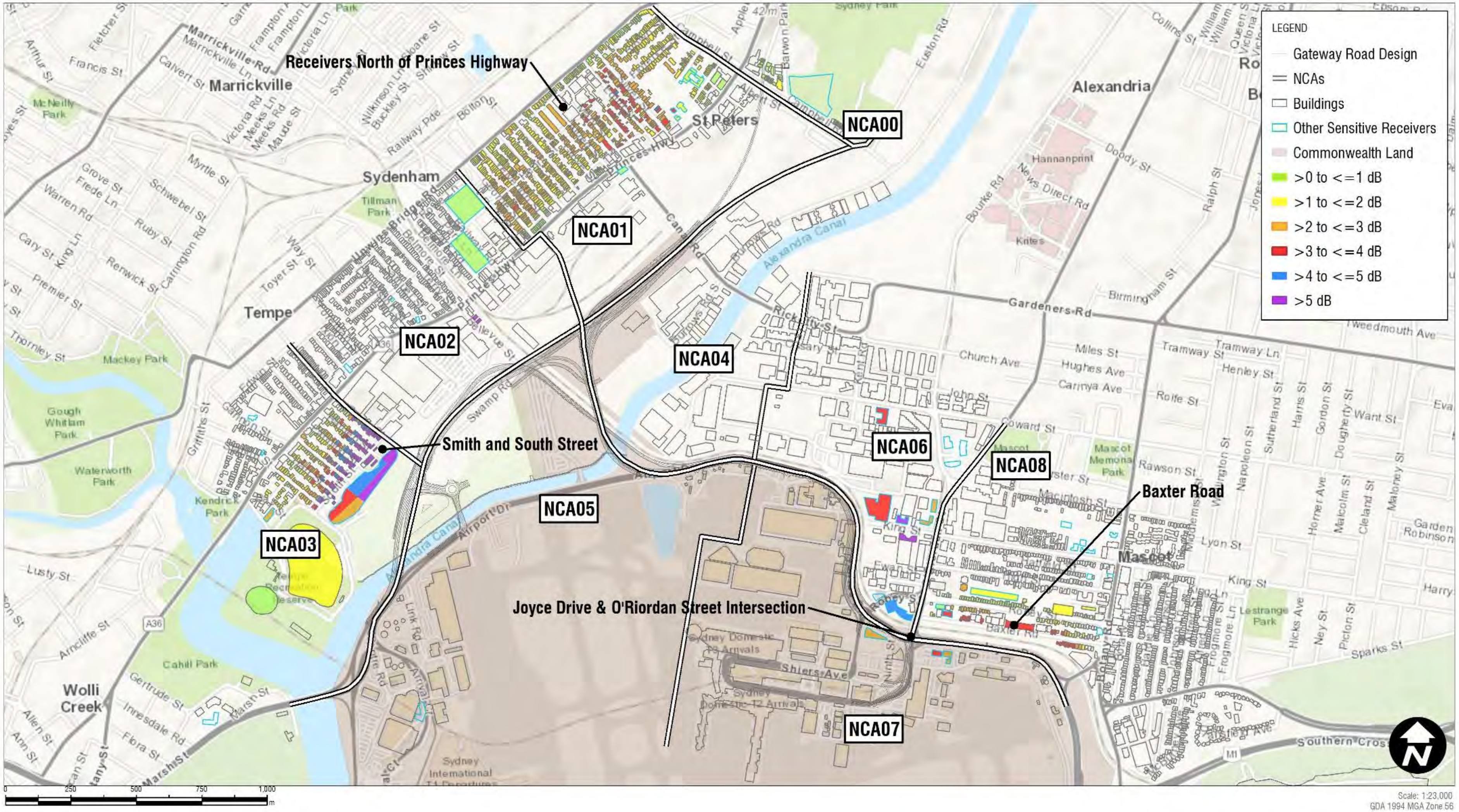


Figure 4 Worst-case Predicted Change in Operational Noise (2036 Night-time, Build minus No Build)



The above results show the following:

- The revised predicted noise levels at residential receivers in the study area are largely consistent with the exhibited EIS/preliminary draft MDP predictions in *Technical Working Paper 2 – Noise and Vibration.*
- The inclusion of the commercial building at 396 Princes Highway and revised alignment at Cooks River Intermodal Terminal results in marginally different noise levels in NCA01 to the north of Princes Highway in St Peters. The inclusion of traffic noise from Unwins Bridge Road also increases the contribution of non-project related noise levels at the adjacent receivers. The revised assessment shows receivers which are predicted to exceed the criteria in NCA01 are reduced from 78 to 63.
- The noise levels, impacts and exceeding receivers over the rest of the project are largely consistent with the exhibited EIS/preliminary draft MDP.

2.2 'Other Sensitive' Receivers

'Other sensitive' receivers that are predicted to have exceedances of the trigger levels are shown in **Table 2** for the 2036 scenario. The location of the triggered 'other sensitive' receivers are shown **Figure 6**.

Table 2 'Other Sensitive' Receivers Triggers

NCA	Receiver	Type	Noise Mitigation Guideline Triggers[1]		
			Trigger 1 >2.0 dB	Trigger 2 Cumulative	Trigger 3 Acute
NCA01	St Peters Public School	Educational	-	Y	-
		Educational	-	Y	-
	St Peters Anglican Church	Place of Worship	-	Y	-
		Place of Worship	Y	Y	-
		Place of Worship	-	Y	-
NCA03	Guardian Early Learning Centre	Childcare	Y	Y	-
	Tempe Wetlands	Outdoor Passive	Y	-	-
NCA06	Aero Kids Early Learning Centre	Childcare	Y	Y	-
	New Qantas Flight Training Centre	Educational	Y	Y	Y
	Stamford Plaza Sydney Airport	Hotel	Y	Y	Y
	Travelodge	Hotel	Y	Y	Y
	Pullman Hotel	Hotel	Y	-	-
	Coleman Reserve	Outdoor Passive	-	Y	Y
NCA07	Ibis Budget Sydney Airport	Hotel	Y	-	Y
	Mantra Hotel	Hotel	Y	-	Y
	Future airport hotel	Hotel	Y	Y	Y
NCA08	Quest Mascot (Hotel)	Hotel	-	-	Y
	Citadines Connect Sydney Airport	Hotel	Y	-	Y

The above assessment shows a total of 18 'other sensitive' receivers are predicted to have exceedances of the operational road traffic noise criteria, which is an increase from 15 in the exhibited EIS/preliminary draft MDP.

The three additionally identified exceedances are a small part of Tempe Wetlands in NCA03, and the new Qantas Flight Training Centre and Pullman Hotel in NCA06.

The area of Tempe Wetlands that is predicted to exceed the criteria is shown below in **Figure 5** in red.

Figure 5 Tempe Wetlands Assessment

It is noted that while Tempe Wetlands has been identified as an additional triggered receiver, the exhibited EIS/preliminary draft MDP recommended a 5 m noise barrier adjacent to this location (NW02, shown in **Figure 5**) to mitigate operational road traffic noise levels at residential receivers at Tempe. The recommended barrier would provide around 5 dB benefit to the area of Tempe Wetlands that is predicted to exceed the criteria.

With regard to the new Qantas Flight Training Centre, it is noted that the design of the new centre includes consideration of potentially increased road traffic noise levels in the area due to Sydney Gateway road project and assumes an external L_{Aeq} noise level of 74 dBA (*Assessment of Noise and Vibration Emissions (SEARs) - Qantas Flight Training & Simulator Centre*, dated May 2019). The predicted operational road traffic noise levels from the Sydney Gateway road project to the new centre are 72 dBA during the daytime and 71 dBA during the night-time.

As per the exhibited EIS/preliminary draft MDP, only areas of permanent residence in hotels require assessment and consideration of mitigation.

2.3 Receivers Eligible for Consideration of 'Additional Noise Mitigation'

The receivers which have been identified as eligible for consideration of 'additional noise mitigation' (ie triggered receivers) are summarised in **Table 3** and shown in **Figure 6**.

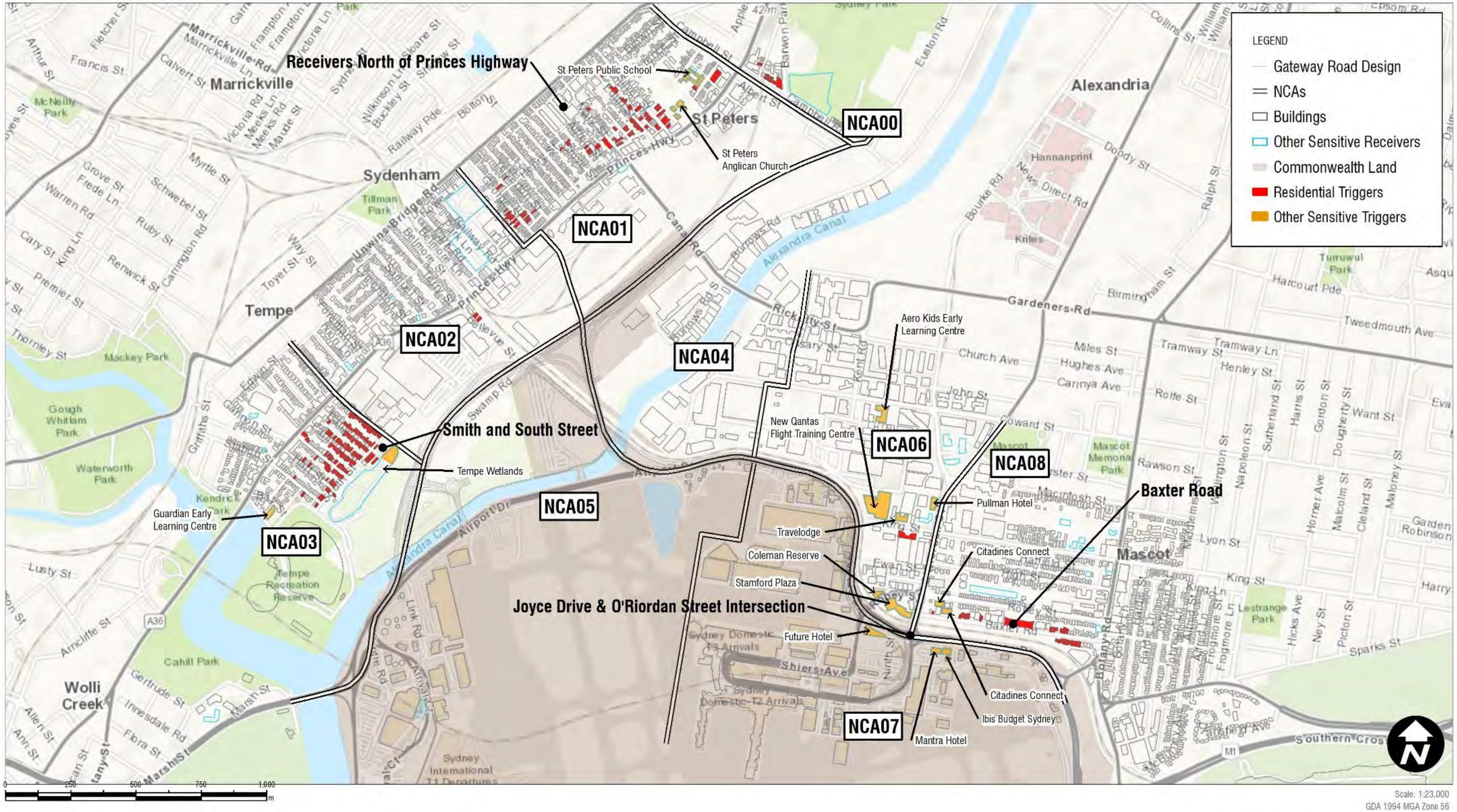
Table 3 Receivers Eligible for Consideration for 'Additional Noise Mitigation'

NCA	Number of Triggered Buildings (Floors)				Comparison to the exhibited EIS/preliminary draft MDP
	EIS/draft MDP		Revised Assessment		
	Residential	Other Sensitive	Residential	Other Sensitive	
NCA00	9 (18)	- (-)	9 (16)	- (-)	While the number of triggered buildings is the same for the revised assessment, the ground floor level of two residential receivers on Campbell Street are no longer triggered due to a marginal decrease in predicted noise level from the revised alignment at Cooks River Terminal and near St Peters interchange.
NCA01	78 (83)	5 (9)	63 (68)	5 (9)	The number of triggered residential buildings is reduced from 78 to 63 in this catchment which is a result of the revised alignment and inclusion of the commercial building at 396 Princes Highway. The receivers which are no longer triggered are residential buildings clustered around Yelverton Street and Frederick Street in St Peters.
NCA02	2 (2)	- (-)	2 (2)	- (-)	No changes are predicted in this catchment.
NCA03	119 (131)	1 (1)	116 (128)	2 (2)	The number of triggered residential buildings is reduced from 119 to 116 in this catchment which is a result of minor changes in noise due to revised alignment. A small part of Tempe Wetlands is additionally triggered in this catchment.
NCA04	- (-)	- (-)	- (-)	- (-)	No changes are predicted in this catchment.
NCA05	- (-)	- (-)	- (-)	- (-)	No changes are predicted in this catchment.
NCA06	1 (10)	4 (33)	1 (11)	6 (35)	The New Qantas Flight Training Centre and the Pullman Hotel are the two additional 'other sensitive' receivers which are triggered in this catchment.
NCA07	- (-)	3 (25)	- (-)	3 (25)	No changes are predicted in this catchment.
NCA08	22 (34)	2 (13)	22 (34)	2 (12)	The number of triggered residential buildings in this catchment is the same in the revised assessment.
Sub Total	**231 (278)**	**15 (81)**	**213 (259)**	**18 (83)**	-
TOTAL	**246 (359)**		**231 (342)**		-

Note 1: The count of 'floors' represents separate floors within each building. For some receivers there would likely be multiple units within the same floor, such as in residential apartment blocks.

Note 2: Where hotels are triggered, only areas of permanent residence are eligible for consideration of additional mitigation.

Figure 6 Receivers Eligible for Consideration of Additional Mitigation



In summary, the above assessment shows the number of sensitive receivers with predicted exceedances of the operational road traffic noise criteria is reduced from 246 in the exhibited EIS/preliminary draft MDP to 231 in this revised assessment. These receivers are therefore eligible for consideration of 'additional noise mitigation'.

3 Recommended Operational Road Traffic Noise Mitigation Measures

Consistent with *Technical Working Paper 2*, potential noise mitigation measures are to be considered in the following order of preference for receivers that qualify for consideration of 'additional noise mitigation':

- At-source mitigation:
  - Quieter road pavement surfaces
- In-corridor mitigation:
  - Noise mounds
  - Noise barriers
- At-receiver mitigation:
  - At-property treatments.

Detailed methodology regarding how mitigation was recommended to be applied to the project is contained in *Technical Working Paper 2.*

3.1 At-Source Mitigation – Low Noise Pavements

Consistent with *Technical Working Paper 2*, the assessment includes the use of quieter noise pavement in the form of dense graded asphalt across the extent of the project. The use of low noise pavements, such as Open Graded Asphalt, are not currently considered a suitable mitigation approach for the project due to relatively low vehicle speeds and also stop-start traffic at the signalised intersection, however, they should be investigated further during detailed design taking into account whole-of-life engineering considerations and the overall social, economic and environmental effects.

3.2 In-Corridor Mitigation – Noise Barriers

After at-source mitigation has been investigated, the next approach is to consider in-corridor mitigation which aims to block line of sight from the source of noise to nearby receivers.

As the number of exceeding receivers is predicted to be substantially lower in NCA01 in St Peters, noise barrier NW01 has been revaluated as part of this assessment. The revised assessment of NW01 is detailed in **Table 4** in comparison to the assessment in the EIS/draft MDP. **Appendix A** provides more details of the barrier analysis.

Table 4 Indicative Noise Barrier Details

<table>
<tr><th rowspan="3">Stage</th><th rowspan="3">Barrier ID</th><th colspan="6">Noise Barrier Details</th><th rowspan="3">Comments</th></tr>
<tr><th rowspan="2">Type</th><th rowspan="2">Length (m)</th><th rowspan="2">Height (m)[1]</th><th colspan="2">Triggered Receivers[2]</th><th rowspan="2">Reasonable?</th></tr>
<tr><th>No Barrier</th><th>With Barrier</th></tr>
<tr><td rowspan="2">EIS/ draft MDP</td><td>NW01a</td><td>New</td><td>738</td><td rowspan="2">4.5[3]</td><td rowspan="2">71</td><td rowspan="2">39</td><td rowspan="2">Unlikely</td><td rowspan="2">While the barrier reduces the number of property treatments, it provides less than 2 dB noise benefit and does not meet the NMG minimum requirement of 5 dB for barriers less than 5 m in height.
Many of the triggered receivers in this area are also only marginally over the criteria (around 1 to 2 dB), which is within the accuracy limitation of noise modelling and small changes in noise level due to design changes may result in these receivers no longer exceeding the criteria.
Barrier unlikely to be considered reasonable due to minimal noise benefit.</td></tr>
<tr><td>NW01b</td><td>New</td><td>266</td></tr>
<tr><td rowspan="2">Revised assessment</td><td>NW01a</td><td>New</td><td>628</td><td rowspan="2">4.5[3]</td><td rowspan="2">53</td><td rowspan="2">28</td><td rowspan="2">Unlikely</td><td rowspan="2">The performance of revised design of NW01 is similar to the barrier assessed in the EIS/draft MDP. The barrier provides less than 2 dB noise benefit and does not meet the NMG minimum requirement of 5 dB for barriers less than 5 m in height.
This barrier remains unlikely to be considered reasonable due to minimal noise benefit.</td></tr>
<tr><td>NW01b</td><td>New</td><td>329</td></tr>
</table>

Note 1: Recommended height is subject to further considerations during detailed design such as construction limitations, overshadowing, urban design and community preference.

Note 2: The count of 'Triggered Receivers' represents the number of individual floors (at ground and first level only) of the affected buildings.

Note 3: The height is relative to the adjacent carriageway level as the ground below the barrier is undulating.

The revised assessment shows a similar performance for noise barrier NW01. The barrier does not meet the minimum noise benefit requirements and remains unlikely to be considered reasonable to implement.

3.3 At-Property Mitigation – Architectural Treatment

Where residual impacts remain after the use of at-source and in-corridor mitigation, the final approach is to use at-property mitigation. This typically involves using architectural treatments such as thicker glazing and doors, or upgraded facade constructions to achieve appropriate internal noise levels.

The architectural treatments provided are typically limited to:

- Fresh air ventilation systems that meet the National Construction Code of Australia requirements with the windows and doors shut
- Upgraded windows and glazing and solid core doors on the exposed facades of the substantial structures only (eg masonry or insulated weather board cladding with sealed underfloor). These techniques would be unlikely to produce any noticeable benefit for light frame structures with no acoustic insulation in the walls

- Upgrading window or door seals and appropriately treating sub-floor ventilation
- The sealing of wall vents
- The sealing of the underfloor below the bearers
- The sealing of eaves.

As per the discussion in *Technical Working Paper 2*, the final operational noise mitigation strategy would be determined as the project design progresses and would likely use a combination of the approaches discussed.

Checked/
Authorised by: RH

APPENDIX A

Operational Road Traffic Noise Assessment Information

Receiver Assessment Table

Name	NCA	Flr	Easting	Northing	RecType	Name	Address	NCG Criteria		Period	Predicted Noise Level (dBA)								> 2 dB(A) Increase		Cumulative Limit		Project Acute		Eligible for Consideration of Mitigation
											At Opening (2026)				Future Design (2036)										
											No Build		Build		No Build		Build								
								D	N		D	N	D	N	D	N	D	N	D	N	D	N	D	N	
NCA00.RES.0016.01	NCA00	1	331785	6246028	Residential		29 Campbell Street St Peters 2044	55	50	P	76	72	76	72	76	73	76	72	-	-	-	-	-	Y	Y
NCA00.RES.0016.01	NCA00	2	331785	6246028	Residential		29 Campbell Street St Peters 2044	55	50	P	76	73	76	73	77	73	76	73	-	-	-	-	-	Y	Y
NCA00.RES.0020.01	NCA00	1	331789	6246026	Residential		27 Campbell Street St Peters 2044	55	50	P	76	72	76	72	76	72	76	72	-	-	-	-	-	Y	Y
NCA00.RES.0020.01	NCA00	2	331789	6246026	Residential		27 Campbell Street St Peters 2044	55	50	P	76	73	76	72	76	73	76	73	-	-	-	-	-	Y	Y
NCA00.RES.0021.01	NCA00	2	331794	6246022	Residential		25 Campbell Street St Peters 2044	55	50	P	76	72	76	72	76	73	76	73	-	-	-	-	-	Y	Y
NCA00.RES.0026.01	NCA00	2	331798	6246020	Residential		23 Campbell Street St Peters 2044	55	50	P	76	72	76	72	76	73	76	73	-	-	-	-	Y	Y	Y
NCA00.RES.0027.01	NCA00	1	331804	6246017	Residential		21 Campbell Street St Peters 2044	55	50	P	76	72	76	72	76	72	76	72	-	-	-	-	-	Y	Y
NCA00.RES.0027.01	NCA00	2	331804	6246017	Residential		21 Campbell Street St Peters 2044	55	50	P	76	73	76	73	77	73	77	73	-	-	-	-	Y	Y	Y
NCA00.RES.0029.01	NCA00	1	331807	6246015	Residential		19 Campbell Street St Peters 2044	55	50	P	76	72	76	72	76	72	76	72	-	-	-	-	-	Y	Y
NCA00.RES.0029.01	NCA00	2	331807	6246015	Residential		19 Campbell Street St Peters 2044	55	50	P	76	73	76	73	77	73	76	73	-	-	-	-	Y	Y	Y
NCA00.RES.0033.01	NCA00	1	331836	6246001	Residential		53 Barwon Park Road St Peters 2044	55	50	P	76	72	76	72	76	72	76	72	-	-	-	-	-	Y	Y
NCA00.RES.0033.01	NCA00	2	331836	6246001	Residential		53 Barwon Park Road St Peters 2044	55	50	P	76	73	76	72	76	73	76	73	-	-	-	-	-	Y	Y
NCA00.RES.0033.01	NCA00	3	331836	6246001	Residential		53 Barwon Park Road St Peters 2044	55	50	P	76	72	76	72	76	73	76	73	-	-	-	-	Y	Y	Y
NCA00.RES.0037.01	NCA00	2	331763	6246074	Residential		75 Crown Street St Peters 2044	55	50	P	61	57	62	58	61	57	62	59	-	-	-	Y	-	-	Y
NCA00.RES.0039.01	NCA00	1	331816	6246005	Residential		53 Barwon Park Road St Peters 2044	55	50	P	75	71	75	71	75	71	75	71	-	-	-	-	-	Y	Y
NCA00.RES.0039.01	NCA00	2	331816	6246005	Residential		53 Barwon Park Road St Peters 2044	55	50	P	76	72	76	72	76	72	76	72	-	-	-	-	-	Y	Y
NCA01.OED.0214.01	NCA01	1	331509	6246025	Other (Educational)	St Peters Public School	Church St, St Peters Nsw 2044	50	-	H	53	51	54	52	53	51	55	53	-	-	Y	-	-	-	Y
NCA01.OED.0214.01	NCA01	2	331509	6246025	Other (Educational)	St Peters Public School	Church St, St Peters Nsw 2044	50	-	H	55	53	56	54	55	53	57	55	-	-	Y	-	-	-	Y
NCA01.OED.0220.01	NCA01	1	331470	6246015	Other (Educational)	St Peters Public School	Church St, St Peters Nsw 2044	50	-	H	54	52	55	53	54	52	56	54	-	-	Y	-	-	-	Y
NCA01.OPW.0320.01	NCA01	1	331462	6245917	Other (Place of Worship)	St Peters Anglican Church	187 Princes Hwy, St Peters Nsw 2044	50	50	H	61	59	62	59	61	59	62	60	-	-	Y	Y	-	-	Y
NCA01.OPW.0320.01	NCA01	2	331462	6245917	Other (Place of Worship)	St Peters Anglican Church	187 Princes Hwy, St Peters Nsw 2044	50	50	H	63	60	63	61	63	61	64	61	-	-	Y	Y	-	-	Y
NCA01.OPW.0320.01	NCA01	3	331462	6245917	Other (Place of Worship)	St Peters Anglican Church	187 Princes Hwy, St Peters Nsw 2044	50	50	H	63	61	64	62	64	61	65	63	-	-	Y	Y	-	-	Y
NCA01.OPW.0334.01	NCA01	1	331431	6245903	Other (Place of Worship)	St Peters Anglican Church	187 Princes Hwy, St Peters Nsw 2044	50	50	H	54	51	56	53	54	52	56	54	Y	Y	Y	-	-	-	Y
NCA01.OPW.0334.01	NCA01	2	331431	6245903	Other (Place of Worship)	St Peters Anglican Church	187 Princes Hwy, St Peters Nsw 2044	50	50	H	57	55	58	56	57	56	59	57	Y	Y	Y	Y	-	-	Y
NCA01.OPW.0366.01	NCA01	1	331446	6245875	Other (Place of Worship)	St Peters Anglican Church	187 Princes Hwy, St Peters Nsw 2044	50	50	H	58	56	59	57	59	57	60	58	-	-	-	Y	-	-	Y
NCA01.RES.0176.01	NCA01	2	331172	6246057	Residential		100 Silver Street St Peters 2044	55	50	P	51	47	54	50	51	48	54	51	-	Y	-	-	-	-	Y
NCA01.RES.0207.01	NCA01	2	331161	6246032	Residential		59 Edith Street St Peters 2044	55	50	P	51	47	54	50	51	48	55	51	-	Y	-	-	-	-	Y
NCA01.RES.0210.01	NCA01	4	331593	6246029	Residential		124 Church Street St Peters 2044	55	50	P	59	55	60	56	59	55	60	56	-	-	-	Y	-	-	Y
NCA01.RES.0243.01	NCA01	3	331516	6245987	Residential		95 Church Street St Peters 2044	55	50	P	58	54	59	55	58	55	59	56	-	-	-	Y	-	-	Y
NCA01.RES.0247.01	NCA01	3	331512	6245982	Residential		97 Church Street St Peters 2044	55	50	P	59	55	59	55	59	55	60	56	-	-	-	Y	-	-	Y
NCA01.RES.0248.01	NCA01	2	331201	6245981	Residential		Unit 4 45 Edith Street St Peters 2044	55	50	P	52	48	55	51	52	48	55	52	-	Y	-	-	-	-	Y
NCA01.RES.0248.01	NCA01	3	331201	6245981	Residential		Unit 4 45 Edith Street St Peters 2044	55	50	P	53	49	56	52	53	50	57	53	Y	Y	-	-	-	-	Y
NCA01.RES.0257.01	NCA01	2	331213	6245971	Residential		43 Edith Street St Peters 2044	55	50	P	51	48	54	51	52	48	55	52	-	Y	-	-	-	-	Y
NCA01.RES.0291.01	NCA01	2	331238	6245939	Residential		33 Edith Street St Peters 2044	55	50	P	51	47	54	51	52	48	55	52	-	Y	-	-	-	-	Y
NCA01.RES.0300.01	NCA01	2	331248	6245933	Residential		66 Silver Street St Peters 2044	55	50	P	52	48	55	51	52	48	55	52	-	Y	-	-	-	-	Y
NCA01.RES.0324.01	NCA01	1	331262	6245913	Residential		23 Edith Street St Peters 2044	55	50	P	51	47	54	50	51	48	54	51	-	Y	-	-	-	-	Y
NCA01.RES.0325.01	NCA01	2	331369	6245912	Residential		21-23 Silver Street St Peters 2044	55	50	P	52	47	55	51	52	48	55	52	-	Y	-	-	-	-	Y
NCA01.RES.0328.01	NCA01	1	331297	6245905	Residential		34 Silver Street St Peters 2044	55	50	P	51	47	54	50	51	47	54	51	-	Y	-	-	-	-	Y
NCA01.RES.0329.01	NCA01	1	331267	6245905	Residential		21 Edith Street St Peters 2044	55	50	P	52	48	54	50	52	48	54	51	-	Y	-	-	-	-	Y
NCA01.RES.0331.01	NCA01	2	331375	6245905	Residential		21-23 Silver Street St Peters 2044	55	50	P	52	48	55	51	52	48	55	52	-	Y	-	-	-	-	Y
NCA01.RES.0335.01	NCA01	2	331106	6245902	Residential		69 Mary Street St Peters 2044	55	50	P	52	48	54	50	52	49	54	51	-	Y	-	-	-	-	Y
NCA01.RES.0353.01	NCA01	2	331384	6245886	Residential		Unit 2 13 Silver Street St Peters 2044	55	50	P	55	51	57	53	55	51	58	54	Y	Y	-	-	-	-	Y
NCA01.RES.0358.01	NCA01	1	331325	6245883	Residential		26 Silver Street St Peters 2044	55	50	P	51	47	54	50	51	47	54	51	-	Y	-	-	-	-	Y
NCA01.RES.0373.01	NCA01	1	331333	6245873	Residential		24 Silver Street St Peters 2044	55	50	P	52	47	54	50	52	48	55	51	-	Y	-	-	-	-	Y
NCA01.RES.0378.01	NCA01	1	331306	6245866	Residential		11 Edith Street St Peters 2044	55	50	P	54	50	56	52	55	51	57	53	Y	Y	-	-	-	-	Y
NCA01.RES.0378.01	NCA01	2	331306	6245866	Residential		11 Edith Street St Peters 2044	55	50	P	56	52	58	54	56	52	59	55	Y	Y	-	Y	-	-	Y
NCA01.RES.0381.01	NCA01	1	331341	6245863	Residential		14 Silver Street St Peters 2044	55	50	P	52	47	54	50	52	48	54	51	-	Y	-	-	-	-	Y
NCA01.RES.0382.01	NCA01	1	331270	6245862	Residential		20 Edith Street St Peters 2044	55	50	P	52	48	54	50	52	49	55	51	-	Y	-	-	-	-	Y
NCA01.RES.0386.01	NCA01	1	331400	6245860	Residential		5 Silver Street St Peters 2044	55	50	P	52	48	54	50	53	49	55	51	-	Y	-	-	-	-	Y
NCA01.RES.0386.01	NCA01	2	331400	6245860	Residential		5 Silver Street St Peters 2044	55	50	P	58	54	59	55	58	54	60	56	Y	Y	Y	Y	-	-	Y
NCA01.RES.0394.01	NCA01	1	331276	6245855	Residential		18 Edith Street St Peters 2044	55	50	P	53	49	55	51	53	49	55	52	-	Y	-	-	-	-	Y
NCA01.RES.0402.01	NCA01	1	331283	6245850	Residential		14 Edith Street St Peters 2044	55	50	P	52	48	54	50	52	48	54	51	-	Y	-	-	-	-	Y
NCA01.RES.0416.01	NCA01	1	331287	6245842	Residential		12 Edith Street St Peters 2044	55	50	P	52	48	54	50	52	49	54	51	-	Y	-	-	-	-	Y
NCA01.RES.0422.01	NCA01	2	331413	6245838	Residential		3 Silver Street St Peters 2044	55	50	P	59	55	60	56	59	55	60	57	Y	Y	-	Y	-	-	Y
NCA01.RES.0425.01	NCA01	1	331329	6245836	Residential		5 Edith Street St Peters 2044	55	50	P	58	53	59	55	58	54	59	55	-	-	-	Y	-	-	Y
NCA01.RES.0427.01	NCA01	1	331294	6245836	Residential		10 Edith Street St Peters 2044	55	50	P	52	48	54	50	52	49	54	51	-	Y	-	-	-	-	Y
NCA01.RES.0432.01	NCA01	2	331371	6245833	Residential		Unit 2 2 Silver Street St Peters 2044	55	50	P	56	52	58	54	56	53	58	55	Y	Y	-	Y	-	-	Y
NCA01.RES.0433.01	NCA01	1	331247	6245831	Residential		17 Roberts Street St Peters 2044	55	50	P	51	47	54	50	51	47	54	51	-	Y	-	-	-	-	Y
NCA01.RES.0439.01	NCA01	1	331300	6245829	Residential		8 Edith Street St Peters 2044	55	50	P	57	53	58	54	57	53	59	55	-	-	-	Y	-	-	Y
NCA01.RES.0440.01	NCA01	2	331207	6245827	Residential		2 Roberts Street St Peters 2044	55	50	P	52	49	55	51	53	49	55	52	-	Y	-	-	-	-	Y
NCA01.RES.0445.01	NCA01	1	331253	6245824	Residential		9 Roberts Street St Peters 2044	55	50	P	52	47	54	50	52	48	55	51	-	Y	-	-	-	-	Y
NCA01.RES.0451.01	NCA01	1	331310	6245822	Residential		1 Roberts Street St Peters 2044	55	50	P	59	55	60	55	59	55	60	56	-	Y	-	Y	-	-	Y
NCA01.RES.0464.01	NCA01	1	331274	6245813	Residential		3 Roberts Street St Peters 2044	55	50	P	55	50	56	52	55	51	57	53	-	Y	-	-	-	-	Y
NCA01.RES.0476.01	NCA01	1	331263	6245804	Residential		5 Roberts Street St Peters 2044	55	50	P	51	47	54	50	51	48	54	51	-	Y	-	-	-	-	Y
NCA01.RES.0502.01	NCA01	2	331205	6245787	Residential		13 Mary Street St Peters 2044	55	50	P	53	49	55	51	53	49	55	52	-	Y	-	-	-	-	Y
NCA01.RES.0506.01	NCA01	2	331223	6245786	Residential		11 Mary Street St Peters 2044	55	50	P	53	49	55	51	53	49	55	52	-	Y	-	-	-	-	Y
NCA01.RES.0520.01	NCA01	2	331027	6245778	Residential		39 Grove Street St Peters 2044	55	50	P	52	48	54	50	52	49	54	51	-	Y	-	-	-	-	Y
NCA01.RES.0530.01	NCA01	2	331178	6245772	Residential		Unit 4 14-18 Mary Street St Peters 2044	55	50	P	52	48	54	51	52	48	55	52	-	Y	-	-	-	-	Y
NCA01.RES.0530.01	NCA01	3	331178	6245772	Residential		Unit 4 14-18 Mary Street St Peters 2044	55	50	P	58	54	60	56	59	55	61	57	Y	Y	Y	Y	-	-	Y
NCA01.RES.0536.01	NCA01	1	331227	6245769	Residential		5 Mary Street St Peters 2044	55	50	P	52	48	54	50	53	49	55	51	-	Y	-	-	-	-	Y
NCA01.RES.0536.01	NCA01	2	331227	6245769	Residential		5 Mary Street St Peters 2044	55	50	P	55	51	57	53	55	51	58	54	Y	Y	-	-	-	-	Y
NCA01.RES.0538.01	NCA01	2	331030	6245768	Residential		37 Grove Street St Peters 2044	55	50	P	52	48	54	50	52	49	54	51	-	Y	-	-	-	-	Y
NCA01.RES.0548.01	NCA01	2	331141	6245760	Residential		13 Alfred Street St Peters 2044	55	50	P	52	48	54	50	52	49	55	51	-	Y	-	-	-	-	Y
NCA01.RES.0550.01	NCA01	2	331097	6245759	Residential		24 Alfred Street St Peters 2044	55	50	P	52	48	54	50	52	48	54	51	-	Y	-	-	-	-	Y

Name	NCA	Flr	Easting	Northing	RecType	Name	Address	NCG Criteria		Period	Predicted Noise Level (dBA)								> 2 dB(A) Increase		Cumulative Limit		Project Acute		Eligible for Consideration of Mitigation
											At Opening (2026)				Future Design (2036)										
											No Build		Build		No Build		Build								
								D	N		D	N	D	N	D	N	D	N	D	N	D	N	D	N	
NCA01.RES.0555.01	NCA01	2	331099	6245756	Residential		22 Alfred Street St Peters 2044	55	50	P	52	48	54	50	52	48	54	51	-	Y	-	-	-	-	Y
NCA01.RES.0565.01	NCA01	2	331002	6245750	Residential		46 Grove Street St Peters 2044	55	50	P	52	48	54	50	52	49	54	51	-	Y	-	-	-	-	Y
NCA01.RES.0575.01	NCA01	2	331106	6245744	Residential		20 Alfred Street St Peters 2044	55	50	P	53	48	54	50	53	49	55	51	-	Y	-	-	-	-	Y
NCA01.RES.0583.01	NCA01	2	331110	6245740	Residential		20 Alfred Street St Peters 2044	55	50	P	53	49	55	51	53	49	55	52	-	Y	-	-	-	-	Y
NCA01.RES.0589.01	NCA01	2	331113	6245736	Residential		10 Alfred Street St Peters 2044	55	50	P	53	49	55	51	53	49	55	52	-	Y	-	-	-	-	Y
NCA01.RES.0749.01	NCA01	2	330787	6245638	Residential		64 Yelverton Street Sydenham 2044	55	50	P	52	48	54	50	52	49	54	51	-	Y	-	-	-	-	Y
NCA01.RES.0789.01	NCA01	2	330765	6245605	Residential		51 George Street Sydenham 2044	55	50	P	52	48	54	50	52	48	54	51	-	Y	-	-	-	-	Y
NCA01.RES.0864.01	NCA01	1	330896	6245512	Residential		8 Yelverton Street Sydenham 2044	55	50	P	52	48	54	50	52	48	55	51	-	Y	-	-	-	-	Y
NCA01.RES.0869.01	NCA01	1	330857	6245503	Residential		13 George Street Sydenham 2044	55	50	P	52	48	54	50	52	48	55	51	-	Y	-	-	-	-	Y
NCA01.RES.0871.01	NCA01	1	330860	6245496	Residential		11 George Street Sydenham 2044	55	50	P	52	48	54	50	53	49	55	51	-	Y	-	-	-	-	Y
NCA01.RES.0875.01	NCA01	1	330869	6245486	Residential		7 George Street Sydenham 2044	55	50	P	53	49	55	51	53	50	56	52	Y	Y	-	-	-	-	Y
NCA01.RES.0877.01	NCA01	1	330873	6245480	Residential		5 George Street Sydenham 2044	55	50	P	53	49	55	51	54	50	56	52	Y	Y	-	-	-	-	Y
NCA01.RES.0879.01	NCA01	1	330877	6245475	Residential		3 George Street Sydenham 2044	55	50	P	54	50	55	52	54	50	56	52	-	Y	-	-	-	-	Y
NCA02.RES.0037.01	NCA01	2	330789	6245515	Residential		52 George Street Sydenham 2044	55	50	P	54	50	56	52	54	50	56	53	Y	Y	-	-	-	-	Y
NCA02.RES.0044.01	NCA01	1	330798	6245503	Residential		46 George Street Sydenham 2044	55	50	P	53	49	55	51	53	49	55	52	-	Y	-	-	-	-	Y
NCA02.RES.0051.01	NCA01	1	330797	6245489	Residential		44 George Street Sydenham 2044	55	50	P	52	48	55	51	52	49	55	52	-	Y	-	-	-	-	Y
NCA02.RES.0052.01	NCA01	1	330812	6245488	Residential		42 George Street Sydenham 2044	55	50	P	54	50	55	51	54	50	56	52	-	Y	-	-	-	-	Y
NCA02.RES.0063.01	NCA01	1	330820	6245472	Residential		36 George Street Sydenham 2044	55	50	P	52	48	55	51	53	49	55	52	-	Y	-	-	-	-	Y
NCA02.RES.0073.01	NCA01	1	330832	6245459	Residential		28 George Street Sydenham 2044	55	50	P	52	48	54	50	52	49	55	51	-	Y	-	-	-	-	Y
NCA02.RES.0445.01	NCA02	1	330673	6245113	Residential		1-2 Bellevue Street Tempe 2044	55	50	P	63	59	64	60	63	59	64	61	Y	Y	-	Y	-	-	Y
NCA02.RES.0456.01	NCA02	1	330687	6245099	Residential		3 Bellevue Street Tempe 2044	55	50	P	61	57	63	59	61	58	63	60	Y	Y	Y	Y	-	-	Y
NCA03.OCC.0471.01	NCA03	1	329887	6244358	Other (Childcare)	Guardian Early Learning Centre	18 Holbeach Avenue Tempe 2044	45	-	H	55	53	57	55	56	54	58	56	Y	-	Y	-	-	-	Y
NCA03.RES.0110.01	NCA03	1	330196	6244732	Residential		Unit 2 34-36 Smith Street Tempe 2044	55	50	P	54	50	56	52	54	50	56	53	Y	Y	-	-	-	-	Y
NCA03.RES.0110.01	NCA03	2	330196	6244732	Residential		Unit 2 34-36 Smith Street Tempe 2044	55	50	P	56	52	58	54	56	52	59	55	Y	Y	-	Y	-	-	Y
NCA03.RES.0114.01	NCA03	1	330207	6244725	Residential		32 Smith Street Tempe 2044	55	50	P	50	46	55	51	50	47	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0116.01	NCA03	1	330217	6244723	Residential		30 Smith Street Tempe 2044	55	50	P	51	47	55	51	51	47	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0120.01	NCA03	1	330225	6244717	Residential		28 Smith Street Tempe 2044	55	50	P	52	48	54	50	52	48	54	51	-	Y	-	-	-	-	Y
NCA03.RES.0125.01	NCA03	1	330232	6244710	Residential		26 Smith Street Tempe 2044	55	50	P	51	47	55	52	51	48	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0126.01	NCA03	1	330240	6244706	Residential		24 Smith Street Tempe 2044	55	50	P	52	48	54	50	52	48	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0127.01	NCA03	1	330112	6244705	Residential		58 Barden Street Tempe 2044	55	50	P	52	48	54	50	52	48	54	51	-	Y	-	-	-	-	Y
NCA03.RES.0131.01	NCA03	2	330173	6244701	Residential		45 Barden Street Tempe 2044	55	50	P	57	53	58	55	57	53	59	55	Y	Y	-	Y	-	-	Y
NCA03.RES.0133.01	NCA03	1	330245	6244697	Residential		22 Smith Street Tempe 2044	55	50	P	52	48	54	50	52	48	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0136.01	NCA03	2	330179	6244694	Residential		43 Barden Street Tempe 2044	55	50	P	56	52	58	54	56	52	58	54	Y	-	-	-	-	-	Y
NCA03.RES.0137.01	NCA03	1	330189	6244691	Residential		41 Barden Street Tempe 2044	55	50	P	53	49	56	52	54	50	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0140.01	NCA03	1	330252	6244690	Residential		20 Smith Street Tempe 2044	55	50	P	51	47	56	52	51	47	56	53	Y	Y	-	-	-	-	Y
NCA03.RES.0143.01	NCA03	1	330261	6244685	Residential		18 Smith Street Tempe 2044	55	50	P	51	47	55	51	51	47	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0148.01	NCA03	1	330197	6244678	Residential		37 Barden Street Tempe 2044	55	50	P	52	48	55	52	53	49	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0148.01	NCA03	2	330197	6244678	Residential		37 Barden Street Tempe 2044	55	50	P	54	51	58	54	55	51	58	54	Y	Y	-	-	-	-	Y
NCA03.RES.0151.01	NCA03	1	330266	6244676	Residential		16 Smith Street Tempe 2044	55	50	P	51	47	57	53	51	47	57	53	Y	Y	-	-	-	-	Y
NCA03.RES.0153.01	NCA03	1	330212	6244675	Residential		25 Barden Street Tempe 2044	55	50	P	51	47	55	51	51	48	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0157.01	NCA03	1	330273	6244670	Residential		14 Smith Street Tempe 2044	55	50	P	50	47	58	54	51	47	58	54	Y	Y	-	-	-	-	Y
NCA03.RES.0158.01	NCA03	1	330107	6244669	Residential		53 Fanning Street Tempe 2044	55	50	P	52	48	54	50	52	49	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0159.01	NCA03	1	330220	6244668	Residential		23 Barden Street Tempe 2044	55	50	P	51	47	55	51	51	47	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0161.01	NCA03	1	330283	6244667	Residential		12 Smith Street Tempe 2044	55	50	P	49	46	58	54	50	46	58	54	Y	Y	-	-	-	-	Y
NCA03.RES.0166.01	NCA03	1	330112	6244663	Residential		51 Fanning Street Tempe 2044	55	50	P	52	48	54	50	52	48	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0166.01	NCA03	2	330112	6244663	Residential		51 Fanning Street Tempe 2044	55	50	P	54	50	56	52	54	50	57	53	Y	Y	-	-	-	-	Y
NCA03.RES.0167.01	NCA03	1	330227	6244663	Residential		21 Barden Street Tempe 2044	55	50	P	50	47	55	52	51	47	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0167.01	NCA03	2	330227	6244663	Residential		21 Barden Street Tempe 2044	55	50	P	53	49	58	54	53	49	59	55	Y	Y	-	Y	-	-	Y
NCA03.RES.0168.01	NCA03	1	330171	6244662	Residential		36 Barden Street Tempe 2044	55	50	P	52	48	55	51	52	48	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0169.01	NCA03	1	330290	6244661	Residential		10 Smith Street Tempe 2044	55	50	P	50	46	58	54	50	47	59	55	Y	Y	-	Y	-	-	Y
NCA03.RES.0172.01	NCA03	1	330176	6244659	Residential		34 Barden Street Tempe 2044	55	50	P	51	47	55	51	52	48	55	52	-	Y	-	-	-	-	Y
NCA03.RES.0173.01	NCA03	1	330018	6244658	Residential		846-854 Princes Highway Tempe 2044	55	50	P	52	48	54	51	52	48	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0174.01	NCA03	1	330119	6244658	Residential		49 Fanning Street Tempe 2044	55	50	P	52	48	54	51	52	48	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0175.01	NCA03	1	330184	6244658	Residential		32 Barden Street Tempe 2044	55	50	P	52	48	55	51	52	48	55	52	-	Y	-	-	-	-	Y
NCA03.RES.0176.01	NCA03	1	330234	6244657	Residential		19 Barden Street Tempe 2044	55	50	P	50	46	56	52	51	47	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0177.01	NCA03	1	330300	6244656	Residential		8 Smith Street Tempe 2044	55	50	P	50	46	58	54	50	46	59	55	Y	Y	-	Y	-	-	Y
NCA03.RES.0181.01	NCA03	1	330189	6244650	Residential		30 Barden Street Tempe 2044	55	50	P	50	46	55	51	50	47	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0183.01	NCA03	1	330306	6244650	Residential		6 Smith Street Tempe 2044	55	50	P	48	44	60	56	49	45	61	57	Y	Y	Y	Y	-	-	Y
NCA03.RES.0184.01	NCA03	1	330238	6244648	Residential		17 Barden Street Tempe 2044	55	50	P	52	48	57	53	52	48	57	53	Y	Y	-	-	-	-	Y
NCA03.RES.0187.01	NCA03	1	330134	6244646	Residential		33 Fanning Street Tempe 2044	55	50	P	51	47	54	50	51	48	54	51	-	Y	-	-	-	-	Y
NCA03.RES.0187.01	NCA03	2	330134	6244646	Residential		33 Fanning Street Tempe 2044	55	50	P	53	49	56	52	53	49	57	53	Y	Y	-	-	-	-	Y
NCA03.RES.0188.01	NCA03	1	330196	6244645	Residential		28 Barden Street Tempe 2044	55	50	P	51	47	55	51	51	47	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0189.01	NCA03	1	330248	6244643	Residential		11 Barden Street Tempe 2044	55	50	P	51	47	56	52	51	47	56	53	Y	Y	-	-	-	-	Y
NCA03.RES.0190.01	NCA03	1	330028	6244641	Residential		45 Wentworth Street Tempe 2044	55	50	P	52	48	54	50	52	49	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0193.01	NCA03	1	330257	6244640	Residential		9 Barden Street Tempe 2044	55	50	P	50	47	57	53	51	47	58	54	Y	Y	-	-	-	-	Y
NCA03.RES.0196.01	NCA03	1	330203	6244635	Residential		22 Barden Street Tempe 2044	55	50	P	51	47	55	52	51	48	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0197.01	NCA03	1	330214	6244635	Residential		20 Barden Street Tempe 2044	55	50	P	50	47	55	51	51	47	55	52	-	Y	-	-	-	-	Y
NCA03.RES.0198.01	NCA03	1	330147	6244635	Residential		29 Fanning Street Tempe 2044	55	50	P	52	48	54	51	53	49	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0198.01	NCA03	2	330147	6244635	Residential		29 Fanning Street Tempe 2044	55	50	P	52	48	57	53	52	49	57	53	Y	Y	-	-	-	-	Y
NCA03.RES.0200.01	NCA03	2	330034	6244632	Residential		43 Wentworth Street Tempe 2044	55	50	P	54	50	57	53	54	51	57	53	Y	Y	-	-	-	-	Y
NCA03.RES.0204.01	NCA03	1	330260	6244629	Residential		7 Barden Street Tempe 2044	55	50	P	50	47	56	53	51	47	57	53	Y	Y	-	-	-	-	Y
NCA03.RES.0204.01	NCA03	2	330260	6244629	Residential		7 Barden Street Tempe 2044	55	50	P	50	47	59	55	51	47	59	55	Y	Y	-	Y	-	-	Y
NCA03.RES.0206.01	NCA03	1	330156	6244628	Residential		25 Fanning Street Tempe 2044	55	50	P	51	47	54	50	51	47	54	51	-	Y	-	-	-	-	Y
NCA03.RES.0207.01	NCA03	1	330219	6244627	Residential		18 Barden Street Tempe 2044	55	50	P	50	47	56	52	51	47	56	52	Y	Y	-	-	-	-	Y

Name	NCA	Flr	Easting	Northing	RecType	Name	Address	NCG Criteria		Period	Predicted Noise Level (dBA)								> 2 dB(A) Increase		Cumulative Limit		Project Acute		Eligible for Consideration of Mitigation
											At Opening (2026)				Future Design (2036)										
											No Build		Build		No Build		Build								
								D	N		D	N	D	N	D	N	D	N	D	N	D	N	D	N	
NCA03.RES.0208.01	NCA03	1	330269	6244625	Residential		5 Barden Street Tempe 2044	55	50	P	50	46	56	52	51	47	57	53	Y	Y	-	-	-	-	Y
NCA03.RES.0214.01	NCA03	1	330227	6244621	Residential		10 Barden Street Tempe 2044	55	50	P	50	47	56	52	51	47	57	53	Y	Y	-	-	-	-	Y
NCA03.RES.0217.01	NCA03	1	330278	6244619	Residential		3 Barden Street Tempe 2044	55	50	P	49	46	59	55	50	46	60	56	Y	Y	Y	Y	-	-	Y
NCA03.RES.0218.01	NCA03	1	330161	6244619	Residential		21 Fanning Street Tempe 2044	55	50	P	52	48	54	50	52	48	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0220.01	NCA03	1	330170	6244618	Residential		19 Fanning Street Tempe 2044	55	50	P	52	48	55	51	52	48	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0223.01	NCA03	1	330118	6244616	Residential		46 Fanning Street Tempe 2044	55	50	P	52	48	55	51	53	49	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0230.01	NCA03	1	330128	6244613	Residential		44 Fanning Street Tempe 2044	55	50	P	52	48	55	51	52	49	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0231.01	NCA03	1	330233	6244612	Residential		8 Barden Street Tempe 2044	55	50	P	50	46	56	52	50	47	57	53	Y	Y	-	-	-	-	Y
NCA03.RES.0232.01	NCA03	1	330180	6244612	Residential		17 Fanning Street Tempe 2044	55	50	P	50	47	55	51	51	47	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0233.01	NCA03	1	330243	6244610	Residential		6 Barden Street Tempe 2044	55	50	P	50	46	56	53	50	47	57	53	Y	Y	-	-	-	-	Y
NCA03.RES.0234.01	NCA03	1	330292	6244610	Residential		1 Barden Street Tempe 2044	55	50	P	49	45	60	56	49	46	61	57	Y	Y	Y	Y	-	-	Y
NCA03.RES.0241.01	NCA03	1	330134	6244605	Residential		42 Fanning Street Tempe 2044	55	50	P	52	48	55	51	52	48	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0243.01	NCA03	1	330249	6244604	Residential		4 Barden Street Tempe 2044	55	50	P	49	46	57	53	50	46	57	53	Y	Y	-	-	-	-	Y
NCA03.RES.0245.01	NCA03	1	330187	6244604	Residential		15 Fanning Street Tempe 2044	55	50	P	51	47	54	51	51	48	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0249.01	NCA03	1	330196	6244599	Residential		11 Fanning Street Tempe 2044	55	50	P	50	46	55	51	50	46	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0251.01	NCA03	1	330141	6244598	Residential		28 Fanning Street Tempe 2044	55	50	P	52	48	55	51	52	48	55	52	-	Y	-	-	-	-	Y
NCA03.RES.0256.01	NCA03	1	330256	6244596	Residential		2 Barden Street Tempe 2044	55	50	P	48	44	57	53	48	45	58	54	Y	Y	-	-	-	-	Y
NCA03.RES.0262.01	NCA03	1	330146	6244590	Residential		26 Fanning Street Tempe 2044	55	50	P	51	47	54	50	52	48	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0265.01	NCA03	1	330157	6244588	Residential		24 Fanning Street Tempe 2044	55	50	P	51	47	55	51	51	47	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0267.01	NCA03	1	330207	6244586	Residential		7 Fanning Street Tempe 2044	55	50	P	49	45	54	50	50	46	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0268.01	NCA03	1	330102	6244585	Residential		27 Wentworth Street Tempe 2044	55	50	P	51	48	54	50	52	48	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0273.01	NCA03	1	330215	6244580	Residential		5 Fanning Street Tempe 2044	55	50	P	49	45	54	50	49	45	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0273.01	NCA03	2	330215	6244580	Residential		5 Fanning Street Tempe 2044	55	50	P	50	46	58	54	51	47	58	54	Y	Y	-	-	-	-	Y
NCA03.RES.0274.01	NCA03	1	330279	6244580	Residential		7 South Street Tempe 2044	55	50	P	48	45	59	55	49	45	59	55	Y	Y	-	Y	-	-	Y
NCA03.RES.0274.01	NCA03	2	330279	6244580	Residential		7 South Street Tempe 2044	55	50	P	51	47	61	57	51	48	62	58	Y	Y	Y	Y	-	-	Y
NCA03.RES.0275.01	NCA03	1	330162	6244579	Residential		22 Fanning Street Tempe 2044	55	50	P	51	47	55	51	51	47	55	52	-	Y	-	-	-	-	Y
NCA03.RES.0278.01	NCA03	1	330111	6244578	Residential		25 Wentworth Street Tempe 2044	55	50	P	51	47	54	50	51	48	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0280.01	NCA03	1	330223	6244574	Residential		3 Fanning Street Tempe 2044	55	50	P	49	45	54	50	49	46	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0281.01	NCA03	1	330170	6244573	Residential		14 Fanning Street Tempe 2044	55	50	P	51	47	55	51	51	48	55	52	-	Y	-	-	-	-	Y
NCA03.RES.0284.01	NCA03	1	330272	6244573	Residential		5 South Street Tempe 2044	55	50	P	48	45	58	54	49	45	58	55	Y	Y	-	Y	-	-	Y
NCA03.RES.0287.01	NCA03	1	330117	6244569	Residential		23 Wentworth Street Tempe 2044	55	50	P	50	46	54	50	50	47	54	51	-	Y	-	-	-	-	Y
NCA03.RES.0288.01	NCA03	1	330176	6244569	Residential		12 Fanning Street Tempe 2044	55	50	P	51	47	55	51	51	47	55	52	-	Y	-	-	-	-	Y
NCA03.RES.0289.01	NCA03	1	330231	6244569	Residential		1 Fanning Street Tempe 2044	55	50	P	50	47	54	50	51	47	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0292.01	NCA03	2	330062	6244568	Residential		30 Wentworth Street Tempe 2044	55	50	P	53	49	56	52	53	49	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0296.01	NCA03	1	330179	6244565	Residential		10 Fanning Street Tempe 2044	55	50	P	50	47	55	51	51	47	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0297.01	NCA03	1	330264	6244565	Residential		3 South Street Tempe 2044	55	50	P	48	45	57	53	49	45	58	54	Y	Y	-	-	-	-	Y
NCA03.RES.0298.01	NCA03	1	330295	6244564	Residential		7 South Street Tempe 2044	55	50	P	49	45	58	54	49	46	59	55	Y	Y	-	Y	-	-	Y
NCA03.RES.0300.01	NCA03	1	330123	6244564	Residential		21 Wentworth Street Tempe 2044	55	50	P	50	46	54	50	50	47	54	51	-	Y	-	-	-	-	Y
NCA03.RES.0302.01	NCA03	1	330185	6244562	Residential		8 Fanning Street Tempe 2044	55	50	P	50	46	55	51	50	46	55	52	-	Y	-	-	-	-	Y
NCA03.RES.0303.01	NCA03	2	330017	6244561	Residential		55 Hart Street Tempe 2044	55	50	P	53	49	55	52	53	49	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0307.01	NCA03	1	330257	6244558	Residential		1 South Street Tempe 2044	55	50	P	48	45	57	54	49	45	58	54	Y	Y	-	-	-	-	Y
NCA03.RES.0308.01	NCA03	1	330194	6244558	Residential		6 Fanning Street Tempe 2044	55	50	P	50	46	55	51	50	47	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0315.01	NCA03	1	330285	6244553	Residential		3 South Street Tempe 2044	55	50	P	48	45	58	54	49	45	59	55	Y	Y	-	Y	-	-	Y
NCA03.RES.0316.01	NCA03	1	330139	6244553	Residential		15-17 Wentworth Street Tempe 2044	55	50	P	49	46	54	50	50	46	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0316.01	NCA03	2	330139	6244553	Residential		15-17 Wentworth Street Tempe 2044	55	50	P	51	47	56	52	51	48	57	53	Y	Y	-	-	-	-	Y
NCA03.RES.0321.01	NCA03	1	330096	6244549	Residential		22 Wentworth Street Tempe 2044	55	50	P	52	48	54	50	53	49	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0322.01	NCA03	1	330198	6244548	Residential		4 Fanning Street Tempe 2044	55	50	P	50	46	56	52	50	47	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0324.01	NCA03	1	330209	6244547	Residential		2 Fanning Street Tempe 2044	55	50	P	50	46	57	53	50	47	58	54	Y	Y	-	-	-	-	Y
NCA03.RES.0329.01	NCA03	2	330038	6244541	Residential		45 Hart Street Tempe 2044	55	50	P	52	48	55	51	52	48	55	52	-	Y	-	-	-	-	Y
NCA03.RES.0330.01	NCA03	1	330103	6244539	Residential		20 Wentworth Street Tempe 2044	55	50	P	52	48	54	50	52	48	54	51	-	Y	-	-	-	-	Y
NCA03.RES.0330.01	NCA03	2	330103	6244539	Residential		20 Wentworth Street Tempe 2044	55	50	P	53	49	56	52	54	50	57	53	Y	Y	-	-	-	-	Y
NCA03.RES.0331.01	NCA03	1	330151	6244539	Residential		13 Wentworth Street Tempe 2044	55	50	P	49	45	54	50	50	46	54	51	-	Y	-	-	-	-	Y
NCA03.RES.0338.01	NCA03	1	330160	6244535	Residential		11 Wentworth Street Tempe 2044	55	50	P	50	46	56	52	50	47	56	53	Y	Y	-	-	-	-	Y
NCA03.RES.0342.01	NCA03	1	330107	6244532	Residential		18 Wentworth Street Tempe 2044	55	50	P	52	48	54	50	52	48	54	51	-	Y	-	-	-	-	Y
NCA03.RES.0346.01	NCA03	1	330166	6244526	Residential		9 Wentworth Street Tempe 2044	55	50	P	49	45	56	53	50	46	57	53	Y	Y	-	-	-	-	Y
NCA03.RES.0351.01	NCA03	1	330111	6244522	Residential		16 Wentworth Street Tempe 2044	55	50	P	51	47	54	50	51	48	54	51	-	Y	-	-	-	-	Y
NCA03.RES.0353.01	NCA03	1	330172	6244520	Residential		7 Wentworth Street Tempe 2044	55	50	P	48	45	55	51	49	45	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0358.01	NCA03	1	330130	6244517	Residential		14 Wentworth Street Tempe 2044	55	50	P	51	47	54	50	51	47	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0360.01	NCA03	1	330180	6244514	Residential		5 Wentworth Street Tempe 2044	55	50	P	50	46	57	53	50	47	58	54	Y	Y	-	-	-	-	Y
NCA03.RES.0364.01	NCA03	1	330139	6244512	Residential		12 Wentworth Street Tempe 2044	55	50	P	50	47	54	51	51	47	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0372.01	NCA03	1	330146	6244506	Residential		10 Wentworth Street Tempe 2044	55	50	P	50	47	55	51	51	47	55	52	-	Y	-	-	-	-	Y
NCA03.RES.0379.01	NCA03	1	330152	6244499	Residential		8 Wentworth Street Tempe 2044	55	50	P	50	46	55	51	50	46	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0382.01	NCA03	1	330162	6244495	Residential		6 Wentworth Street Tempe 2044	55	50	P	50	46	57	53	50	47	57	54	Y	Y	-	-	-	-	Y
NCA03.RES.0384.01	NCA03	1	329981	6244494	Residential		29 Station Street Tempe 2044	55	50	P	52	48	54	50	52	48	54	51	-	Y	-	-	-	-	Y
NCA03.RES.0390.01	NCA03	1	330105	6244486	Residential		9 Hart Street Tempe 2044	55	50	P	50	46	54	50	51	47	54	51	-	Y	-	-	-	-	Y
NCA03.RES.0399.01	NCA03	1	330122	6244478	Residential		5 Hart Street Tempe 2044	55	50	P	50	46	55	51	50	46	55	52	-	Y	-	-	-	-	Y
NCA03.RES.0408.01	NCA03	1	330126	6244470	Residential		3 Hart Street Tempe 2044	55	50	P	49	45	55	51	49	45	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0413.01	NCA03	1	330133	6244463	Residential		1 Hart Street Tempe 2044	55	50	P	50	47	56	53	51	47	57	53	Y	Y	-	-	-	-	Y
NCA03.RES.0426.01	NCA03	1	330105	6244448	Residential		4 Hart Street Tempe 2044	55	50	P	50	46	54	50	51	47	55	51	-	Y	-	-	-	-	Y
NCA03.RES.0435.01	NCA03	1	330112	6244441	Residential		2 Hart Street Tempe 2044	55	50	P	52	48	56	52	53	49	57	53	Y	Y	-	-	-	-	Y
NCA03.RES.0446.01	NCA03	2	330012	6244429	Residential		16 Station Street Tempe 2044	55	50	P	53	49	55	51	53	49	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0447.01	NCA03	1	330132	6244425	Residential		43 South Street Tempe 2044	55	50	P	49	46	55	51	50	46	56	52	Y	Y	-	-	-	-	Y
NCA03.RES.0452.01	NCA03	2	330080	6244419	Residential		3 Station Street Tempe 2044	55	50	P	52	48	56	52	52	48	57	53	Y	Y	-	-	-	-	Y
NCA03.RES.0456.01	NCA03	1	330086	6244413	Residential		1 Station Street Tempe 2044	55	50	P	52	48	56	52	53	49	56	53	Y	Y	-	-	-	-	Y

Name	NCA	Flr	Easting	Northing	RecType	Name	Address	NCG Criteria		Period	Predicted Noise Level (dBA)								> 2 dB(A) Increase		Cumulative Limit		Project Acute		Eligible for Consideration of Mitigation
											At Opening (2026)				Future Design (2036)										
											No Build		Build		No Build		Build								
								D	N		D	N	D	N	D	N	D	N	D	N	D	N	D	N	
NCA03.RES.0456.01	NCA03	2	330086	6244413	Residential		1 Station Street Tempe 2044	55	50	P	55	51	58	54	56	52	58	55	Y	Y	-	Y	-	-	Y
NCA03.RES.0469.01	NCA03	1	330064	6244387	Residential		2 Station Street Tempe 2044	55	50	P	52	48	55	51	53	49	56	52	Y	Y	-	-	-	-	Y
NCA03.OOP.8000.01	NCA03	1	330350	6244580	Other (Outdoor Passive)	Tempe Wetlands	-	55	-	P	47	43	56	52	47	44	57	53	Y	-	-	-	-	-	Y
NCA06.OCC.0032.01	NCA06	1	332230	6244737	Other (Childcare)	Aero Kids Early Learning Centre	247 Coward Street Mascot 2020	45	-	H	54	53	54	51	55	54	54	52	Y	-	Y	-	-	-	Y
NCA06.OCC.0032.01	NCA06	2	332230	6244737	Other (Childcare)	Aero Kids Early Learning Centre	247 Coward Street Mascot 2020	45	-	H	56	54	56	53	56	55	56	54	Y	-	Y	-	-	-	Y
NCA06.OCC.0032.01	NCA06	3	332230	6244737	Other (Childcare)	Aero Kids Early Learning Centre	247 Coward Street Mascot 2020	45	-	H	57	55	57	54	57	56	57	55	Y	-	Y	-	-	-	Y
NCA06.OCC.0032.01	NCA06	4	332230	6244737	Other (Childcare)	Aero Kids Early Learning Centre	247 Coward Street Mascot 2020	45	-	H	58	56	58	56	58	57	59	57	Y	-	Y	-	-	-	Y
NCA06.OCC.0032.01	NCA06	5	332230	6244737	Other (Childcare)	Aero Kids Early Learning Centre	247 Coward Street Mascot 2020	45	-	H	59	57	59	57	59	58	60	58	Y	-	Y	-	-	-	Y
NCA06.OED.9999.01	NCA06	1	332218	6244388	Other (Educational)	New Qantas Flight Training Centre	-	50	-	H	67	66	69	67	68	67	70	69	Y	-	Y	-	Y	-	Y
NCA06.OED.9999.01	NCA06	2	332218	6244388	Other (Educational)	New Qantas Flight Training Centre	-	50	-	H	70	68	71	69	70	69	72	71	Y	-	Y	-	Y	-	Y
NCA06.OHO.0091.01	NCA06	1	332288	6243995	Other (Hotel)	Stamford Plaza Sydney Airport	Cnr Of Robey Street & O'Riordan Street, Mascot 2020	60	55	P	74	71	72	68	74	72	73	68	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0091.01	NCA06	2	332288	6243995	Other (Hotel)	Stamford Plaza Sydney Airport	Cnr Of Robey Street & O'Riordan Street, Mascot 2020	60	55	P	74	71	72	68	74	72	73	68	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0091.01	NCA06	3	332288	6243995	Other (Hotel)	Stamford Plaza Sydney Airport	Cnr Of Robey Street & O'Riordan Street, Mascot 2020	60	55	P	72	69	72	69	72	70	73	69	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0091.01	NCA06	4	332288	6243995	Other (Hotel)	Stamford Plaza Sydney Airport	Cnr Of Robey Street & O'Riordan Street, Mascot 2020	60	55	P	72	69	72	69	72	70	73	70	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0091.01	NCA06	5	332288	6243995	Other (Hotel)	Stamford Plaza Sydney Airport	Cnr Of Robey Street & O'Riordan Street, Mascot 2020	60	55	P	72	69	72	69	72	69	73	70	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0091.01	NCA06	6	332288	6243995	Other (Hotel)	Stamford Plaza Sydney Airport	Cnr Of Robey Street & O'Riordan Street, Mascot 2020	60	55	P	71	69	72	69	72	69	73	69	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0091.01	NCA06	7	332288	6243995	Other (Hotel)	Stamford Plaza Sydney Airport	Cnr Of Robey Street & O'Riordan Street, Mascot 2020	60	55	P	71	68	72	68	72	69	73	69	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0091.01	NCA06	8	332288	6243995	Other (Hotel)	Stamford Plaza Sydney Airport	Cnr Of Robey Street & O'Riordan Street, Mascot 2020	60	55	P	71	67	73	69	71	68	74	70	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0091.01	NCA06	9	332288	6243995	Other (Hotel)	Stamford Plaza Sydney Airport	Cnr Of Robey Street & O'Riordan Street, Mascot 2020	60	55	P	71	67	72	69	71	68	73	70	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0091.01	NCA06	10	332288	6243995	Other (Hotel)	Stamford Plaza Sydney Airport	Cnr Of Robey Street & O'Riordan Street, Mascot 2020	60	55	P	70	67	72	69	71	68	73	70	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0091.01	NCA06	11	332288	6243995	Other (Hotel)	Stamford Plaza Sydney Airport	Cnr Of Robey Street & O'Riordan Street, Mascot 2020	60	55	P	70	67	72	69	71	68	73	70	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0091.01	NCA06	12	332288	6243995	Other (Hotel)	Stamford Plaza Sydney Airport	Cnr Of Robey Street & O'Riordan Street, Mascot 2020	60	55	P	70	67	72	68	71	68	73	70	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0091.01	NCA06	13	332288	6243995	Other (Hotel)	Stamford Plaza Sydney Airport	Cnr Of Robey Street & O'Riordan Street, Mascot 2020	60	55	P	70	67	72	68	71	68	73	70	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0091.01	NCA06	14	332288	6243995	Other (Hotel)	Stamford Plaza Sydney Airport	Cnr Of Robey Street & O'Riordan Street, Mascot 2020	60	55	P	70	67	72	68	71	67	73	69	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0091.01	NCA06	15	332288	6243995	Other (Hotel)	Stamford Plaza Sydney Airport	Cnr Of Robey Street & O'Riordan Street, Mascot 2020	60	55	P	70	67	71	68	70	67	72	69	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0091.01	NCA06	16	332288	6243995	Other (Hotel)	Stamford Plaza Sydney Airport	Cnr Of Robey Street & O'Riordan Street, Mascot 2020	60	55	P	70	67	71	68	70	67	72	69	-	Y	Y	Y	Y	Y	Y
NCA06.OHO.0108.01	NCA06	4	332305	6244339	Other (Hotel)	Travelodge	289 King Street, Mascot 2020	60	55	P	56	53	59	56	57	53	60	57	-	Y	-	-	-	-	Y
NCA06.OHO.0108.01	NCA06	5	332305	6244339	Other (Hotel)	Travelodge	289 King Street, Mascot 2020	60	55	P	58	55	61	58	58	55	62	59	Y	Y	-	-	-	-	Y
NCA06.OHO.0108.01	NCA06	6	332305	6244339	Other (Hotel)	Travelodge	289 King Street, Mascot 2020	60	55	P	60	56	63	59	60	57	64	61	Y	Y	-	Y	-	Y	Y
NCA06.OHO.0108.01	NCA06	7	332305	6244339	Other (Hotel)	Travelodge	289 King Street, Mascot 2020	60	55	P	61	58	64	60	61	58	65	62	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0108.01	NCA06	8	332305	6244339	Other (Hotel)	Travelodge	289 King Street, Mascot 2020	60	55	P	62	59	65	61	63	59	66	63	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0108.01	NCA06	9	332305	6244339	Other (Hotel)	Travelodge	289 King Street, Mascot 2020	60	55	P	63	60	65	62	63	60	66	63	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0108.01	NCA06	10	332305	6244339	Other (Hotel)	Travelodge	289 King Street, Mascot 2020	60	55	P	64	60	66	62	64	61	67	64	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0108.01	NCA06	11	332305	6244339	Other (Hotel)	Travelodge	289 King Street, Mascot 2020	60	55	P	64	61	66	62	65	61	67	64	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0108.01	NCA06	12	332305	6244339	Other (Hotel)	Travelodge	289 King Street, Mascot 2020	60	55	P	64	61	66	63	65	62	67	64	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0108.01	NCA06	13	332305	6244339	Other (Hotel)	Travelodge	289 King Street, Mascot 2020	60	55	P	65	61	66	63	65	62	67	64	Y	Y	Y	Y	Y	Y	Y
NCA06.OHO.0110.01	NCA06	13	332427	6244393	Other (Hotel)	Pullman Hotel	191 O'Riordan Street, Mascot 2020	60	55	P	57	54	59	56	58	55	60	57	-	Y	-	-	-	-	Y
NCA06.OOP.0116.01	NCA06	1	332213	6244048	Other (Outdoor Passive)	Coleman Reserve	4 Coleman Street, Mascot 2020L	55	-	P	66	63	66	62	67	64	66	63	-	-	Y	-	Y	-	Y
NCA06.RES.0115.01	NCA06	2	332326	6244270	Residential	King Apartments	338 King Street Mascot 2020	60	55	P	54	51	58	54	54	51	59	56	-	Y	-	-	-	-	Y
NCA06.RES.0115.01	NCA06	3	332326	6244270	Residential	King Apartments	338 King Street Mascot 2020	60	55	P	55	52	59	55	55	52	60	57	-	Y	-	-	-	-	Y
NCA06.RES.0115.01	NCA06	4	332326	6244270	Residential	King Apartments	338 King Street Mascot 2020	60	55	P	56	53	60	56	57	54	61	58	Y	Y	-	-	-	-	Y
NCA06.RES.0115.01	NCA06	5	332326	6244270	Residential	King Apartments	338 King Street Mascot 2020	60	55	P	58	54	61	58	58	55	62	59	Y	Y	-	-	-	-	Y
NCA06.RES.0115.01	NCA06	6	332326	6244270	Residential	King Apartments	338 King Street Mascot 2020	60	55	P	59	56	62	59	60	57	63	61	Y	Y	-	Y	-	Y	Y
NCA06.RES.0115.01	NCA06	7	332326	6244270	Residential	King Apartments	338 King Street Mascot 2020	60	55	P	61	57	63	60	61	58	64	62	Y	Y	-	Y	-	Y	Y
NCA06.RES.0115.01	NCA06	8	332326	6244270	Residential	King Apartments	338 King Street Mascot 2020	60	55	P	62	58	64	61	62	59	65	62	Y	Y	Y	Y	Y	Y	Y
NCA06.RES.0115.01	NCA06	9	332326	6244270	Residential	King Apartments	338 King Street Mascot 2020	60	55	P	62	59	65	61	63	60	66	63	Y	Y	Y	Y	Y	Y	Y
NCA06.RES.0115.01	NCA06	10	332326	6244270	Residential	King Apartments	338 King Street Mascot 2020	60	55	P	63	60	65	62	63	60	66	63	Y	Y	Y	Y	Y	Y	Y
NCA06.RES.0115.01	NCA06	11	332326	6244270	Residential	King Apartments	338 King Street Mascot 2020	60	55	P	63	60	65	62	64	61	66	63	Y	Y	Y	Y	Y	Y	Y
NCA06.RES.0115.01	NCA06	12	332326	6244270	Residential	King Apartments	338 King Street Mascot 2020	60	55	P	64	60	66	62	64	61	67	64	Y	Y	Y	Y	Y	Y	Y
NCA07.OHO.0028.01	NCA07	1	332479	6243819	Other (Hotel)	Ibis Budget Sydney Airport	5 Ross Smith Avenue, Mascot 2020	60	55	P	73	70	75	72	74	71	76	73	Y	Y	-	-	-	-	Y
NCA07.OHO.0028.01	NCA07	2	332479	6243819	Other (Hotel)	Ibis Budget Sydney Airport	5 Ross Smith Avenue, Mascot 2020	60	55	P	74	71	76	73	75	72	77	74	Y	Y	-	-	-	-	Y
NCA07.OHO.0028.01	NCA07	3	332479	6243819	Other (Hotel)	Ibis Budget Sydney Airport	5 Ross Smith Avenue, Mascot 2020	60	55	P	75	71	76	73	75	72	77	74	Y	Y	-	-	-	Y	Y
NCA07.OHO.0028.01	NCA07	4	332479	6243819	Other (Hotel)	Ibis Budget Sydney Airport	5 Ross Smith Avenue, Mascot 2020	60	55	P	74	71	76	73	75	72	77	74	Y	Y	-	-	-	Y	Y
NCA07.OHO.0028.01	NCA07	5	332479	6243819	Other (Hotel)	Ibis Budget Sydney Airport	5 Ross Smith Avenue, Mascot 2020	60	55	P	74	71	76	72	74	71	76	74	Y	Y	-	-	-	Y	Y
NCA07.OHO.0075.01	NCA07	1	332438	6243830	Other (Hotel)	Mantra Hotel	3 Ross Smith Avenue, Mascot 2020	60	55	P	74	70	75	72	74	71	76	73	Y	Y	-	-	Y	Y	Y
NCA07.OHO.0075.01	NCA07	2	332438	6243830	Other (Hotel)	Mantra Hotel	3 Ross Smith Avenue, Mascot 2020	60	55	P	75	71	76	73	75	72	77	74	Y	Y	-	-	Y	Y	Y
NCA07.OHO.0075.01	NCA07	3	332438	6243830	Other (Hotel)	Mantra Hotel	3 Ross Smith Avenue, Mascot 2020	60	55	P	74	71	76	73	75	72	77	74	Y	Y	-	-	Y	Y	Y
NCA07.OHO.0075.01	NCA07	4	332438	6243830	Other (Hotel)	Mantra Hotel	3 Ross Smith Avenue, Mascot 2020	60	55	P	74	71	76	73	74	71	77	74	Y	Y	-	-	Y	Y	Y
NCA07.OHO.0075.01	NCA07	5	332438	6243830	Other (Hotel)	Mantra Hotel	3 Ross Smith Avenue, Mascot 2020	60	55	P	74	71	76	72	74	71	76	74	Y	Y	-	-	Y	Y	Y
NCA07.OHO.0075.01	NCA07	6	332438	6243830	Other (Hotel)	Mantra Hotel	3 Ross Smith Avenue, Mascot 2020	60	55	P	74	70	75	72	74	71	76	73	Y	Y	-	-	Y	Y	Y
NCA07.OHO.0075.01	NCA07	7	332438	6243830	Other (Hotel)	Mantra Hotel	3 Ross Smith Avenue, Mascot 2020	60	55	P	73	70	75	72	74	71	76	73	Y	Y	-	-	Y	Y	Y
NCA07.OHO.0075.01	NCA07	8	332438	6243830	Other (Hotel)	Mantra Hotel	3 Ross Smith Avenue, Mascot 2020	60	55	P	73	70	75	72	73	70	76	73	Y	Y	-	-	Y	Y	Y
NCA07.OHO.0075.01	NCA07	9	332438	6243830	Other (Hotel)	Mantra Hotel	3 Ross Smith Avenue, Mascot 2020	60	55	P	73	69	75	71	73	70	75	73	Y	Y	-	-	Y	Y	Y
NCA07.OHO.0075.01	NCA07	10	332438	6243830	Other (Hotel)	Mantra Hotel	3 Ross Smith Avenue, Mascot 2020	60	55	P	73	69	74	71	73	70	75	72	Y	Y	-	-	Y	Y	Y
NCA07.OHO.0076.01	NCA07	1	332195	6243901	Other (Hotel)	Future Airport Hotel	Future Airport Hotel	60	55	P	72	69	74	71	73	70	75	73	Y	Y	Y	Y	Y	Y	Y
NCA07.OHO.0076.01	NCA07	2	332195	6243901	Other (Hotel)	Future Airport Hotel	Future Airport Hotel	60	55	P	73	70	75	71	73	71	76	73	Y	Y	Y	Y	Y	Y	Y
NCA07.OHO.0076.01	NCA07	3	332195	6243901	Other (Hotel)	Future Airport Hotel	Future Airport Hotel	60	55	P	74	71	76	72	74	71	77	74	Y	Y	Y	Y	Y	Y	Y
NCA07.OHO.0076.01	NCA07	4	332195	6243901	Other (Hotel)	Future Airport Hotel	Future Airport Hotel	60	55	P	73	70	75	71	74	71	76	73	Y	Y	Y	Y	Y	Y	Y
NCA07.OHO.0076.01	NCA07	5	332195	6243901	Other (Hotel)	Future Airport Hotel	Future Airport Hotel	60	55	P	73	70	75	72	74	71	76	73	Y	Y	Y	Y	Y	Y	Y
NCA07.OHO.0076.01	NCA07	6	332195	6243901	Other (Hotel)	Future Airport Hotel	Future Airport Hotel	60	55	P	73	70	75	72	74	71	76	73	Y	Y	Y	Y	Y	Y	Y
NCA07.OHO.0076.01	NCA07	7	332195	6243901	Other (Hotel)	Future Airport Hotel	Future Airport Hotel	60	55	P	73	70	75	72	74	71	76	73	Y	Y	Y	Y	Y	Y	Y
NCA07.OHO.0076.01	NCA07	8	332195	6243901	Other (Hotel)	Future Airport Hotel	Future Airport Hotel	60	55	P	73	70	75	71	73	70	76	73	Y	Y	Y	Y	Y	Y	Y
NCA07.OHO.0076.01	NCA07	9	332195	6243901	Other (Hotel)	Future Airport Hotel	Future Airport Hotel	60	55	P	72	69	74	71	73	70	75	72	Y	Y	Y	Y	Y	Y	Y
NCA07.OHO.0076.01	NCA07	10	332195	6243901	Other (Hotel)	Future Airport Hotel	Future Airport Hotel	60	55	P	72	69	74	71	73	70	75	72	Y	Y	Y	Y	Y	Y	Y

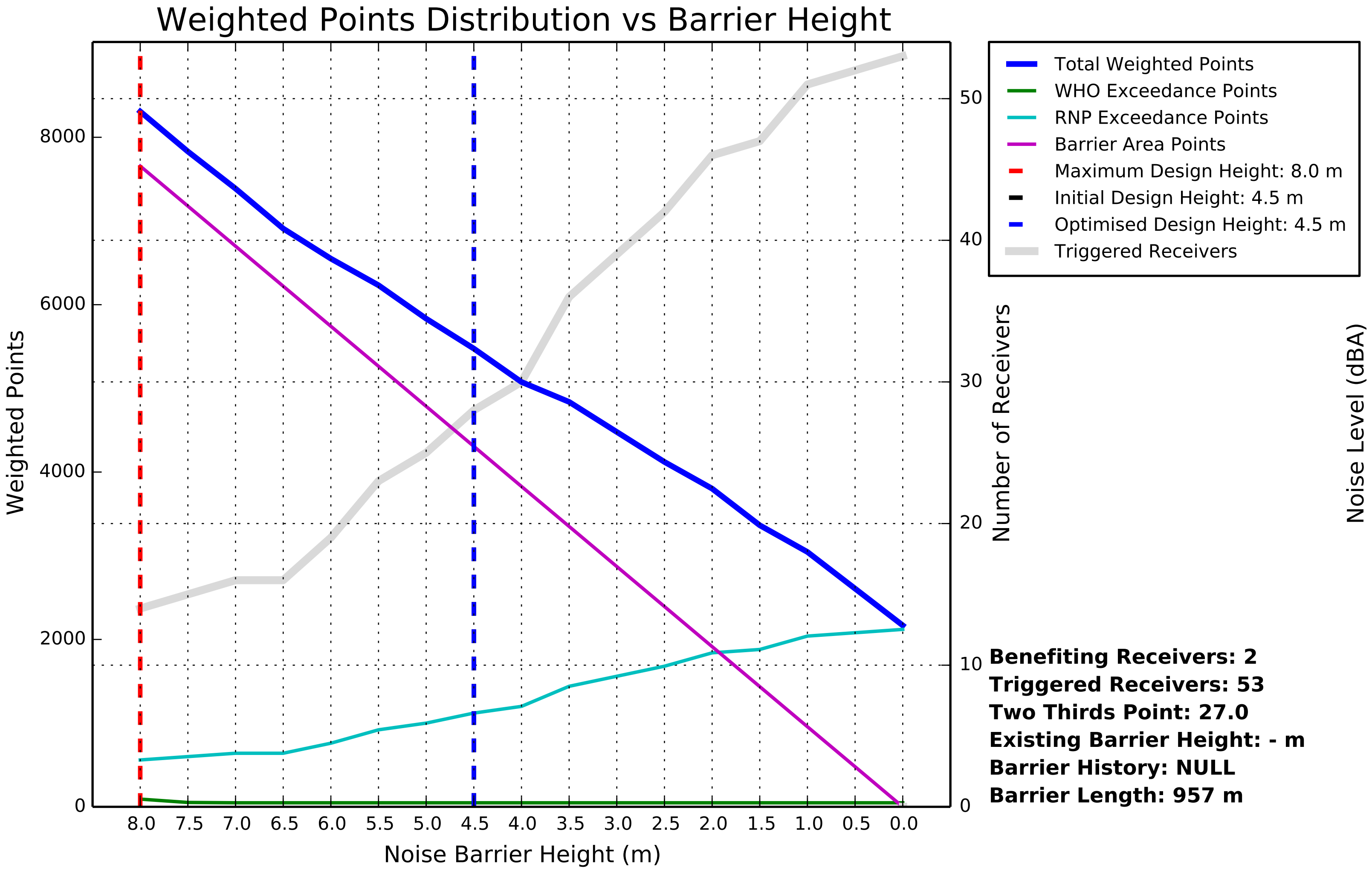
Name	NCA	Flr	Easting	Northing	RecType	Name	Address	NCG Criteria D	NCG Criteria N	Period	Predicted Noise Level (dBA) At Opening (2026) No Build D	At Opening (2026) No Build N	At Opening (2026) Build D	At Opening (2026) Build N	Future Design (2036) No Build D	Future Design (2036) No Build N	Future Design (2036) Build D	Future Design (2036) Build N	> 2 dB(A) Increase D	> 2 dB(A) Increase N	Cumulative Limit D	Cumulative Limit N	Project Acute D	Project Acute N	Eligible for Consideration of Mitigation
NCA08.OHO.0314.01	NCA08	7	332450	6244009	Other (Hotel)	Quest Mascot (Hotel)	108-114 Robey Street, Mascot 2020	60	55	P	68	65	68	65	69	66	69	65	-	-	-	-	-	Y	Y
NCA08.OHO.0314.01	NCA08	8	332450	6244009	Other (Hotel)	Quest Mascot (Hotel)	108-114 Robey Street, Mascot 2020	60	55	P	68	66	68	65	69	66	69	65	-	-	-	-	-	Y	Y
NCA08.OHO.0314.01	NCA08	9	332450	6244009	Other (Hotel)	Quest Mascot (Hotel)	108-114 Robey Street, Mascot 2020	60	55	P	68	66	69	65	69	66	69	66	-	-	-	-	-	Y	Y
NCA08.OHO.0314.01	NCA08	10	332450	6244009	Other (Hotel)	Quest Mascot (Hotel)	108-114 Robey Street, Mascot 2020	60	55	P	69	66	69	65	69	66	69	66	-	-	-	-	-	Y	Y
NCA08.OHO.0421.01	NCA08	1	332479	6243981	Other (Hotel)	Felix Hotel	121 Baxter Road, Mascot 2020	60	55	P	60	57	62	59	60	57	63	61	Y	Y	-	-	-	-	Y
NCA08.OHO.0421.01	NCA08	2	332479	6243981	Other (Hotel)	Felix Hotel	121 Baxter Road, Mascot 2020	60	55	P	63	60	65	62	63	60	66	63	Y	Y	-	-	-	-	Y
NCA08.OHO.0421.01	NCA08	3	332479	6243981	Other (Hotel)	Felix Hotel	121 Baxter Road, Mascot 2020	60	55	P	64	61	67	63	65	62	67	65	Y	Y	-	-	-	-	Y
NCA08.OHO.0421.01	NCA08	4	332479	6243981	Other (Hotel)	Felix Hotel	121 Baxter Road, Mascot 2020	60	55	P	66	62	68	64	66	63	68	66	Y	Y	-	-	-	-	Y
NCA08.OHO.0421.01	NCA08	5	332479	6243981	Other (Hotel)	Felix Hotel	121 Baxter Road, Mascot 2020	60	55	P	66	63	68	65	67	63	69	66	Y	Y	-	-	-	-	Y
NCA08.OHO.0421.01	NCA08	6	332479	6243981	Other (Hotel)	Felix Hotel	121 Baxter Road, Mascot 2020	60	55	P	67	63	69	65	67	64	69	67	Y	Y	-	-	-	-	Y
NCA08.OHO.0421.01	NCA08	7	332479	6243981	Other (Hotel)	Felix Hotel	121 Baxter Road, Mascot 2020	60	55	P	67	64	69	66	67	64	70	67	Y	Y	-	-	-	Y	Y
NCA08.OHO.0421.01	NCA08	8	332479	6243981	Other (Hotel)	Felix Hotel	121 Baxter Road, Mascot 2020	60	55	P	67	64	69	66	67	64	70	67	Y	Y	-	-	-	Y	Y
NCA08.RES.0345.01	NCA08	1	332426	6243975	Residential		131 Baxter Road Mascot 2020	60	55	P	56	53	58	55	57	54	59	56	-	Y	-	-	-	-	Y
NCA08.RES.0353.01	NCA08	1	332540	6243966	Residential		107 Baxter Road Mascot 2020	60	55	P	59	56	62	59	60	57	63	60	Y	Y	-	-	-	-	Y
NCA08.RES.0353.01	NCA08	2	332540	6243966	Residential		107 Baxter Road Mascot 2020	60	55	P	62	59	65	61	63	60	65	63	Y	Y	-	-	-	-	Y
NCA08.RES.0355.01	NCA08	1	332561	6243963	Residential		103 Baxter Road Mascot 2020	60	55	P	60	56	62	59	60	57	63	60	Y	Y	-	-	-	-	Y
NCA08.RES.0355.01	NCA08	2	332561	6243963	Residential		103 Baxter Road Mascot 2020	60	55	P	62	59	65	61	63	60	65	63	Y	Y	-	-	-	-	Y
NCA08.RES.0356.01	NCA08	1	332549	6243962	Residential		105 Baxter Road Mascot 2020	60	55	P	60	56	62	59	60	57	63	60	Y	Y	-	-	-	-	Y
NCA08.RES.0357.01	NCA08	1	332530	6243961	Residential		109 Baxter Road Mascot 2020	60	55	P	60	57	63	60	61	58	64	61	Y	Y	-	-	-	-	Y
NCA08.RES.0363.01	NCA08	1	332609	6243954	Residential		93 Baxter Road Mascot 2020	60	55	P	60	56	62	59	60	57	63	60	Y	Y	-	-	-	-	Y
NCA08.RES.0386.01	NCA08	1	332899	6243912	Residential		29 Baxter Road Mascot 2020	60	55	P	58	55	60	57	58	55	61	58	Y	Y	-	-	-	-	Y
NCA08.RES.0386.01	NCA08	2	332899	6243912	Residential		29 Baxter Road Mascot 2020	60	55	P	60	57	62	59	60	57	63	60	Y	Y	-	-	-	-	Y
NCA08.RES.0387.01	NCA08	1	332878	6243911	Residential		33 Baxter Road Mascot 2020	60	55	P	61	58	63	60	61	58	64	61	Y	Y	-	-	-	-	Y
NCA08.RES.0388.01	NCA08	1	332889	6243911	Residential		31 Baxter Road Mascot 2020	60	55	P	60	57	62	59	61	58	63	61	Y	Y	-	-	-	-	Y
NCA08.RES.0389.01	NCA08	1	332929	6243908	Residential		23 Baxter Road Mascot 2020	60	55	P	57	54	59	55	58	55	60	57	-	Y	-	-	-	-	Y
NCA08.RES.0390.01	NCA08	1	332918	6243907	Residential		25 Baxter Road Mascot 2020	60	55	P	57	53	59	56	57	54	60	57	-	Y	-	-	-	-	Y
NCA08.RES.0391.01	NCA08	1	332938	6243905	Residential		21 Baxter Road Mascot 2020	60	55	P	57	54	58	55	57	54	59	56	-	Y	-	-	-	-	Y
NCA08.RES.0391.01	NCA08	2	332938	6243905	Residential		21 Baxter Road Mascot 2020	60	55	P	59	56	61	57	60	56	61	59	-	Y	-	-	-	-	Y
NCA08.RES.0403.01	NCA08	1	332920	6243868	Residential		32 Baxter Road Mascot 2020	60	55	P	60	57	63	60	61	58	64	61	Y	Y	-	-	-	-	Y
NCA08.RES.0403.01	NCA08	2	332920	6243868	Residential		32 Baxter Road Mascot 2020	60	55	P	63	60	65	62	63	60	66	63	Y	Y	-	-	-	-	Y
NCA08.RES.0404.01	NCA08	1	332910	6243866	Residential		34 Baxter Road Mascot 2020	60	55	P	62	58	64	61	62	59	65	62	Y	Y	-	-	-	-	Y
NCA08.RES.0404.01	NCA08	2	332910	6243866	Residential		34 Baxter Road Mascot 2020	60	55	P	64	61	66	63	65	62	67	65	Y	Y	-	-	-	-	Y
NCA08.RES.0405.01	NCA08	1	332929	6243864	Residential		30 Baxter Road Mascot 2020	60	55	P	61	58	64	60	61	58	64	62	Y	Y	-	-	-	-	Y
NCA08.RES.0406.01	NCA08	1	332940	6243862	Residential		28 Baxter Road Mascot 2020	60	55	P	61	57	63	60	61	58	64	61	Y	Y	-	-	-	-	Y
NCA08.RES.0407.01	NCA08	1	332950	6243862	Residential		26 Baxter Road Mascot 2020	60	55	P	58	55	60	57	58	55	61	58	Y	Y	-	-	-	-	Y
NCA08.RES.0408.01	NCA08	1	332961	6243858	Residential		22-24 Baxter Road Mascot 2020	60	55	P	58	55	61	58	59	56	62	59	Y	Y	-	-	-	-	Y
NCA08.RES.0409.01	NCA08	1	332973	6243857	Residential		18-20 Baxter Road Mascot 2020	60	55	P	57	54	59	56	58	55	60	58	-	Y	-	-	-	-	Y
NCA08.RES.0410.01	NCA08	1	332985	6243855	Residential		14-16 Baxter Road Mascot 2020	60	55	P	56	53	58	55	57	54	59	57	-	Y	-	-	-	-	Y
NCA08.RES.0418.01	NCA08	1	332899	6243869	Residential		36 Baxter Road Mascot 2020	60	55	P	62	59	64	61	62	59	65	63	Y	Y	-	-	-	-	Y
NCA08.RES.0420.01	NCA08	1	332754	6243935	Residential		59 Baxter Road Mascot 2020	60	55	P	61	58	64	61	62	59	65	62	Y	Y	-	-	-	-	Y
NCA08.RES.0420.01	NCA08	2	332754	6243935	Residential		59 Baxter Road Mascot 2020	60	55	P	63	60	66	63	64	61	67	64	Y	Y	-	-	-	-	Y
NCA08.RES.0420.01	NCA08	3	332754	6243935	Residential		59 Baxter Road Mascot 2020	60	55	P	64	61	67	64	65	62	68	65	Y	Y	-	-	-	-	Y
NCA08.RES.0420.01	NCA08	4	332754	6243935	Residential		59 Baxter Road Mascot 2020	60	55	P	66	62	68	65	66	63	69	66	Y	Y	-	-	-	-	Y
NCA08.RES.0420.01	NCA08	5	332754	6243935	Residential		59 Baxter Road Mascot 2020	60	55	P	66	63	68	65	67	63	69	66	Y	Y	-	-	-	-	Y
NCA08.RES.0420.01	NCA08	6	332754	6243935	Residential		59 Baxter Road Mascot 2020	60	55	P	67	63	69	65	67	64	70	67	Y	Y	-	-	-	-	Y
NCA08.RES.0420.01	NCA08	7	332754	6243935	Residential		59 Baxter Road Mascot 2020	60	55	P	67	64	69	66	67	64	70	67	Y	Y	-	-	-	-	Y
																								Total	342

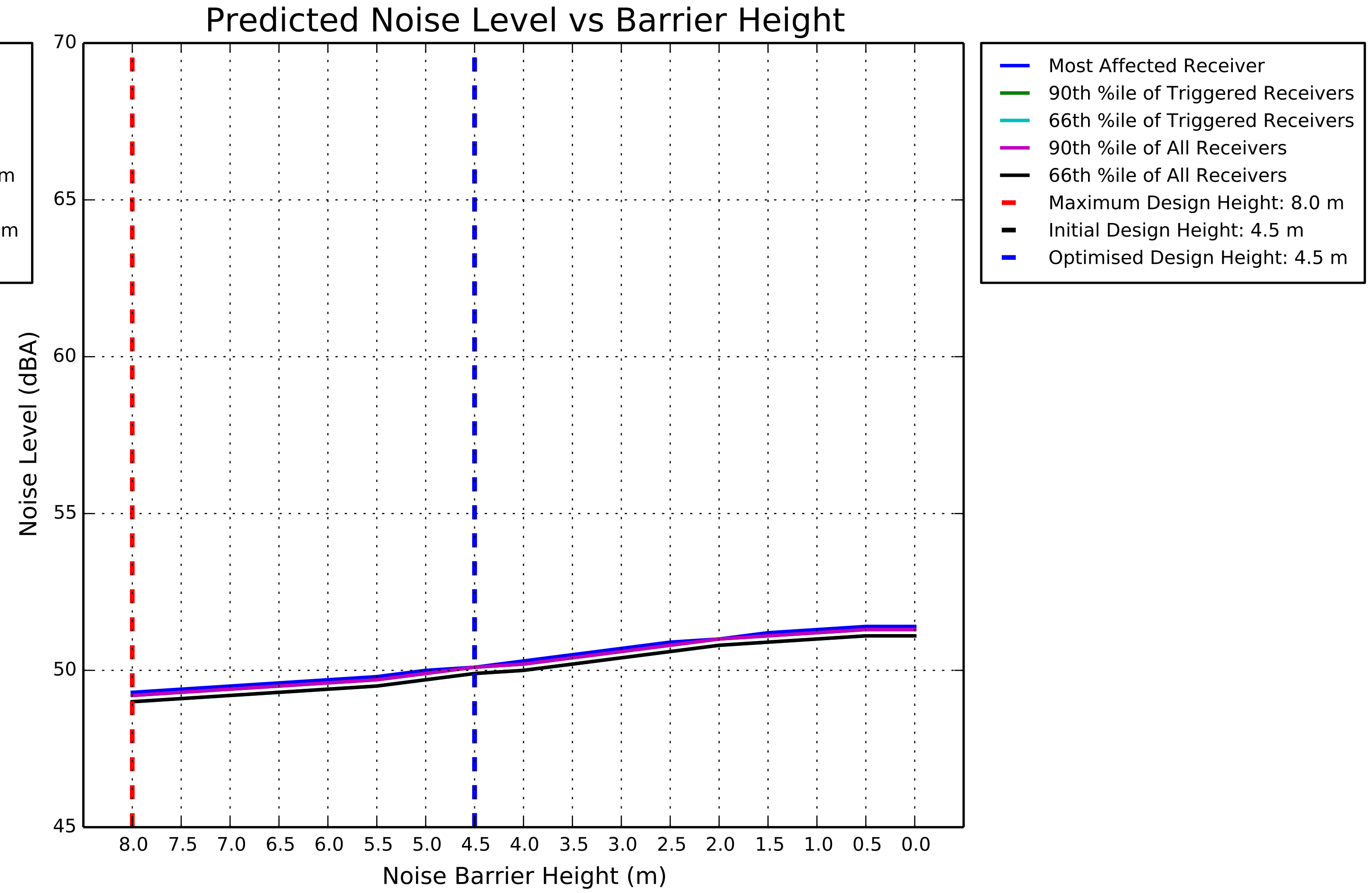
Note: The results in this table are based on the highest noise level of the triggered facades, per floor. If no facades are triggered, then the highest noise level of all facades is presented for each floor. It is noted that a single receiver may be triggered on multiple facades by different criteria and for some receivers where a >2 dB increase is shown, the increase may be on a different facade from where the highest noise level is predicted.

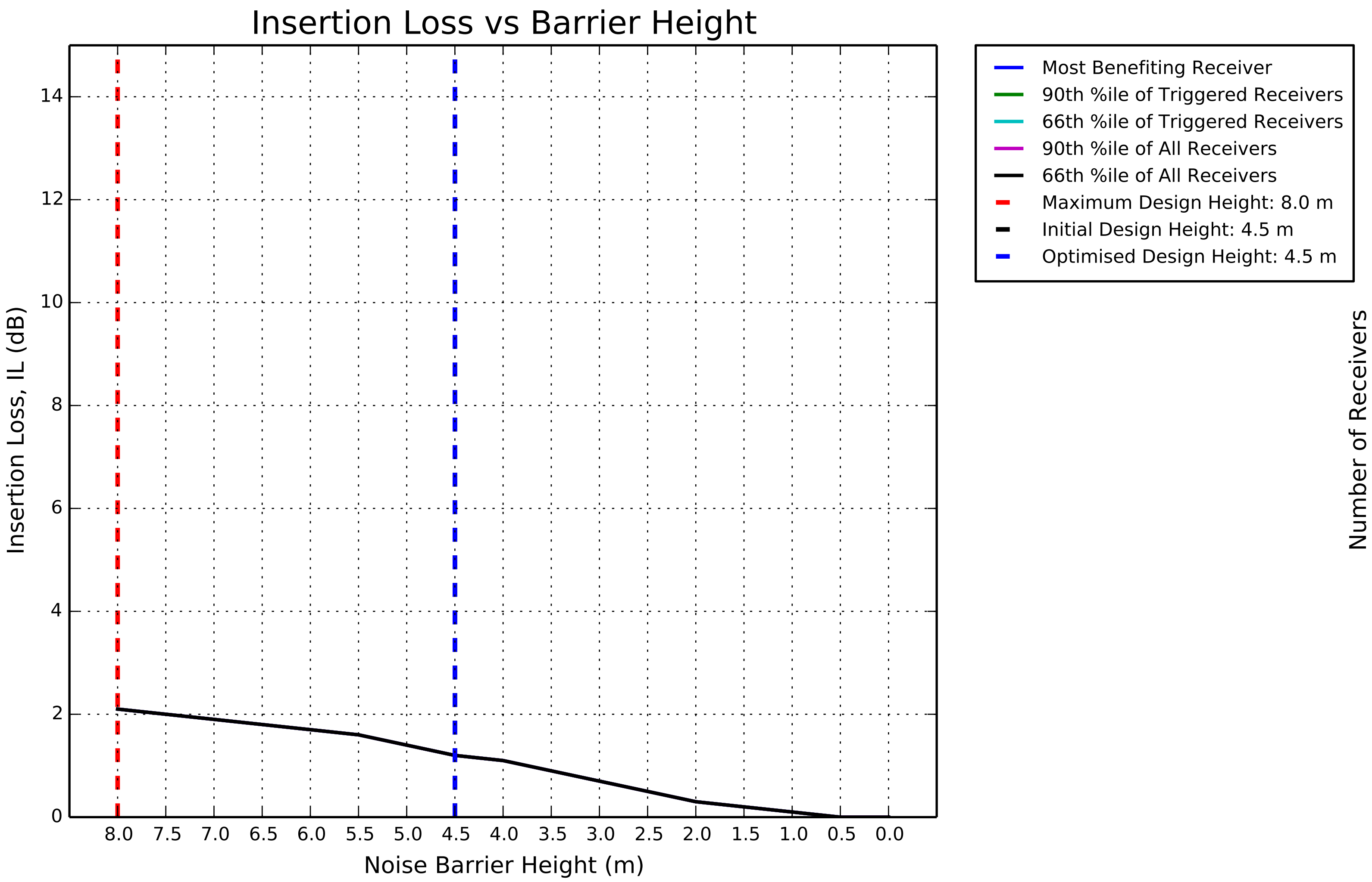
Note: Address information has been taken from third party data. Reference should be made to the exceedance maps for the location of all triggered buildings.

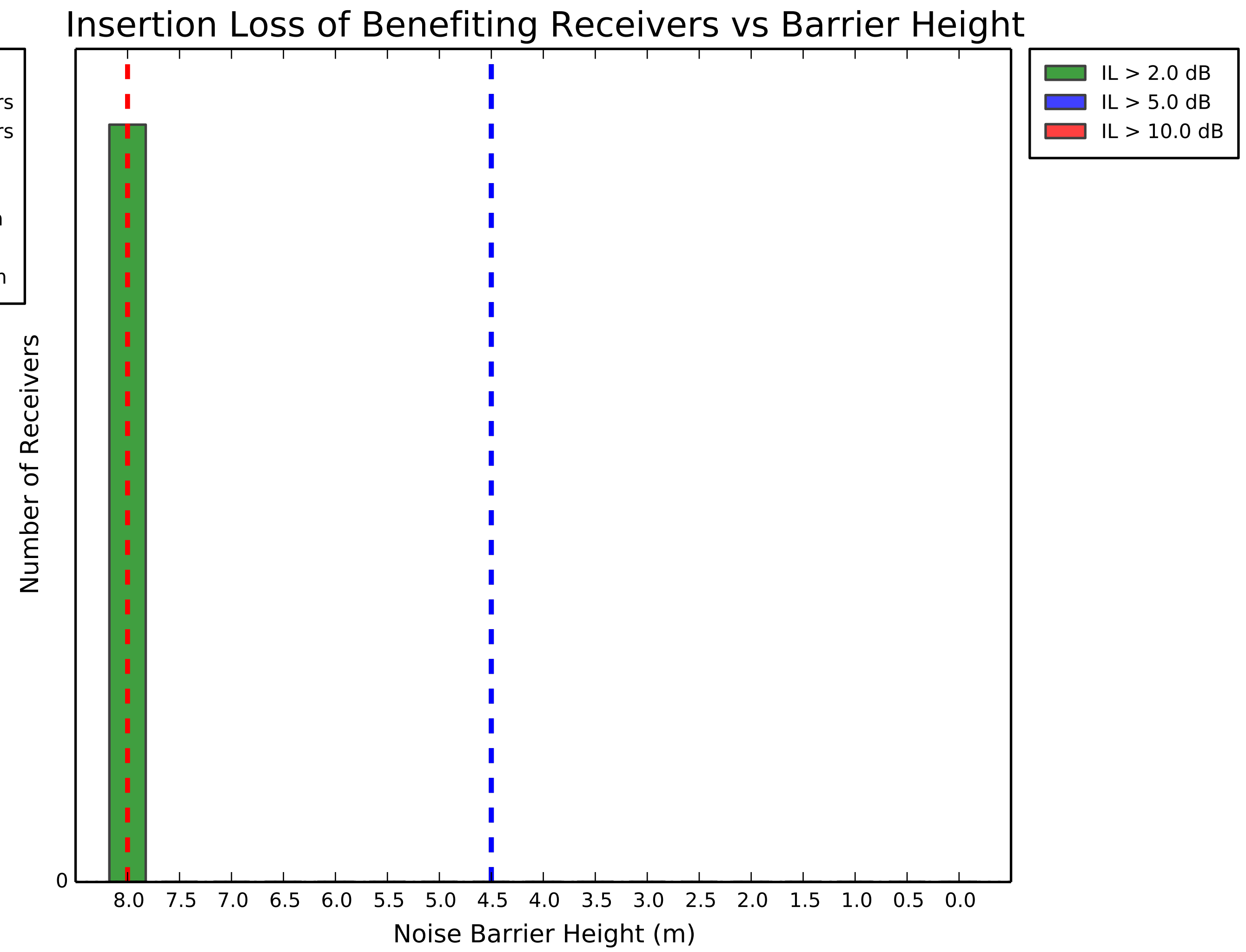
Noise Barrier Optimisation Graphs

Noise Barrier Optimisation: NW01



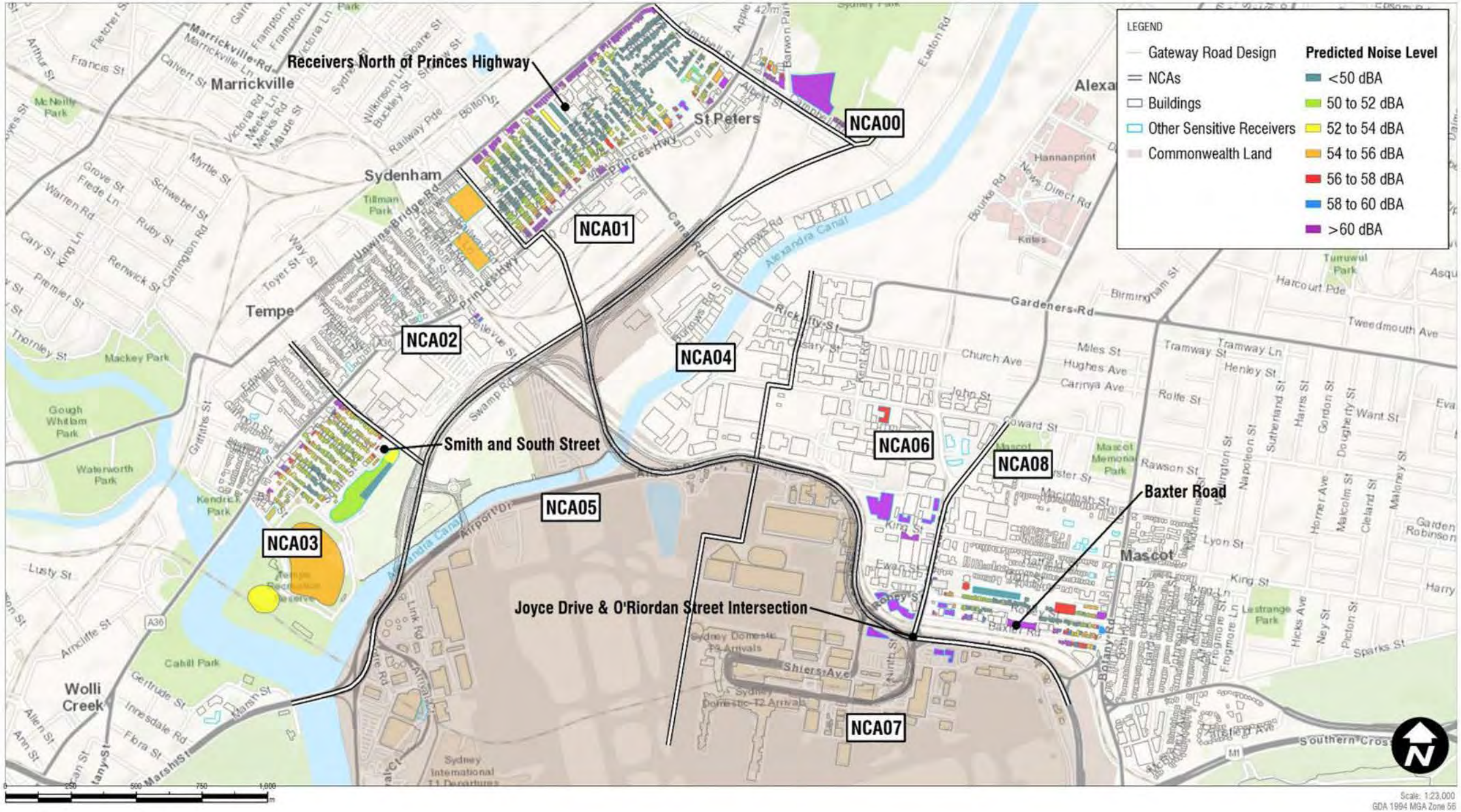






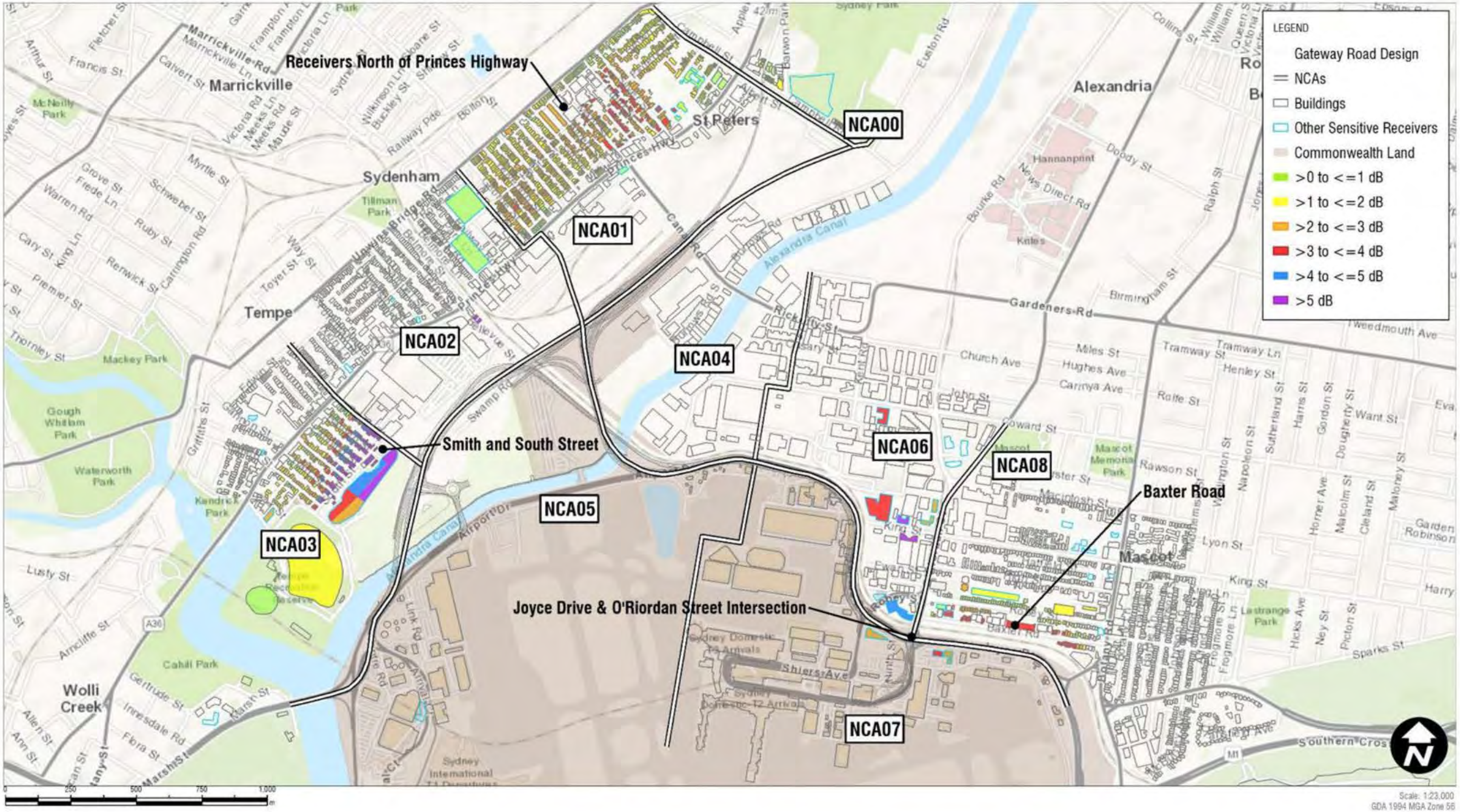
Hi-Resolution Operational Mapping

Figure 1 Worst-case Predicted Operational Noise Levels (2036 Night-time, Build)



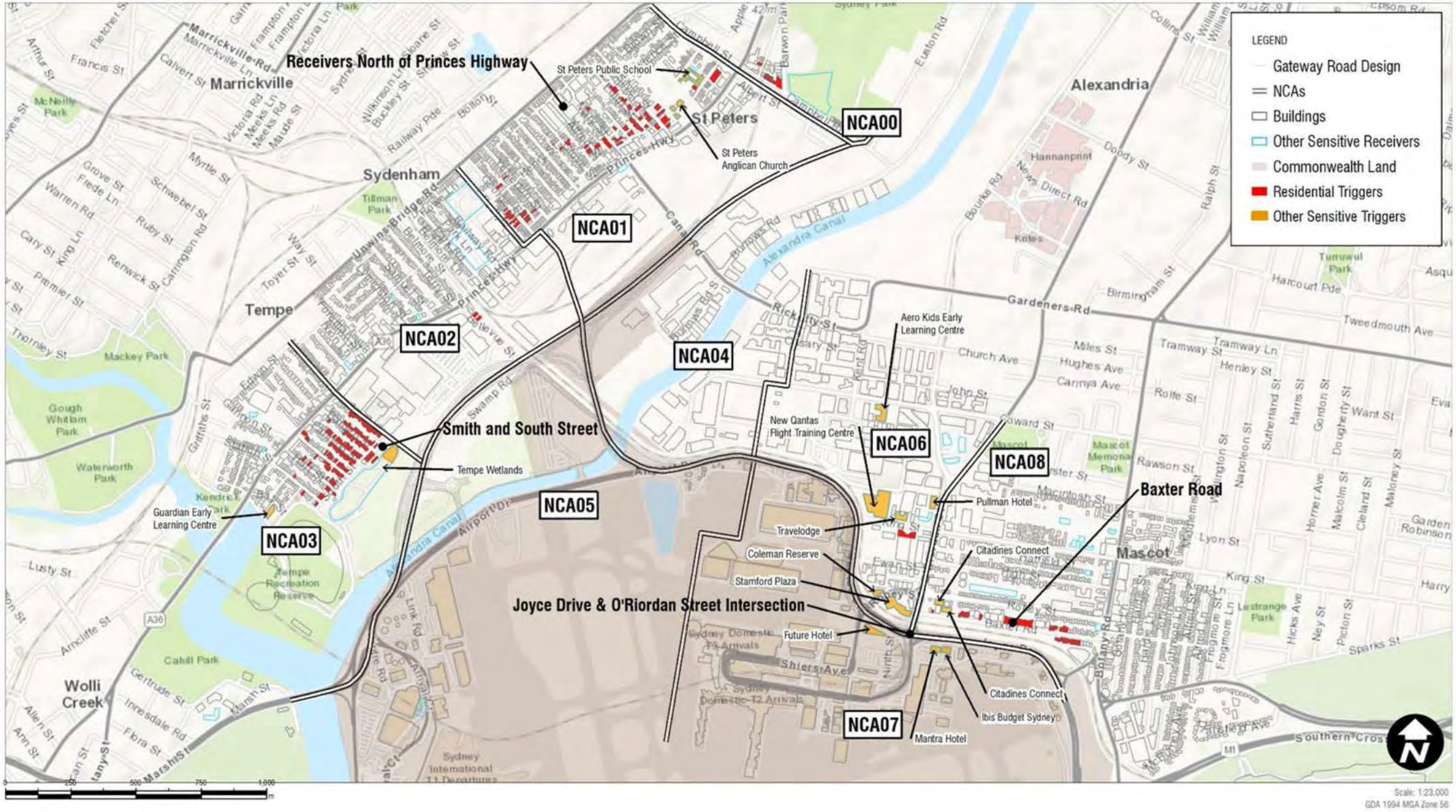
SLR

Figure 2 Worst-case Predicted Change in Operational Noise (2036 Night-time, Build minus No Build)



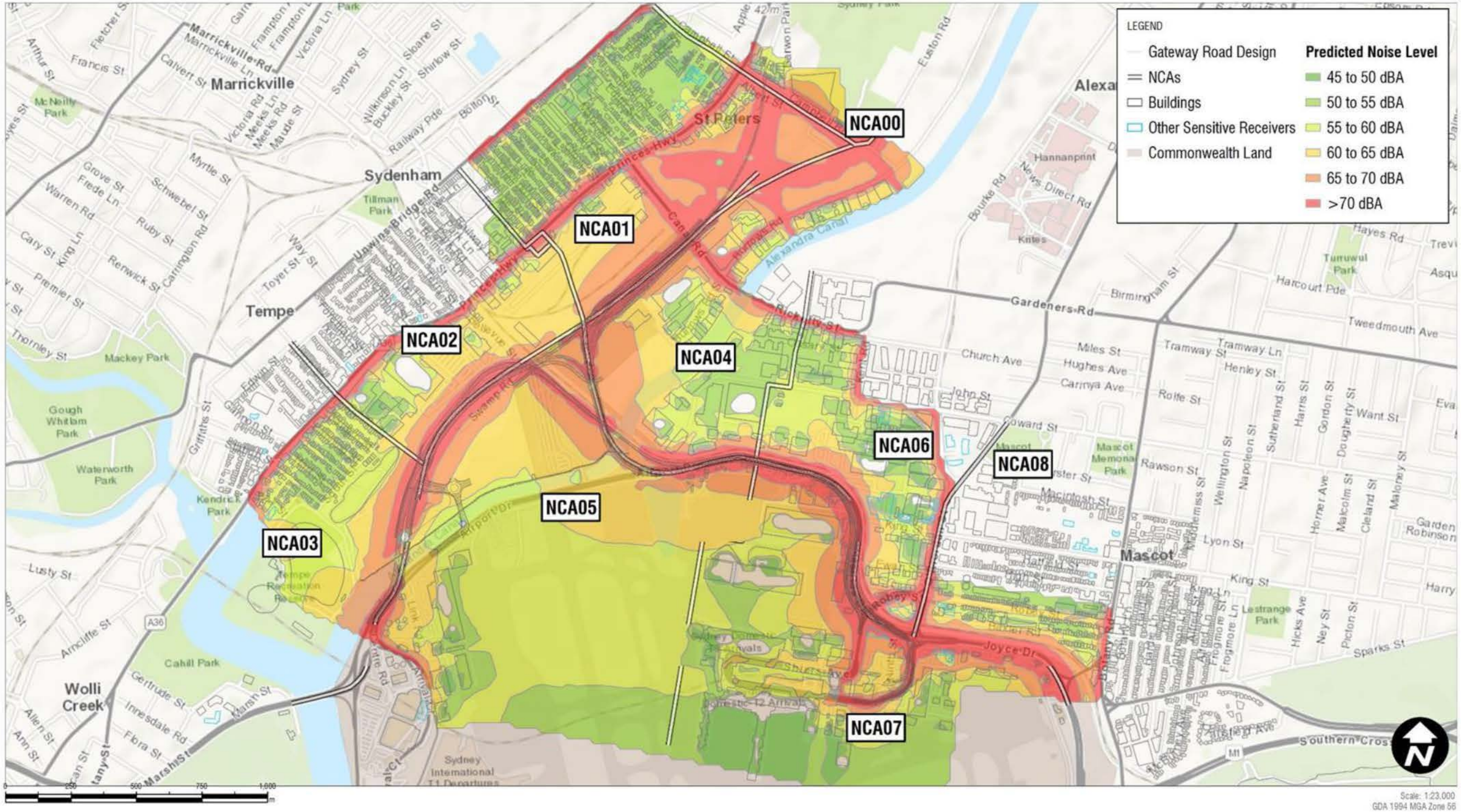
SLR

Figure 3 Receivers Eligible for Consideration of Additional Mitigation



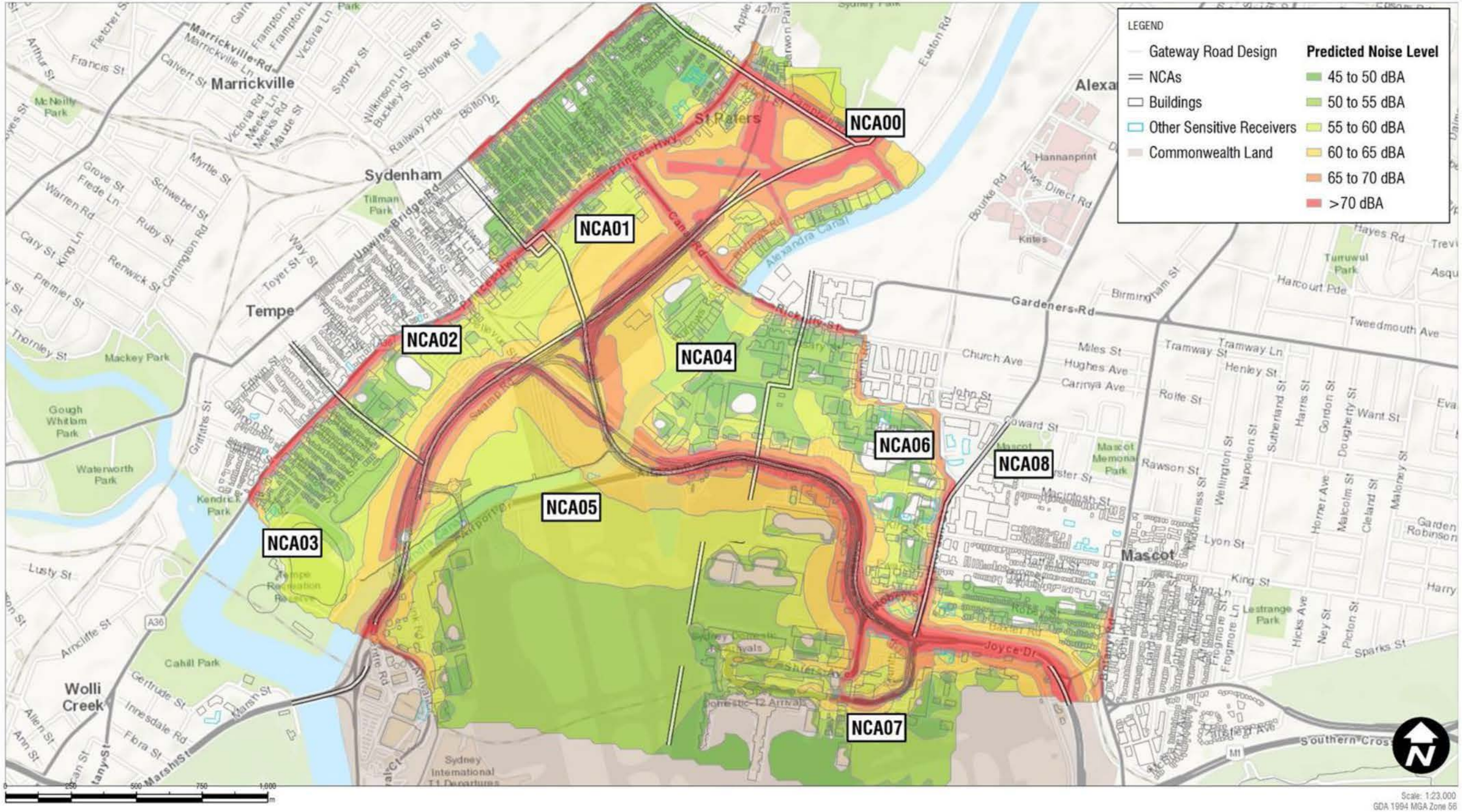
SLR

Figure 4 Grid Noise Maps – 2036 Build Daytime



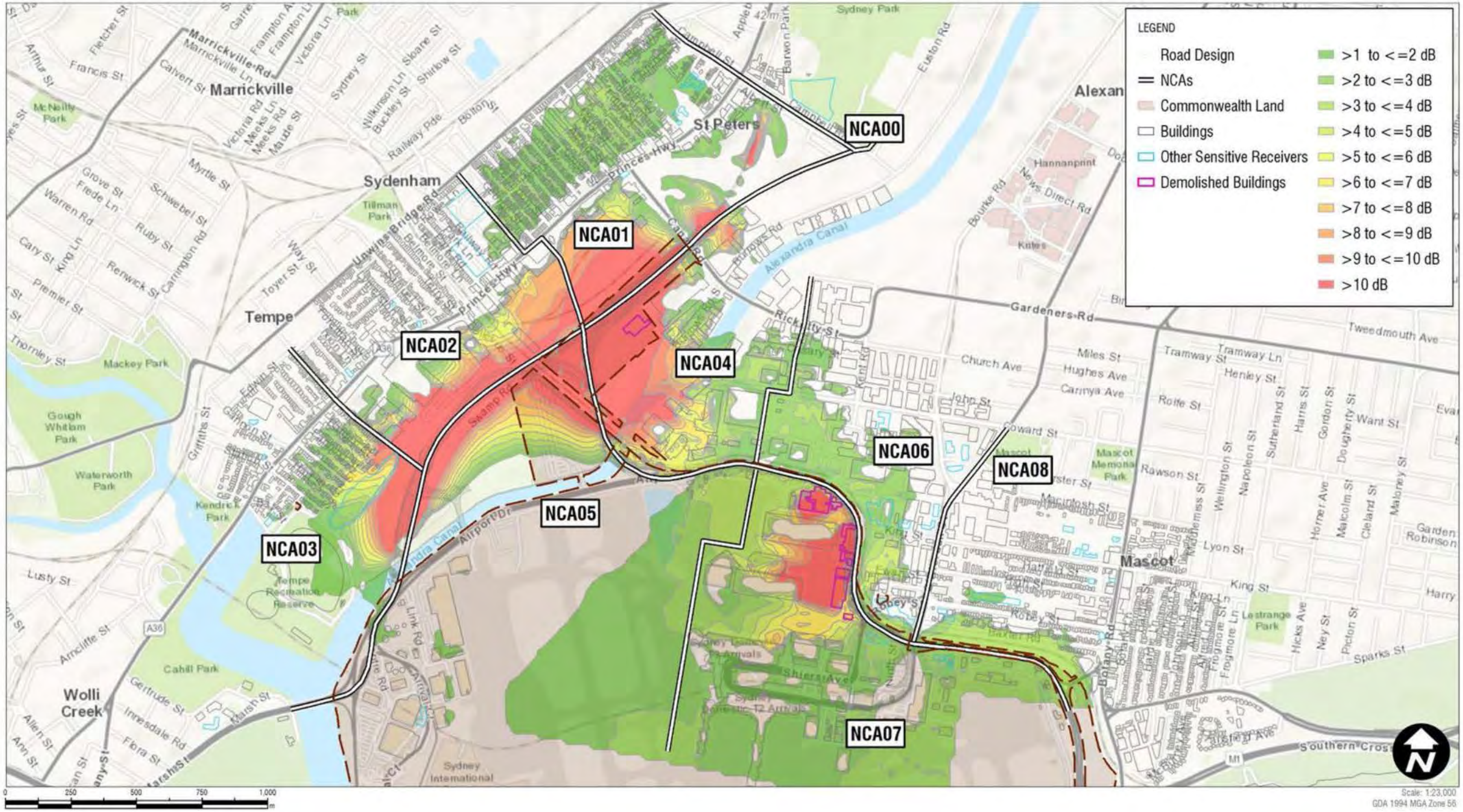
SLR

Figure 5 Grid Noise Maps – 2036 Build Night-time



SLR

Figure 6 Change in Noise Level Across the Project – Commonwealth Land



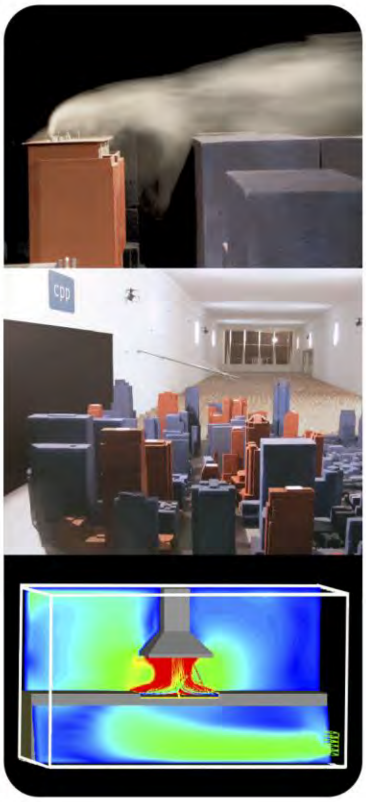
SLR

Appendix C
Additional windshear and turbulence assessment

CERMAK
PETERKA
PETERSEN

WIND ENGINEERING AND AIR QUALITY CONSULTANTS

Final Report



Wind Tunnel Tests for:

Sydney Gateway

NSW, Australia

Prepared for:

Roads and Maritime Services

101 Miller Street

North Sydney, NSW 2060

Australia

February 2020

CPP Project: 13049

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EXECUTIVE SUMMARY

A wind tunnel study was conducted to determine the effect of the proposed Sydney Gateway roads on wind conditions along the approach flight path to the existing Runway 16R at Sydney Airport. The threshold of the runway is close to the proposed roadway which is located within the assessment trigger area for this runway and penetrates the 1:35 surface. Therefore, a detailed assessment with regard to the potential of the proposed roadway to generate wind shear and wake turbulence affecting approaching aircraft was required.

A model of the runway approach was fabricated to a length scale of 1:750 with the runway approach approximately centred on the turntable in the wind tunnel. Replicas of the surrounding structures within a 1060 m radius were constructed and placed on the turntable. Testing was conducted for 4 configurations:

- Configuration 1: Datum: existing configuration without containers in Tempe storage area and without Boral concrete recycling facility
- Configuration 2: Existing: existing configuration including containers and Boral facility
- Configuration 3: Proposed Option A: Datum plus addition of proposed Sydney Gateway roadway including noise wall and traffic
- Configuration 4: Proposed Option B: As Option A plus waste mound in Tempe

The wind tunnel testing was performed in the natural boundary layer wind tunnel of Cermak Peterka Petersen Pty. Ltd., St Peters. Appropriate approach boundary layer conditions representative of a suburban environment were established in the test section of the wind tunnel. The approach wind flow had appropriate turbulence characteristics as defined in Standards Australia (2011).

Measurements of wind conditions at various locations up to 60-70 m above ground level along the glide slope to the threshold of Runway 16R were made with Cobra probes at various heights and locations for 9 wind directions. These measurements were used to predict the wind conditions caused by the proposed roadway, and to compare the level of wind shear and turbulence with design criteria.

In overview, the minimum wind speed for exceedance of the DIRDC (2018) criteria was found to change by up to +0.8 kt and -1.7 kt compared to the datum and existing configuration depending on direction, with the average exceedance wind speed changing by up to +1.0 kt and -1.1 kt.

DOCUMENT VERIFICATION

Date	Revision	Prepared by	Checked by	Approved by
14/02/20	Initial release	JP	PE	JP

TABLE OF CONTENTS

LIST OF FIGURES

1 INTRODUCTION

In the vicinity of areas of aircraft operations such as airports, a combination of strong runway cross winds and large structures near runways can create wind effects in the form of wind shear and turbulence that could affect aviation safety. Assessment of the acceptability of the wind environment near an airport is determined against the National Airports Safeguarding Framework (NASF) Guideline B (DIRDC, 2018), which outlines the maximum influence that a particular structure can have on the wind characteristics in the vicinity of operating aircraft.

CPP has been commissioned by Roads and Maritime Services to determine the influence of the proposed Sydney Gateway road project located close to the approach of the existing Runway 16R, Figure 1, on the wind characteristics in the vicinity of operating aircraft.

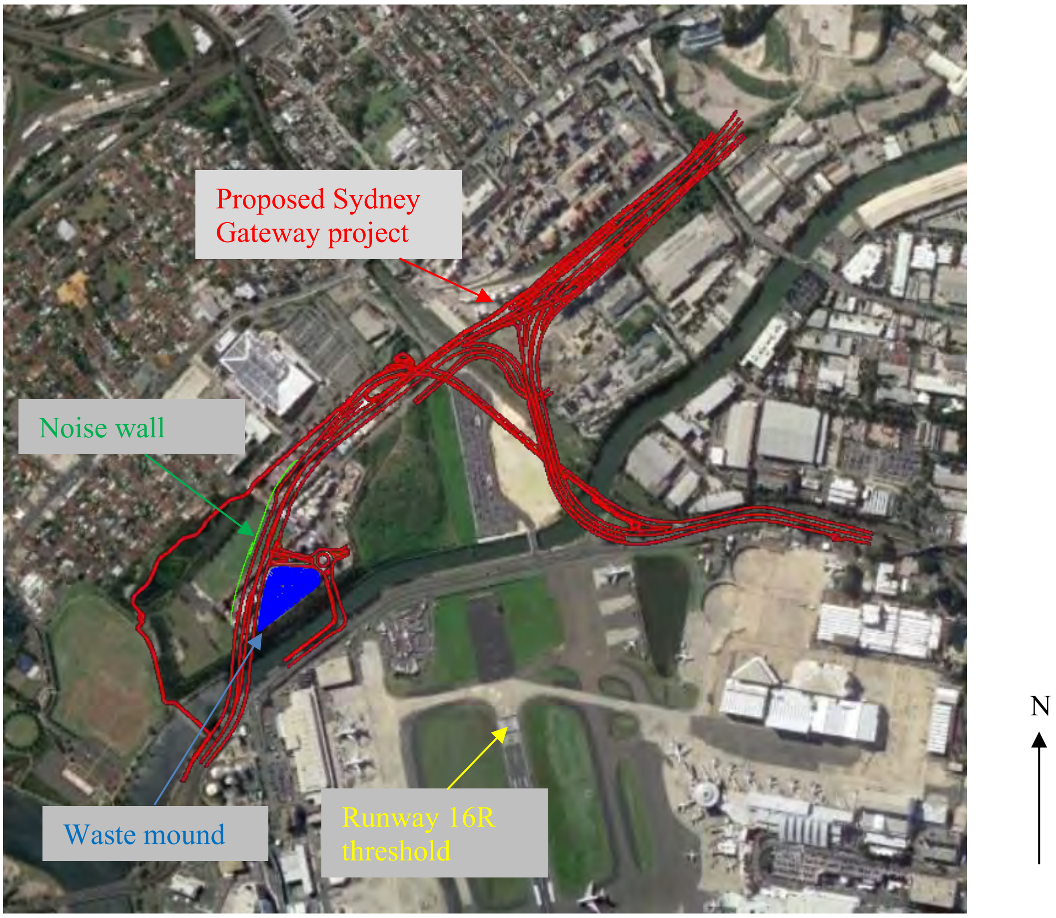


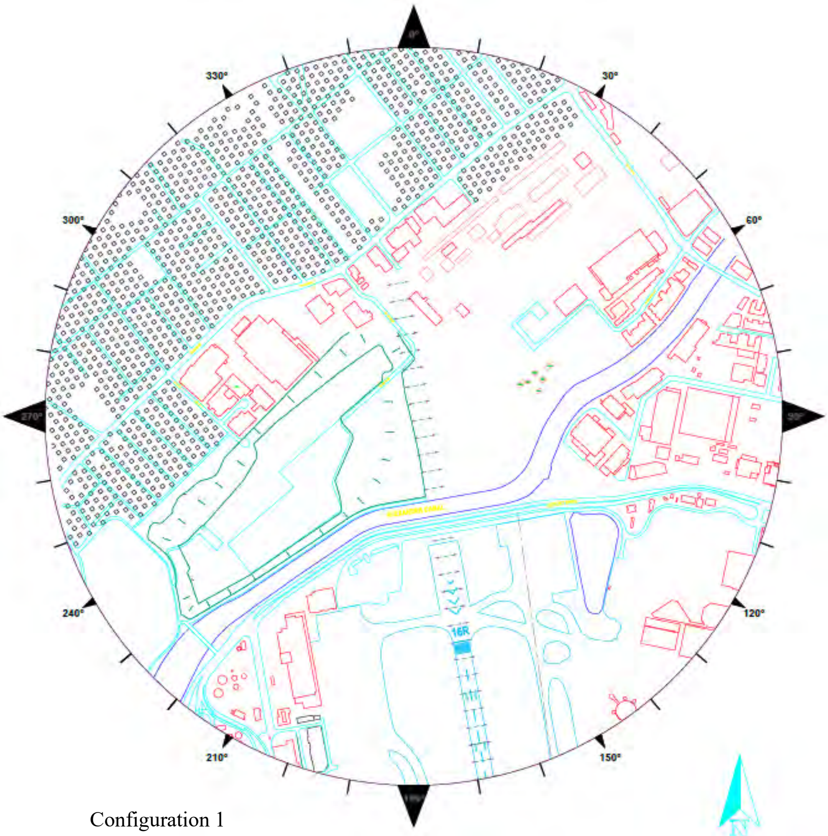
Figure 1: Aerial view with proposed roadway highlighted (Google Earth, 2018).

The proposed roadway is located north of the threshold to Runway 16R at Sydney Airport, Figure 1. The proposed roadway is elevated above ground level and comprises various bridges across Alexandria Canal and existing trainlines, as well as a 5 m high noise wall over a length of 400 m to the north-west, thereby the development penetrates the NASF 1:35 surface for Runway 16R; i.e. the specified ratio of building height to perpendicular distance from the runway centreline. Therefore, a more detailed assessment is required to determine their impact on wind shear and turbulence for aircraft approaching this runway. The proposed development also includes a waste mound to the west of the runway approach near Alexandria canal with heights of up to approximately 13.5 m above existing ground level. A total of four configurations were assessed in the wind tunnel testing:

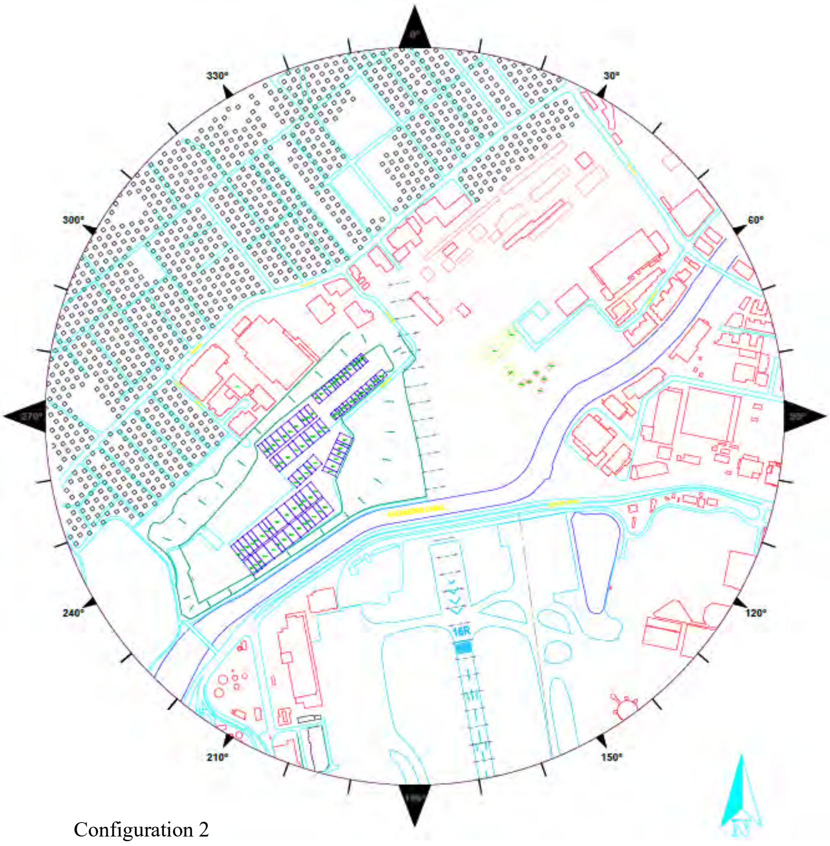
- Configuration 1: Datum: existing configuration without containers in Tempe storage area and without Boral concrete recycling facility
- Configuration 2: Existing: existing configuration including containers and Boral facility
- Configuration 3: Proposed Option A: Datum plus addition of proposed Sydney Gateway roadway including noise wall and traffic
- Configuration 4: Proposed Option B: As Option A plus waste mound in Tempe

A site plan for the test configurations is shown in Figure 2 to Figure 3. The standard averaging time period for the wind gust speed provided by the Bureau of Meteorology and from AirServices Australia is a *"3-second average"*. The sampling frequency of the data is unknown, which could have a slight impact on the results presented herein.

There are six anemometers located around the airport near the threshold to each runway. When the measured gust wind speed is higher than the aforementioned cross-wind limit, the operating runway may be changed. For this study, it has been assumed that only one anemometer is used for the assessment of the wind speed, and that this is located in a similar turbulent environment to the landing aircraft. The typical approach speed of aircraft is between about 36 and 77 m/s (70 and 150 kt), which is significantly higher than normal operational wind speeds.

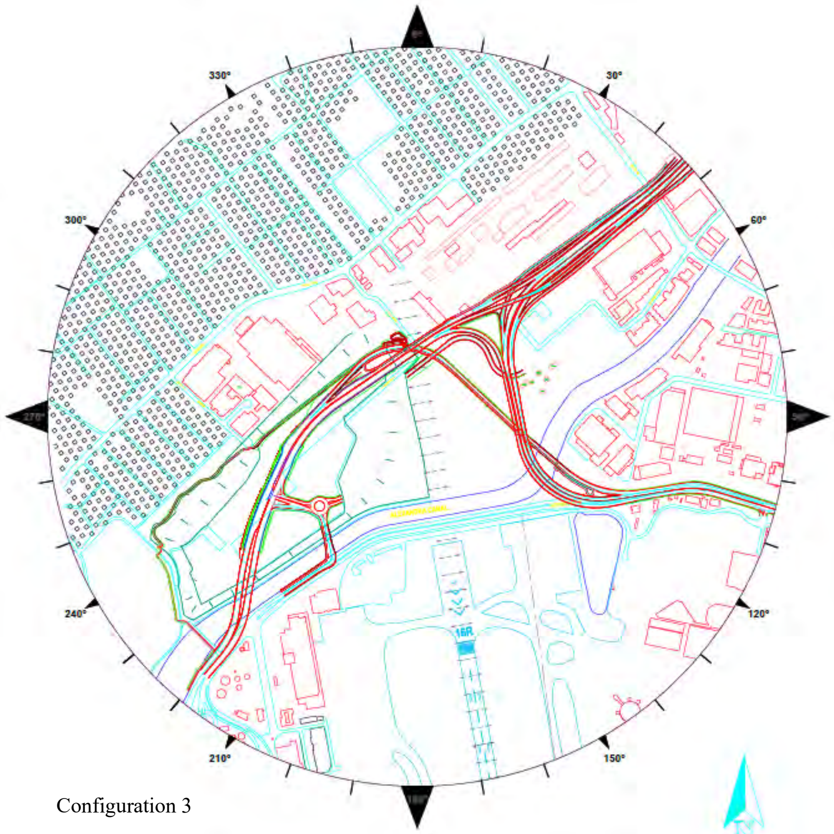


Configuration 1

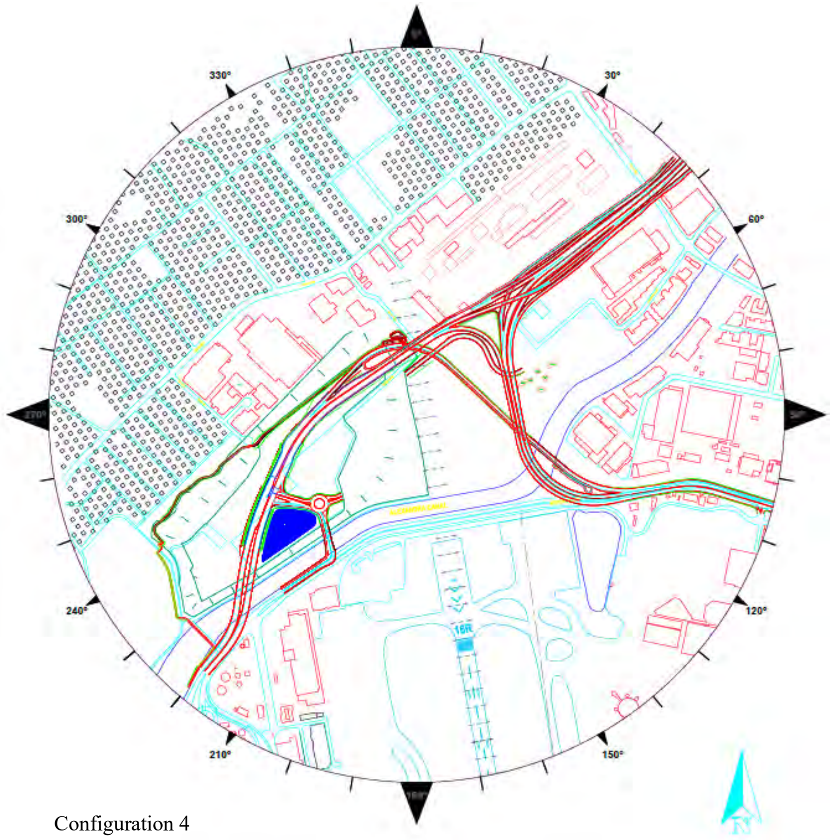


Configuration 2

Figure 2: Site plan of the wind tunnel model for Configurations 1 (T) and 2 (B)



Configuration 3



Configuration 4

Figure 3: Site plan of the wind tunnel model for Configurations 3 (T) and 4 (B)

2 THE WIND TUNNEL TEST

Wind tunnel modelling requires special consideration of flow conditions to obtain similitude between the model and the prototype. A detailed discussion of the similarity requirements and their wind tunnel implementation can be found in Cermak (1971, 1975, 1976). In general, the requirements are that the model and prototype be geometrically similar, that the approach wind speed and turbulence profiles at the model have a similar profile shape to the full-scale flow, and that the Reynolds number for the model and prototype be equal. Due to modelling constraints the Reynolds number cannot be made equal and all testing was conducted to the requirements of Australasian Wind Engineering Society Quality Assurance Manual (2001). For this project, modelling the Reynolds number is not critical as the flow characteristics are considered to be Reynolds number independent and it is the wind profiles and spectral content of the flow that is paramount to model.

The testing was performed in the boundary layer wind tunnel shown in Figure 4. This wind tunnel has a 16 m long, 3.0 m wide, by 2.4 m high test section, with a porous slatted roof for passive blockage correction. The floor of the test section is covered with roughness elements, preceded by a vorticity generating fence and spires to reproduce at model scale the atmospheric wind characteristics required for the model test. The spires, barrier, and roughness were designed to provide a modelled atmospheric boundary layer approximately 0.6 m thick with a mean velocity and turbulence intensity profile, and distribution of turbulent energy similar to that expected to occur in the region approaching the modelled area. The approach wind characteristics used for the model test are shown in Figure 5. As the mean wind speed and turbulence characteristics in the wind tunnel have been scaled to model full-scale conditions, and assuming these conditions are independent of wind speed, the results presented are valid for all wind speeds.

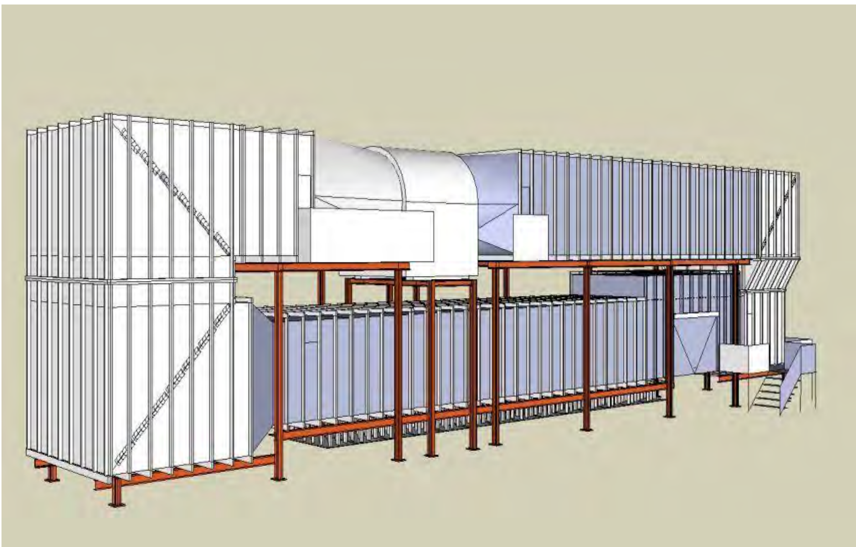


Figure 4: Schematic of the closed-circuit wind tunnel.

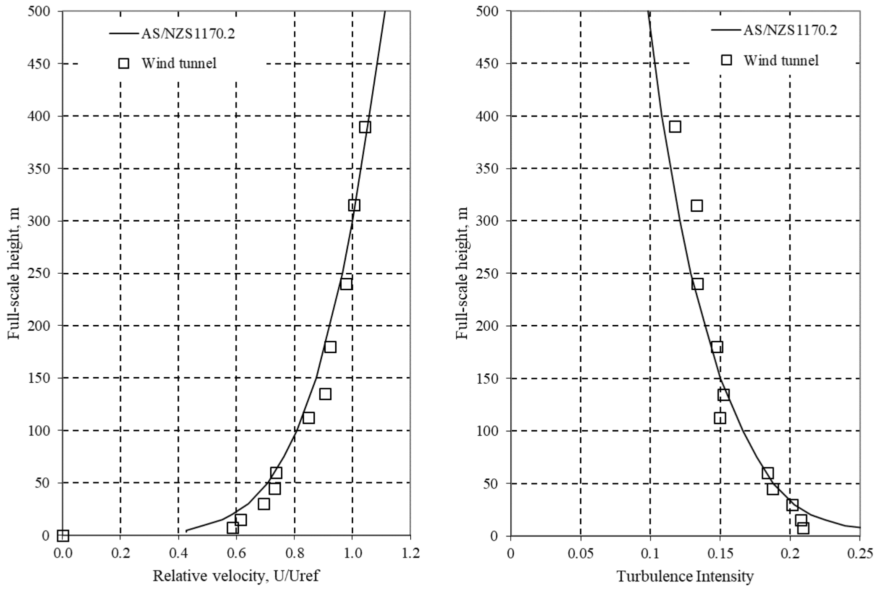


Figure 5: Mean velocity and turbulence profiles approaching the model.

Wind velocity and turbulence profiles are developed from the ground up with changing roughness. The distance required to fully develop a boundary layer after a change in roughness is considerable. Hence, for winds moving across the relatively flat open areas of the airport precinct, a transition boundary layer profile will be developed with reduced levels of near ground turbulence, but unchanged at higher altitudes. In the context of the current study, it is important to note that in the wake region of the relatively isolated modelled building structures, the measured turbulence levels will be dominated by the turbulence generated from wind flow over these structures. It should be noted that these profiles are for extreme wind events and at lower wind speeds, the turbulence characteristics can increase or decrease depending on the meteorological wind event.

For analysis purposes, it is important to appreciate the difference between wind shear and mechanical turbulence to enable a reasonable interpretation of the wind tunnel testing results conducted on the proposed configurations. A brief discussion is included in Appendix 3.

A model of the runway approach and surrounds were constructed to a length scale of 1:750, which was consistent with the modelled atmospheric flow, permitted a reasonable test model size with an adequate portion of the adjoining environment to be included in a proximity model, and was within wind tunnel blockage limitations. The turntable layout indicating the tested wind directions and chainages is presented in Figure 6, with further details and the results of all testing presented in Appendix 2. A representative layout of shipping containers stacked up to 6 containers high in the storage area east of the runway approach, north of the proposed roads was included in the wind tunnel model as requested by Roads and Maritime Services.

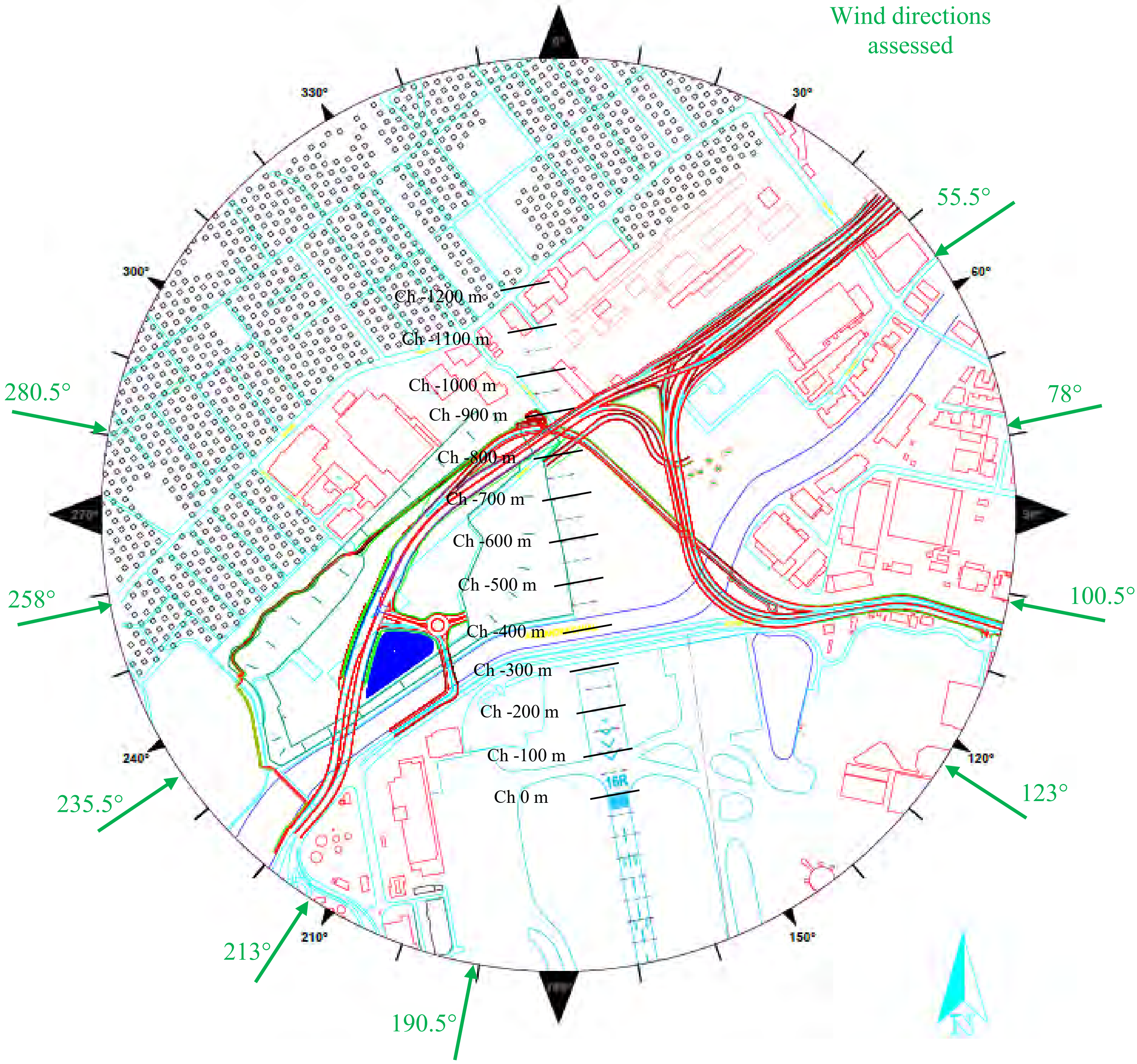


Figure 6: Wind tunnel model with proposed Sydney Gateway (Configuration 4 shown)

The model was mounted on a turntable located near the downstream end of the wind tunnel test section, Figure 7. Additional photos of the model are shown in Appendix 1. The turntable permitted rotation of the modelled areas for examination of wind speeds from any approach wind direction.

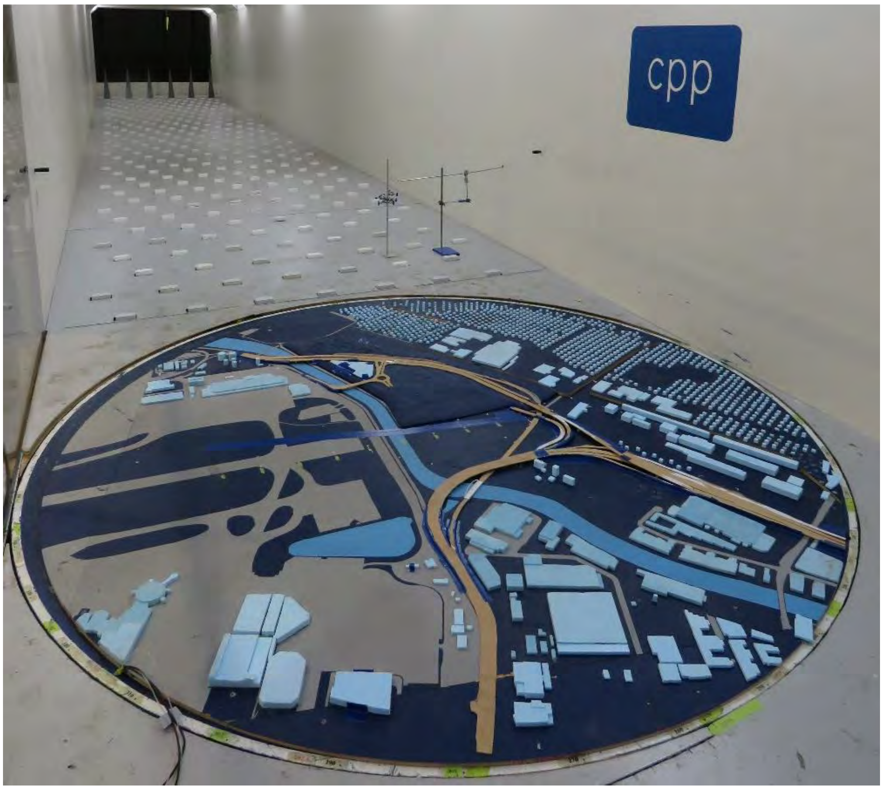


Figure 7: Sydney Airport model including the proposed Sydney Gateway in the wind tunnel (Configuration 4 shown).

3 DATA ACQUISITION

3.1 Velocity measurements

Wind speed profile measurements were taken to verify that appropriate boundary layer flow approaching the site was established. All wind speed measurements were made with 4-hole Cobra probes and resolved into longitudinal, lateral, and vertical components.

Mean wind speed and turbulence intensity profiles for the boundary layer flow approaching the model are shown in Figure 5, as measured at the centre of the turntable. Turbulence intensities are related to the local mean wind speed.

The velocity signals were sampled for a period corresponding to about 4 hours in prototype (but representative of a self-stationary random data set of 1 hour duration within the micrometeorological peak) to obtain the mean and standard deviation of wind speed for comparison with the available wind shear and turbulence criteria.

It is evident from the body of research into wind flow around bluff features that the local wind flow pattern will change considerably up to about 5 times the height of the feature downstream of the downstream edge of the structure. Further downstream, the turbulence generated by the structure is dissipated through viscous effects and the far field flow pattern is expected to be relatively constant.

NASF Guideline B (DIRDC, 2018) requires testing for all relevant wind directions, in increments of 22.5°, that intersect the structure and the runway centreline at chainages between -900 m and 500 m. The wind directions and testing area were agreed upon upfront of the testing between RMS, Sydney Airport representatives, and CPP, and are shown in the location plans in Figure 8 to Figure 10. Test locations are 100 m apart horizontally, and 5 m apart vertically, for ease of analysis with the available criteria.

These wind directions were selected as they are the ones most likely to cause mechanical turbulence and corner vortices generated by the subject structures, which could impact aircraft operations. It is noted that for wind directions 190.5° and 213° the international terminal building was included in the surrounds model as requested.

Due to the variability in the wind, the results reported herein for the mean wind speed and turbulence intensity values are considered accurate to within 5% respectively, based on the assumption that the modelled flow matches the theoretical predictions of different storm events. This is considered reasonable as the natural variability in wind characteristics at these lower wind speeds will be greater than these values.

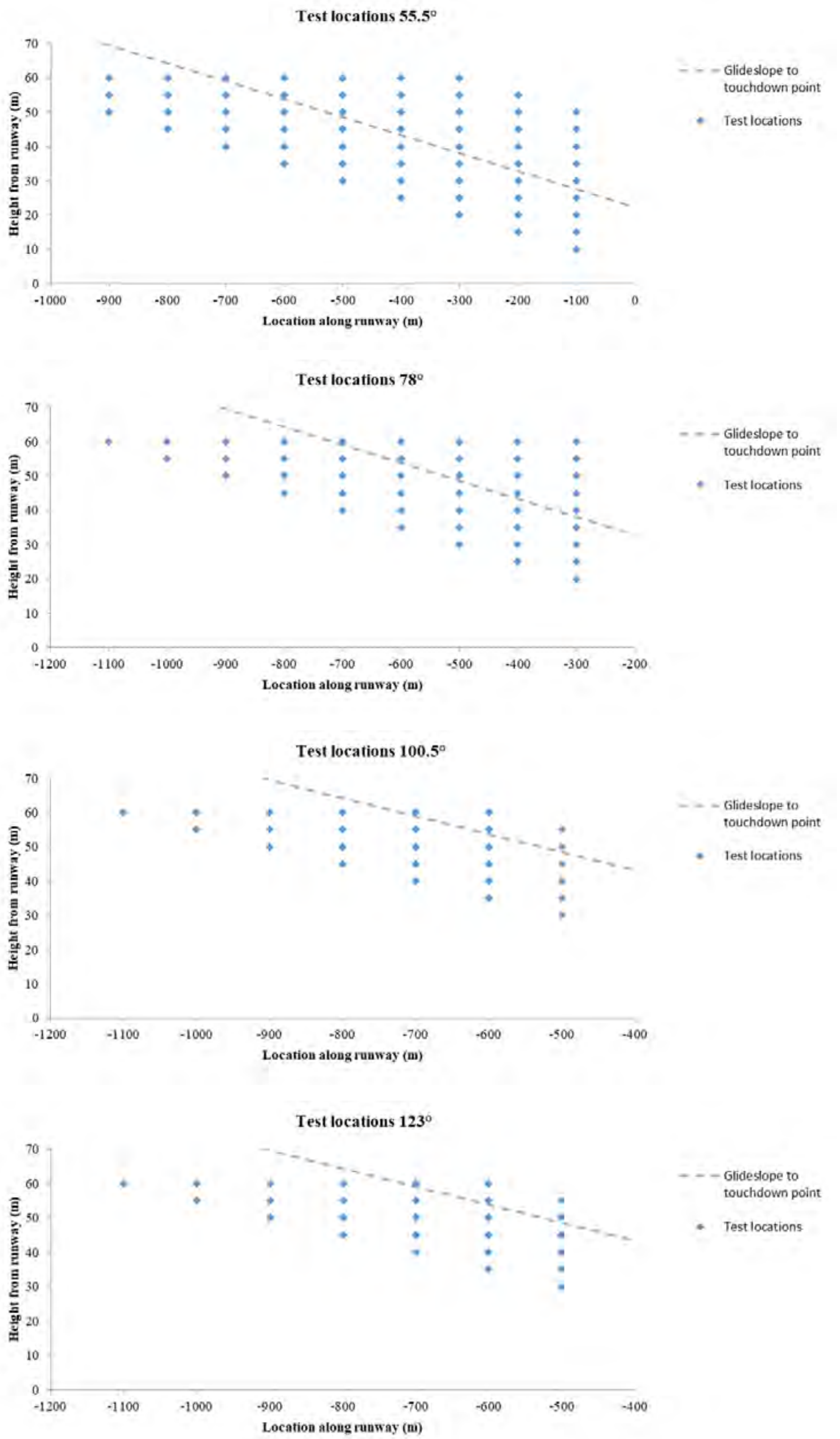


Figure 8: Test locations for Runway 16R at 55.5°, 78°, 100.5°, and 123°.

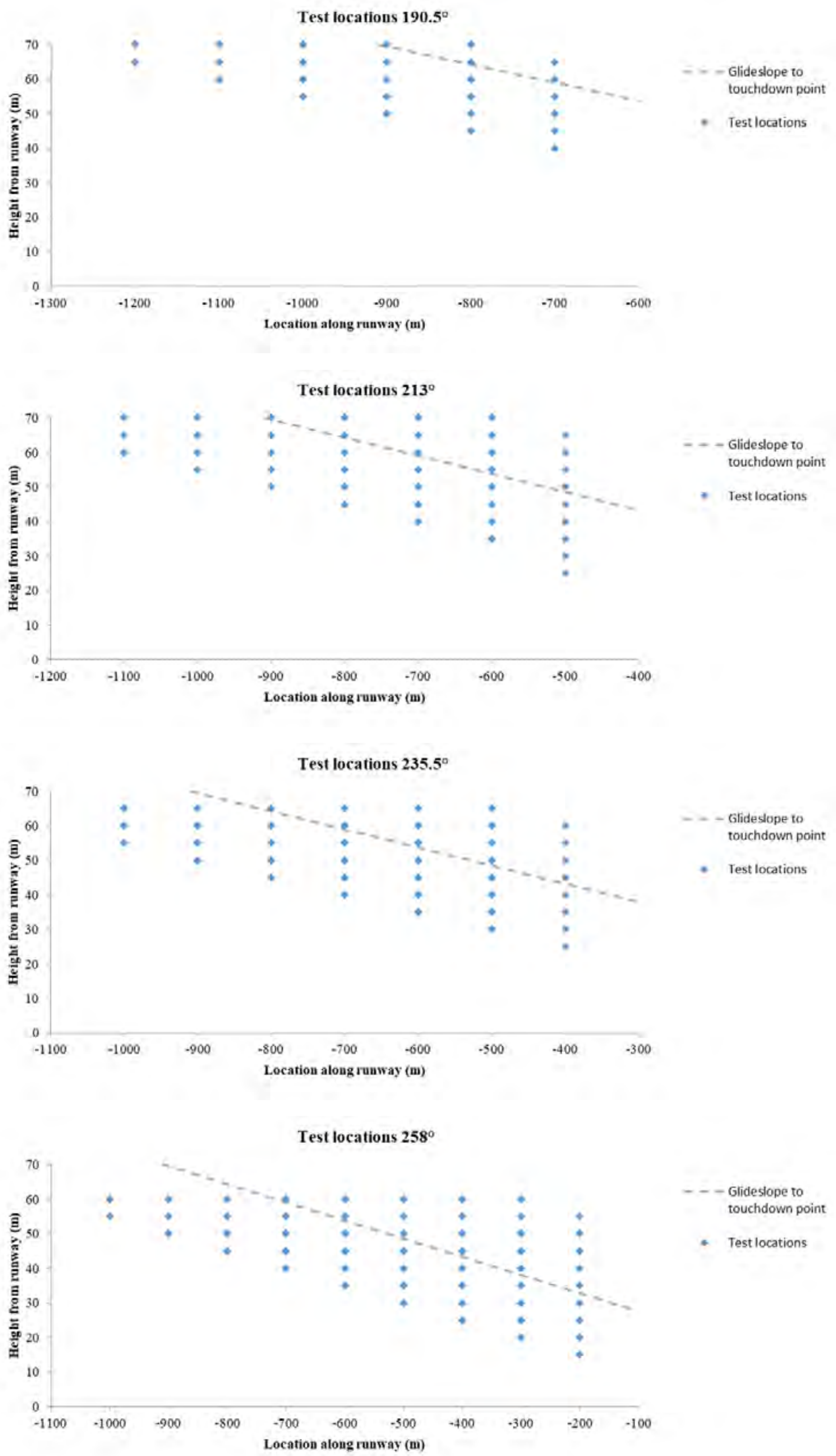


Figure 9: Test locations for Runway 16R at, and 190.5°, 213°, 235.5°, and 258°.

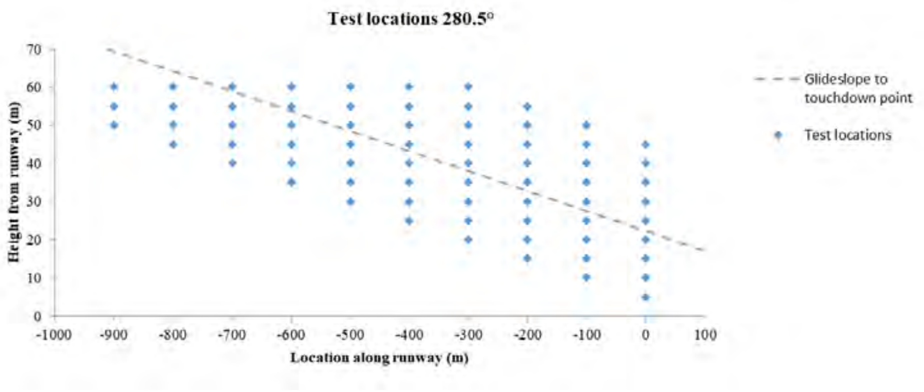


Figure 10: Test locations for Runway 16R at 280.5°.

4 WIND SHEAR AND TURBULENCE CRITERIA AND RESULTS

Wind speed profiles at several heights were tested along the runways downwind of the subject structure. The specific locations and chainages tested for the various wind directions are presented in Figure 8 to Figure 10. The mean lateral and vertical wind velocities were generally below 10% of the longitudinal wind velocity and therefore will not be discussed further as these would not be expected to cause any significant issues for landing aircraft.

With standard approach profiles for mean wind speed and turbulence, wind conditions in the natural wind have the potential to cause wind shear and turbulence issues for landing aircraft. The 3 s gust wind speed in knots, measured at an anemometer location at a height of 10 m in similar approach conditions, required to create wind conditions that would exceed the DIRDC (2018) wind shear and turbulence criteria are presented in Figure 11. The criteria allow a maximum wind shear of 3.1 m/s (6 kt) in the cross-wind direction, and 3.6 m/s (7 kt) in the along-wind direction over a distance of 100 m, and a maximum standard deviation of wind speed of 2.06 m/s (4 kt). It is evident that the natural turbulence in the wind is more important than wind shear for aircraft operations with regard to these criteria.

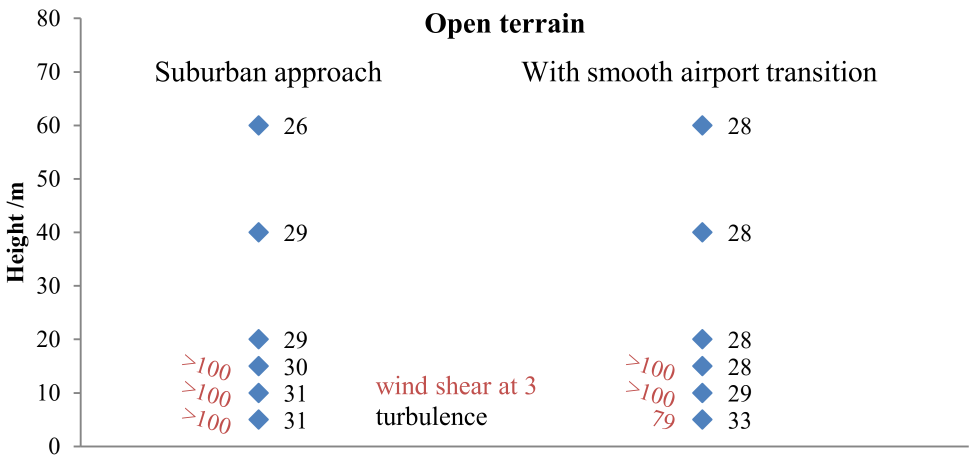


Figure 11: Results for standard approach roughness conditions.

4.1 Background of the criteria

The criteria contained within the recent update of the NASF Guideline B (DIRDC, 2018) are based on research conducted by the Dutch NLR Air Transport Safety Institute and is detailed in Nieuwpoort (2010). The Dutch NLR Air Transport Safety Institute define a turbulence criterion with the standard deviation of the flow velocity limited to 2.1 m/s (4 kt) as well as wind shear criteria of 3.6 m/s (7 kt) and 3.1 m/s (6 kt) in the along-flight and cross-flight directions respectively. These criteria are based on a range of studies including observation of pilots in flight simulators and were found to be appropriate for a wide range of jet aircraft sizes bounded by the Boeing 747 and Fokker 100. The criteria have not been developed for General Aircraft. The Dutch guidelines for turbulence and wind shear are primarily for landing aircraft; “Because aircraft are much more vulnerable to disturbed wind velocity profiles during the final stage of the approach than during take-off only the effects on approaching aircraft have been considered.”. Private communication with staff who were involved with the research into the turbulence criteria developed at the Dutch NLR Air Transport Safety Institute have indicated that the effect of turbulence on departing aircraft is not well quantified, but from experience “that during take-off an aircraft may be able to cope with around 30% higher wind disturbances than during landing.”, Geest (2012). Thus, for departing aircraft, if this advice were to be adopted, a limiting standard deviation of wind speed of 2.7 m/s (5.2 kt) would be appropriate.

4.2 Wind shear

The NASF Guideline B (DIRDC, 2018) wind shear criteria state that the mean wind speed difference in the cross-flight direction between two locations 100 m apart should be less than 3.1 m/s (6 kt), and 3.6 m/s (7 kt) in the along-flight direction. This matches the wind shear criteria specified in the Dutch criteria. The minimum gust wind speed at the anemometer location, in knots, required to exceed these criteria are presented in Figure 16 to Figure 51 in Appendix 2. The gust wind speed causing exceedance of the wind shear criterion between two locations along the glideslope are noted in orange and between two horizonal locations in green. The results shown are the minimum gust wind speeds required to exceed the cross-flight and along-flight criteria. The cross-flight criterion was dominant for all test locations and wind directions, with the wind speeds causing an exceedance of the along-flight criterion being higher than the reported cross-flight values.

The reported 3 s gust at the anemometer is in the direction of the mean wind speed and has not been converted into an along-flight, or cross-flight component. The conversion from the measurements to the anemometer location assumes the control anemometer is sited in the same turbulence conditions as the approach flow for that wind direction, and that the operational criterion is based on a gust wind speed of 3 s duration, as provided by the Bureau of Meteorology, and Airservices Australia.

The lowest anemometer gust wind speeds required to exceed the NASF Guideline B wind shear criteria are:

- 54 kt for Configuration 1,
- 54 kt for Configuration 2,
- 59 kt for Configuration 3,
- 52 kt for Configuration 4.

4.3 Turbulence

The recent update of the NASF Guideline B incorporated the turbulence criterion as defined in the Dutch criteria. The landing criterion has been used for all wind directions. The relationship between the criterion level and the required wind speed to exceed the criterion is linear; therefore, if the criterion were raised to 5.2 kt for departing aircraft, in line with the advice from Geest (2012), then the required wind speed to exceed the criterion would be the values presented in Appendix 2 multiplied by 1.3.

The 3 s gust wind speed in knots, at an anemometer height of 10 m located in similar approach turbulence conditions, required to generate a turbulence level in the horizontal plane of 2.1 m/s (4 kt) at all relevant locations are presented in the black font in Figure 16 to Figure 51 of Appendix 2. The 3 s gust is in the direction of the mean wind speed and has not been converted into an along-flight, or cross-flight component.

The gust wind speeds required to exceed the turbulence criterion are generally significantly lower than those required to exceed the mean wind shear criteria. The minimum and average gust wind speeds required to exceed the turbulence criterion for all configurations and wind directions are presented in Table 1.

Table 1: Minimum and average gust wind speeds in knots required to exceed the NASF turbulence criterion.

		Wind Direction								
	Configuration	**55.5°**	**78°**	**100.5°**	**123°**	**190.5°**	**213°**	**235.5°**	**258°**	**280.5°**
Minimum	**1**	26.2	24.8	25.4	25.4	26.5	25.5	26.1	25.0	24.2
	2	25.4	24.8	25.0	26.5	26.3	25.2	24.9	25.0	24.1
	3	24.7	24.1	24.0	25.5	26.7	25.7	25.7	25.7	24.6
	4	24.6	24.2	24.2	24.8	26.9	25.3	25.5	25.5	24.3
Average	**1**	28.5	27.5	27.5	27.4	28.2	27.4	27.6	27.2	27.2
	2	28.0	27.3	27.0	28.1	27.7	27.1	27.3	26.9	26.5
	3	27.5	26.9	26.5	27.0	28.7	27.6	27.1	27.2	26.6
	4	27.5	26.8	26.6	27.1	28.4	27.5	27.1	27.1	26.7

5 CONCLUSIONS

Wind tunnel model tests of the proposed Sydney Gateway roads and bridges at Sydney Airport were conducted to determine the wind characteristics in the vicinity of operating aircraft on the approach to the runway at Sydney Airport. Tests were conducted for aircraft operating along Runway 16R in areas considered most likely to be affected by the presence of the proposed roadway for the 9 wind directions. The minimum wind speed for exceedance of the DIRDC (2018) turbulence criterion was found to change by up to +0.8 kt and -1.7 kt compared to the datum and existing configuration depending on direction, with the average exceedance wind speed changing by up to +1.0 kt and -1.1 kt.

6 REFERENCES

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Appendix 1: Additional photographs of the CPP wind tunnel model

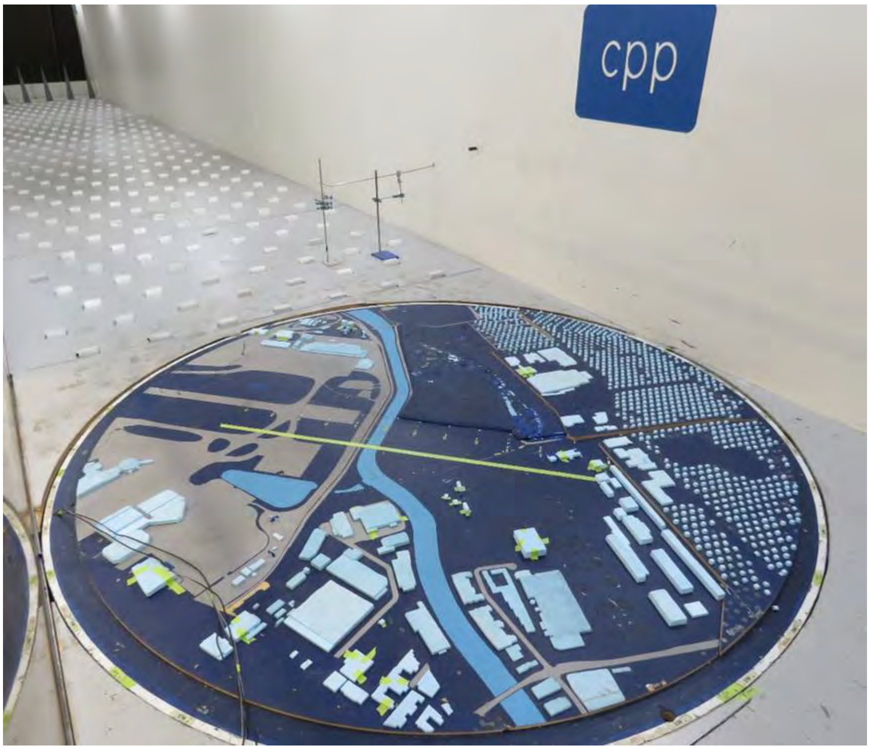


Figure 12: Wind tunnel model in configuration 1 viewed from the east.

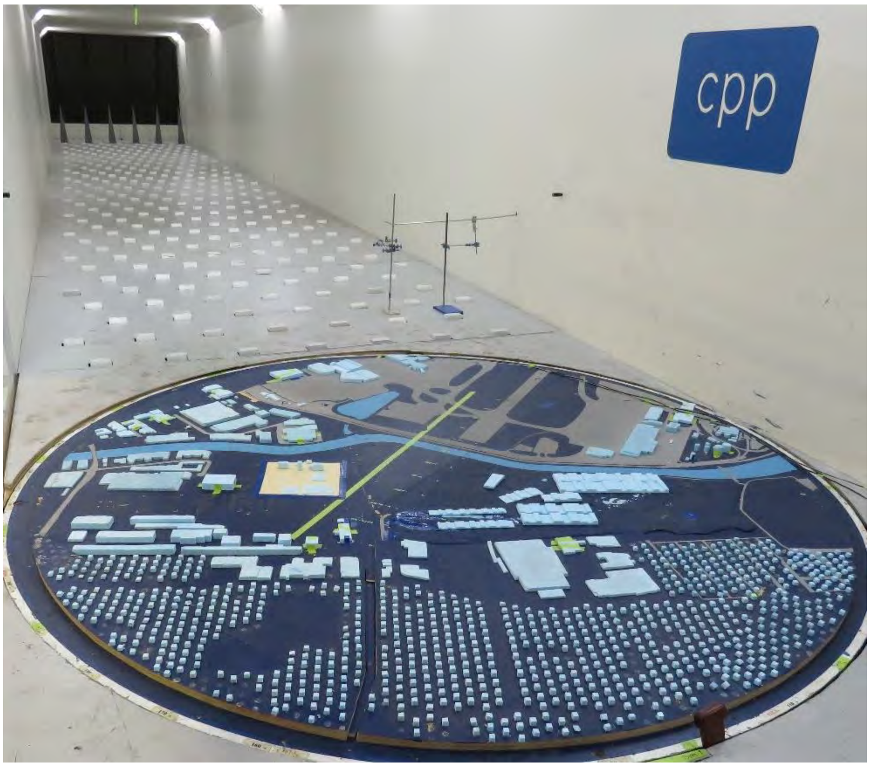


Figure 13: Wind tunnel model in configuration 2 viewed from the north-west.

Figure 14: Wind tunnel model in configuration 3 viewed from the east.

Figure 15: Close up photographs of the wind tunnel model – traffic and noise wall.

Appendix 2: Test configurations and results

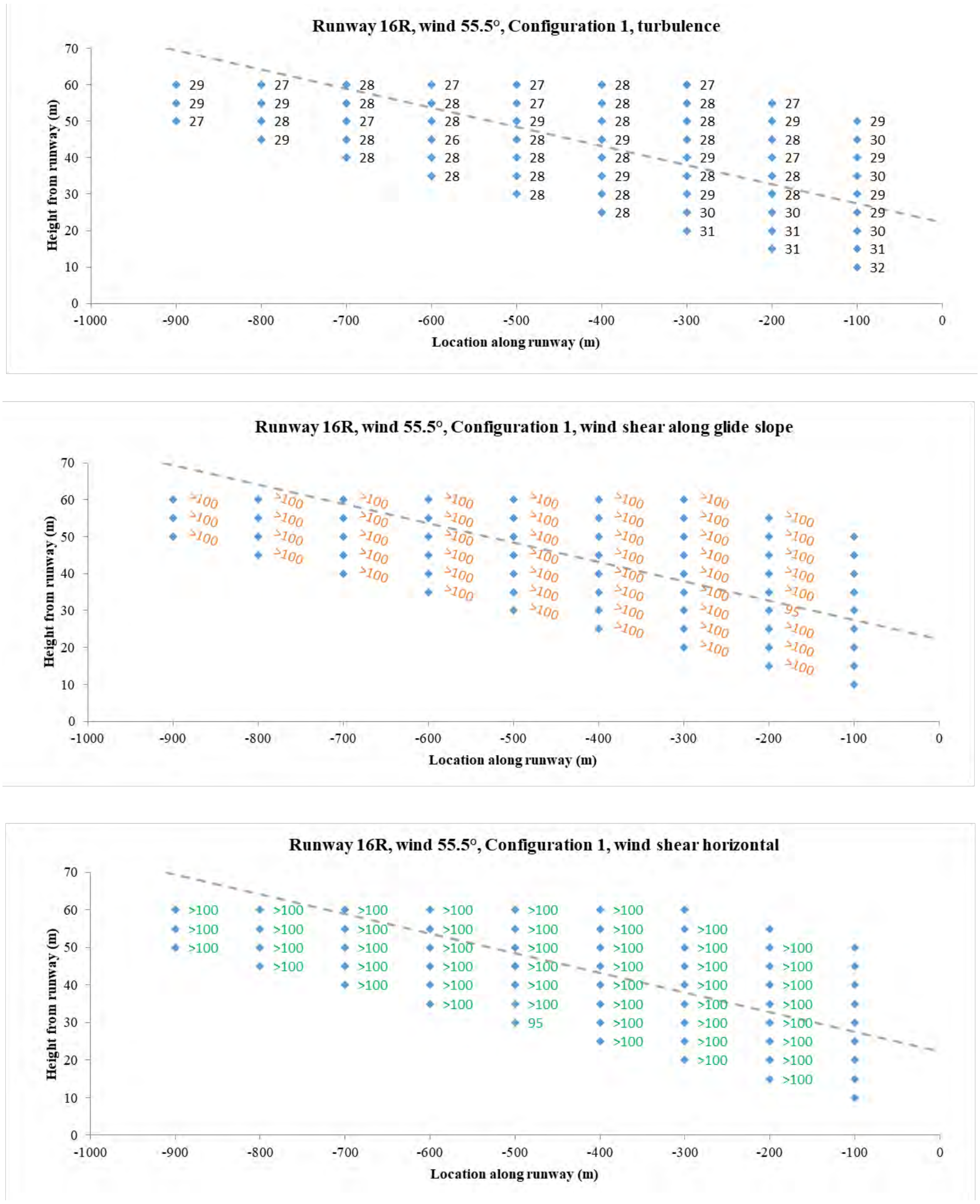


Figure 16: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 55.5° wind direction, configuration 1 (Datum).

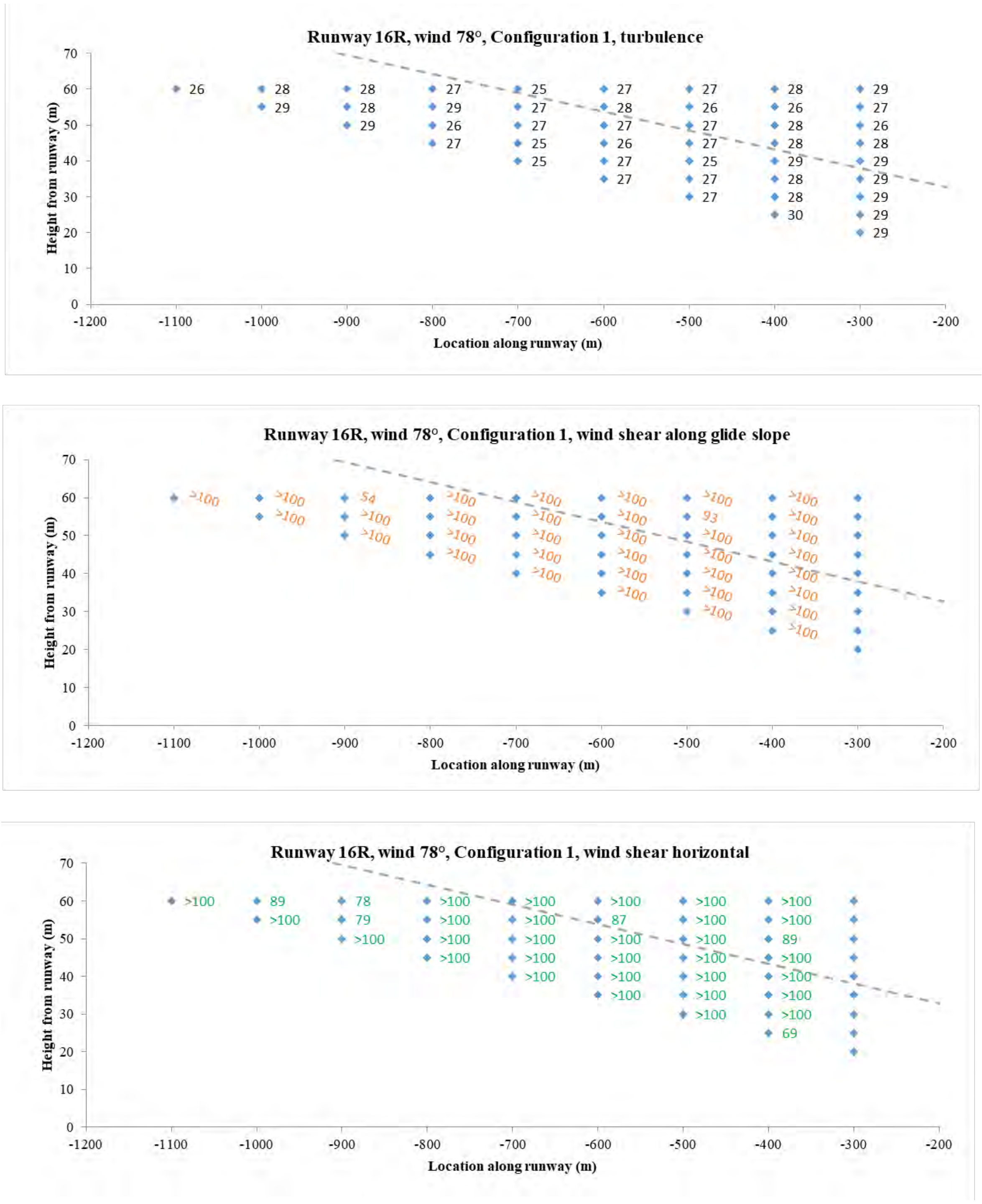


Figure 17: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 78° wind direction, configuration 1 (Datum).

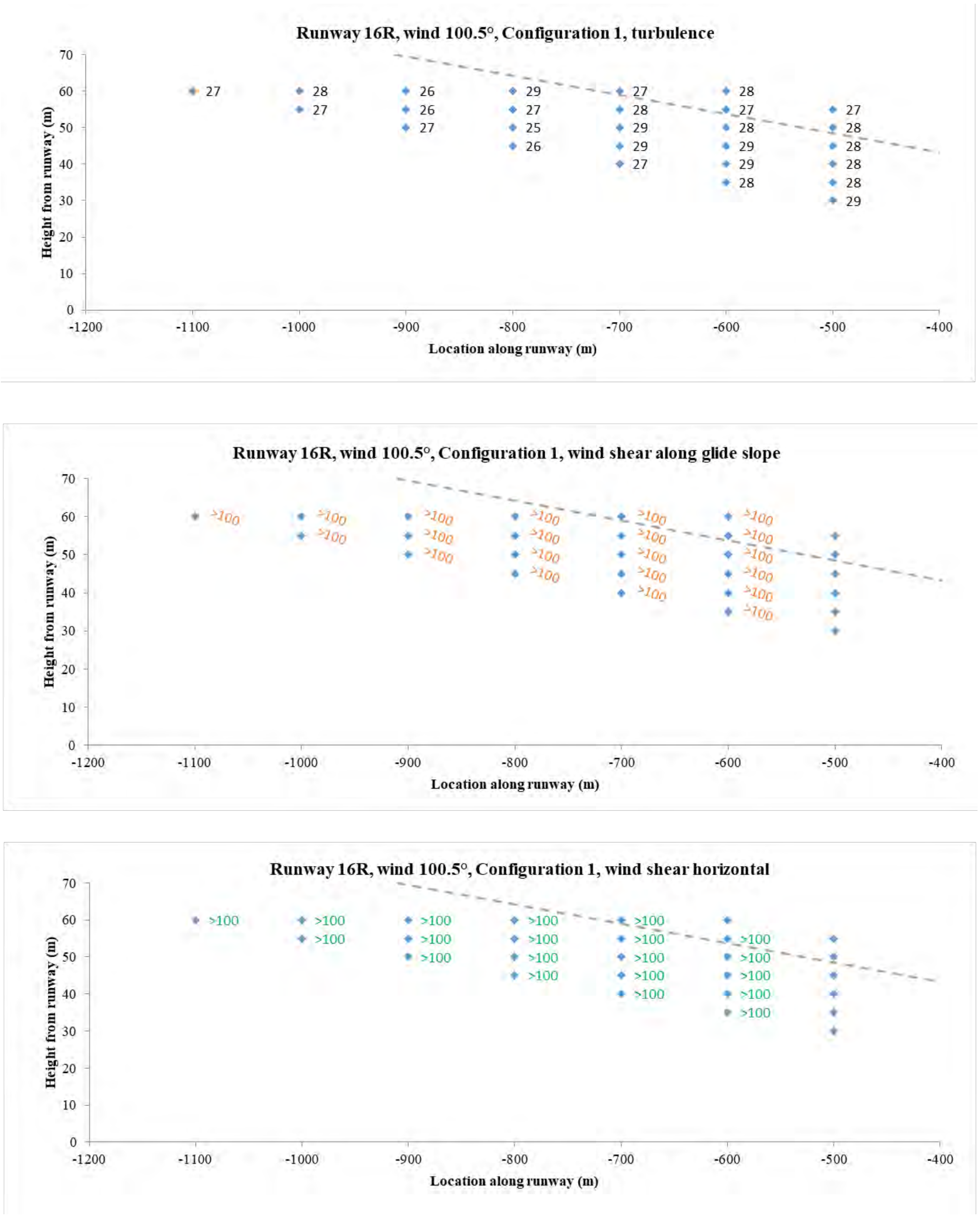


Figure 18: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 100.5° wind direction, configuration 1 (Datum).

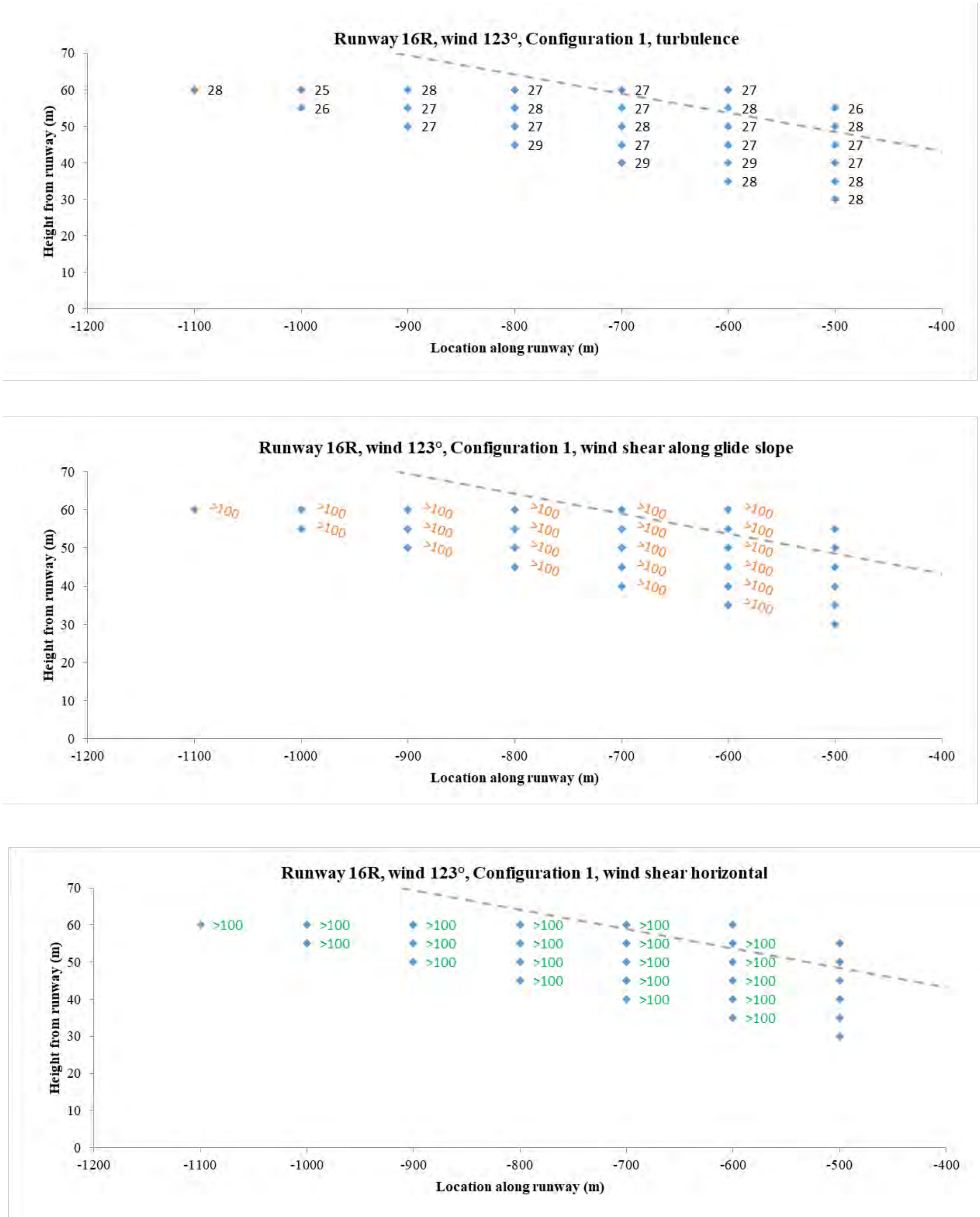
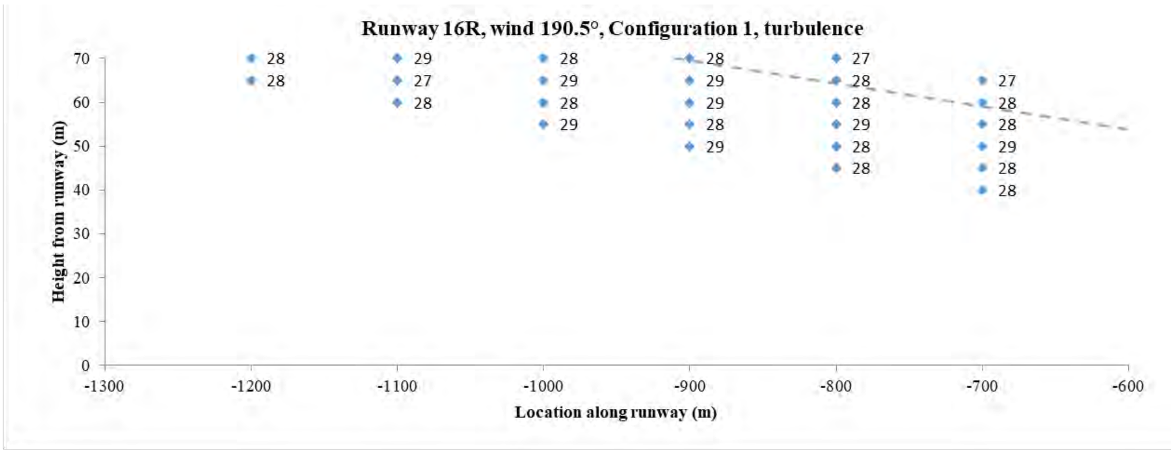
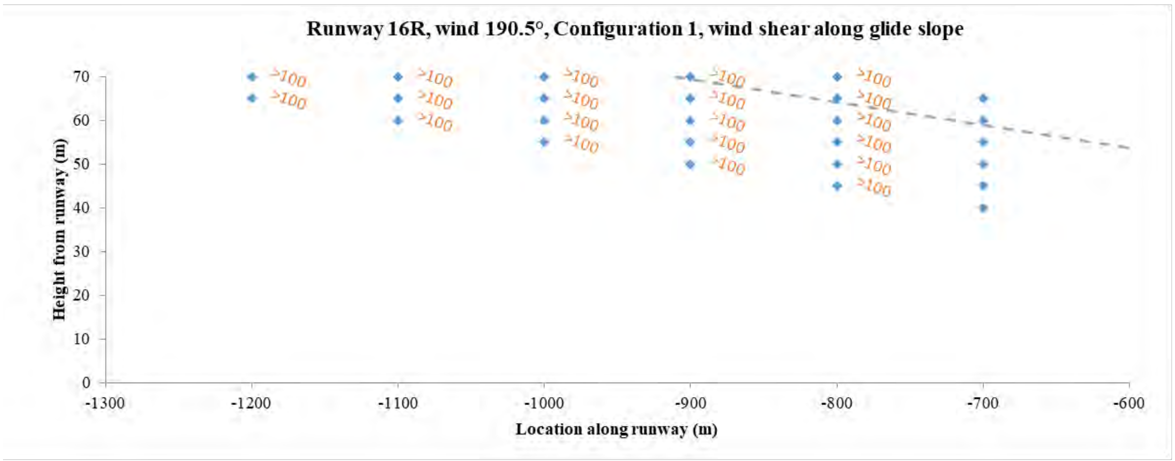


Figure 19: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 123° wind direction, configuration 1 (Datum).





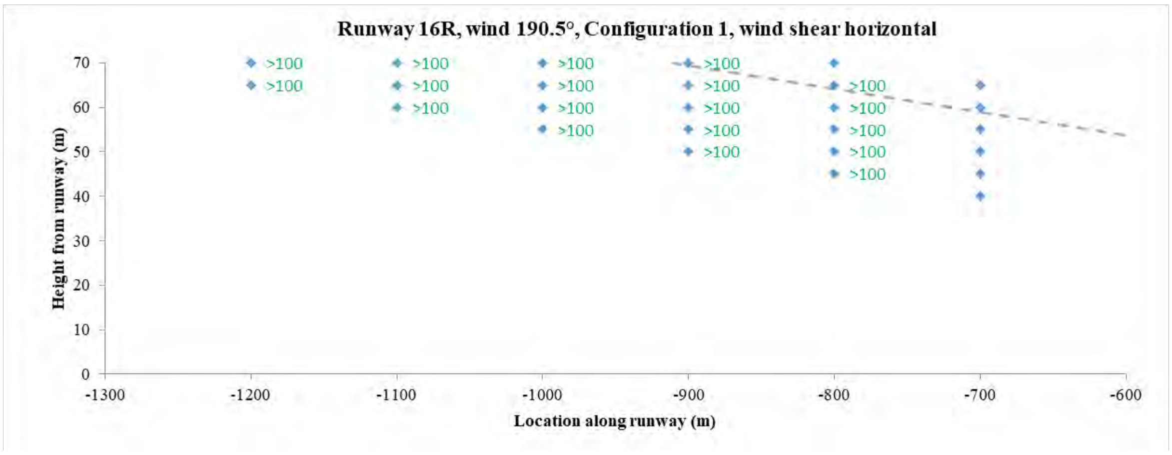
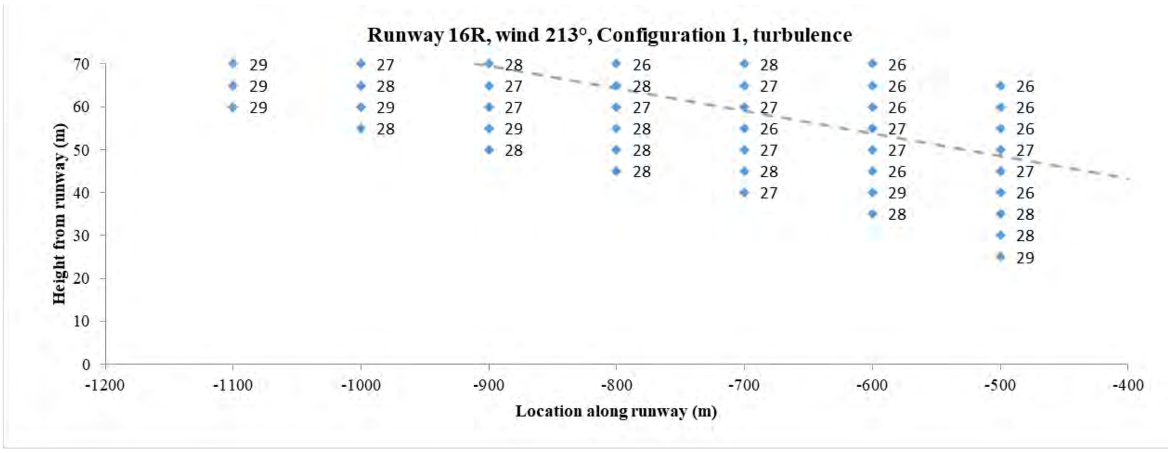
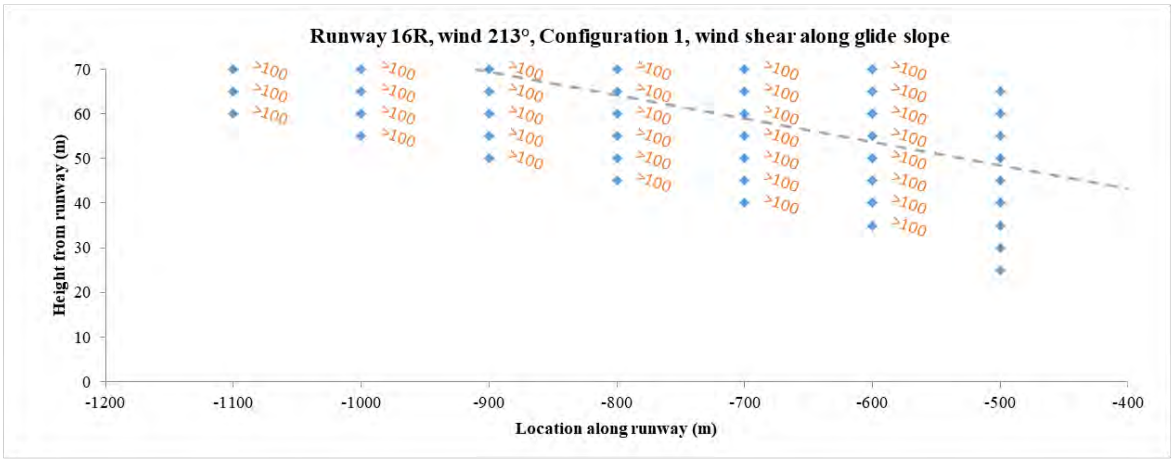


Figure 20: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 190.5° wind direction, configuration 1 (Datum).





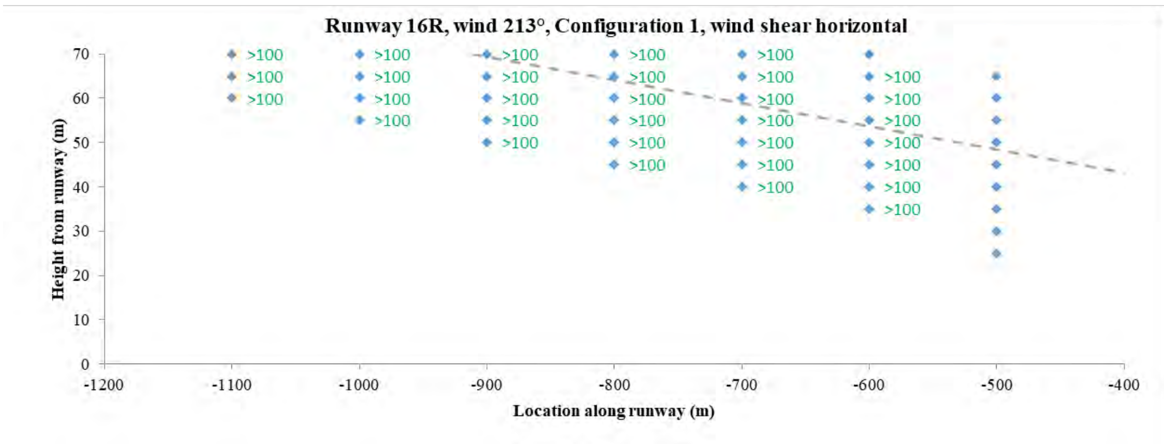


Figure 21: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 213° wind direction, configuration 1 (Datum).

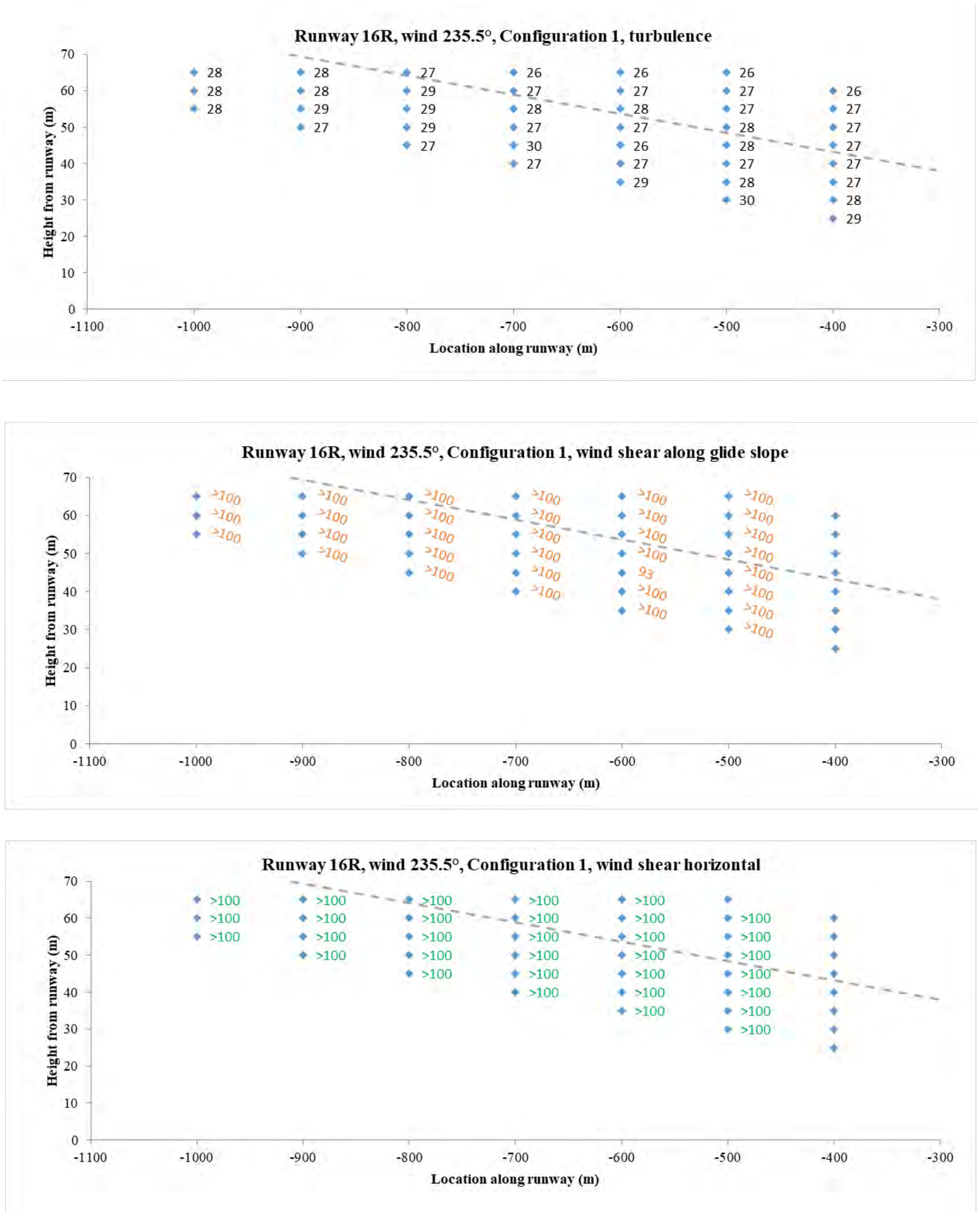


Figure 22: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 235.5° wind direction, configuration 1 (Datum).

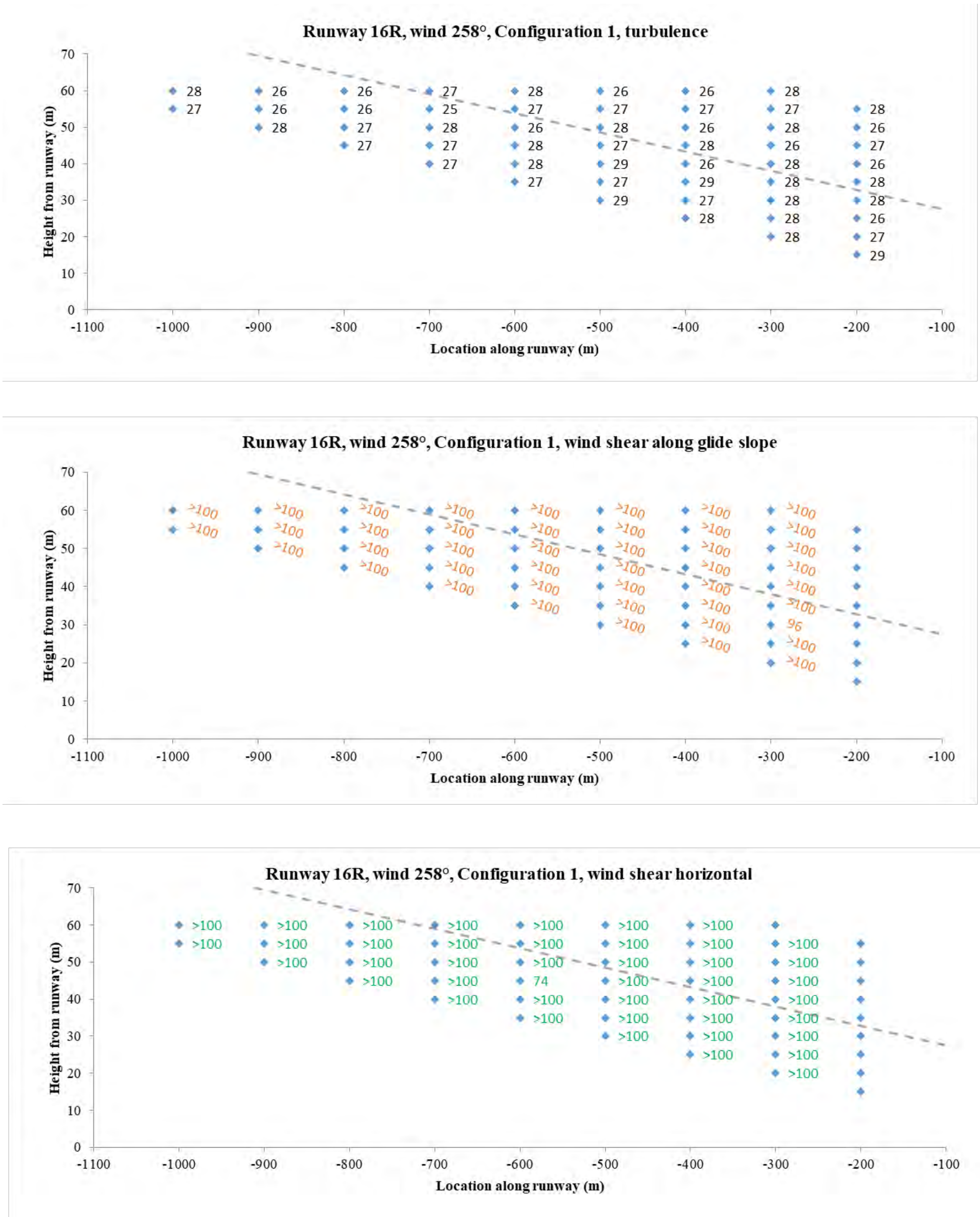


Figure 23: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 258° wind direction, configuration 1 (Datum).

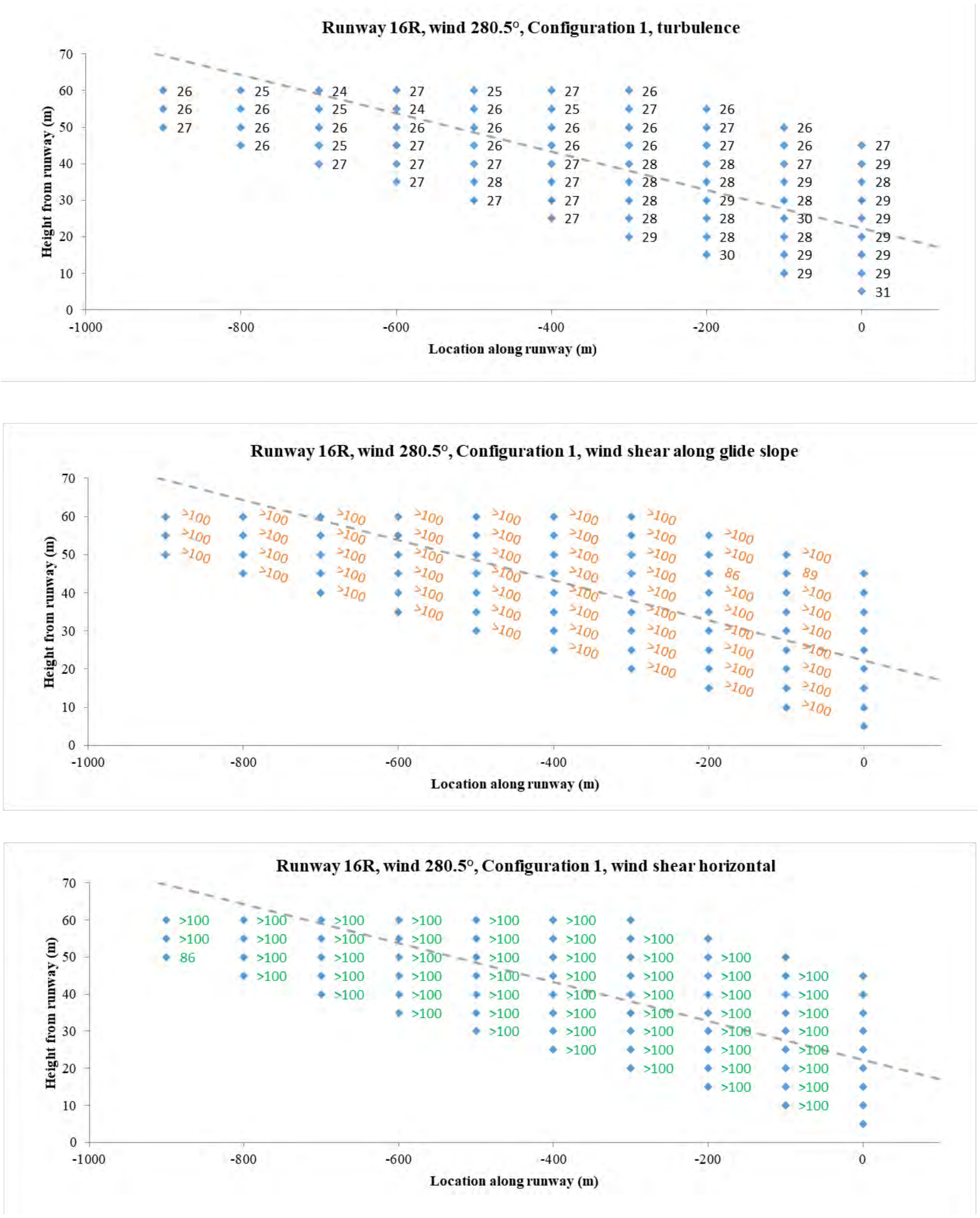
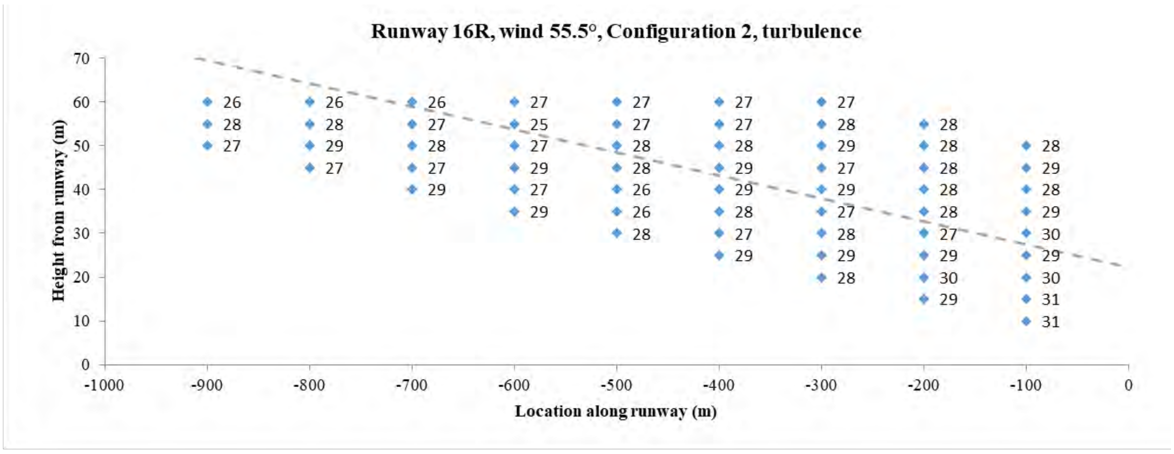
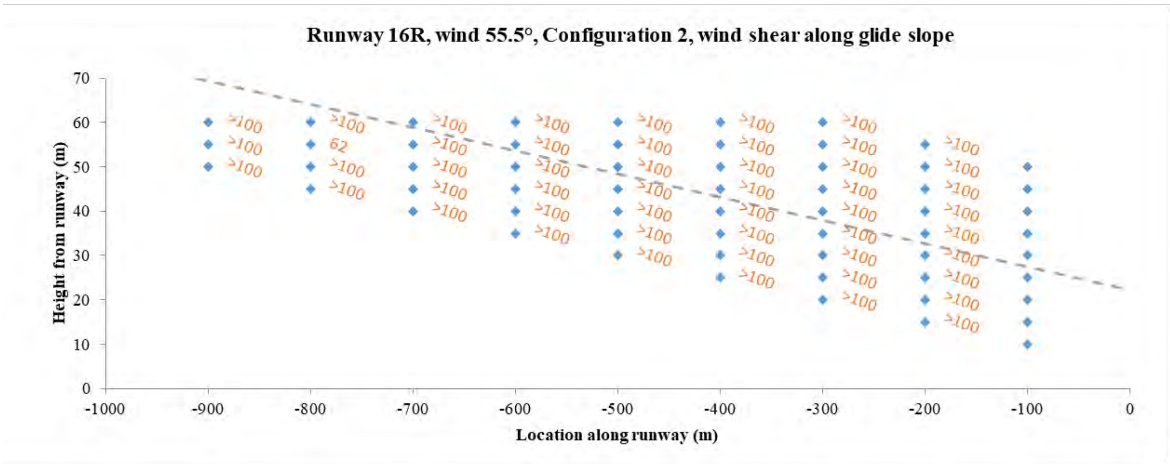


Figure 24: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 280.5° wind direction, configuration 1 (Datum).





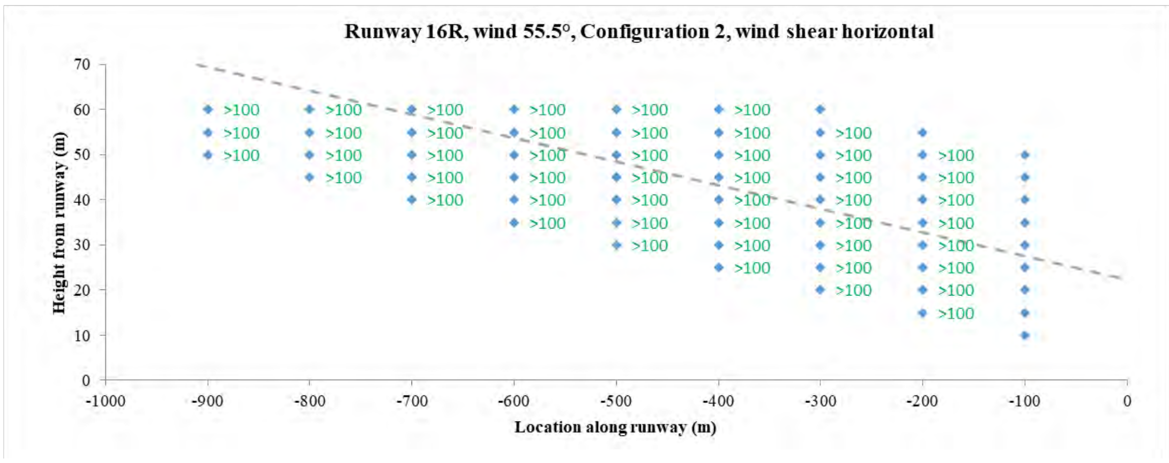
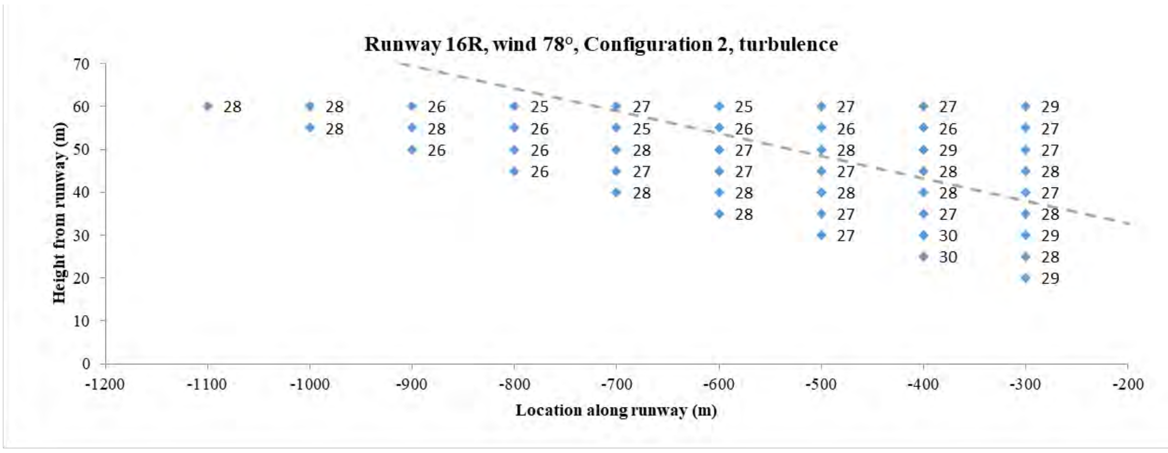
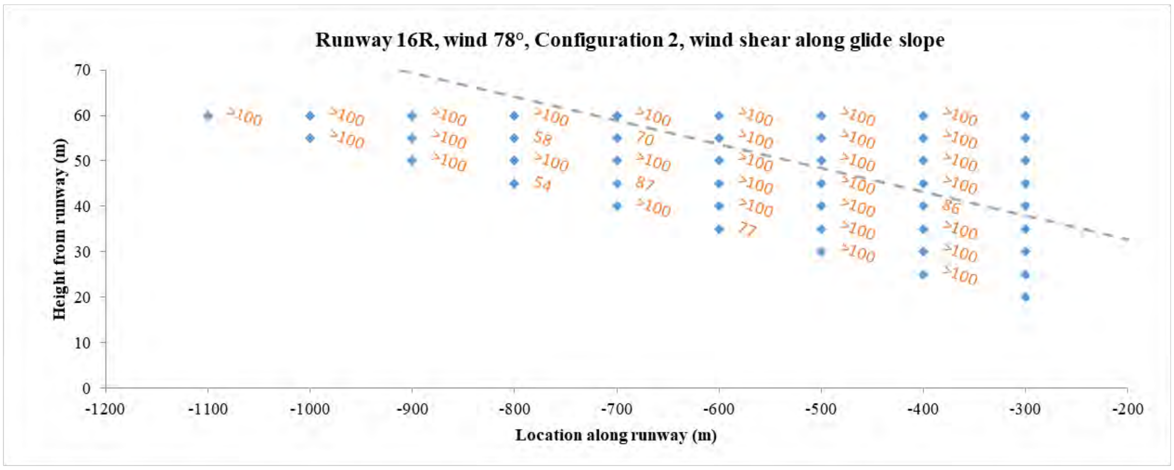


Figure 25: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 55.5° wind direction, configuration 2 (Existing).





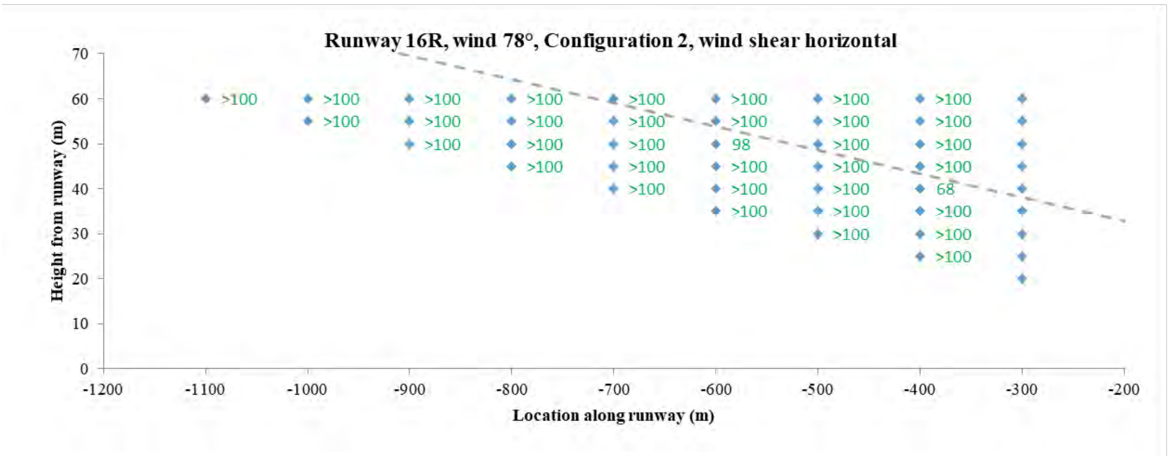
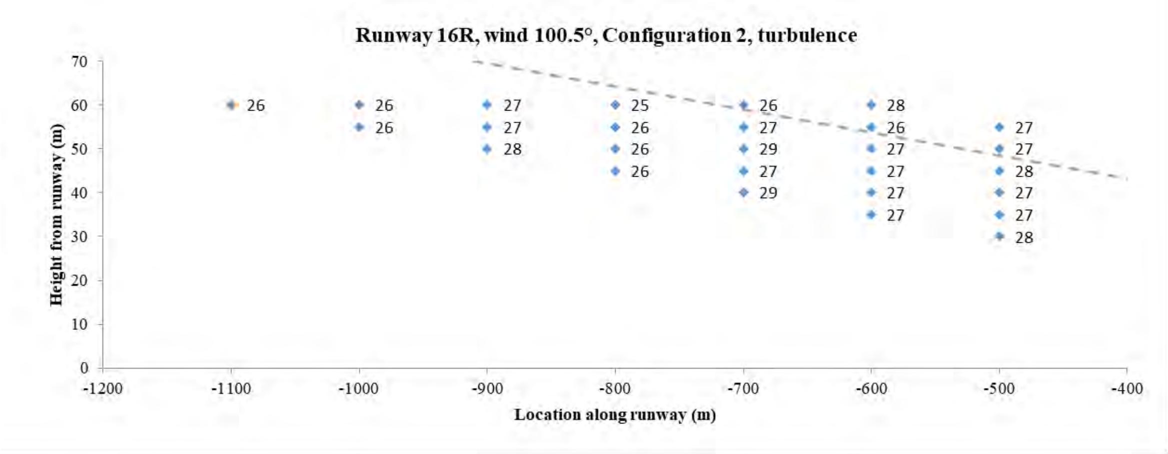
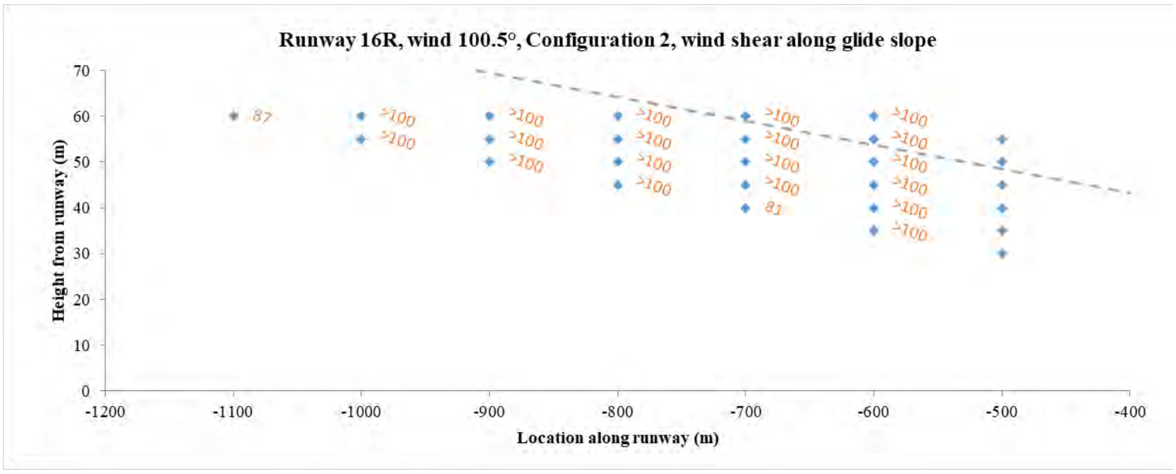


Figure 26: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 78° wind direction, configuration 2 (Existing).





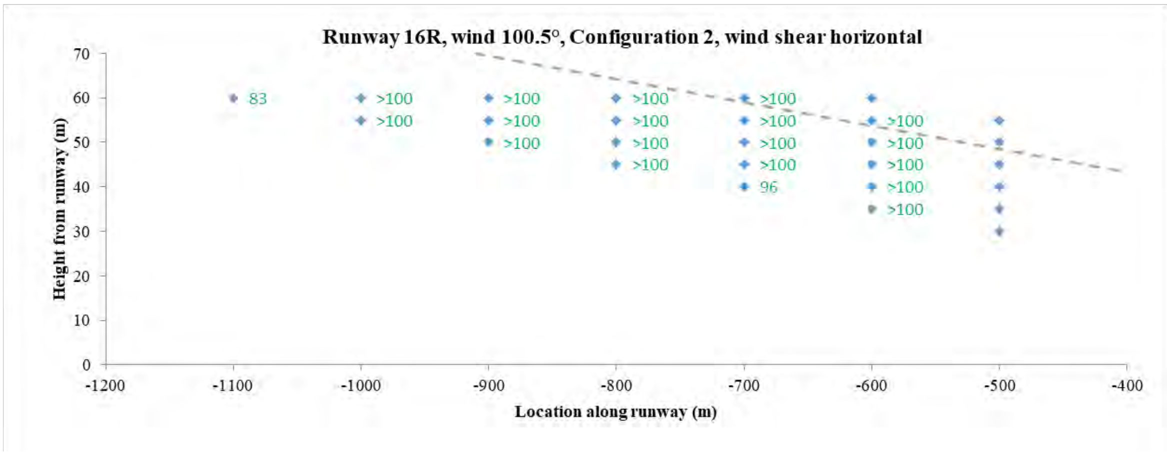
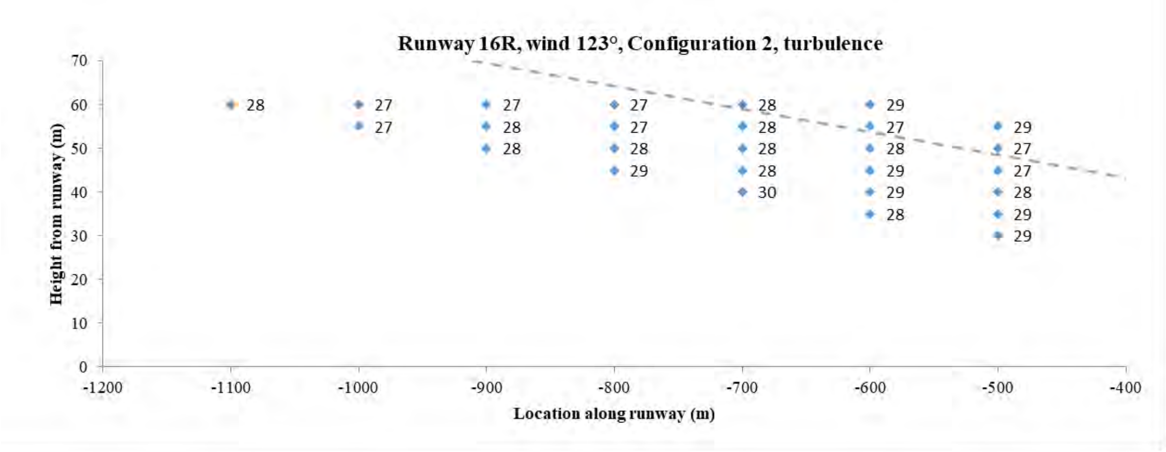
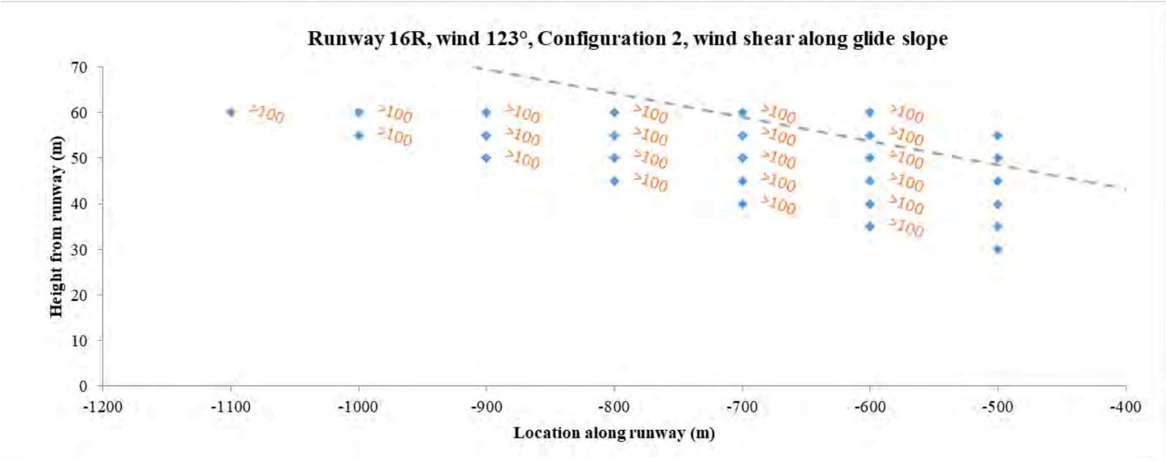


Figure 27: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 100.5° wind direction, configuration 2 (Existing).





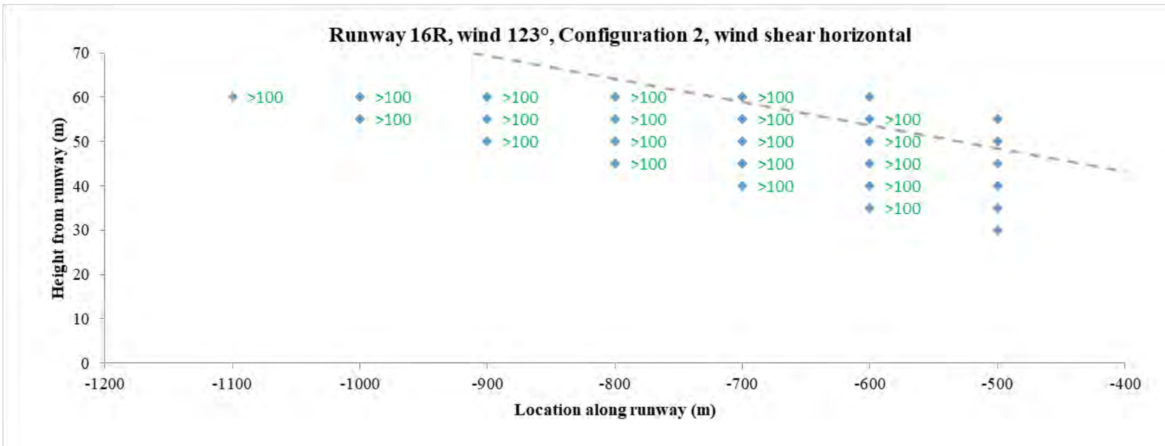


Figure 28: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 123° wind direction, configuration 2 (Existing).

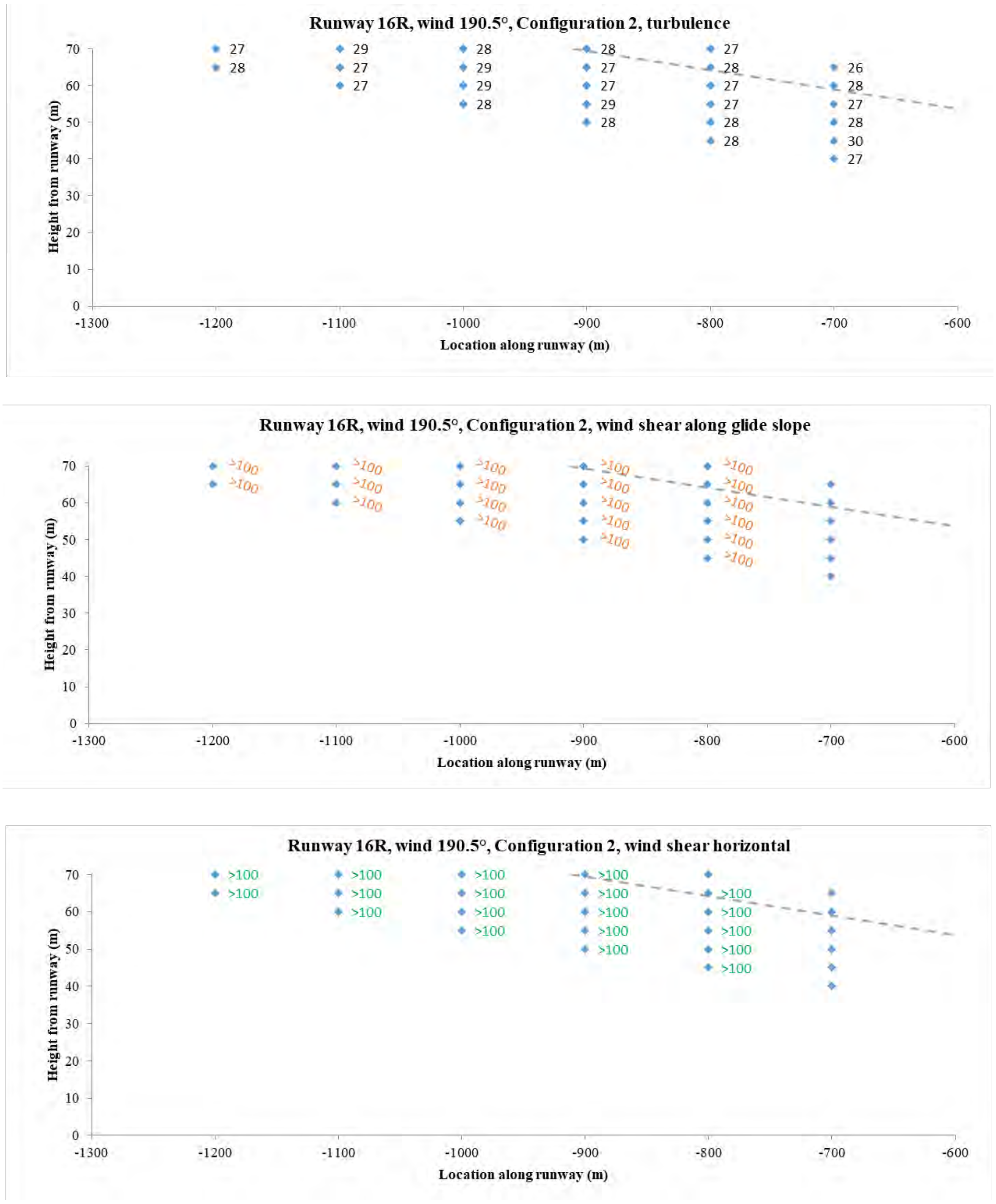


Figure 29: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 190.5° wind direction, configuration 2 (Existing).

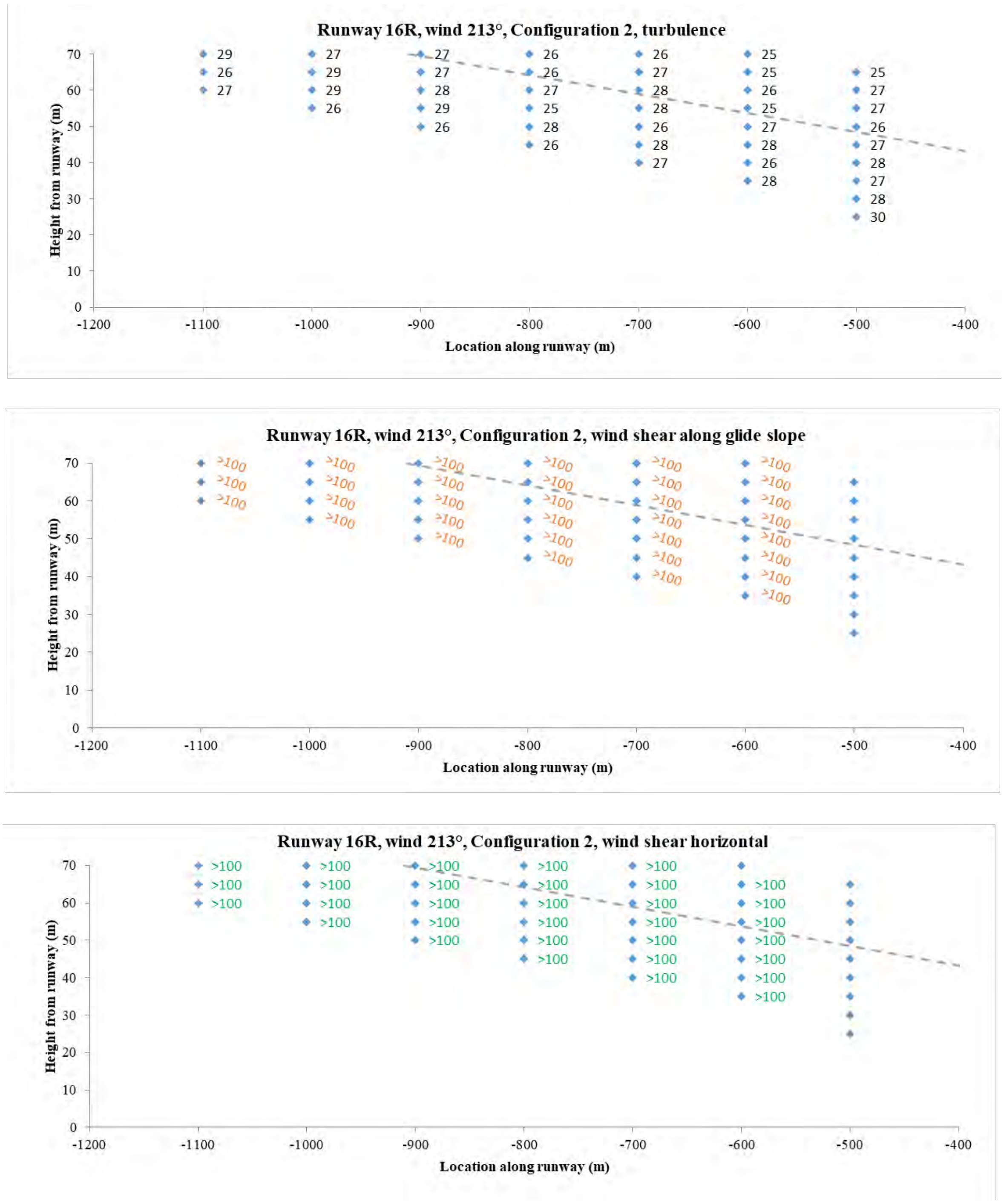


Figure 30: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 213° wind direction, configuration 2 (Existing).

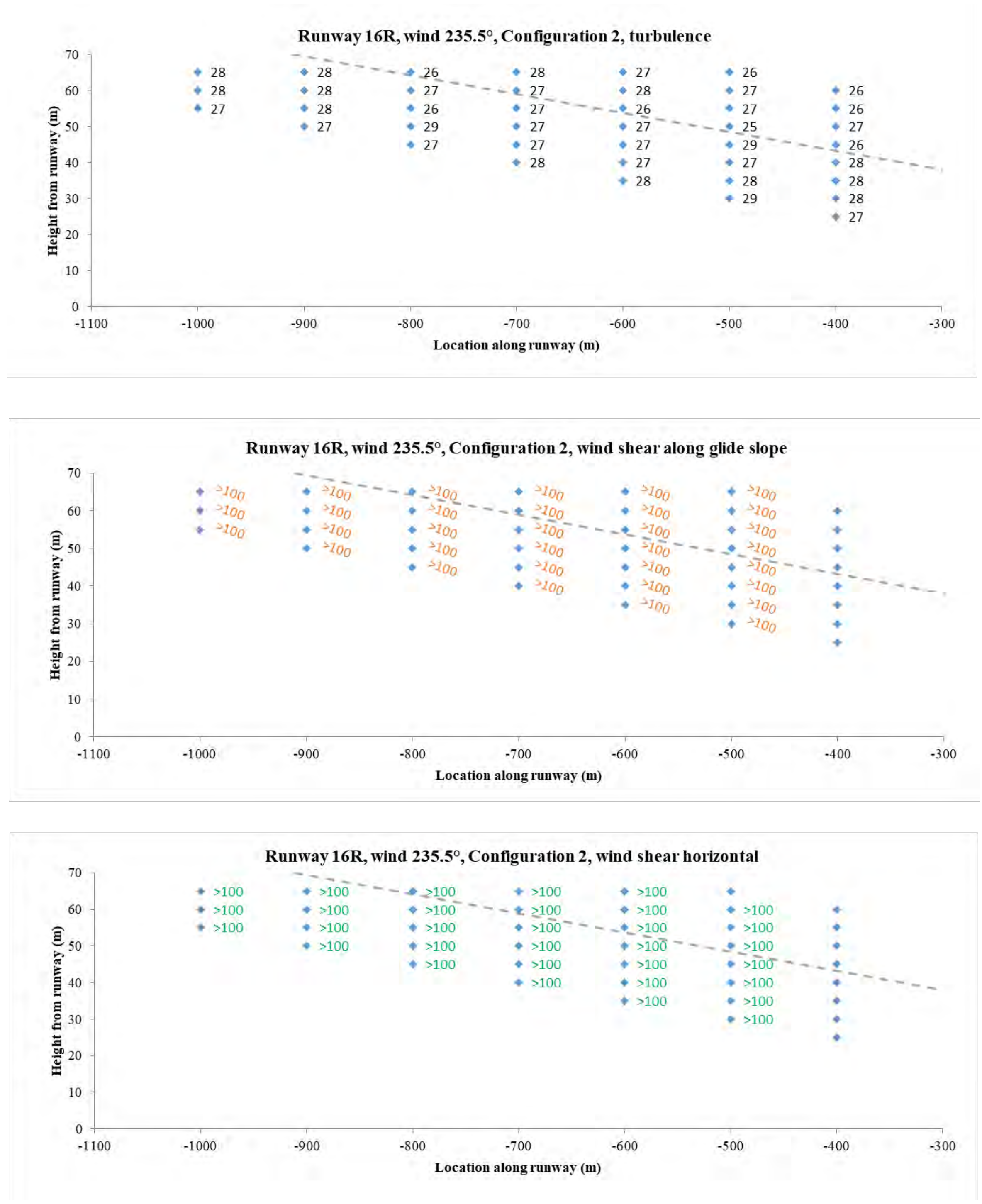


Figure 31: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 235.5° wind direction, configuration 2 (Existing).

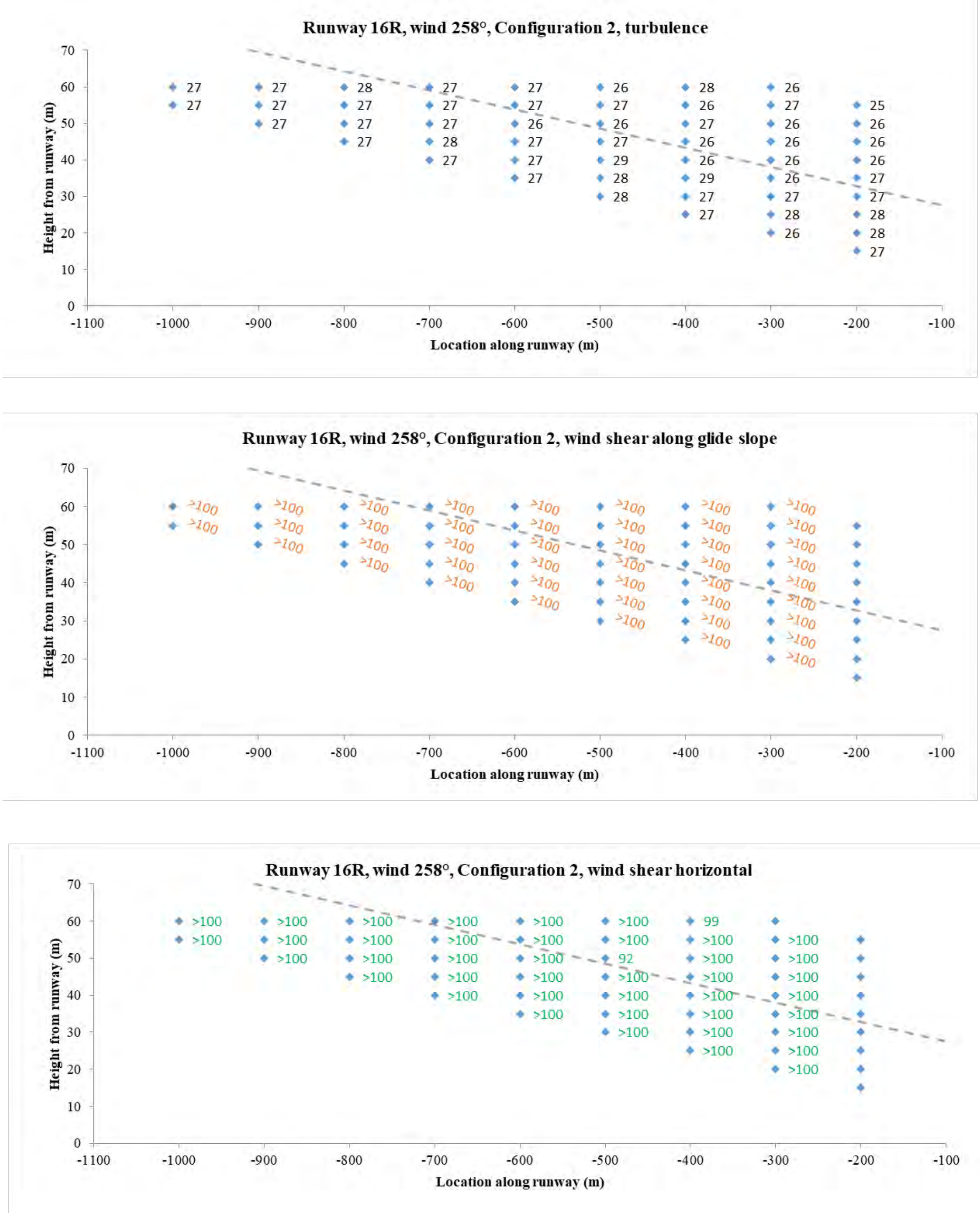


Figure 32: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 258° wind direction, configuration 2 (Existing).

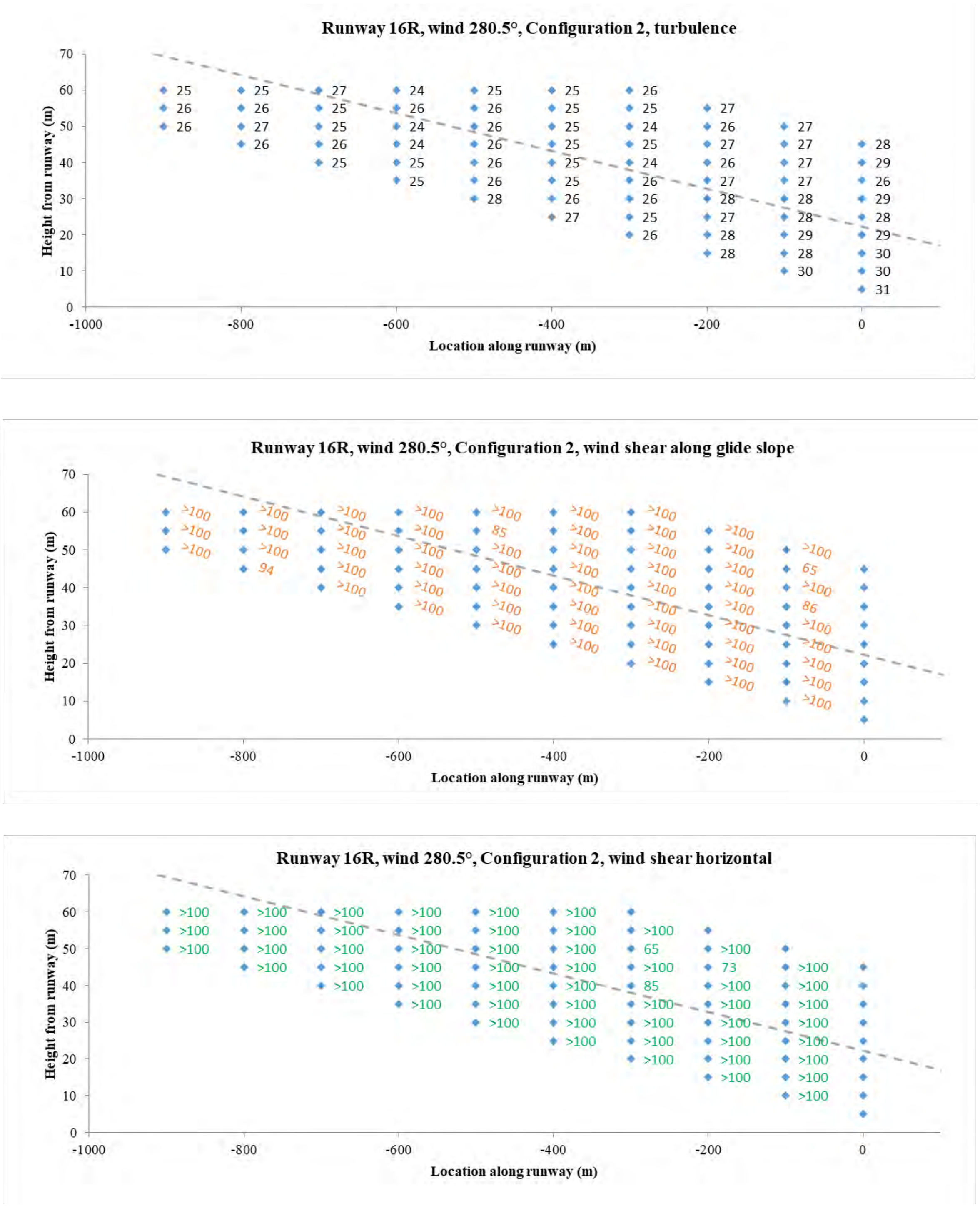
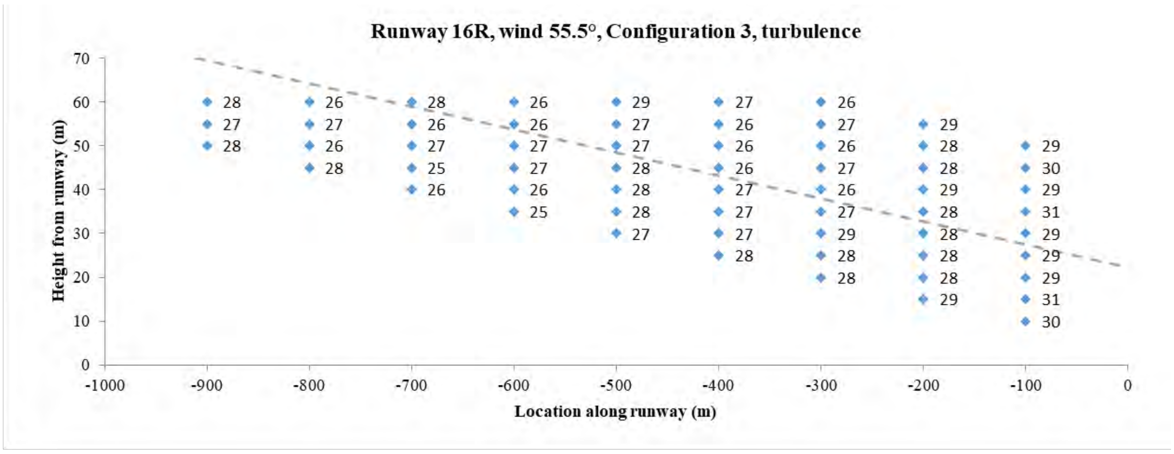
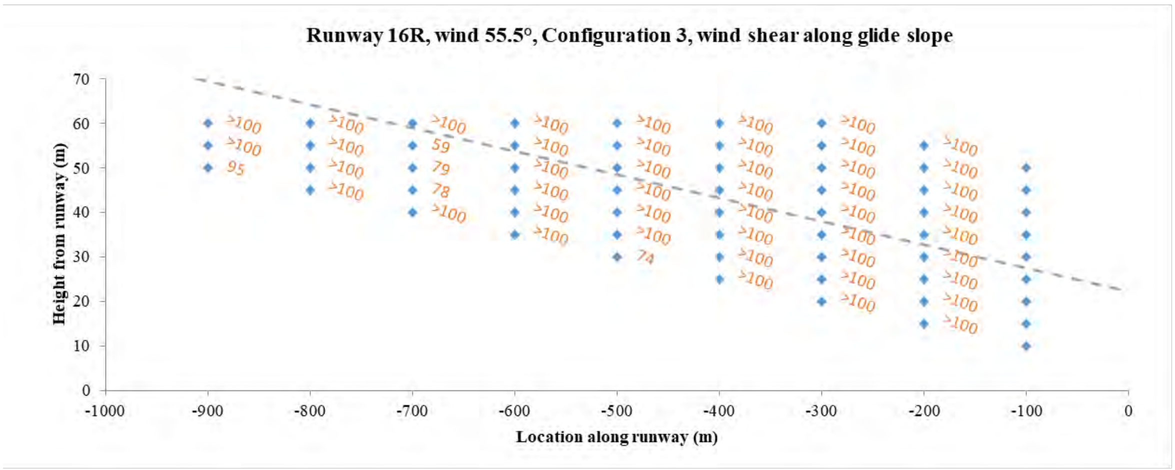


Figure 33: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 280.5° wind direction, configuration 2 (Existing).





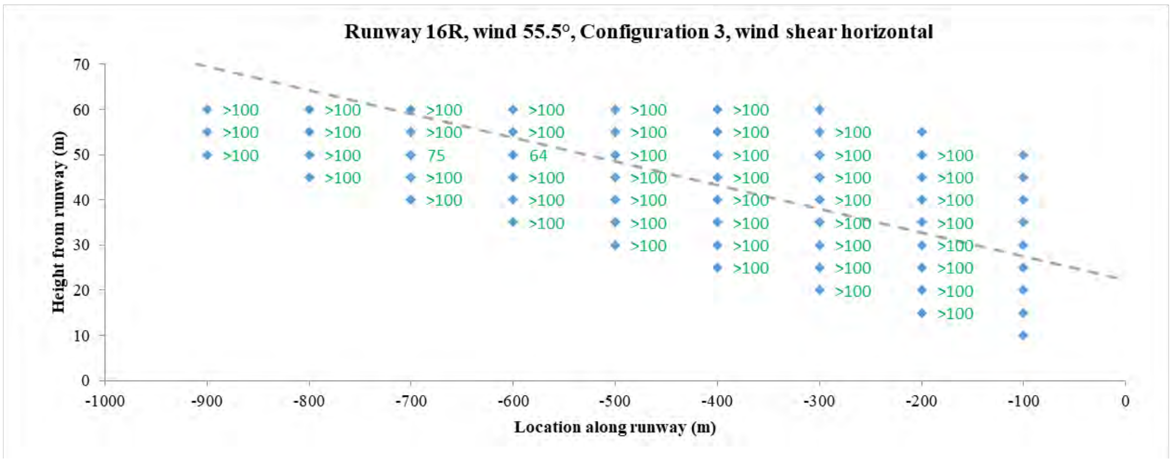


Figure 34: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 55.5° wind direction, configuration 3 (Proposed Option A).

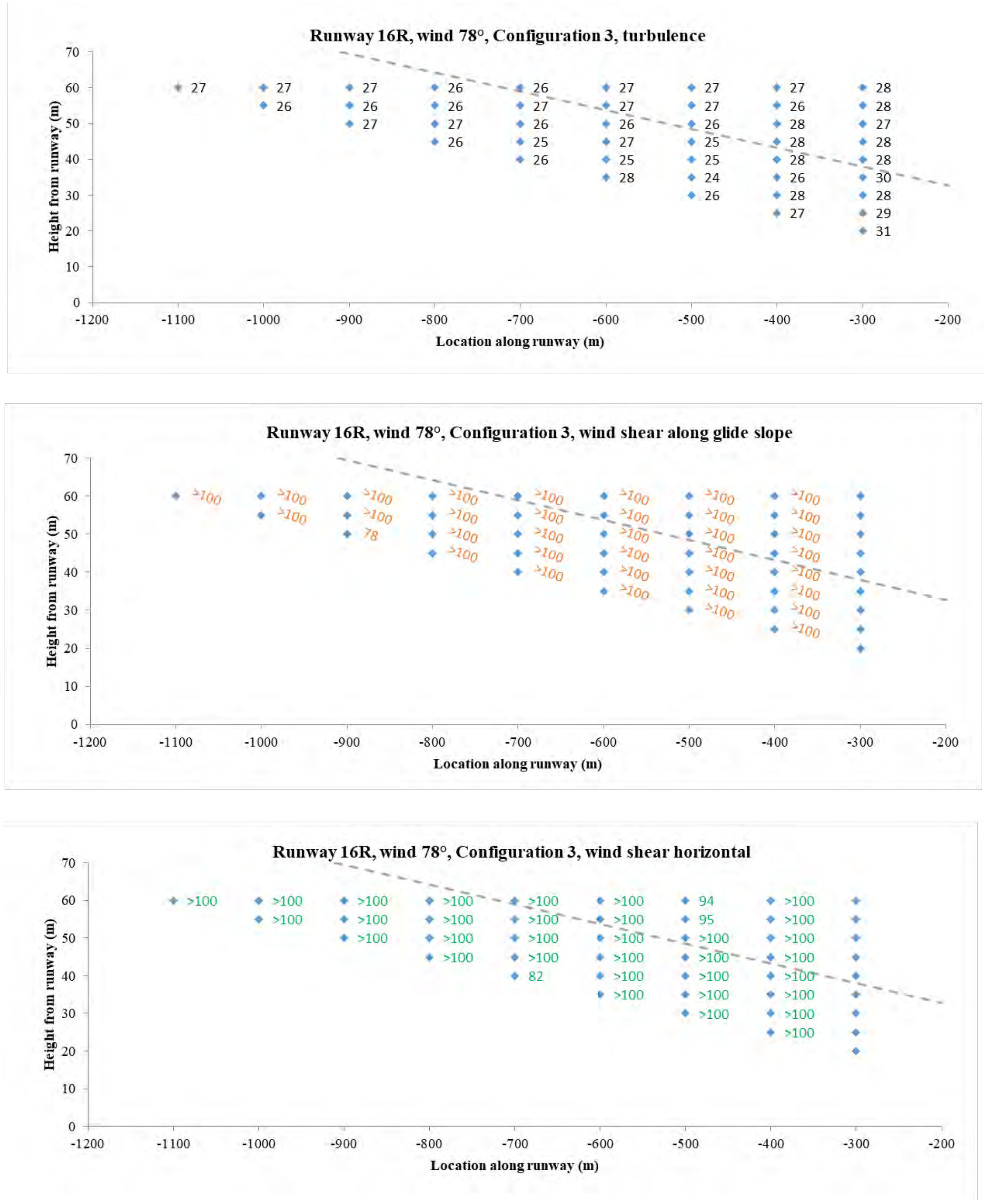
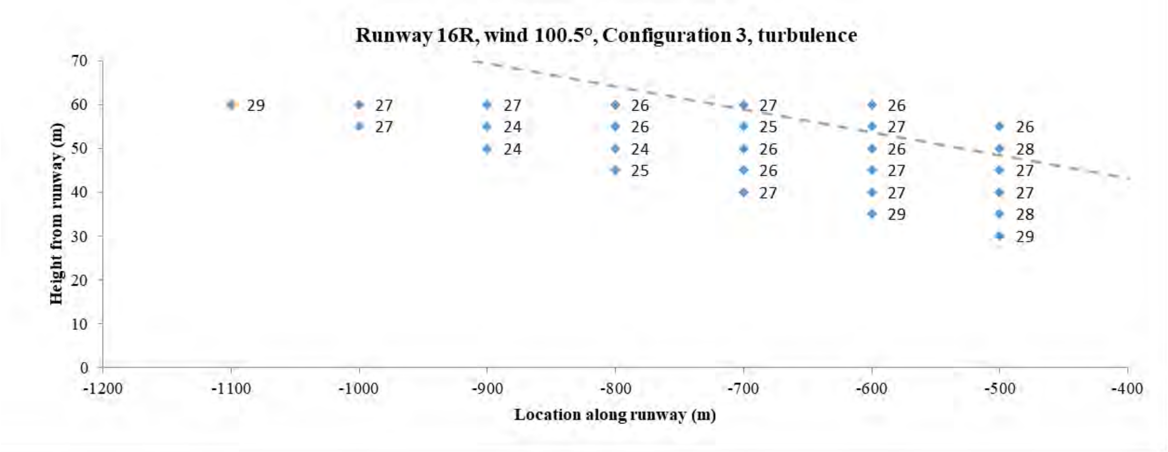
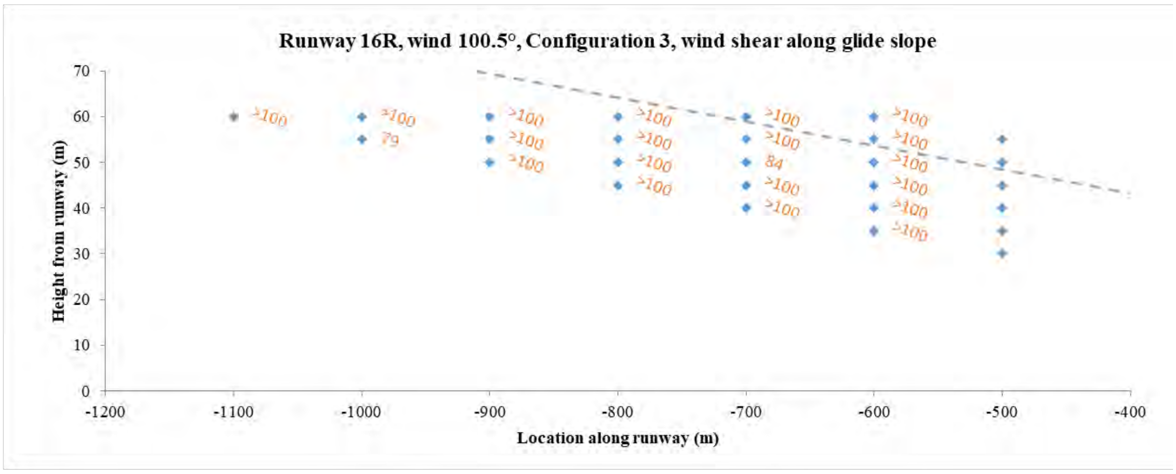


Figure 35: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 78° wind direction, configuration 3 (Proposed Option A).





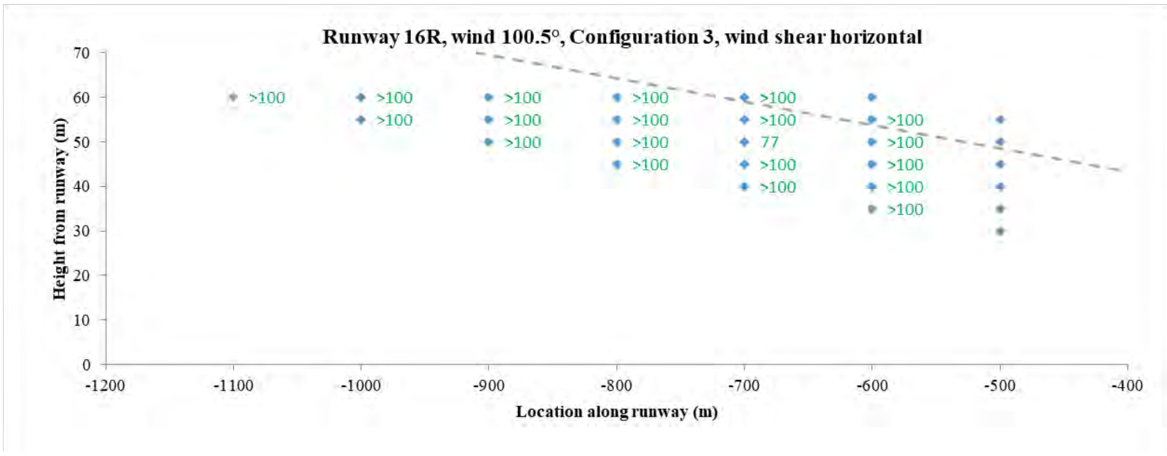


Figure 36: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 100.5° wind direction, configuration 3 (Proposed Option A).

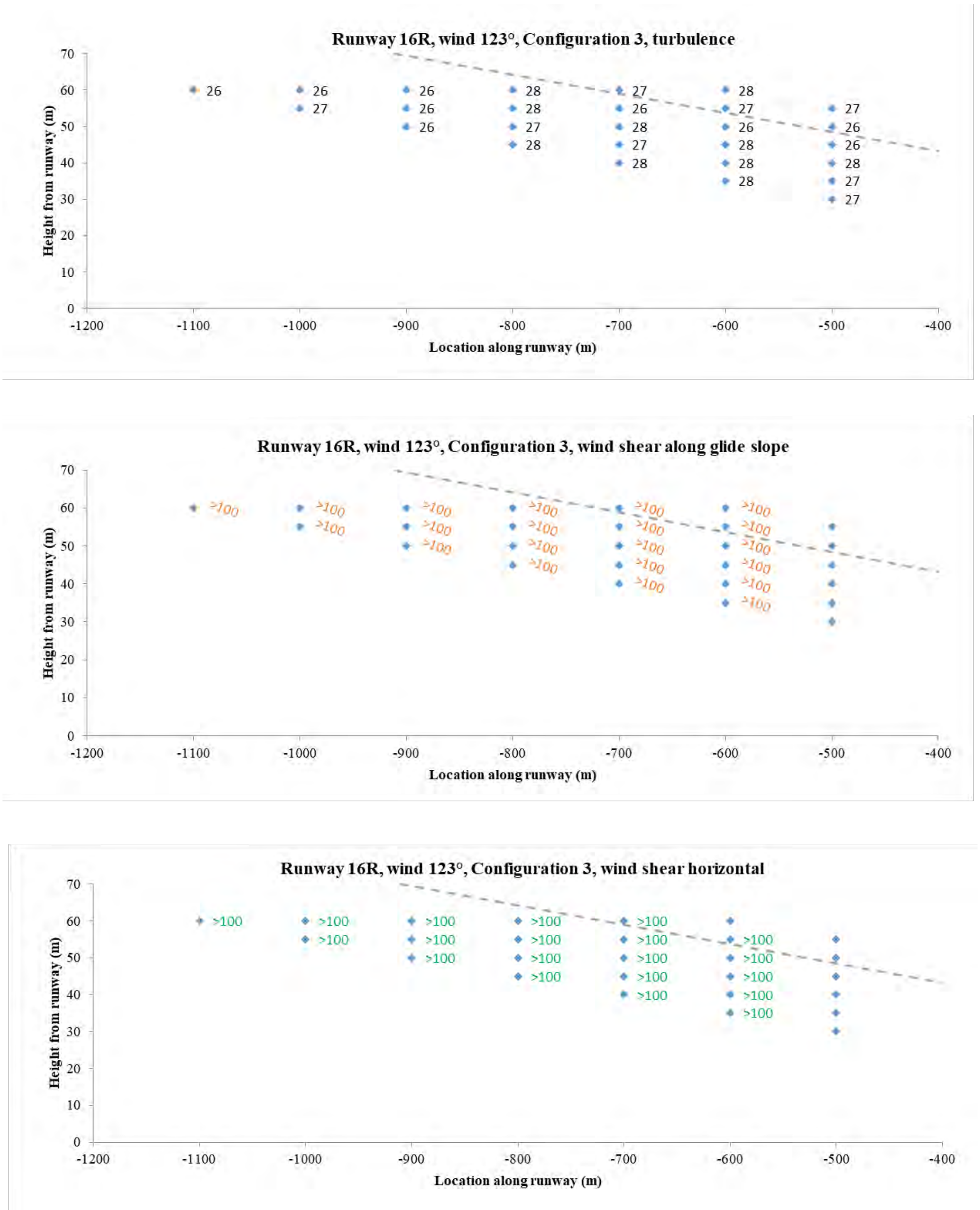
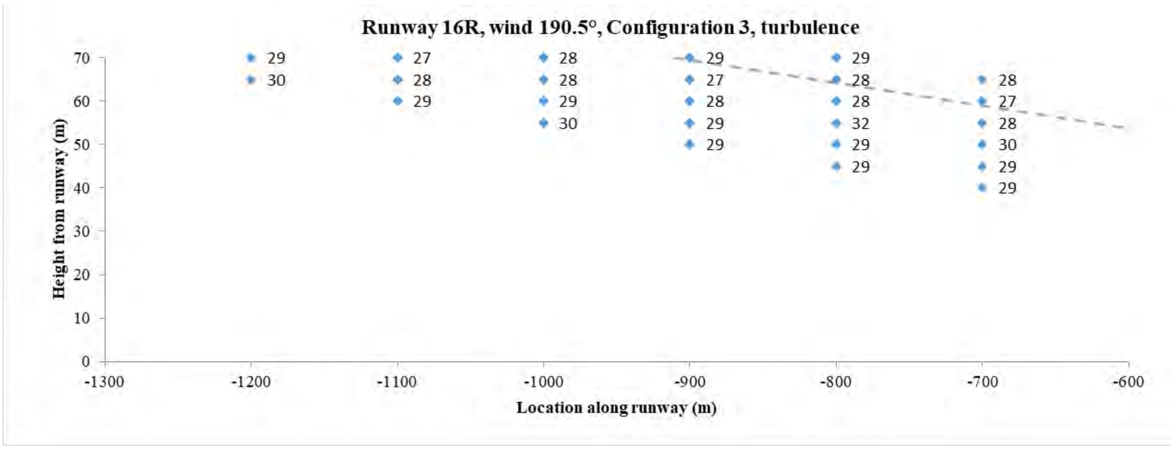
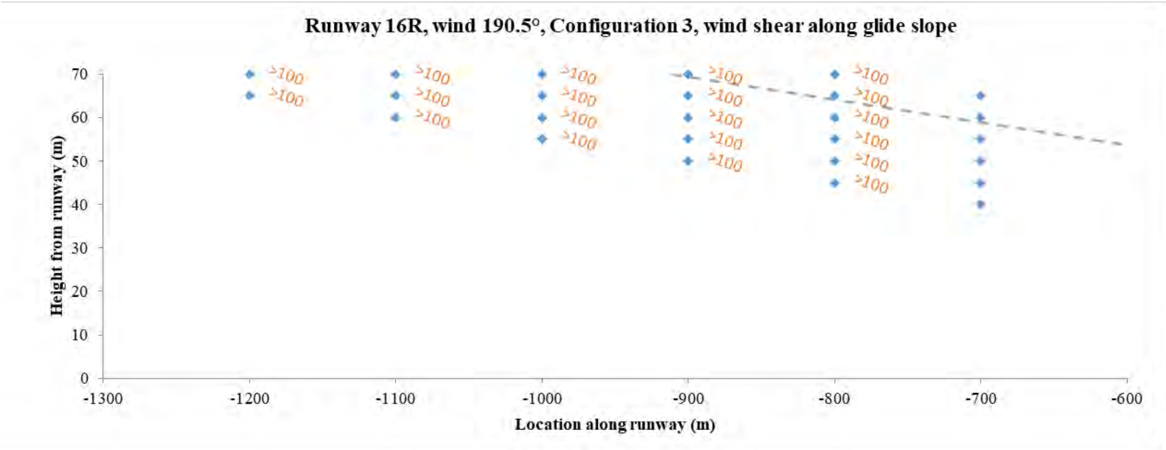


Figure 37: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 123° wind direction, configuration 3 (Proposed Option A).





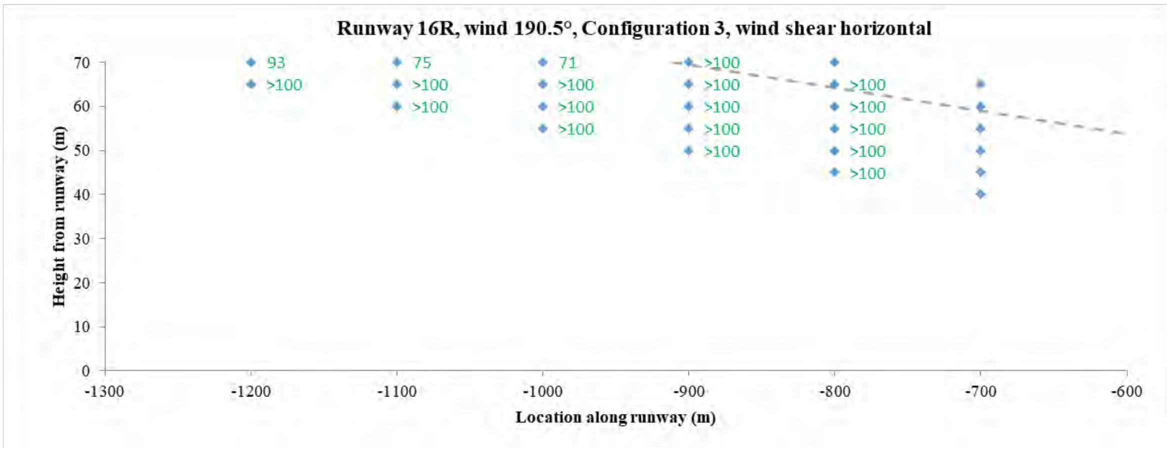
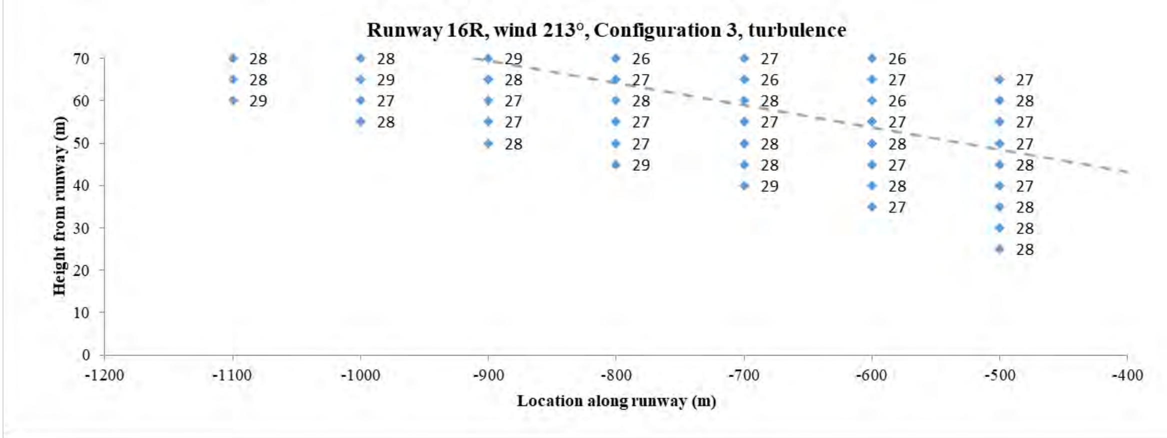
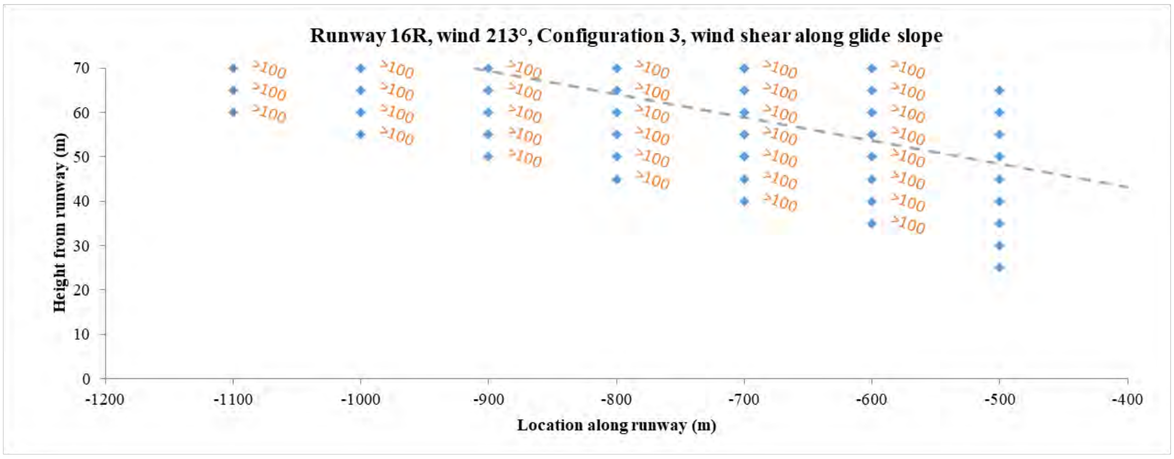


Figure 38: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 190.5° wind direction, configuration 3 (Proposed Option A).





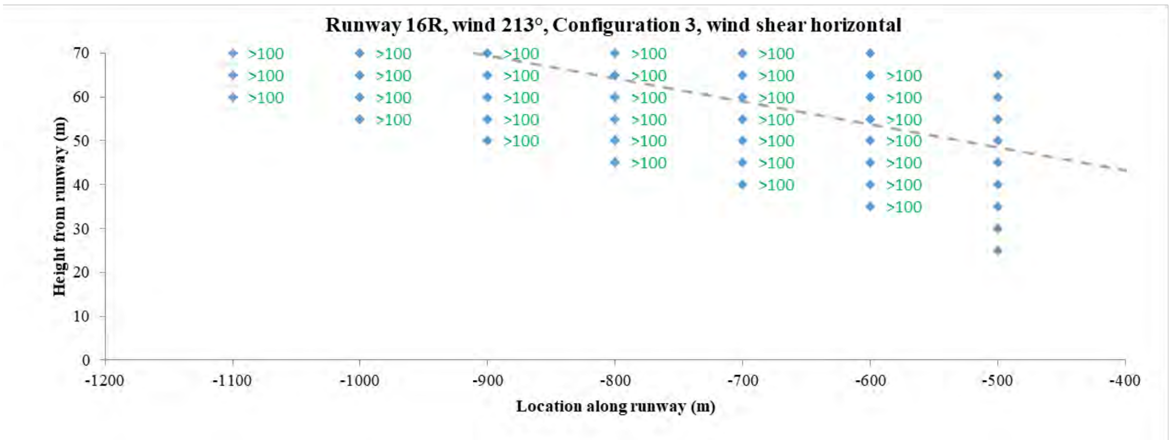


Figure 39: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 213° wind direction, configuration 3 (Proposed Option A).

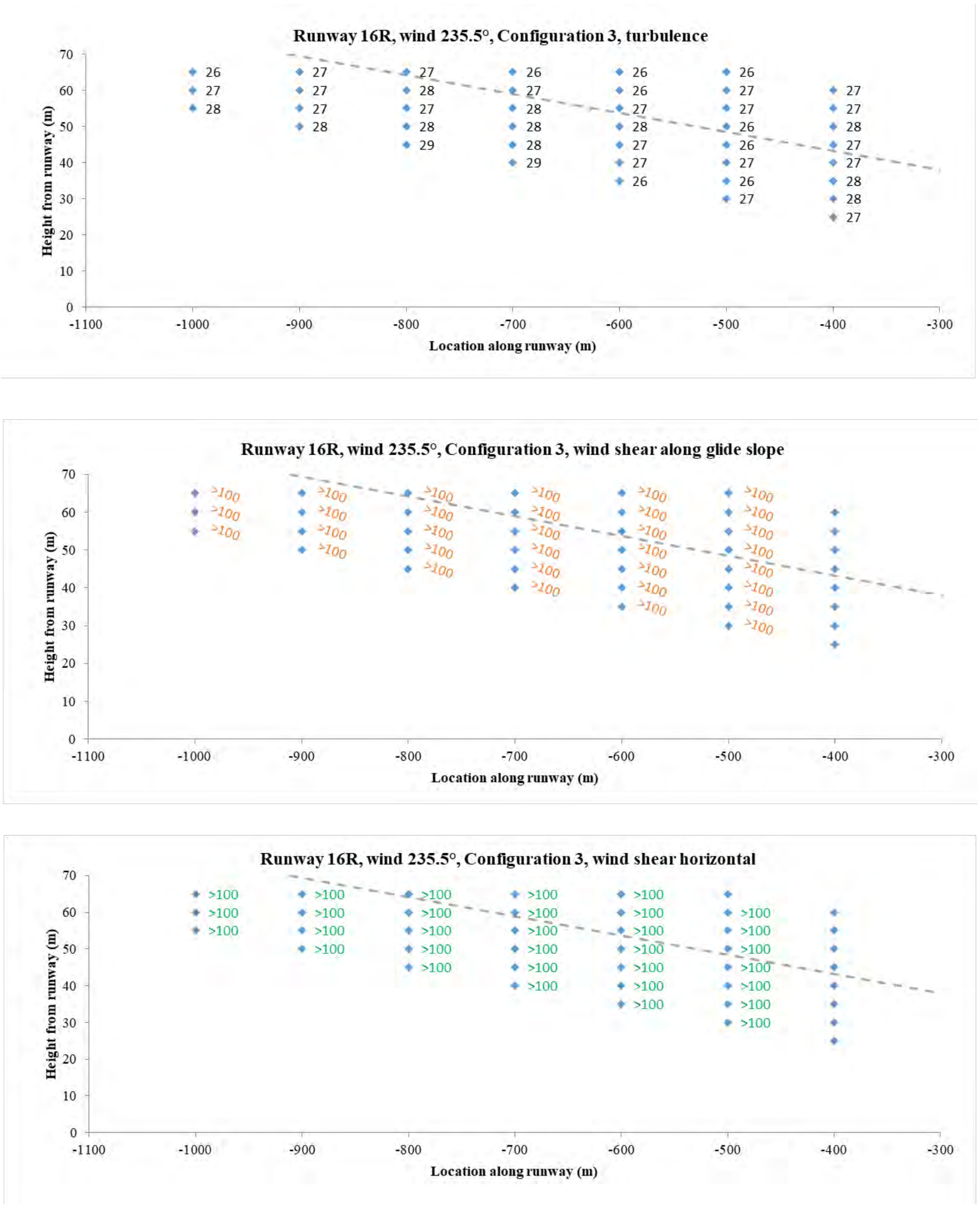


Figure 40: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 235.5° wind direction, configuration 3 (Proposed Option A).

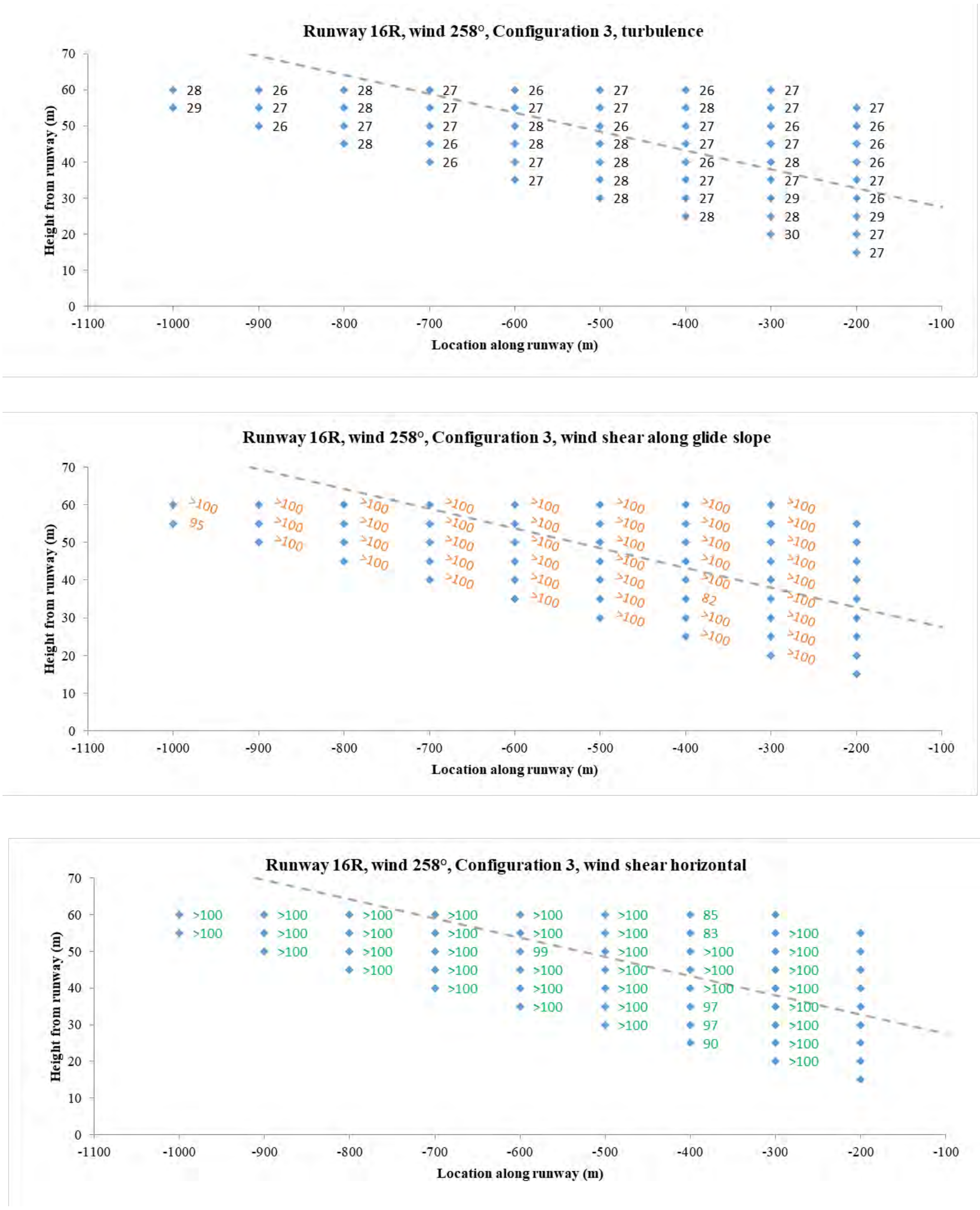


Figure 41: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 258° wind direction, configuration 3 (Proposed Option A).

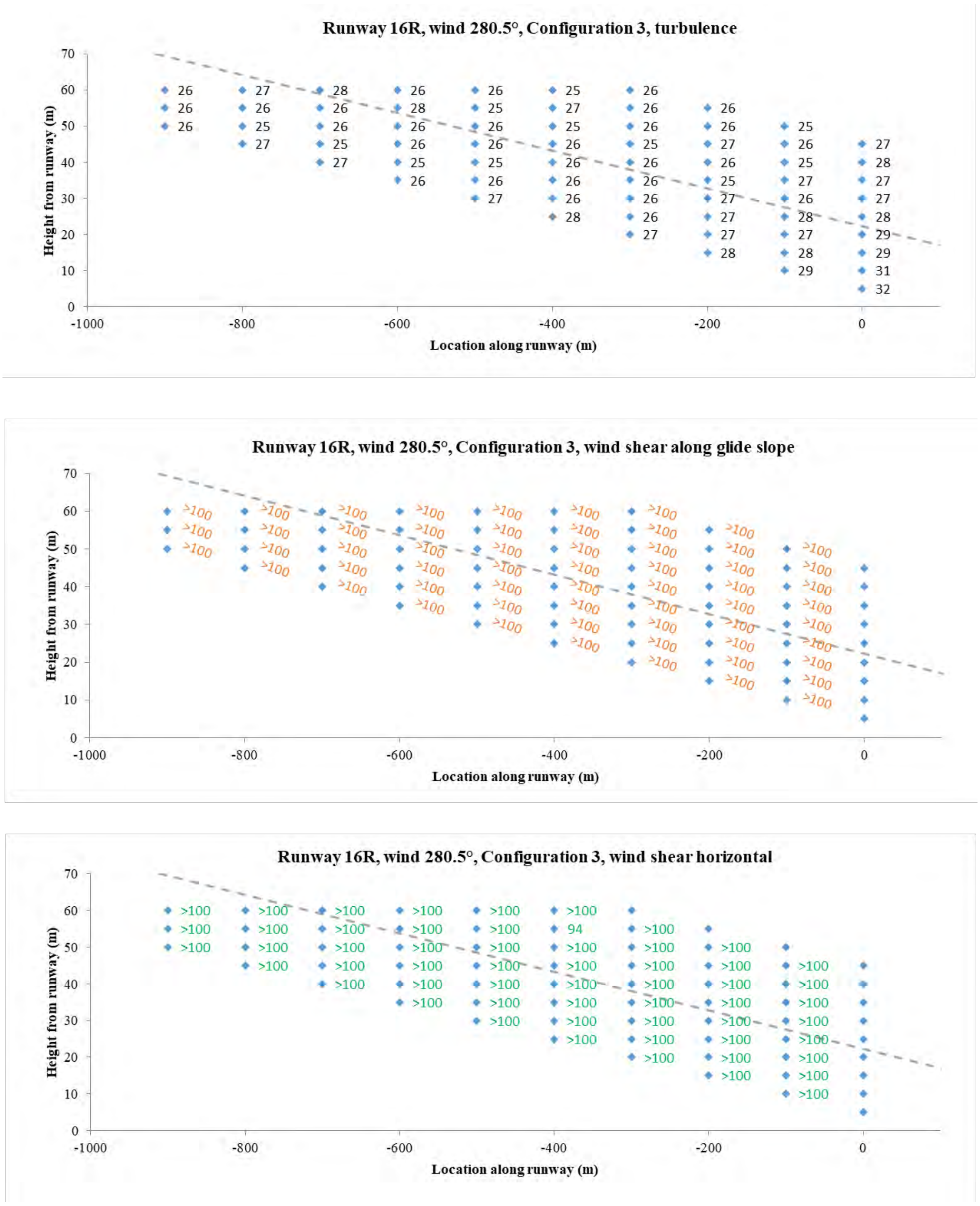


Figure 42: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 280.5° wind direction, configuration 3 (Proposed Option A).

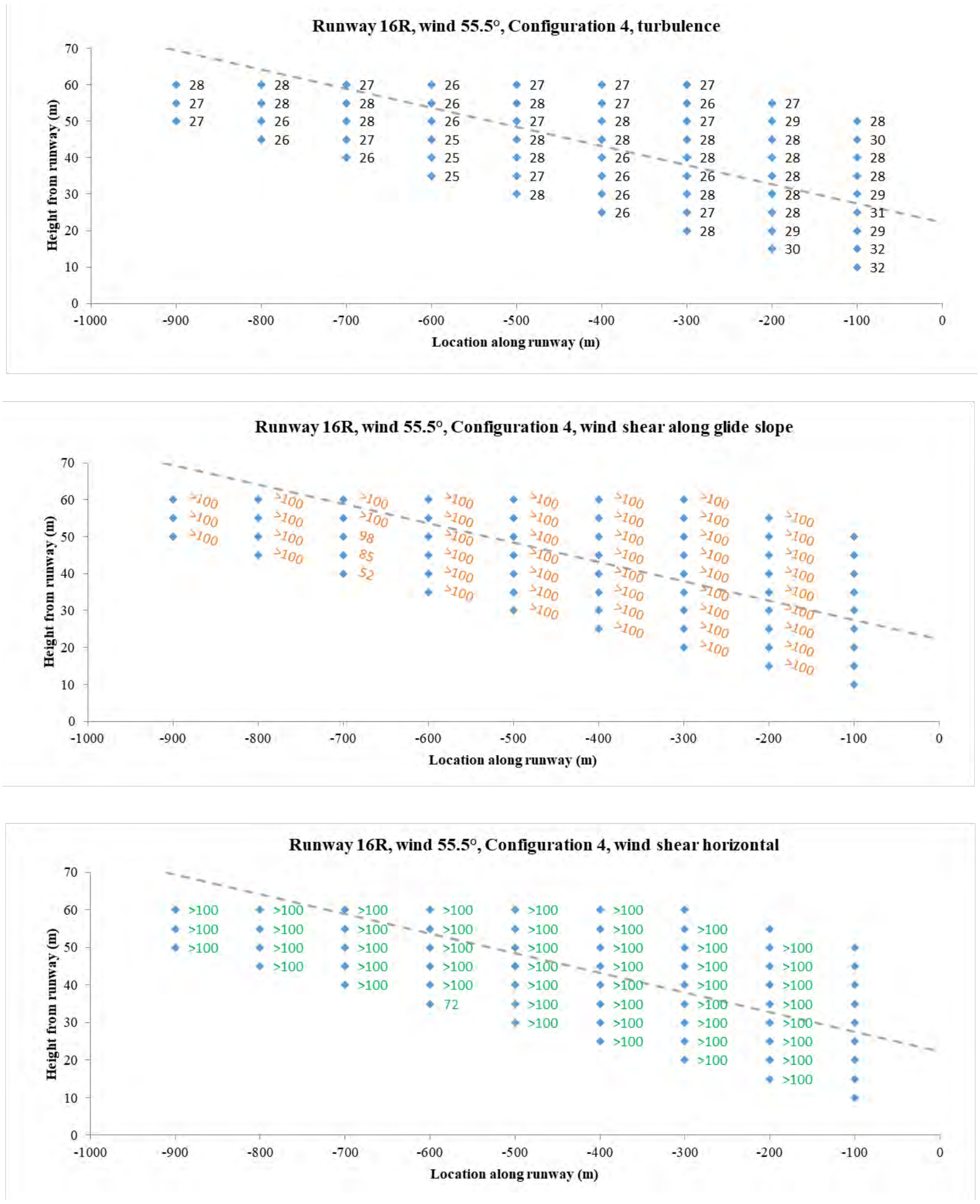
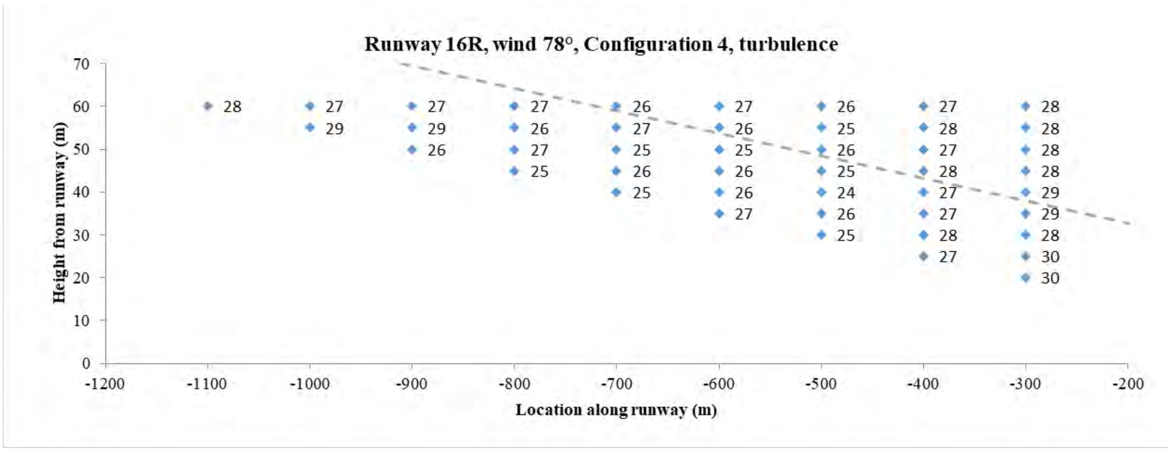
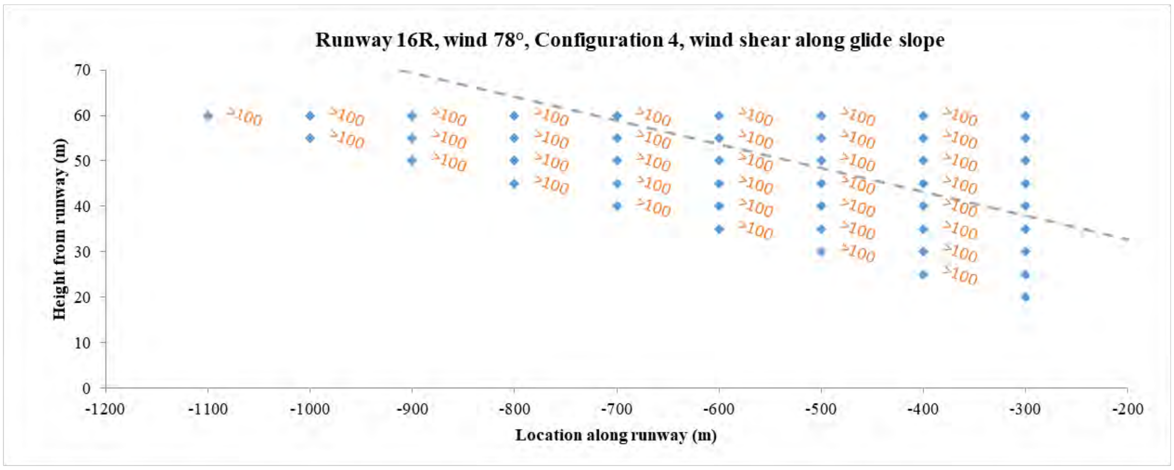


Figure 43: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 55.5° wind direction, configuration 4 (Proposed Option B).





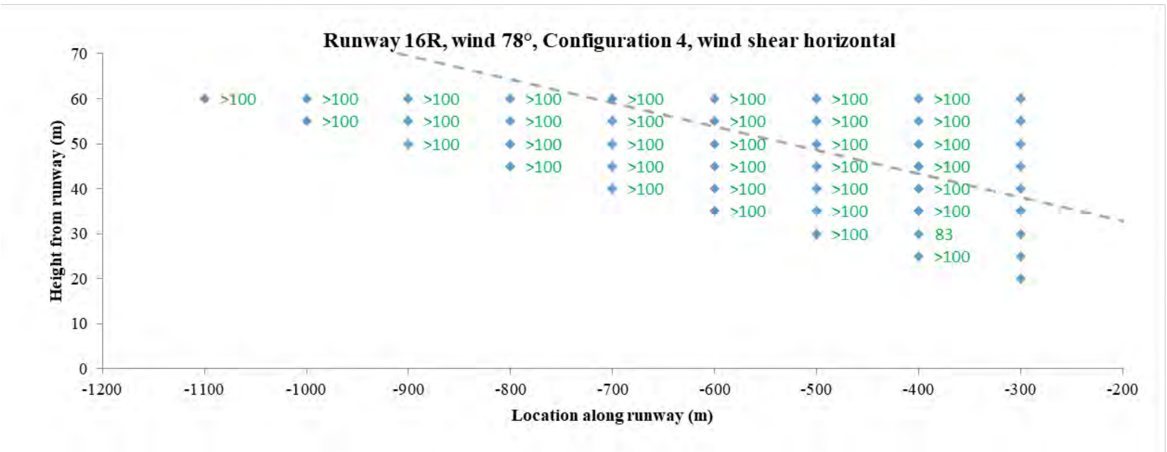


Figure 44: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 78° wind direction, configuration 4 (Proposed Option B).

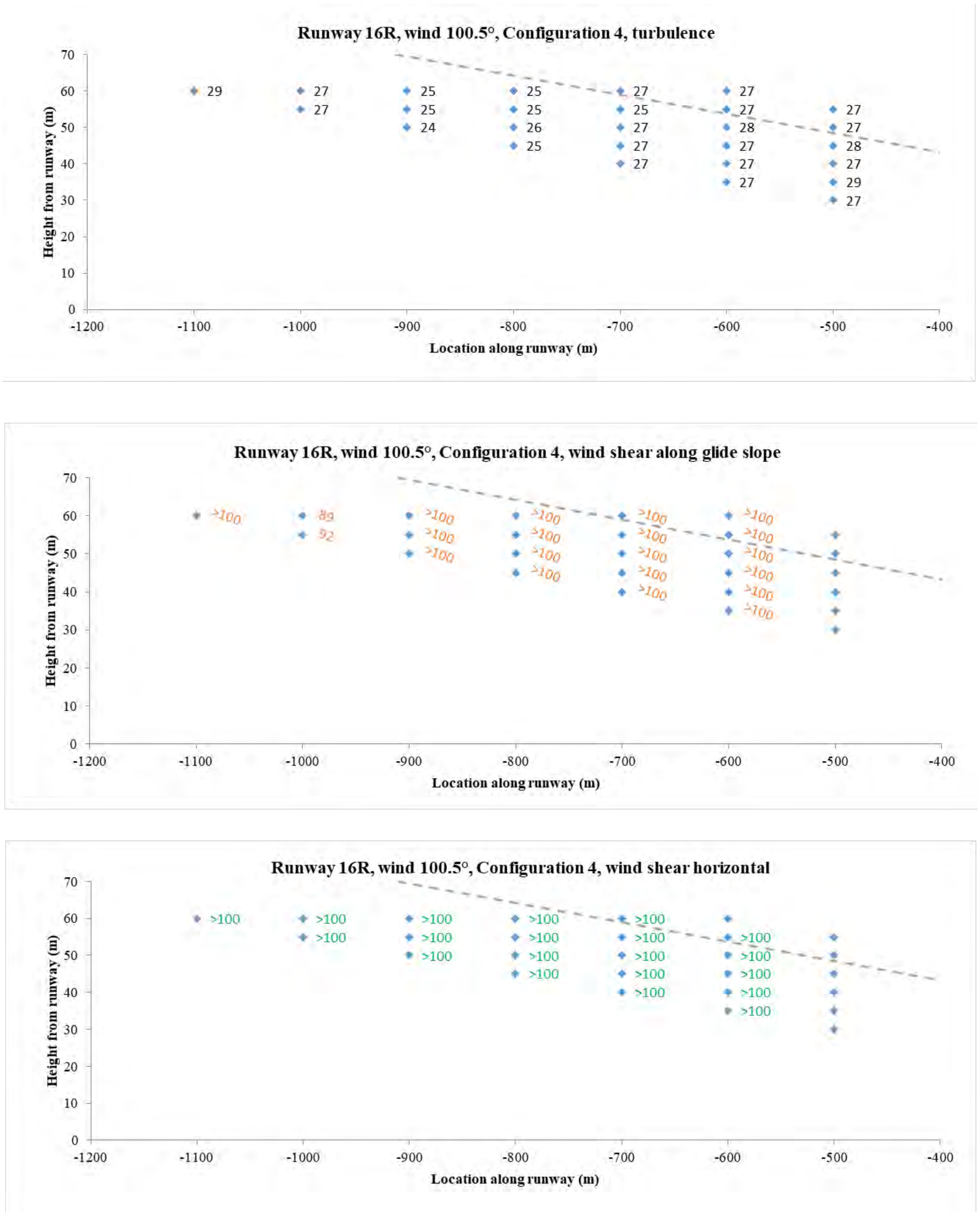


Figure 45: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 100.5° wind direction, configuration 4 (Proposed Option B).

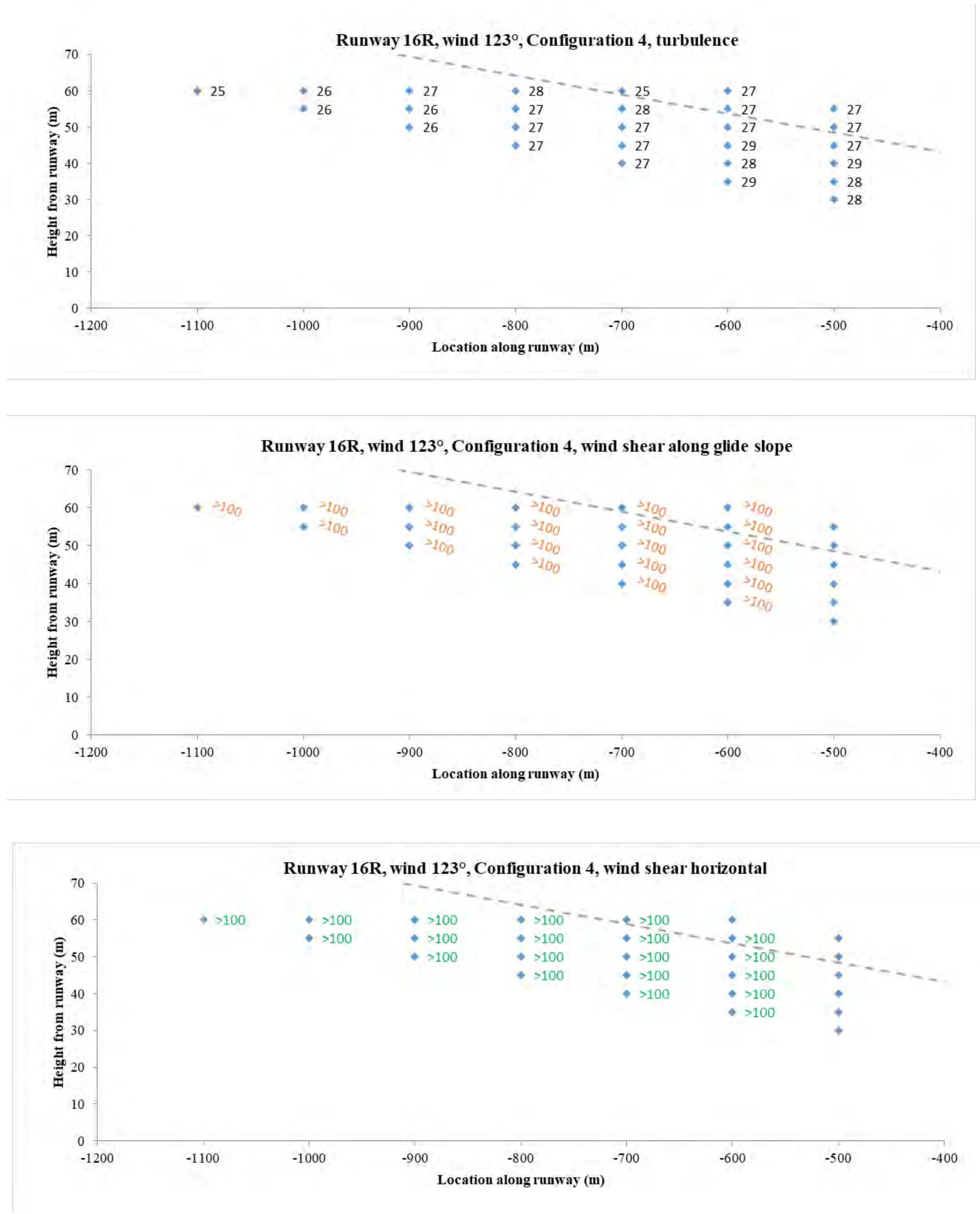
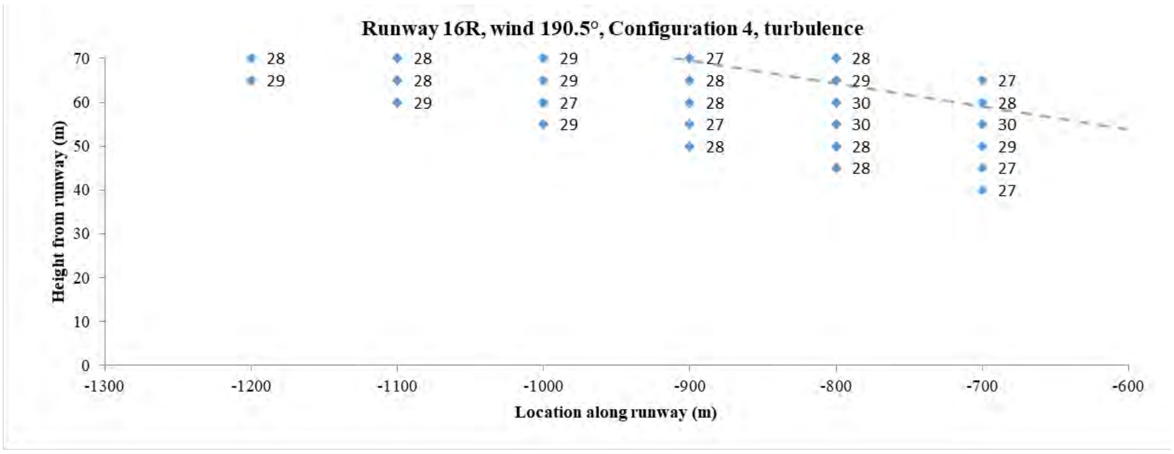
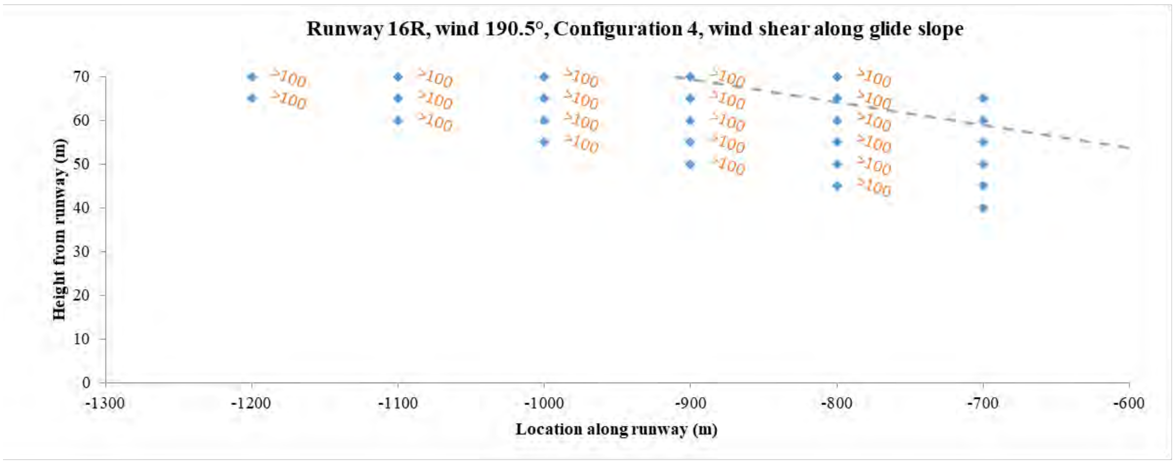


Figure 46: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 123° wind direction, configuration 4 (Proposed Option B).





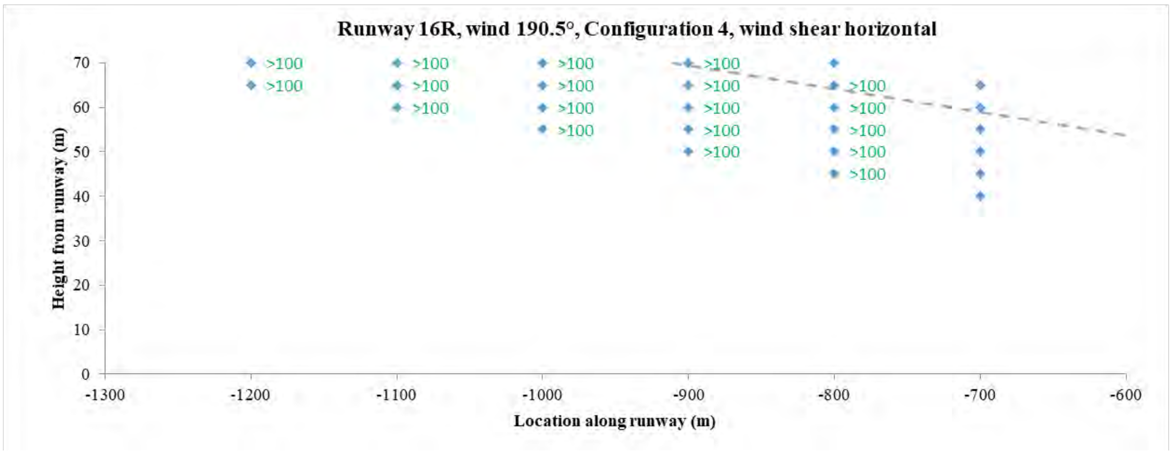


Figure 47: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 190.5° wind direction, configuration 4 (Proposed Option B).

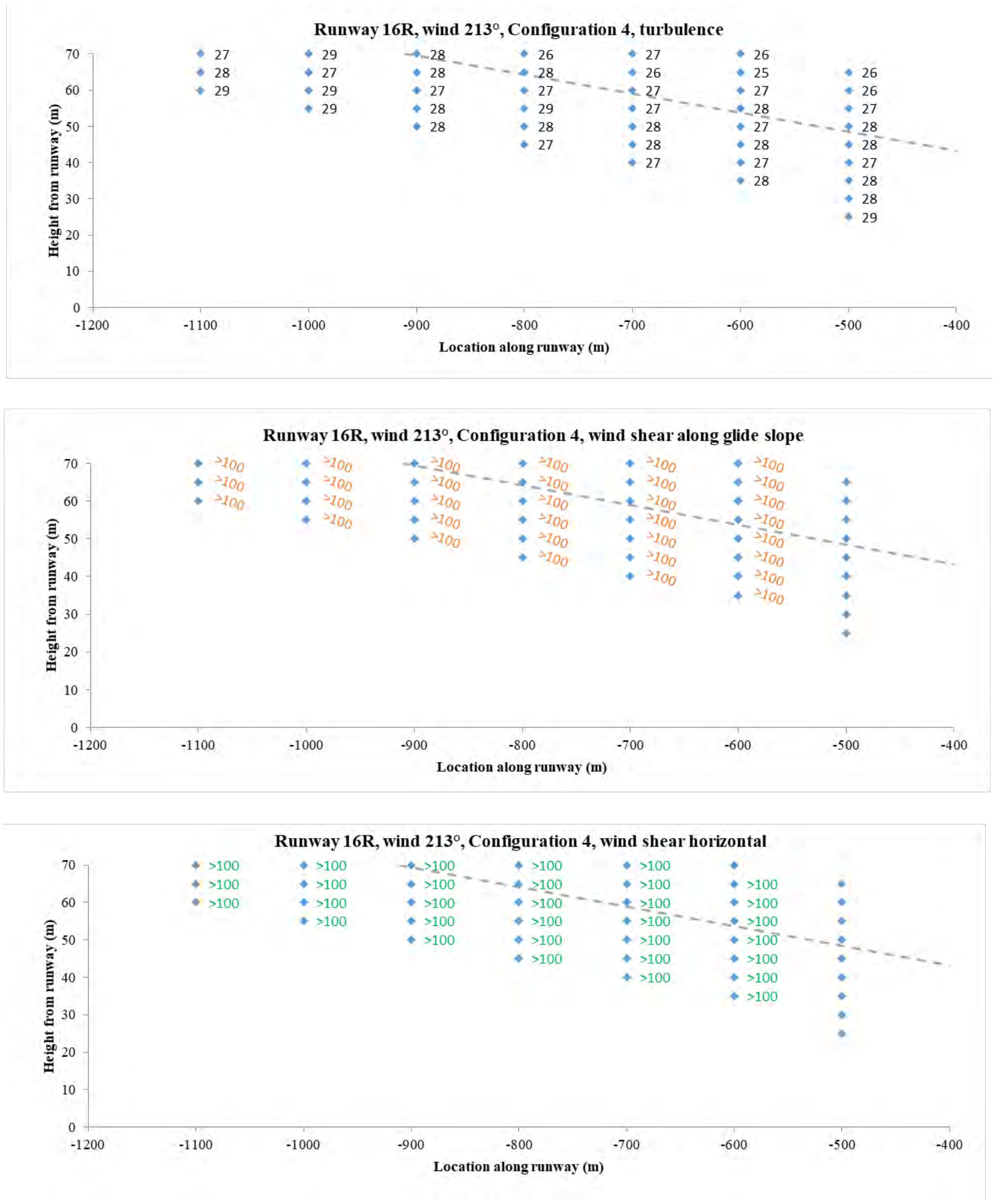


Figure 48: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 213° wind direction, configuration 4 (Proposed Option B).

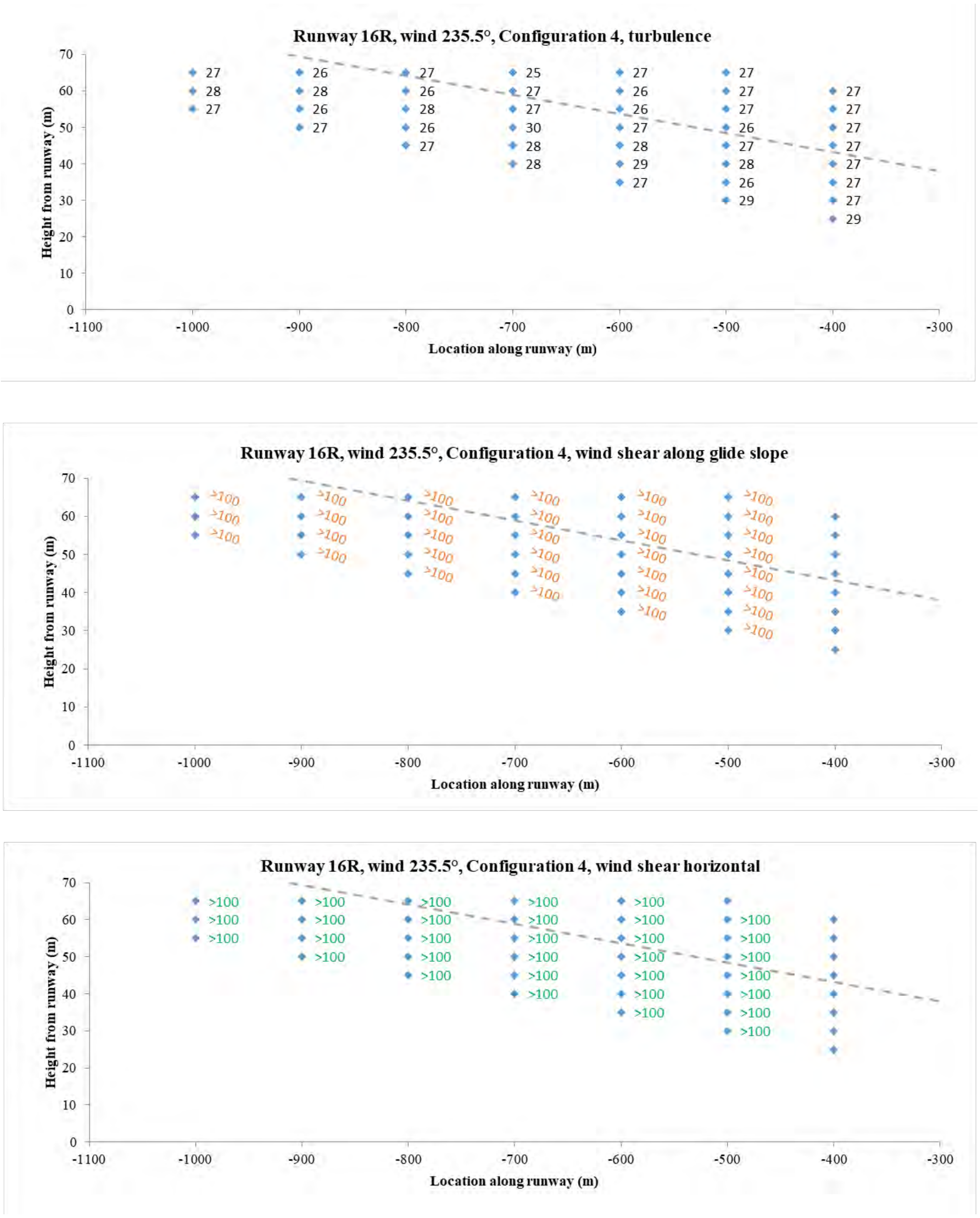


Figure 49: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 235.5° wind direction, configuration 4 (Proposed Option B).

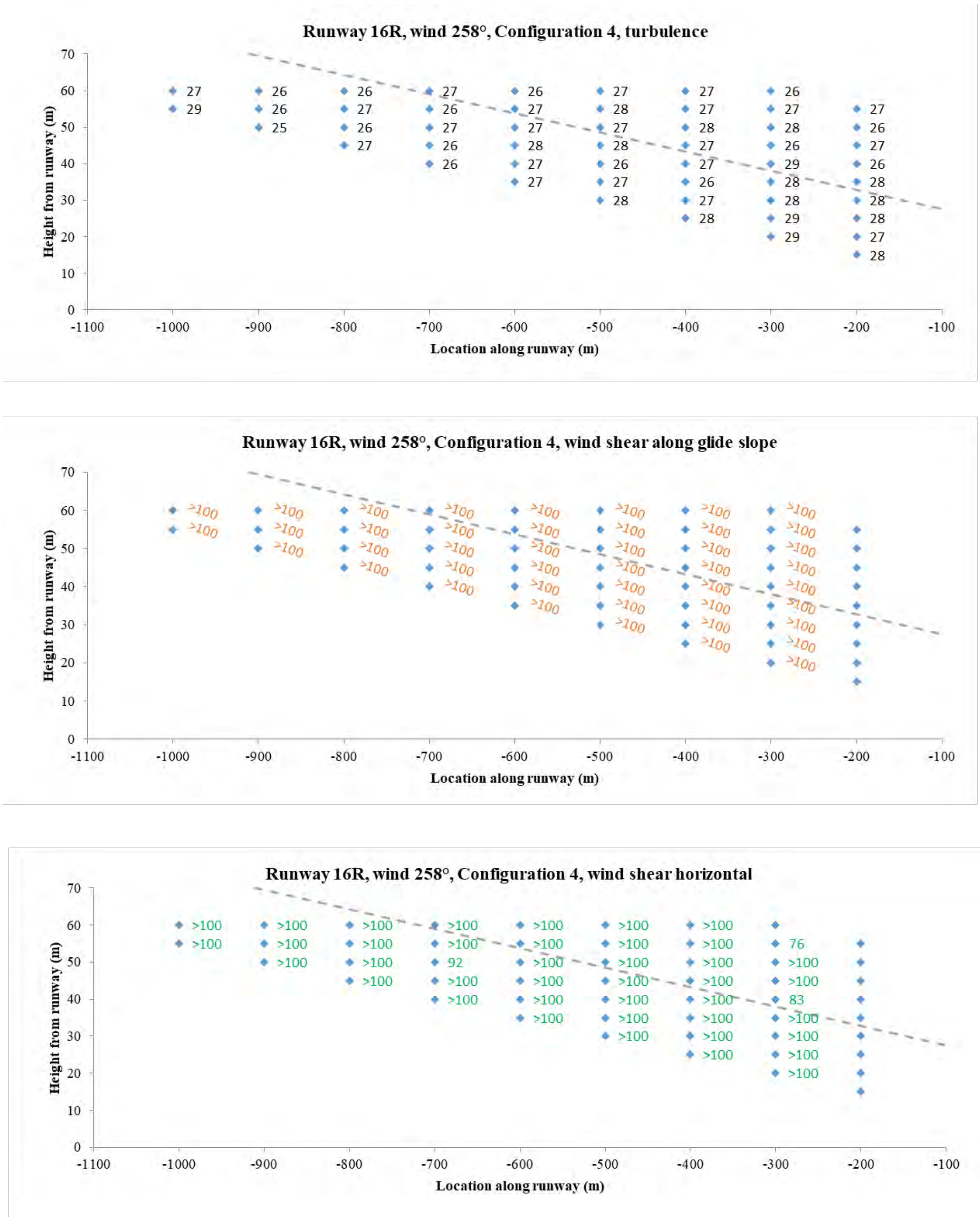


Figure 50: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 258° wind direction, configuration 4 (Proposed Option B).

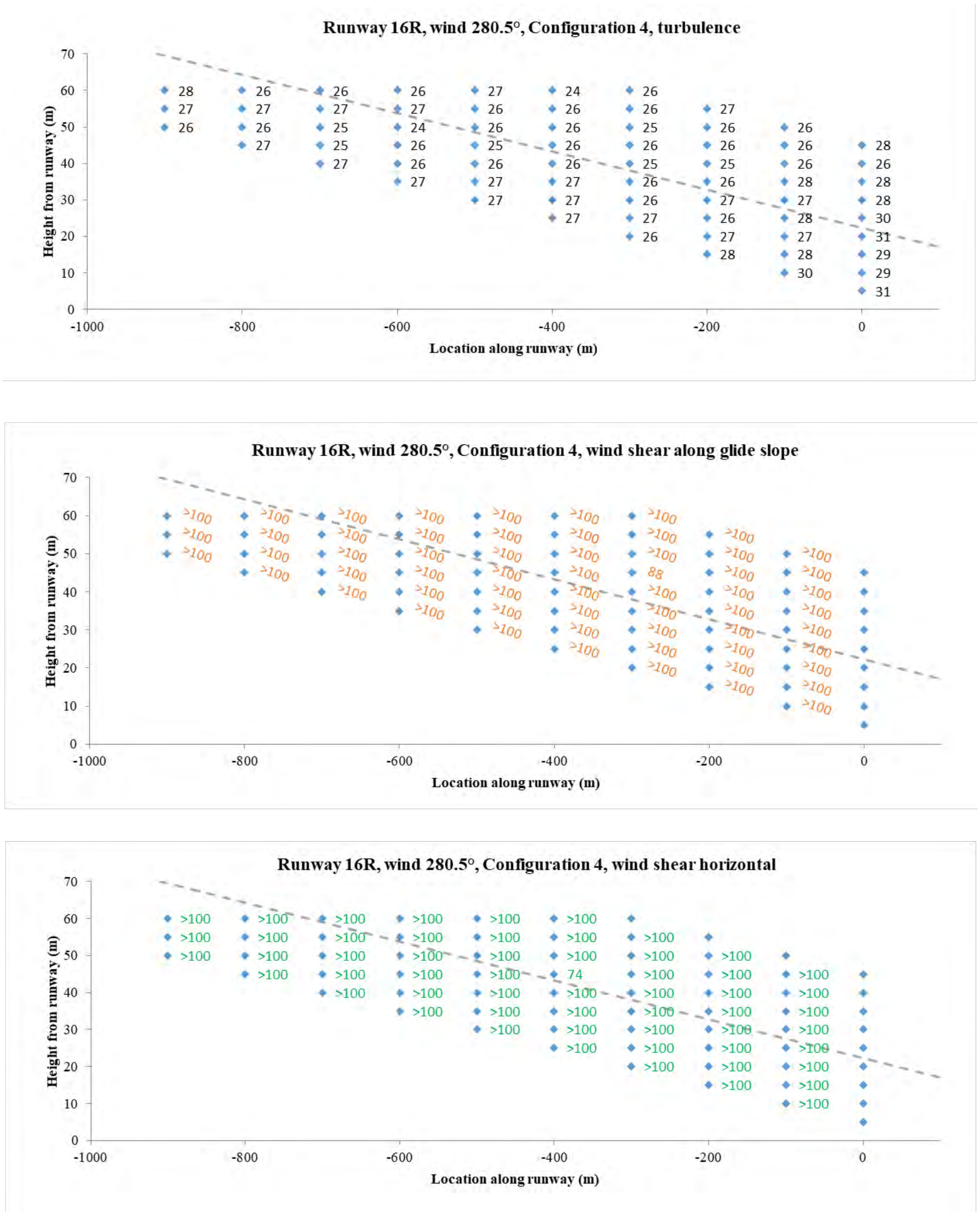


Figure 51: Runway 16R test results: 3 s gust wind speeds in knots required for exceedance of specified criteria, 280.5° wind direction, configuration 4 (Proposed Option B).

Appendix 3: Discussion on wind shear and turbulence

Paragraph 2.2.1 from ICAO (2005) states:

'In the explanation of wind shear given in Chapter 1, the changes in wind speed and/or direction concern changes in the mean (or prevailing) wind from one reference point in space to another. Short-term fluctuations of the wind about a mean direction and/or speed are normally referred to as "variations" from the prevailing wind. Such variations of the wind, individually at least, are temporary, like eddies; while eddies clearly involve wind shear; because they are on a much smaller scale than an aircraft, they tend to affect the aircraft as bumpiness or turbulence. The scale on which the wind shear operates, in relation to the overall size of the aircraft concerned, is therefore of fundamental importance.'

From the above, it can be appreciated that wind shear is based on a difference in mean wind speed between two locations, whereas turbulence is the natural variation in the wind speed and direction due to the flow over the ground.

The "variations" mentioned above are generally called turbulence in the wind engineering community and will be used in this document. Turbulence intensity is a term used to quantify turbulence and is calculated as the standard deviation of wind speed divided by the mean wind speed. This does not give an indication of the size of, or energy level associated with the gusts. A spectral analysis would be required to extract the frequency structure of the gusts from which a measure of the size could be inferred. This is beyond the scope of the current discussion, and would be impractical to monitor full-scale.

To emphasise the difference between wind shear and turbulence, a brief discussion on the driving mechanisms involved in generating turbulence and low level wind shear in the form of a thunderstorm downburst is included. "Low level" in wind engineering terms is defined as below about 500 m.

The typical atmospheric boundary layer created by synoptic wind events is created by friction at the ground surface, and therefore changes from the ground up. The boundary layer typically extends about 500 to 1000 m above ground level. Increasing friction caused by ground objects causes a decrease in the near-ground mean wind speed and an increase in turbulence intensity. The ratio of mean wind speed at 500 m to that at 10 m is typically about 1.6 for winds over open terrain (scattered trees and uncut grass), and 2.1 times for winds over suburbia. The mean wind speed at 500 m over open terrain is about 10% higher than that over suburbia. Turbulence intensity ratios between 500 m and 10 m are typically about 0.4, with winds over suburbia having about 1.3 times the turbulence intensity of those created over open country terrain.

To develop ICAO (2005) defined moderate and strong wind shear in open country terrain from 40 m to 10 m above ground level, the mean wind speed at 10 m would have to be in excess of 18 m/s (36 kt), and 33 m/s (66 kt) respectively. However, paragraph 5.2.8 of ICAO (2005) indicates that an aircraft could withstand a wind shear of 1.67 m/s per s (3 kt/s); for an aircraft landing in open country terrain with a ground speed of 55 m/s on a 3° glide slope, this would relate to a mean wind speed at a height of 10 m of approximately 75 m/s (150 kt), which would evidently never occur.

Turbulence intensity is wind speed dependent and the lower the mean wind speed, the higher the turbulence intensity. However, once the mean wind speed exceeds about 10 m/s (20 kt), the turbulence statistics become relatively less sensitive to wind speed. At the lower wind speeds, turbulence intensity is not considered a significant issue to aircraft safety, as the change in relative air speed between the aircraft and the wind is negligible. Turbulence is also a function of the meteorological event; local pressure driven winds such as a summer onshore wind will contain much smoother flow than winds associated with a large frontal system, even if they come from the same direction. This report only deals with developed atmospheric boundary layer flows and does not deal with meteorological events such as frontal systems and thunderstorm events, which cannot be practically modelled.

It is evident from the above, and an appreciation of the different surrounding terrain roughness that the existing wind conditions at the Airport are diverse depending on wind speed and direction. Determining the cause of any turbulence-related pilot complaints based on isolated Bureau of Meteorology data would be exceptionally difficult; especially if it could be proven there were a lack of complaints during similar wind event days. It would be considered necessary to investigate the number of similar meteorological events and determine whether similar complaints were received on those days. Discussions with pilots would also be considered important to determine the frequency and severity of turbulent events.

The most likely cause of low level wind shear at the Airport is caused by a frontal system, thunderstorm downdraft, or some form of temperature inversion. One mechanism for generating low level wind shear in thunderstorms is created by a descending column of generally cold air reaching the ground, then being turned by the ground plane, Figure 52. These events are called thunderstorm downbursts. Thunderstorm microbursts have a central diameter of between 400 m and 4 km. The dashed white line starting on the left of Figure 52 at an elevation 1 k ft (300 m) is a typical glide slope for a landing aircraft. The concern for aviation is that a landing aircraft initially experiences a significant headwind in excess of 20 m/s (40 kt), which changes into a tailwind after passing through the impingement point, at the centre of the descending column of air where the wind is coming vertically downward. The headwind causes the aircraft to rise, whereby the pilot will lower the throttle causing the aircraft to descend back to the glide slope, but then tailwind causes a reduction in lift causing the aircraft to land short of the runway. Thunderstorm downburst events typically last for only a few minutes and therefore have the spatial and temporal size to create localised wind shear.

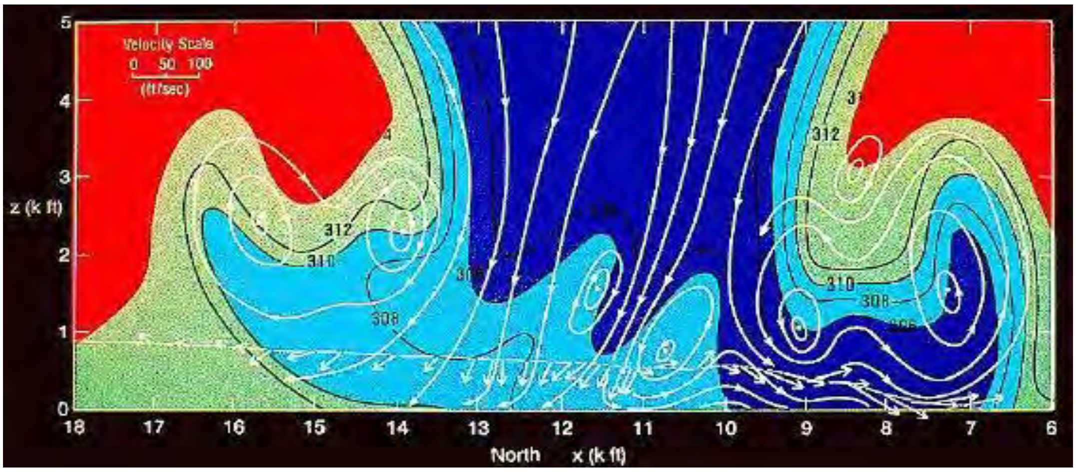


Figure 52: Radar image of a thunderstorm downburst.

The wind flow patterns over a building, Figure 53, are completely different in that there will be recirculation zones near the windward wall and roof edge, and in the immediate lee of the building. The typical extent of these recirculation zones relative to the height of the structure, h, is illustrated conservatively in Figure 53; for instance Peterka et al. (1985) describe the downstream recirculation zone extending 2 to 6 times the height of the structure. These regions are not fixed but fluctuate in time thereby increasing downstream turbulence, but wind shear would only be experienced in the recirculation zones. As the distance increases from the structure, the flow pattern will resort to the undisturbed state. This distance is a function of the geometry of the building, and the roughness of the surrounding terrain, but the mean velocity and turbulence intensity at roof height would be expected to be within 10% of the free stream conditions at 10 times the height of the structure downwind from the building. The building will influence the wind pattern to a distance larger than this, but the magnitude of any change is expected to be slight. The frequency of turbulence shed from the building would be expected to be fairly high and the spatial extend of a similar size to a large aircraft, therefore any effect would be expected to be of short duration.

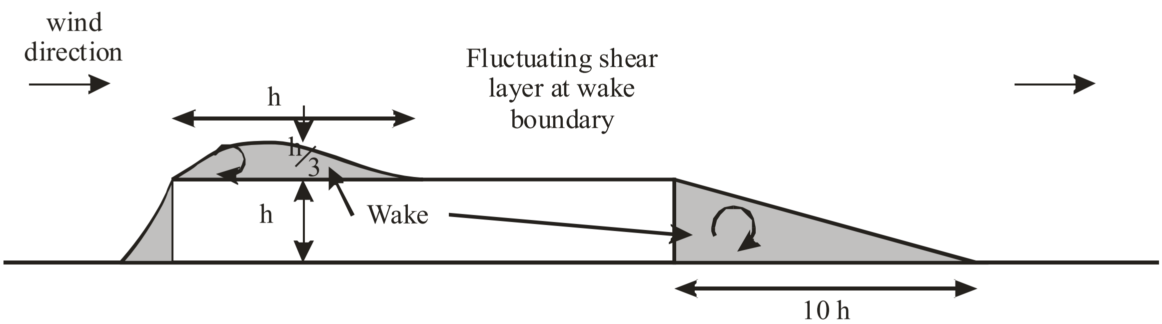


Figure 53: Sketch of the flow pattern over a structure.

It is evident from the above that the wind shear situation for flow over a structure is completely different to that for a thunderstorm. Unless the aircraft were to fly directly through one of the small wake regions, which are probably smaller in spatial extent than the aircraft itself, it would not experience any wind shear. The only concern would be if a large building were constructed right next to the runway and there were no provisions for using another runway during strong cross-wind events.

This discussion is in agreement with the ICAO Manual which in section 3.2.2 states:

'…This means that while the buildings are comparatively low, they present a wide and solid barrier to the prevailing surface wind flow. The wind flow is diverted around and over the buildings causing the surface wind to vary along the runway. Such horizontal wind shear, which is normally very localised, shallow and turbulent, is of particular concern to light aircraft operating into smaller aerodromes, but has also been known to affect larger aircraft.'

Before the discussion on the specific development site, it should be appreciated that only strong wind events (gusting to over 10 m/s, 20 kt) are considered here, because wind events with a lower wind speed would not be expected to appreciably influence the lift characteristics of a landing aircraft moving at a minimum of 36 m/s (70 kt).

Appendix D
Odour assessment addendum

Transport

Sydney Gateway Road Project

Technical Working Paper 17 – Odour Assessment Addendum

Distribution

Transport, Gateway to Sydney Joint Venture (G2S JV)

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1. Introduction and structure of this report

1.1 Background

Following exhibition of the EIS/preliminary draft MDP in 2019, the NSW Environment Protection Authority has requested an updated odour assessment be completed to include consideration of odour generated from leachate during excavation at the former Tempe landfill.

This document provides a description and results of an additional assessment in response to the EPA's request and prepared as part of the response to submissions requested by the NSW Department of Planning, Industry and Environment.

This report has been prepared as an addendum to Technical Working Paper 17 – Odour Assessment prepared as part of the EIS/preliminary draft MDP and as many aspects of the approach and methodology are unchanged from the original assessment, this addendum should be read in conjunction with that report.

Chapter 3 of the response to submissions report describes a number of refinements to the project which have occurred following exhibition of the EIS/preliminary draft MDP. Relevant to this report, two of the original three emplacement mounds assessed in Technical Working Paper 17 have been removed from the project. The implications of these changes have been considered in this revised assessment.

1.2 Structure of this report

The remainder of this addendum report is structured as follows:

- Section 2 describes the site conceptualisation undertaken and presents the analysis of the potential volume of leachate which might occur
- Section 3 describes the odour modelling inputs and results of the assessment
- Section 4 outlines any recommended mitigation measures, additional to those in Technical Working Paper 17
- Section 5 provides a summary and conclusions.

Throughout this report, the term 'surface leachate' is used to refer to leachate generated through rainfall following contact with exposed waste and not infiltrating into it.

It should be noted that there is an additional component of leachate discussed in Technical Working Paper 16 (Former Tempe Landfill Assessment) which refers to the extraction and disposal of leachate from within the waste mass and beneath the ground.

2. Leachate water balance

The assessment methodology takes into account guidance provided in the Environmental Guidelines: Solid Waste Landfills (EPA, 2016).

2.1 Site conceptualisation

A key input to the revised odour analysis is the conceptualisation of how surface leachate is collected, stored and managed during the works as well as the estimation of likely volumes that might be generated.

A summary of the key site conceptualisation outcomes is provided below:

- Surface water would be diverted around the area of exposed waste and rainfall on areas not containing exposed waste would be captured and treated in accordance with separate site management procedures, including the conditions of any environmental protection licence
- Rainfall on areas of exposed waste that does not infiltrate into the waste mass (termed surface leachate) would be captured and directed to a leachate storage
- Surface leachate would be continually disposed of from the leachate storage to provide capacity for subsequent rainfall events
- During periods of intense or prolonged rainfall, where the leachate storage capacity is reached, excess leachate would be temporarily stored within the exposed waste area until capacity is available in the leachate storage. Excess leachate is a portion of surface leachate.

The above conceptualisation is considered to form a reasonable basis to model surface leachate generation and disposal from the site. During detailed design and construction planning by the appointed construction contractor, the generation and management of surface leachate may be adjusted based on the preferred construction methodology and worksite planning.

Based on the above site conceptualisation, two key sources of odour from surface leachate exist:

1. Leachate stored in the leachate storage
2. Excess leachate stored from periods of intense or prolonged rainfall.

Based on these sources, a water balance model was developed to quantify the surface leachate storage that may be required and the likelihood and duration of excess leachate being generated.

2.2 Leachate water balance

A water balance model was prepared with regard to the site conceptualisation and Environmental Guidelines: Solid Waste Landfills (EPA 2016) and represented with the following key parameters:

- A daily time-step simulation based on approximately 120 years of rainfall data from 1900 to 2020. The data was sourced from Bureau of Meteorology observations at Sydney Airport infilled with patched data from other sources where it was not available in this location
- Surface leachate generation from exposed waste assumed to be 80 per cent of incident rainfall. The Environmental Guidelines: Solid Waste Landfills offers a rainfall infiltration rate of 100 per cent for active filling areas, however the difference (20 per cent) has already been assumed in the complementary analysis presented in Technical Working Paper 16 for rainfall infiltration into the waste mass
- The area of exposed waste (including the relocated waste) was set at the working cut area of 2.22 Ha. Working cut (and total cut) terminology is as described in Technical Working Paper 17

- Surface leachate being conveyed to the leachate storage where capacity is available. When it is not available, the leachate is temporarily stored within the exposed waste area until capacity is available in the storage
- Operation of the leachate storage such that disposal is continuously undertaken at the full disposal rate until it is empty
- Evaporation from and direct rainfall onto the leachate storage based on climate data over the same period as rainfall
- Surface leachate storage capacity and the disposal rates were adjusted in the water balance model to reduce the predicted occurrence and duration of excess leachate generation.

2.3 Results

A process of iteration and statistical analysis was carried out to identify an acceptable storage capacity and disposal rate to inform the subsequent odour assessment. The following capacity and disposal rates were adopted for the odour modelling:

- A combined surface leachate storage of 3.9 ML capacity is required (plus a freeboard of 300 mm). The model predicts the storage is likely to be empty for over 90 per cent of the time, on average, however there are individual rainfall events, and consecutive events which would generate surface leachate volumes greater than this
- In combination with the above storage capacity, a surface leachate disposal rate of 425 kL/day
- Based on the above storage and disposal rate, the likelihood of excess leachate occurring is predicted to be approximately 0.2 per cent of the time, on average, which is a low risk of occurrence and for this reason is excluded as a potential odour source
- To provide perspective to this frequency, 0.2 per cent of the time corresponds to excess leachate predicted to occur on average 0.4 days each year. That is, for many years there are no occurrences of excess leachate. Furthermore, the model predicts that even when excess leachate does occur, it is only for relatively short periods. For example, the occurrence of excess leachate for a period of greater than three days was only predicted to occur once every 30 years on average. As this is much greater than the project construction period, it is highly likely that the occurrence of excess leachate for a period of over three days will not occur
- Another factor that would further reduce the risk of occurrence of excess leachate is that the exposed waste may be covered each night with virgin excavated natural material (VENM) with a minimum depth of about 150 millimetres. Rainfall experienced at night over the covered working cut area would potentially be suitable to be managed in the stormwater management system instead of leachate. The leachate water balance however adopted a conservative approach by assuming the working cut area was exposed to rainfall at all times of the day
- It is important to note that there is an infinite number of combinations of surface leachate storage and disposal rates that could be adopted, each inherent with a different risk of the leachate storage being empty for a period and the risk of the storage capacity being exceeded and the volume of excess leachate generated
- For the purposes of the odour assessment, a judgement has been made on an appropriate balance between provision of surface leachate storage capacity and the likelihood of excess leachate occurring and its duration. Given the space constraints of the site, capacity of the local sewerage system, and subject to the construction contractors preferred working methods, it is likely that the construction contractor may choose a different combination of these variables. Nonetheless, the mitigation measures have been drafted so that achievement of the odour criteria is the critical objective (along with compliance with other conditions of approvals, relevant legislation and any other licence limits) and so that there is adequate flexibility regarding the proposed site working methods.

3. Revised odour assessment

3.1 Method

3.1.1 General

The revised odour assessment focuses on impacts during the construction stage because potential odour impacts are likely only when waste is exposed at the former Tempe landfill or where another source of odour occurs eg surface leachate storages. Areas uncovered during the construction stage and where waste would be relocated would be re-capped and rehabilitated and therefore odour during the operation of the project is unlikely.

The odour impact assessment included the following activities:

- Reviewing revised construction scenarios, areas and odour sources
- Preparing an updated odour emissions inventory
- Undertaking odour dispersion modelling to predict potential odour levels during construction.

3.1.2 Odour modelling methodology

The revised odour impact assessment follows the approach documented in Technical Working Paper 17. Consequently, the odour dispersion modelling methodology including generation of site-specific meteorology, modelling software and procedures and selection of sensitive receptors is the same as that outlined in Technical Working Paper 17.

3.1.3 Modelled construction scenarios

The revised odour impact assessment was undertaken with consideration of refinements made to the project following exhibition of the EIS/preliminary draft MDP. Specifically, the proposed works include only one emplacement mound on site (previously three were assumed). The revised scenarios are identified as Scenario 1 and Scenario 2 consistent with the original assessment. The revised details of these two scenarios are shown in Figure 3-1 and Figure 3-2 respectively.

Scenario 1 assumes the entire cut area (total cut area) contains exposed waste which contributes to odour and is considered the worst case for this reason. Scenario 2 assumes the construction contractor exposes waste across a more limited area at any time (about 30 per cent compared to Scenario 1) and the majority of waste (about 70 per cent) would remain covered. A smaller proportion of waste (termed the working cut area) would be exposed progressively across the total cut area and is therefore considered a more realistic construction approach given the potential for odour impacts.

The areas and volumes of waste to be excavated, handled and moved on-site have been calculated based on information developed for these two scenarios.

To account for the different work areas within the total cut area where waste would be exposed and surface leachate managed, the surface leachate storage volume calculated in section 2.3 was divided into three smaller storages; one for each proposed working area.

The surface area of leachate within each storage was calculated on the basis that the dams were full. This is a conservative assumption as the water balance indicates that the dams would be empty more than 90 per cent of the time, on average.

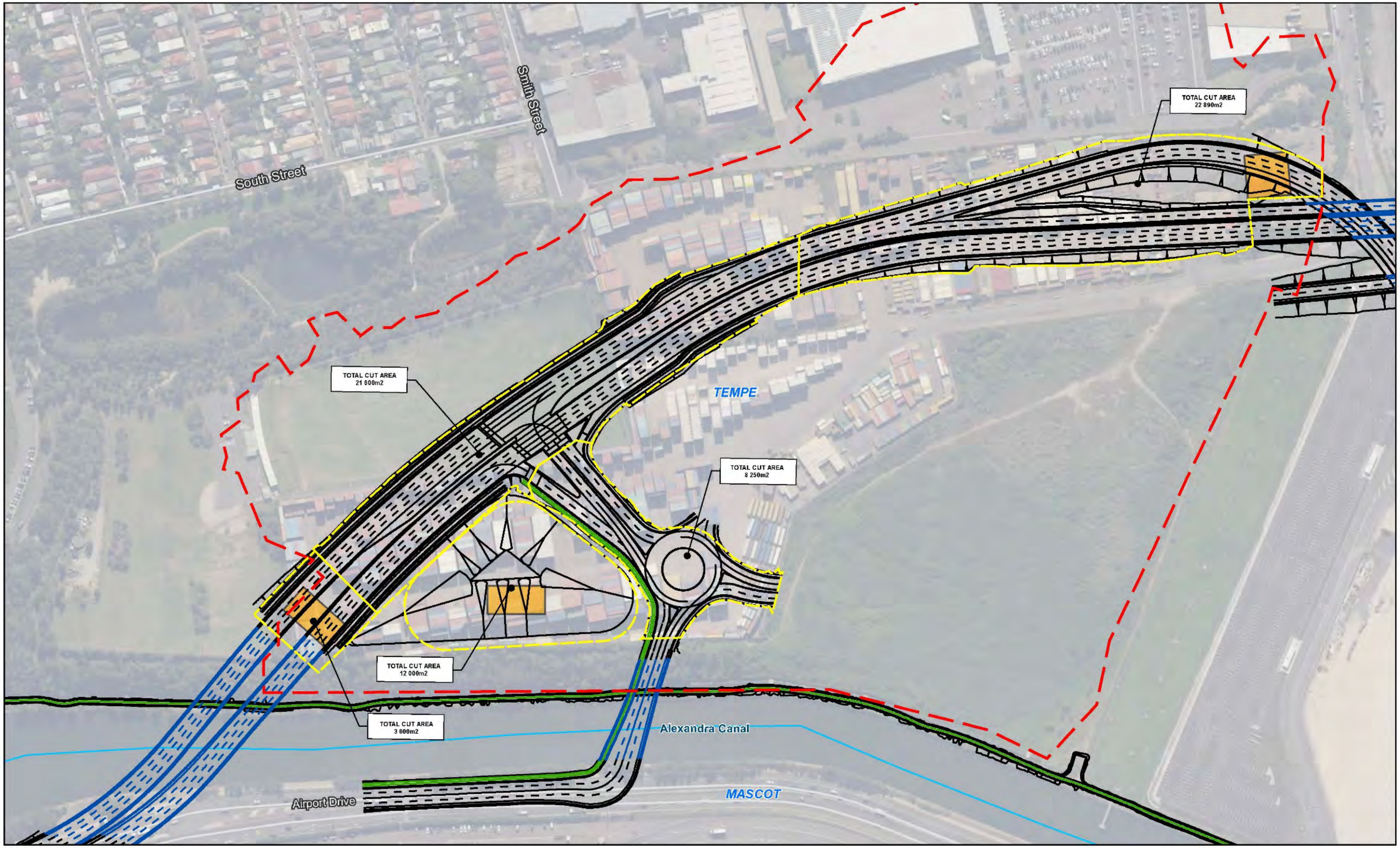
The working cut, total cut and leachate storage areas for the two modelling scenarios are provided in Table 3-1. The potential odour contribution from disturbing, moving and relocating waste as detailed in section 3.5.3 of Technical Working Paper 17 also remains valid.

For both scenarios, the waste relocation works would generally be restricted to the standard hours proposed for the road project. Outside of these times, all waste is assumed to be either:

- Covered with virgin excavated natural material (VENM) in the form of soil with a minimum cover depth of about 150 millimetres to supress odour emissions, or
- That the relevant mitigation measures detailed in section 6 of Technical Working Paper 17 are adopted.

Table 3-1 Summary of assessment scenarios, working and total cut and surface leachate storage areas

Scenario	Working cut area (m^2)	Total cut area (m^2)	Working cut to Total cut ratio	Surface leachate storage area (m^2)
1 – Worst case	69,450	69,450	1.00	2,547
2 – Realistic case	22,200	69,450	0.32	2,547



0 25 50 m
Scale 1:2,500

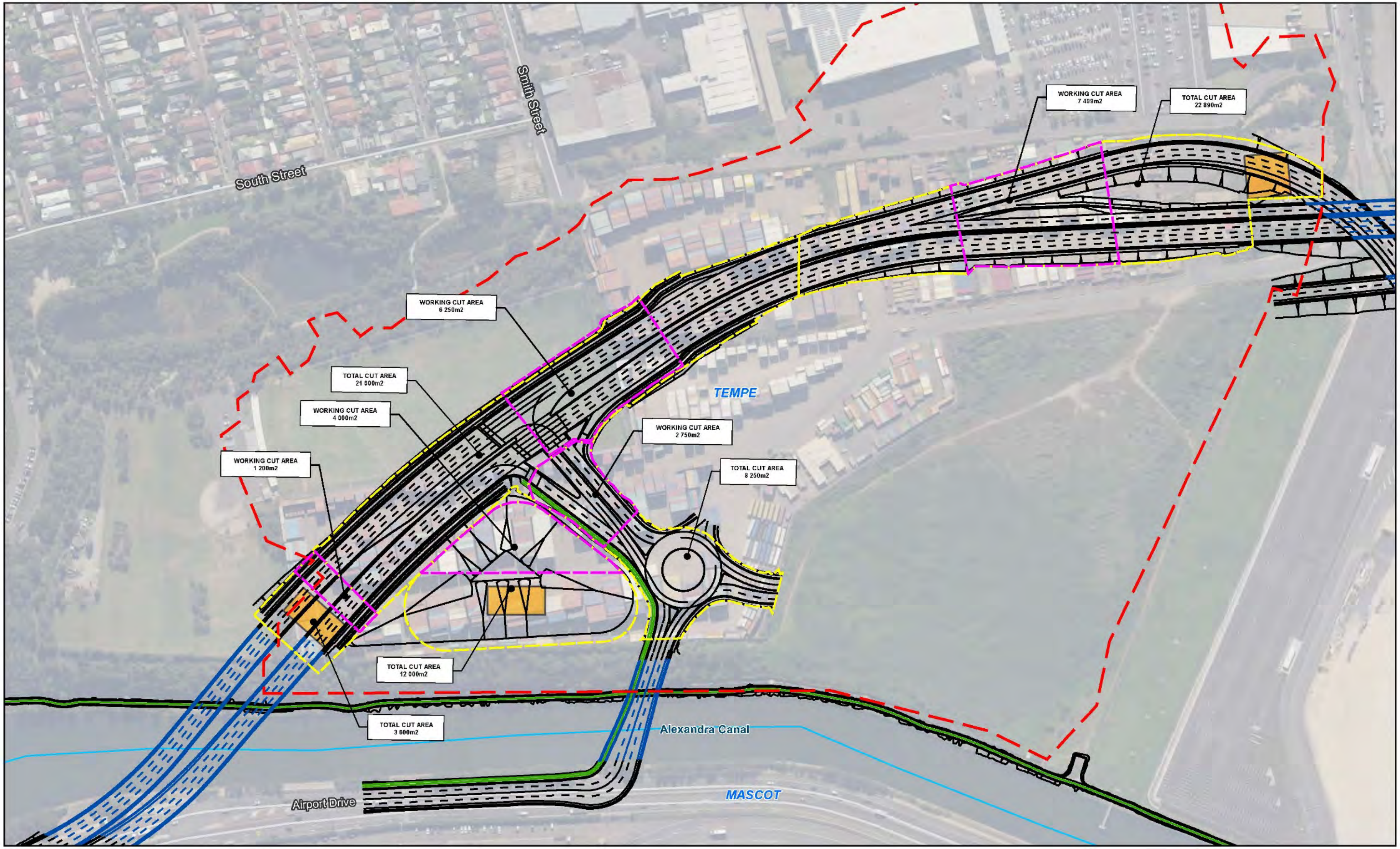
Author: David.Naiken
Date: 09/03/2020
Map no: PS109315_GIS_374_A3

Legend

- Watercourses
- Major Roads
- Landfill boundary (indicative)
- Total and Working cut area
- Conceptual Leachate Storage Location
- Design
- Lanemarking
- Shared path
- Elevated Design (Bridge)

TEMPE LANDFILL ODOUR ASSESSMENT

Figure 3.1
Scenario 1 - Worst Case, 100% of Total Cut Exposed



0 25 50 m
Scale 1:2,500

Author: David.Naiken
Date: 09/03/2020
Map no: PS109315_GIS_375_A5

Legend

- Major Roads
- Watercourses
- Landfill boundary (indicative)
- Working cut area
- Total cut area
- Conceptual Leachate Storage Location
- Design
- Lanemarking
- Shared path
- Elevated Design (Bridge)

TEMPE LANDFILL ODOUR ASSESSMENT

Figure 3.2
Scenario 2 - Realistic Case, about 30% of Total Cut Exposed

3.1.4 Emission sources and estimates

Odour emission rates from exposed, covered and disturbed waste are the same as those outlined in Technical Working Paper 17.

The potential surface leachate odour emissions likely to be encountered at the site is a key variable considering the mixture of wastes deposited at the site and the mechanism of surface leachate generation.

Surface leachate generated from rainwater falling on exposed waste would be in contact with the surface of waste for a relatively short period of time before being collected and directed to the leachate storage. It is expected that the short contact time with the exposed waste would limit the transfer of contaminants from waste to the surface leachate and could result in relatively low odour emissions, compared with leachate that is extracted from within the waste mass and therefore in contact with waste for a much longer period.

Furthermore as described in Technical Working Paper 17, based on the reviewed bore logs, the bulk of the waste that is expected to be exposed is soil fill and non-putrescible materials and hence less likely to generate highly odorous surface leachate comparable to leachate derived from putrescible materials.

If left stagnant for a period of time, surface leachate which has been in contact with exposed waste has the potential to turn anaerobic which can significantly increase odour emissions. To prevent this, odorous leachate ponds can be aerated. This can, however, lead to temporary increases in odour due to agitation of the leachate (but still less than for anaerobic conditions). Aeration might not be required for surface leachate generated during the project due to the waste type and the short contact time, if the leachate is found not to be odorous. It has, however, been included in the modelling to ensure that the modelling results are conservative.

Reference was made to in-house odour emissions data collected from sampling of leachate ponds at putrescible and non-putrescible landfills in NSW. No odour emissions data was available for surface leachate. Specific Odour Emission Rates (SOER) from the database are summarised in Table 3-2.

Table 3-2 Review of database leachate odour emission rates

Odour source	Sampling method	SOER ($OU/m^2/s$)	Data source
Putrescible leachate pond (non-aerated)	Average of two isolation flux chamber samples	0.26	Lucas Heights Resource Recovery Park (Ektimo, 2014)
Putrescible leachate pond (aerated)	Upwind, downwind	1.80	Lucas Heights Resource Recovery Park (Ektimo, 2014)
Non-putrescible leachate pond (aerated)	Isolation flux chamber	0.03	Horsley Park Waste Management Facility (Ektimo, 2018)

It is considered appropriate to assume an odour emission rate which reflects the variability of known waste types at the site, and the potential for certain areas of the site to have a higher potential to generate more odorous leachate. Given the lack of available surface leachate data, it has been assumed to be equivalently odorous as leachate extracted from the waste in a landfill. This is expected to be a conservative assumption. Allowance for this uncertainty was accommodated by the sensitivity analysis conducted (refer section 3.1.5) and recommended mitigation measures (refer section 1).

An average of putrescible (non-aerated) and non-putrescible (aerated) leachate pond odour emission rates from Table 3-2 was adopted for non-aerated surface leachate storages ($(0.26 + 0.03)/2 = 0.145$ $OU/m^2/s$). Due to limited data availability, non-putrescible (aerated) leachate pond odour emission rate was conservatively used in this calculation.

It is anticipated that surface leachate storages might only require aeration infrequently on an 'as needs' basis (i.e. if significant odour is being generated). Nevertheless to account for a potential worst case situation, surface leachate storages were assumed to be aerated from 9:00am to 3:00pm (6 hours total) each day. This ensures aeration is undertaken outside periods of poor odour dispersion and also allows the construction contractor to perform any required odour management prior to commencing aeration.

Odour emissions rates for aerated leachate storages were calculated by multiplying the SOER for non-aerated leachate storages (0.145 refer Table 3-3) with the ratio of aerated to non-aerated odour emissions from putrescible leachate (1.8/0.26 = 6.97). This results in an estimated odour emission rate from an aerated leachate storage of 1.010 $OU/m^2/s$ (0.145*6.97 $OU/m^2/s$).

The derived SOERs for the surface leachate ponds is provided in Table 3-3.

Table 3-3 Aerated and non-aerated leachate odour emission rates

Item	SOER ($OU/m^2/s$)	Data source and derivation
Leachate pond (non-aerated)	0.145	Average of non-aerated putrescible and aerated non-putrescible leachate pond
Leachate pond (aerated)	1.010	Average of non-aerated putrescible and aerated non-putrescible leachate pond multiplied by aeration ratio of a putrescible landfill

The derived odour emissions inventory including Specific Odour Emission Rates (SOER) and Odour Emission Rates (OER) for Scenario 1 and Scenario 2 is provided in Table 3-4 and Table 3-5. These odour emission rates were input into the CALPUFF dispersion model. They are termed the 'base case' in this report.

Table 3-4 Scenario 1 odour emissions inventory

Item	Source type	Active hours	Area (m^2)	SOER ($OU/m^2/s$)	OER (OU/s)
Waste disturbance and handling	Volume	7am to 6pm	104[1]	26	2,708
Exposed waste	Area	7am to 6pm	69,450	1	69,450
Covered waste	Area	6pm to 7am	69,450	0.12	8,334
Leachate storage (non-aerated)	Area	3pm to 9am	2,547	0.145	369
Leachate storage (aerated)	Area	9am to 3pm	2,547	1.010	2,573

(1) Waste disturbance and handling shown in waste moved per hour (m^3/hour)

Table 3-5 Scenario 2 odour emissions inventory

Item	Source type	Active hours	Area (m^2)	SOER ($OU/m^2/s$)	OER (OU/s)
Waste disturbance and handling	Volume	7am to 6pm	104[1]	26	2,708
Exposed waste	Area	7am to 6pm	22,200	1	22,200
Covered waste	Area	7am to 6pm	47,250	0.12	5,670
Covered waste	Area	6pm to 7am	69,450	0.12	8,334
Leachate storage (non-aerated)	Area	3pm to 9am	2,547	0.145	369
Leachate storage (aerated)	Area	9am to 3pm	2,547	1.010	2573

(1) Waste disturbance and handling shown in waste moved per hour (m^3/hour)

3.1.5 Sensitivity analysis

Consistent with Technical Working Paper 17 and in lieu of site-specific waste and surface leachate odour sampling to confirm site-specific odour emission rates, a sensitivity analysis was undertaken.

The sensitivity analysis considered the following adjustments (applied to working cut areas and surface leachate storages) to the adopted odour emission rates:

- 0.5 to counter a number of conservative (worst case) assumptions made discussed above
- 2.0 to provide for the possibility that the assessment has underestimated the potential odour emissions.

This sensitivity analysis was used in combination with the different scenarios which also reflect realistic case/ worst case approaches.

3.2 Predicted odour concentrations

Predicted odour concentrations at each receptor for Scenario 1 (worst-case) and 2 (realistic case) are provided in Table 3-6 and shown in and Figure 3-4 respectively. Table 3-6 includes the results of the sensitivity analysis. Predicted exceedances of the assessment criteria (2 OU) are shaded.

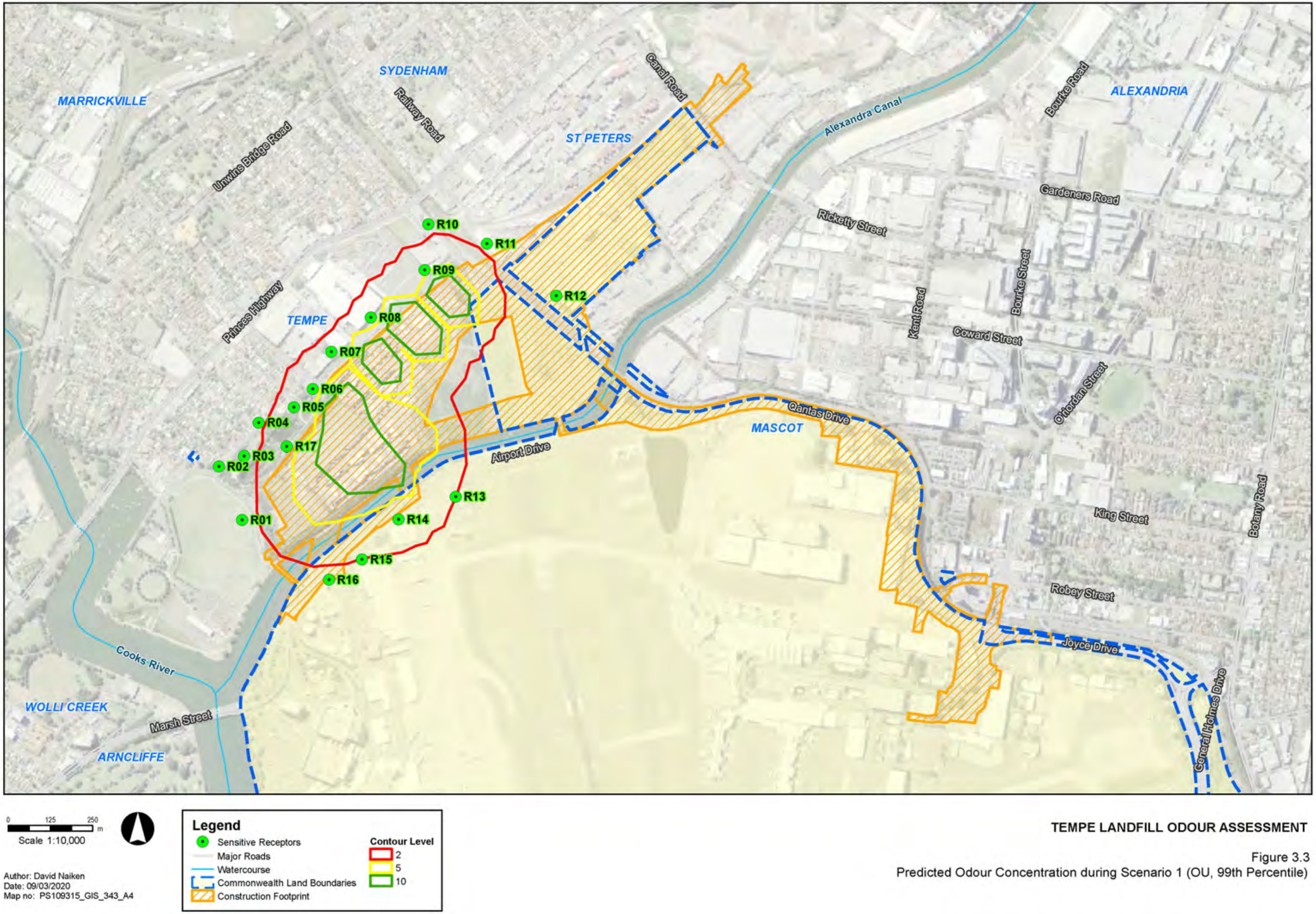
The analysis predicted exceedances of 2 OU at seven receptors for Scenario 1 for the base case. No odour assessment criterion exceedances are predicted for Scenario 2 for the base case.

No odour assessment criterion exceedance are predicted for either scenario for a sensitivity factor of 0.5. The model predicted exceedances of 2 OU at 15 receptors for Scenario 1 and seven receptors for Scenario 2 adopting a sensitivity factor of 2.

Table 3-6 Predicted odour concentrations and sensitivity analysis (99th percentile)

Base case and odour source sensitivity factor	**Base case (1.0)**		**0.5**		**2**	
Scenario	**S1**	**S2**	**S1**	**S2**	**S1**	**S2**
Criteria (OU)	**2**	**2**	**2**	**2**	**2**	**2**
R01	1.5	0.8	1.0	0.7	2.5	1.2
R02	1.1	0.6	0.7	0.5	2.1	0.9
R03	1.5	0.8	0.9	0.6	2.8	1.2
R04	1.8	0.9	1.0	0.7	3.3	1.4
R05	2.6	1.6	1.6	1.1	5.0	2.5
R06	3.1	2.0	1.8	1.3	5.7	3.3
R07	2.5	1.4	1.4	1.0	4.8	2.2
R08	3.1	1.5	1.7	1.1	5.9	2.6
R09	3.5	1.6	1.9	1.1	6.5	2.4
R10	1.4	0.7	0.8	0.5	2.6	1.1
R11	1.5	0.7	0.9	0.6	2.9	1.1
R12	0.9	0.5	0.5	0.4	1.6	0.7
R13	2.0	1.1	1.2	1.0	3.7	1.6

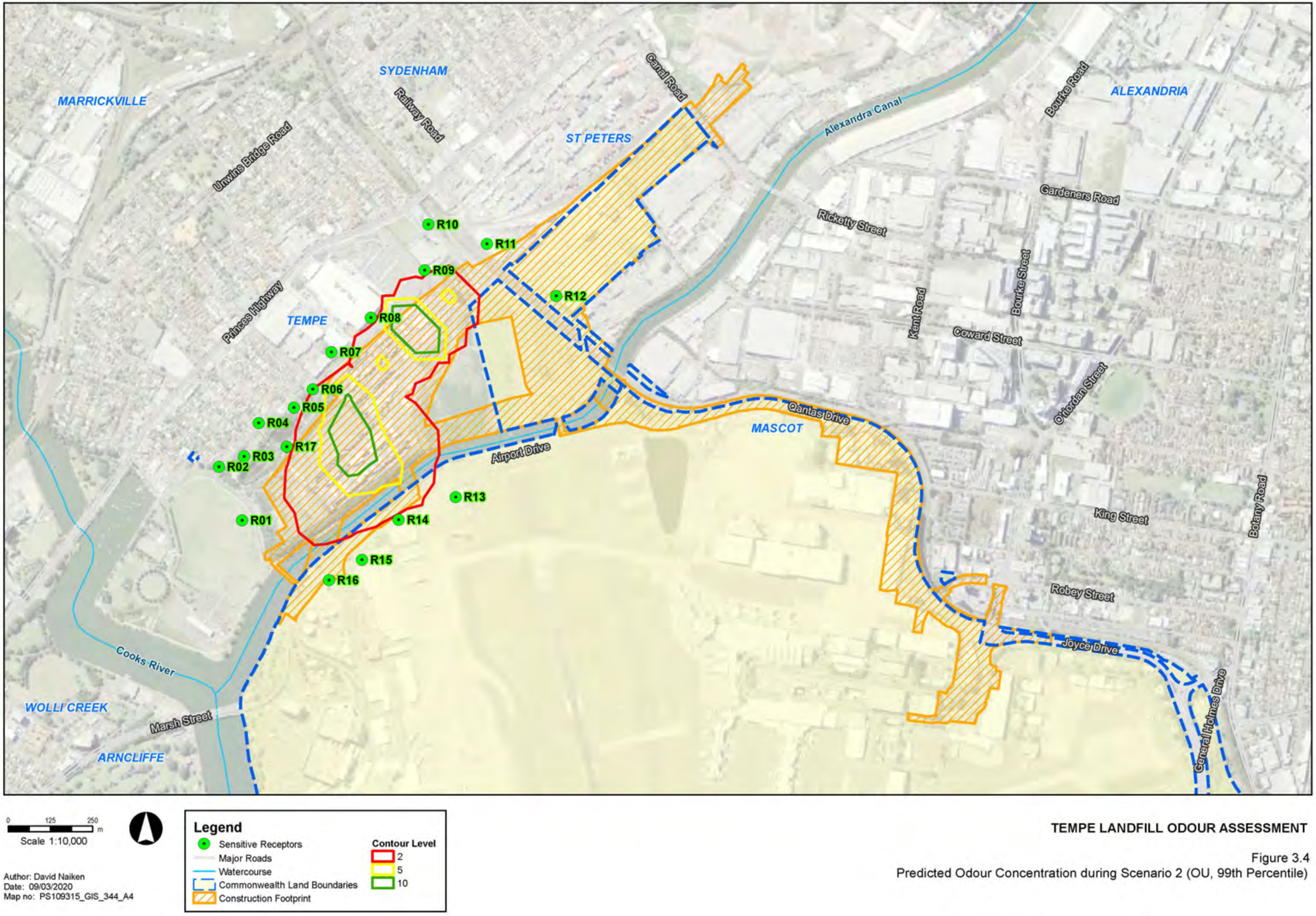
Base case and odour source sensitivity factor	**Base case (1.0)**		**0.5**		**2**	
Scenario	**S1**	**S2**	**S1**	**S2**	**S1**	**S2**
Criteria (OU)	**2**	**2**	**2**	**2**	**2**	**2**
R14	3.2	1.8	2.0	1.6	6.3	2.6
R15	2.0	1.2	1.3	1.0	3.6	1.6
R16	1.6	1.0	1.1	0.8	2.9	1.3
R17	3.0	1.6	1.8	1.2	5.5	2.3



Author: David Naiken
Date: 09/03/2020
Map no: PS109315_GIS_343_A4

TEMPE LANDFILL ODOUR ASSESSMENT

Figure 3.3
Predicted Odour Concentration during Scenario 1 (OU, 99th Percentile)



Author: David Naiken
Date: 09/03/2020
Map no: PS109315_GIS_344_A4

TEMPE LANDFILL ODOUR ASSESSMENT

Figure 3.4
Predicted Odour Concentration during Scenario 2 (OU, 99th Percentile)

4. Recommended mitigation measures

The mitigation measures outlined in the EIS/preliminary draft MDP have adopted an ‘envelope approach’ to the management of potential odour impacts from the works. This includes all likely odour sources, including surface leachate. Ultimately, the construction contractor is required to plan and construct the works to minimise the potential for odour impacts and not cause offensive odour at the nearest sensitive receiver.

These measures remain valid and appropriate for the pro-active and reactive control of odour sources, including surface leachate, from the proposed works at the former Tempe landfill.

While the temporary storage of surface leachate based on analysis in this report is not predicted to lead to odour impacts, this is based on a number of key assumptions in section 2 which would affect odour levels if modified.

The following additional odour mitigation measure is recommended to reduce potential odour impacts:

- Areas of exposed waste at the former Tempe landfill should be isolated from other surface water runoff to control the generation of surface leachate.
- Rainfall that has come into contact with exposed waste and not infiltrated into the former Tempe landfill should be captured onsite in surface leachate storage(s).
- The surface leachate storage(s) should be sized based on updated leachate water balance modelling undertaken at the pre-construction stage to reflect the proposed construction methodology. The storage(s) would be sized to minimise the risk of the capacity being exceeded.
- Regular monitoring of leachate storage(s) would be undertaken to detect the presence of significant odour. If significant odour is detected, measures such as the aeration of leachate storage(s) during the daytime and/or increased disposal rates will be considered and implemented.

The risk of excess leachate occurring at the site can be further reduced by monitoring upcoming rainfall forecasts and should significant rainfall be predicted, reducing the area of exposed waste as much as possible before rainfall eg by placing VENM cover materials or other suitable materials/measures.

5. Summary and conclusion

The G2SJV has completed a revised odour assessment of the proposed construction activities at the former Tempe landfill including potential odour emissions from surface leachate generation and storage at the site. This report has been prepared as an addendum to Technical Working Paper 17 – Odour Assessment prepared for the EIS/preliminary draft MDP and should be read in conjunction with it.

Overall, the updated odour impact assessment predicts a small reduction in potential odour emissions from the works compared with Technical Working Paper 17. This is attributed to a design refinement which removes two of the three proposed waste emplacement mounds from the site. Instead, the majority of the excavated waste would be loaded into trucks and removed off-site. This refinement considerably reduces the area of exposed waste and more than compensates for the additional odour emissions from storage of surface leachate on site.

To inform the odour modelling, a leachate water balance was undertaken based on a conceptualisation of the site management approach.

The leachate water balance was used to identify leachate storage capacity and disposal rate options. Statistical analysis was used to assess the performance of various storage capacity and disposal rate options. This process identified a total surface leachate storage capacity of 3.9 ML (excluding freeboard), based on three separate storages and a surface leachate disposal rate of 425 kL/day as an appropriate scenario for the revised odour modelling. With the assumed working cut area, leachate storage capacity and disposal rates, excess leachate (ie leachate greater than the capacity of the storage and disposal rate) was predicted to occur less than 0.2 per cent of the time, on average.

A review of odour emissions from leachate storages at other landfills in Sydney was used to estimate odour emission rates for surface leachate storage that could be used for this assessment. The odour assessment used a sensitivity analysis to allow consideration of uncertainty in these and other key modelling variables.

Consistent with the analysis in Technical Working Paper 17, two (revised) construction scenarios were modelled. Scenario 1 is a worst case scenario in terms of the area of exposed waste contributing to odour and Scenario 2, considered a more realistic construction approach, where waste is exposed in a staged manner over an area approximately 30 per cent of Scenario 1.

The revised odour impact assessment predicts compliance with the 2 OU assessment criterion for Scenario 2 under the base case (sensitivity factor of 1.0) at all identified sensitive receptors.

The report concludes that the mitigation measures and approach outlined in the EIS/preliminary draft MDP remain valid and appropriate when surface leachate is included in the assessment. Additional practical mitigation measures are also outlined which could be considered by the construction contractor to address the risks associated with potential odour emissions and from excess leachate.

6. References

Australian Standard 4323.3:2014 *Stationary source emissions: determination of odour concentration by dynamic olfactometry*.

DECC, 2006. *Technical framework – Assessment and management of odour from stationary sources in NSW.*

EPA, 2016. *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*. NSW Government Gazette of 26 August 2005, minor revisions November 2016. Sydney, NSW: Department of Environment and Conservation NSW (DEC).

J Barclay and J Scire, Atmospheric Studies Group TRC Environmental Corporation, 2011. *Generic Guidance and Optimum Model Settings for the CALPUFF Modelling System for Inclusion into the Approved Methods for the Modelling and Assessments of Air Pollutants in NSW, Australia.*

Road and Maritime Services, Sydney Gateway Road Project EIS/preliminary draft MDP 2019, Technical Working Paper 16 – Former Tempe Landfill Assessment.

Roads and Maritime Services, Sydney Gateway Road Project EIS/preliminary draft MDP 2019, Technical Working Paper 17 – Odour Assessment.

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Appendix E
Proposed surface water quality discharge criteria

Memorandum

To Sarah Barker (Transport), John Fisher (Transport)	**Date** 30 March 2020	
Copies Greg Marshall (G2SJV)	**Memorandum number** SG-G2S-MEM-WQ-006-002	**Revision** 2
From Sarah Redfern (G2SJV), Rob Leslie (G2SJV), Eric Lam (G2SJV)	**Other Reference**	

Subject

Sydney Gateway Road Project - Updates to Surface Water Quality Management Criteria published in the exhibited EIS

1 PURPOSE OF THIS MEMORANDUM

The purpose of this memorandum is to provide updated surface water quality management criteria that were published in *Technical Working Paper 8 – Surface Water* (TWP8) of the exhibited Gateway road project ('the project') EIS/preliminary draft MDP in November 2019. The criteria published in TWP8 were based on baseline water quality monitoring data from December 2017 up to March 2019. This update has been prepared based on additional data collected from April 2019 to February 2020.

The memorandum presents the following updates:

- Updates to the baseline water quality summary tables presented in Appendix E of TWP8 (refer to Section 4.1 of this memorandum):
  - Alexandra Canal – refer to Table 4.1 and Table 4.2
  - Cooks River – refer to Table 4.3
  - Mill Stream (upstream of the tidal barrier) – refer to Table 4.4
  - Mill Stream (downstream of the tidal barrier) – refer to Table 4.5
- Updates to the comparison of Mill Stream data against the *Airports (Environment Protection) Regulations 1997* water quality criteria presented in Appendix F of TWP8 (refer to Table 4.6 and Table 4.7).
- Updates to the indicative site-specific trigger values for Alexandra Canal, Cooks River and Mill Stream for monitoring in the receiving waterways during the construction phase presented in Appendix B of TWP8 (refer to Table 4.8).
- The proposed discharge criteria for Alexandra Canal for discharge of treated wastewater (made up of extracted groundwater and other sources of potentially contaminated water) during the construction phase. These criteria are based on the indicative discharge criteria presented in Appendix B of TWP8 (refer to Table 4.9) and have been updated based on the results from the most recent surface water quality monitoring. The proposed discharge criteria for Alexandra Canal are presented in Table 4.8 in Section 4.3 of this memorandum.

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The update also considers the following new information since publication of TWP8:

- A review, in March 2020, of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018) identified the guideline trigger value for nitrate toxicity had been updated since publication of the TWP8. This was the only change identified in the ANZG relevant to the project. Since publication of TWP8 it has been confirmed that only a very small part of the project area, on and around Sir Reginald Ansett Drive within the domestic terminal precinct, drains to Mill Stream. The existing stormwater system at this location conveys stormwater across the airport site to where it discharges into Mill Stream south of General Holmes Drive and east of Foreshore Road. This location is downstream of a tidal barrier on Mill Stream. The previously assessed Mill Stream data points SW9, SW10 and SW11 are upstream of the tidal barrier and therefore not relevant to monitoring changes in Mill Stream water quality during construction, as the project would not affect water quality upstream of the tidal barrier. Accordingly, water quality monitoring has been carried out from an additional data point SW12 on Mill Stream located in the tidal reach of Mill Stream downstream of the tidal barrier (refer to Figure 2.1).
- It has also been confirmed that significant extraction of groundwater and subsequent discharge to Mill Stream via the airport stormwater system is not anticipated during the project. This is due to the proposed construction methodology and hydrogeological conditions on and around Sir Reginald Ansett Drive. As a result, construction phase releases of water to Mill Stream would involve general construction site runoff that would be subject to standard sedimentation and erosion controls and would not include sources of potentially contaminated water that would require treatment before discharge.

2 OVERVIEW OF AVAILABLE DATA

Additional water quality data was provided to the G2SJV for Alexandra Canal, Cooks River and Mill Stream for all sample locations included in the exhibited EIS/preliminary draft MDP. Data from a surface water sampling location SW12 on Mill Stream was also provided. The surface water sample locations are shown in Figure 2.1 and described in Table 2.1 below. Initial baseline water quality data typically began 21st December 2017 to 15th March 2019, and this memo includes additional water quality data from 24th April 2019 to 20th February 2020. The additional data was used to review the discharge criteria for Alexandra Canal and original trigger values for Alexandra Canal, Cooks River and Mill Stream proposed in TWP8, adjusting where appropriate any trigger values and discharge criteria that were based on the 80th percentile values from monitoring data.

Figure 2.1 Gateway road project - surface water sample locations

Table 2.1 Baseline water quality monitoring locations (Table 1 AECOM, 2018)

Site ref	Water course	Type	Suburb	Location description	Easting	Northing	Monitoring purpose
SW1	Alexandra Canal	Tidal	Mascot	Drainage line flowing from Mascot Industrial area into Alexandra Canal	-33.923140	151.175986	Downstream of industrial area inflow
SW2	Alexandra Canal	Tidal	Mascot	Alexandra Canal – upstream of proposed road and rail bridge	-33.924333	151.174602	Downstream of industrial area inflow
SW3	Alexandra Canal	Tidal	Mascot	North pond connection surface water body	-33.925684	151.174625	Downstream location of Northern Lands Car Park
SW4	Alexandra Canal	Tidal	Tempe	Alexandra Canal – at proposed Blue Option road bridge to QANTAS Drive	-33.927153	151.168323	Downstream location of Tempe Tip, Sydney Airport
SW5	Alexandra Canal	Tidal	Tempe	Alexandra Canal – at proposed Green Option road bridge to QANTAS Drive	-33.929990	151.163728	Downstream location of Tempe Tip, Sydney Airport
SW6	Alexandra Canal	Tidal	Tempe	Alexandra Canal – before the confluence with Cooks River	-33.927658	151.162005	Downstream location of Tempe Tip, Sydney Airport before Cooks River
SW7	Cooks River	Tidal	Wolli Creek	Cooks River – North of Princess Highway	-33.927658	151.156588	Upstream of construction works in Cooks River
SW8	Cooks River	Tidal	Kyeemagh	Cooks River south of Marsh Street	-33.938560	151.161819	Downstream location of Sydney Airport
SW9	Mill Stream	Freshwater	Botany	Mill Stream – adjacent to Eastlakes Gold Course, north of the project alignment	-33.937163	151.202408	Upstream of rail corridor and tidal barrier
SW10	Mill Pond	Freshwater	Botany	Mill Pond – south of the project alignment, east of Botany Road	-33.939162	151.195937	Downstream of rail corridor and upstream of tidal barrier
SW11	Mill Pond	Freshwater	Botany	Drainage line parallel to General Holmes Drive flowing into Mill Pond at Southern Cross Drive	-33.939654	151.193290	Downstream of rail corridor and upstream of the tidal barrier
SW12	Mill Stream	Tidal	Botany	West of Foreshore Rd	-33.945594	151.188828	Downstream of Sydney Airport and the tidal barrier

The additional water quality data was downloaded from ESdat Online in March 2020 and the number of additional samples per location is summarised in Table 2.2.

Table 2.2 Surface water quality sample quantities

Site ref	Number of samples collected previously (2017 – March 2019)	Number of additional samples collected (April 2019 – February 2020)	Total number of samples collected
SW1	18	15	33
SW2	17	15	32
SW3	17	15	32
SW4	19	15	34
SW5	18	17	35
SW6	18	15	33
SW7	44	15	59
SW8	36	19	55
SW9	14	22	36
SW10	40	28	68
SW11	25	16	41
SW12	-	16	16

3 APPROACH

The process for establishing trigger values and discharge criteria is documented in detail in TWP8.

To establish the site-specific trigger values in the waterways that are protective of existing water quality in the short term, the following approach was adopted:

- Trigger values would apply during construction and after construction until the works areas are adequately stabilised. Given that Environmental Values (EVs) such as 'secondary / primary contact recreation' or 'aquatic food' will not apply in the short term due to the poor existing water quality, the more relevant ecological EVs are used to set these trigger values.
- For physical and chemical stressors: Use the least stringent of (1) the 80th percentile value from the monitoring data and (2) the default trigger value for aquatic ecosystems in marine waters.
- For non-bioaccumulative toxicants: Use the least stringent of (1) the 80th percentile value from the monitoring data and (2) the 80% level of protection for species in marine waters.
- For bioaccumulative toxicants: Use the least stringent of (1) the 80th percentile value from the monitoring data and (2) the 95% level of protection for species in marine waters.

To establish the discharge criteria for release of treated wastewater to Alexandra Canal, the following approach was adopted:

- Construction water from potentially contaminated sources would be tested in situ and treatment system designed and implemented to achieve suitable water quality prior to discharge. The proposed water quality discharge criteria have been developed as follows:
  - For physical and chemical stressors: Use the least stringent of (1) the 80th percentile value from the monitoring data and (2) the default trigger value for aquatic ecosystems in marine waters.

- For non-bioaccumulative toxicants: Use the least stringent of (1) the 80th percentile value from the monitoring data and (2) the 80% level of protection for species in marine waters.
- For bioaccumulative toxicants: Use the 95% level of protection for species in marine waters.

80th percentile values used in the site-specific short term trigger values and discharge criteria were updated based on the additional monitoring data.

In addition, the short term trigger values for Mill Stream were re-assessed based on the SW12 data point rather than the previously used SW9, SW10 and SW11 data points, which are no longer relevant as the project would not affect water quality in the reach of Mill Stream where these previous data points are located.

4 UPDATED WATER QUALITY DATA, TRIGGER VALUES AND DISCHARGE CRITERIA

The following tables provide updates to those presented in Appendices E, F and B of TWP8.

4.1 Updated water quality data summary tables (Appendix E of TWP8)

Values highlighted red indicate relevant trigger value is exceeded.

Table 4.1 Statistics of water quality data for selected parameters at SW1, SW2, SW3 (Alexandra Canal)

POLLUTANT	UNITS	LOD	TRIGGER VALUE	SW1				SW2				SW3			
				AVERAGE	MEDIAN	MAX	80%ILES	AVERAGE	MEDIAN	MAX	80%ILES	AVERAGE	MEDIAN	MAX	80%ILES
Aluminium	µg/L	5	10.00	232.56	147.50	939.00	384.40	286.69	155.50	2200.00	369.80	267.65	129.00	836.00	328.80
Aluminium (Filtered)	µg/L	0.2	10.00	30.09	22.00	156.00	41.80	33.84	23.00	171.00	40.80	32.49	20.00	163.00	25.60
Arsenic	µg/L	0.2	30.00	2.00	1.95	3.10	2.40	2.15	1.90	5.30	2.50	2.08	2.00	2.80	2.40
Arsenic (Filtered)	µg/L	0.2	30.00	1.64	1.60	2.70	1.90	1.67	1.60	3.00	2.00	1.66	1.70	2.60	1.96
Chromium	µg/L	0.2	20.00	0.98	0.75	2.10	1.56	1.57	0.95	9.40	1.84	1.38	1.00	3.20	1.88
Chromium (Filtered)	µg/L	0.5	20.00	0.67	0.65	1.10	0.98	0.82	0.80	1.50	1.20	0.78	0.70	1.10	0.98
Copper	µg/L	0.5	5.00	4.72	2.00	19.00	10.00	6.35	2.50	71.00	8.88	5.93	2.00	22.00	8.80
Copper (Filtered)	µg/L	2	5.00	2.89	2.90	5.00	4.00	2.94	2.60	6.20	4.66	2.94	2.50	4.80	4.00
Iron	µg/L	2	10.00	374.38	273.50	1420.00	523.60	464.34	251.50	4630.00	519.20	444.09	252.00	1890.00	489.20
Iron (Filtered)	µg/L	2	10.00	56.50	30.00	312.00	94.60	48.09	29.50	155.00	85.20	51.47	25.00	169.00	61.60
Lead	µg/L	0.1	4.40	4.35	2.90	13.80	6.88	4.50	2.30	33.00	6.36	4.55	2.60	15.20	5.54
Lead (Filtered)	µg/L	0.1	4.40	0.70	0.40	3.30	1.00	0.74	0.40	3.20	1.20	0.76	0.35	3.20	1.18
Manganese	µg/L	0.5	10.00	29.95	26.40	80.80	42.18	28.28	24.30	96.80	39.06	29.73	24.40	85.60	40.74
Manganese (Filtered)	µg/L	0.5	10.00	24.91	23.70	52.90	34.18	23.34	21.25	54.10	32.26	23.76	18.05	64.10	30.04
Mercury	µg/L	0.005	0.40	0.76	0.01	13.00	0.02	0.71	0.01	9.00	0.02	0.84	0.01	8.00	0.01
Mercury (Filtered)	µg/L	0.005	0.40	0.90	0.01	7.00	2.20	0.64	0.01	6.00	0.86	1.02	0.01	7.00	1.41
Nickel	µg/L	0.5	100	1.20	1.10	2.70	1.50	1.41	1.00	7.10	1.56	1.34	1.20	1.90	1.52
Nickel (Filtered)	µg/L	0.5	100	0.98	1.00	1.70	1.10	1.02	1.10	1.60	1.20	1.02	0.90	4.20	1.10
Zinc	µg/L	1	5.00	48.53	33.50	204.00	75.20	51.59	34.00	360.00	75.40	55.14	29.00	346.00	71.00

POLLUTANT	UNITS	LOD	TRIGGER VALUE	SW1				SW2				SW3			
				AVERAGE	MEDIAN	MAX	80%ILES	AVERAGE	MEDIAN	MAX	80%ILES	AVERAGE	MEDIAN	MAX	80%ILES
Zinc (Filtered)	µg/L	1	5.00	35.38	29.50	100.00	57.40	34.53	28.00	123.00	48.80	36.44	24.00	202.00	46.80
pH (Lab)	pH Units	0.01	7-8.5	7.59	7.70	8.07	7.82	7.65	7.71	8.17	7.84	7.54	7.82	8.19	7.86
Total Suspended Solids	mg/L	5	10.00	14.00	12.00	33.00	20.00	12.00	10.00	24.00	15.80	14.17	13.00	25.00	22.80
Turbidity	NTU	0.1	10.00	6.59	3.60	21.20	14.74	6.08	3.30	20.50	11.04	6.81	4.00	22.40	13.84
Ammonia (as N)	mg/L	0.005	0.01	0.13	0.10	0.32	0.23	0.15	0.09	0.66	0.23	0.15	0.10	0.48	0.22
Nitrate (as N)	mg/L	0.002	10.00	0.16	0.13	0.42	0.32	0.17	0.10	0.41	0.31	0.17	0.11	0.42	0.29
Nitrite (as N)	mg/L	0.002	0.10	0.02	0.02	0.03	0.03	0.02	0.01	0.04	0.02	0.02	0.02	0.03	0.02
Total Nitrogen (as N)	mg/L	0.01	0.30	0.86	0.67	2.53	1.23	0.78	0.66	2.00	1.23	0.84	0.77	1.89	1.10
Total Phosphorus	mg/L	0.005	0.03	0.06	0.06	0.28	0.08	0.06	0.05	0.26	0.07	0.07	0.05	0.18	0.07
PFOA	µg/L	0.0005	220	0.01	0.00	0.02	0.01	0.01	0.00	0.02	0.01	0.01	0.00	0.01	0.01
PFOS	µg/L	0.0002	0.13	0.02	0.01	0.22	0.03	0.02	0.02	0.06	0.03	0.02	0.01	0.08	0.03

Table 4.2 Statistics of water quality data for selected parameters at SW4, SW5, SW6 (Alexandra Canal)

POLLUTANT	UNITS	LOD	TRIGGER VALUE	SW4				SW5				SW6			
				AVERAGE	MEDIAN	MAX	80%ILES	AVERAGE	MEDIAN	MAX	80%ILES	AVERAGE	MEDIAN	MAX	80%ILES
Aluminium	µg/L	0.2	10.00	206.09	116.00	861.00	344.00	241.12	107.00	1110.00	528.20	289.34	93.00	2420.00	484.00
Aluminium (Filtered)	µg/L	0.2	10.00	27.25	18.00	148.00	35.40	25.18	15.00	144.00	27.80	24.00	16.00	122.00	26.80
Arsenic	µg/L	0.2	30.00	1.98	1.95	3.00	2.40	1.99	1.90	3.20	2.32	2.06	2.00	5.30	2.26
Arsenic (Filtered)	µg/L	0.2	30.00	1.68	1.65	2.70	1.96	1.61	1.60	2.60	1.92	1.68	1.70	2.60	2.06
Chromium	µg/L	0.2	20.00	1.10	1.00	2.10	1.80	1.33	1.30	3.30	1.78	1.64	1.20	8.90	2.04
Chromium (Filtered)	µg/L	0.5	20.00	0.56	0.60	0.90	0.78	0.49	0.45	0.80	0.72	0.53	0.53	0.80	0.72
Copper	µg/L	0.5	5.00	3.78	2.00	13.00	7.60	5.48	4.00	21.00	8.96	5.62	3.80	40.00	8.90
Copper (Filtered)	µg/L	2	5.00	2.27	2.00	5.00	3.16	2.23	2.00	4.80	2.78	2.14	2.00	4.70	3.00
Iron	µg/L	2	10.00	302.78	214.00	783.00	571.60	367.00	187.50	2260.00	637.20	413.66	158.00	4780.00	582.20
Iron (Filtered)	µg/L	2	10.00	38.19	21.00	212.00	66.60	39.78	16.50	181.00	76.40	36.45	15.50	138.00	67.80
Lead	µg/L	0.1	4.40	3.15	2.35	8.50	4.76	3.55	2.20	21.10	5.30	4.48	1.80	48.10	6.18
Lead (Filtered)	µg/L	0.1	4.40	0.59	0.30	2.20	0.98	0.53	0.30	2.10	0.86	0.54	0.30	1.40	1.04
Manganese	µg/L	0.5	10.00	23.60	20.80	58.60	37.86	26.91	18.90	201.00	32.64	19.21	13.40	85.00	28.78
Manganese (Filtered)	µg/L	0.5	10.00	19.32	16.40	50.50	28.76	16.91	13.20	44.40	25.28	14.23	13.00	46.80	21.12
Mercury	µg/L	0.005	0.40	0.57	0.01	9.00	0.02	0.34	0.01	6.00	0.01	0.65	0.01	9.00	0.02
Mercury (Filtered)	µg/L	0.005	0.40	1.12	0.01	10.00	2.01	0.39	0.01	4.00	0.41	0.64	0.01	5.00	1.60
Nickel	µg/L	0.5	100	1.09	1.10	1.70	1.50	1.26	1.10	3.80	1.60	17.91	1.20	317.00	1.96
Nickel (Filtered)	µg/L	0.5	100	0.90	0.80	1.40	1.20	0.88	0.80	1.90	0.90	0.92	0.96	1.60	1.14
Zinc	µg/L	1	5.00	33.72	23.50	105.00	57.60	39.26	21.50	251.00	53.60	41.81	16.00	385.00	51.80
Zinc (Filtered)	µg/L	1	5.00	24.47	22.50	60.00	35.40	21.09	18.00	52.00	31.20	18.90	15.00	54.00	32.00
pH (Lab)	pH Units	0.01	7-8.5	7.75	7.85	8.15	7.94	7.78	7.88	8.20	8.00	7.80	7.90	8.16	8.00

POLLUTANT	UNITS	LOD	TRIGGER VALUE	SW4				SW5				SW6			
				AVERAGE	MEDIAN	MAX	80%ILES	AVERAGE	MEDIAN	MAX	80%ILES	AVERAGE	MEDIAN	MAX	80%ILES
Total Suspended Solids	mg/L	5	10.00	12.56	13.00	21.00	18.00	14.43	10.00	26.00	25.40	14.88	8.00	47.00	26.20
Turbidity	NTU	0.1	10.00	6.41	3.20	22.20	15.78	6.44	2.20	27.90	15.80	7.86	2.20	44.20	13.72
Ammonia (as N)	mg/L	0.005	0.01	0.13	0.12	0.36	0.21	0.09	0.08	0.22	0.17	0.09	0.07	0.20	0.17
Nitrate (as N)	mg/L	0.002	10.00	0.15	0.09	0.46	0.30	0.13	0.08	0.40	0.26	0.15	0.07	0.84	0.28
Nitrite (as N)	mg/L	0.002	0.10	0.01	0.01	0.03	0.02	0.01	0.01	0.02	0.02	0.01	0.01	0.02	0.02
Total Nitrogen (as N)	mg/L	0.01	0.30	0.65	0.57	1.32	1.09	0.58	0.50	1.43	1.00	0.52	0.37	1.62	0.94
Total Phosphorus	mg/L	0.005	0.03	0.05	0.04	0.10	0.07	0.04	0.03	0.10	0.07	0.04	0.03	0.12	0.07
PFOA	µg/L	0.0005	220	0.00	0.00	0.01	0.01	0.00	0.00	0.02	0.01	0.00	0.00	0.01	0.01
PFOS	µg/L	0.0002	0.13	0.01	0.01	0.06	0.02	0.01	0.01	0.05	0.02	0.01	0.01	0.04	0.02

Table 4.3 Statistics of water quality data for selected parameters at SW7 and SW8 (Cooks River)

POLLUTANT	UNITS	LOD	TRIGGER VALUE	SW7				SW8			
				AVERAGE	MEDIAN	MAX	80%ILES	AVERAGE	MEDIAN	MAX	80%ILES
Aluminium	µg/L	5	10.00	250.73	160.00	1610.00	438.80	230.21	100.00	1,820.00	260.20
Aluminium (Filtered)	µg/L	0.2	10.00	28.71	17.00	203.00	30.40	23.41	17.00	138.00	28.60
Arsenic	µg/L	0.2	30.00	1.95	2.00	2.60	2.28	2.05	2.00	4.20	2.24
Arsenic (Filtered)	µg/L	0.2	30.00	1.60	1.60	2.50	1.90	1.75	1.70	2.90	2.00
Chromium	µg/L	0.2	20.00	1.20	0.95	3.30	1.80	1.15	0.50	9.20	1.18
Chromium (Filtered)	µg/L	0.5	20.00	0.49	0.50	0.80	0.62	0.55	0.50	1.00	0.50
Copper	µg/L	0.5	5.00	4.16	2.00	22.00	6.92	3.84	2.00	20.00	5.84
Copper (Filtered)	µg/L	2	5.00	2.49	2.00	6.00	3.20	1.60	1.00	5.90	2.00
Iron	µg/L	2	10.00	364.24	227.00	1580.00	509.60	305.29	157.50	2,490.00	444.80
Iron (Filtered)	µg/L	2	10.00	41.39	17.00	190.00	84.40	30.15	11.00	139.00	43.00
Lead	µg/L	0.1	4.40	3.53	2.30	18.50	3.78	2.70	1.60	23.50	3.74
Lead (Filtered)	µg/L	0.1	4.40	0.56	0.30	1.60	1.00	0.51	0.20	1.90	0.96
Manganese	µg/L	0.5	10.00	22.42	17.60	68.70	33.42	16.32	11.80	55.50	27.42
Manganese (Filtered)	µg/L	0.5	10.00	18.61	16.00	67.60	29.00	11.98	8.85	38.20	18.90
Mercury	µg/L	0.005	0.40	0.47	0.01	7.00	0.02	0.38	0.01	9.00	0.02
Mercury (Filtered)	µg/L	0.005	0.40	0.76	0.01	5.00	2.41	0.36	0.01	6.00	0.01
Nickel	µg/L	0.5	100	1.38	1.10	5.30	1.70	1.04	0.80	6.10	1.40
Nickel (Filtered)	µg/L	0.5	100	0.90	0.85	1.70	1.10	0.73	0.70	1.40	1.00
Zinc	µg/L	1	5.00	26.63	20.00	80.00	36.20	24.62	14.00	111.00	45.00
Zinc (Filtered)	µg/L	1	5.00	17.83	16.00	37.00	26.00	15.66	10.00	42.00	29.60
pH (Lab)	pH Units	0.01	7-8.5	7.76	7.82	8.11	7.95	7.82	7.95	8.24	8.07

POLLUTANT	UNITS	LOD	TRIGGER VALUE	SW7				SW8			
				AVERAGE	MEDIAN	MAX	80%ILES	AVERAGE	MEDIAN	MAX	80%ILES
Total Suspended Solids	mg/L	5	10.00	13.53	8.00	47.00	25.20	9.04	5.00	52.00	8.40
Turbidity	NTU	0.1	10.00	6.94	3.40	47.00	8.58	6.27	2.20	53.50	9.50
Ammonia (as N)	mg/L	0.005	0.01	0.12	0.08	0.40	0.18	0.06	0.01	0.30	0.11
Nitrate (as N)	mg/L	0.002	10.00	0.18	0.06	1.27	0.21	0.13	0.047	0.93	0.21
Nitrite (as N)	mg/L	0.002	0.10	0.01	0.01	0.03	0.02	0.01	0.005	0.02	0.02
Total Nitrogen (as N)	mg/L	0.01	0.30	0.66	0.45	2.18	1.13	0.54	0.37	1.85	0.93
Total Phosphorus	mg/L	0.005	0.03	0.05	0.04	0.14	0.08	0.04	0.02	0.10	0.07
PFOA	µg/L	0.0005	220	0.01	0.00	0.01	0.01	0.01	0.00	0.05	0.01
PFOS	µg/L	0.0002	0.13	0.01	0.01	0.04	0.01	0.01	0.01	0.05	0.01

Table 4.4 Statistics of water quality data for selected parameters at SW9, SW10, SW11 (Mill Stream upstream of tidal barrier)

POLLUTANT	UNITS	LOD	TRIGGER VALUE	SW9				SW10				SW11			
				AVERAGE	MEDIAN	MAX	80%ILES	AVERAGE	MEDIAN	MAX	80%ILES	AVERAGE	MEDIAN	MAX	80%ILES
Aluminium	µg/L	5	10.00	858.87	132.00	18,500.00	265.80	232.70	180.00	846.00	324.00	879.76	392.00	5,740.00	1,120.00
Aluminium (Filtered)	µg/L	0.2	10.00	24.17	20.00	90.00	34.20	44.02	39.00	170.00	53.00	107.73	83.00	268.00	157.80
Arsenic^	µg/L	0.2	30.00	7.82	1.55	168.00	3.02	3.08	2.45	12.30	3.90	1.77	1.60	5.20	2.36
Arsenic (Filtered)	µg/L	0.2	30.00	1.01	1.00	1.80	1.30	2.01	1.85	8.20	2.64	1.12	1.10	2.10	1.46
Chromium^	µg/L	0.2	20.00	1.87	0.50	31.50	0.86	1.54	1.00	7.90	1.90	1.79	1.20	11.80	1.80
Chromium (Filtered)	µg/L	0.5	20.00	0.26	0.20	0.60	0.30	0.34	0.25	1.10	0.40	0.65	0.65	0.90	0.80
Copper	µg/L	0.5	5.00	7.98	2.40	127.00	6.20	7.48	5.00	69.00	8.00	7.99	4.20	50.40	10.04
Copper (Filtered)	µg/L	2	5.00	2.09	1.70	6.90	3.40	2.58	1.30	23.00	2.96	2.33	2.00	6.00	3.56
Iron	µg/L	2	10.00	6,204.80	611.00	143,000.00	2,410.00	735.13	507.50	3,030.00	1,000.00	1,335.12	686.00	6,720.00	1,940.00
Iron (Filtered)	µg/L	2	10.00	233.97	227.50	442.00	319.20	209.80	201.50	370.00	281.00	248.05	265.00	535.00	343.80
Lead	µg/L	0.1	4.40	13.68	3.05	278.00	4.62	8.04	5.85	28.00	10.00	8.02	2.50	68.50	11.40
Lead (Filtered)	µg/L	0.1	4.40	0.62	0.35	2.10	1.24	1.14	1.00	2.20	1.64	0.70	0.60	2.70	0.96
Manganese	µg/L	0.5	10.00	409.31	54.65	8,650.00	108.60	63.17	37.80	410.00	89.40	45.13	31.40	280.00	54.44
Manganese (Filtered)	µg/L	0.5	10.00	34.15	28.75	80.30	53.26	18.11	14.60	102.00	23.40	23.72	21.30	66.40	29.46
Mercury^	µg/L	0.005	0.40	11.40	0.01	193.00	0.05	0.54	0.01	12.00	0.02	0.40	0.01	9.00	0.01
Mercury^ (Filtered)	µg/L	0.005	0.40	0.54	0.01	6.00	0.01	0.21	0.01	5.00	0.01	0.21	0.01	5.00	0.01
Nickel	µg/L	0.5	100	1.60	0.60	17.80	1.08	1.04	0.70	4.00	1.40	1.60	0.95	11.70	1.72
Nickel (Filtered)	µg/L	0.5	100	0.59	0.50	0.90	0.80	0.65	0.50	2.00	0.50	0.98	0.70	9.70	0.82
Zinc	µg/L	1	5.00	66.37	23.50	1,090.00	49.20	29.44	22.50	120.00	45.00	69.61	42.00	364.00	88.00
Zinc (Filtered)	µg/L	1	5.00	18.37	15.00	39.00	27.60	8.44	5.00	42.00	13.00	31.63	28.00	92.00	41.80
pH (Lab)	pH Units	0.01	7-8.5	7.10	7.14	7.87	7.31	7.35	7.36	9.62	7.64	7.09	7.08	7.91	7.39

POLLUTANT	UNITS	LOD	TRIGGER VALUE	SW9				SW10				SW11			
				AVERAGE	MEDIAN	MAX	80%ILES	AVERAGE	MEDIAN	MAX	80%ILES	AVERAGE	MEDIAN	MAX	80%ILES
Total Suspended Solids	mg/L	5	10.00	127.25	12.50	2,150.00	47.20	48.84	28.00	290.00	55.20	38.97	16.00	394.00	40.20
Turbidity	NTU	0.1	10.00	118.41	4.40	1,290.00	53.32	14.38	7.85	56.60	21.60	17.90	11.30	142.00	17.54
Ammonia (as N)	mg/L	0.005	0.01	0.13	0.10	0.48	0.22	0.03	0.02	0.17	0.06	0.18	0.18	0.43	0.26
Nitrate (as N)	mg/L	0.002	10.00	0.51	0.46	2.47	0.58	0.19	0.11	0.75	0.38	0.67	0.56	3.26	0.84
Nitrite (as N)	mg/L	0.002	0.10	0.01	0.01	0.03	0.02	0.01	0.01	0.25	0.01	0.02	0.01	0.04	0.02
Total Nitrogen (as N)	mg/L	0.01	0.30	0.98	0.87	3.34	1.13	1.51	0.70	37.00	1.16	1.21	1.02	3.57	1.71
Total Phosphorus	mg/L	0.005	0.03	0.04	0.02	0.26	0.08	0.04	0.01	0.32	0.06	0.13	0.04	4.20	0.06
PFOA	µg/L	0.0005	220	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.02
PFOS	µg/L	0.0002	0.13	0.02	0.02	0.03	0.02	0.04	0.04	0.09	0.06	0.05	0.05	0.13	0.06

^Further review of data required as exceedance may be due to outliers

Table 4.5 Statistics of water quality data for selected parameters at SW12 (Mill Stream downstream of tidal barrier) – new data point not previously reported in TWP8

POLLUTANT	UNITS	LOD	TRIGGER VALUE	SW12			
				AVERAGE	MEDIAN	MAX	80%ILES
Aluminium	µg/L	5	10.00	581.19	309.50	3,820.00	867.20
Aluminium (Filtered)	µg/L	0.2	10.00	49.19	32.00	114.00	103.60
Arsenic^	µg/L	0.2	30.00	2.70	2.50	4.50	3.66
Arsenic (Filtered)	µg/L	0.2	30.00	1.90	1.90	3.20	2.36
Chromium^	µg/L	0.2	20.00	2.52	1.40	13.90	3.16
Chromium (Filtered)	µg/L	0.5	20.00	0.54	0.40	1.20	0.80
Copper	µg/L	0.5	5.00	31.46	14.75	141.00	48.20
Copper (Filtered)	µg/L	2	5.00	8.21	2.30	27.30	21.18
Iron	µg/L	2	10.00	1,349.50	622.00	9,580.00	1,364.80
Iron (Filtered)	µg/L	2	10.00	199.38	145.00	762.00	266.40
Lead	µg/L	0.1	4.40	8.82	4.50	59.20	12.24
Lead (Filtered)	µg/L	0.1	4.40	0.96	1.05	2.20	1.60
Manganese	µg/L	0.5	10.00	28.44	23.75	66.80	42.88
Manganese (Filtered)	µg/L	0.5	10.00	19.49	16.90	45.40	27.20
Mercury^	µg/L	0.005	0.40	0.02	0.02	0.04	0.02
Mercury (Filtered)	µg/L	0.005	0.40	0.01	0.01	0.01	-
Nickel	µg/L	0.5	100	3.21	1.40	13.80	5.62
Nickel (Filtered)	µg/L	0.5	100	2.35	1.35	12.00	2.28
Zinc	µg/L	1	5.00	73.27	43.00	359.00	112.40
Zinc (Filtered)	µg/L	1	5.00	20.38	16.00	59.00	39.40
pH (Lab)	pH Units	0.01	7-8.5	7.19	7.28	7.64	7.45

POLLUTANT	UNITS	LOD	TRIGGER VALUE	SW12			
				AVERAGE	MEDIAN	MAX	80%ILES
Total Suspended Solids	mg/L	5	10.00	111.13	83.00	337.00	173.60
Turbidity	NTU	0.1	10.00	41.30	26.00	106.00	90.06
Ammonia (as N)	mg/L	0.005	0.01	3.11	0.22	18.70	5.37
Nitrate (as N)	mg/L	0.002	10.00	0.62	0.35	4.74	0.57
Nitrite (as N)	mg/L	0.002	0.10	0.07	0.03	0.35	0.14
Total Nitrogen (as N)	mg/L	0.01	0.30	5.39	1.36	23.70	10.18
Total Phosphorus	mg/L	0.005	0.03	0.63	0.09	3.64	1.41
PFOA	µg/L	0.0005	220	0.02	0.01	0.03	0.02
PFOS	µg/L	0.0002	0.13	0.17	0.16	0.44	0.28

4.2 Updated comparison of Mill Stream data statistics with accepted limits of *Airports (Environment Protection) Regulations 1997* (Appendix F of TWP8)

Values highlighted red indicate relevant trigger value is exceeded.

Table 4.6 Comparison of SW9, SW10 and SW11 water quality monitoring data with trigger values based on acceptable limits set in Schedule 2 of the *Airports (Environment Protection) Regulations 1997*

Pollutants \ Location	**Unit**	**Trigger Value (Airports Regs 1997)**	**SW9**			**SW10**			**SW11**		
			Average	**Median**	**Max**	**Average**	**Median**	**Max**	**Average**	**Median**	**Max**
Arsenic	µg/L	50.00	7.82	1.55	168.00	3.08	2.45	12.30	1.77	1.6	5.2
Arsenic (Filtered)	µg/L	50.00	1.01	1.00	1.80	2.01	1.85	8.20	1.12	1.10	2.10
Chromium	µg/L	50.00	1.87	0.50	31.50	1.54	1.00	7.90	1.79	1.20	11.80
Chromium (Filtered)	µg/L	50.00	0.26	0.20	0.60	0.34	0.25	1.10	0.65	0.65	0.90
Copper	µg/L	5.00	7.98	2.40	127.00	7.48	5.00	69.00	7.99	4.20	50.4
Copper (Filtered)	µg/L	5.00	2.09	1.70	6.90	2.58	1.30	23.00	2.33	2.00	6.00
Lead	µg/L	5.00	13.68	3.05	278.00	8.04	5.85	28.00	8.02	2.50	68.50
Lead (Filtered)	µg/L	5.00	0.62	0.35	2.10	1.14	1.00	2.20	0.70	0.60	2.70
Mercury	µg/L	0.10	11.40	0.01	193.00	0.54	0.01	12.00	0.40	0.01	9.00
Mercury (Filtered)	µg/L	0.10	0.54	0.01	6.00	0.21	0.01	5.00	0.21	0.01	5.00
Nickel	µg/L	15.00	1.60	0.60	17.80	1.04	0.70	4.00	1.60	0.95	11.70
Nickel (Filtered)	µg/L	15.00	0.59	0.50	0.90	0.65	0.50	2.00	0.98	0.70	9.70
Zinc	µg/L	50.00	66.37	23.50	1,090.00	29.44	22.50	120.00	69.61	42.00	364.00
Zinc (Filtered)	µg/L	50.00	18.37	15.00	39.00	8.44	5.00	42.00	31.63	28.00	92.00
Ammonia (as N)	mg/L	0.005	0.14	0.12	0.48	0.47	0.03	20.00	0.15	0.014	0.43
Nitrate (as N)	mg/L	0.01	0.51	0.46	2.47	0.19	0.11	0.75	0.67	0.56	3.26

Table 4.7 Comparison of SW12 water quality monitoring data with trigger values based on acceptable limits set in Schedule 2 of the *Airports (Environment Protection) Regulations 1997*– new data point not previously reported in TWP8

Pollutants \ Location	Unit	Trigger Value (Airports Regs 1997)	SW12		
			Average	Median	Max
Arsenic	µg/L	50.00	2.70	2.50	4.50
Arsenic (Filtered)	µg/L	50.00	1.90	1.90	3.20
Chromium	µg/L	50.00	2.52	1.40	13.90
Chromium (Filtered)	µg/L	50.00	0.54	0.40	1.20
Copper	µg/L	5.00	31.46	14.75	141.00
Copper (Filtered)	µg/L	5.00	8.21	2.30	27.30
Lead	µg/L	5.00	8.82	4.50	59.20
Lead (Filtered)	µg/L	5.00	0.96	1.05	2.20
Mercury	µg/L	0.10	0.02	0.02	0.04
Mercury (Filtered)	µg/L	0.10	0.01	0.01	0.01
Nickel	µg/L	15.00	3.21	1.40	13.80
Nickel (Filtered)	µg/L	15.00	2.35	1.35	12.00
Zinc	µg/L	50.00	73.27	43.00	359.00
Zinc (Filtered)	µg/L	50.00	20.38	16.00	59.00
Ammonia (as N)	mg/L	0.005	3.11	0.22	18.70
Nitrate (as N)	mg/L	0.01	0.62	0.35	4.74

4.3 Updated indicative site-specific trigger values and discharge criteria (Appendix B of TWP8)

The NSW Water Quality and River Flow Objectives (DECCW, 2006) provide EVs and associated water quality objectives. ANZECC Guidelines 2000 and the *Airports (Environment Protection) Regulations 1997* recommend contaminant trigger values for these environmental values. As explained in TW8 Section 2.2.2, guideline trigger values are the criteria used for concentrations that, if exceeded, would indicate a potential environmental problem, and so 'trigger' a management response.
Table 4.8 has been updated to provide indicative site-specific trigger values for Alexandra Canal, Cooks River and Mill Stream for short term monitoring.

Table 4.8 Updated indicative site-specific trigger values for Alexandra Canal, Cooks River and Mill Stream for monitoring in the short term

Pollutants \ Location	**Unit**	**Alexandra Canal Trigger value**	**Cooks River Trigger Value**	**Mill Stream Trigger Value**
Aluminium (Filtered)	µg/L	27.40	23.60	103.60 (10.00)
Arsenic (Filtered) ++	µg/L	30.00	30.00	30.00
Barium++	mg/L	2	2	2
Boron+	µg/L	5100	5100	5100
Cadmium (Filtered)*	µg/L	36	36	36
Chromium (CrVI) (Filtered)*	µg/L	85.00	85.00	20.00
Copper (Filtered)*	µg/L	8.00	8.00	21.18 (5.00)
Cobalt (Filtered)	µg/L	150	150	150
Iron (Filtered)	µg/L	48.8	36.80	266.40 (10.00)
Lead (Filtered)*	µg/L	4.40 (12.00)	4.40 (12.00)	4.40
Manganese (Filtered)	µg/L	20.26	17.40	27.20 (10.00)
Mercury (Filtered)**	µg/L	0.40	0.40	0.40
Nickel (Filtered)*	µg/L	560	560	100
Zinc (Filtered)*	µg/L	55.60 (43.00)	43.00	39.40 (5.00)
pH (Lab)*	pH Units	7-8.5	7-8.5	7-8.5
Total Suspended Solids	mg/L	15.20	10.00*	173.60 (10.00)
Turbidity	NTU	11.48	10.00*	90.06 (10.00)
Bicarbonate Alkalinity as $CaCO_3$	mg/L	124.00	125.00	To be determined from future monitoring data
Ammonia	mg/L	1.7	1.7	5.37
Nitrate (as N) ++	mg/L	10.00	10.00	10.00
Nitrite (as N) ++	mg/L	0.10	0.10	0.14 (0.10)
Total Nitrogen (as N)	mg/L	0.90	0.93	10.18 (0.30)
Total Phosphorus	mg/L	0.07	0.07	1.41 (0.03)
PFOA^	µg/L	220	220	220
PFOS^	µg/L	0.13	0.13	0.28 (0.13)
TPH – C_6-C_9 fractions+++	µg/L	150	150	150
TPH – Mineral Oil (>C_9 fractions)+++	µg/L	600	600	600

Pollutants \ Location	Unit	Alexandra Canal Trigger value	Cooks River Trigger Value	Mill Stream Trigger Value
F2-NAPHTHALENE	mg/L	120	120	120
Ethylbenzene	µg/L	250	250	250
Total Xylenes+	µg/L	625	625	625
p-Xylene+	µg/L	200	200	200
m-Xylene+	µg/L	75	75	75
o-Xylene+	µg/L	350	350	350
Naphthalene+	µg/L	70	70	70
Anthracene+	µg/L	0.4	0.4	0.4
Phenanthrene+	µg/L	2	2	2
Fluoranthene+	µg/L	1.4	1.4	1.4
Benzo(a)pyrene+	µg/L	0.2	0.2	0.2

Notes:

The above table contains pollutants that have not been detected in the surface or groundwater monitoring but which are potential contaminants of concern if detected in future monitoring data.

Trigger values for all watercourses should be revised as future monitoring data is collected.

ADDITIONAL NOTE: Yellow highlighted cells indicate trigger value adjusted from EIS/preliminary draft MDP TWP8. Previous TWP8 value provided in brackets. Note that changed values are taken as the 80th percentile values from the latest monitoring data. Most changes occur for Mill Stream as the 80th percentile values for monitoring point SW12 have been adopted for Mill Stream which is closest to the location where runoff from the project area would enter Mill Stream.

*80th percentile site monitoring value is lower than 80% protection level for aquatic ecosystems

**bioaccumulative toxin 95% protection level was above the 80th percentile monitoring value

++ No aquatic ecosystems value available and default trigger value in Appendix A is higher than 80th percentile value so Appendix A value is adopted

^no values recommended in ANZECC (2000), values adopted from the PFAS NEMP

+Low reliability trigger values from ANZECC (2000) adopted

++Australian Drinking Water Guidelines (NHMRC 2011) trigger value adopted in absence of value available from ANZECC (2000)

+++*Airports (Environment Protection) Regulations 1997* freshwater trigger values adopted in absence of values available from ANZECC (2000) and monitoring data.

Discharging construction water to the Alexandra Canal, either directly or via stormwater systems, would not cause environmental degradation or pollution if it is of suitable quality relative to existing water quality. Table B.2 provides the proposed discharge criteria for Alexandra Canal.

Table 4.9 Proposed discharge criteria for Alexandra Canal

Pollutants	Unit	Alexandra Canal discharge criteria
Aluminium (Total)	µg/L	356.8
Aluminium (Filtered)	µg/L	27.40
Arsenic (Filtered) ++	µg/L	30.00
Barium++	µg/L	2
Boron+	µg/L	5100
Cadmium (Filtered)*	µg/L	36
Chromium (CrVI) (Filtered)*	µg/L	85.00
Copper (Filtered)*	µg/L	8.00
Cobalt (Filtered)	µg/L	150
Iron (Total)	µg/L	489.8
Iron (Filtered)	µg/L	48.8
Lead (Filtered)**	µg/L	12.00
Manganese (Total)	µg/L	27.82
Manganese (Filtered)	µg/L	20.26
Mercury (Filtered)**	µg/L	0.40
Nickel (Filtered)*	µg/L	560.00
Zinc (Total)*	µg/L	75.40 (46.10)
Zinc (Filtered)*	µg/L	55.60 (43.00)
pH (Lab)*	pH Units	7-8.5
Total Suspended Solids	mg/L	15.20
Turbidity	NTU	11.48
Bicarbonate Alkalinity as $CaCO_3$	mg/L	124.00
Ammonia	mg/L	1.7
Nitrate (as N) ++	mg/L	10.00
Nitrite (as N) ++	mg/L	0.10
Total Nitrogen (as N)	mg/L	0.90
Total Phosphorus	mg/L	0.07
PFOA^	µg/L	220
PFOS^	µg/L	0.13
TPH – C_6-C_9 fractions+++	µg/L	150
TPH – Mineral Oil (>C_9 fractions)+++	µg/L	600
F2-NAPHTHALENE	mg/L	120
Ethylbenzene	µg/L	250
Total Xylenes	µg/L	625
p-Xylene	µg/L	200
m-Xylene	µg/L	75
o-Xylene	µg/L	350
Naphthalene+	µg/L	70
Anthracene+	µg/L	0.4

Pollutants	Unit	Alexandra Canal discharge criteria
Phenanthrene+	µg/L	2
Fluoranthene+	µg/L	1.4
Benzo(a)pyrene+	µg/L	0.2

Note: The above table contains pollutants that have not been detected in the surface or groundwater monitoring but which are potential contaminants of concern if detected in future monitoring data.

ADDITIONAL NOTE: Yellow highlighted cell indicate trigger value adjusted from EIS/preliminary draft MDP TWP8. Previous TWP8 value provided in brackets. Note that changed values are taken as the 80th percentile values from the latest monitoring data.

*80th percentile site monitoring value is lower than 80% protection level for aquatic ecosystems

++ No aquatic ecosystems value available and default trigger value in Appendix A is higher than 80th percentile value so Appendix A value adopted

**bioaccumulative toxin - 95% protection level adopted

^no values recommended in ANZECC (2000), values adopted from the PFAS NEMP and since PFAS is bioaccumulative toxin 95% protection level instead of 80% protection level adopted

+Low reliability trigger values from ANZECC (2000) adopted

++Australian Drinking Water Guidelines (NHMRC 2011) trigger value adopted in absence of value available from ANZECC (2000)

+++*Airports (Environment Protection) Regulations 1997* freshwater trigger values adopted in absence of values available from ANZECC (2000) and monitoring data

5 KEY FINDINGS

Key findings from the review and inclusion of the extended baseline water quality monitoring data are as follows:

- The additional data shows some changes in the 80th percentile values for Alexandra Canal and Cooks River but generally the previously established short term trigger values for Alexandra Canal and Cooks River and Alexandra Canal discharge criteria remain similar to those presented in TWP8. Some metals concentrations were found to be lower in the extended baseline dataset.
- For Mill Stream, the water quality at SW12 is significantly different to the other monitoring points upstream, with higher concentrations and poorer water quality in general. It is confirmed that releases of construction phase water to Mill Stream would occur downstream of the tidal barrier in the vicinity of the SW12 and therefore this data point is the only relevant point of all Mill Stream monitoring locations, as the other data points are located upstream of the tidal barrier. SW12 was therefore adopted to establish the short term trigger values for monitoring impacts of the project on Mill Stream.

6 REFERENCES

AECOM, 2081–2019. Sydney Gateway Project – Monthly Baseline Surface Water Monitoring. January 2018 – January 2019.

ANZECC & ARMCANZ, 2000, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra.

WSP & GHD, 2019, Sydney Gateway Road Project Technical Working Paper 8 – Surface Water, Document No. SG04-G2S-EN-RPT-WQ-006-05, Roads and Maritime Services, NSW.

Appendix F
Historical Archaeological Assessment

Sydney Gateway Road

Historical Archaeological Assessment

Report prepared for Gateway to Sydney Joint Venture for Roads and Maritime

April 2020

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EXECUTIVE SUMMARY

The following document comprises a Historical Archaeological Assessment for proposed works in the Sydney Airport Northern Lands (the study area) to accommodate the Sydney Gateway Road project (the project).

The overall Sydney Gateway Road project is being carried out by Roads and Maritime Services (Roads and Maritime) and Sydney Airport Corporation, who are proposing a new direct high capacity road connection linking the Sydney motorway network at the St Peters interchange with Sydney Airport's domestic and international terminals and beyond. The project would comprise new and upgraded sections of road connecting to the airport terminals and would occur in the suburbs of Tempe, St Peters and Mascot, in the Inner West and City of Sydney Local Government Areas (LGAs). It also partially includes Commonwealth-owned land leased to the Sydney Airport Corporation. As such, the overall project is subject to approval under NSW and Commonwealth legislation.

The study area for this document comprises the Sydney Airport Northern Lands, located in the suburb of St Peters, within the Inner West LGA (the study area). It is wholly located within Commonwealth-owned land leased to the Sydney Airport Corporation. Works within the study area will accommodate early stage construction works for the project including the site establishment, installation of retaining walls and drainage infrastructure, piling for road overpass abutments and construction of a flood mitigation basin.

In terms of project history, an integrated Environmental Impact Statement (EIS) and Major Development Plan (MDP) was prepared for the overall Sydney Gateway Road project in accordance with the requirements of the Environmental Planning and Assessment Act 1979 (NSW) (EP&A Act) and Airports Act 1996 (respectively) in 2019.

As part of the EIS/MDP, a Statement of Heritage Impact (SoHI) was prepared by Artefact Heritage in October 2019. The SoHI identified an area of moderate archaeological potential within the Sydney Airport Northern Lands in St Peters, east of the Botany Rail Line. As a result, it concluded that a Historical Archaeological Assessment and Research Design (HAARD) and Excavation Methodology be prepared to further assess the likelihood that intact and significant archaeological remains would survive within this area.

In November 2019, WSP and GHD engaged Artefact Heritage to prepare the HAARD and Excavation Methodology for the study area. Following a detailed analysis of historical plans, lands titles information and contamination reports, it was concluded that the likelihood for significant archaeological remains to survive within the study area was nil. Therefore, this HAA has been prepared in lieu of a HAARD and Excavation Methodology, as no archaeological management is required in the study area.

Conclusions

This Historical Archaeological Assessment has made the following conclusions:

- The study area has been subject to four occupation phases:
    - **Phase 1** (circa 1796–1870): Construction of an embankment wall along Sheas Creek
    - **Phase 2** (1870–1919): Reclamation activities associated with the establishment of the Alexandra Canal
    - **Phase 3** (1919–1990): Construction of linear shaped features for the Mount Frome lime factory and Government woolstore warehouses
    - **Phase 4** (1990–present): Commercial activities and land fill events

- Based on known land use in the study area, Phase 3 and 4 occupation activities are likely to have disturbed, truncated or removed potential archaeological remains associated with Phase 1 and 2 occupation
- Land use that occurred during Phase 3 and 4 involved commercial and industrial activities and land fill events that have contaminated soils and groundwater within parts of the study area
- Based on findings outlined in this report, the study area contains the following archaeological potential and heritage significance:
  - **Phase 1** (circa 1796–1870): Nil potential for intact or recognisable archaeological remains of an embankment wall to survive within the study area. Archaeological remains of the embankment would likely be heavily disturbed and ephemeral in nature. Therefore, they would not reach the threshold for archaeological significance at a local or state level.
  - **Phase 2** (1870–1919): Low potential for archaeological remains associated with Phase 2 land reclamation activities. Archaeological evidence of these activities would not reach the threshold for archaeological significance at a local or state level.
  - **Phase 3** (1919–1990): High potential for archaeological evidence associated with Phase 3 industrial and commercial activities associated with the Mount Frome lime factory and later Government woolstore warehouses. These would not reach the threshold for archaeological significance at a local or state level.
- Based on these findings, the proposed works will not impact locally or state significant archaeological remains and a HAARD and Excavation Methodology is not required for the project.

Recommendations

Based on these conclusions, the following recommendations have been made:

- The Roads and Maritime *Standard Management Procedure for Unexpected Heritage Items* (2015) would be implemented during all excavation works
- All relevant staff, contractors and subcontractors must be made aware of statutory obligations for heritage under the *NSW Heritage Act 1977* and best practice guidelines as outlined in the Burra Charter (Australia ICOMOS 2013) to ensure no significant unexpected archaeological remains are impacted during the proposed works. This would be implemented through a heritage induction carried out prior to works commencing and throughout the works program.
- If human remains, or suspected human remains, are found during the works, all work in the vicinity must cease, the site should be secured, and the NSW Police and Heritage Council must be notified under the Roads and Maritime *Standard Management Procedure for Unexpected Heritage Items* (2015).

Document history and status

1	19/11/2019	Jenny Winnett	Jenny Winnett	19/11/2019	First draft – internal review
2	27/11/2019	Philip Burns (WSP) and Greg Marshall (GHD)	Sandra Wallace	6/12/2019	Second draft
3	7/4/2020	Sandra Wallace	Sandra Wallace	7/4/20	Final

Author:	Adele Zubrzycka and Sophie Barbera
Project manager:	Dr Sandra Wallace
Project number:	18083 Sydney Gateway Road: Sydney Airport Northern Lands Historical Archaeological Assessment
Name of organisation:	Artefact Heritage
Document version:	

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FIGURES

TABLES

1.0 INTRODUCTION

The following document comprises a Historical Archaeological Assessment for proposed works in the Sydney Airport Northern Lands (the study area) to accommodate the Sydney Gateway Road project (the project).

1.1 Project background

The overall Sydney Gateway Road project is being carried out by Roads and Maritime Services (Roads and Maritime) and Sydney Airport Corporation, who are proposing a new direct high capacity road connection linking the Sydney motorway network at the St Peters interchange with Sydney Airport's domestic and international terminals and beyond. The project would comprise new and upgraded sections of road connecting to the airport terminals and would occur in the suburbs of Tempe, St Peters and Mascot, in the Inner West and City of Sydney Local Government Areas (LGAs). It also partially includes Commonwealth-owned land leased to the Sydney Airport Corporation. As such, the overall project is subject to approval under NSW and Commonwealth legislation.

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[1] Artefact Heritage, 2019. Statement of Heritage Impact – Sydney Gateway Road. *Report prepared for Gateway to Sydney Joint Venture for Transport* for NSW.

2.0 METHODOLOGY

2.1 Historical Archaeological Assessment preparation

This HAA has been prepared in accordance with the following guidelines:

- *Historical Archaeology Code of Practice* 2006 (Heritage Office, Department of Planning)
- *Assessing Significance for Historical Archaeological Sites and Relics* 2009 (Heritage Branch, Dept. of Planning)
- *Burra Charter* 2013 (Australia ICOMOS).

2.2 Site location

The study area encompasses land occupied by 30 Canal Road, St Peters (Lot 3 and Lot 4 DP 555771, Lot 3 DP 825649 and Lot 2 DP 802342), which is located approximately eight kilometres south of Sydney's Central Business District (CBD) and to the north of Sydney Airport (see Figure 2-1).

The northern extent of the study area adjoins the Cooks River Container Terminal site. The eastern extent of the study area adjoins Canal Road, near the intersection of Canal and Burrows Roads, St Peters. The southern extent of the study area is bounded by the Boral industrial site, and the western boundary of the study area adjoins the Botany Rail Line.

2.3 Archaeological significance assessments

In 2009, the NSW Heritage Division of the Office of Environment and Heritage (OEH) (now Heritage NSW, DPC) issued a set of guidelines titled *Assessing Significance for Historical Archaeological Sites and 'Relics'*. These guidelines call for broader consideration of multiple values of archaeological sites beyond their research potential. Under the guidelines, the significance of a potential archaeological site can then be assessed as being of local or State significance.

'State heritage significance', in relation to a place, building, work, relic, moveable object or precinct, means significance to the State in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item. 'Local heritage significance', in relation to a place, building, work, relic, moveable object or precinct, means significance to an area in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item (as outlined in Table 2-1).

The overall aim of assessing archaeological significance is to identify whether an archaeological resource, deposit, site or feature is of cultural value. The assessment will result in a succinct statement of heritage significance that summarises the values of the place, site, resource, deposit or feature.

Table 2-1: NSW Heritage Manual heritage assessment criteria.

Criteria	Description
A – Historical significance	An item is important in the course or pattern of the local area's cultural or natural history
B – Associative significance	An item has strong or special associations with the life or works of a person, or group of people, of importance in the local area's cultural or natural history
C – Aesthetic and/or technical significance	An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in the local area

Criteria	Description
D – Social significance	An item has strong or special association with a particular community or cultural group in the local area for social, cultural or spiritual reasons
E – Research potential	An item has potential to yield information that will contribute to an understanding of the local area's cultural or natural history
F – Rarity	An item possesses uncommon, rare or endangered aspects of the local area's cultural or natural history
G – Representativeness	An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places or environments (or the cultural or natural history of the local area)

2.4 Archaeological potential

The identified levels of archaeological potential referred to in this document are based on the definitions outlined in Table 2-2.

Table 2-2: Definition of assessed archaeological potential.

Grading	Definition
High Potential	Where there is evidence of multiple phases of historic development and structures, with minimal or localised twentieth-century development impacts, and where it is likely that archaeological resources would remain intact.
Moderate Potential	Where analysis has demonstrated known historical development with some previous impacts, but where it is likely that archaeological remains would survive with localised truncation and disturbance.
Low Potential	Where research has indicated little historical development, or where there have been substantial previous impacts which may not have removed deeper subsurface remains entirely.
Nil Potential	Where there is no evidence of historical development or use, or where previous impacts such as deep basement structures would have removed all archaeological potential.

2.5 Site inspection

A site inspection of the study area was carried out on 28 October 2019 by Adele Zubrzycka (Senior Heritage Consultant, Artefact Heritage) and Sophie Barbera (Heritage Consultant, Artefact Heritage). The aim of the inspection was to evaluate the existing environment within the study area and further assess the likelihood that intact and significant archaeological remains associated with European land use from c1830 onwards would survive within the Sydney Airport Northern Lands.

2.6 Limitations

The findings outlined in this document are based on historical research and field inspections. No physical archaeological investigation was undertaken during the preparation of this report.

Aboriginal cultural heritage assessment is beyond the scope of this report.

The majority of land within Lot 3 and Lot 4 DP 555771, Lot 3 DP 825649 and Lot 2 DP 802342 was investigated on foot during the inspection. However, a fenced area in the southeast corner of Lot 2 DP 802342 was not investigated due to access issues. The ground surface was visually inspected from a boundary fence around the property.

2.7 Authorship

The report was authored by Adele Zubrzycka (Senior Heritage Consultant, Artefact Heritage) and Sophie Barbara, (Heritage Consultant, Artefact Heritage). Jenny Winnett (Principal, Artefact Heritage) and Sandra Wallace (Director, Artefact Heritage) provided management input and review.

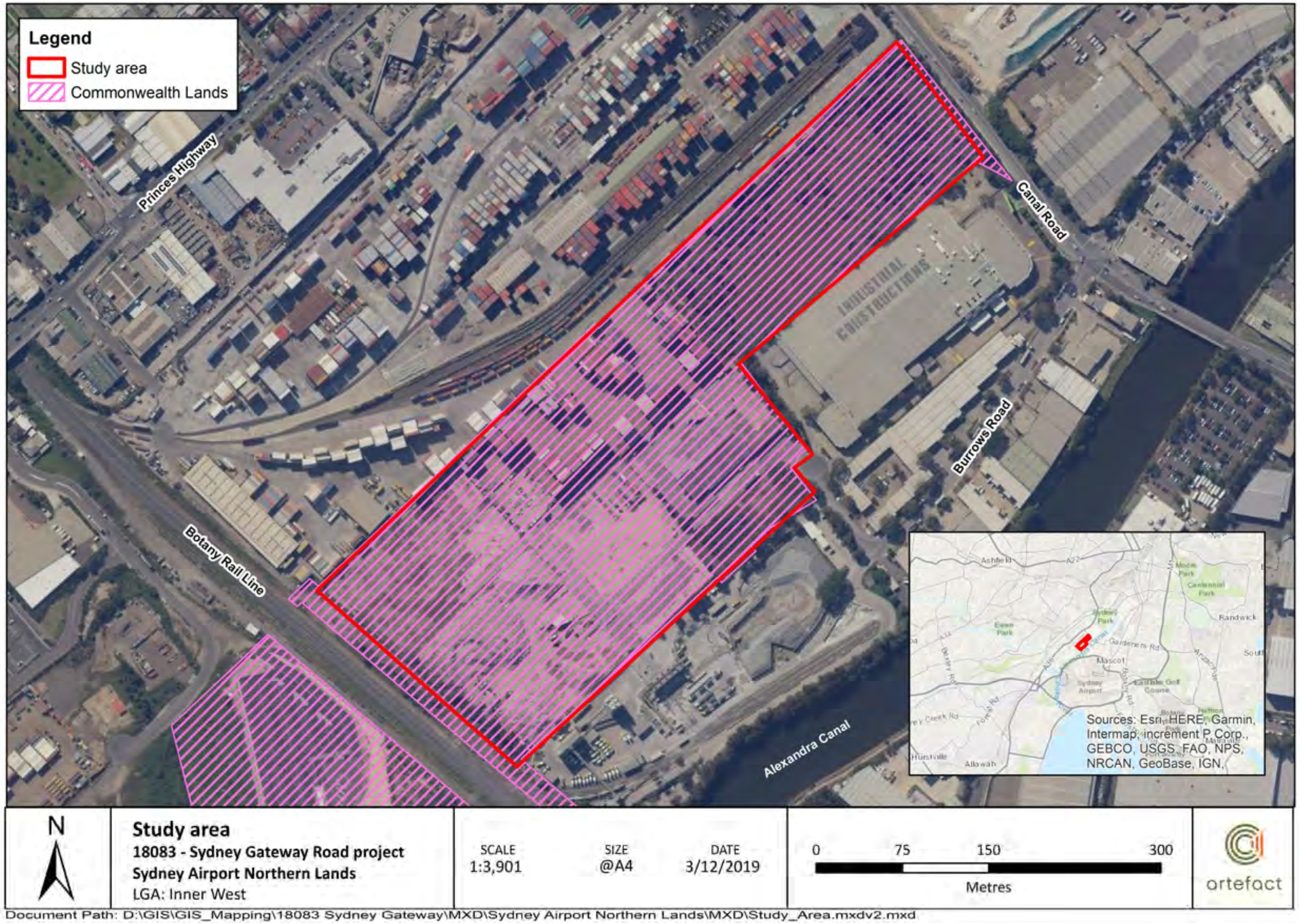

Figure 2-1: Location of the study area

3.0 STATUTORY CONTEXT

The study area is located within Commonwealth owned land and is therefore not subject to the *Environmental Planning and Assessment Act 1979* (EP&A Act) or New South Wales (NSW) state legislation.

3.1 The World Heritage Convention

The Convention Concerning the Protection of World Cultural and National Heritage (the World Heritage Convention) was adopted by the General Conference of the United Nations Educational, Scientific and Cultural Organisation (UNESCO) on 16 November 1972 and came into force on 17 December 1975. The World Heritage Convention aims to promote international cooperation to protect heritage that is of such outstanding universal value that its conservation is important for current and future generations. It sets out the criteria that a site must meet to be inscribed on the World Heritage List (WHL) and the role of State Parties in the protection and preservation of world heritage and their own national heritage.

The concept of a buffer zone was first included in the operational guidelines for the implementation of the World Heritage Convention in 1977 and recognises the value of the environment that surrounds a site.

There are no WHL items within the study area.

3.2 Commonwealth legislation

National Heritage List

The NHL was established under the EPBC Act, which provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places. Under the EPBC Act, nationally significant heritage items are protected through listing on the NHL.

There are no NHL items located within the study area.

Commonwealth Heritage List

The CHL has been established to list heritage places that are either entirely within a Commonwealth area or outside the Australian jurisdiction and owned or leased by the Commonwealth or a Commonwealth Authority. The CHL includes natural, Indigenous and historic heritage places that the Minister for the Environment is satisfied have one or more Commonwealth Heritage values.

There are no CHL items located within the study area.

3.2.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is administered by the Australian Department of the Environment and Energy and provides a legal framework to protect and manage nationally important flora, fauna, ecological communities and heritage places defined as 'matters of national environmental significance' (MNES).

Under the EPBC Act, proposed actions (i.e. activities or projects) with the potential to significantly impact matters protected by the EPBC Act must be referred to the Australian Minister for the Environment to determine whether they are controlled actions, requiring approval from the Minister. The following matters are defined as protected matters by Part 3 of the EPBC Act:

- Matters of national environmental significance

- The environment of Commonwealth land
- The environment in general if the actions are being carried out by an Australian Government agency.

Under Part 9, approval under the EPBC Act is required for any action occurring within, or outside, a heritage place that has, will have or is likely to have a 'significant impact' on the heritage values of a World, National or Commonwealth heritage listed property (referred to as a 'controlled action' under the Act). A 'significant impact' is defined as:

> *an impact which is important, notable, or of consequence, having regard to its context or intensity. If an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.*

The EPBC Act stipulates that a person who has proposed an action that will, or is likely to, have a significant impact on a site that is listed on the WHL, NHL or CHL must refer the action to the Minister for Environment (hereafter the Minister). The Minister will then determine if the action requires approval under the EPBC Act. If approval is required, an environmental assessment would need to be prepared. The Minister would approve or decline the action based on this assessment.

As land within the study area is not listed as an item of significance on the NHL or CHL, referral to the Minister is not required.

3.3 Non-statutory considerations

3.3.1 National Trust of Australia (NSW)

The National Trust of Australia (NSW) maintains a register of landscapes, townscapes, buildings, industrial sites, cemeteries and other items or places which the National Trust determines have cultural significance and are worthy of conservation. Items registered on the National Trust are not protected by statutory legislation. However, if an item is listed on the register, it is generally an indication that the item is held in esteem by the heritage community.

There are no items listed on the National Trust located within the study area.

3.3.2 Register of the National Estate

The Register of the National Estate (RNE) was closed in 2007 and is no longer a statutory list. However, it remains available as an archive.

There are no items listed on the RNE located within the study area.

4.0 NON-ABORIGINAL HISTORICAL BACKGROUND

4.1 Phase 1 – Early European occupation and land use (circa 1796–1870)

4.1.1 Early grants and land use

During the early years of settlement, land in and surrounding the study area, within Tempe and St Peters comprised thick scrub and forest, marshy swamps and sand banks, similar to that shown in Figure 4-1. These were dissected by streams and creeks associated with Sheas Creek and the Cooks River. Land outside of the study area, to the southeast, was occupied by a combination of large and modest grants, given to ex-convicts such as Simeon Lord (600 acres), Edward Redmond (135 acres), Andrew Byrne (30 acres) and Mary Lewin (30 acres) as shown in Figure 4-3.

The study area itself was located immediately south of Thomas Smith's (also known as Smyth) 470-acre allotment, granted to him in 1796. This would eventually become the Tempe Estate and later the Village of Tempe, as shown in Figure 4-2. Smith's grant represented a 'southward spread of the colony towards Botany Bay' in the late 18th century.[2] It was taken over by merchant Robert Campbell in 1808 following Smith's death in 1804 and the land was leased to graziers and farmers.[3]

In 1810 the Cooks River Road (today's Princes Highway) was established about 350 metres north of the study area). This is shown in Figure 4-4. The advent of this new transport route promoted settlement in the area and allowed goods to be transported from surrounding farms into town.[4] Land within the study area remained unoccupied at this time, likely due to its marshy nature. However, informal farming or grazing activities may have occurred.

Figure 4-1: View near Botany Bay towards Sydney by William Leigh in 1853 showing the natural environment at the time. Source. State Library of NSW.

[2] Costin, C. 2003. The Changing Landscape of Smyth's Land Grant From 1788-1900, p. 41.
[3] Costin, C. 2003. The Changing Landscape of Smyth's Land Grant From 1788-1900, p. 43.
[4] Costin, C. 2003, p. 44.

Figure 4-2: 1833 or 1834 plan of the Alexandria and Petersham parishes showing indicative location of Smyths grant and extent of the Cooks River within the study area. Source. State Library of NSW.

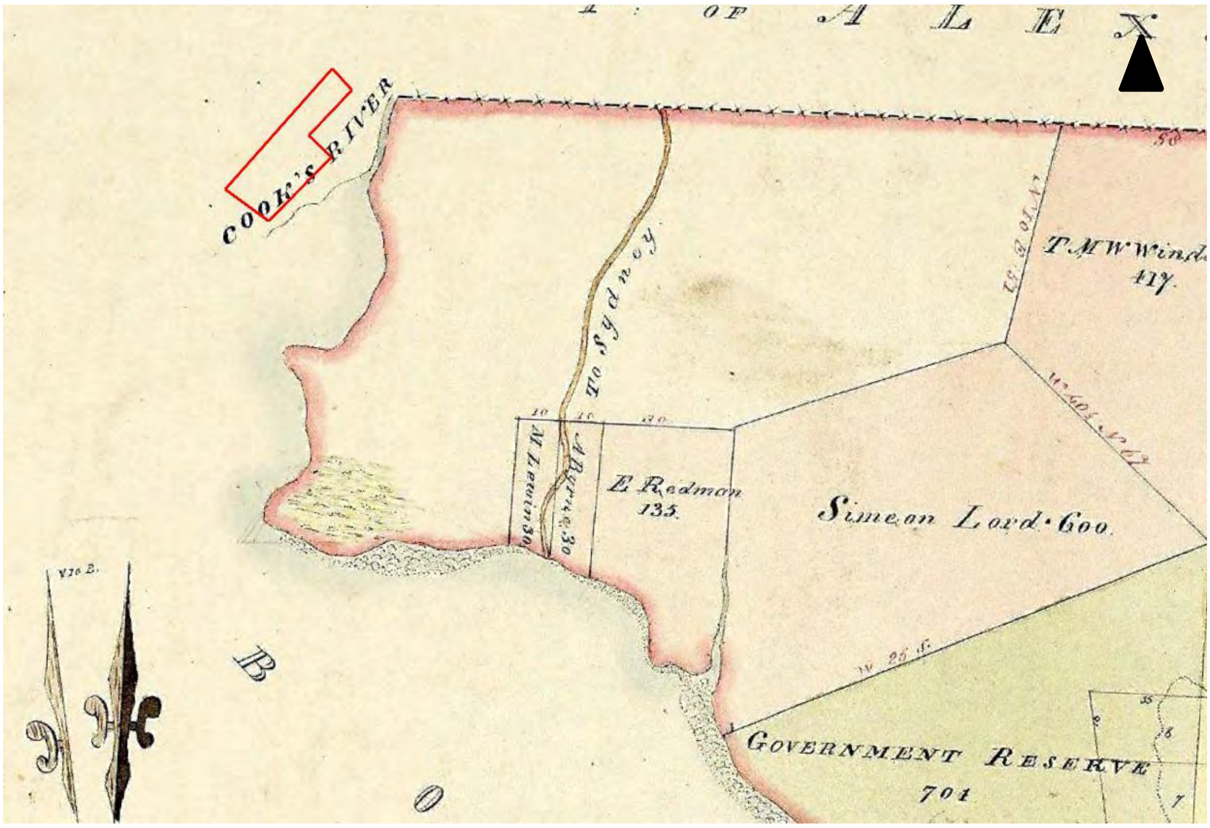

Figure 4-3: Undated parish map of Botany plan showing indicative location of the study area in relation to surrounding land grants. Source. State Library of NSW.

4.1.2 Sheas Creek, farming and industry

Sheas Creek, which wound its way through the landscape southeast of the study area, was flanked by swamps, mudflats and marshes at the time, as shown in Figure 4-6. Europeans would collect shells from the many Aboriginal middens and cheniers along the banks of the creek and the Cooks River during the early years of settlement. These were then used to produce lime for mortar which was subsequently used in the construction of various buildings in colonial Sydney.[5]

The Tempe Estate was formally subdivided and put up for sale in 1856. Interest was low and the property was subdivided again in 1859. Land within and next to the study area was subsequently sold to Thomas Holt and brothers Patrick and Thomas Maguire (or McGuire). Plans prepared at the time show land in the study area belonging to Thomas Holt (Figure 4-4 and Figure 4-5).

Holt's land was primarily described as 'mud flats with mangroves' and an embankment can be seen running parallel to the banks of Sheas Creek. With the exception of the embankment, no structures are shown to occupy the study area at the time and no records have been found to provide information regarding Holt's ownership of the land. However, he is recorded as experimenting with oyster breeding near Shea's Creek in the early 1870s.[6]

4.1.3 Noxious industries (1848 onwards)

The *Noxious Industries Act* of 1848 pushed industries out of the city limits and into Botany, Tempe, St Peters and Mascot. Soon, Tempe and St Peters were being heavily utilised for industries such as brick making.[7] Although most industries were established along the banks of Sheas Creek and the Cooks River, there is no record of these occurring with the study area.

Figure 4-4: Plan of portions 1 to 11 at Sheas Creek Cook's River, prepared in March 1859 showing nine allotments and an embankment to the west of the Cooks River. The Cooks River Road is also visible. Source. State Library of NSW.

[5] Ringer, R. 2013. From Sheas Creek to Alexandra Canal, Dictionary of Sydney, http://dictionaryofsydney.org/entry/from_sheas_creek_to_alexandra_canal, viewed 29 Nov 2018
[6] Tyrell, I. 2018. *River Dreams*, pp. 83-84.
[7] Lawrence, J. 2001. p. 9 and Thorp, W. 1999. Archaeological Assessment. Former Chubb Factory Site, Waterloo. Prepared on Behalf of St Hilliers Pty Ltd, p. 11.

Figure 4-5: Undated parish of Lewisham map showing nine allotments along Cooks River and Thomas Smith's 470 acre grant. Source. Land Registry Services.

4.2 Phase 2 – Establishment of the Alexandra Canal and industrial development (1870–1919)

4.2.1 Formation of the Municipalities and evolution of the brick and lime industry

By 1890, there were eighteen dairies in St Peters reflecting its early pastoral and agricultural beginnings. However, it was becoming increasingly industrial and predominantly consisted of brickworks by the end of the 19th and beginning of the 20th century.[8] Development of the brick making industry had a strong influence on the built landscape during this period, primarily due to the large amount of land required to manufacture and extract the clay itself (an activity that required large open area clay pits to be excavated into adjoining land) alongside the vast array of purpose built structures required for brick production.[9]

Although the study area itself was not occupied by brick pits, the St Peters brickworks was located immediately to its east, along Canal Road and the Princes Highway.

4.2.2 Establishment of the Alexandra Canal (1880s-1919)

The Alexandra Canal is located approximately 100 metres south of the study area along the alignment of Sheas Creek. Despite its distance, works required to construct the canal and modify the landscape are relevant to this assessment as the banks of Sheas Creek, which was modified for the canal's construction, extended into its southern boundary.

Early construction for the canal took place to the west of the study area, in land now occupied by the Tempe Recreation Reserve. Works included reclaiming the various mudflats surrounding Sheas Creek and the Cooks River.[10] This practice continued into the 1890s and suggests that large portions of land on either side of the Alexandra Canal may consist of redeposited spoil laid over (and effectively capping) the original swamp and marshland.[11]

[8] Costin, C. 2003, p. 77.
[9] Costin, C. 2003, p. 81.
[10] Alexandra Canal, CMP. 2009, p. 11.
[11] Alexandra Canal, CMP. 2009, pp. 9-13.

The year 1891 saw major construction works begin for the canal. This involved formalising Sheas Creek and land along the mouth of the Cooks River to create a wider and deeper channel which could be used to transport goods up and down the waterway.[12] Excavations occurred on either side of the watercourse and spoil material was used to raise the ground level above the high tide line to provide level ground for surrounding industries. This most likely occurred in close proximity to the study area, and would have modified land once occupied by mangroves and mudflats.

4.2.2.1 Aboriginal archaeological discoveries

In 1896, excavations for the canal uncovered remains of early Aboriginal occupation along the watercourse including butchered 7,000 year old dugong bones, two stone hatchets and remains of "*an ancient forest in estuarine clays below the low tide level*".[13] These were found several metres below the creek bed and examined by palaeontologist and curator at the Australian Museum Robert Etheridge and government palaeontologist William Dun (illustrated in Figure 4-7).

The general nature of the landscape following completion of the Alexandra Canal is shown in Figure 4-8.

4.2.2.2 The study area

Land use within the study area during this time is not known, although it may have been utilized by nearby industries such as the St Peters brickworks.

Figure 4-6: Higginbotham and Robinson plan prepared in 1880-1899 showing the nature of the study area prior to the construction of the Alexandra Canal. Note mangroves and swamps along the banks of Sheas Creek within the southern boundary of the study area. Approximate location of the Dugong excavation marked by blue cross. Source. State Library of NSW.

[12] Ringer, R. 2013.
[13] Ringer, R. 2013.

Figure 4-7: William Sutherland Dun excavating dugong remains at Sheas Creek for the Alexandra Canal 1896. Source. Australian Museum.

Figure 4-8: 1916 parish map showing land grants within the study area at the time and the newly established Botany Rail Line and Alexandra Canal to its west and south. Source. State Library of NSW.

4.3 Phase 3 – Industrial and commercial post-war development (1919–1990)

4.3.1 Industrial development, Government woolstores and the Mount Frome Lime factory (1919-1950)

By the early-mid 20th century land to the south, west and east was heavily associated with the lime and brick industry. Land directly southwest of the study area was leased to the Mount Frome Lime factory and Wilsons Limited during the 1920 and 1930s.[14] These companies would go on to lease portions of the study area over time.

Although details regarding their activities within the study area is not known, an aerial photograph taken in 1930 (Figure 4-9) shows what is likely a manager's house associated with the Mount Frome Lime factory located along the southern boundary of the study area. The photograph also shows linear shaped trenches or mounds, likely market garden beds, within the western extent of the study area.

Photographic evidence dating from February to September of 1934 depicts construction works and levelling activities in the north-eastern boundary of the study area, immediately west of Canal Road (Figure 4-10 and Figure 4-11).

By 1943, twenty government wool store warehouses had been established within the study area as shown in Figure 4-12. Works associated with the Mount Frome Lime factory appear to have continued on land between the warehouses and Botany Rail Line until 1949, by which time warehouse development had expanded west.

Alongside the warehouses, the study area continued to be occupied by the linear shaped trenches or mounds. These had however reduced in scale, only covering the centre of the study area at this time.

Figure 4-9: 1930 Aerial showing land use within the study area this time. Note the Mount Frome factory to the southwest of the study area indicated by an arrow. Linear trenches or mounds can be seen within the study area and the Mount Frome lime factory's manager's residence occupies land along the study area's southern boundary (circled). Source. AECOM.

[14] NSW Land registry Services. Fol.3862 Vol.104.

Figure 4-10: View of Canal Road, facing north, 8 February 1934. Source. The north-eastern boundary of the study area. (outlined). Source. NSW State Archives. NRS-20224-1-[18/3064]-F71_F219-141

Figure 4-11: View of Canal Road, facing north, 13 September 1934. The north-eastern boundary of the study area. (outlined). Note the clearing of the study area. Source. NSW State Archives. F288 - M.R.183

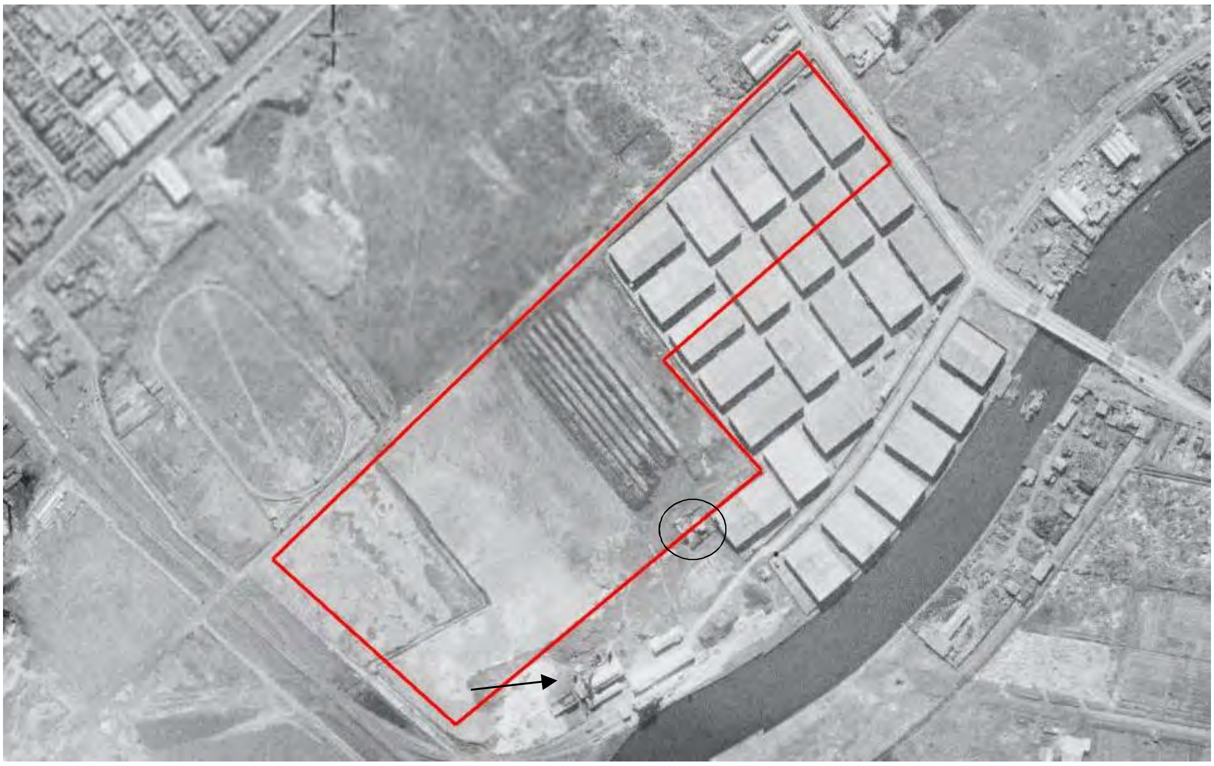

Figure 4-12: 1943 aerial. Note the development of the Government warehouses within the eastern extent of the study area (outlined in red), Mount Frome factory to the southwest (indicated by an arrow) and factory's manager's residence (circled). Source. Sixmaps.

4.3.2 Ongoing commercial and industrial occupation (1949-1990)

In January 1952, three woolstores were destroyed by fire as shown in Figure 4-15 and Figure 4-16. Reports at the time stated the cause was unknown, while 'refrigerators, cars, linoleum, wool and jute were ruined by flames and water'.[15]

Between 1961 and 1970, two of the larger warehouses had been demolished for the construction of a large warehouse facility. This building remains intact at the site and partially occupies land formerly associated with the linear trenches/mounds and the later warehouse footings. All other structures constructed at this time appear to have been demolished, with the exception of a brick barrier wall, which remains intact to the southwest of the building.

The south-eastern boundary of the study area appears to have remained relatively free from warehouse development; rather, it was utilised as a storage depot for containers in 1949 (Figure 4-13). By 1970, a small toilet block was constructed to the northeast of this area, which remains intact. The remaining ground surface in this area has been covered with vegetation and soil over time. By 1990, it appears the western side of this area was grassed over by 1990 (Figure 4-23).

By 1982, eight of the warehouses towards the eastern end of the study area had been demolished for the eventual construction of 'Industrial Constructions' warehouse, which remains intact today and is part of the St Peter's Business Park. On 1 April 1990, an LPG fuel tank exploded at the St Peters Boral site, which destroyed much of the Boral site and damaged at least three of the wool store warehouse buildings. (Figure 4-23).

[15] Store Fires in Sydney (1952, January 11). Barrier Miner (Broken Hill, NSW: 1888 - 1954), p. 2. Retrieved October 30, 2019, from http://nla.gov.au/nla.news-article49232987

Figure 4-13: 1949 aerial showing Government warehouses within the eastern extent of the study area (outlined in red), Mount Frome factory to the southwest (indicated by an arrow) and factory's manager's residence (circled). Source: City of Sydney Archives.

Figure 4-14: 1951 aerial showing Government warehouses within the eastern extent of the study area (outlined in red), Mount Frome factory to the southwest (indicated by an arrow) and factory's manager's residence (circled). Source: City of Sydney Archives.

Figure 4-15: c1952 aerial image showing Government warehouses within the study area, including those destroyed by fire (outlined in red), Mount Frome factory to the southwest (indicated by an arrow) and factory's manager's residence (circled). Source. State Library of NSW.

Figure 4-16: c1952 aerial image showing Government warehouses within the study area, including those destroyed by fire (outlined in red), Mount Frome factory to the southwest

(indicated by an arrow) and factory's manager's residence (circled). Source. State Library of NSW.

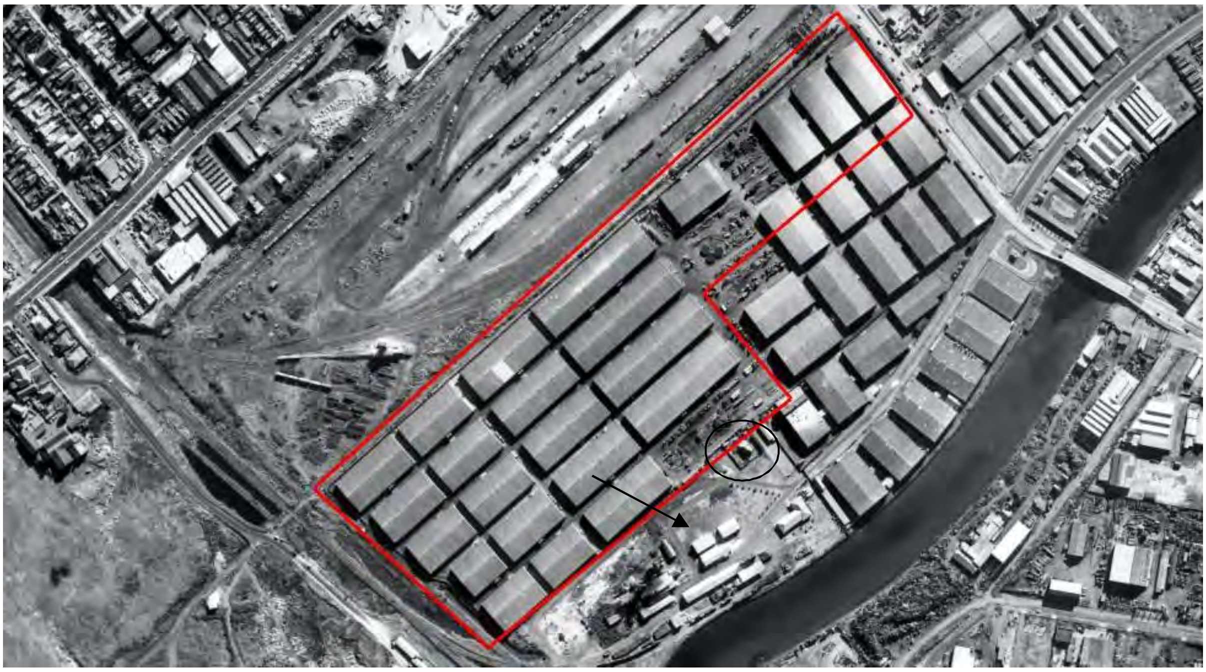

Figure 4-17: Aerial photograph taken in 1961 showing warehouses occupying the study area (outlined in red), Mount Frome factory to the southwest (indicated by an arrow) and factory's manager's residence (circled). Source. WSP.

Figure 4-18: 1970 aerial image showing warehouses occupying the study area (outlined in red), industrial development to the south. Source. AECOM.

Figure 4-19: 1970 aerial image showing development within the study area (outlined in red) at this time. Source. State Library of New South Wales.

Figure 4-20: 1970 aerial image showing development within the study area (outlined in red) at this time. Source. State Library of New South Wales.

Figure 4-21: 1970 aerial image showing development within the study area (outlined in red) at this time. Source. State Library of New South Wales.

Figure 4-22: 1982 aerial showing development within the study area (outlined in red) at this time. Source. AECOM.

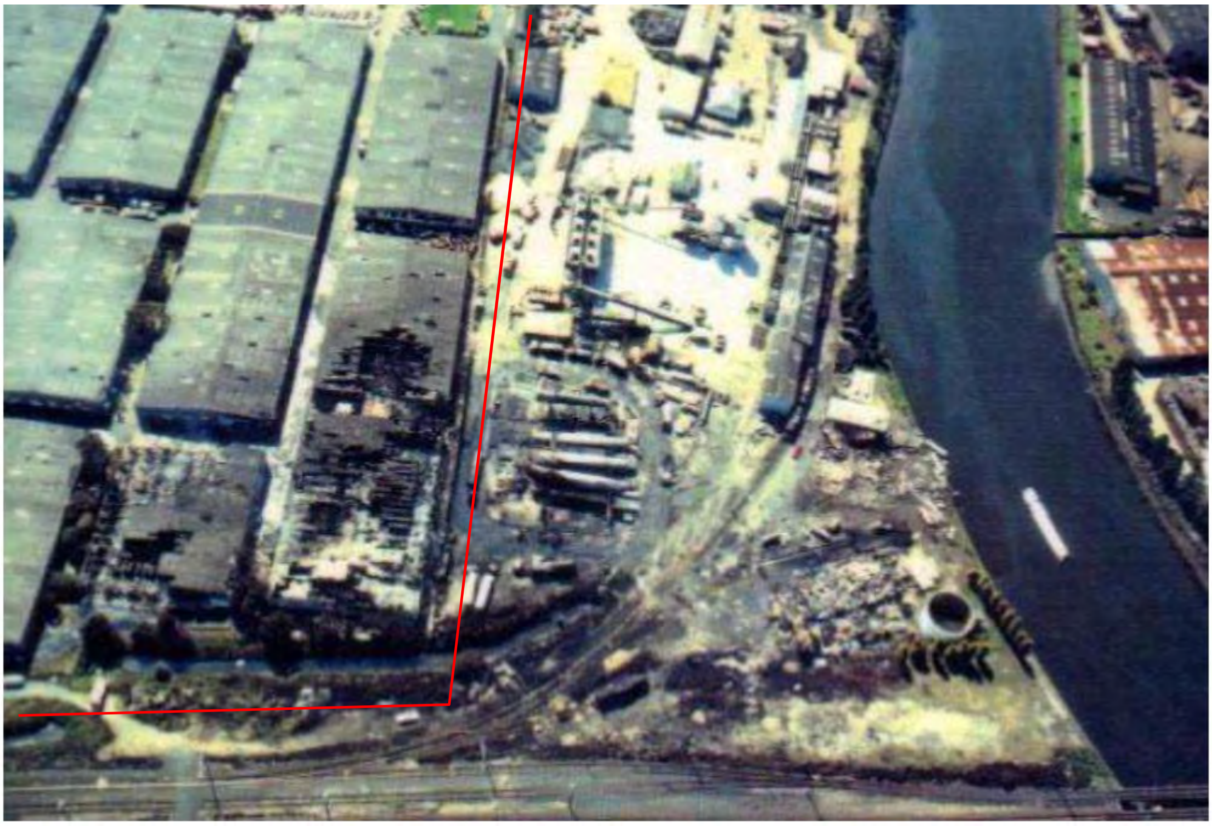

Figure 4-23: 1990 aerial showing warehouses damaged by the LPG fuel tank explosion which destroyed much of the Boral site. Approximate location of study area indicated in red. Source. AECOM.

4.4 Phase 4 – Contemporary land use (1990–present)

4.4.1 Demolition and land fill

Aerial images from 2000 to 2019 depict the changing landscape of the study area. Between 1982 and 2000, the eastern portion (directly north of the 'Industrial Constructions' building) was filled with uncontrolled spoil, reportedly from the former Bunnerong Power Station.[16] These works resulted in two embankments forming to the north east and south west of this area which are still present today within Lot 3 DP 825649 and Lot 4 DP 555771.

The remaining warehouses were demolished by 2005 although the buildings footings were still evident at this time as shown in satellite imagery from 2000 - 2005 (Figure 4-24 - Figure 4-25).

From 2007, the western portion of the study area underwent various stages of utilisation and ground works, including container storage (Figure 4-26) and spoil works, potentially from the adjoining Boral site (Figure 4-28). Following the removal of the warehouses, the remaining landscape was utilised for container storage and spoil works (Figure 4-24 - Figure 4-30). The extent of subsurface excavations required for these activities is unknown, although appears to have been limited to the existing ground surface.

Today the study area is unoccupied and the only evidence of its former occupation by warehouse and industrial activities comprises of concrete slabs and strip footings.

[16] AECOM. 2015. Background Review: proposed Gateway Roadway Alignment, St Peters to Mascot NSW

Figure 4-24: 2000 aerial. Approximate location of study area indicated in red. Source. Google Earth.

Figure 4-25: 2005 aerial. Approximate location of study area indicated in red. Source. Google Earth.

Figure 4-26: 2007 aerial. Approximate location of study area indicated in red. Source. Google Earth.

Figure 4-27: 2009 aerial. Approximate location of study area indicated in red. Source. Google Earth.

Figure 4-28: 2012 aerial. Approximate location of study area indicated in red. Source. Google Earth.

Figure 4-29: 2014 aerial. Approximate location of study area indicated in red. Source. Google Earth.

Figure 4-30: 2018 aerial. Approximate location of study area indicated in red. Source. Google Earth.

5.0 SITE INSPECTION

5.1 Introduction

A site inspection of the study area was carried out on 28 October 2019 by Adele Zubrzycka (Senior Heritage Consultant, Artefact Heritage) and Sophie Barbera (Heritage Consultant, Artefact Heritage). The aim of the inspection was to evaluate the existing environment within the study area and further assess the likelihood that intact and significant archaeological remains associated with European land use from c1830 onwards would survive within the Sydney Airport Northern Lands.

Lot 3 and Lot 4 DP 555771, Lot 3 DP 825649 and Lot 2 DP 802342 were inspected during the site visit. A brief description of each allotment is provided below and the location of allotments is shown in Figure 5-1.

Figure 5-1: Location of lot boundaries within the study area.

5.2 Results

Lot 3 DP 825649 and Lot 4 DP 555771

Lot 3 DP 825649 and Lot 4 DP 555771 are located in the northeast boundary of the study area and bounded by Canal Road to the east, the Cooks River Container Terminal to the north, the St Peters Business Park to the south and Lot 3 DP 555771 and Lot 2 DP 802342 (discussed below) to the west. This area will be used for temporary stockpiling and a utility services corridor for the project.

Lot 3 DP 825649 and Lot 4 DP 555771 comprise of vacant ground currently occupied by grass and various shrubs and trees along their periphery. They occupy a significant rise within the surrounding landscape, by approximately 1 metre. This most likely reflects infill activities documented in Section 4.0 and associated with Phase 3 and 4 land use. Views of the general landscape taken in and outside of Lot 3 DP 825649 and Lot 4 DP 555771 are shown in Figure 5-2 - Figure 5-5.

No evidence of previous land use was identified in the area during the inspection, however, isolated patches of sands containing estuarine deposits such as shells were noted in exposed ground surfaces throughout the property, as shown in Figure 5-6 and Figure 5-7. Considering the land use history of the area and size of shells, these are likely to represent redeposited, natural estuarine materials associated with Sheas Creek.

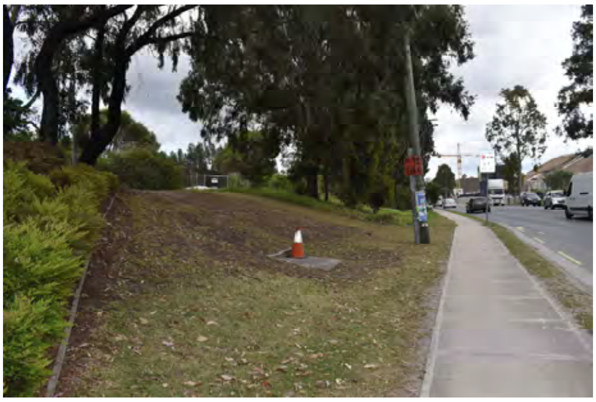

Figure 5-2: View north along Canal Road. Lot 3 DP 825649 and Lot 4 DP 555771 are to the left. Note the variation in height between the road corridor and study area.

Figure 5-3: View east towards Lot 3 DP 825649 and Lot 4 DP 555771 from Lot 2 DP 802342. Note the significant rise within the Lot 3 DP 825649 and Lot 4 DP 555771 portion of the study area.

Figure 5-4: View west towards the Cooks River Container Terminal and Lot 3 DP 555771 and Lot 2 DP 802342 from Lot 3 DP 825649 and Lot 4 DP 555771.

Figure 5-5: Example of the existing landscape within Lot 3 DP 825649 and Lot 4 DP 555771. Note trees along its periphery.

Figure 5-6: Example of a redeposited estuarine deposits within Lot 3 DP 825649 and Lot 4 DP 555771.

Figure 5-7: Detail of bi-valve shell associated with redeposited estuarine deposits.

Lot 3 DP 555771 and Lot 2 DP 802342

Lot 3 DP 555771 and Lot 2 DP 802342 are located along the southern and western boundaries of the study area. They are bounded by Lot 3 DP 825649 and Lot 4 DP 555771 to the east, the Cooks River Container Terminal to the north, Botany Rail Line to the west and Boral Concrete to the south. These areas will be used for temporary stockpiling, a compound site, utility services corridors and a flood storage basin for the project.

Land within Lot 3 DP 555771 and Lot 2 DP 802342 comprises of vacant ground with surfaces varying from concrete slab, sealed/unsealed bitumen, compacted gravel and sandy fill. Concrete slab surfaces represent evidence of original warehouse footings and the later industrial uses of the allotments (discussed in Section 4.0). Views of the general landscape taken in and outside of Lot 3 DP 555771 and Lot 2 DP 802342 are shown in Figure 5-8 - Figure 5-21.

With the exception of concrete slabs and strip footings, no evidence of early land use was identified during the site inspection. However, a sandy fill deposits occupying land within the north-eastern boundary of Lot 3 DP 555771 and Lot 2 DP 802342 was found to contain domestic and commercial waste including ceramics, bottle glass, bricks and animal bones, as shown in Figure 5-15 - Figure 5-17. These items are likely from the late 1800s to the early 1900s. The provenance of these materials is unknown and they most likely represent a secondary deposit that has been removed from its original context redeposited in the study area. These types of deposits generally cannot be attributed to a person or place. Therefore, they are unlikely to contain archaeological research significance.

An area along the south-eastern boundary of Lot 2 DP 802342 was also inspected for the project, this is shown in Figure 5-18 to Figure 5-21 and will be used as a compound site. It currently comprises of vacant ground occupied by grass, shrubs and a modern brick building (c1970) formerly used as a toilet block as shown in Figure 5-18 - Figure 5-21. The southern edge of this area was occupied by the Mount Frome lime factory manager’s residence. No evidence of this was identified during the inspection.

Figure 5-8: View west towards land occupied by Lot 3 DP 555771 and Lot 2 DP 802342 and the Botany Rail Line.

Figure 5-9: View northwest towards land occupied by Lot 3 DP 555771 and Lot 2 DP 802342 and the Cooks River Container Terminal.

Figure 5-10: View east towards land occupied by Lot 3 DP 555771 and Lot 2 DP 802342. The Cooks River Container Terminal is to the left and Boral Concrete to the right.

Figure 5-11: General view of land within the northwest corner of Lot 2 DP 802342 proposed for a flood storage basin. Looking north towards the Cooks River Container Terminal.

Figure 5-12: Example of remnant concrete slabs and strip footings along northern boundary of the Cooks River Container Terminal associated with former warehouses.

Figure 5-13: Example of compacted gravel surface within the central extent of Lot 2 DP 802342.

Figure 5-14: Example of loose bitumen and gravel surfaces within the south-western extent of Lot 2 DP 802342.

Figure 5-15: Example of sandy fill occupying land within the north-eastern boundary of Lot 3 DP 555771 and Lot 2 DP 802342. This contains domestic and commercial waste including ceramics, bottle glass, bricks and animal bones.

Figure 5-16: Clay marble and animal tooth found in loose sandy fill within the north-eastern boundary of Lot 3 DP 555771 and Lot 2 DP 802342.

Figure 5-17: 'Bakewell' brick within loose sandy fill along the north-eastern boundary of Lot 3 DP 555771 and Lot 2 DP 802342.

Figure 5-18: View west along Burrows Road. Land within Lot 2 DP 802342 which will be used for a construction compound is visible to the left.

Figure 5-19: Example of ground surface within Lot 2 DP 802342 which will be used for a construction compound.

Figure 5-20: View west towards the eastern boundary of Lot 2 DP 802342 which will be used for a construction compound. A modern toilet block dating to c1970 can be seen in the midground.

Figure 5-21: Detail of the c1970 toilet block building.

6.0 ASSESSMENT OF ARCHAEOLOGICAL POTENTIAL

6.1 Introduction

This section assesses historical archaeological potential within the study area using information derived from historical and contemporary land use, early maps and plans, archival research and an analyses of previous ground disturbance. Definitions for archaeological potential used in this report are outlined in Table 2-2.

6.2 Previous investigations

A number of archaeological, geotechnical and contamination investigations and assessments have been conducted within, and in the vicinity, of the study area. The results of these investigations provide insights into the nature, presence and survivability of potential archaeological resources in the study area.

6.2.1 Archaeological investigations

6.2.1.1 Godden Mackay Logan (GML) 2003 – Alexandra Canal and Sheas Creek, Alexandria. Proposed Cycle and Pedestrian Path Archaeological Assessment.[17]

GML was commissioned to undertake a non-indigenous Archaeological Assessment for the proposed Alexandra Canal Cycle and Pedestrian Path, in order to identify any non-Aboriginal archaeological constraints associated with the proposed development. The subject site of the report is located approximately 100 metres southwest from the study area. The report found that their study area was likely to contain introduced fill deposits associated with land reclamation works for the construction of the Alexandra Canal in the 1890s.

The report noted that archaeological material associated with the occupation and development of the area prior to land reclamation may be present below the extensive deposits of introduced fill, although this material was considered unlikely and may have been previously disturbed.

Conclusions

Based on the above findings, land along the current Alexandra Canal alignment is likely to be occupied by redeposited fills used to reclaim and level surrounding landforms.

These findings suggest that evidence of land modification and levelling events may exist in areas once occupied by Sheas Creek and its associated mudflats and mangroves. As no residential occupation is known to have occurred in the study area, it is unlikely that remains associated with structural features such as footings or wells would be present.

[17] GML, 2003. Alexandra Canal and Sheas Creek, Alexandria. Proposed Cycle and Pedestrian Path Archaeological Assessment. Report prepared for South Sydney Development Corporation.

6.2.2 Contamination and geotechnical investigations

Four reports prepared for land within and immediately next to the study area were available for review:

6.2.2.1 HLA, 2006 – Baseline Contamination and Limited Scope, Due Diligence Assessment, South Burrows Road, St Peters[18]

HLA-Enviroscience (HLA, now part of AECOM) was engaged to prepare a historical site review, literature review and sampling from 27 test pits across Lot 2 DP802342, South Burrows Road, St Peters. Lot 2 DP802342 is located within the south-western extent of the current study area, to the east of the Botany Rail Line and presently occupied by Boral Concrete.

The report found that:

- Land within Lot 2 DP802342 may have been filled with ash from the Bunnerong Power Station as well as bricks and other rubble
- Land within Lot 2 DP802342 has been occupied by commercial establishment from 1925 onwards, utilised for workshop activities and the storage of hydrocarbon fuels may have occurred within the lot boundary or east of the site
- Insecticide powder may have been observed below a warehouse within the vicinity of Lot 2 DP802342
- Previous site investigations found the site was used for commercial/industrial purposes, which may have resulted in the placement of uncontrolled fill materials on parts of the site that contain asbestos cement fragments. There was also evidence of potential spillage of hydrocarbon fuels into onsite drainage pits and on surface soils
- Seepage of tar like material was observed at 1.5 metres below ground level in one test sampling location within the southwest portion of Lot 2 in DP 802342 (outside the current study area).

6.2.2.2 AECOM. 2015 – Background Review: Proposed Gateway Roadway Alignment, St Peters to Mascot, NSW.[19]

AECOM Australia Pty Ltd (AECOM) was engaged by the WestConnex Delivery Authority to undertake a preliminary contamination assessment of properties located close to the proposed Sydney Gateway project road alignment, in suburbs of Tempe and St Peters in January 2015. This was carried out by a review of previous contamination studies. Land within the current study area was included in the review and referred to as the 'eastern area'.

The 2006 HLA Due Diligence Assessment (discussed above) was reviewed for their assessment. The review found that:

- The HLA 2006 Due Diligence Assessment for land within Lot 2 DP 802342 concluded that it contained elevated concentrations of Polycyclic Aromatic Hydrocarbons (PAH) and heavy fraction Total Petroleum Hydrocarbons (TPH). It also contained potential areas of discrete tar deposits and Asbestos Containing Material (ACM) fragments
- The current study area had potential to contain Petroleum Hydrocarbons in areas occupied by former and current fuel storage structures

[18] HLA. 2006. Baseline Contamination and Limited Scope, Due Diligence Assessment, South Burrows Road, St Peters, NSW
[19] AECOM. 2015. Background Review: Proposed Gateway Roadway Alignment, St Peters to Mascot NSW. Report prepared for WestConnex Delivery Authority (WDA).

- There is a high likelihood for significant contamination to be present in Lot 2 DP 802342 due to uncontrolled land fill activities and a long history of industrial land use.

6.2.2.3 AECOM, 2018 – Sydney Gateway Program − Northern Lands Temporary Stockpiling Review of Environmental Factors (REF): Contamination Assessment.[20]

AECOM was engaged by Roads and Maritime to undertake soil contamination investigations within the Sydney Airport Northern Lands (the current study area) for the Sydney Gateway project Northern Lands Temporary Stockpiling REF. This required the installation of five shallow and deep groundwater monitoring wells and seven boreholes within the current study area.

The report found that:

- Ground surfaces within the central and western portions of the study area primarily comprise of asphalt, concrete or sandy fill materials. These extend to between approximately 1.1 - 1.85 metres below ground level and overly clay and sand.
- The eastern portion of the study area contains a raised grass embankment located in Lot 3 DP 825649 and Lot 4 DP 555771. Fill materials in this embankment extend to depths of approximately 3.5 - 5.6 metres below ground level and overly sand, clay or estuarine deposits.
- Fill materials within the current study area were observed to contain anthropogenic material including fragments of tile, rubble, concrete, brick, coke slag, pieces of iron and asphaltic type materials. These were underlain by natural clay and/or natural sand to approximately 14 metres below ground level. Highly weathered shale was also identified.
- A sulphurous smell was recorded in natural minerals (between 1.5 metres below ground level and 11 metres below ground level), with odour recorded to be distinctive at SG-BH-113 (Lot 4 DP 555771) and GW2d-A (Lot 2 DP 802342). Shell fragments were frequently recorded in the natural material.
- Fragments of asbestos cement sheet were recorded on the surface of Lot 3 DP 555771 and Lot 2 DP 802342. Asbestos materials were not recorded in any of the report bore logs. Soil results from the concurrent investigation recorded that one or more heavy metals were present in soil samples. All results were below the Airports (Environment Protection) Regulations 1997 criteria.
- Contamination issues identified by the assessment were primarily related to historic industrial and commercial land use

Conclusions

The results of contamination investigations support known historical land use of the study area which has involved industrial and commercial activities since the early 20th century. These have gradually resulted in contamination of soils and ground water over time which have been found to contain heavy metals, ACM, PAH and TPH. PAHs and TPHs have likely leached into underlying deposits.

Fill materials across the site range in depth from 1 metre in the western extent of the study area to 4 metres in the eastern extent of the study area. These materials overlie natural clay, sand and estuarine deposits.

[20] AECOM, 2018. Sydney Gateway project, Stage 2 Investigation - soil contamination report.

6.3 Previous impacts

Construction of the Alexandra Canal in the late 19th century involved land reclamation and levelling events. Whether these removed or preserved evidence of earlier land use is not known. If archaeological remains of earlier land use within the study area were preserved, they would be associated with an embankment wall shown in Figure 4-4. However, the survival of this feature within the archaeological record is likely to be limited to ephemeral evidence such as redeposited estuarine deposits, sands and clays.

Land use in the 20th century is likely to have resulted in localised excavations to accommodate the various Government woolstore warehouses in the study area. These warehouses would have been serviced by utilities including wastewater and stormwater drainage channels. The establishment of these service corridors and warehouse slabs would have resulted in localised excavations which may have removed ephemeral or fragile evidence of previous land use such as the Phase 3 linear shaped features shown in Figure 4-9, Figure 4-12 and Figure 4-13, Phase 2 reclamation for the Alexandra Canal and the Phase 1 embankment wall.

6.3.1 Summary of previous impacts

Due to the extent and volume of development in the study area between c1925 and 1990, potential archaeological remains associated with 19th century land use such as a Phase 1 embankment wall are likely to have been disturbed, removed or truncated.

However, evidence of land reclamation activities associated with construction of the Alexandra Canal may survive below evidence of 20th century structures.

6.4 Conclusion

Based on the above findings, the study area has been subject to several phases of land use over time and has undergone extensive commercial and industrial development since c1925. Prior to this it was not used for any significant activities, with the exception of the construction of an embankment wall (Phase 1) and land reclamation (Phase 2).

Based on these impacts and the nature of potential archaeological remains in the study area, evidence of Phase 1 occupation would be ephemeral, fragile or difficult to interpret in the archaeological record. However, evidence of land reclamation for the Alexandra Canal in the form of imported fill may survive. This has been assessed as not containing archaeological significance in Section 7.0 below.

6.4.1 Overview of archaeological potential

Table 6-1 provides an overview of the potential archaeological remains that may survive in the study area and their archaeological potential.

Phase 4 occupation has not been included in this table due to the modern and ubiquitous nature of materials associated with this land use phase.

Table 6-1: Predicted archaeological remains

Phase	Potential archaeological remains	Potential
Phase 1 1796-1870	Embankment wall	**Nil**
Phase 2 1870-1919	Redeposited estuarine deposits and imported fill associated with land reclamation and modification for the Alexandra Canal	**Low**

Phase	Potential archaeological remains	Potential
Phase 3 **1946-1990**	Evidence of concrete slabs and strip footings associated with Government woolstore warehouses Evidence of modern services	**High** **High**

7.0 ASSESSMENT OF ARCHAEOLOGICAL SIGNIFICANCE

Heritage NSW, Department of Premier and Cabinet (Heritage DPC) (formerly NSW Heritage Division of the Office of Environment and Heritage (OEH)) issued a new set of guidelines in 2009: *Assessing Significance for Historical Archaeological Sites and 'Relics.'* These call for broader consideration of multiple values of archaeological sites beyond their research potential. As a result, it is recommended that archaeological significance assessments against all the NSW heritage significance criteria be carried out.

In order to adopt these guidelines, the significance of any potential archaeological remains within the study area has been assessed against the NSW Heritage Criteria in Table 7-1.

Table 7-1: Significance assessment for archaeological remains within the study area.

Criteria	Discussion
A - Historical Significance *An item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area)*	Potential archaeological remains within the study area would represent Phase 1 and 2 landscape modification activities associated with the management and formalisation of Sheas Creek (embankment wall and Alexandra Canal construction) and 20th century industrial and commercial activities associated with the Mount Frome lime factory and later Government woolstore warehouses. Remains of a 19th century embankment wall and land reclamation would have historical significance for their associations with early land formalisation activities in St Peters. These allowed for ongoing commercial and industrial land development, activities the area continues to be known for and would reach the threshold for significance under this creation at a local level. However, the likelihood for archaeological evidence of embankments to survive or be identifiable within the study area is negligible and they, alongside fill materials associated with construction of the Alexandra Canal would likely ephemeral in nature and difficult to identify in the archaeological record alone. Therefore, their significance would not be met through their archaeological remains within the study area. Remains of 20th century linear features and woolstore footings (Phase 3) would represent industrial and commercial land use in St Peters, activities that shaped the area during the post-war period. However, their significance would not be met through their archaeological remains alone, as they would be difficult to interpret and recognise via their subsurface remains. Therefore, they do not meet the threshold for significance under this criterion. **Intact or recognisable archaeological remains associated with Phases 1 could reach the threshold for significance under this criterion at a local level. However, the likelihood of this occurring is negligible.** **Potential archaeological remains associated with Phase 2 and 3 are unlikely to reach the threshold for significance under this criterion.**
B - Associative Significance *an item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history*	There is no evidence to suggest that potential remains would be directly associated with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history **Potential archaeological remains associated with Phases 1, 2 and 3 would not reach the threshold for significance under this criterion.**

Criteria	Discussion
C – Aesthetic Significance *an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW*	Although it is recognised that exposed *in situ* archaeological remains may have distinctive/attractive visual qualities, it is unlikely that these potential features within the study area would be considered 'important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW' **Potential archaeological remains associated with Phases 1, 2 and 3 would not reach the threshold for significance under this criterion.**
D – Social Significance *an item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons*	There is no evidence to suggest that predicted remains would have strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons. The significance of such land use activities is more likely to be met through surviving structures and landscapes. **Potential archaeological remains associated with Phases 1, 2 and 3 would not reach the threshold for significance under this criterion.**
E – Research Potential *an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history*	It is unlikely that potential archaeological remains associated with Phase 1 and 2 landscape modification activities and Phase 3 linear features and woolstore footings would contain research significance as they are unlikely to yield information not readily available in photographs, historical descriptions and archival material. Therefore, they would not reach this threshold of significance at a local or state level. **Potential archaeological remains associated with Phases 1, 2 and 3 are unlikely to reach the threshold for significance under this criterion.**
F – Rarity an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history	Potential archaeological remains would not be considered to possess uncommon, rare or endangered aspects of NSW's cultural or natural history as they would represent relatively common forms of landscape modification activities and 20th century construction methods. **Potential archaeological remains associated with Phases 1, 2 and 3 would not reach the threshold for significance under this criterion.**
G – Representative *an item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places*	Archaeological evidence of former activities may demonstrate some of the principal characteristics of a class of NSW's cultural places or events. However, it is not anticipated that remains would be 'important in demonstrating the principal characteristics' of the place or activity they represent, and therefore, potential remains are unlikely to reach the local or state significance threshold for representativeness. **Potential archaeological remains associated with Phases 1, 2 and 3 would not reach the threshold for significance under this criterion.**

7.1 Archaeological statement of significance

Potential archaeological remains associated with Phase 1 occupation would include 19th century landscape modification activities associated with the management and formalisation of Sheas Creek through the construction of an embankment wall along the creek's mudflats. Although evidence of the embankment would contain historical significance due to their associations with early landscape modification and water management activities in St Peters, the likelihood of finding intact or recognisable remains associated with the item is negligible.

Potential archaeological remains associated with Phase 2 imported fills and land reclamation for the Alexandra Canal are unlikely to reach the threshold for local or state significance under the NSW Heritage Criteria. They would represent secondary deposits that are unlikely to yield new information about the canal's construction or significant evidence relating to landscape modification techniques.

Potential archaeological remains associated with Phase 3 occupation would include 20th century industrial and commercial activities associated with the Mount Frome lime factory and later Government woolstore warehouses. These would not meet the threshold of local or state significance under the NSW heritage criteria as they would be ubiquitous in nature and their significance more likely to be met through surviving examples of these items and written histories rather than their archaeological remains.

The following table provides a summary of the archaeological potential and significance of the study area based on findings outlined in Section 6.4.1 and Section 7.0.

Table 7-2: Summary of archaeological potential and significance for the study area.

Phase	Archaeological potential	Archaeological significance
1 (1788 – 1870)	**Nil**	Local, if intact and recognisable remains were identified
2 (1870 – 1919)	**Low**	Unlikely to reach the threshold of local or State significance
3 (1919 – 1990)	**High**	Unlikely to reach the threshold of local or State significance

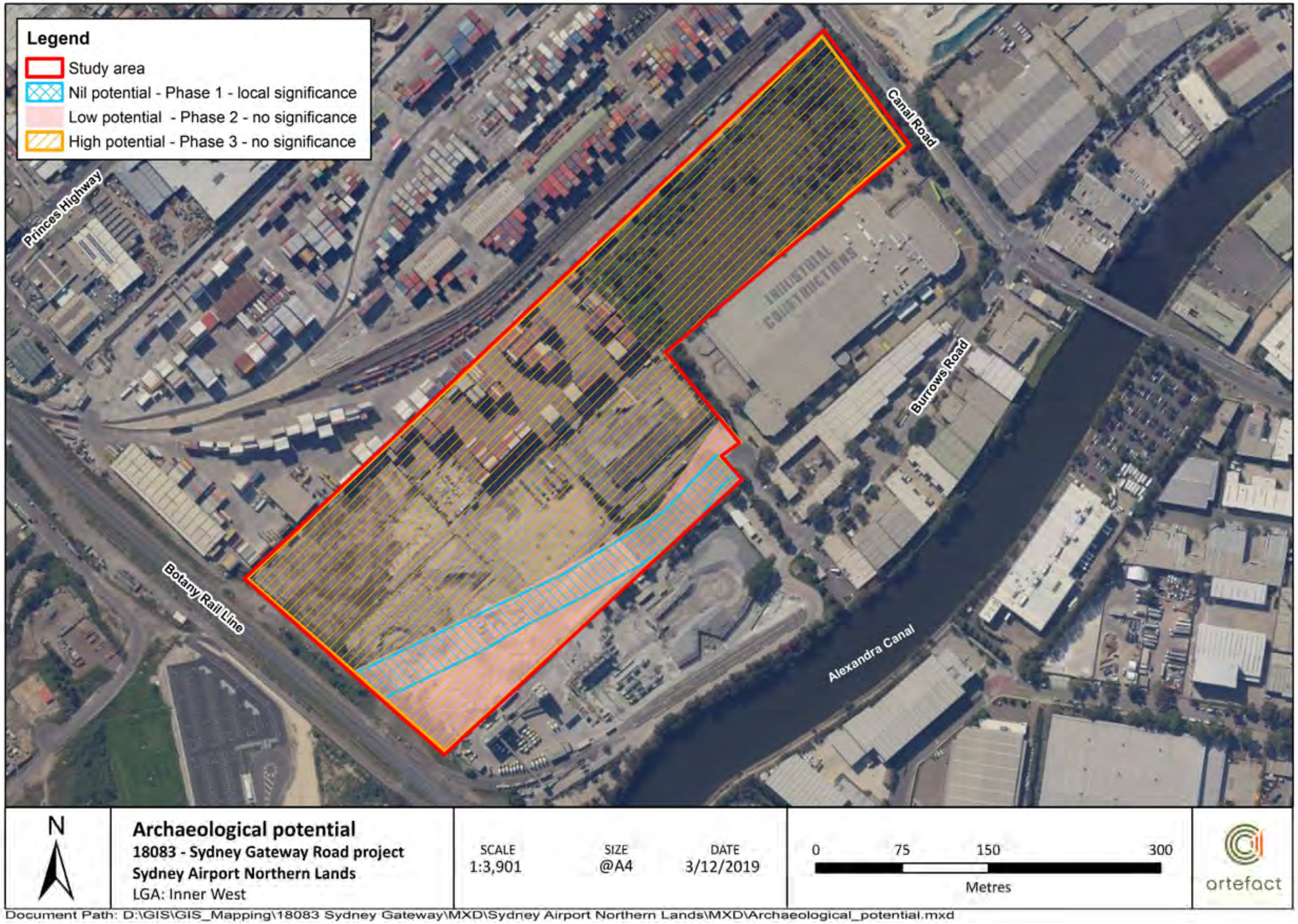

Figure 7-1: Archaeological potential and significance within the study area

8.0 ARCHAEOLOGICAL IMPACT ASSESSMENT

8.1 Proposed works

Proposed works for the Sydney Gateway Road project within the study area with the potential to impact archaeological remains would consist of the following:

- Site establishment, including removal of structures associated with the Visy recycling facility and Boral concrete recycling facility
- Installation of retaining walls and drainage infrastructure
- Piling for road overpass abutments
- Construction of a flood mitigation basin.

8.2 Statement of archaeological impact

The proposed works would involve deep subsurface excavations in areas once occupied by Phase 3 Government woolstore warehouses and linear features associated with the Mount Frome lime factory. These excavations are required for the established of a flood storage basin and utility corridors. There is high potential for archaeological remains associated with these activities to survive, however they would not reach the threshold for local or state significance under the NSW heritage criteria. No activities are known to have occurred in this area prior to c1919.

Other subsurface excavations would occur along the southern boundary of the study area, in Lot 2 DP 802342. This area was occupied by an embankment during Phase 1 occupation and reclaimed for the Alexandra Canal construction during Phase 2 occupation. Impacts to potential archaeological remains within this area are unlikely to occur as there is negligible potential for evidence of Phase 1 occupation to survive and low potential for evidence of Phase 2 occupation to survive. In addition, excavation works in this area would reach an average depth of 300 millimetres,

Table 8-1: Summary of archaeological potential, significance and heritage impact for the study area.

Phase	Potential	Significance	Impact
1 (1788 – 1870)	**Nil**	Local	Nil
2 (1870 – 1919)	**Low**	Unlikely to reach the threshold of local or State significance	Nil
3 (1919 – 1990)	**High**	Unlikely to reach the threshold of local or State significance	Nil

9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

This Historical Archaeological Assessment has made the following conclusions:

- The study area has been subject to four occupation phases:
  - **Phase 1** (circa 1796–1870): Construction of an embankment wall along Sheas Creek
  - **Phase 2** (1870–1919): Reclamation activities associated with the establishment of the Alexandra Canal
  - **Phase 3** (1919–1990): Construction of linear shaped features for the Mount Frome lime factory and Government woolstore warehouses
  - **Phase 4** (1990–present): Commercial activities and land fill events
- Based on known land use in the study area, Phase 3 and 4 occupation activities are likely to have disturbed, truncated or removed potential archaeological remains associated with Phase 1 and 2 occupation
- Land use that occurred during Phase 3 and 4 involved commercial and industrial activities and land fill events that have contaminated soils and groundwater within parts of the study area
- Based on findings outlined in this report, the study area contains the following archaeological potential and heritage significance:
  - **Phase 1** (circa 1796–1870): Nil potential for intact or recognisable archaeological remains of an embankment wall to survive within the study area. Archaeological remains of the embankment would likely be heavily disturbed and ephemeral in nature. Therefore, they would not reach the threshold for archaeological significance at a local or state level.
  - **Phase 2** (1870–1919): Low potential for archaeological remains associated with Phase 2 land reclamation activities. Archaeological evidence of these activities would not reach the threshold for archaeological significance at a local or state level.
  - **Phase 3** (1919–1990): High potential for archaeological evidence associated with Phase 3 industrial and commercial activities associated with the Mount Frome lime factory and later Government woolstore warehouses. These would not reach the threshold for archaeological significance at a local or state level.
- Based on these findings, the proposed works will not impact locally or state significant archaeological remains and a HAARD and Excavation Methodology is not required for the project.

9.2 Recommendations

Based on these conclusions, the following recommendations have been made:

- The Roads and Maritime *Standard Management Procedure for Unexpected Heritage Items* (2015) would be implemented during all excavation works

- All relevant staff, contractors and subcontractors must be made aware of statutory obligations for heritage under the *NSW Heritage Act 1977* and best practice guidelines as outlined in the *Burra Charter* (Australia ICOMOS 2013) to ensure no significant unexpected archaeological remains are impacted during the proposed works. This would be implemented through a heritage induction carried out prior to works commencing and throughout the works program.

- If human remains, or suspected human remains, are found during the works, all work in the vicinity must cease, the site should be secured, and the NSW Police and Heritage Council must be notified under the Roads and Maritime *Standard Management Procedure for Unexpected Heritage Items* (2015).

10.0 REFERENCES

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Appendix G
Revised noise baseline monitoring data

Noise Monitoring Location	L.01
Noise Monitoring Address	**Princes Highway, St Peters**

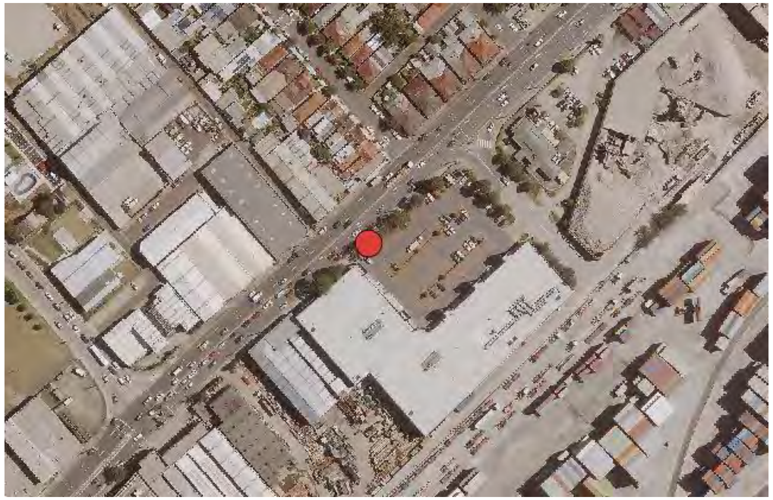
Logger Device Type: Svantek 957, Logger Serial No: 20675
Sound Level Meter: Brüel and Kjær 2250L, Sound Level Meter Serial No: 2414604

Ambient noise logger deployed at roadside, outside carpark of commercial address Princess Highway, St Peters. Logger located on roadside with direct view of Princess Highway.

Attended noise measurements indicate the ambient noise environment at this location is dominated by steady-state road traffic on Princes Highway. Heavy vehicle passbys and local fauna (birds) also contribute to the noise at this location.

Measured Attended Noise Levels (LAmax):
30/10/18: Steady light vehicle traffic on Princes Highway: 72-78 dBA, heavy vehicles: 80-81 dBA, birds 78, 89 dBA

Map of Noise Monitoring Location



Ambient Noise Logging Results – NPfI Defined Time Periods

Monitoring Period	Noise Level (dBA)			
	RBL	LAeq	L10	L1
Daytime	65	75	78	84
Evening	62	74	77	82
Night-time	53	72	75	80

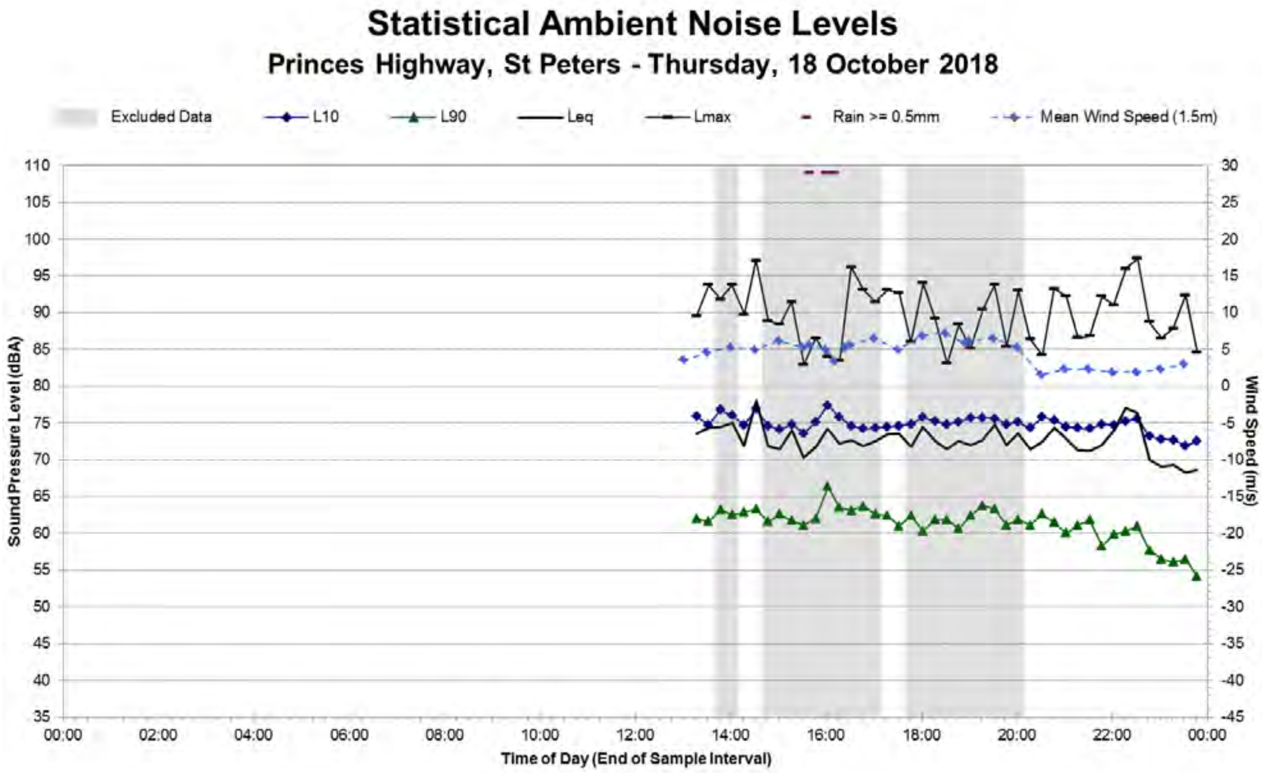
Ambient Noise Logging Results – RNP Defined Time Periods

Monitoring Period	Noise Level (dBA)	
	LAeq(period)	LAeq(1hour)
Daytime (7am-10pm)	75	76
Night-time (10pm-7am)	72	75

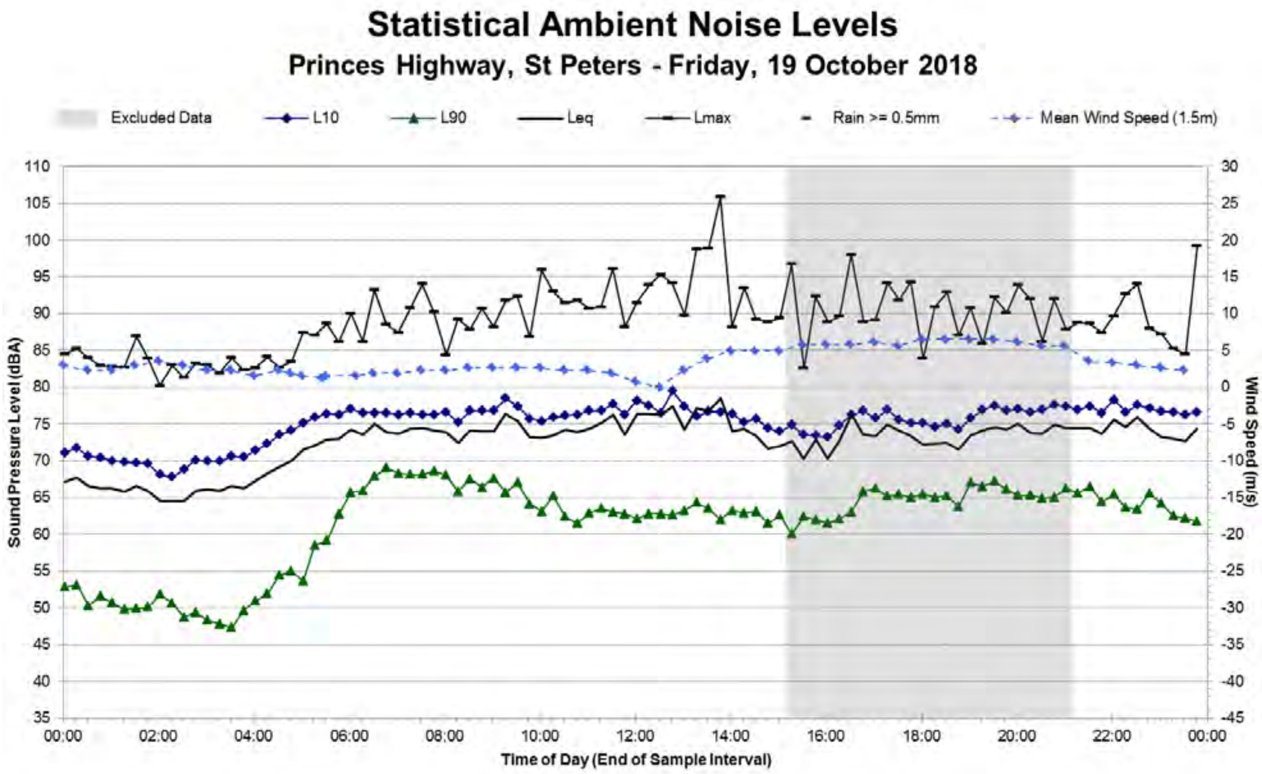
Attended Noise Measurement Results

Date	Start Time	Measured Noise Level (dBA)		
		LA90	LAeq	LAmax
30/10/18	14:05	66	77	99

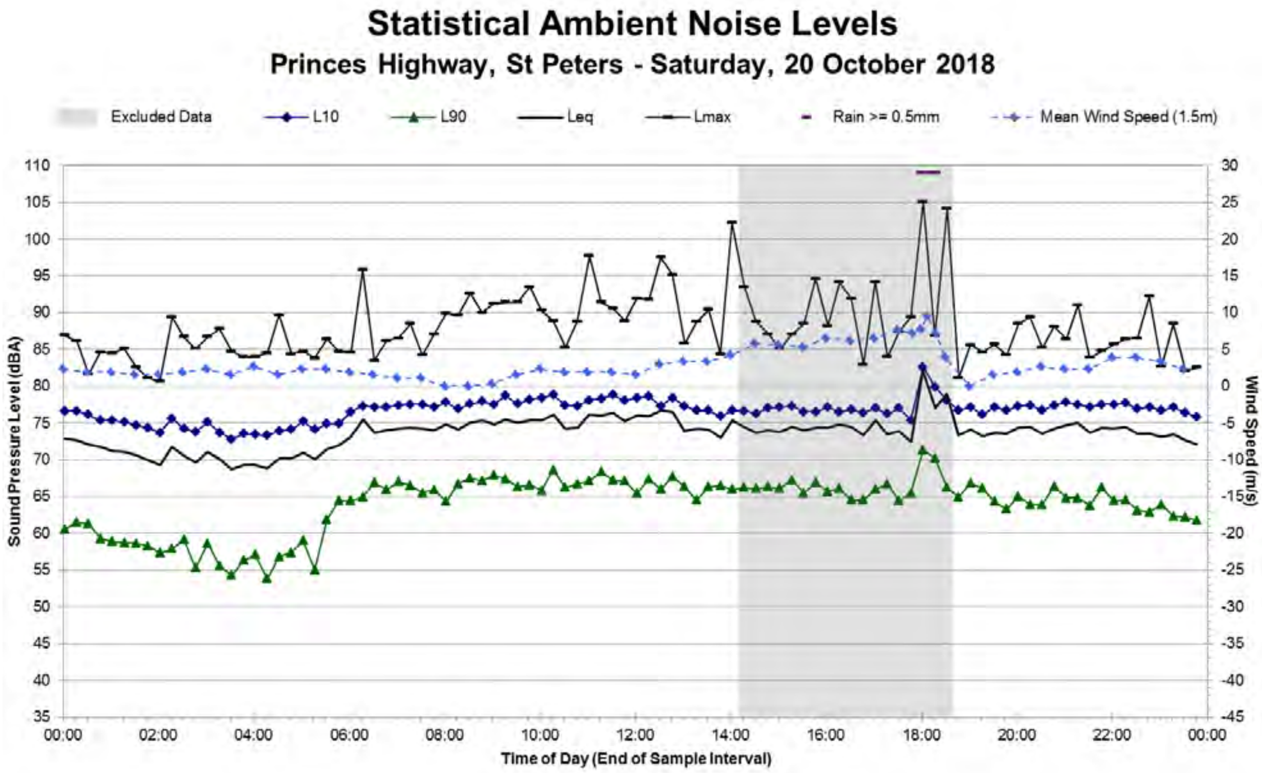
Photo of Noise Monitoring Location



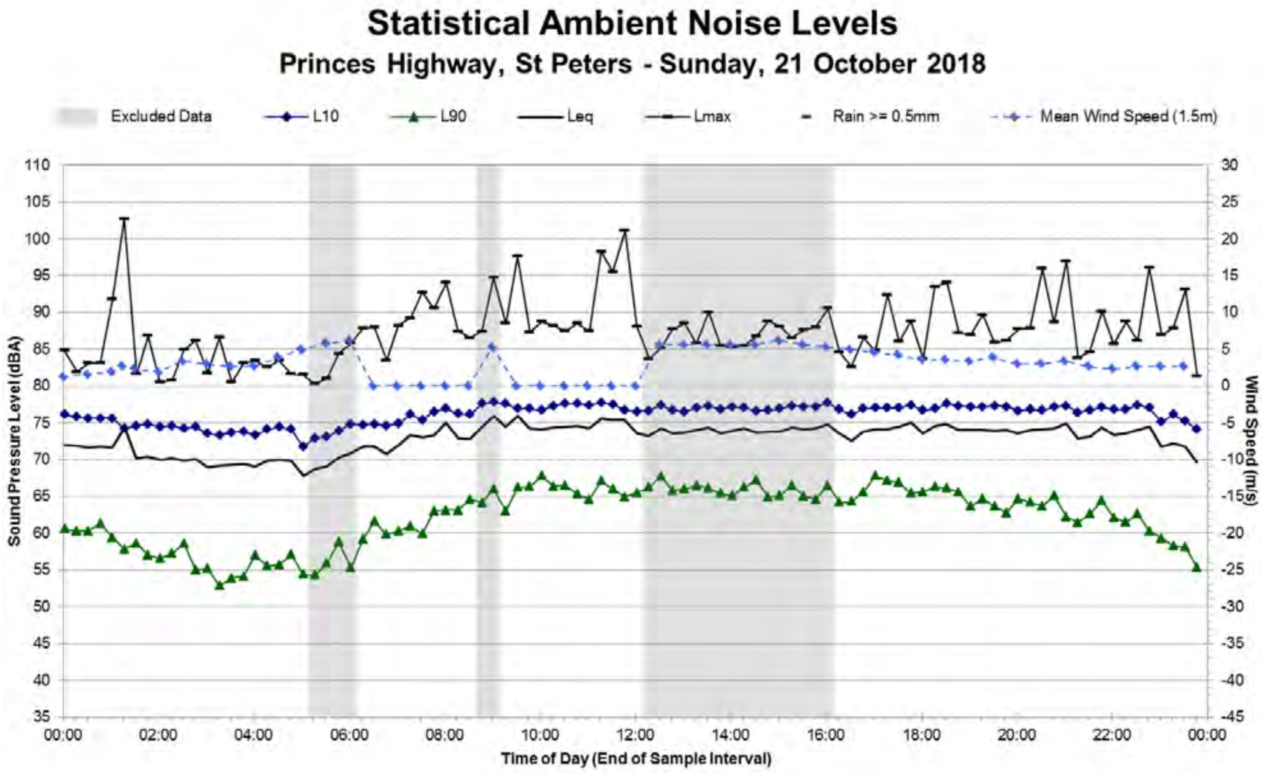
Statistical Ambient Noise Levels
Princes Highway, St Peters - Thursday, 18 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)



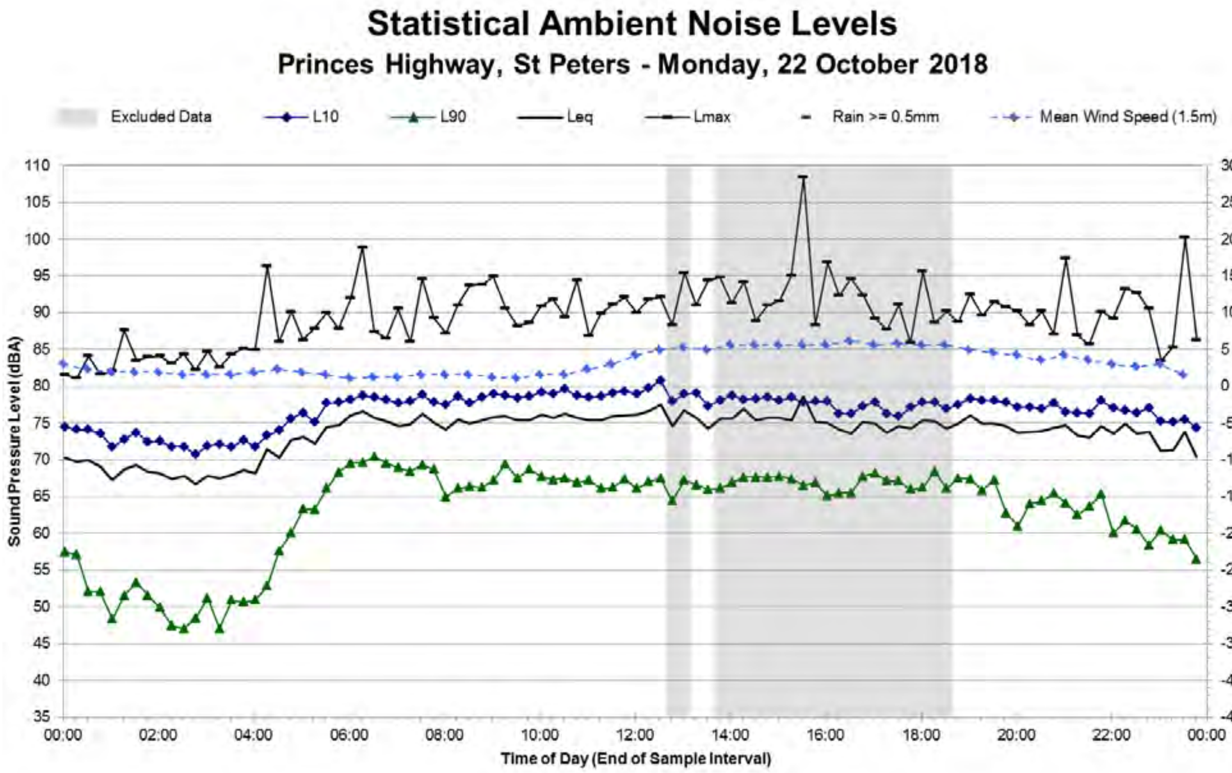
Statistical Ambient Noise Levels
Princes Highway, St Peters - Friday, 19 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

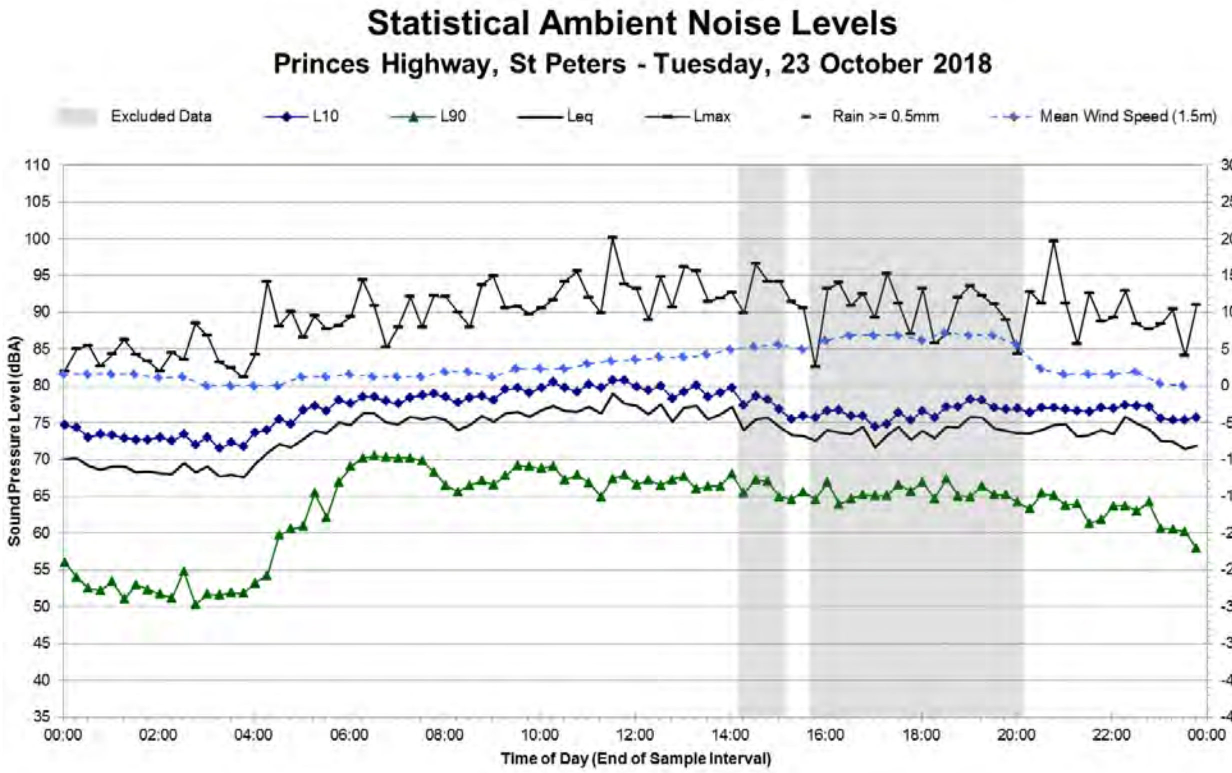


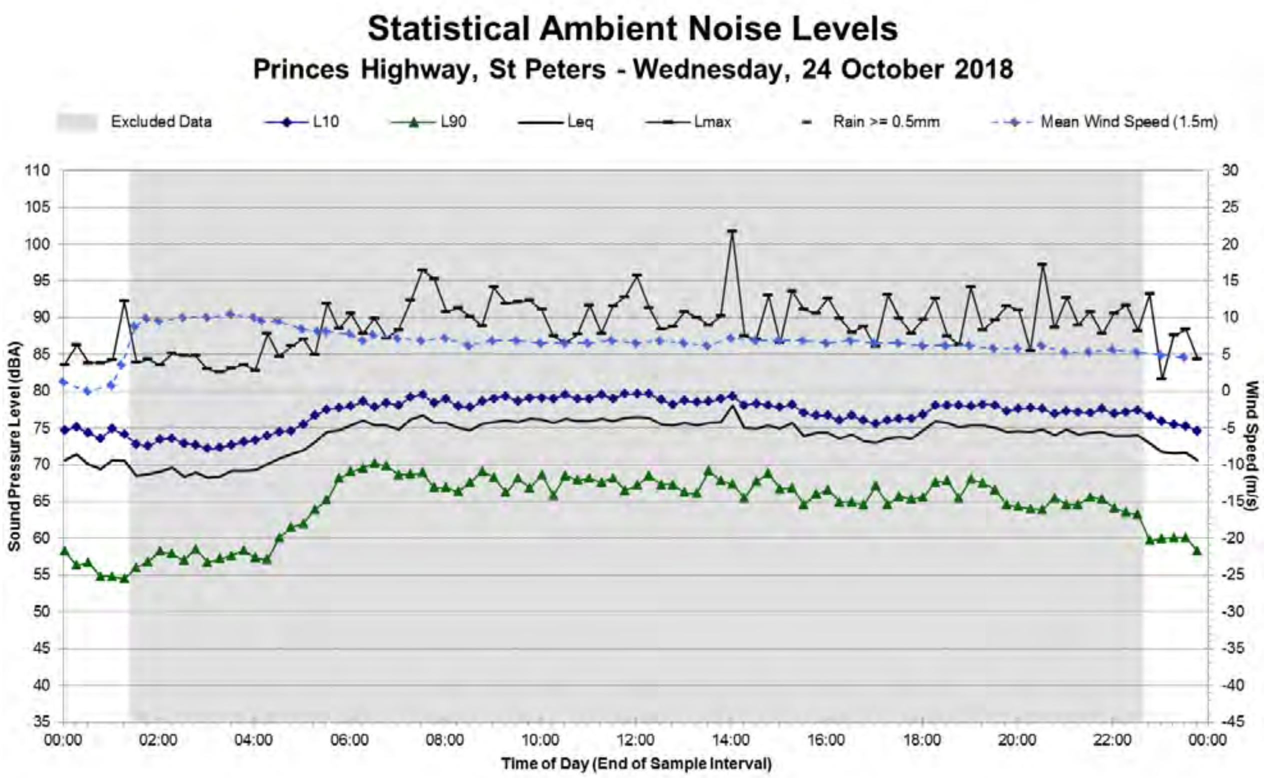
Statistical Ambient Noise Levels
Princes Highway, St Peters - Saturday, 20 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)



Statistical Ambient Noise Levels
Princes Highway, St Peters - Sunday, 21 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Princes Highway, St Peters - Monday, 22 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Princes Highway, St Peters - Tuesday, 23 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Princes Highway, St Peters - Wednesday, 24 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)
110
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
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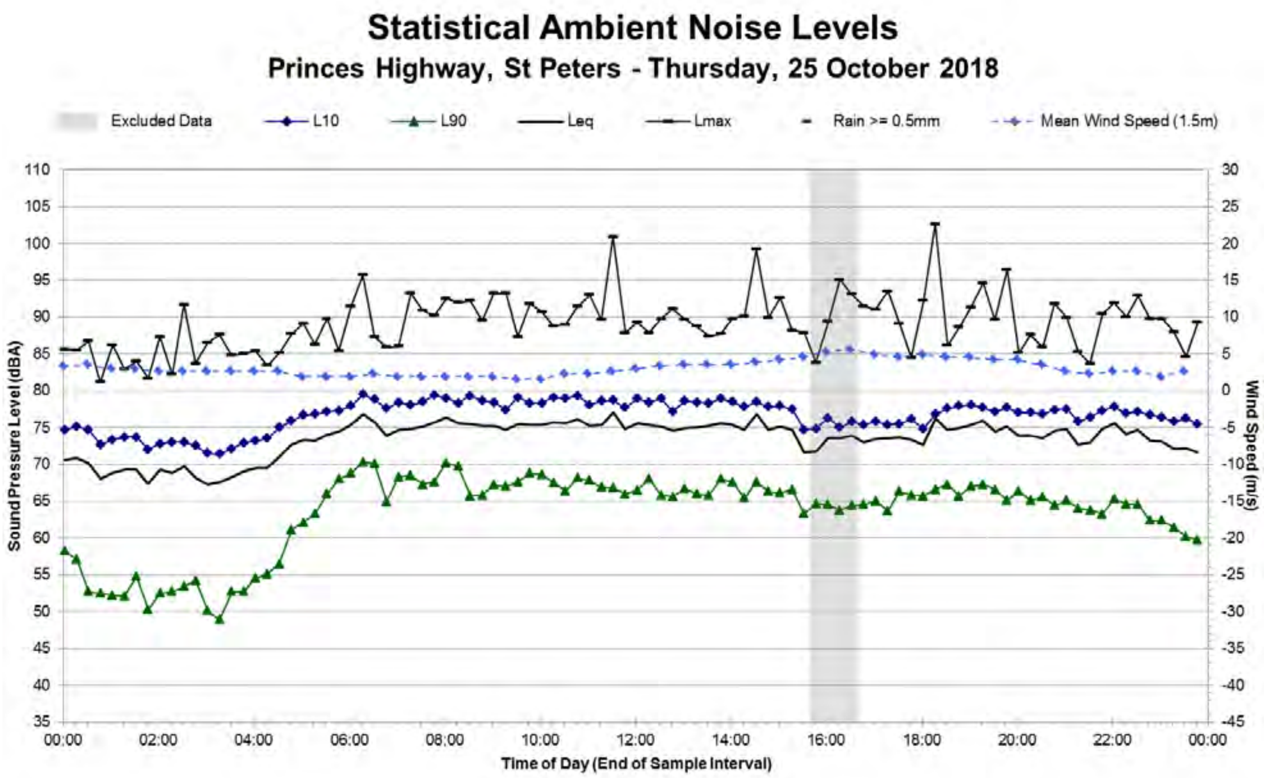
Statistical Ambient Noise Levels
Princes Highway, St Peters - Thursday, 25 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)
110
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
-5
-10
-15
-20
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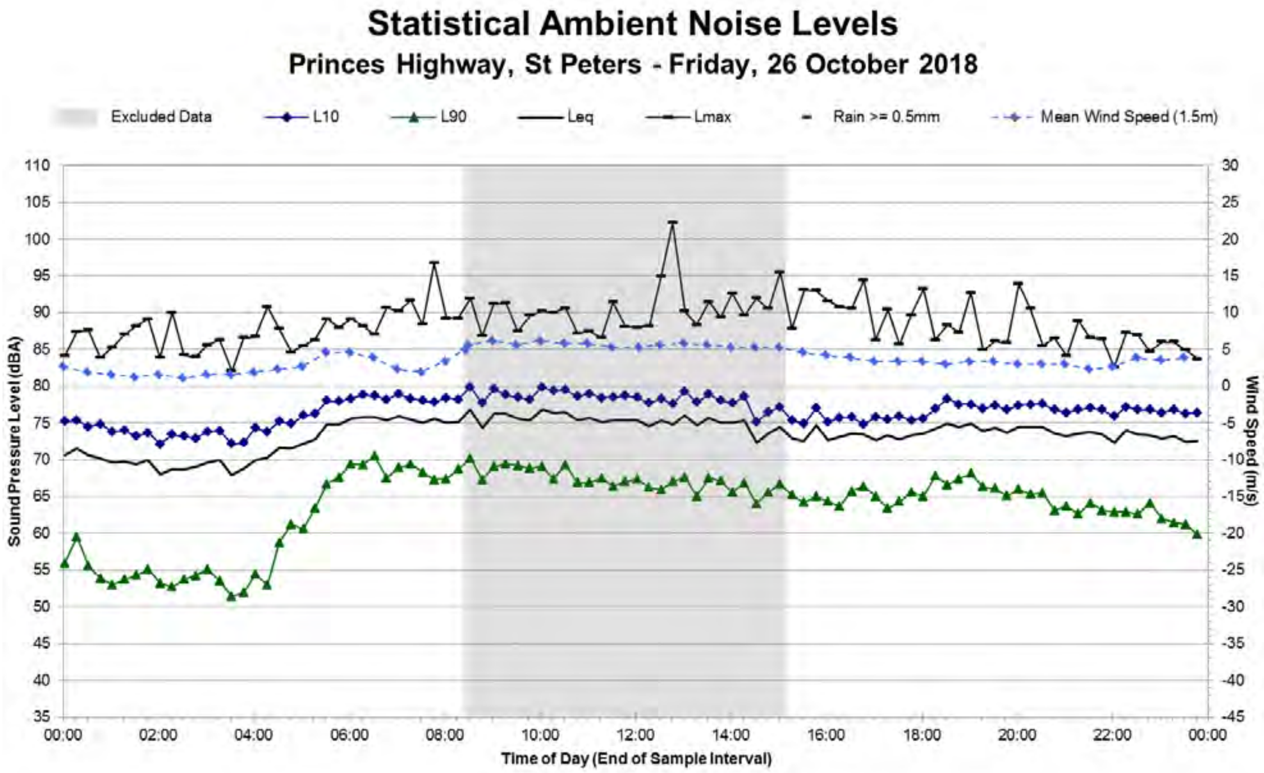

Statistical Ambient Noise Levels
Princes Highway, St Peters - Friday, 26 October 2018
Excluded Data
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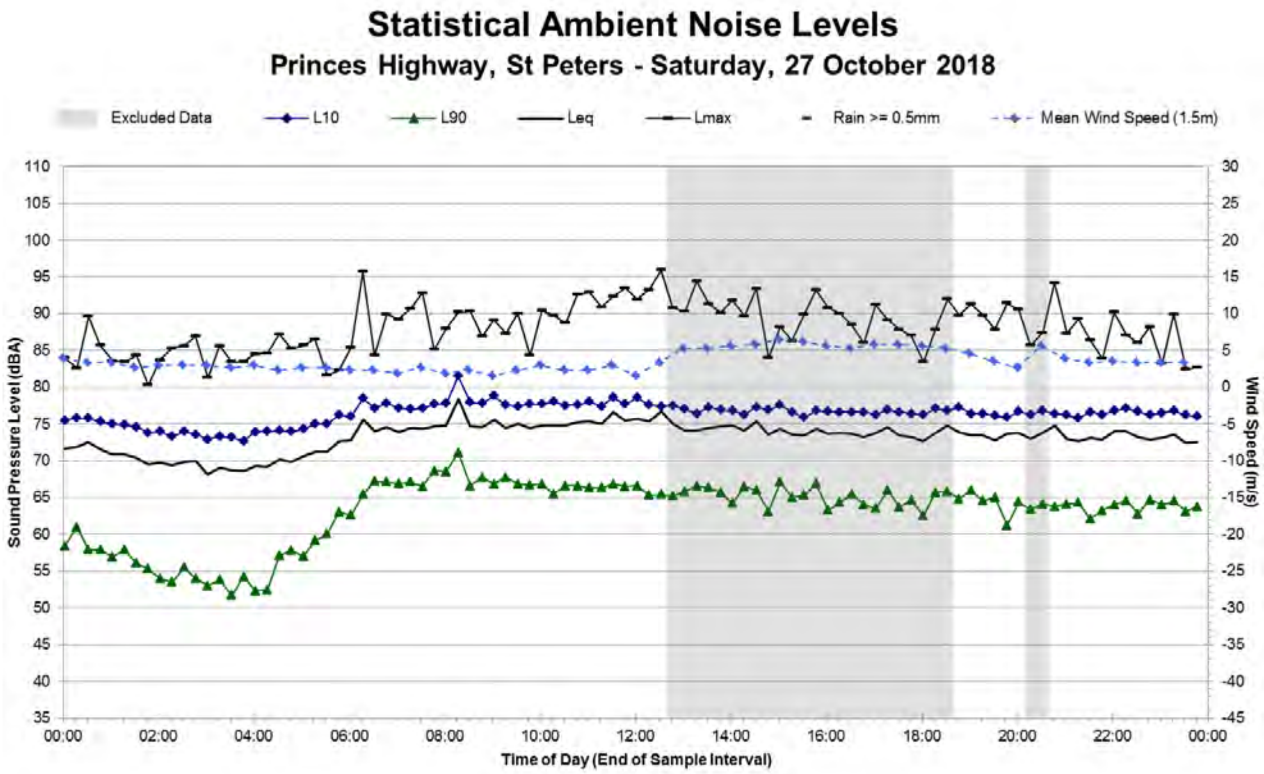
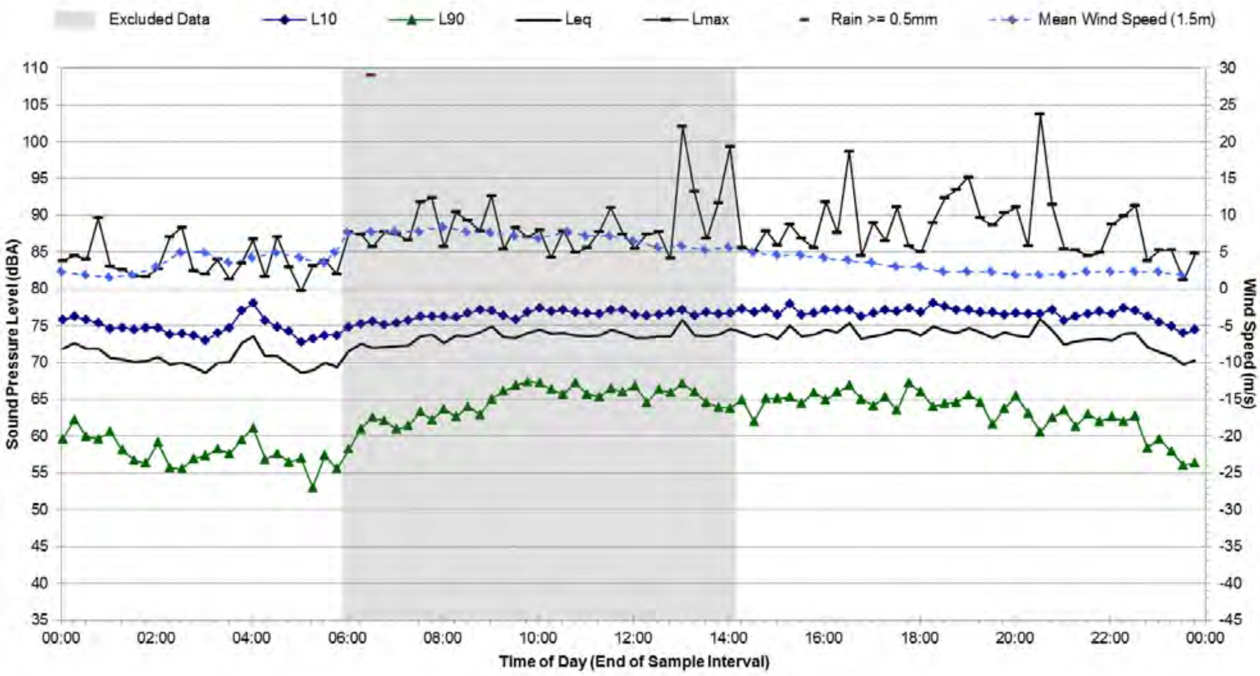
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

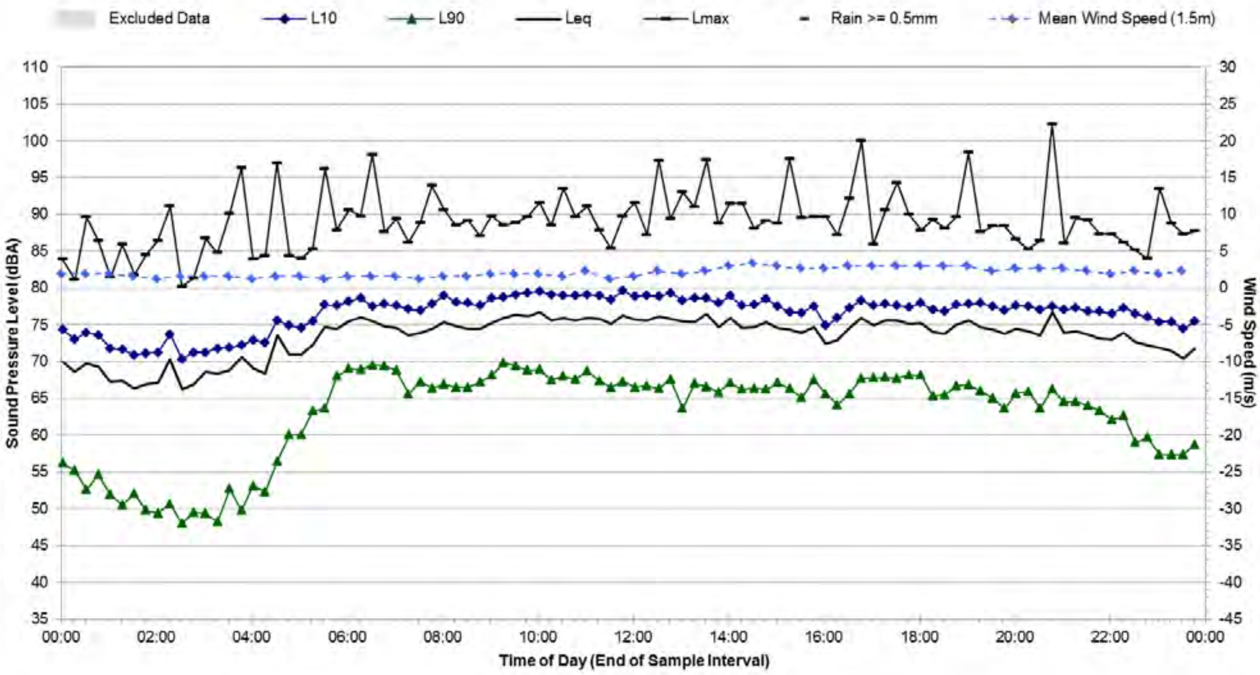


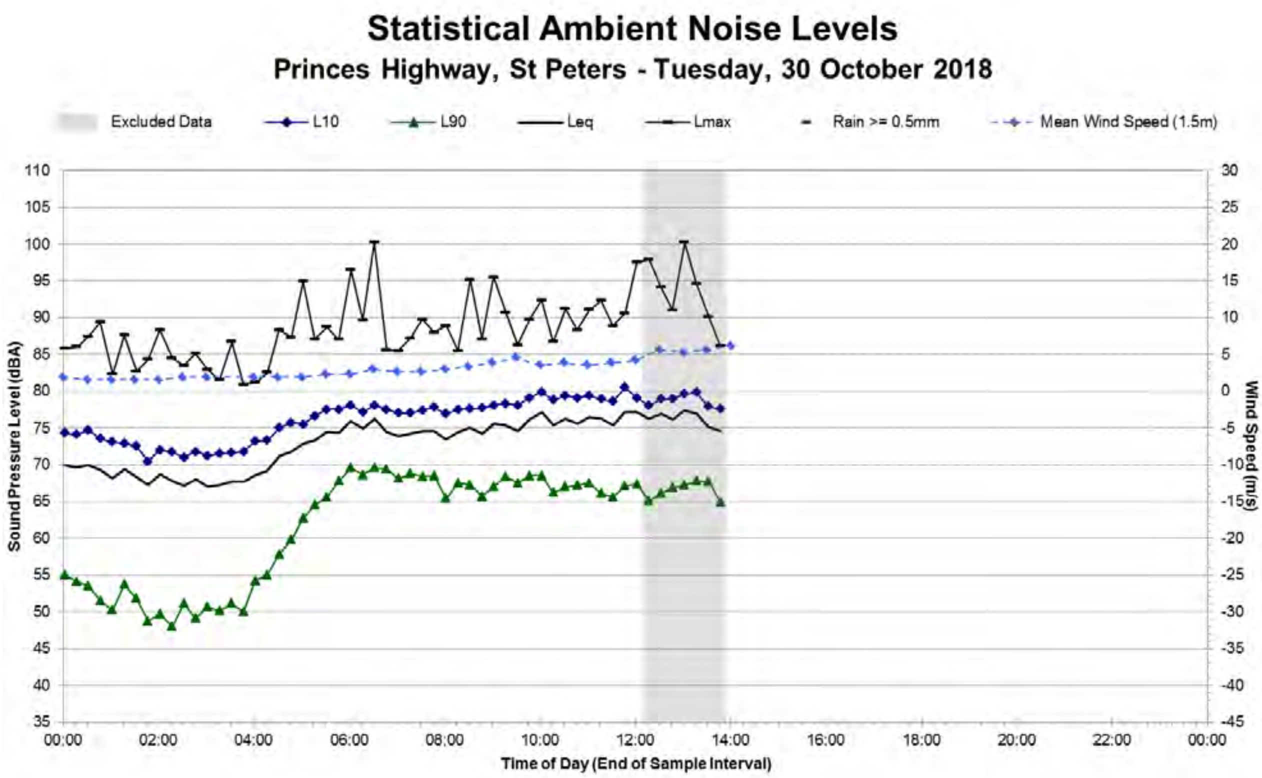
Statistical Ambient Noise Levels
Princes Highway, St Peters - Saturday, 27 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

Statistical Ambient Noise Levels
Princes Highway, St Peters - Sunday, 28 October 2018



Statistical Ambient Noise Levels
Princes Highway, St Peters - Monday, 29 October 2018




Statistical Ambient Noise Levels
Princes Highway, St Peters - Tuesday, 30 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

Noise Monitoring Location	L.02
Noise Monitoring Address	**535 Princes Highway, Tempe**

Logger Device Type: Svantek 957, Logger Serial No: 20664
Sound Level Meter: Brüel and Kjær 2250L, Sound Level Meter Serial No: 2414604

Ambient noise logger deployed at residential address 535 Princess Highway, Tempe.

Attended noise measurements indicate the ambient noise environment at this location is dominated by steady-state road traffic on Princes Highway. Heavy vehicle passbys and aircraft flyovers from Sydney Airport also contribute to the noise at this location.

Measured Attended Noise Levels (LAmax):
30/10/18: Steady light vehicle traffic on Princes Highway: 74 dBA, heavy vehicles: 78-88 dBA, aircraft 78, 81 dBA

Map of Noise Monitoring Location

Ambient Noise Logging Results – NPfI Defined Time Periods

Monitoring Period	Noise Level (dBA)			
	RBL	LAeq	L10	L1
Daytime	64	75	77	83
Evening	60	74	77	81
Night-time	48	72	74	79

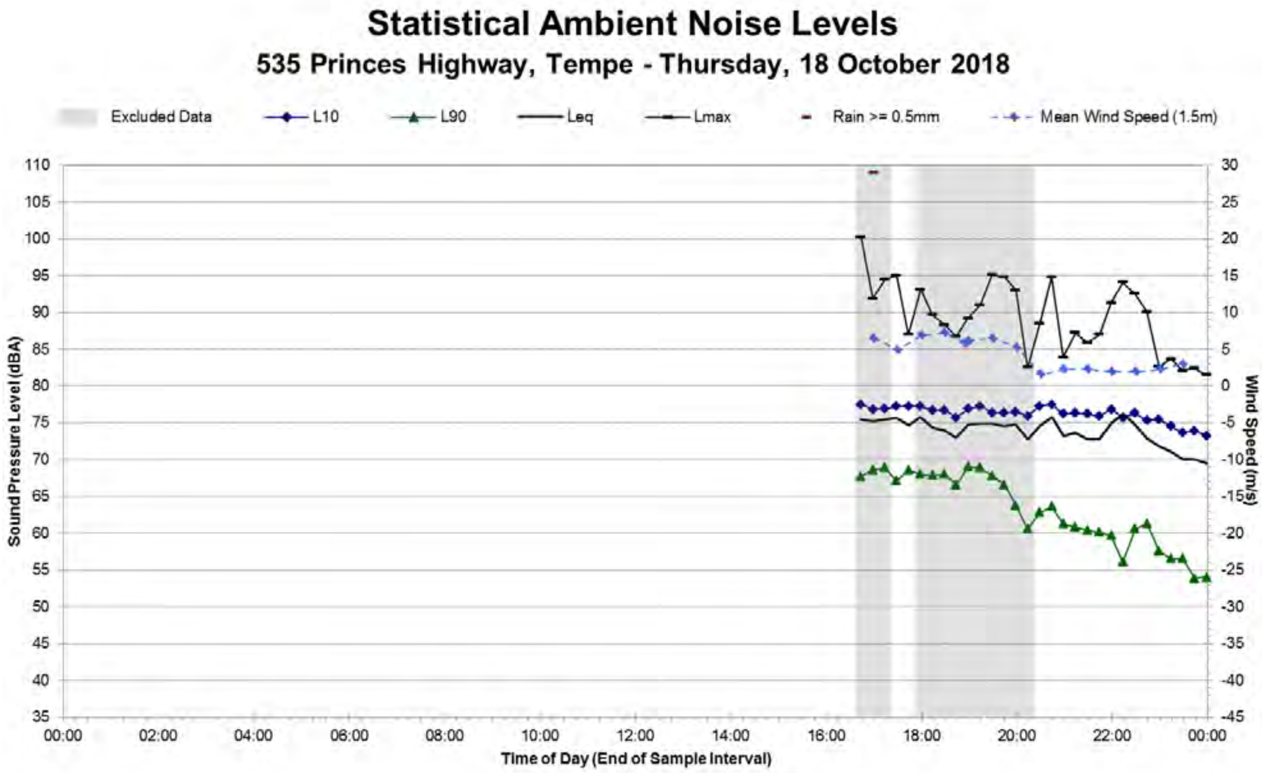
Ambient Noise Logging Results – RNP Defined Time Periods

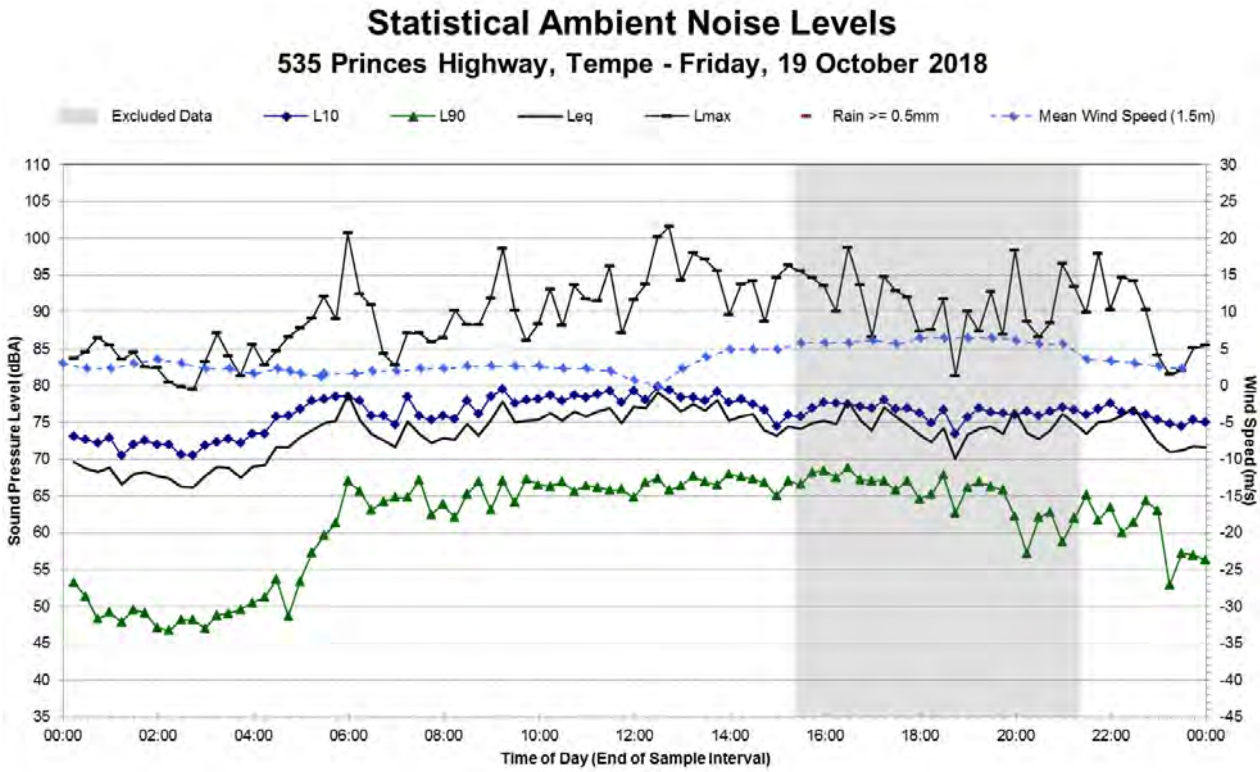
Monitoring Period	Noise Level (dBA)	
	LAeq(period)	LAeq(1hour)
Daytime (7am-10pm)	75	77
Night-time (10pm-7am)	72	75

Attended Noise Measurement Results

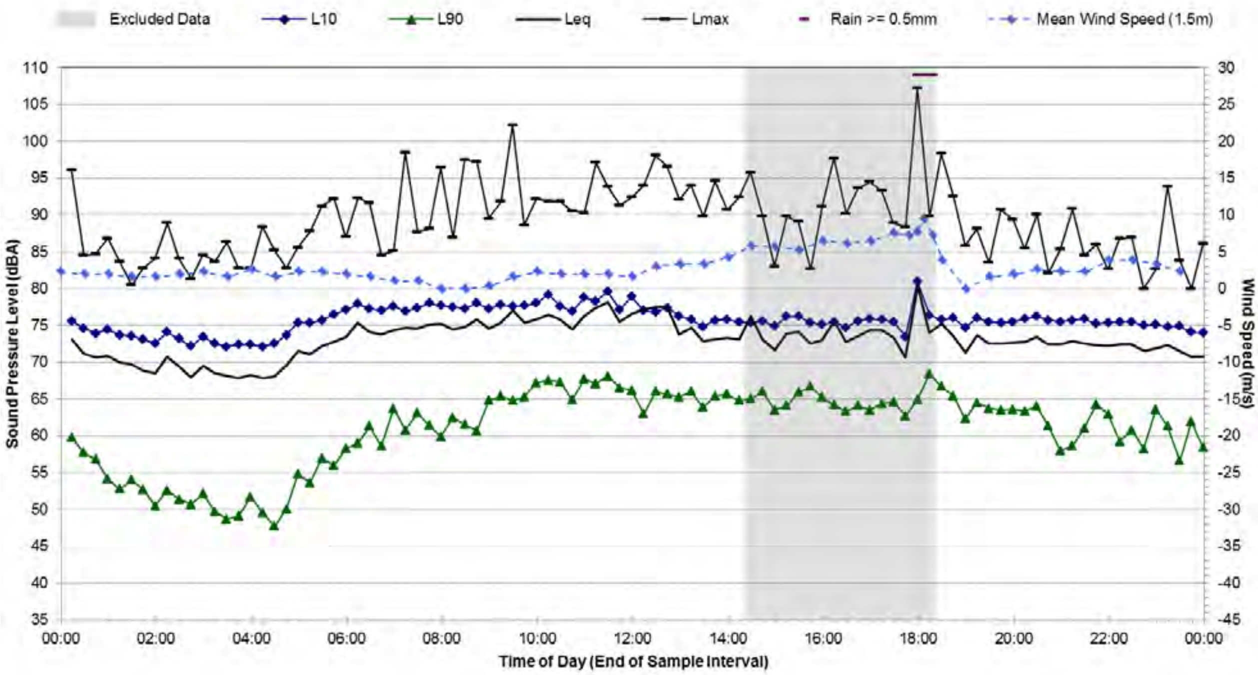
Date	Start Time	Measured Noise Level (dBA)		
		LA90	LAeq	LAmax
30/10/18	13:28	63	74	88

Photo of Noise Monitoring Location

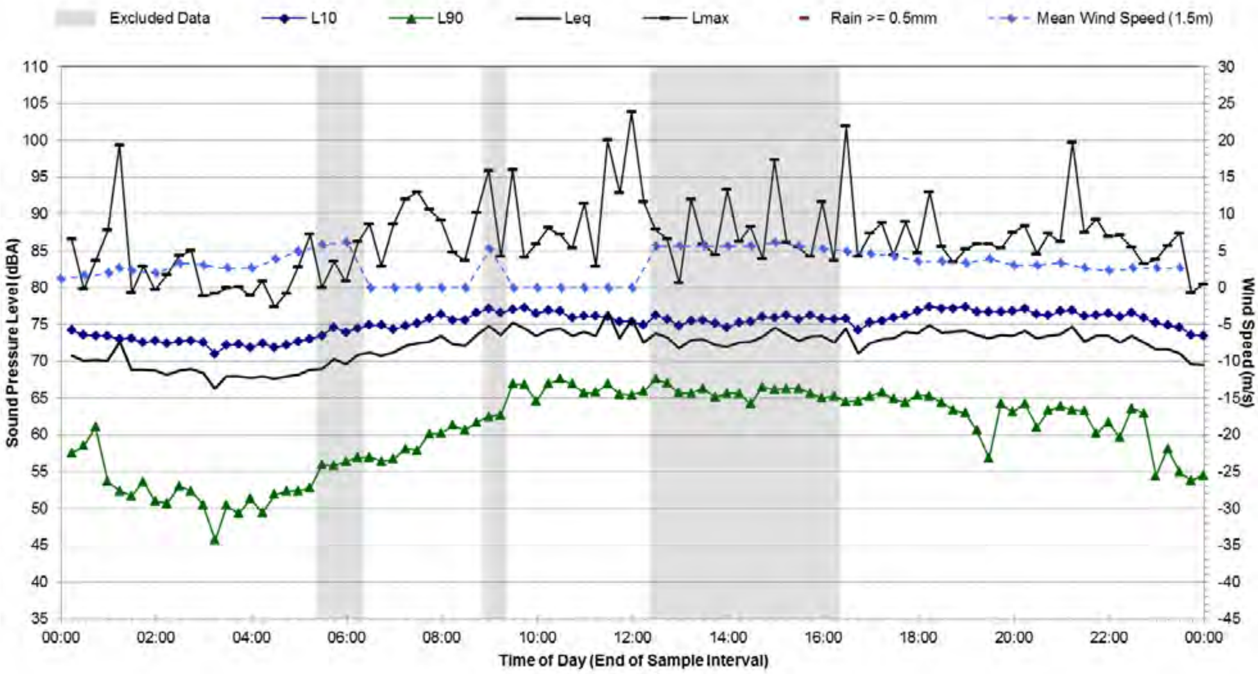

Statistical Ambient Noise Levels
535 Princes Highway, Tempe - Thursday, 18 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

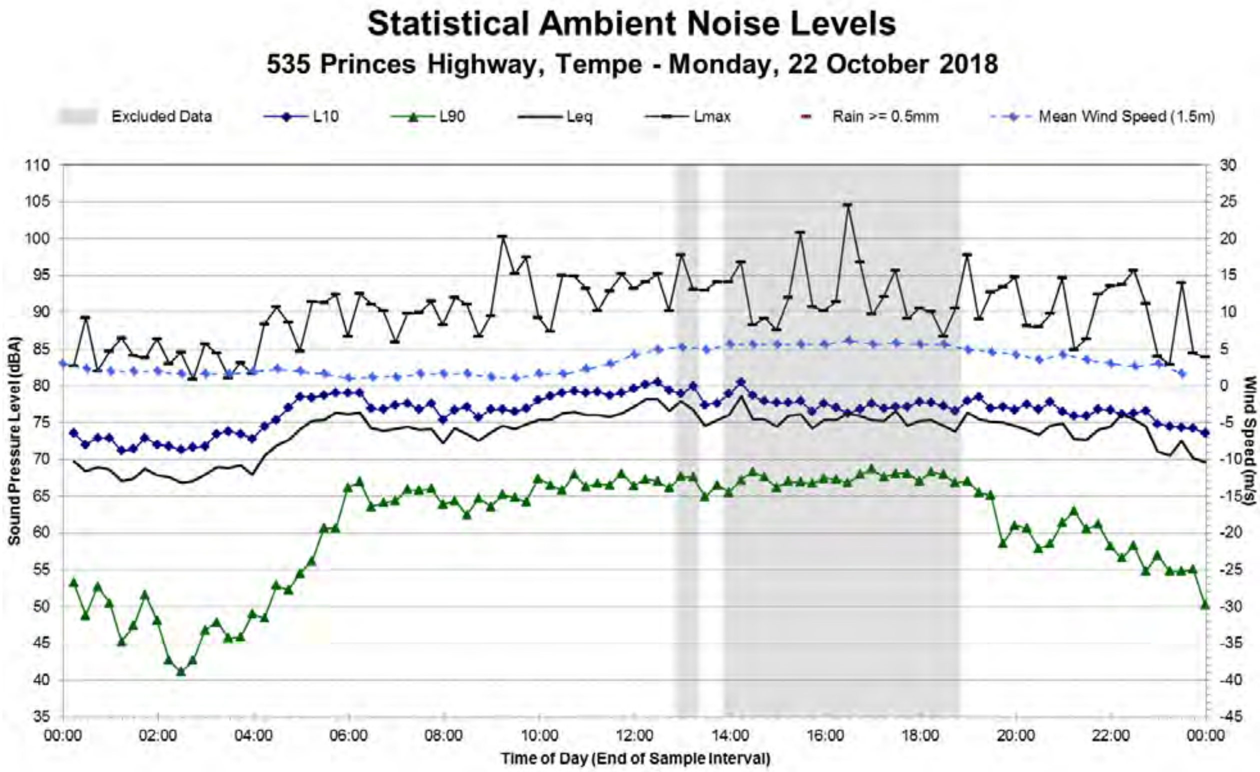

Statistical Ambient Noise Levels
535 Princes Highway, Tempe - Friday, 19 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

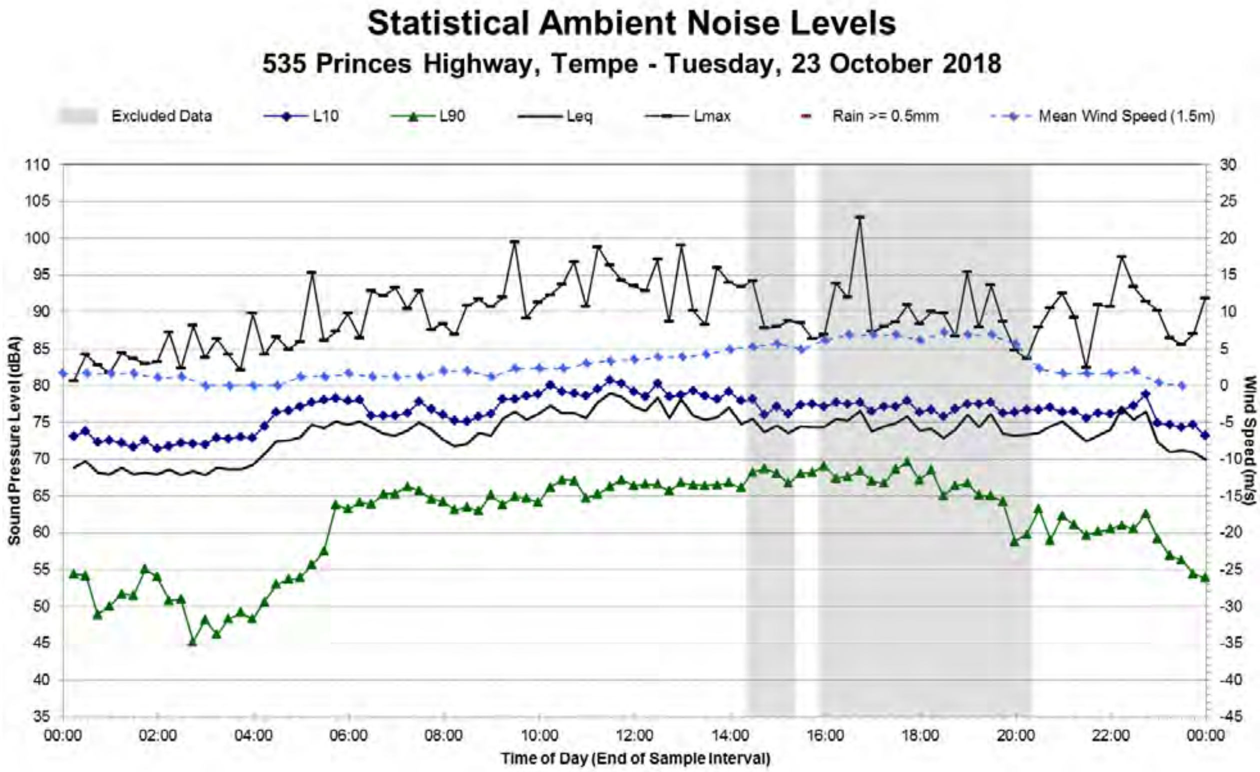
Statistical Ambient Noise Levels
535 Princes Highway, Tempe - Saturday, 20 October 2018

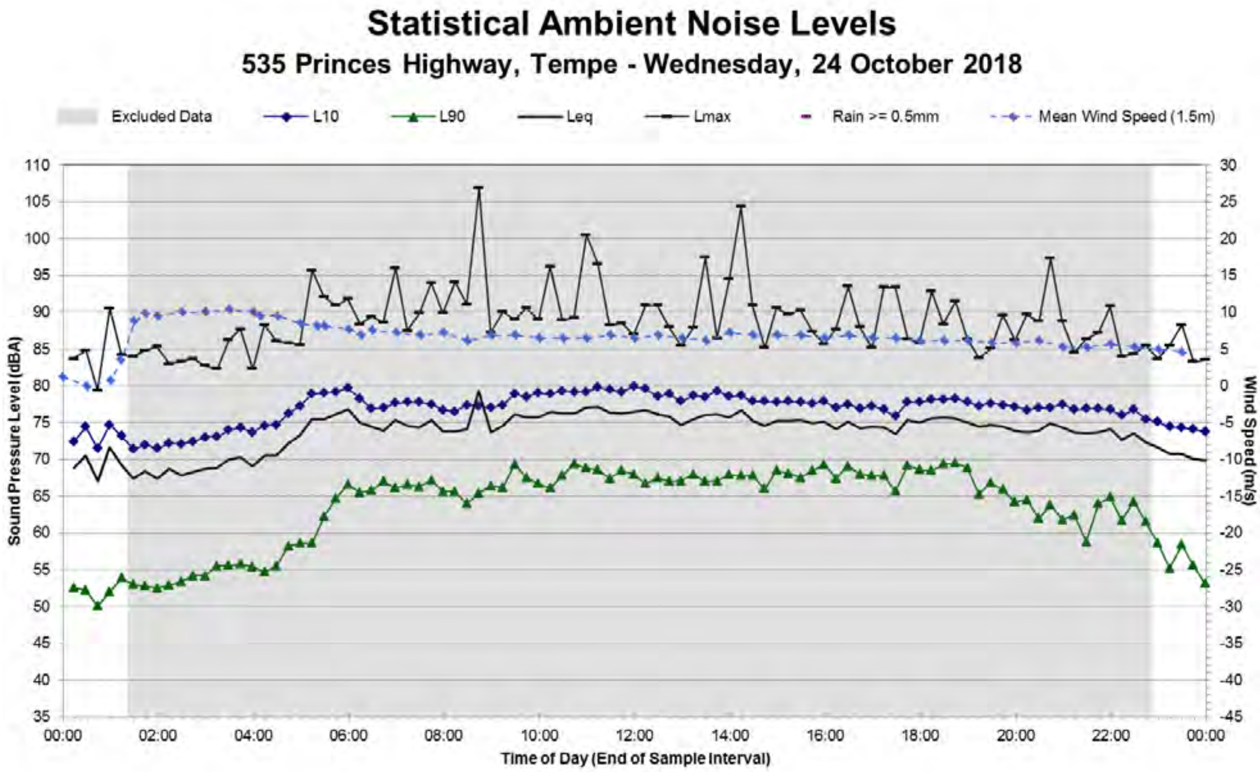


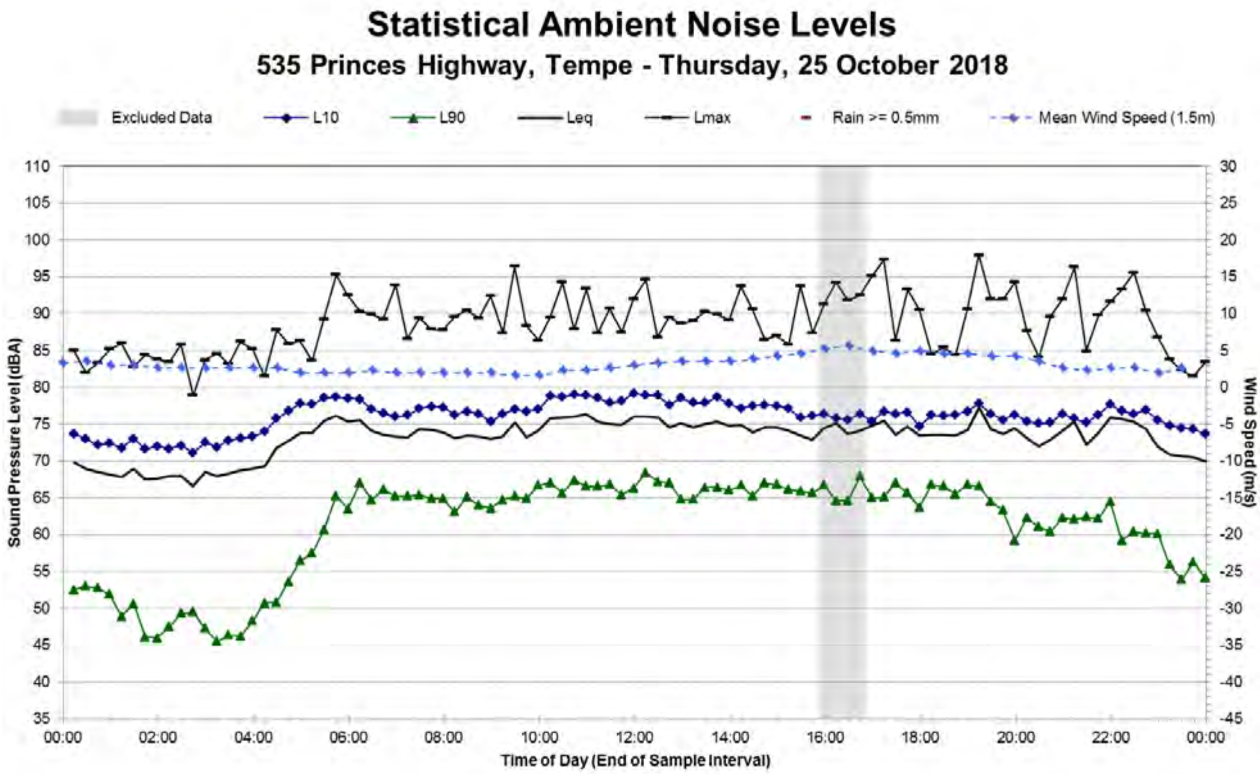
Statistical Ambient Noise Levels
535 Princes Highway, Tempe - Sunday, 21 October 2018

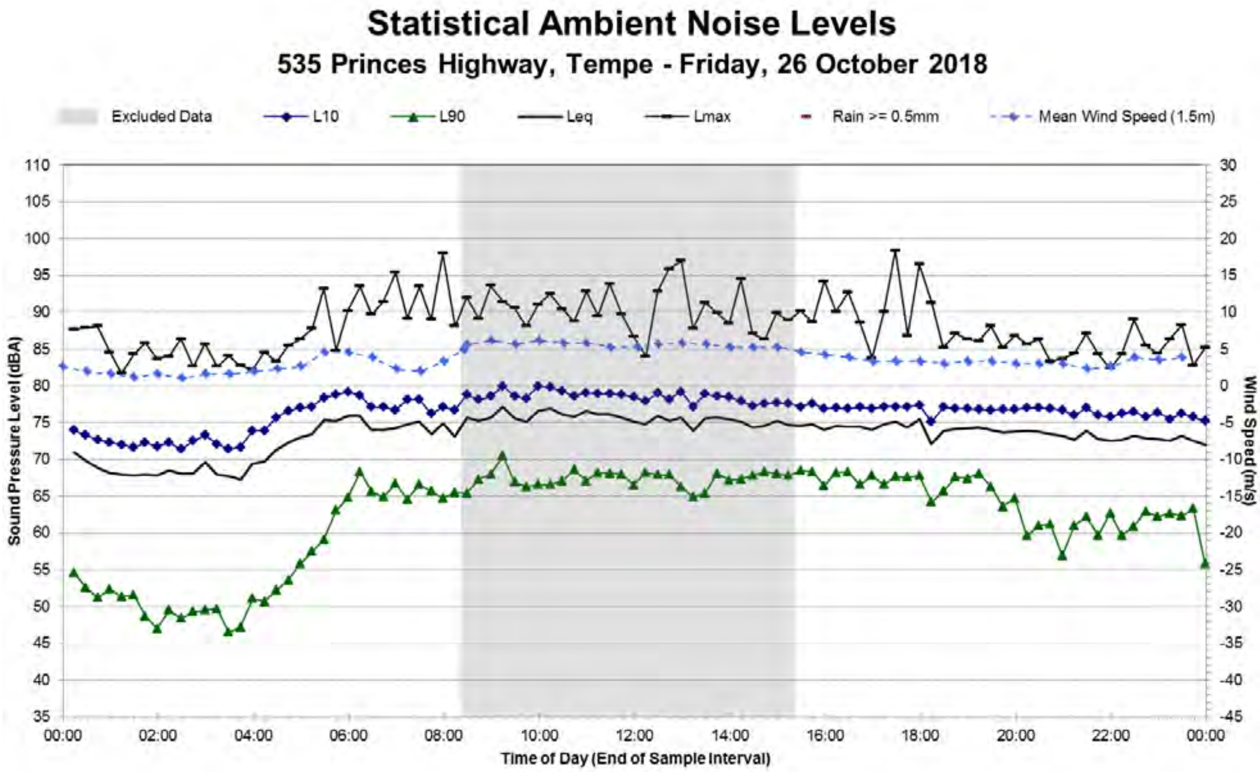


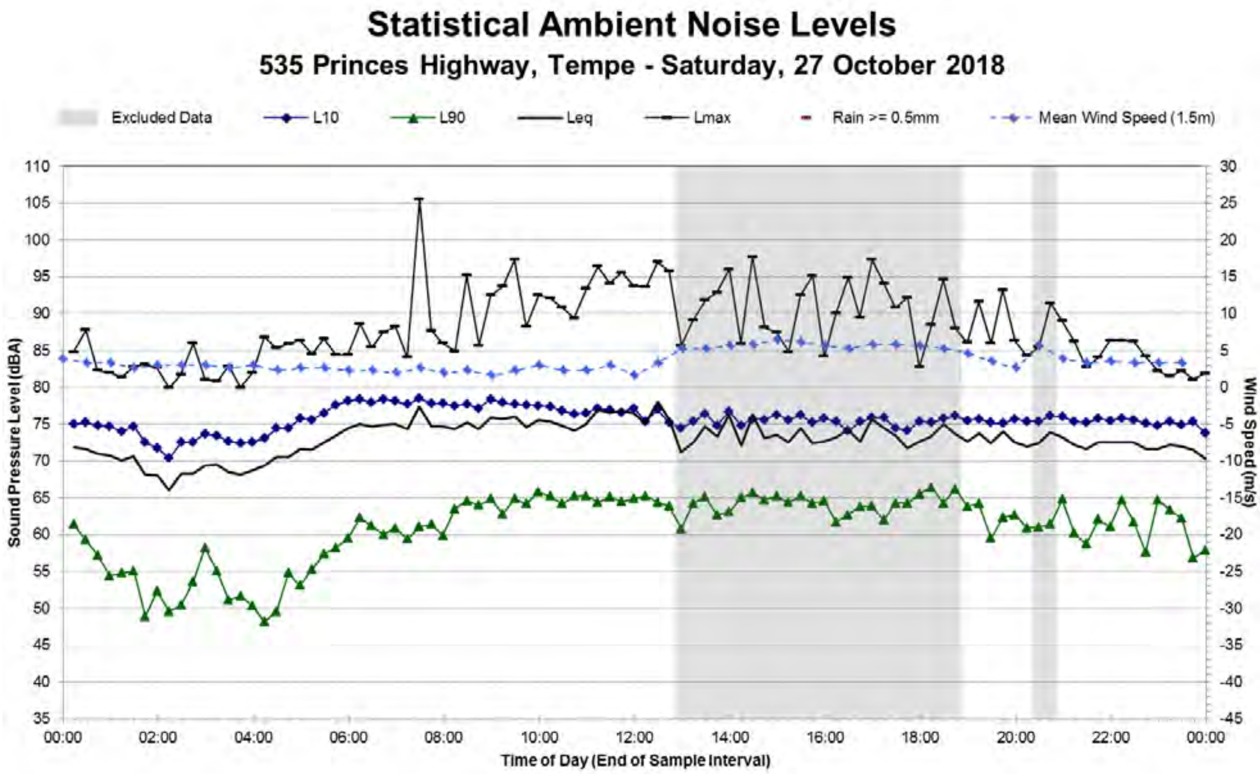

Statistical Ambient Noise Levels
535 Princes Highway, Tempe - Monday, 22 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

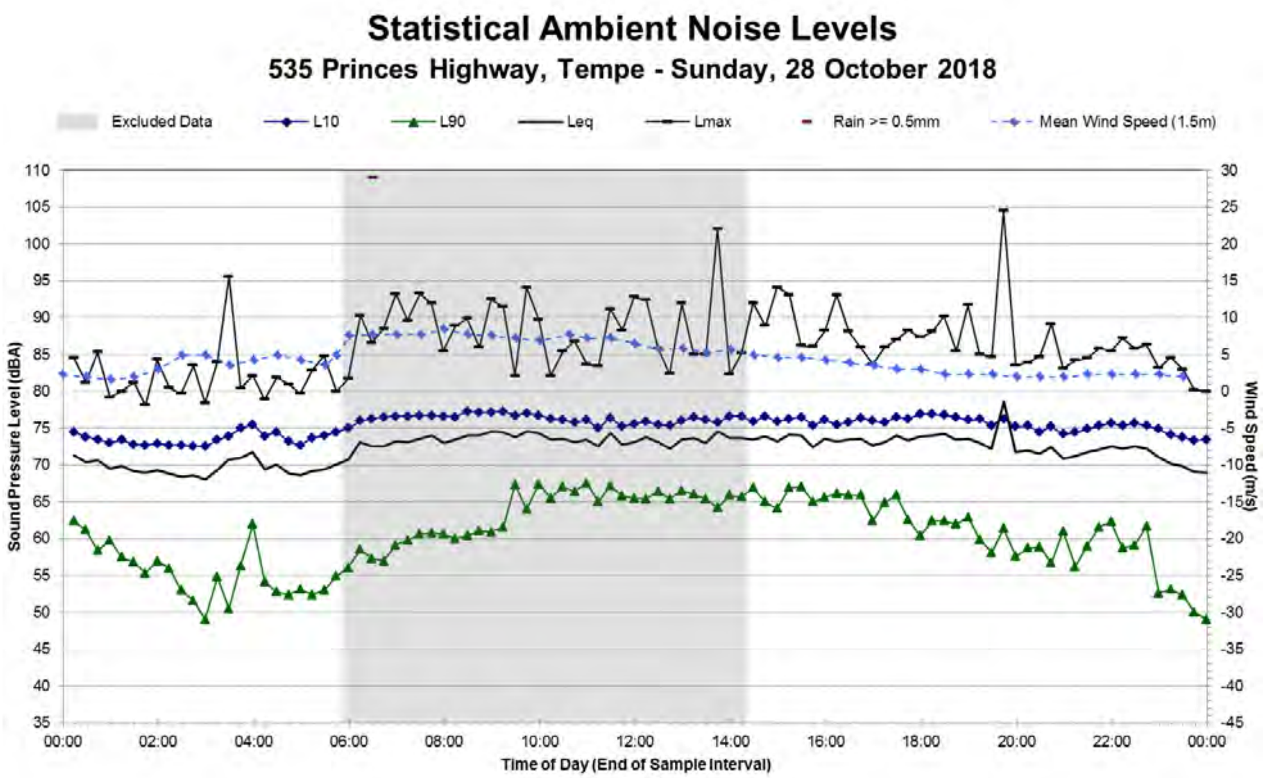

Statistical Ambient Noise Levels
535 Princes Highway, Tempe - Tuesday, 23 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

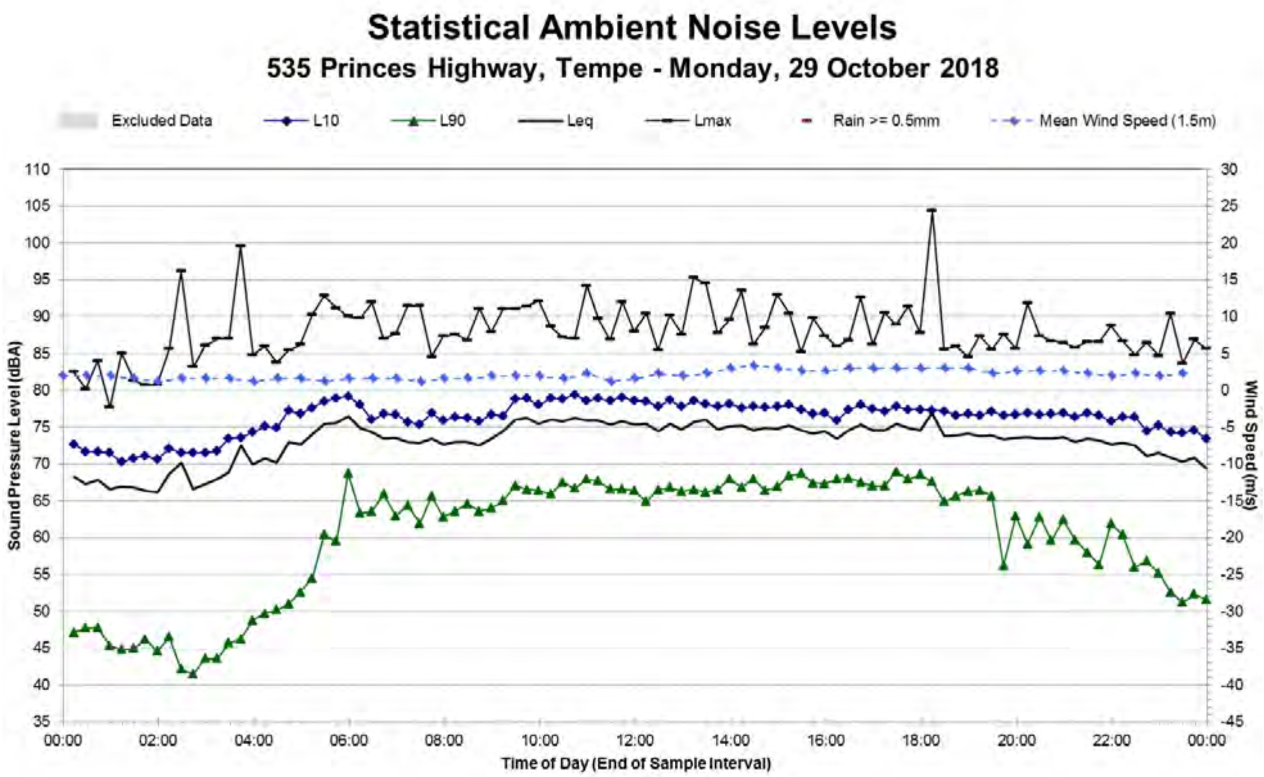

Statistical Ambient Noise Levels
535 Princes Highway, Tempe - Wednesday, 24 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

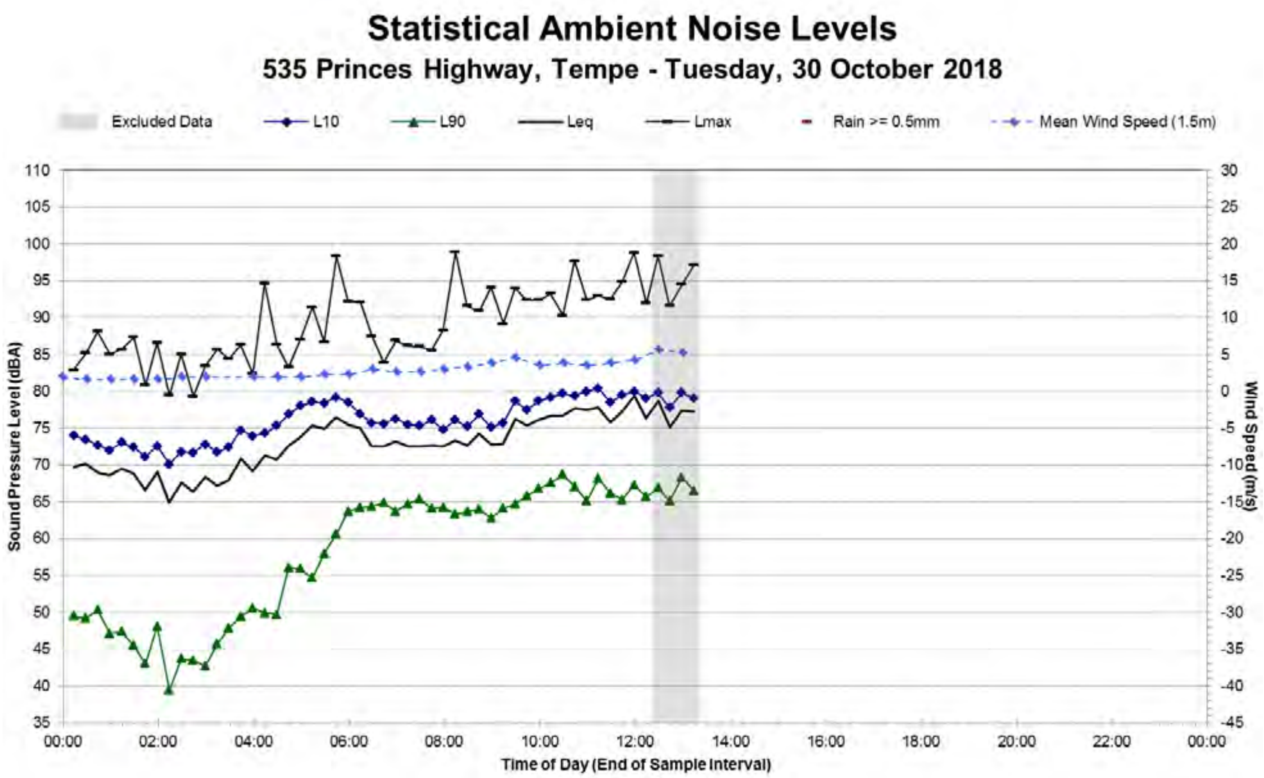

Statistical Ambient Noise Levels
535 Princes Highway, Tempe - Thursday, 25 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
535 Princes Highway, Tempe - Friday, 26 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
535 Princes Highway, Tempe - Saturday, 27 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
535 Princes Highway, Tempe - Sunday, 28 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
535 Princes Highway, Tempe - Monday, 29 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
535 Princes Highway, Tempe - Tuesday, 30 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

Noise Monitoring Location	L.03
Noise Monitoring Address	**1 Fanning Street, Tempe**

Logger Device Type: Svantek 957, Logger Serial No: 23247
Sound Level Meter: Brüel and Kjær 2250L, Sound Level Meter Serial No: 2414604

Ambient noise logger deployed at residential address 1 Fanning Street, Tempe.

Attended noise measurements indicate the ambient noise environment at this location is influenced by infrequent light-vehicles on South Street and Fanning Street. Aircraft flyovers from Sydney Airport, steady state road traffic noise from Princes Highway to the north and local fauna (birds) also contribute to the noise at this location.

Measured Attended Noise Levels (LAmax):
19/09/18: Steady light and heavy vehicle traffic on Princes Highway: 47-50 dBA, aircraft 57–61 dBA, birds 60, 74 dBA

Map of Noise Monitoring Location

Ambient Noise Logging Results – NPfI Defined Time Periods

Monitoring Period	Noise Level (dBA)			
	RBL	LAeq	L10	L1
Daytime	42	61	61	73
Evening	40	60	59	72
Night-time	38	53	45	53

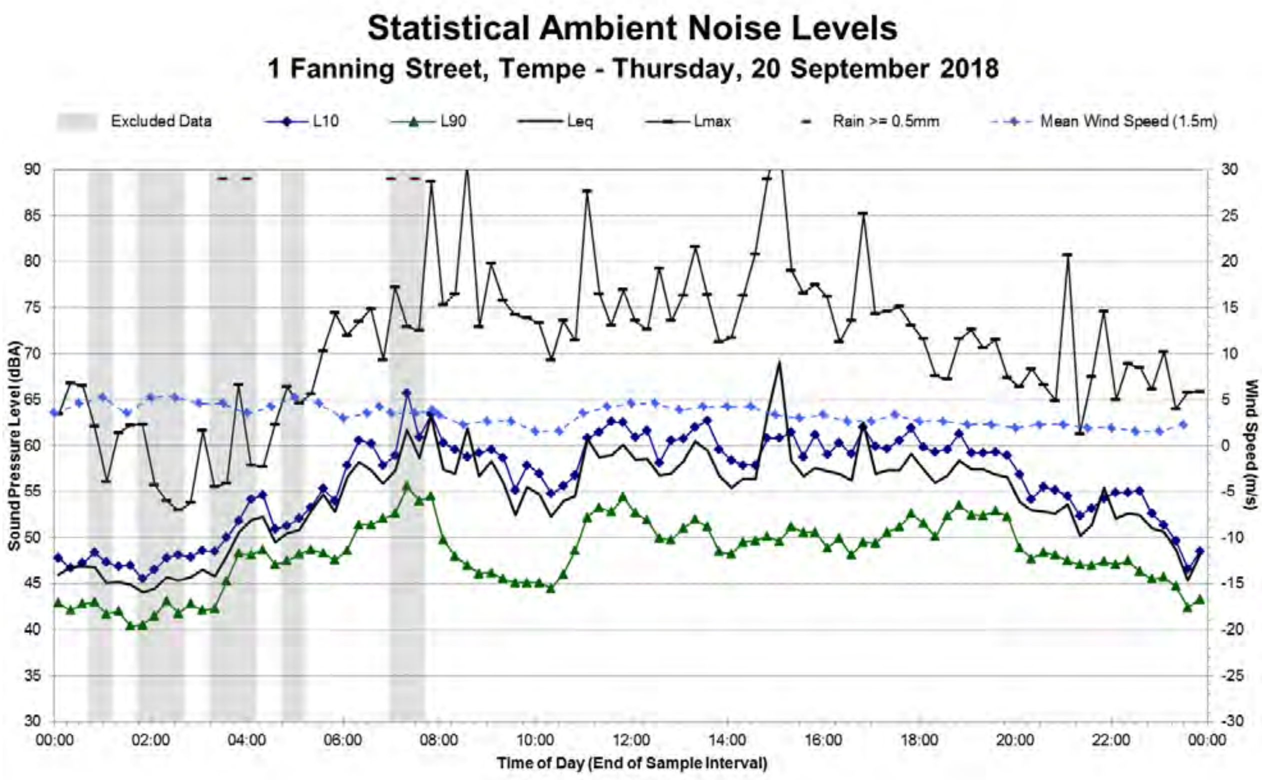
Ambient Noise Logging Results – RNP Defined Time Periods

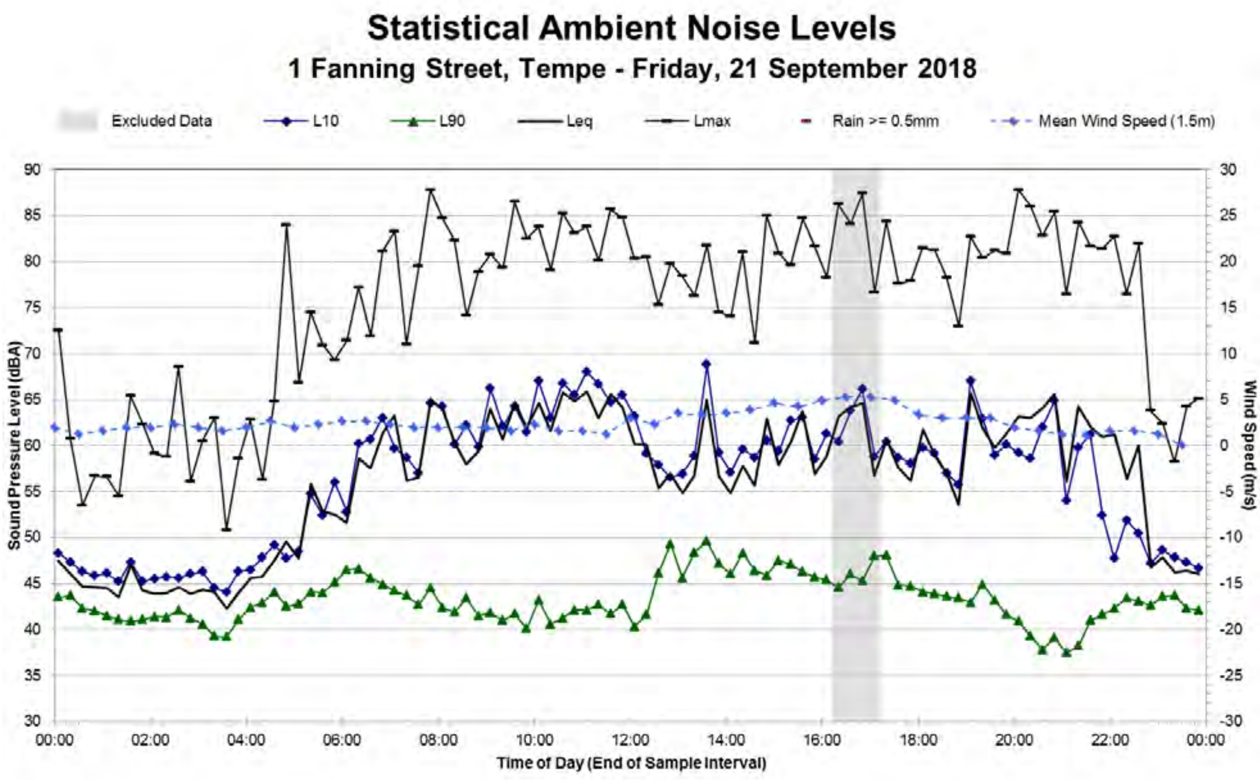
Monitoring Period	Noise Level (dBA)	
	LAeq(period)	LAeq(1hour)
Daytime (7am-10pm)	-	-
Night-time (10pm-7am)	-	-

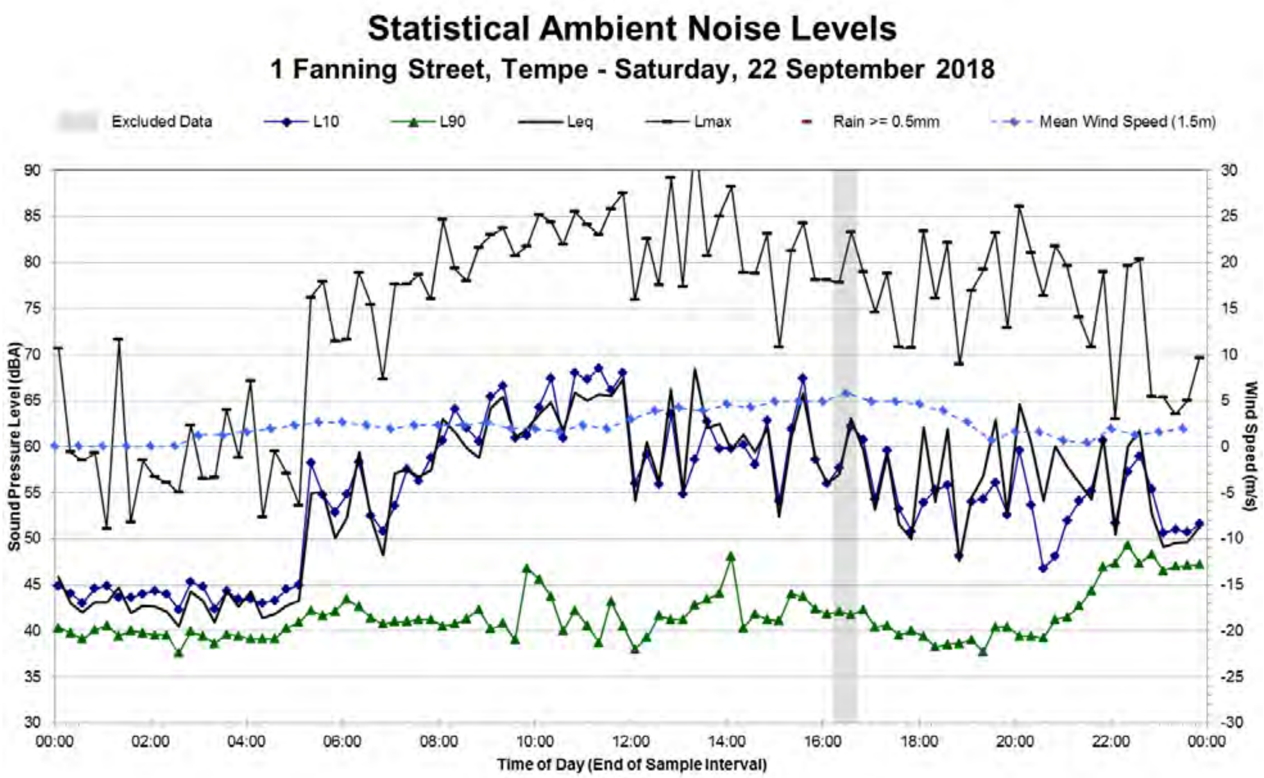
Attended Noise Measurement Results

Date	Start Time	Measured Noise Level (dBA)		
		LA90	LAeq	LAmax
19/09/18	17:00	45	53	74

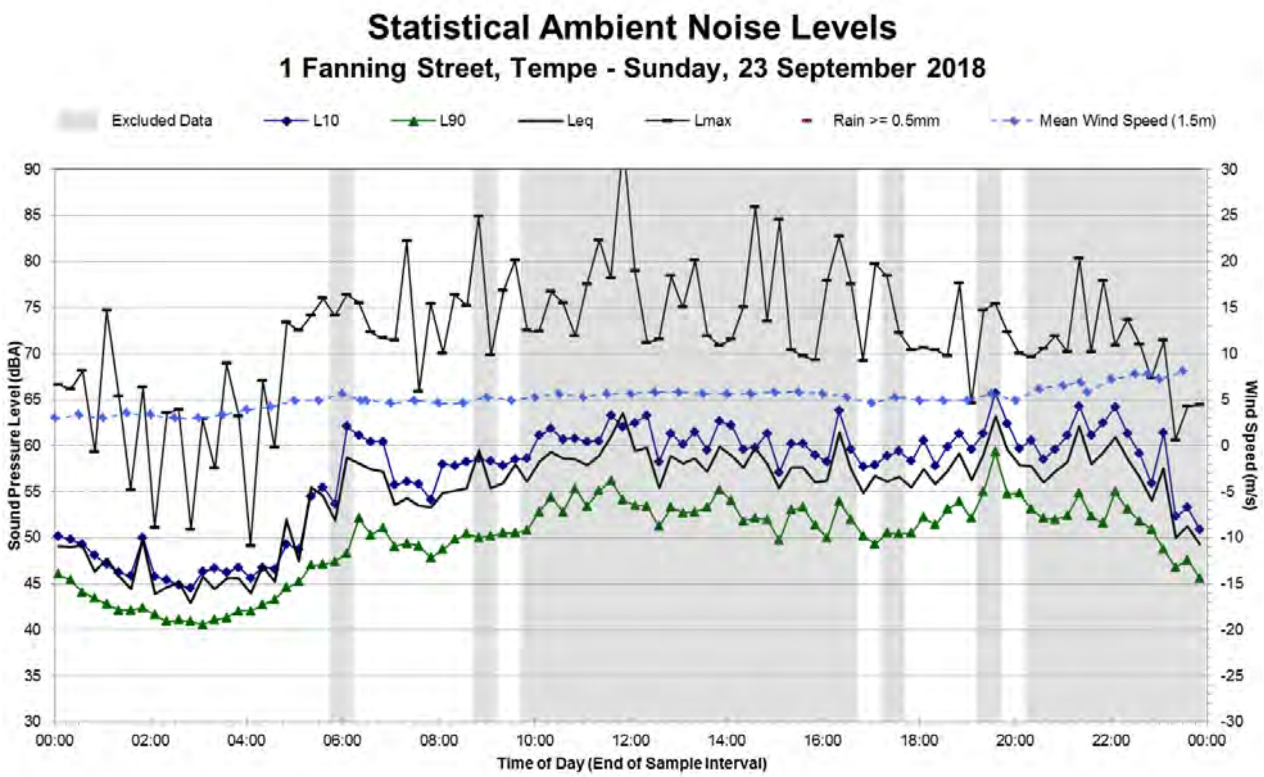
Photo of Noise Monitoring Location


Statistical Ambient Noise Levels
1 Fanning Street, Tempe - Thursday, 20 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

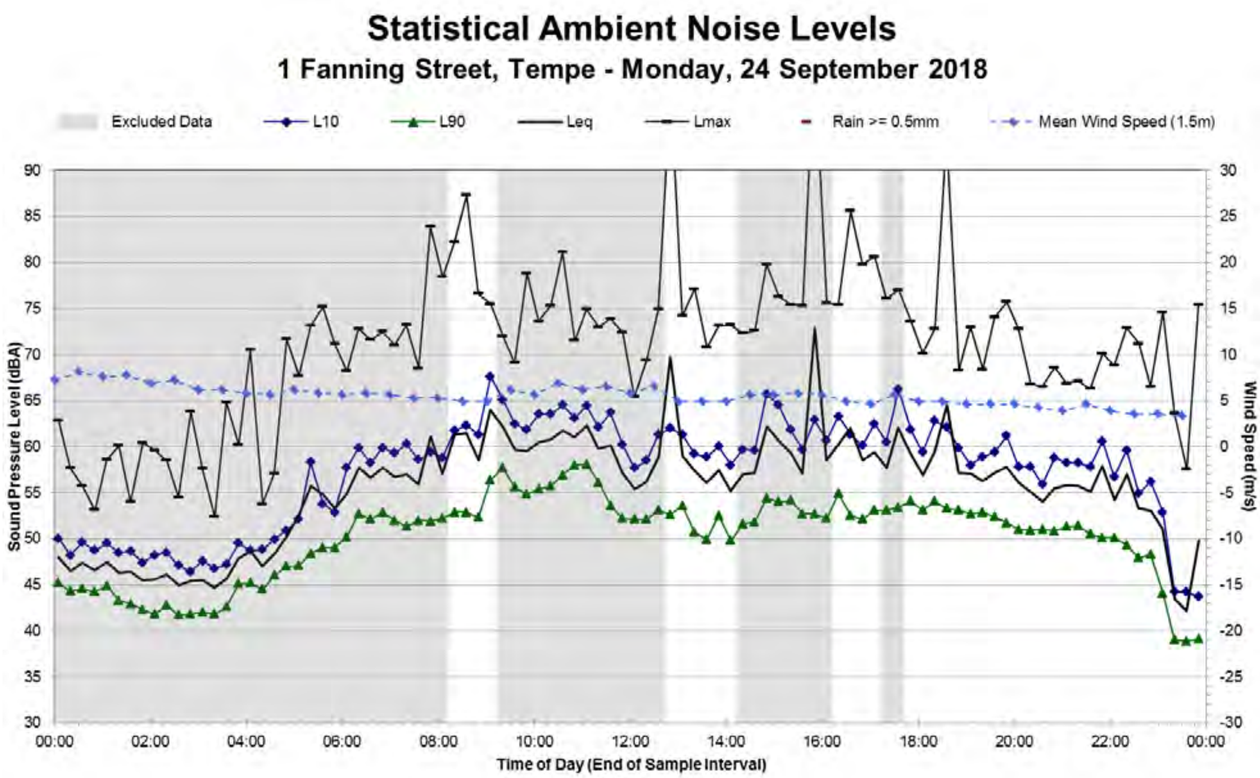

Statistical Ambient Noise Levels
1 Fanning Street, Tempe - Friday, 21 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

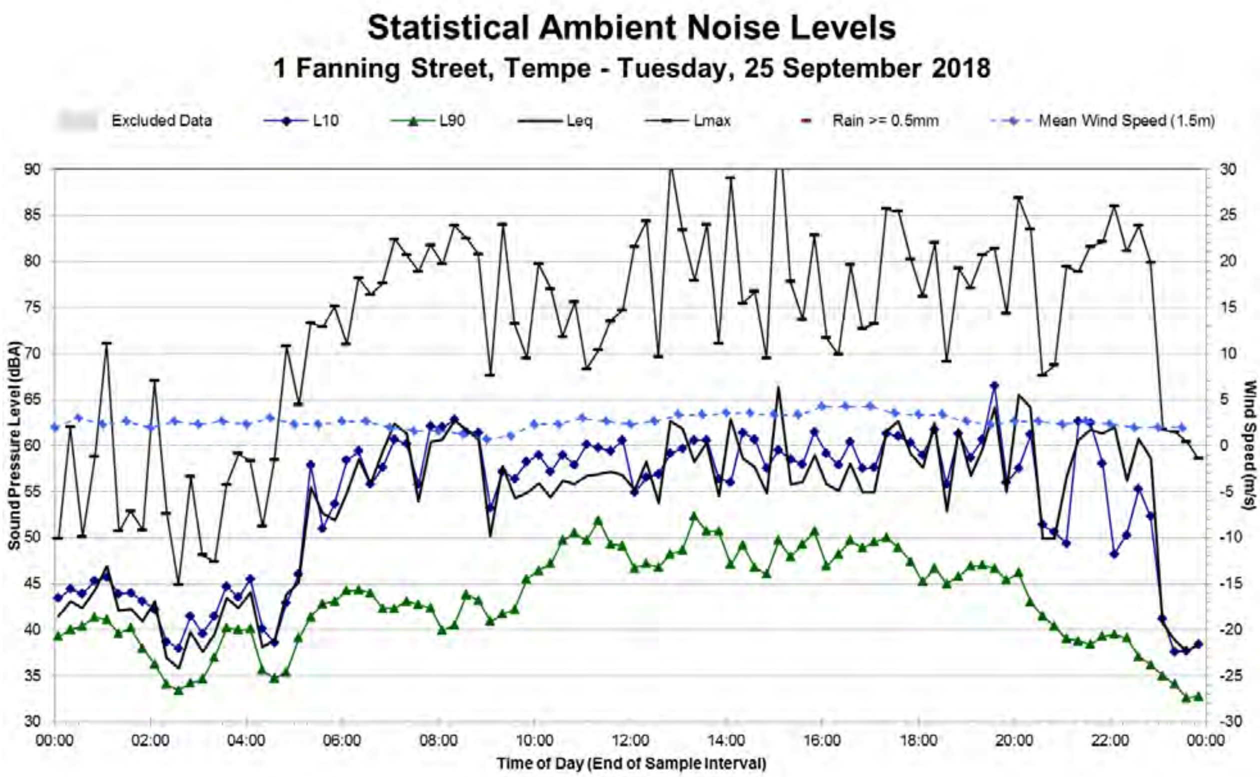


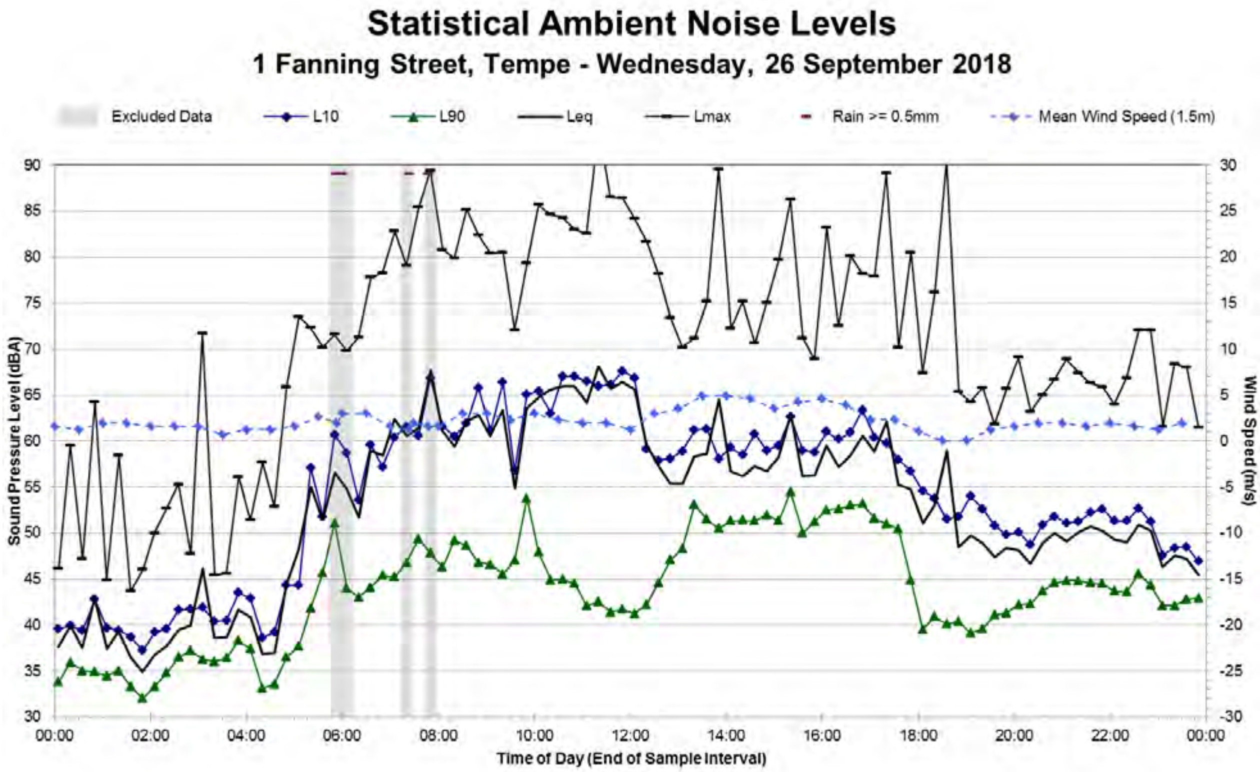
Statistical Ambient Noise Levels
1 Fanning Street, Tempe - Saturday, 22 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

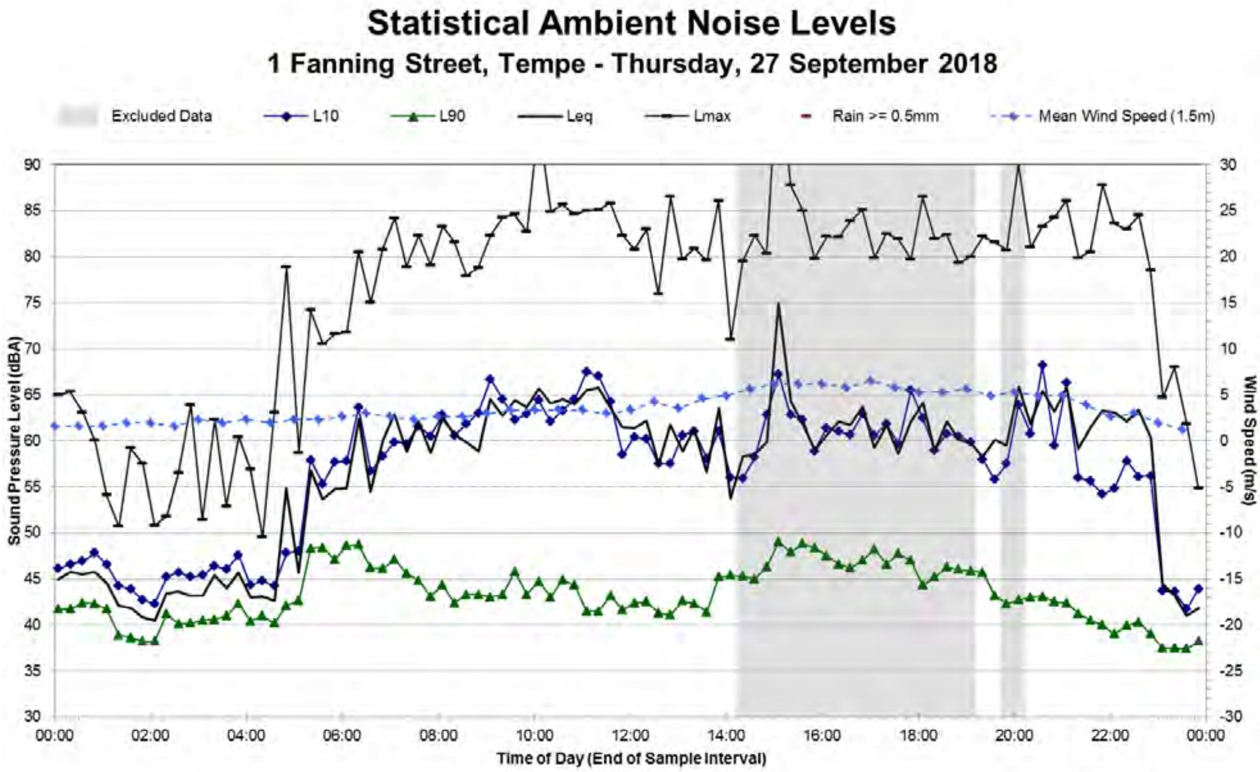


Statistical Ambient Noise Levels
1 Fanning Street, Tempe - Sunday, 23 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
1 Fanning Street, Tempe - Monday, 24 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

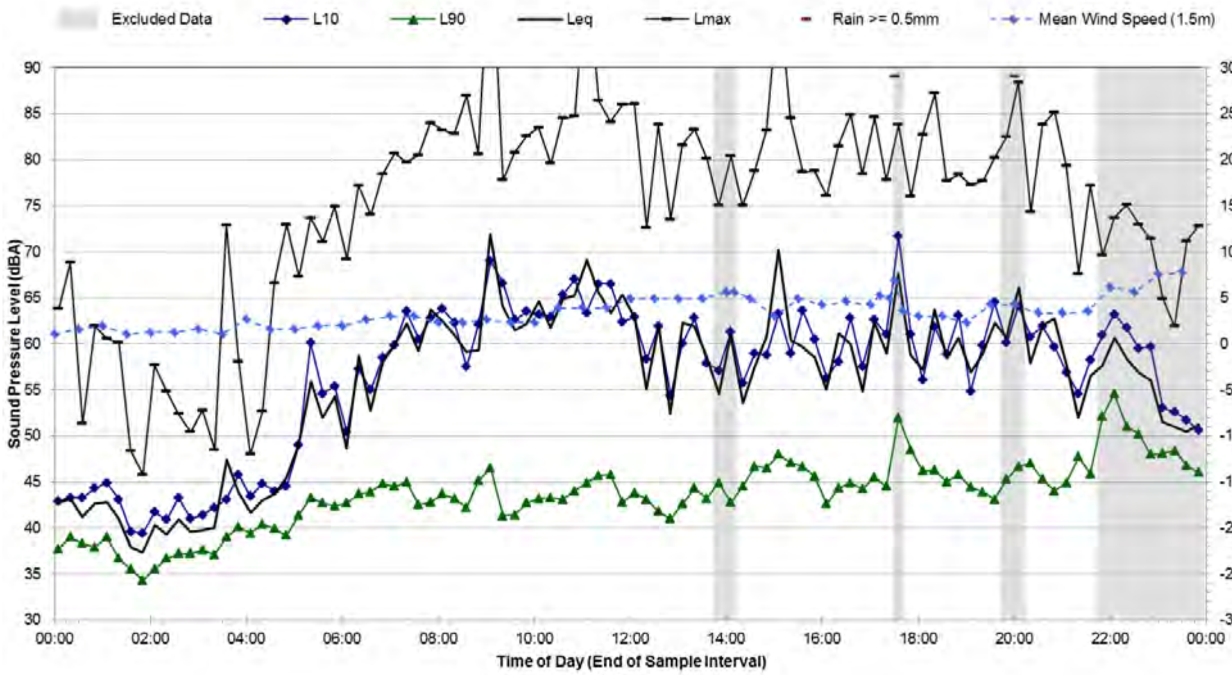

Statistical Ambient Noise Levels
1 Fanning Street, Tempe - Tuesday, 25 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
1 Fanning Street, Tempe - Wednesday, 26 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
1 Fanning Street, Tempe - Thursday, 27 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

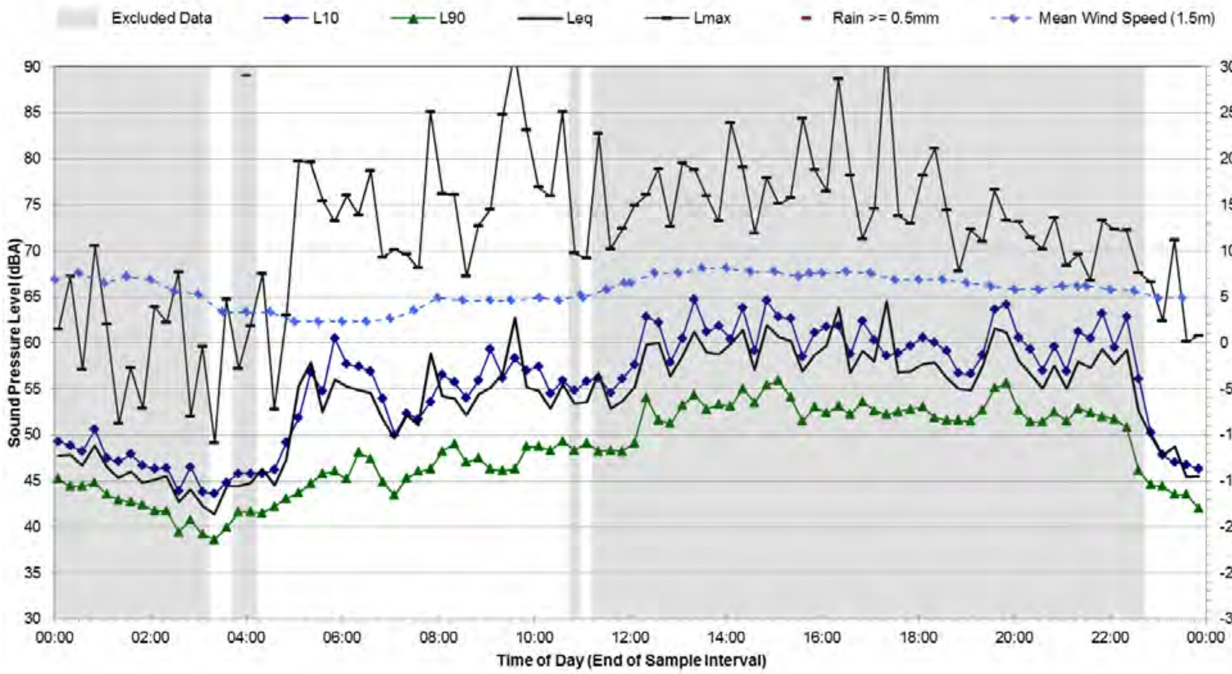
Statistical Ambient Noise Levels

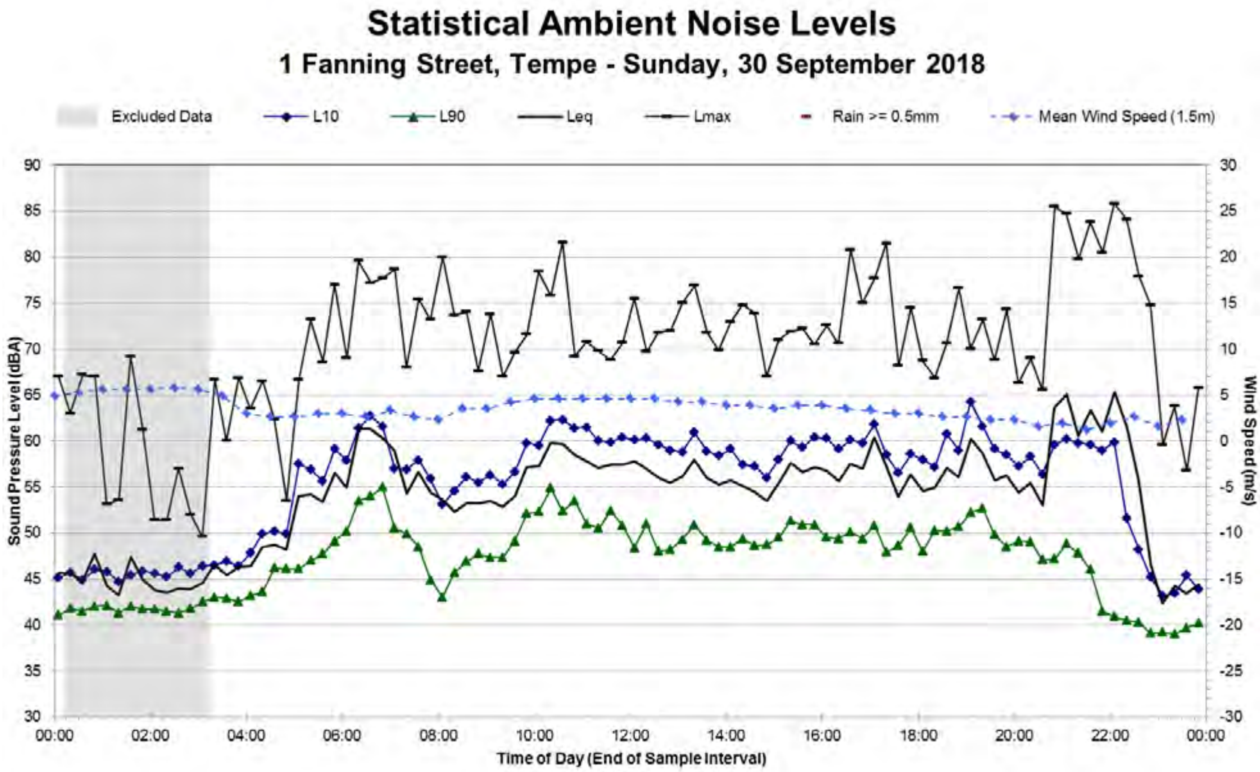
1 Fanning Street, Tempe - Friday, 28 September 2018



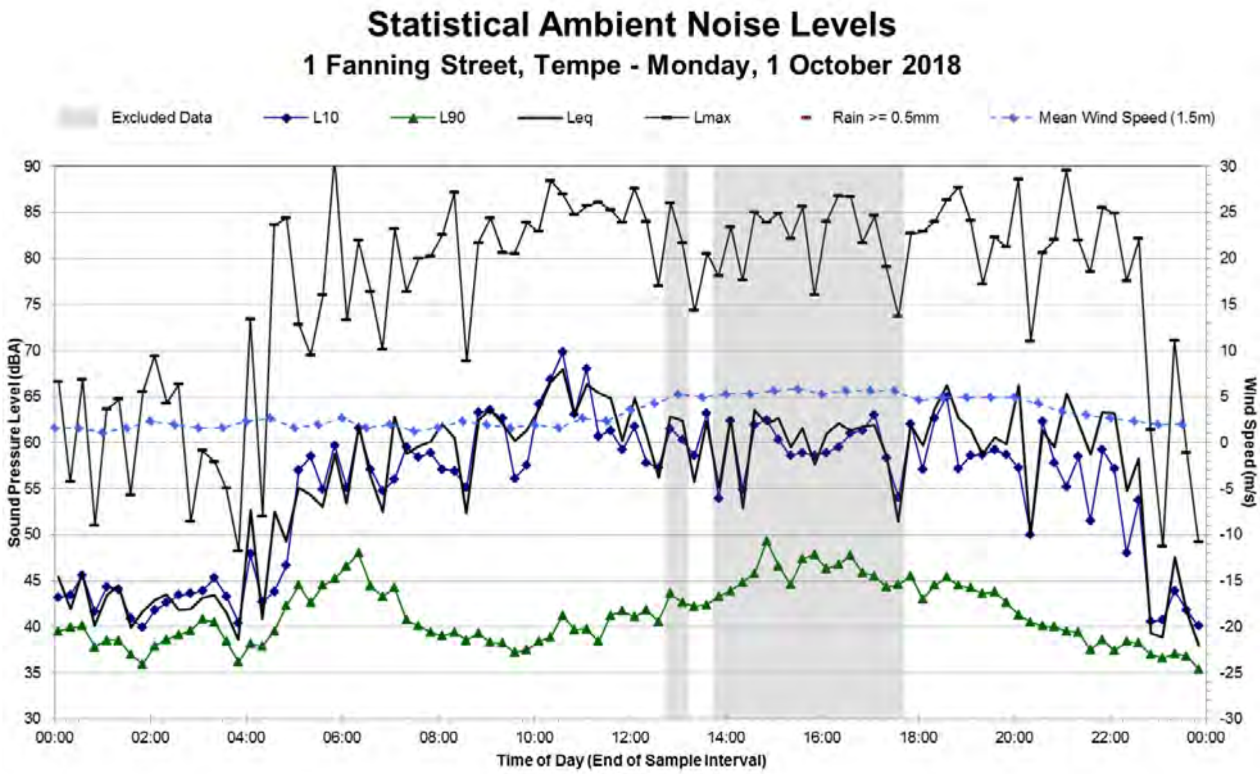
Statistical Ambient Noise Levels

1 Fanning Street, Tempe - Saturday, 29 September 2018

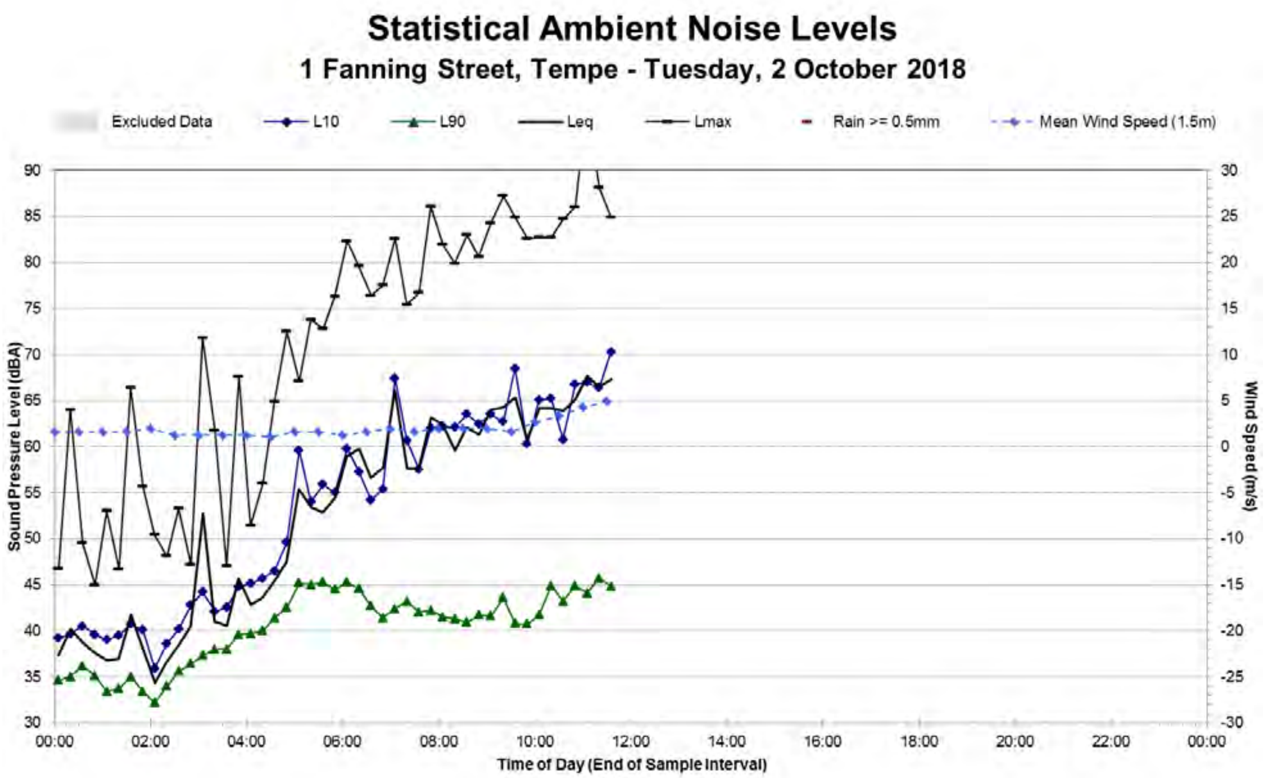




Statistical Ambient Noise Levels
1 Fanning Street, Tempe - Sunday, 30 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)



Statistical Ambient Noise Levels
1 Fanning Street, Tempe - Monday, 1 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)



Statistical Ambient Noise Levels
1 Fanning Street, Tempe - Tuesday, 2 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

Noise Monitoring Location	L.04
Noise Monitoring Address	**Alexandra Canal, Tempe**

Logger Device Type: Svantek 957, Logger Serial No: 26074
Sound Level Meter: Brüel and Kjær 2250L, Sound Level Meter Serial No: 2414604

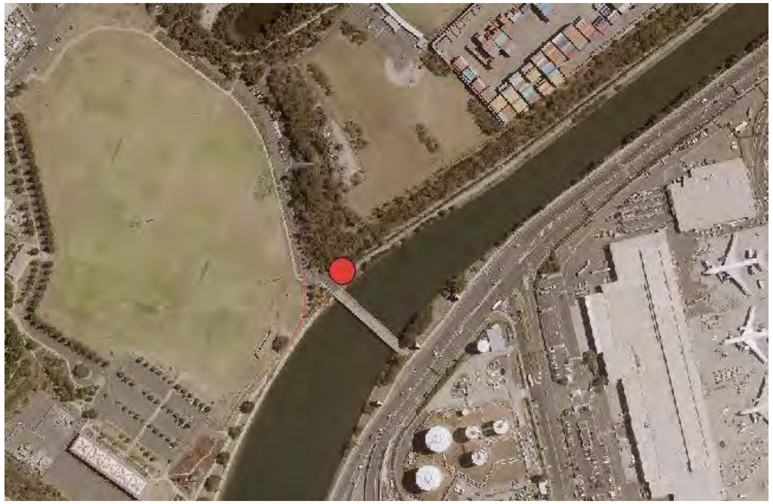
Ambient noise logger deployed at south-western corner of Tempe Park, Tempe. Logger located with direct views of the Alexandra Canal and Airport Drive.

Attended noise measurements indicate the ambient noise environment at this location is dominated by steady state road traffic on Airport Drive. Heavy vehicle passbys on Airport Drive, nearby pedestrians, and aircraft flyovers also contribute to the noise at this location.

Measured Attended Noise Levels (LAmax):

30/10/18: Steady light vehicle traffic on Airport Drive: 56-63 dBA, heavy vehicles: 64 dBA, pedestrians: 61 dBA, aircraft: 76,83 dBA

Map of Noise Monitoring Location



Ambient Noise Logging Results – NPfI Defined Time Periods

Monitoring Period	Noise Level (dBA)			
	RBL	**LAeq**	**L10**	**L1**
Daytime	53	64	66	74
Evening	56	64	64	73
Night-time	46	58	58	61

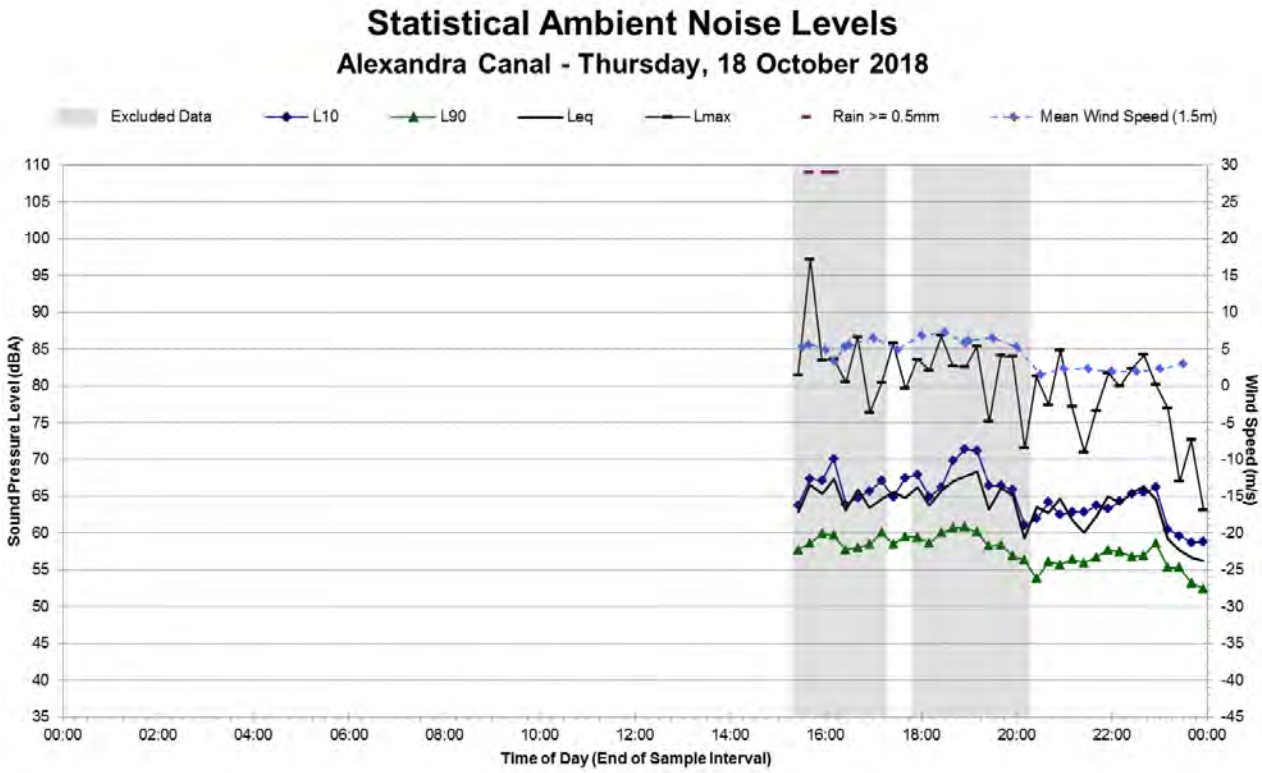
Ambient Noise Logging Results – RNP Defined Time Periods

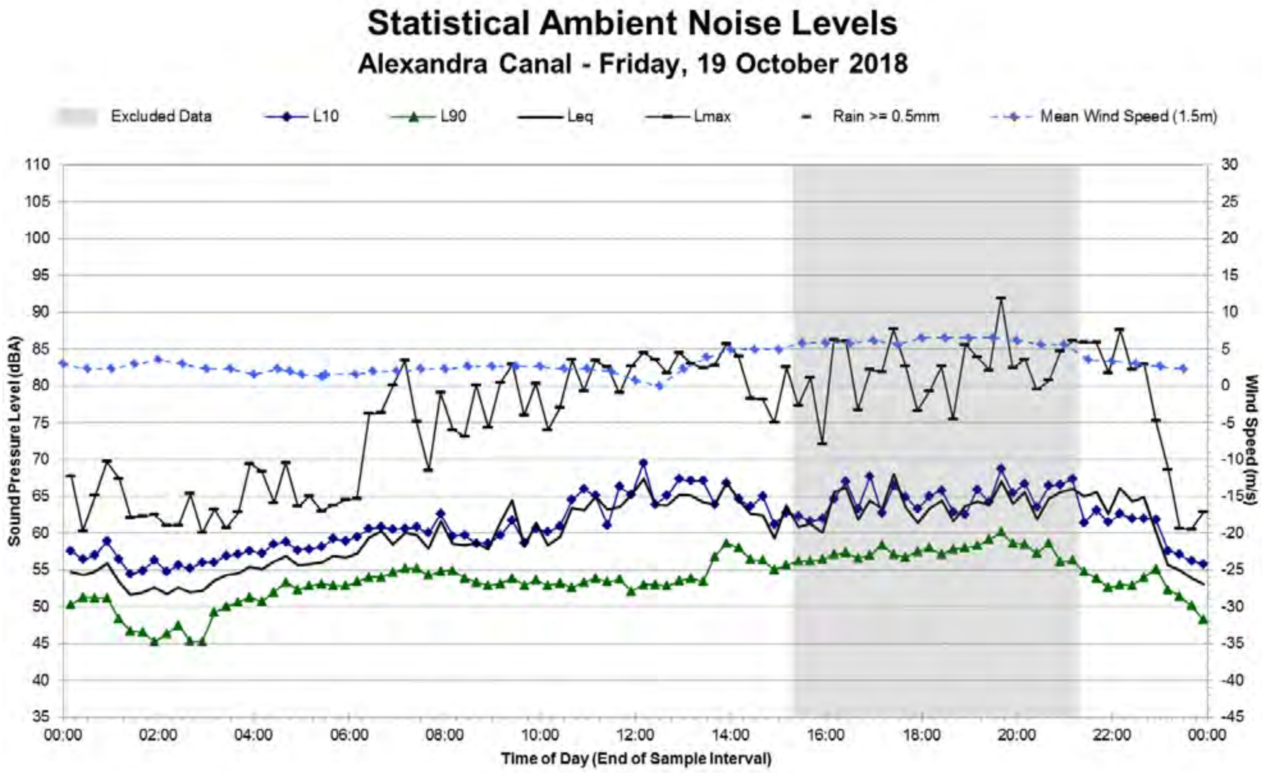
Monitoring Period	Noise Level (dBA)	
	LAeq(period)	**LAeq(1hour)**
Daytime (7am-10pm)	64	66
Night-time (10pm-7am)	58	64

Attended Noise Measurement Results

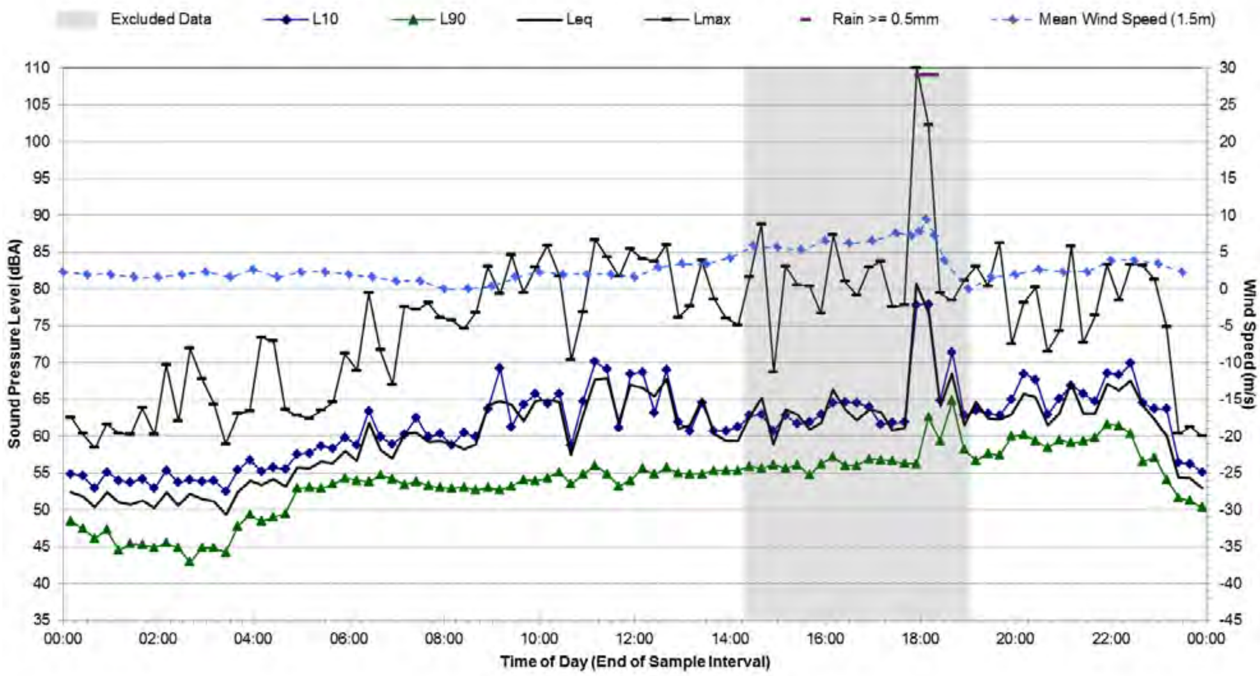
Date	Start Time	Measured Noise Level (dBA)		
		LA90	**LAeq**	**LAmax**
30/10/18	12:46	55	65	83

Photo of Noise Monitoring Location

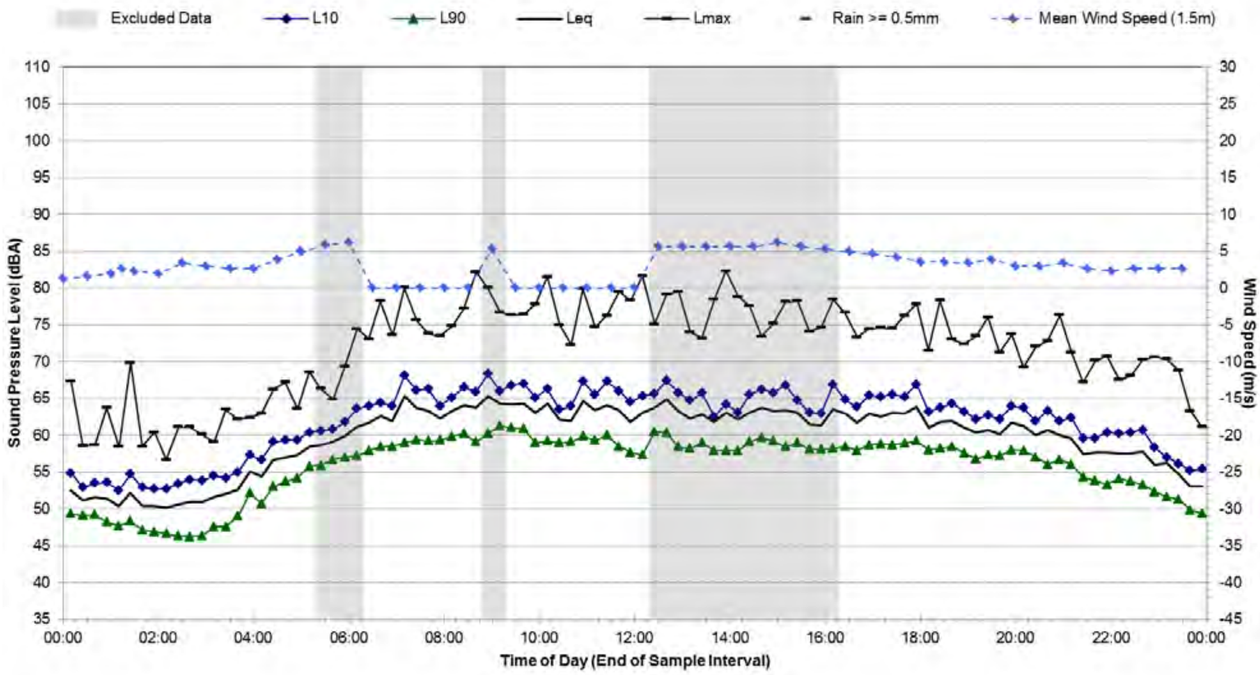

Statistical Ambient Noise Levels
Alexandra Canal - Thursday, 18 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Alexandra Canal - Friday, 19 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

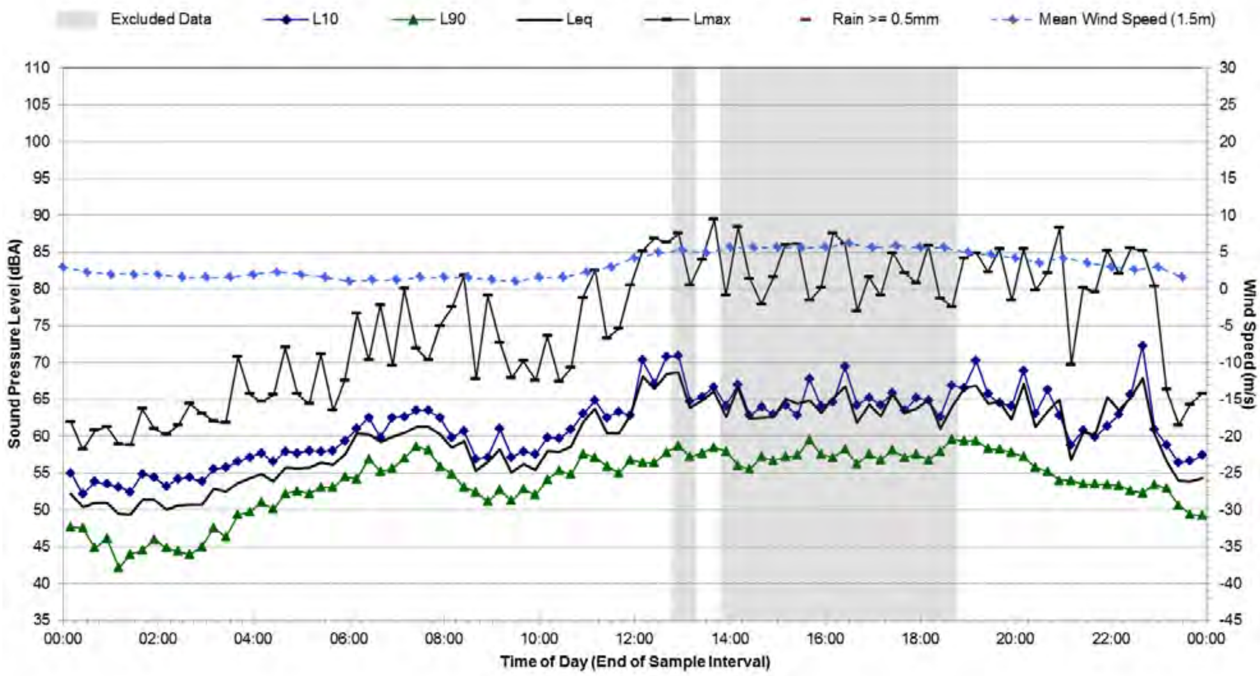
Statistical Ambient Noise Levels
Alexandra Canal - Saturday, 20 October 2018



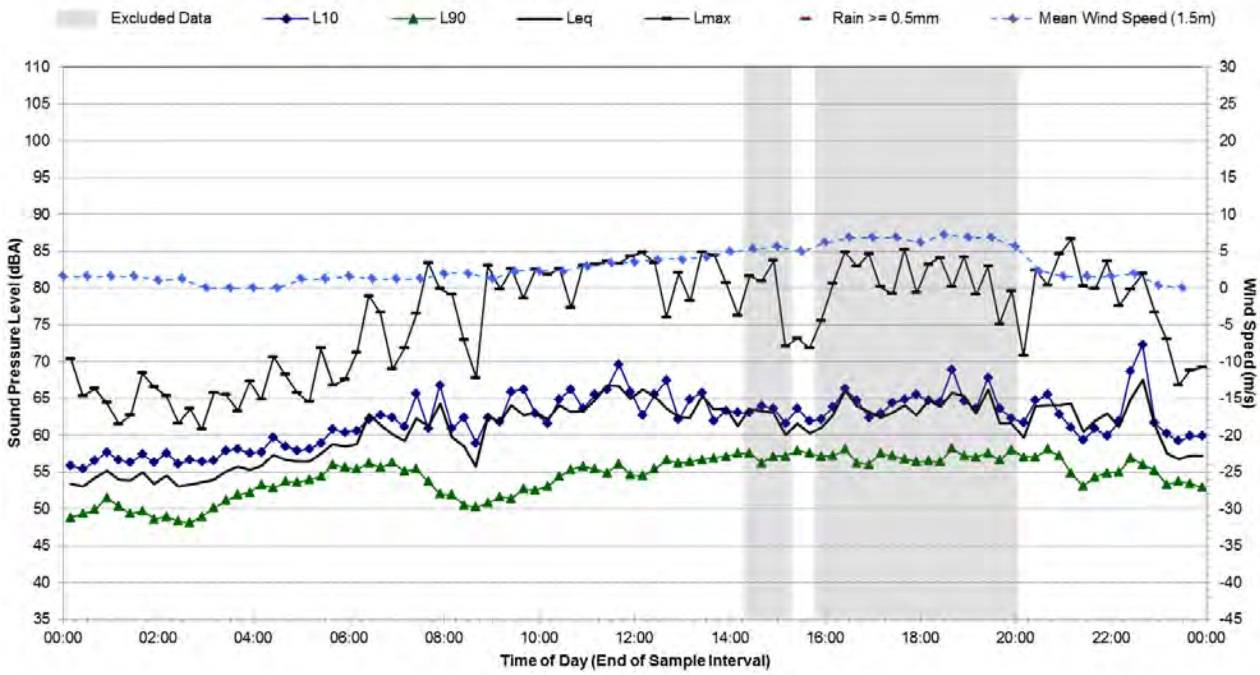
Statistical Ambient Noise Levels
Alexandra Canal - Sunday, 21 October 2018

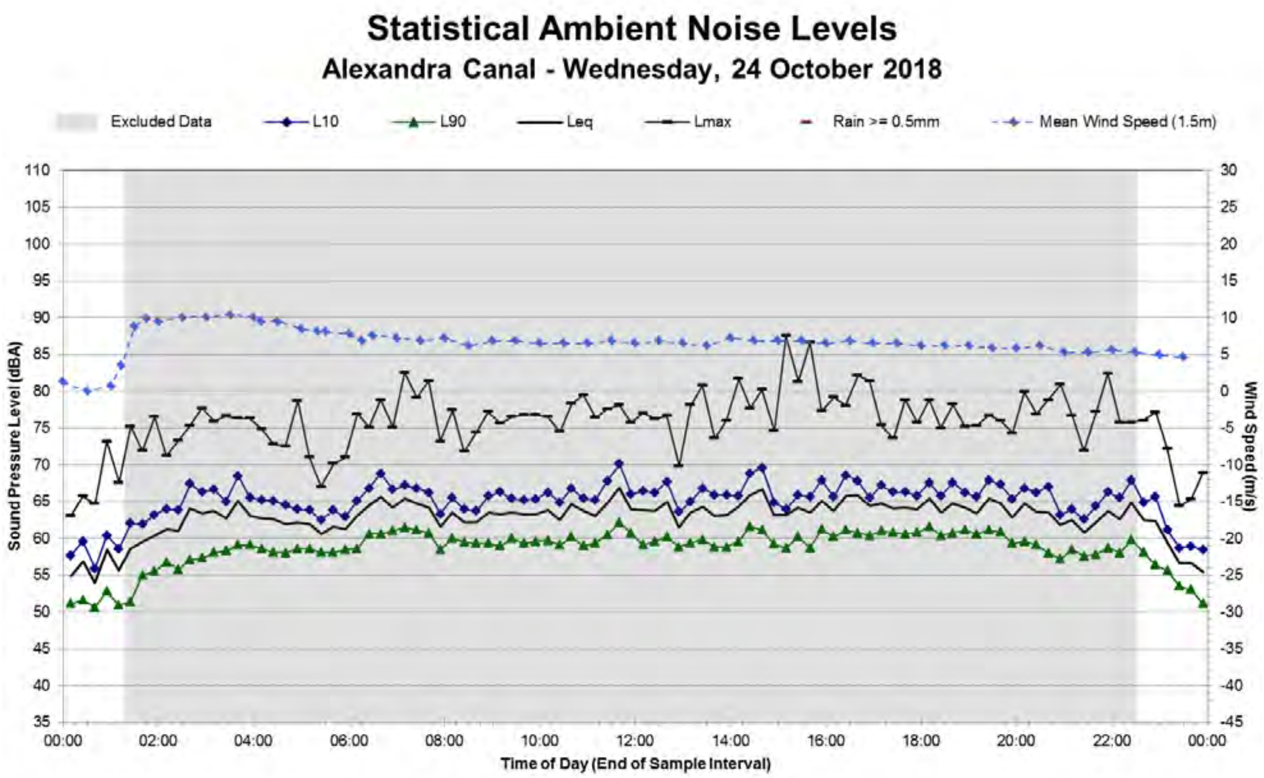


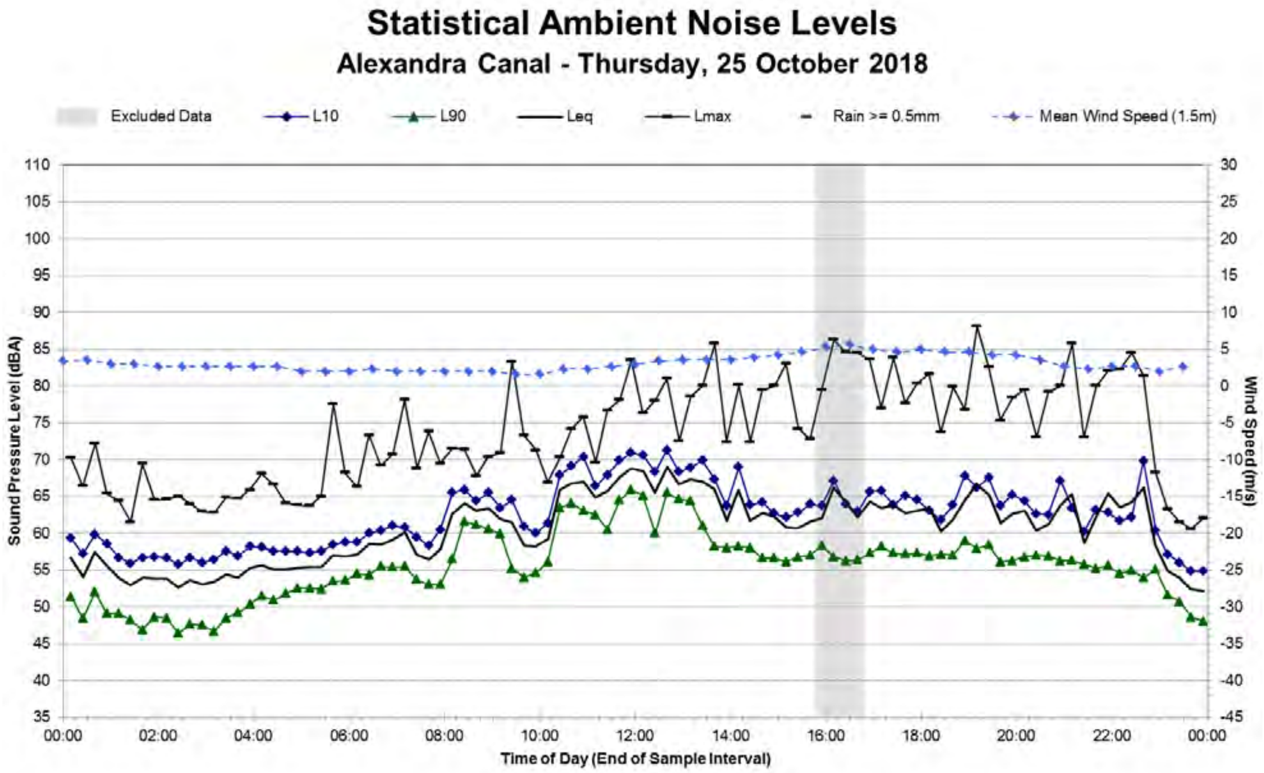
Statistical Ambient Noise Levels
Alexandra Canal - Monday, 22 October 2018

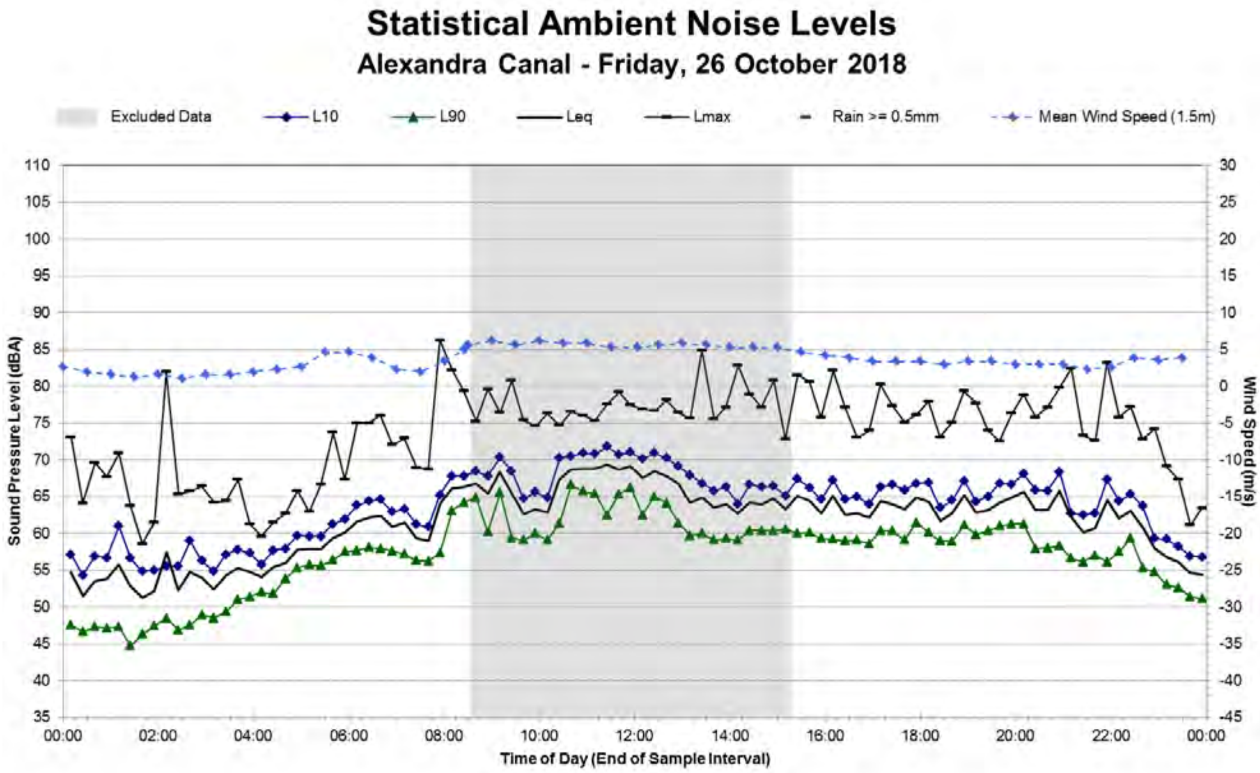


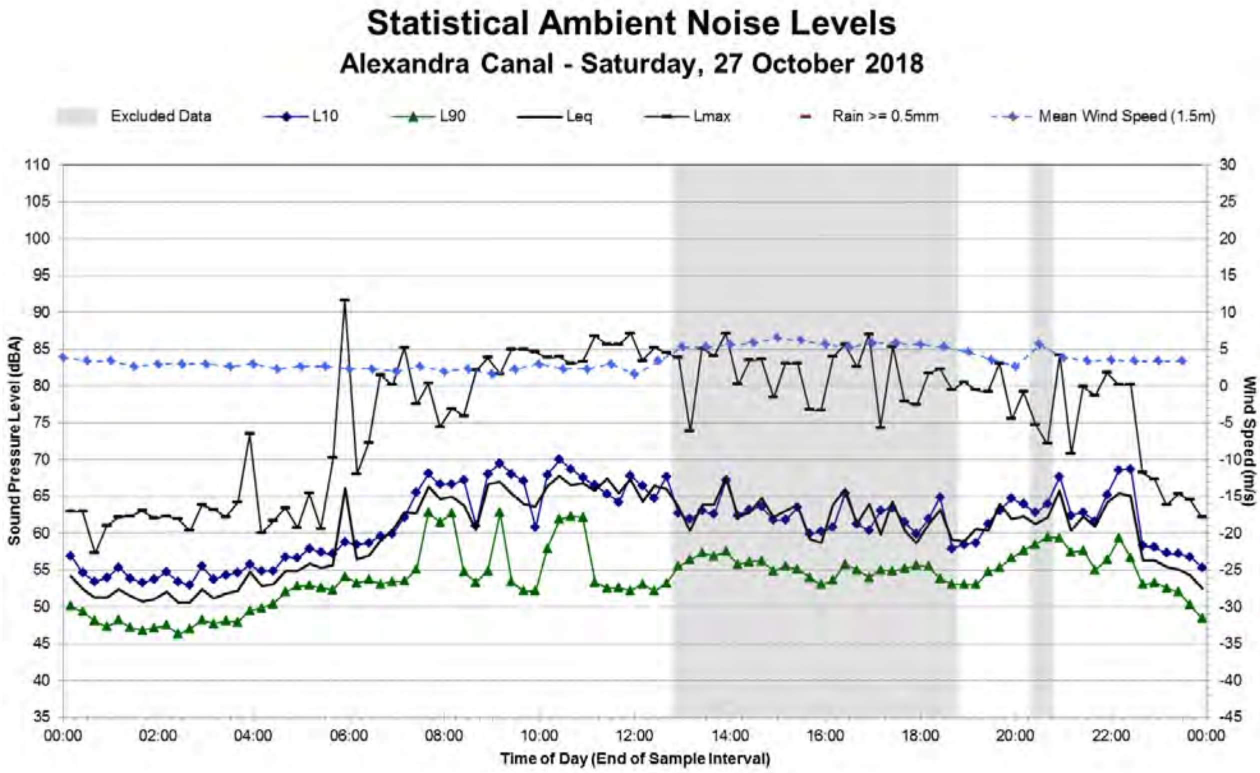
Statistical Ambient Noise Levels
Alexandra Canal - Tuesday, 23 October 2018

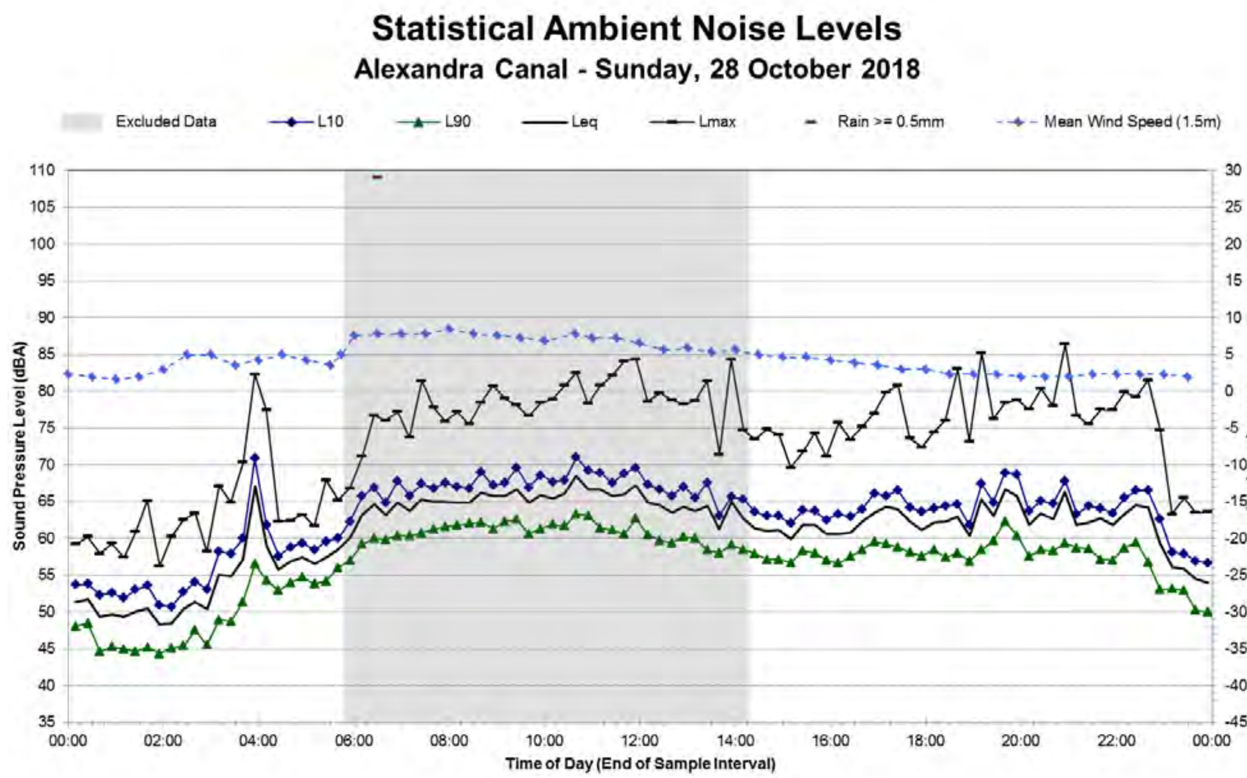


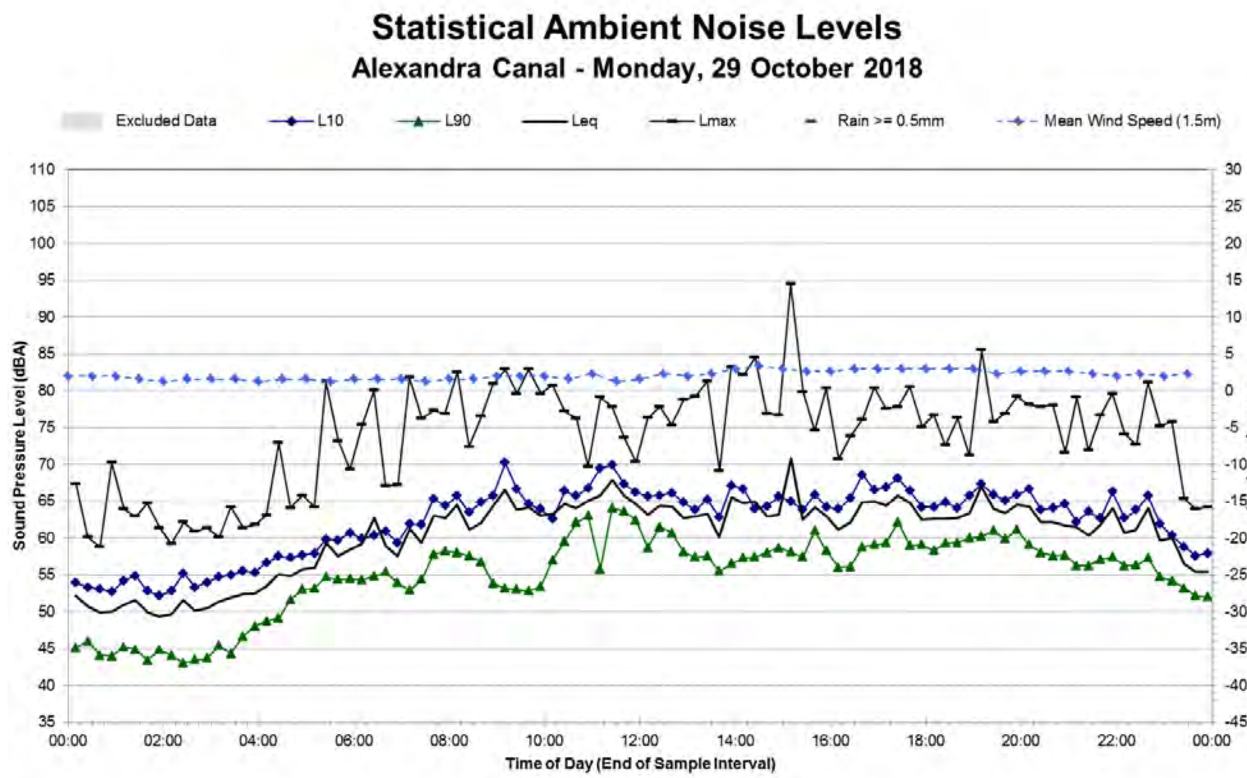

Statistical Ambient Noise Levels
Alexandra Canal - Wednesday, 24 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

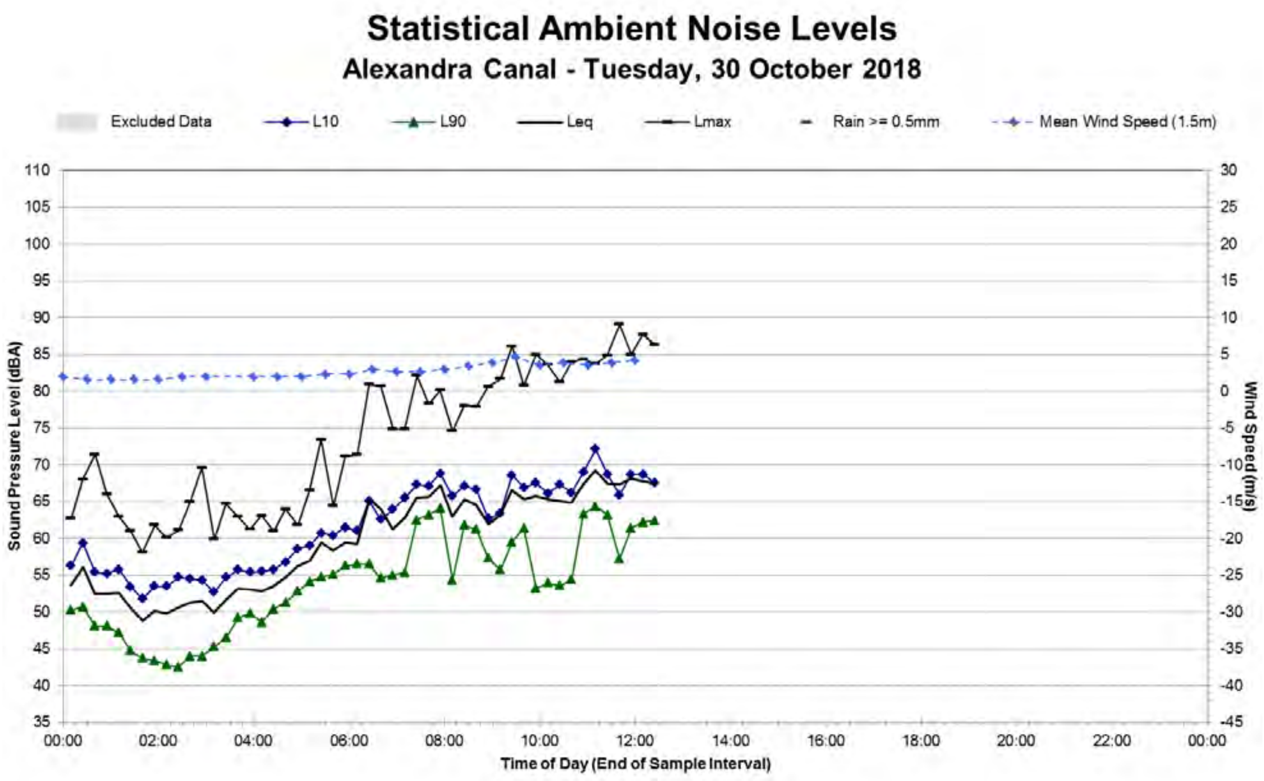

Statistical Ambient Noise Levels
Alexandra Canal - Thursday, 25 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Alexandra Canal - Friday, 26 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Alexandra Canal - Saturday, 27 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Alexandra Canal - Sunday, 28 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Alexandra Canal - Monday, 29 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)



Statistical Ambient Noise Levels
Alexandra Canal - Tuesday, 30 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

Noise Monitoring Location	L.05
Noise Monitoring Address	**Canal Road, St Peters**

Logger Device Type: Svantek 957, Logger Serial No: 23814
Sound Level Meter: Brüel and Kjær 2250L, Sound Level Meter Serial No: 2414604

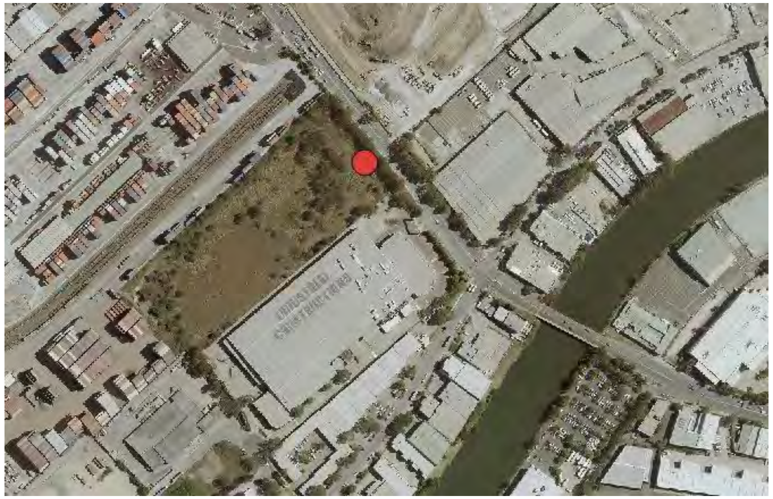
Ambient noise logger deployed at road facing edge of grassland block, 30 Canal Road, St Peters. Logger located with view of Canal Road.

Attended noise measurements indicate the ambient noise environment at this location is influenced by frequent road traffic on Canal Road. Heavy vehicle passbys, nearby container loading, and aircraft flyovers also contribute to the noise at this location.

Measured Attended Noise Levels (LAmax):

30/10/18: Steady light vehicle traffic on Canal Road: 65 dBA, heavy vehicles: 68-75 dBA, container loading: 67 dBA, aircraft: 69 dBA

Map of Noise Monitoring Location



Ambient Noise Logging Results – NPfI Defined Time Periods

Monitoring Period	Noise Level (dBA)			
	RBL	LAeq	L10	L1
Daytime	58	67	69	75
Evening	54	65	68	73
Night-time	49	63	65	70

Ambient Noise Logging Results – RNP Defined Time Periods

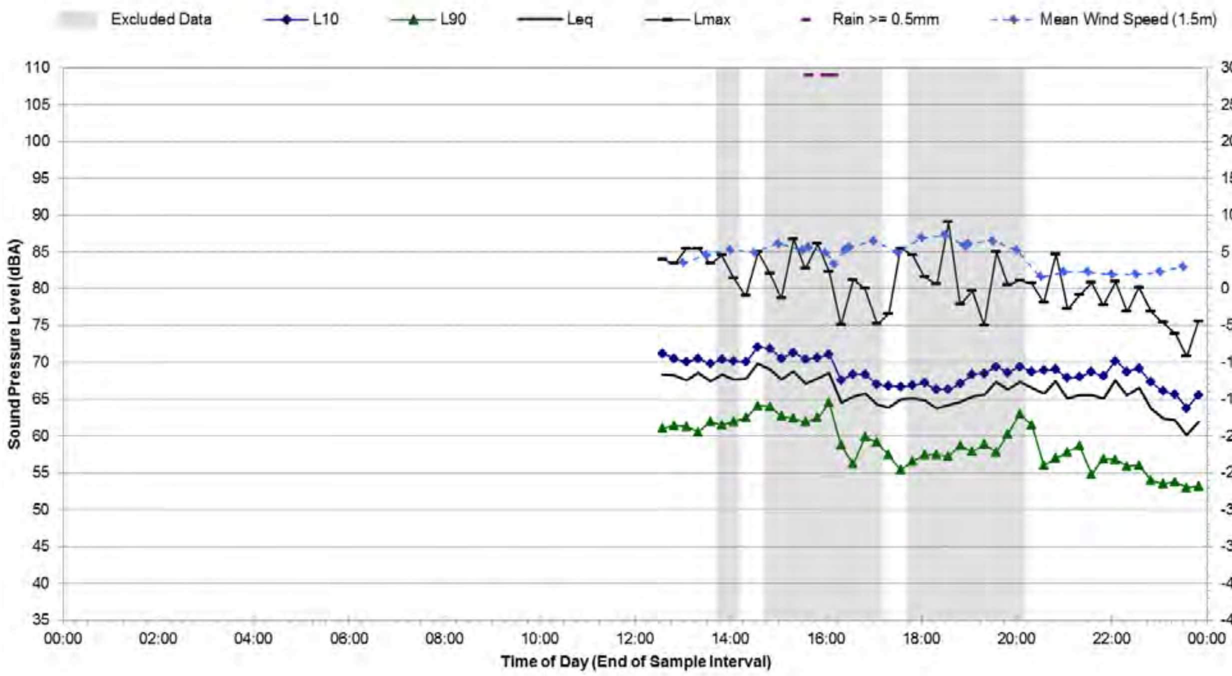
Monitoring Period	Noise Level (dBA)	
	LAeq(period)	LAeq(1hour)
Daytime (7am-10pm)	66	68
Night-time (10pm-7am)	63	67

Attended Noise Measurement Results

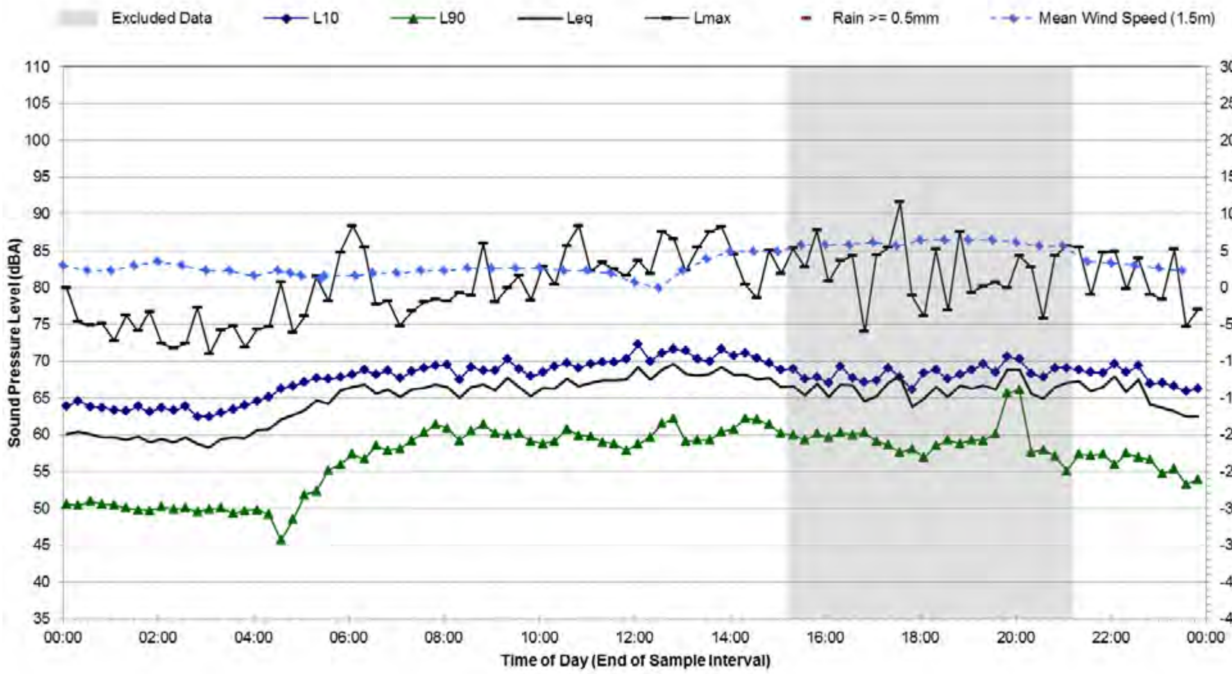
Date	Start Time	Measured Noise Level (dBA)		
		LA90	LAeq	LAmax
30/10/18	14:50	60	66	75

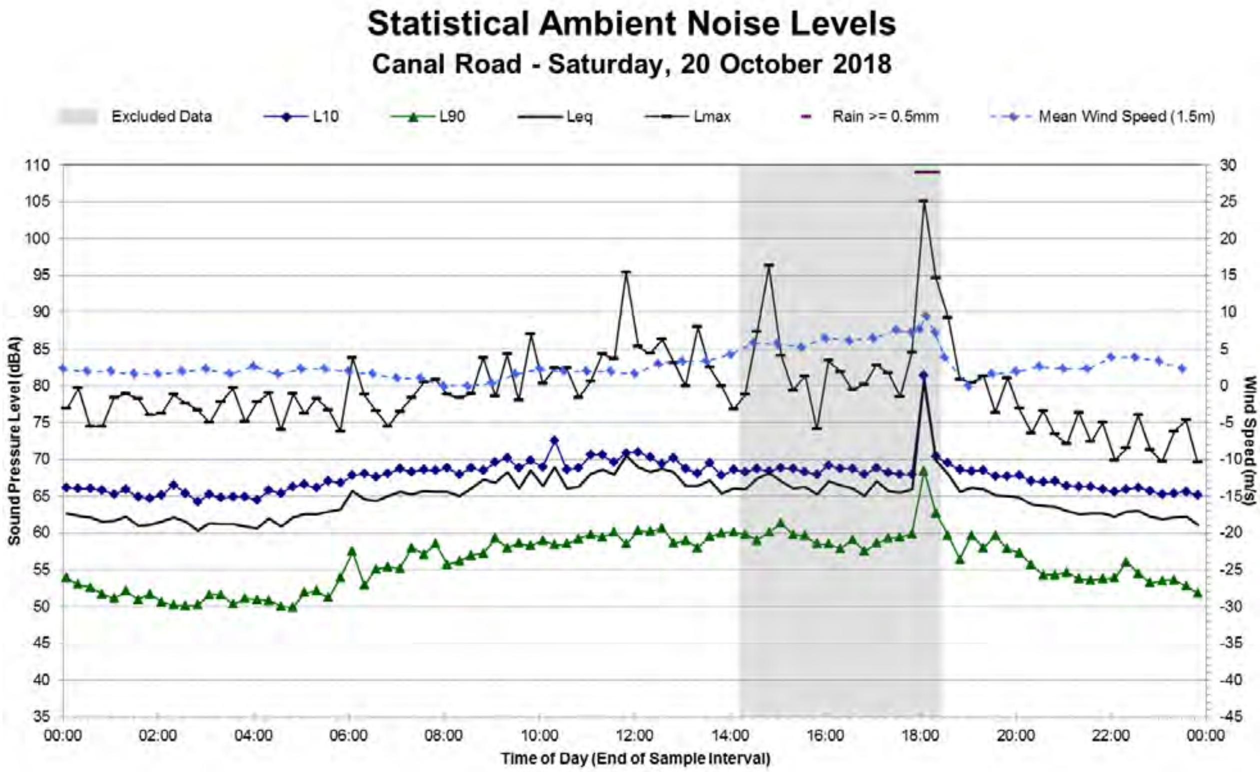
Photo of Noise Monitoring Location

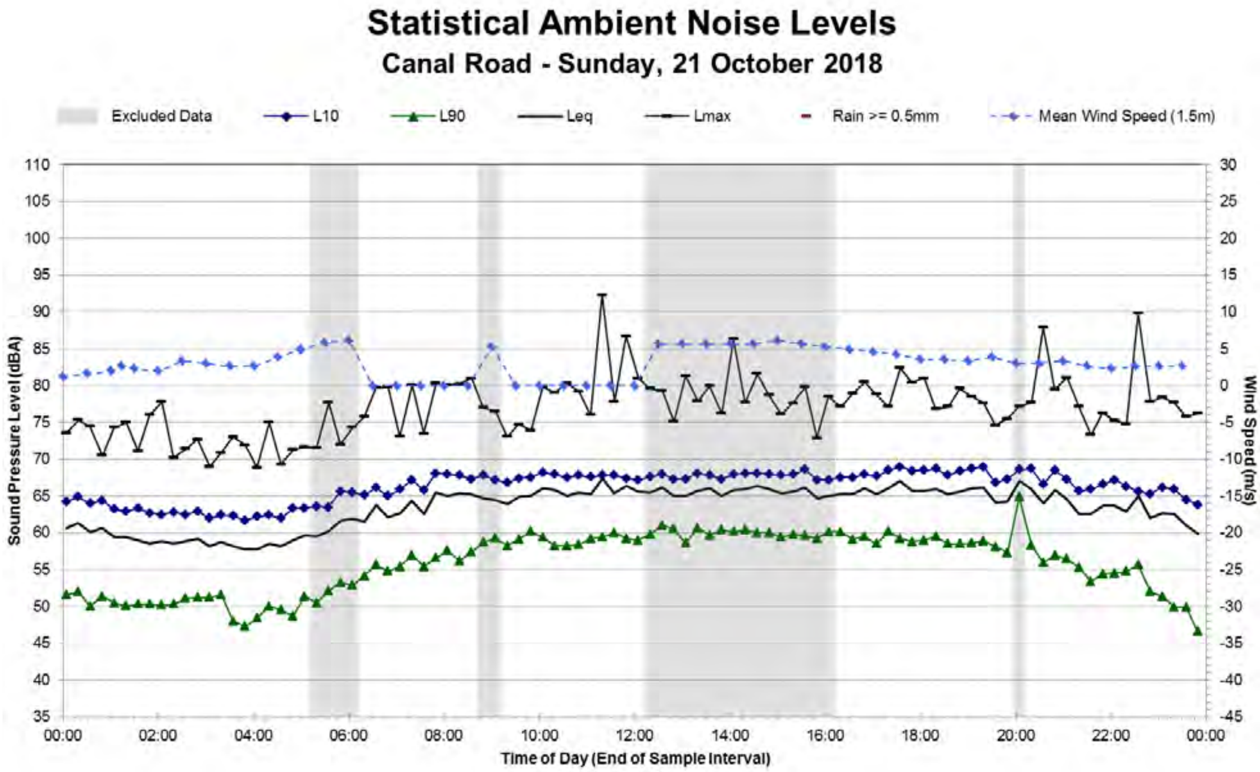
Statistical Ambient Noise Levels
Canal Road - Thursday, 18 October 2018

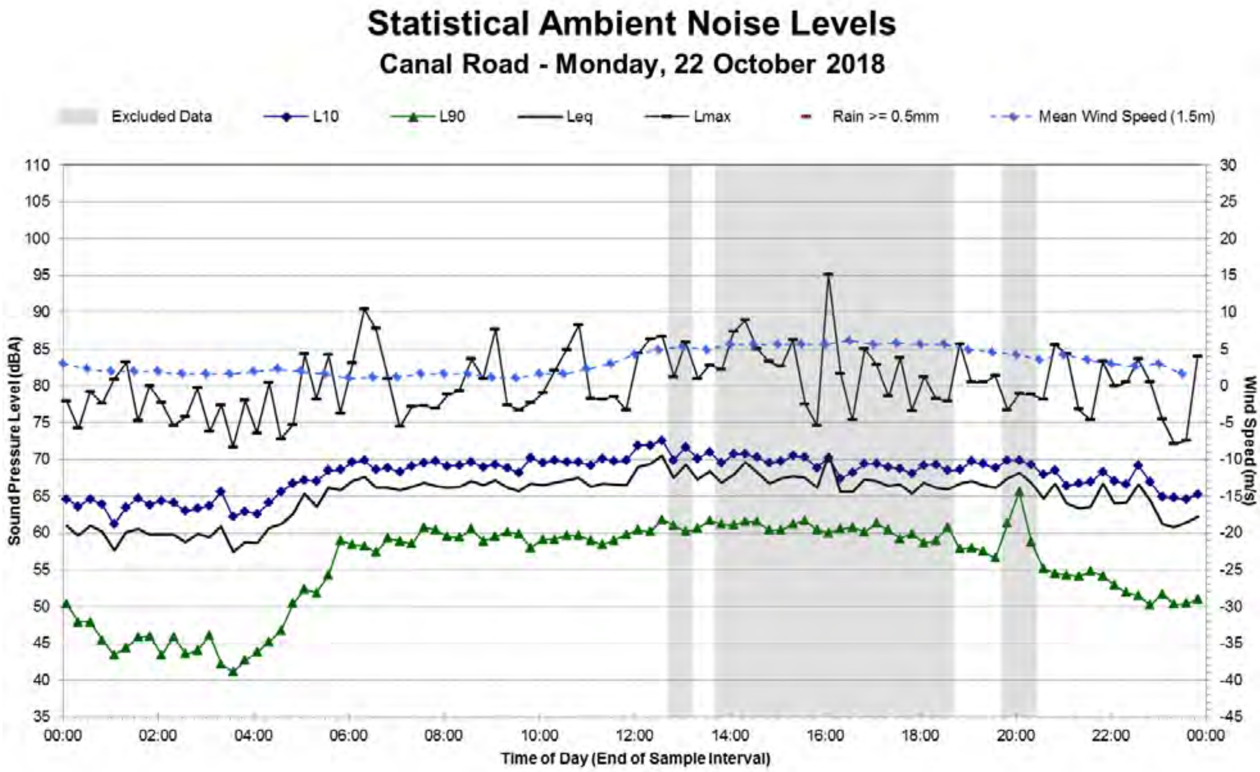


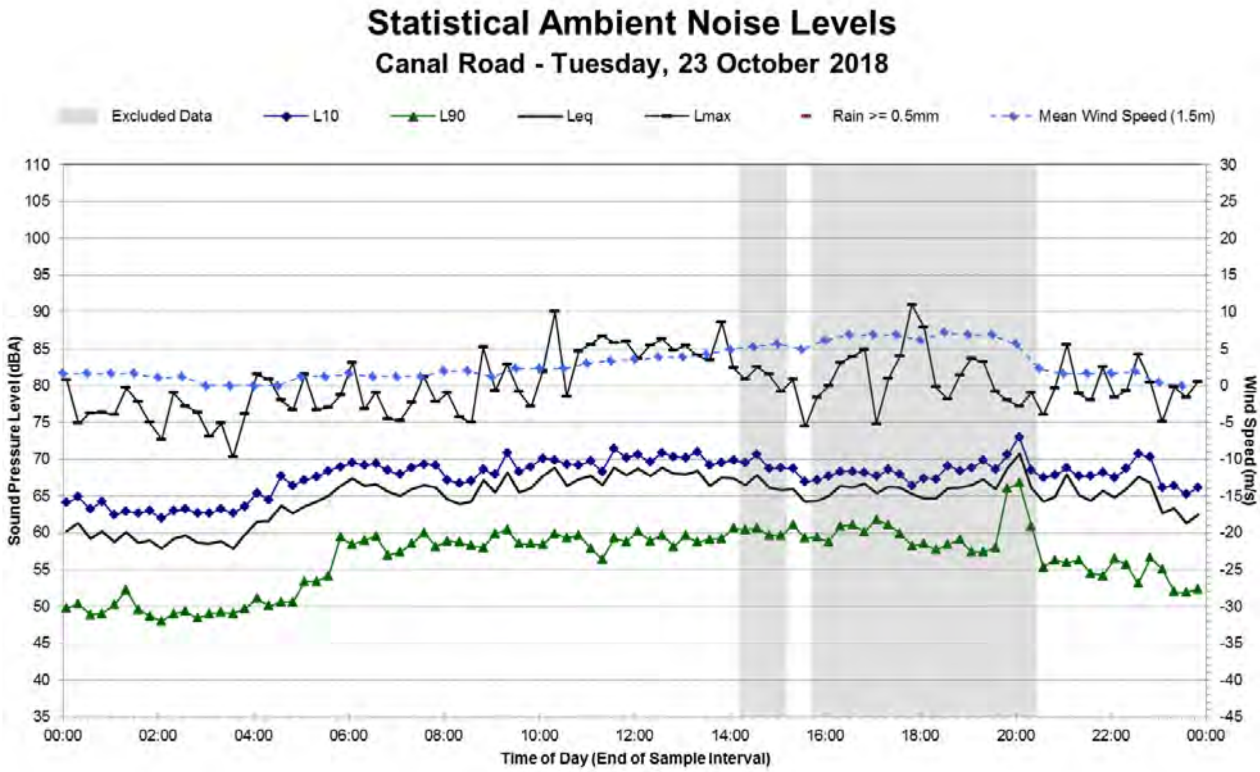
Statistical Ambient Noise Levels
Canal Road - Friday, 19 October 2018

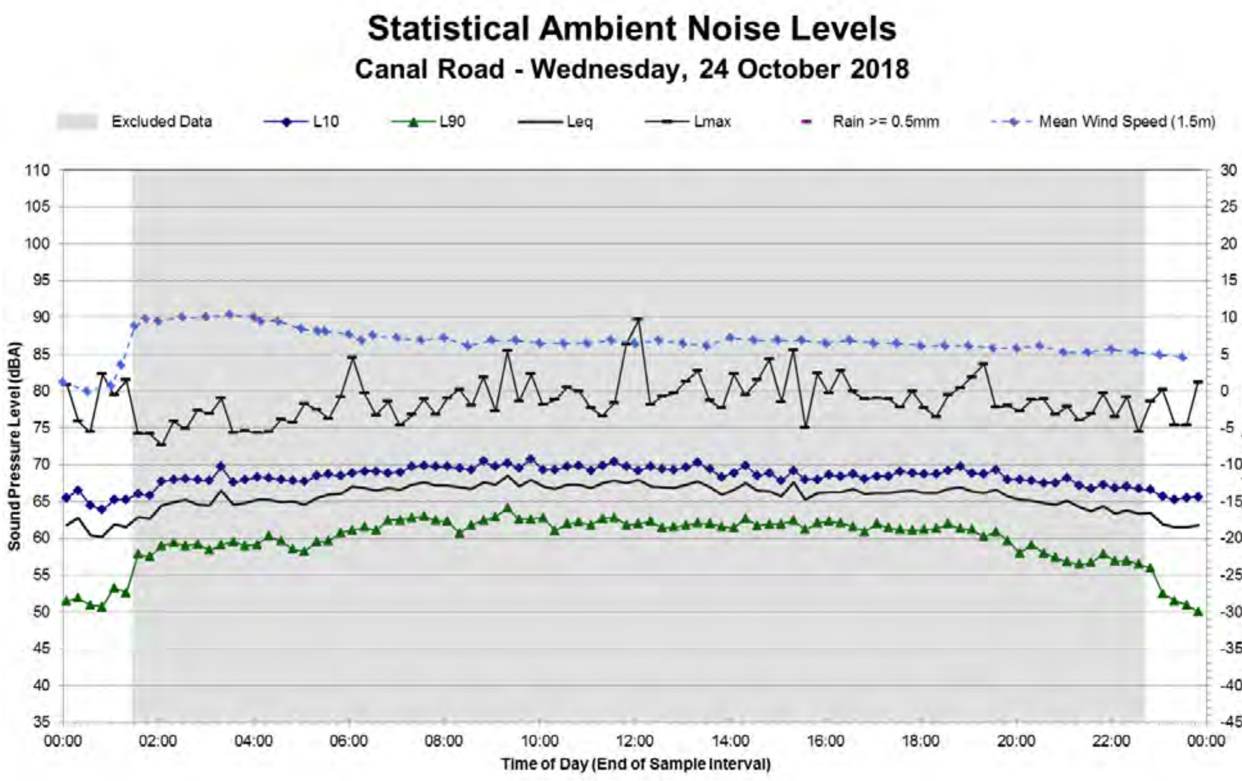


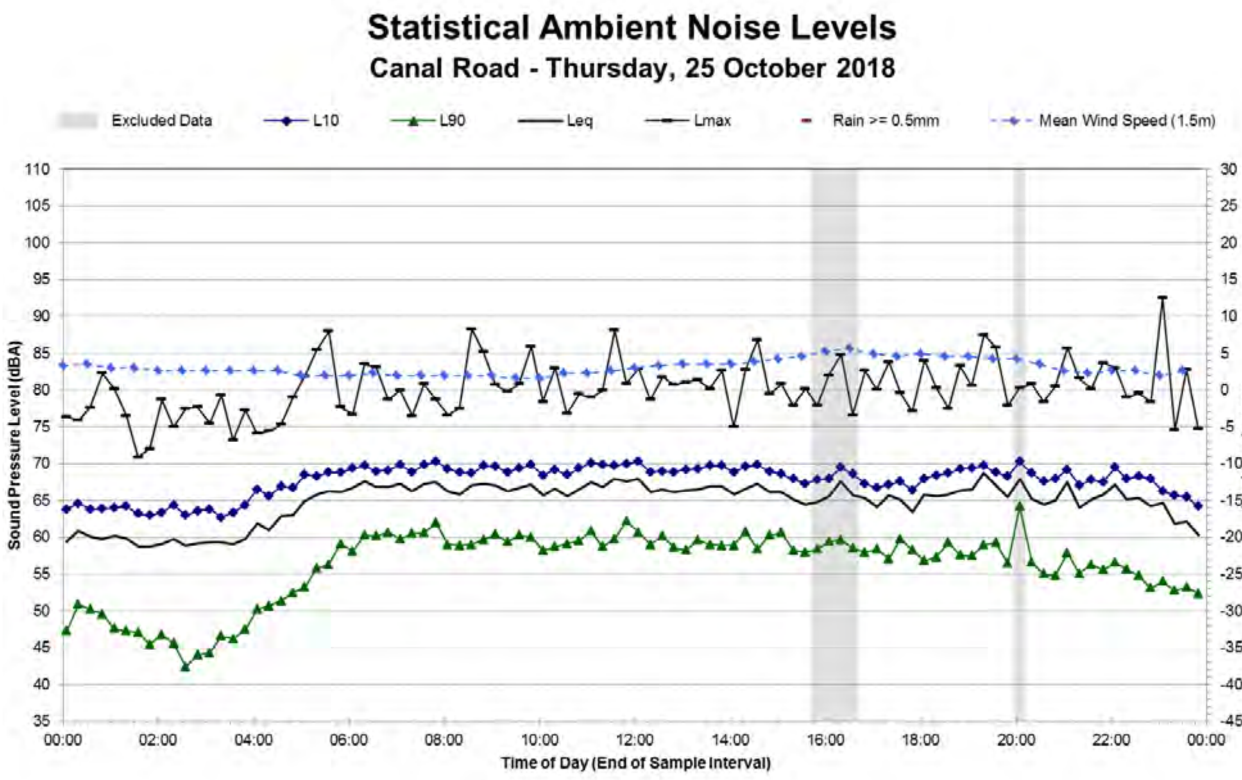

Statistical Ambient Noise Levels
Canal Road - Saturday, 20 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

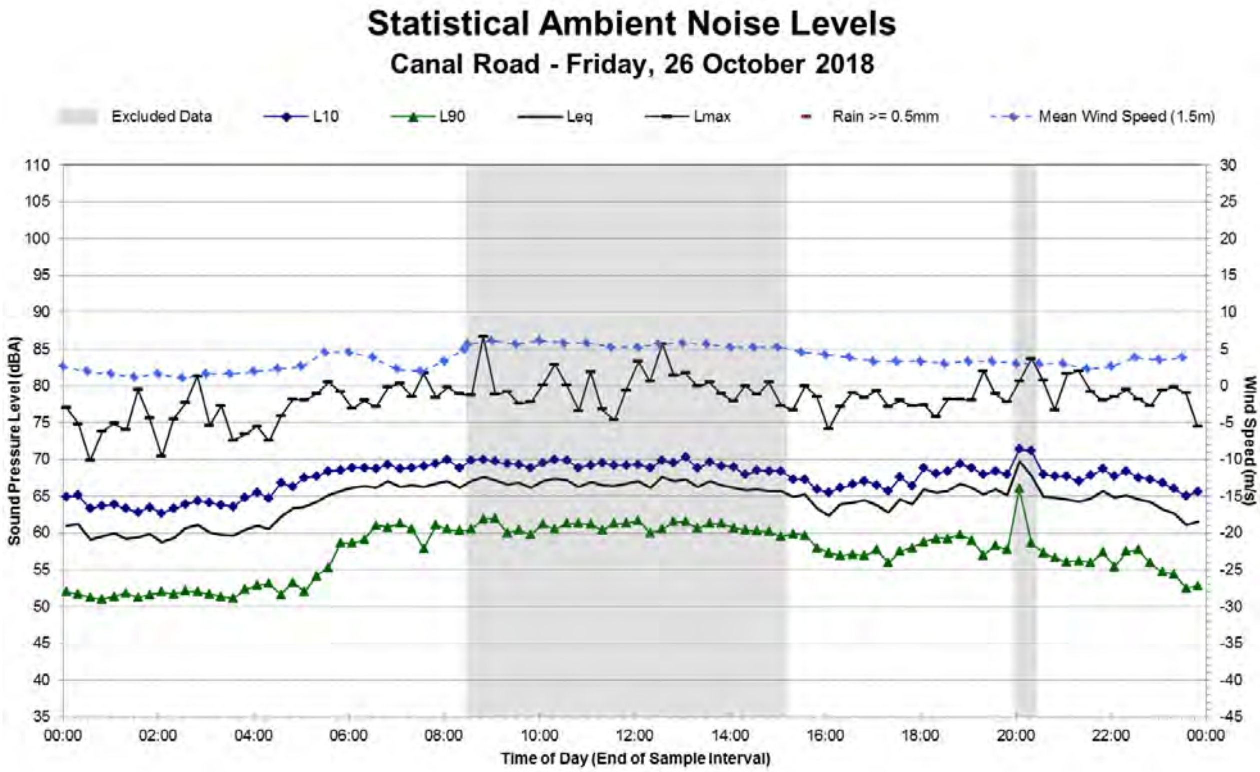

Statistical Ambient Noise Levels
Canal Road - Sunday, 21 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

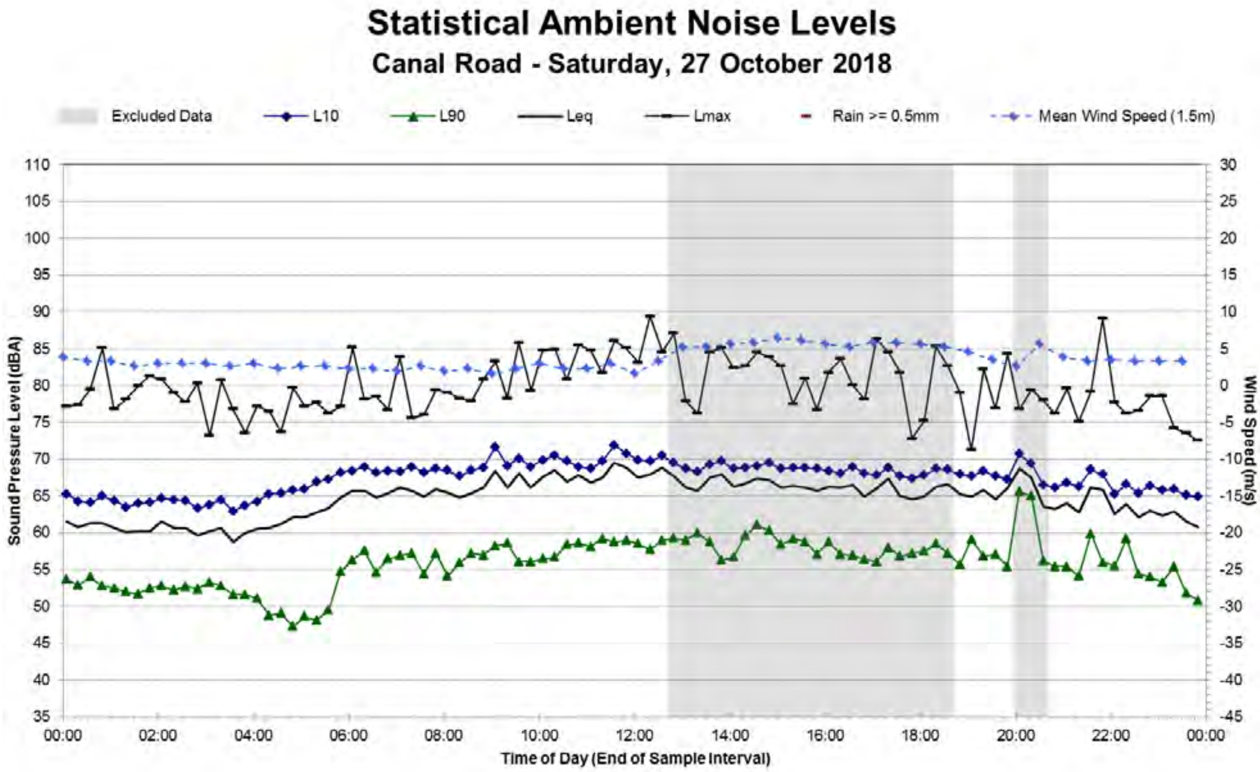

Statistical Ambient Noise Levels
Canal Road - Monday, 22 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00

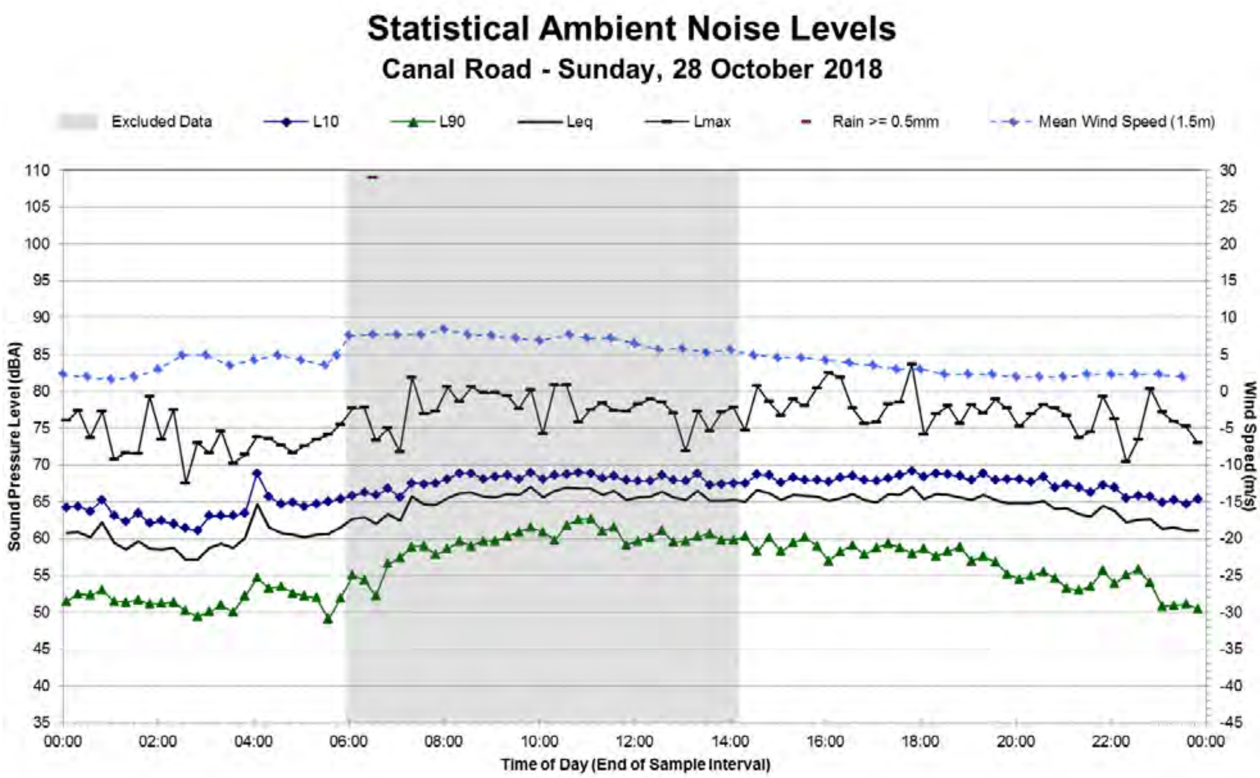

Statistical Ambient Noise Levels
Canal Road - Tuesday, 23 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00

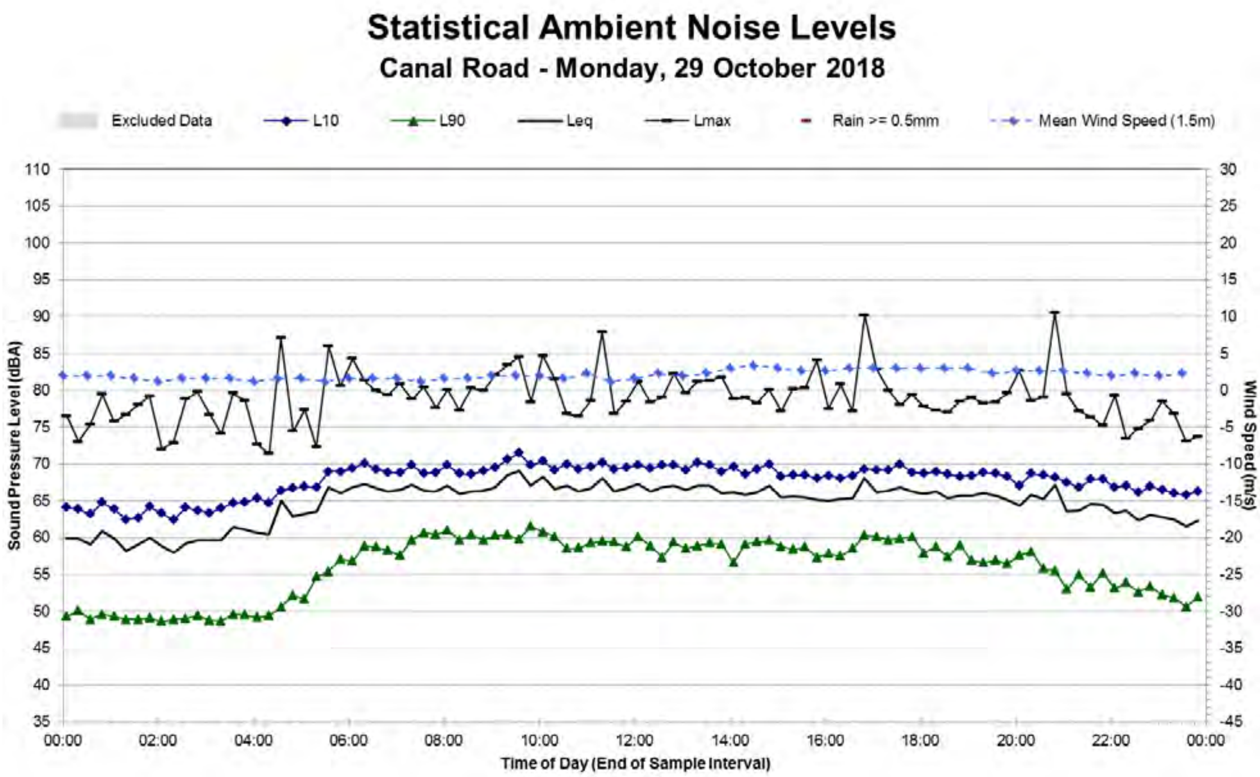

Statistical Ambient Noise Levels
Canal Road - Wednesday, 24 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

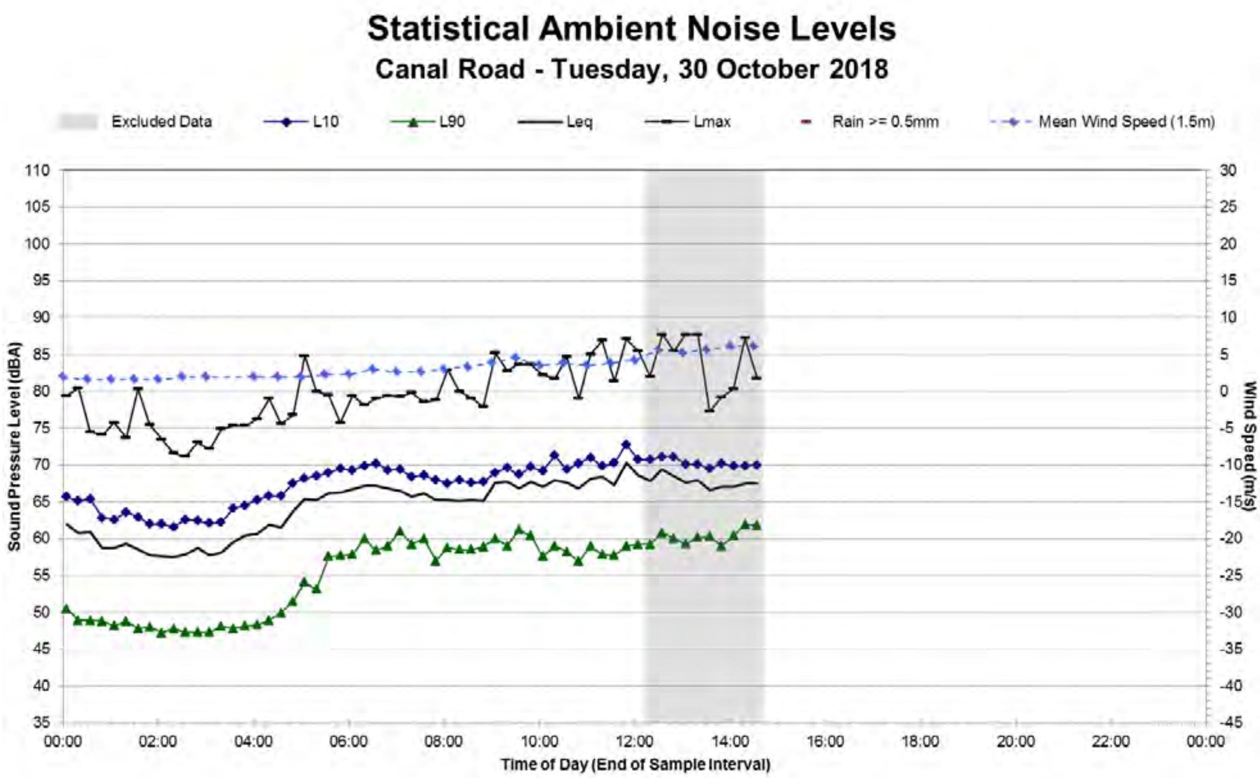

Statistical Ambient Noise Levels
Canal Road - Thursday, 25 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Canal Road - Friday, 26 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Canal Road - Saturday, 27 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Canal Road - Sunday, 28 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Canal Road - Monday, 29 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)



Statistical Ambient Noise Levels
Canal Road - Tuesday, 30 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

Noise Monitoring Location	L.06
Noise Monitoring Address	Qantas Drive, Mascot

Logger Device Type: Svantek 957, Logger Serial No: 21473
Sound Level Meter: Brüel and Kjær 2250L, Sound Level Meter Serial No: 2414604

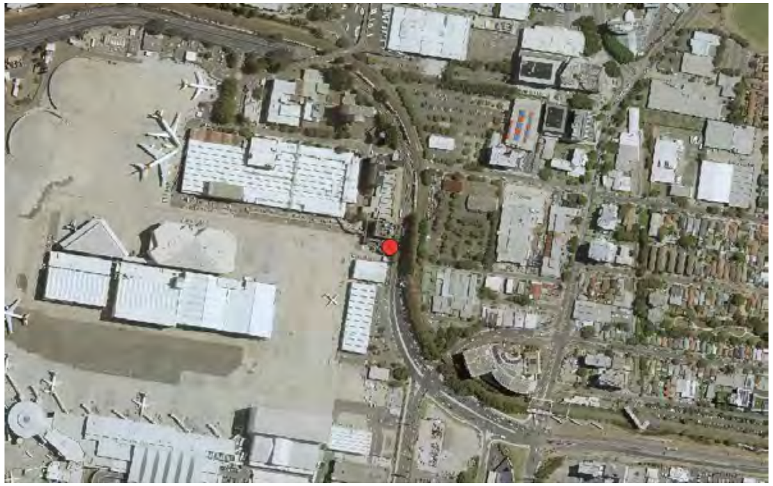
Ambient noise logger deployed at Sydney Domestic Airport opposite 34 Qantas Drive, Mascot.

Attended noise measurements indicate the ambient noise environment at this location is dominated by steady state road traffic on Qantas Drive. Heavy vehicle passbys, train passbys and aircraft noise also contribute to the noise at this location.

Measured Attended Noise Levels (LAmax):

30/10/18: Steady light vehicle traffic: 68-75 dBA, heavy vehicles: 74-84 dBA, train: 95 dBA, helicopter: 73 dBA

Map of Noise Monitoring Location



Ambient Noise Logging Results – NPfI Defined Time Periods

Monitoring Period	Noise Level (dBA)			
	RBL	LAeq	L10	L1
Daytime	63	73	75	81
Evening	60	72	75	80
Night-time	52	70	73	79

Ambient Noise Logging Results – RNP Defined Time Periods

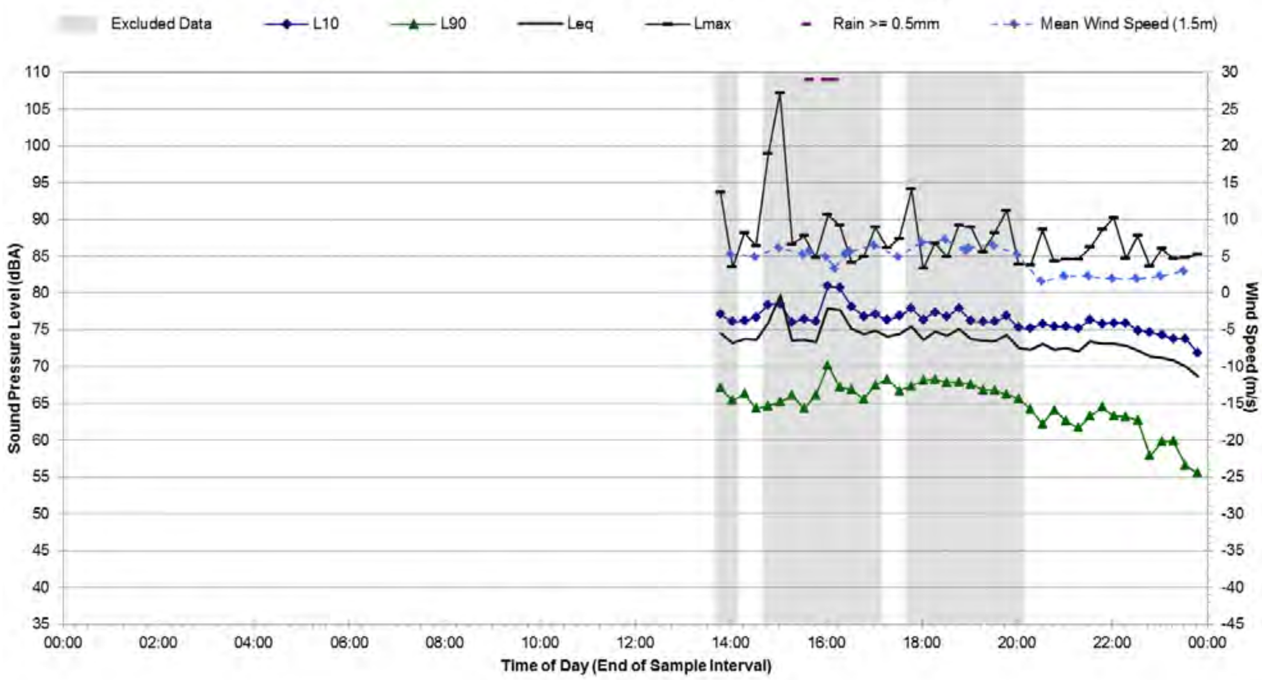
Monitoring Period	Noise Level (dBA)	
	LAeq(period)	LAeq(1hour)
Daytime (7am-10pm)	72	73
Night-time (10pm-7am)	70	73

Attended Noise Measurement Results

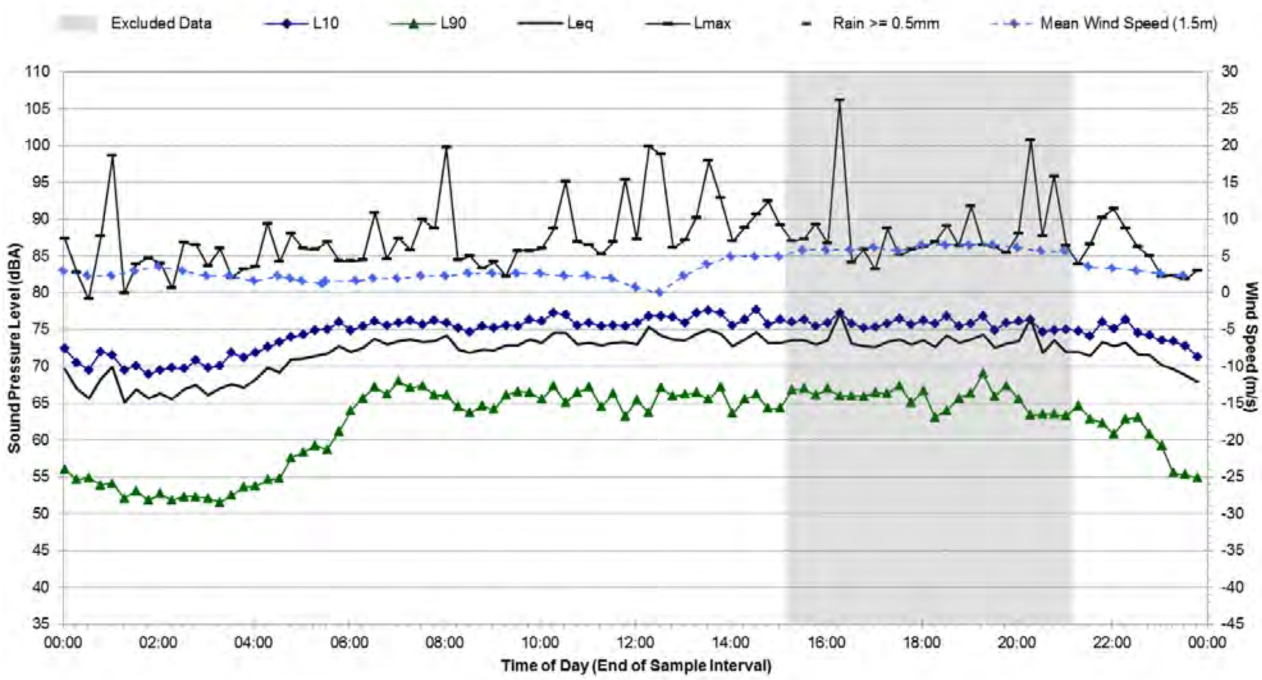
Date	Start Time	Measured Noise Level (dBA)		
		LA90	LAeq	LAmax
30/10/18	11:52	61	74	95

Photo of Noise Monitoring Location

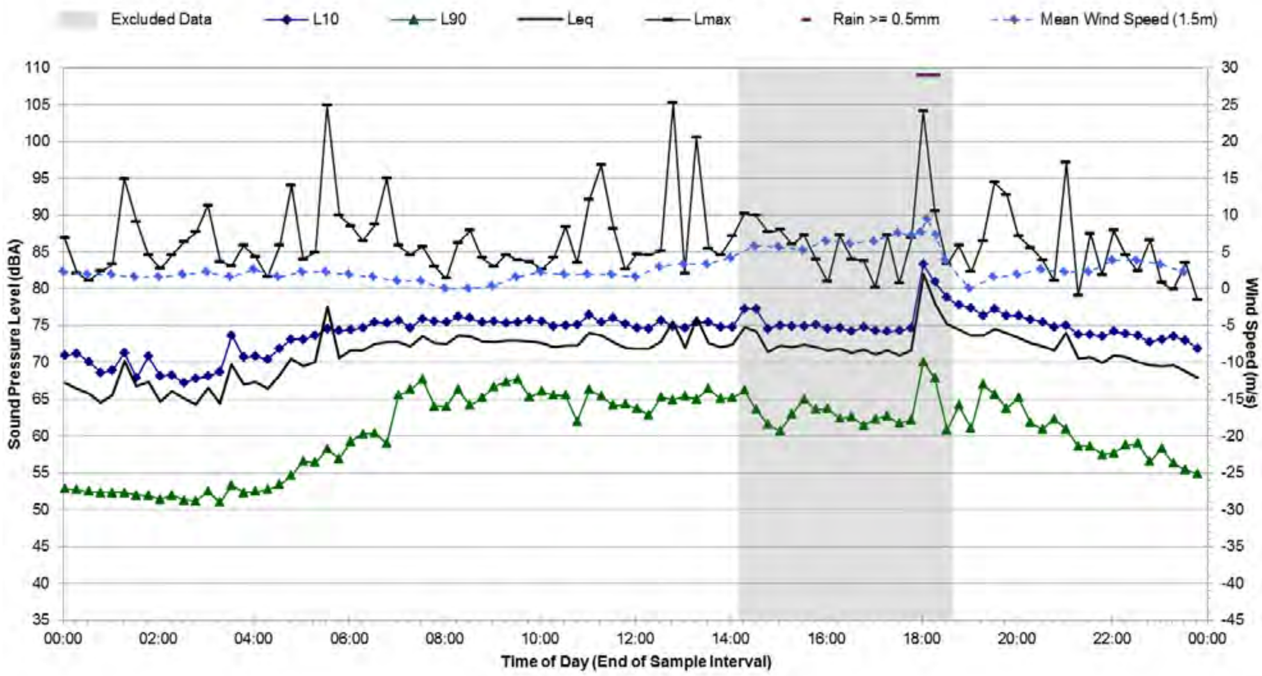
Statistical Ambient Noise Levels
Qantas Drive, Mascot - Thursday, 18 October 2018



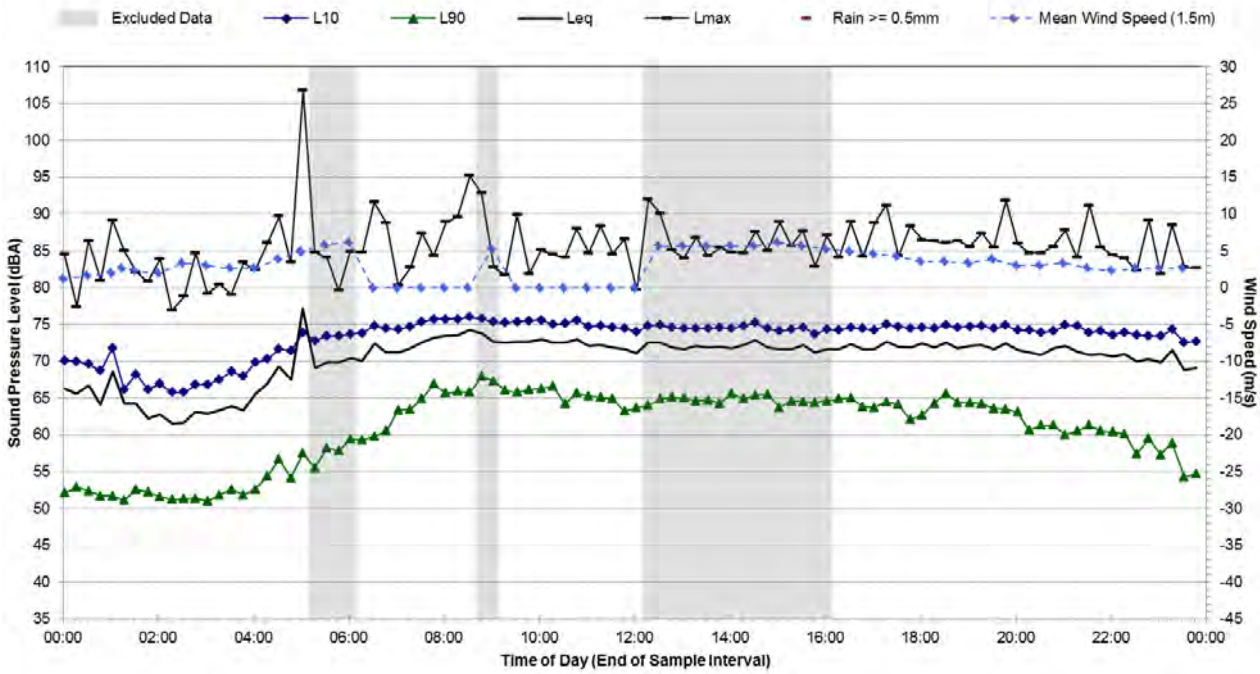
Statistical Ambient Noise Levels
Qantas Drive, Mascot - Friday, 19 October 2018

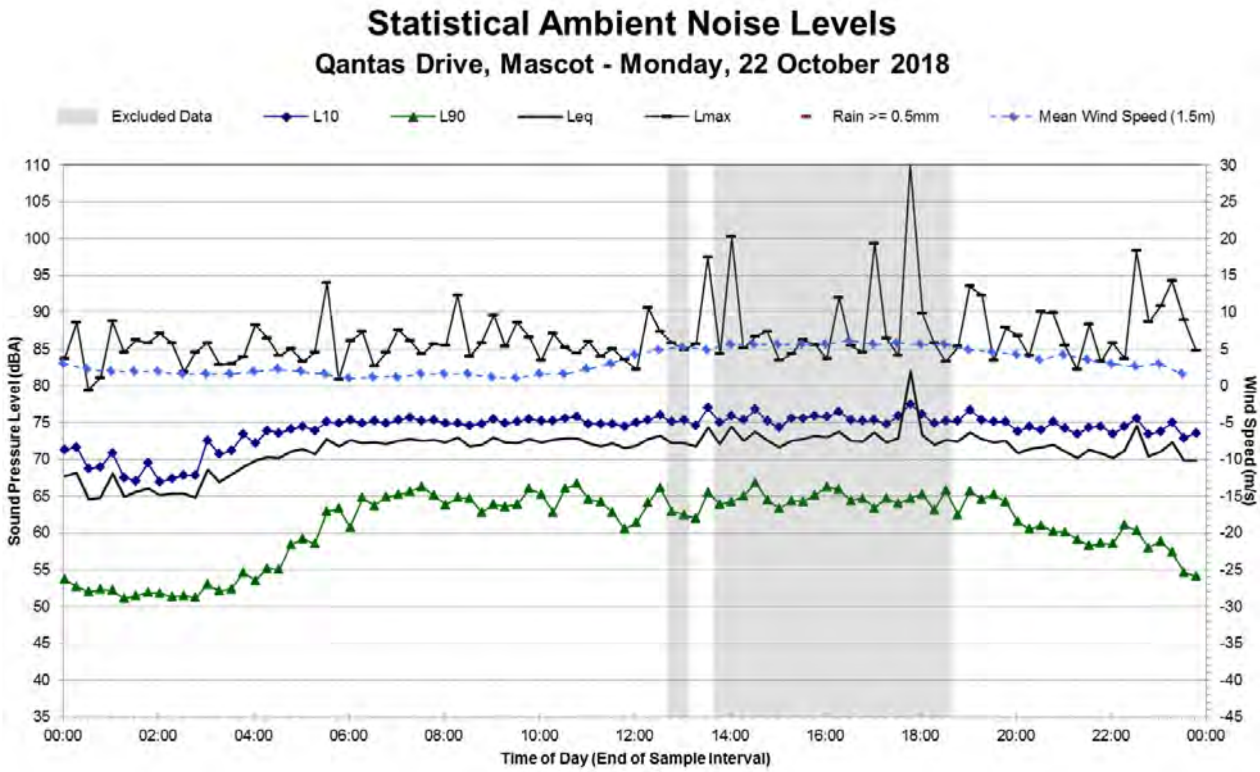


Statistical Ambient Noise Levels
Qantas Drive, Mascot - Saturday, 20 October 2018

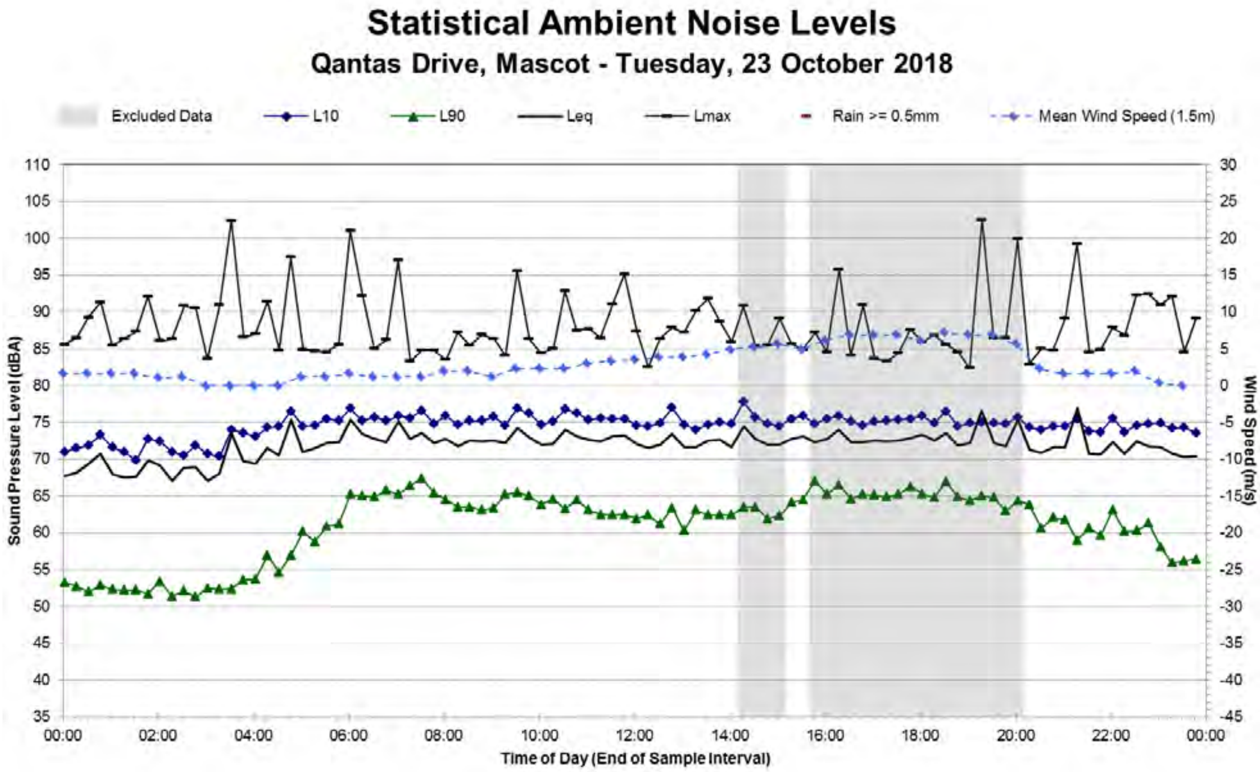


Statistical Ambient Noise Levels
Qantas Drive, Mascot - Sunday, 21 October 2018

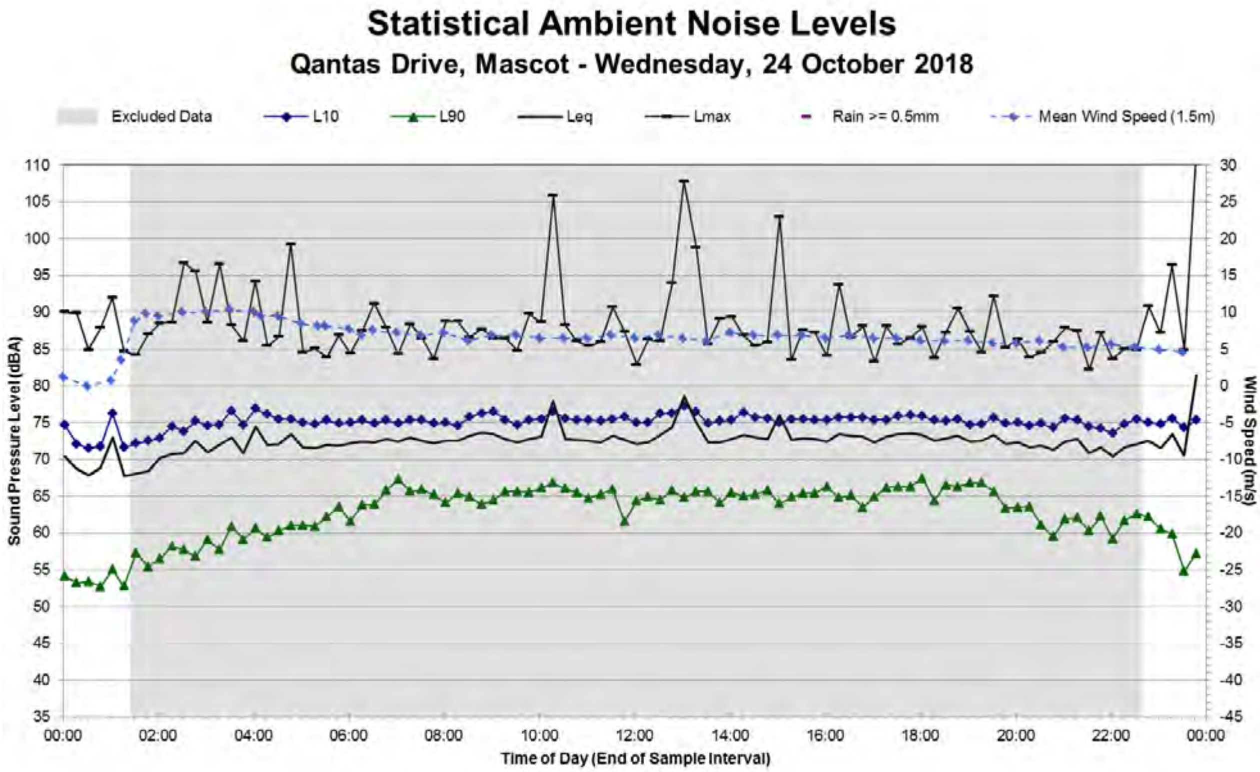


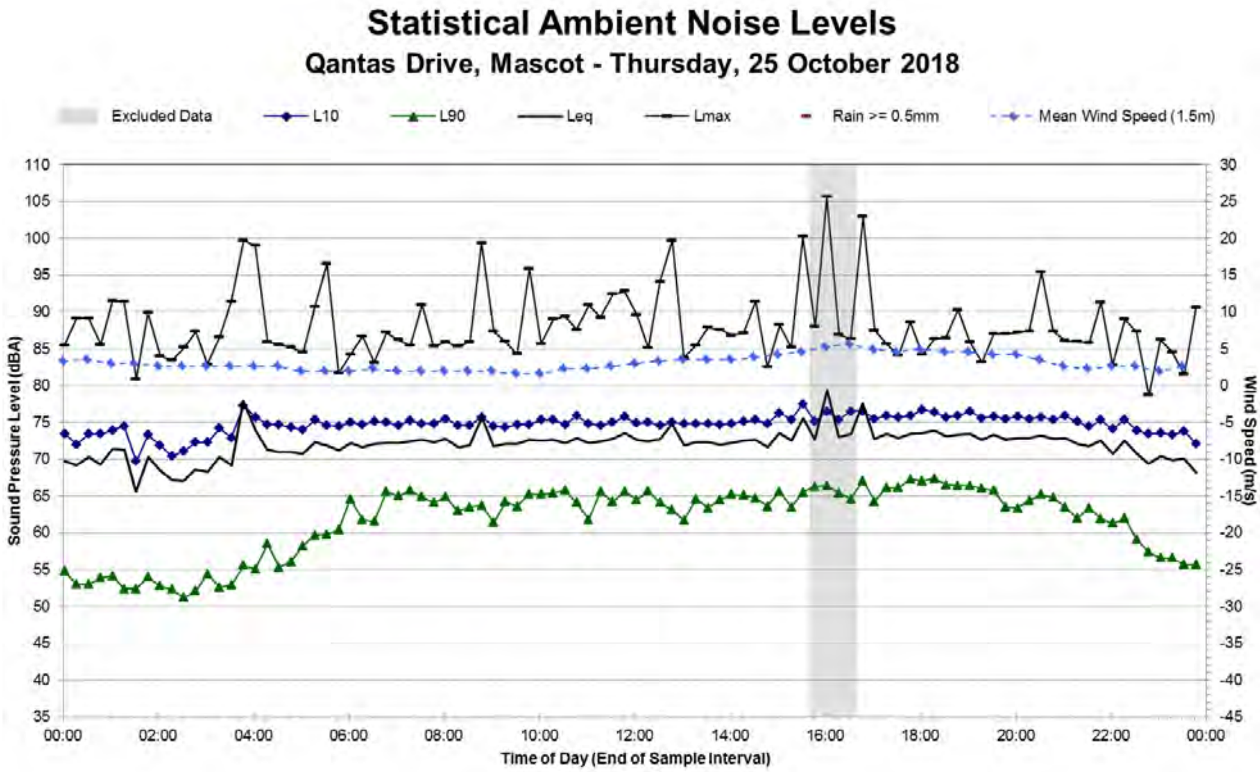


Statistical Ambient Noise Levels
Qantas Drive, Mascot - Monday, 22 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)



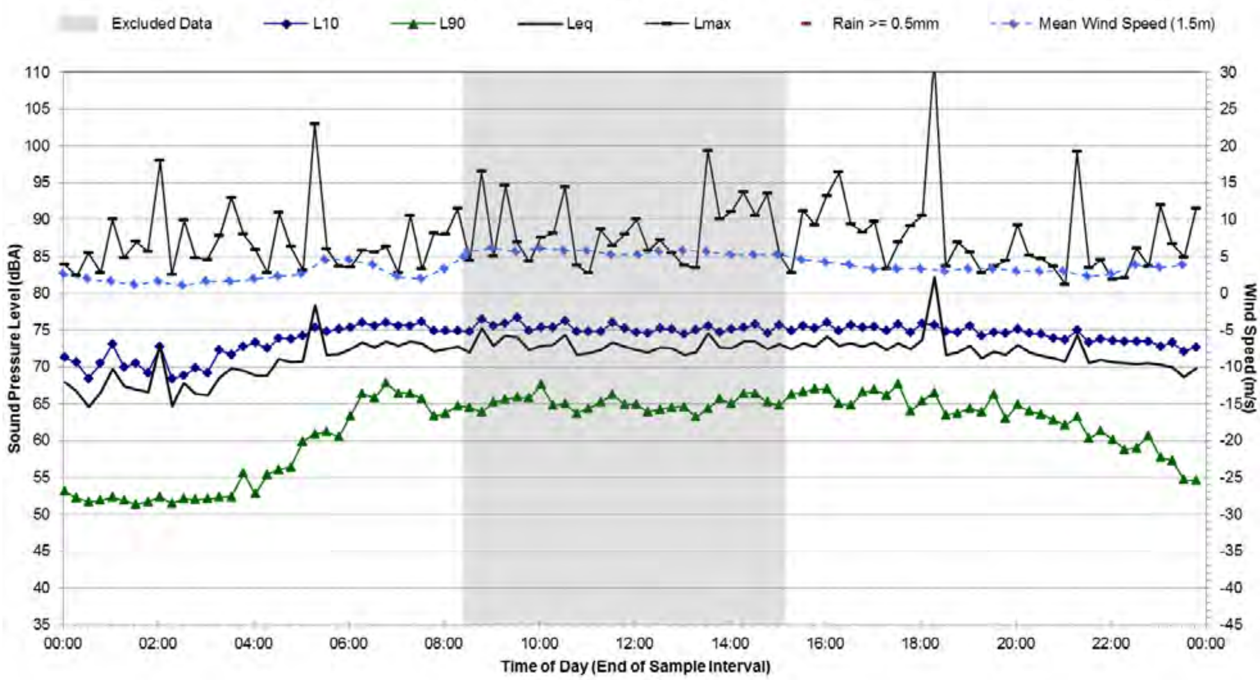
Statistical Ambient Noise Levels
Qantas Drive, Mascot - Tuesday, 23 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Qantas Drive, Mascot - Wednesday, 24 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Qantas Drive, Mascot - Thursday, 25 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

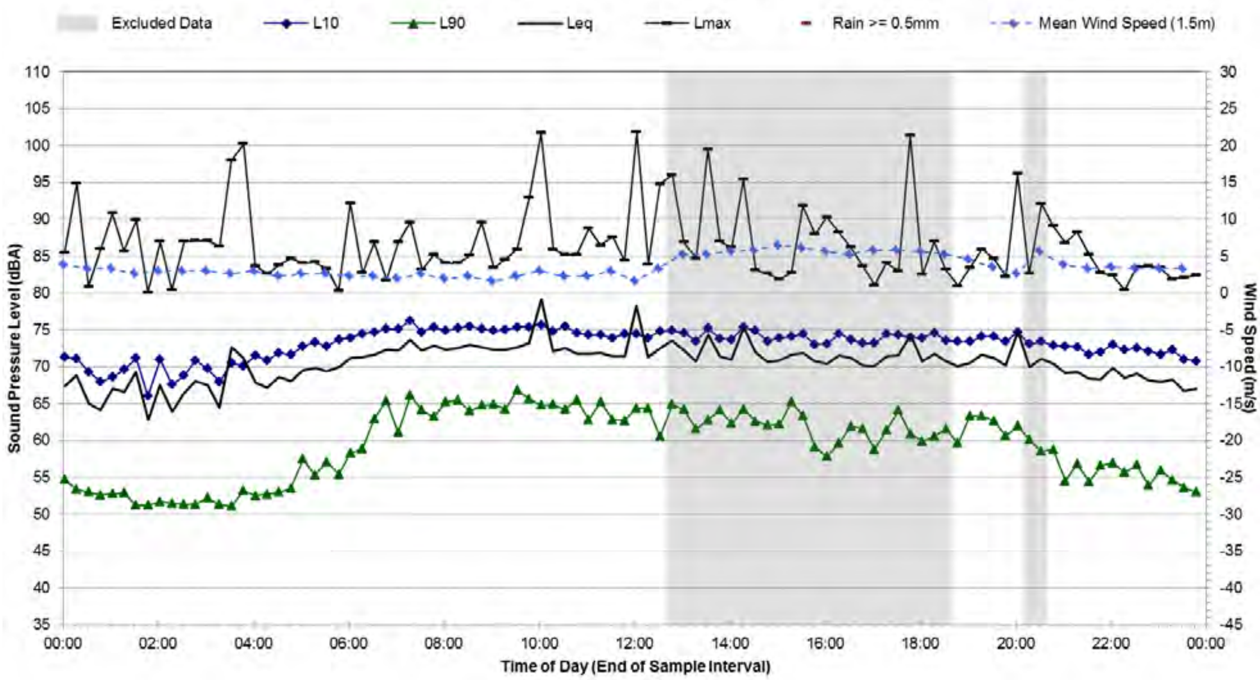
Statistical Ambient Noise Levels

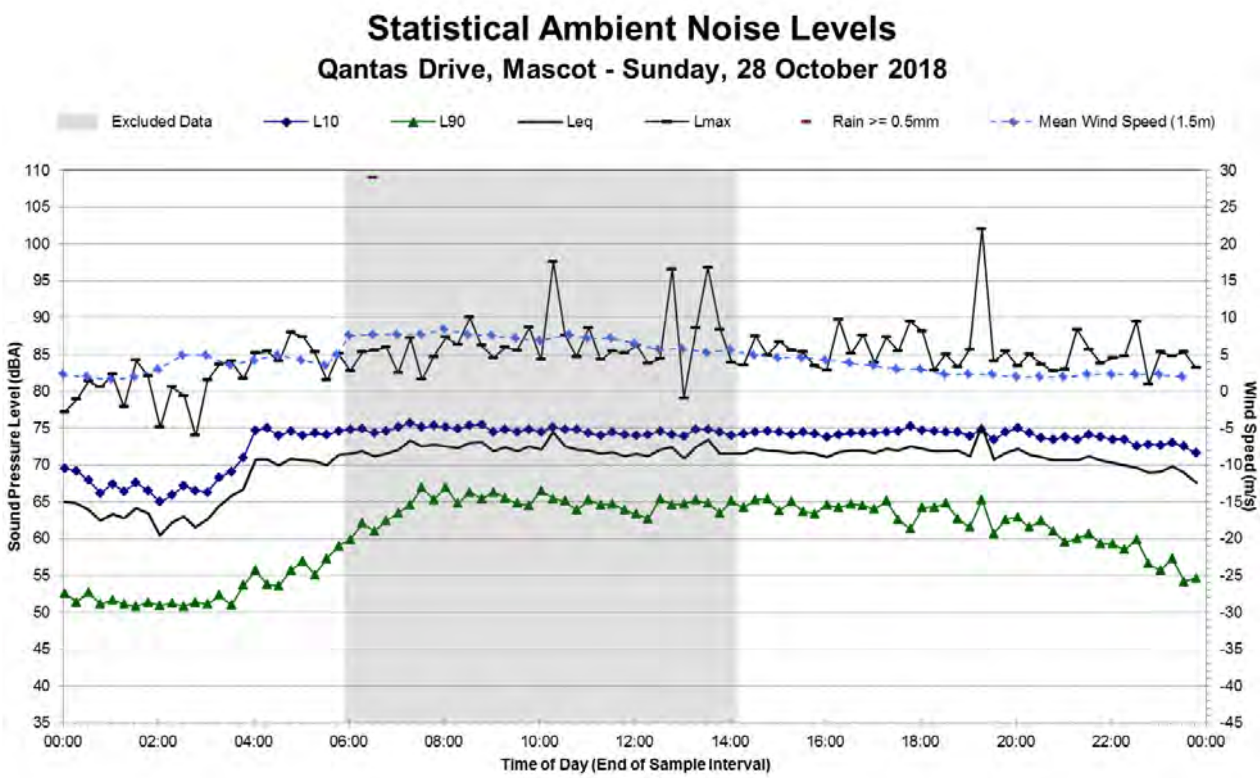
Qantas Drive, Mascot - Friday, 26 October 2018

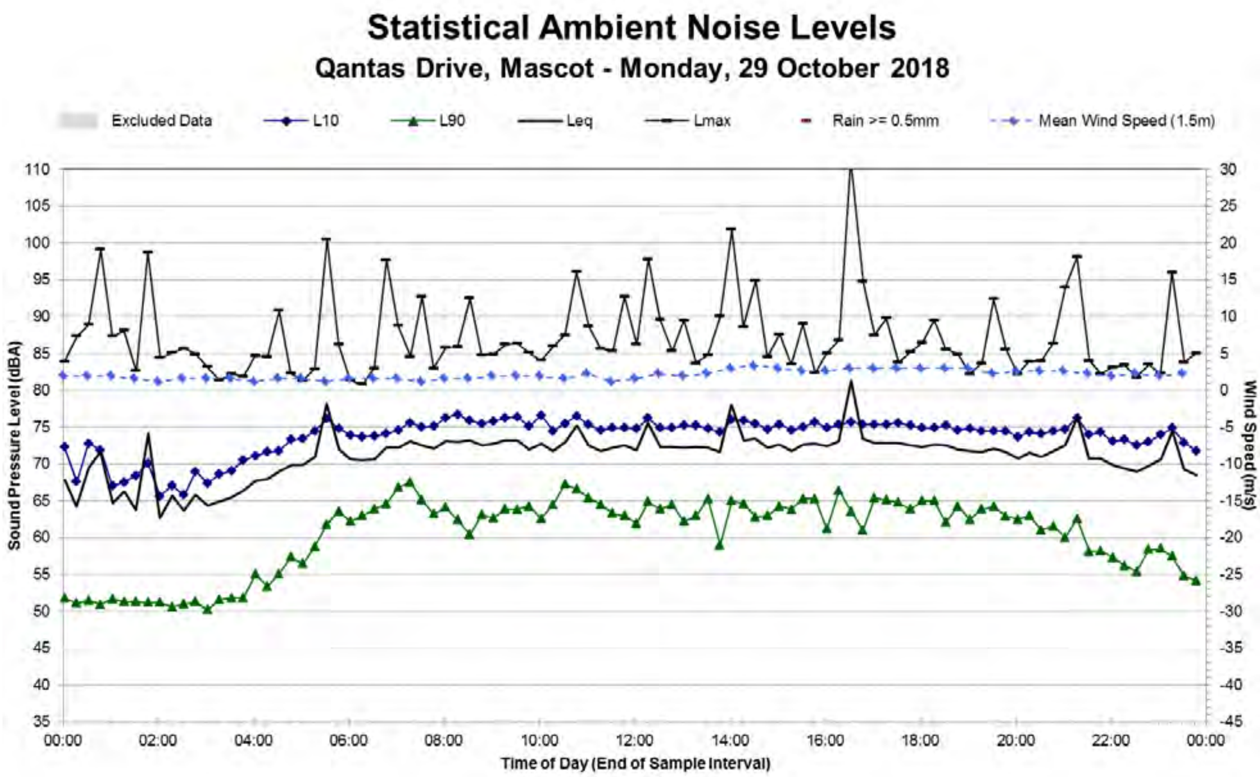


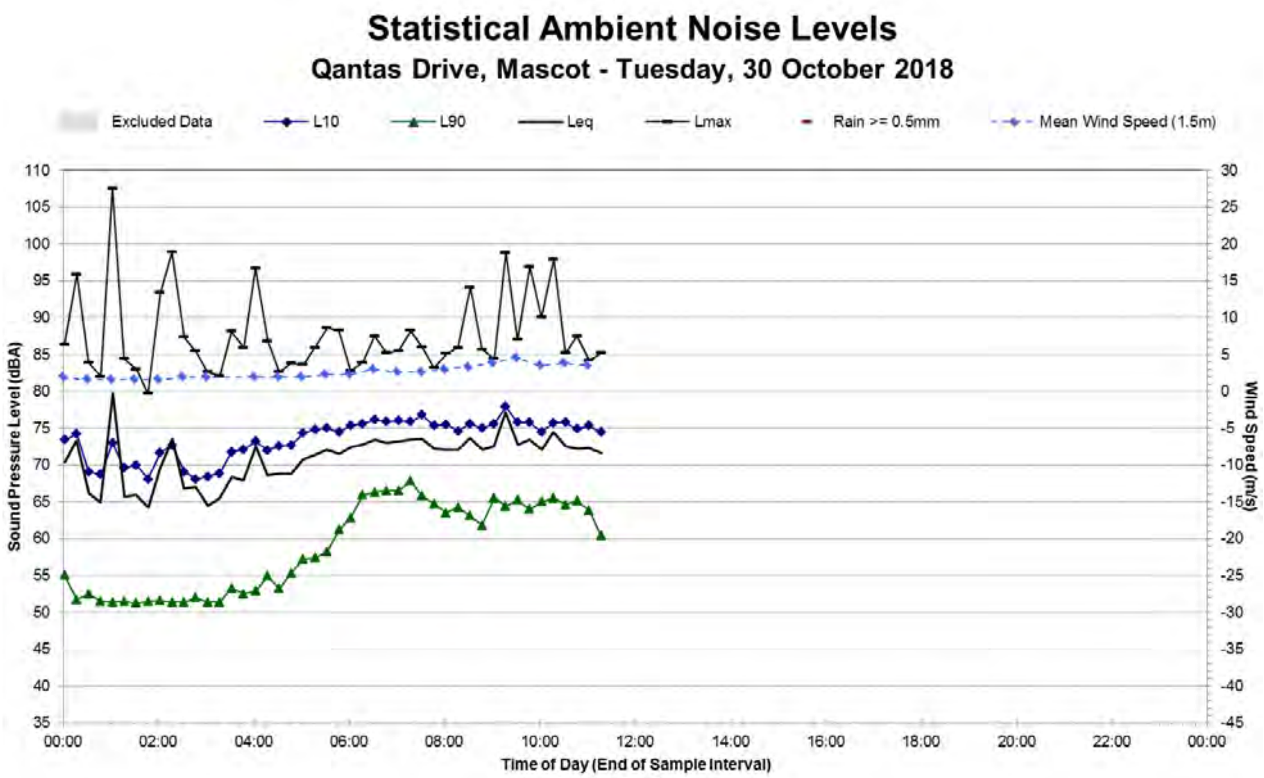
Statistical Ambient Noise Levels

Qantas Drive, Mascot - Saturday, 27 October 2018




Statistical Ambient Noise Levels
Qantas Drive, Mascot - Sunday, 28 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Qantas Drive, Mascot - Monday, 29 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
Qantas Drive, Mascot - Tuesday, 30 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

Noise Monitoring Location	L.07
Noise Monitoring Address	**505/39 Kent Road, Botany**

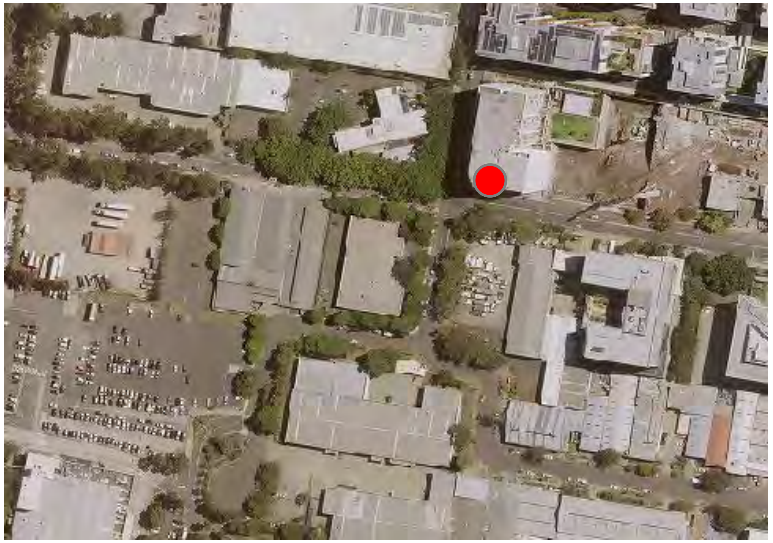
Logger Device Type: Svantek 957, Logger Serial No: 20664
Sound Level Meter: Brüel and Kjær 2250L, Sound Level Meter Serial No: 2487418

Ambient noise logger deployed on balcony of residential address 505/39 Kent Road, Botany.

Attended noise measurements indicate the ambient noise environment at this location is dominated by road traffic noise from the Coward Street and Kent Road intersection. Flyovers from aircraft and intermittent construction noise also contributed to the noise at this location.

Measured Attended Noise Levels (LAmax):
17/09/18: Light-vehicle and heavy-vehicle traffic from intersection: 68 - 82 dBA, aircraft: 83 – 84 dBA, intermittent construction activity: 80 – 88 dBA

Map of Noise Monitoring Location



Ambient Noise Logging Results – NPfI Defined Time Periods

Monitoring Period	Noise Level (dBA)			
	RBL	LAeq	L10	L1
Daytime	60	71	73	80
Evening	56	68	72	79
Night-time	50	67	70	77

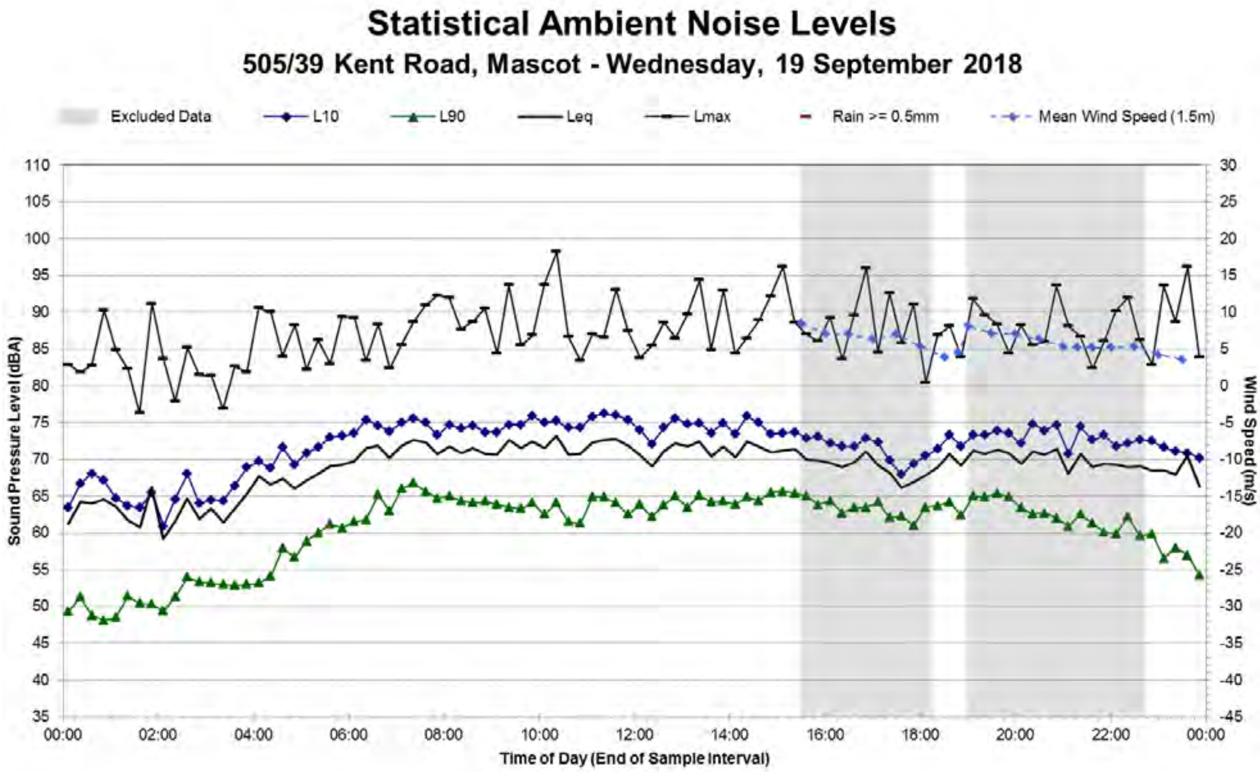
Ambient Noise Logging Results – RNP Defined Time Periods

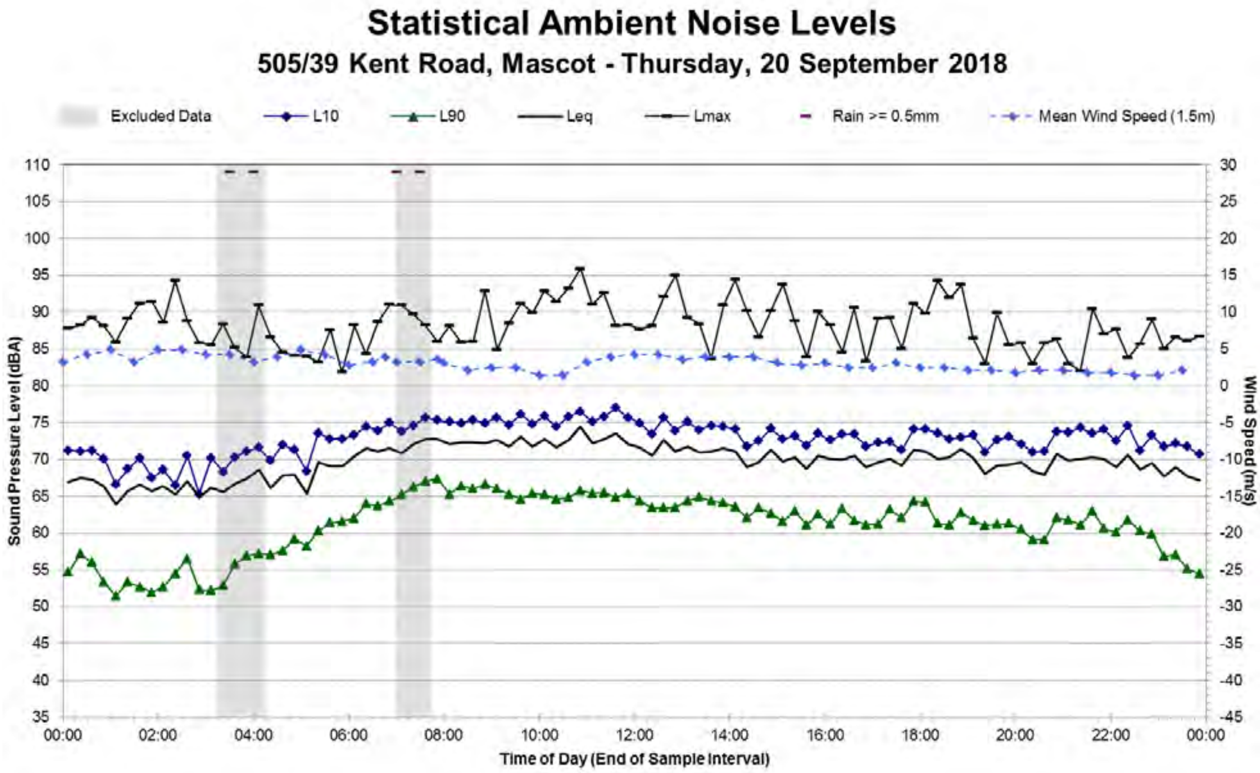
Monitoring Period	Noise Level (dBA)	
	LAeq(period)	LAeq(1hour)
Daytime (7am-10pm)	-	-
Night-time (10pm-7am)	-	-

Attended Noise Measurement Results

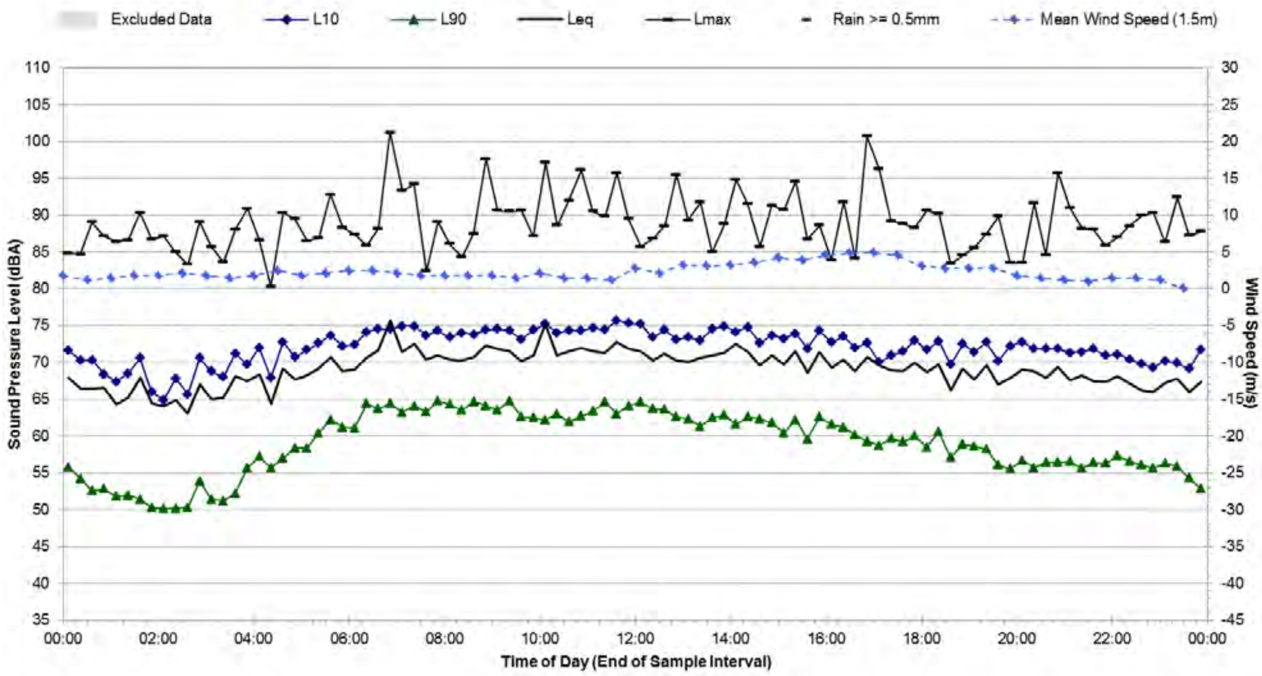
Date	Start Time	Measured Noise Level (dBA)		
		LA90	LAeq	LAmax
17/09/18	09:30	63	72	88

Photo of Noise Monitoring Location

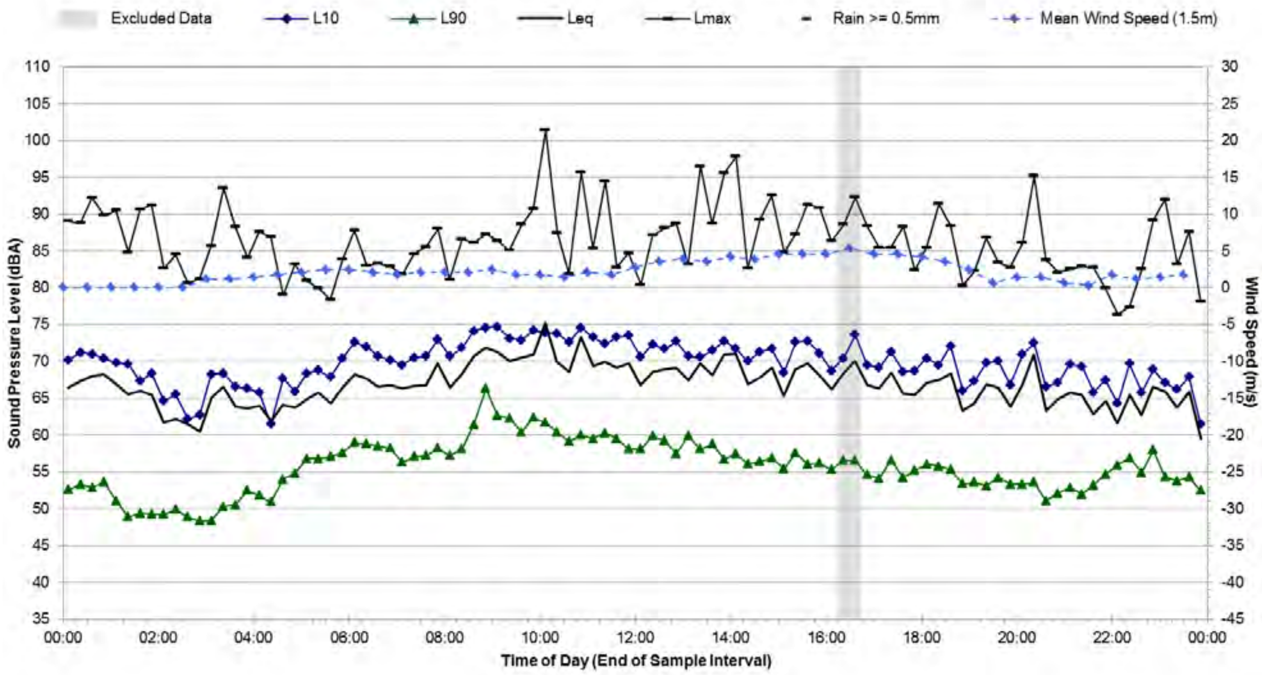

Statistical Ambient Noise Levels
505/39 Kent Road, Mascot - Wednesday, 19 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

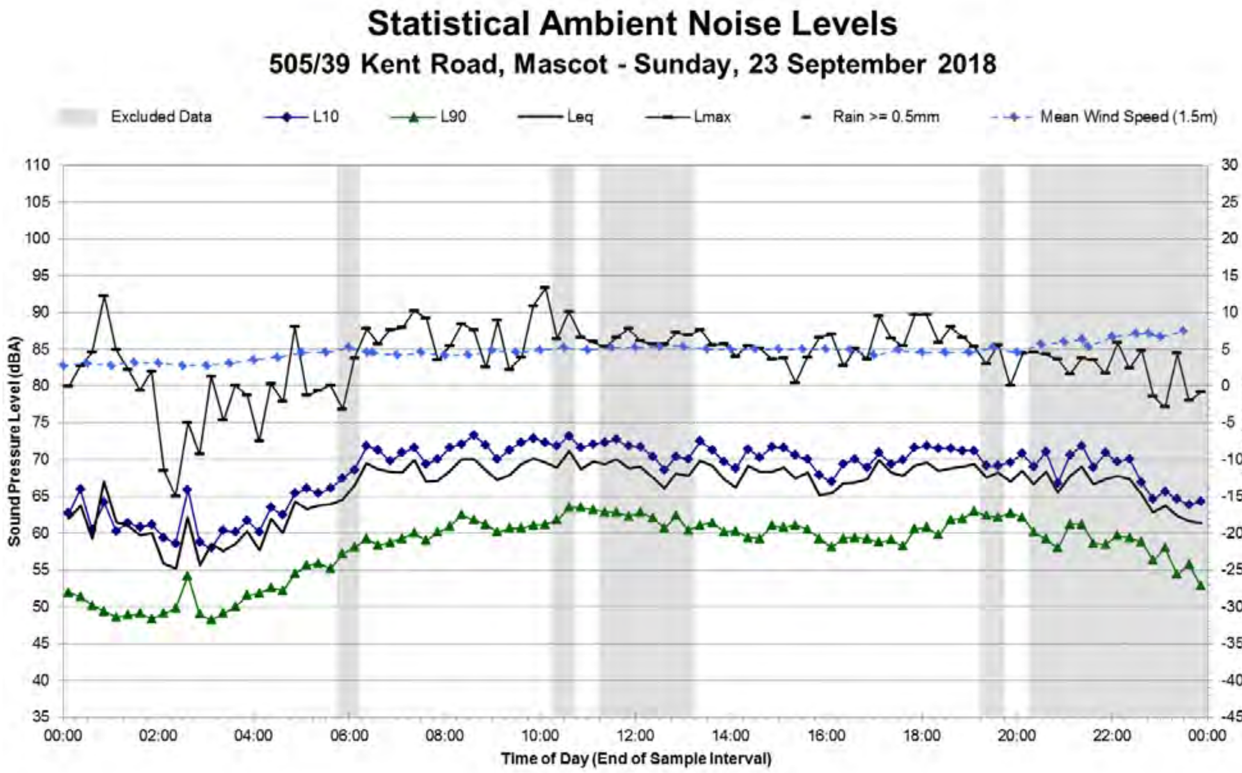

Statistical Ambient Noise Levels
505/39 Kent Road, Mascot - Thursday, 20 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

Statistical Ambient Noise Levels
505/39 Kent Road, Mascot - Friday, 21 September 2018

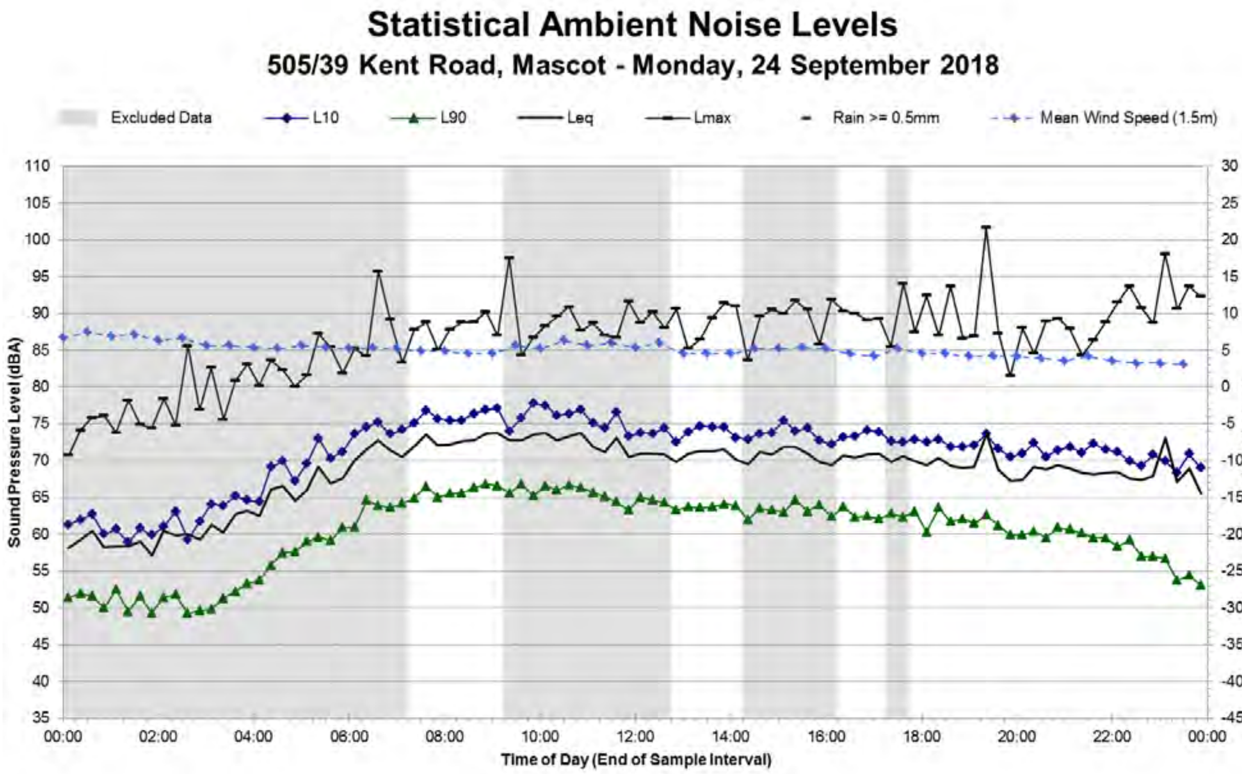


Statistical Ambient Noise Levels
505/39 Kent Road, Mascot - Saturday, 22 September 2018

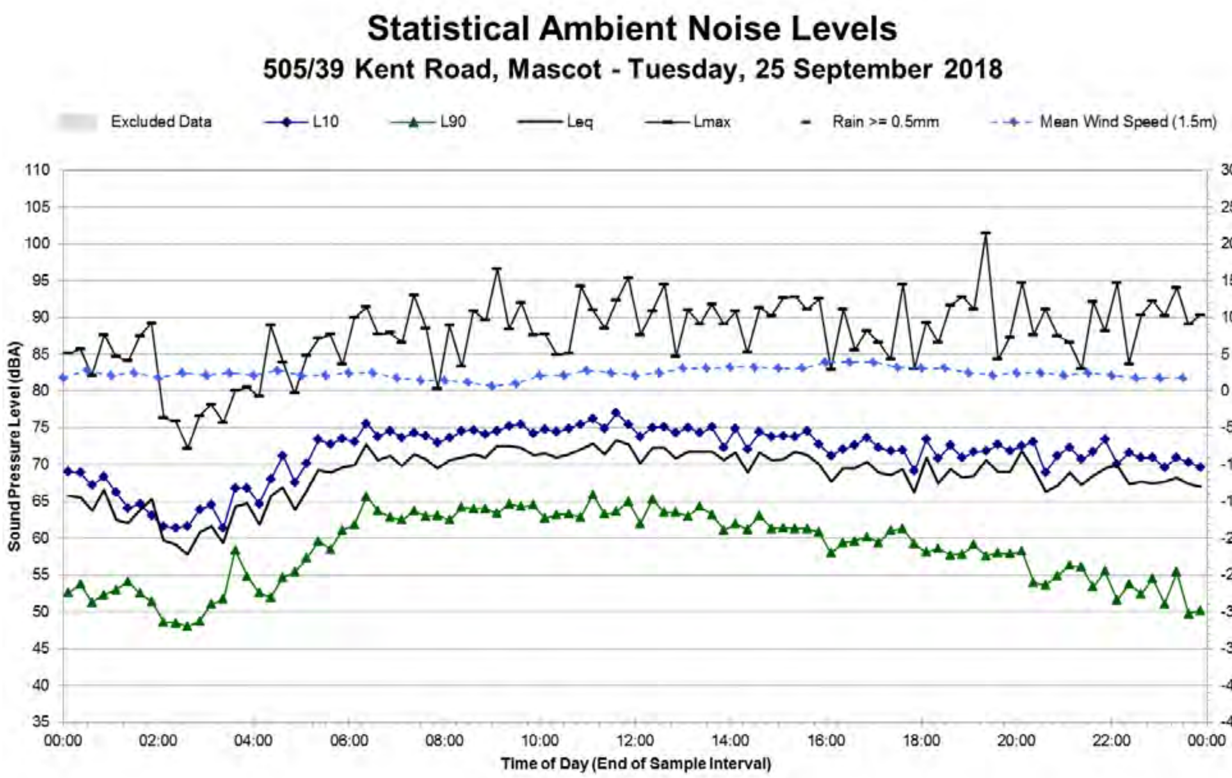


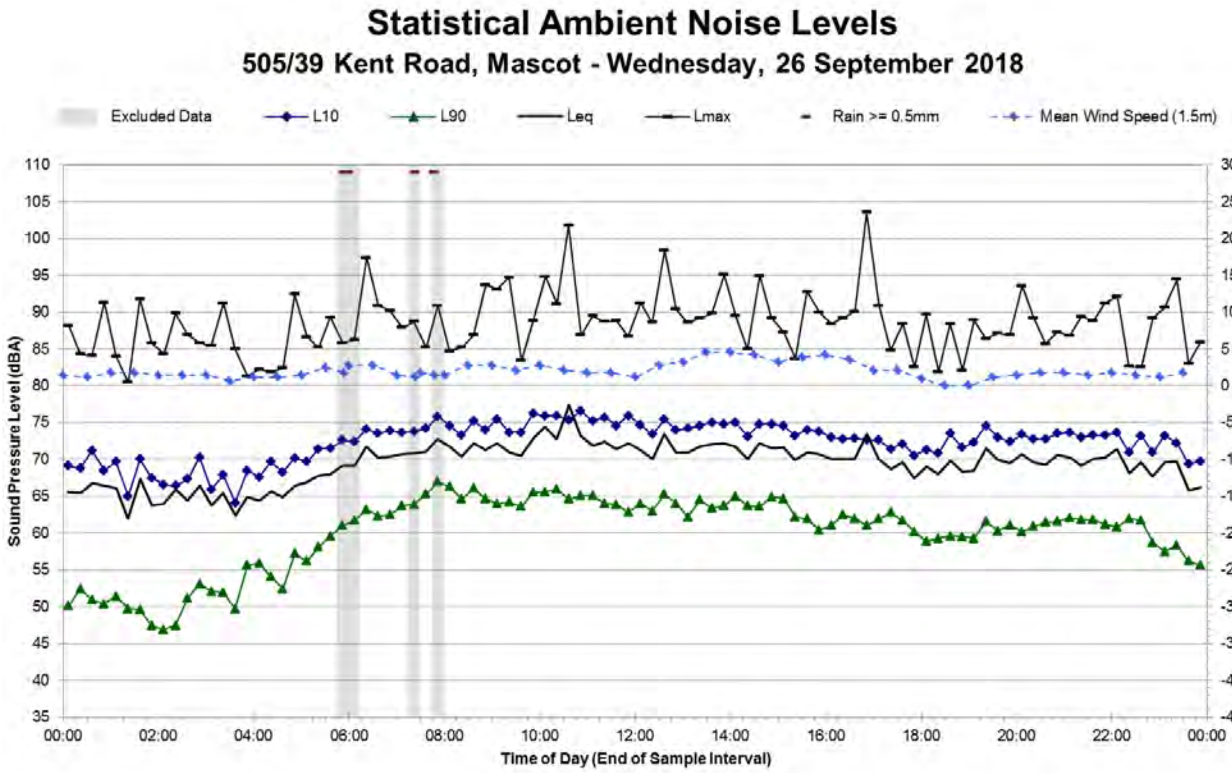


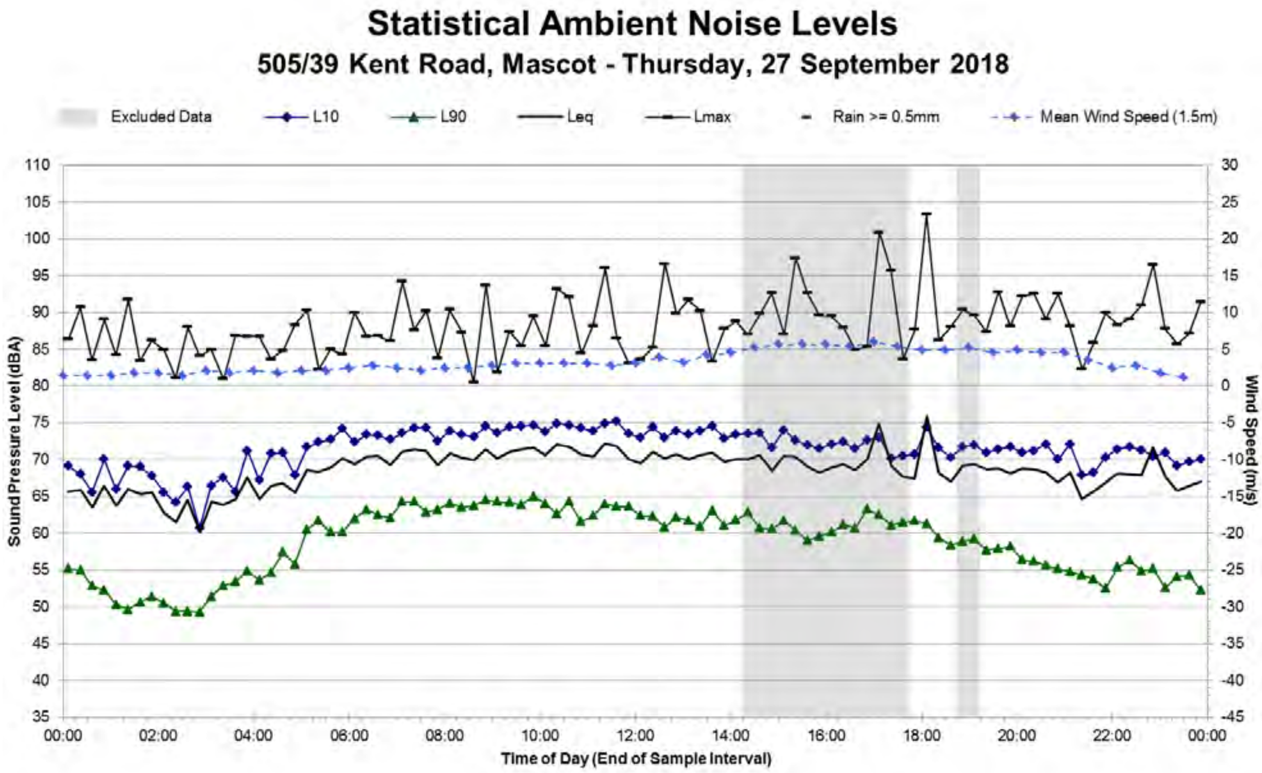
Statistical Ambient Noise Levels
505/39 Kent Road, Mascot - Sunday, 23 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

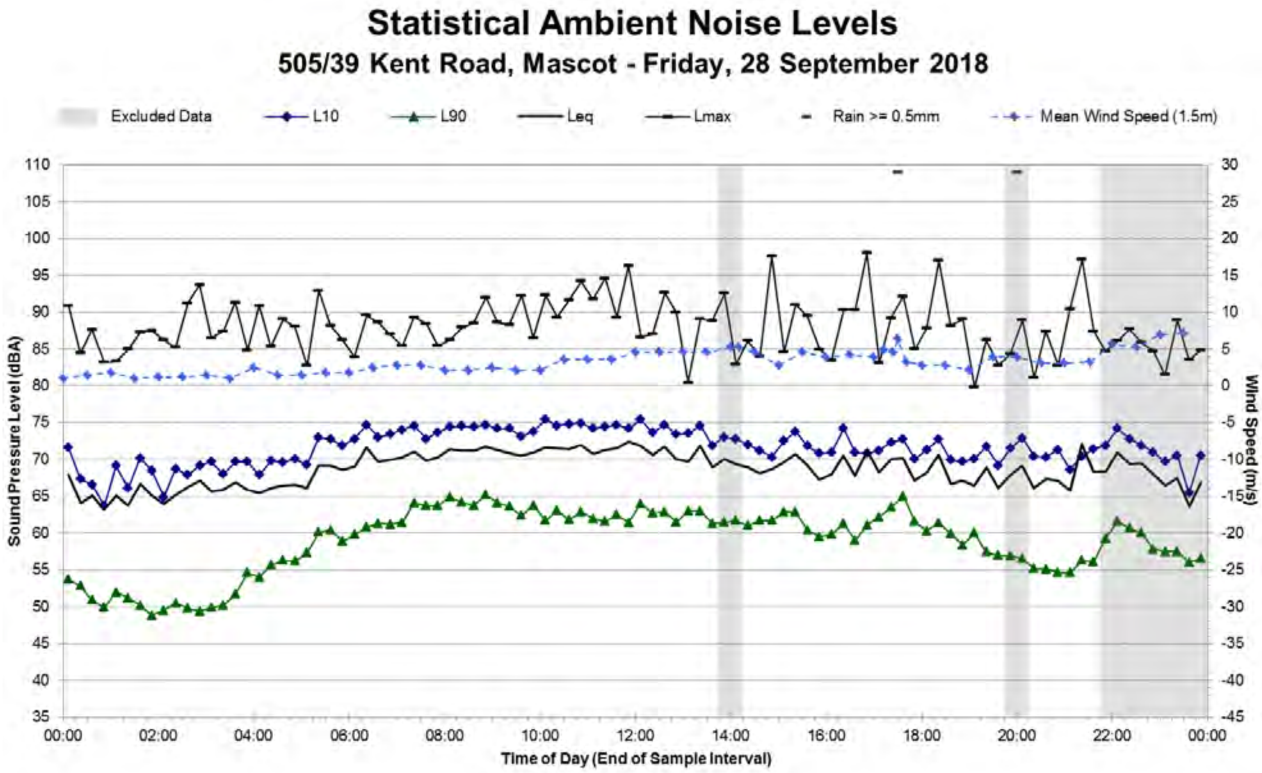


Statistical Ambient Noise Levels
505/39 Kent Road, Mascot - Monday, 24 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
505/39 Kent Road, Mascot - Tuesday, 25 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

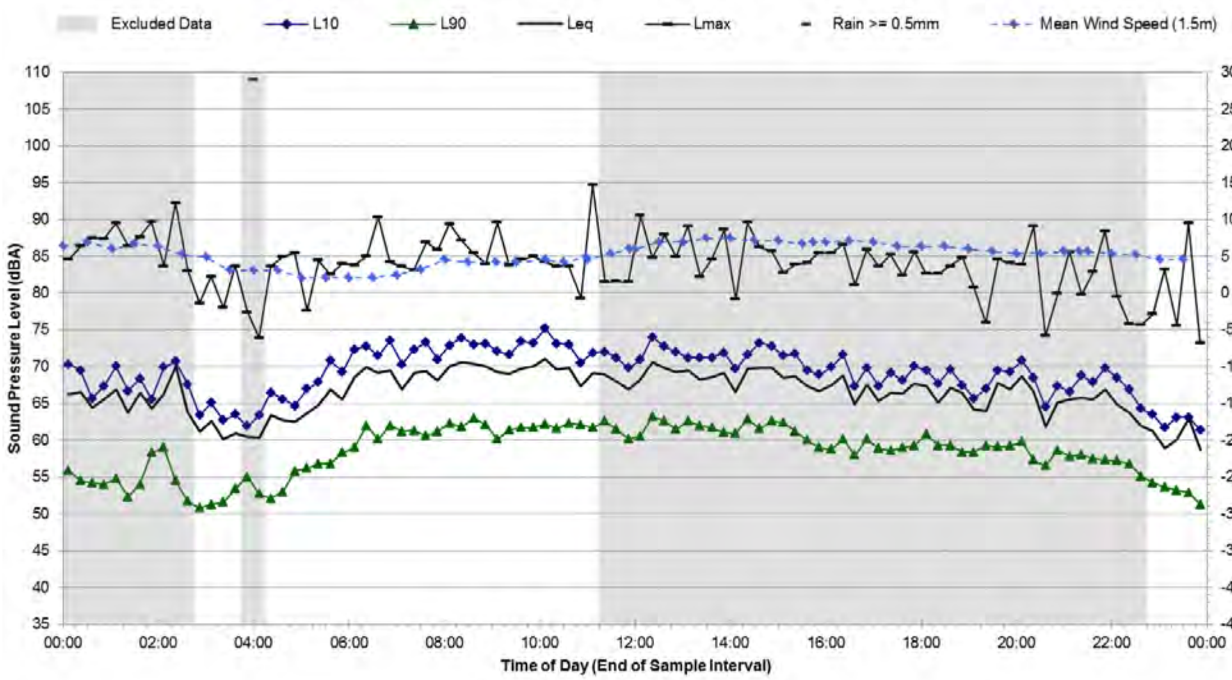

Statistical Ambient Noise Levels
505/39 Kent Road, Mascot - Wednesday, 26 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
505/39 Kent Road, Mascot - Thursday, 27 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
505/39 Kent Road, Mascot - Friday, 28 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

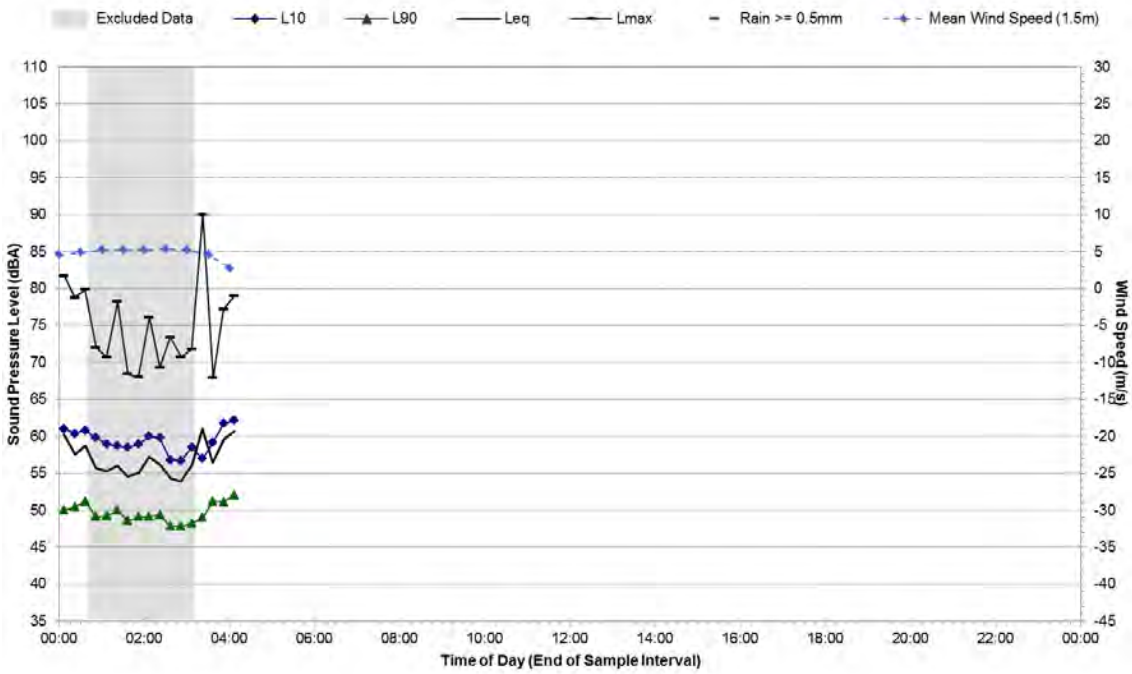
Statistical Ambient Noise Levels

505/39 Kent Road, Mascot - Saturday, 29 September 2018



Statistical Ambient Noise Levels

505/39 Kent Road, Mascot - Sunday, 30 September 2018



Noise Monitoring Location	L.08
Noise Monitoring Address	**289 King Street, Mascot**

Logger Device Type: Svantek 957, Logger Serial No: 20668
Sound Level Meter: Brüel and Kjær 2250L, Sound Level Meter Serial No: 2487418

Ambient noise logger deployed on level 10 of commercial building located at 289 King Street, Mascot. Logger located with line of site views of the Port Botany rail line and Qantas Drive to the south west.

Attended noise measurements indicate the ambient noise environment at this location is influenced by heavy and light-vehicle road traffic noise on Qantas Drive and surrounding industrial activity. Aircraft flyovers and construction noise also contributed to the ambient noise levels at this location.

Measured Attended Noise Levels (LAmax):
17/09/2018: Vehicle movement on Qantas Drive and neighbouring industrial activity: 65 – 68 dBA, inbound aircraft flyovers: 80 -82 dBA, outbound aircraft flyover: 72 dBA, construction noise intermittently audible: 67 – 72 dBA.

Map of Noise Monitoring Location

Ambient Noise Logging Results – NPfI Defined Time Periods

Monitoring Period	Noise Level (dBA)			
	RBL	LAeq	L10	L1
Daytime	60	68	70	78
Evening	58	66	68	76
Night-time	53	64	65	69

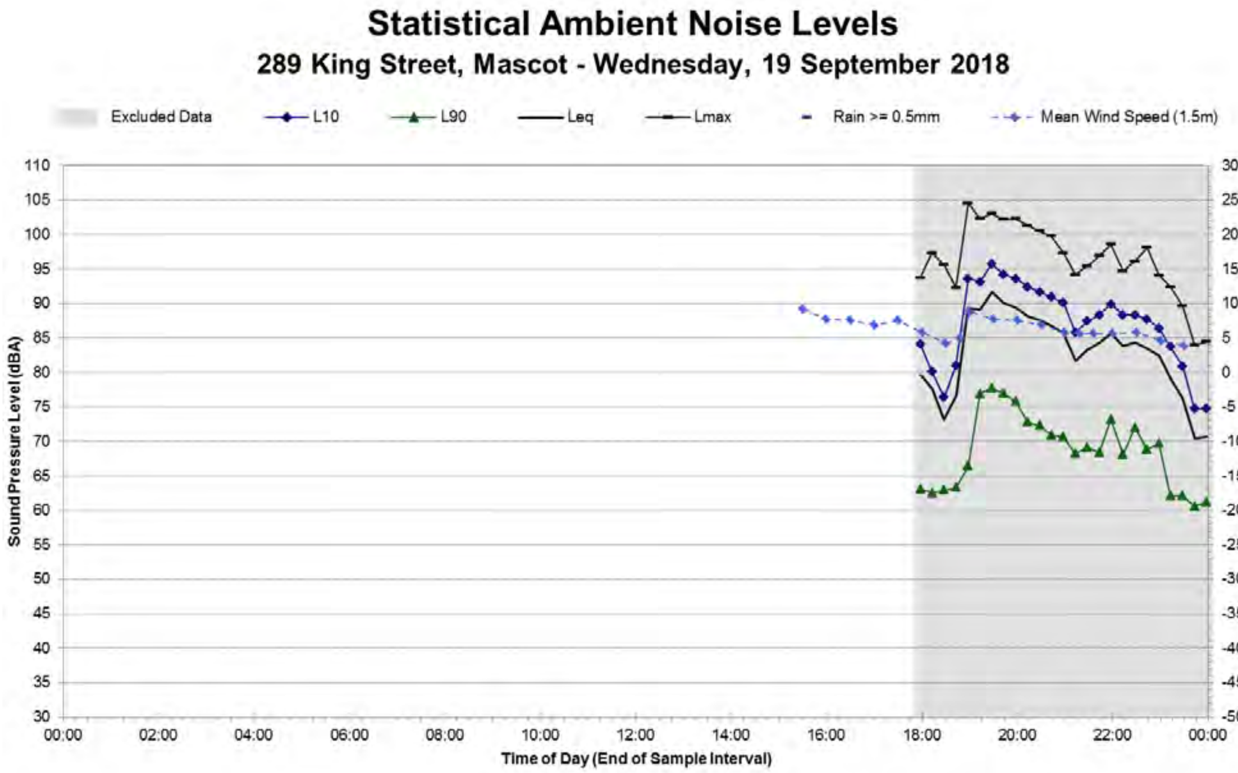
Ambient Noise Logging Results – RNP Defined Time Periods

Monitoring Period	Noise Level (dBA)	
	LAeq(period)	LAeq(1hour)
Daytime (7am-10pm)	-	-
Night-time (10pm-7am)	-	-

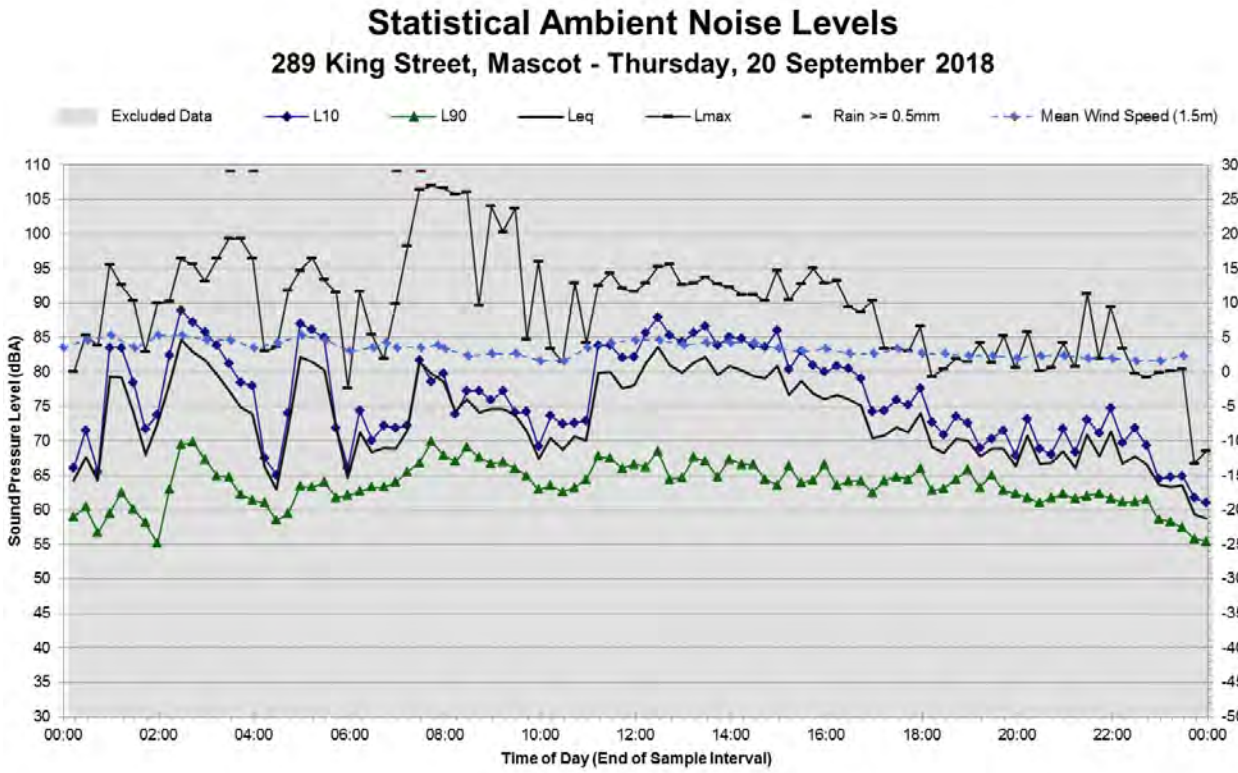
Attended Noise Measurement Results

Date	Start Time	Measured Noise Level (dBA)		
		LA90	LAeq	LAmax
17/09/2018	10:30	64	68	82

Photo of Noise Monitoring Location



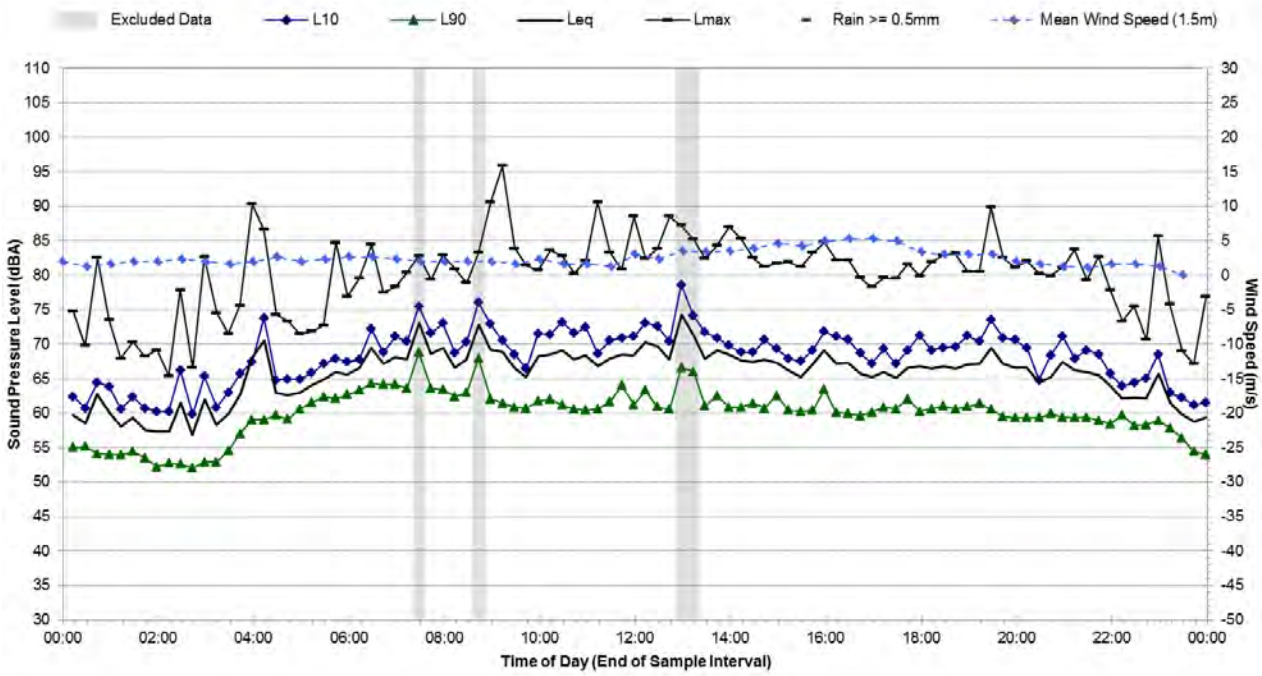
Statistical Ambient Noise Levels
289 King Street, Mascot - Wednesday, 19 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)



Statistical Ambient Noise Levels
289 King Street, Mascot - Thursday, 20 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

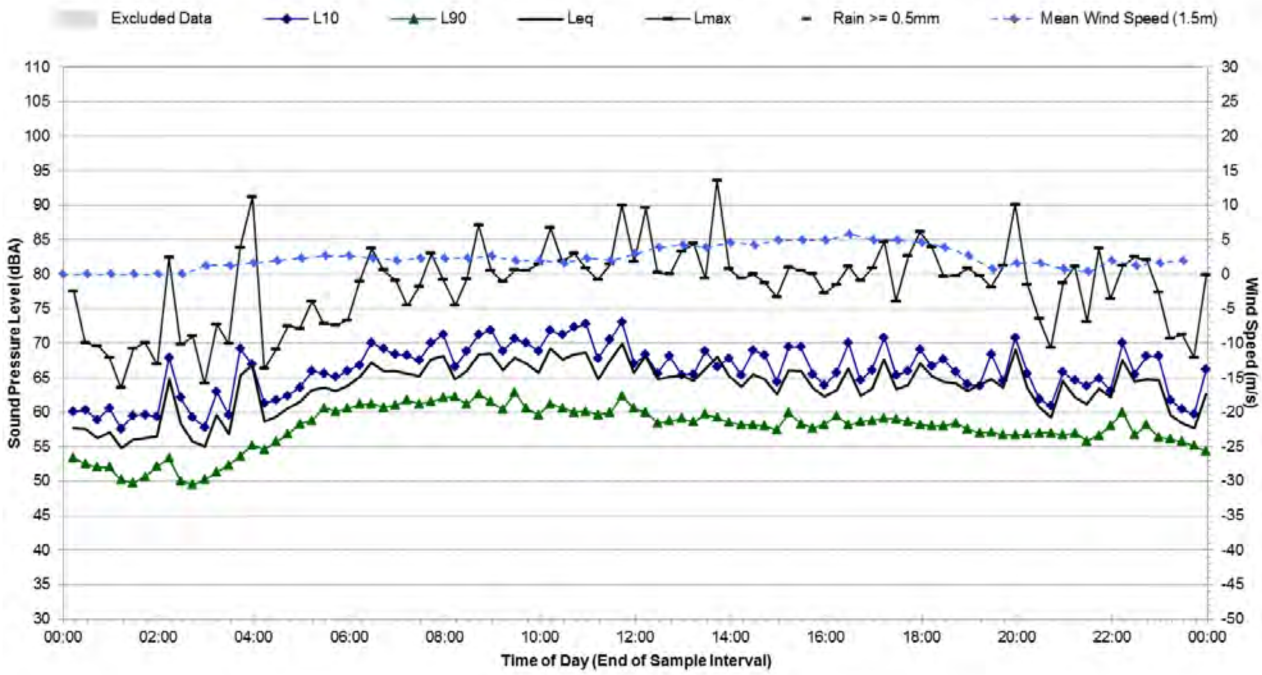
Statistical Ambient Noise Levels

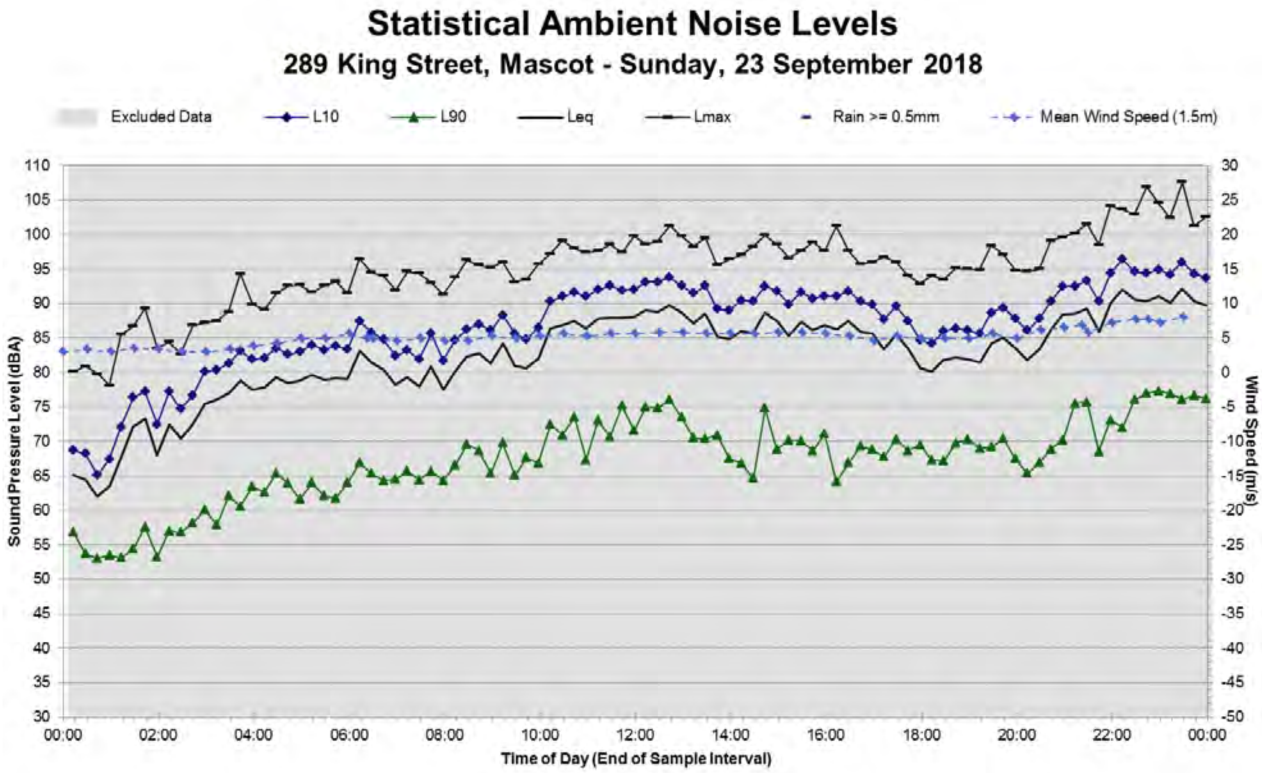
289 King Street, Mascot - Friday, 21 September 2018

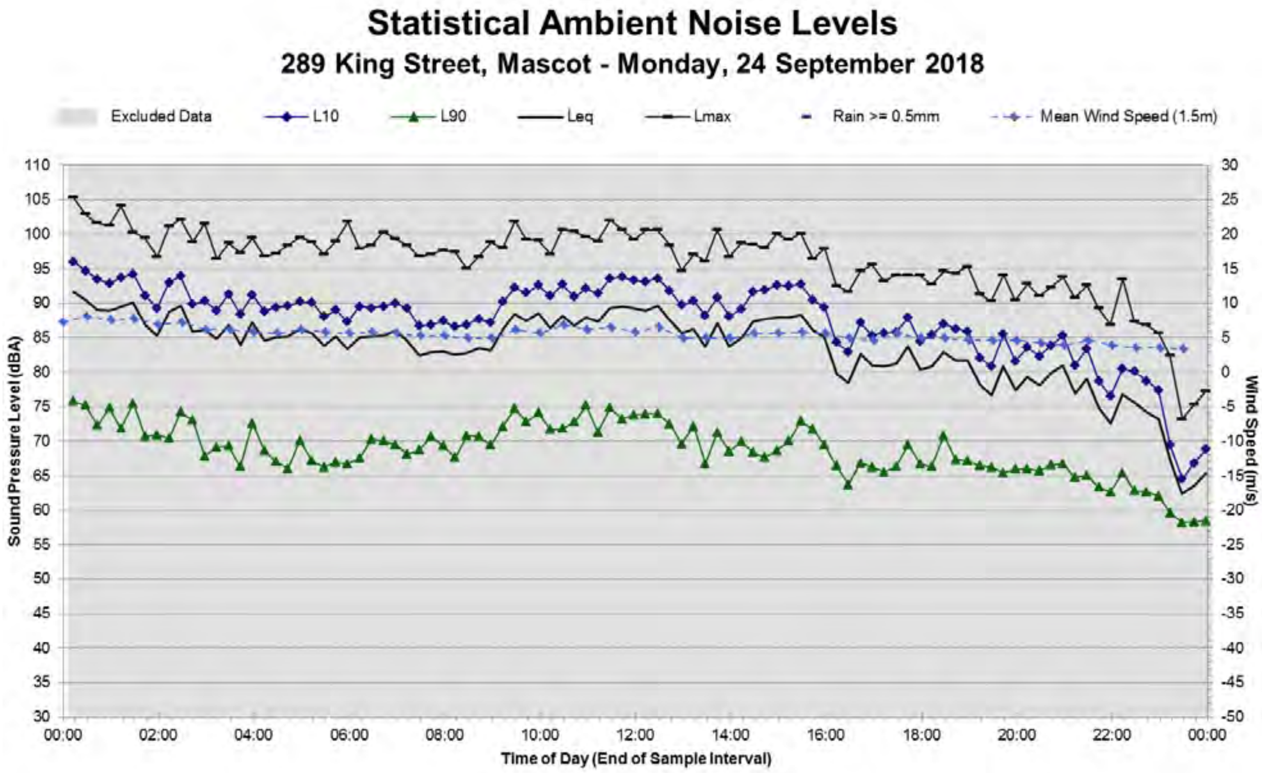


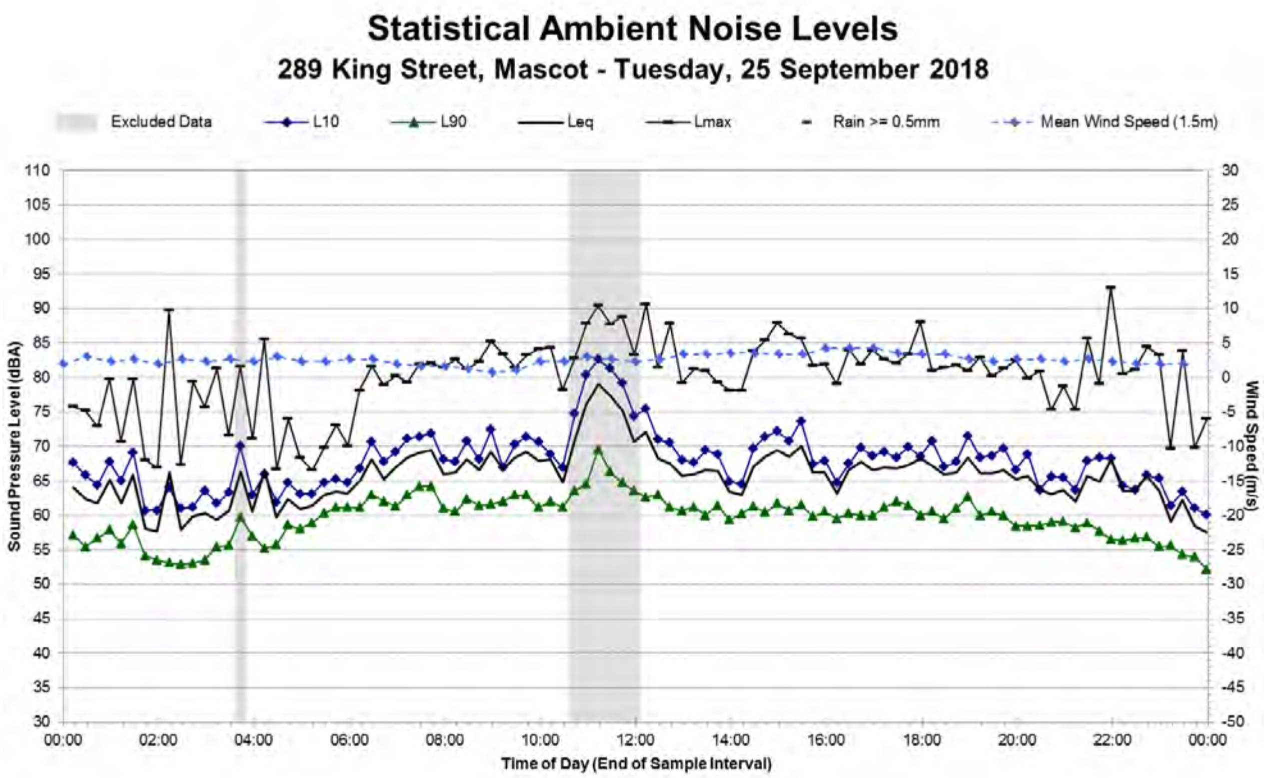
Statistical Ambient Noise Levels

289 King Street, Mascot - Saturday, 22 September 2018

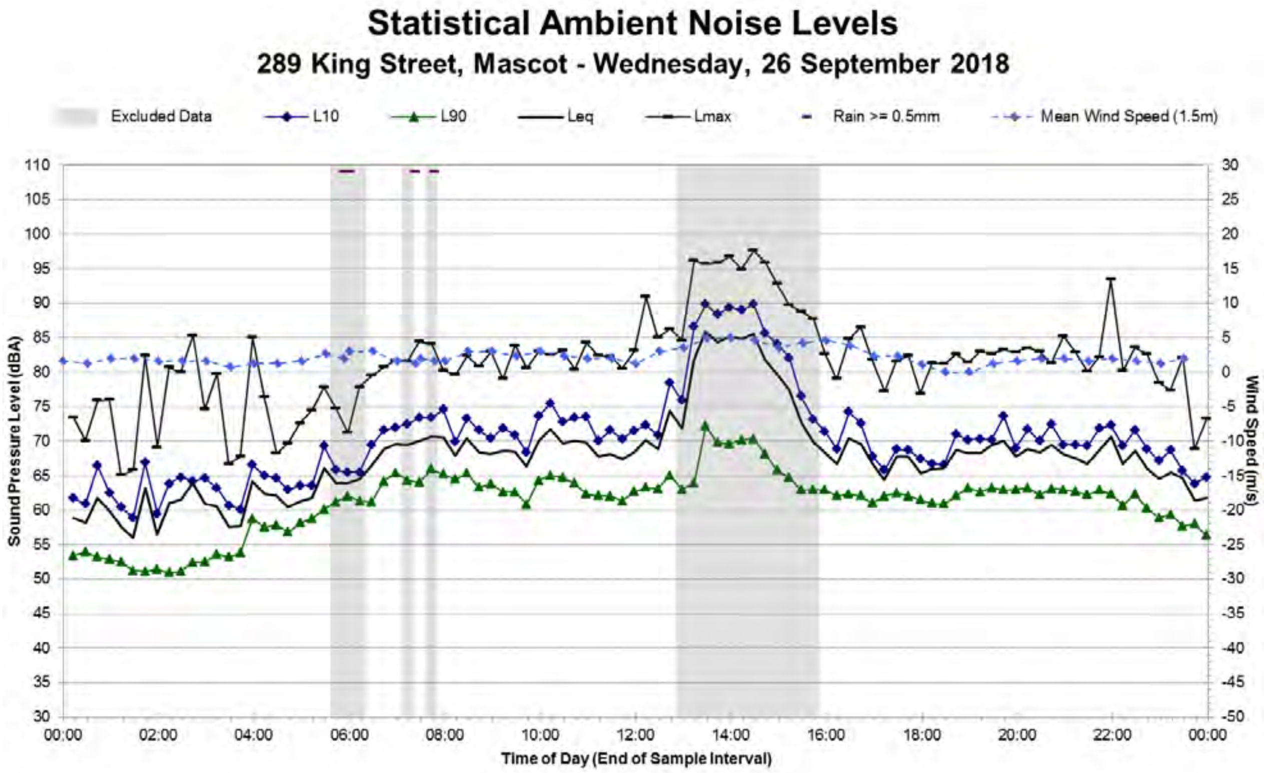



Statistical Ambient Noise Levels
289 King Street, Mascot - Sunday, 23 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

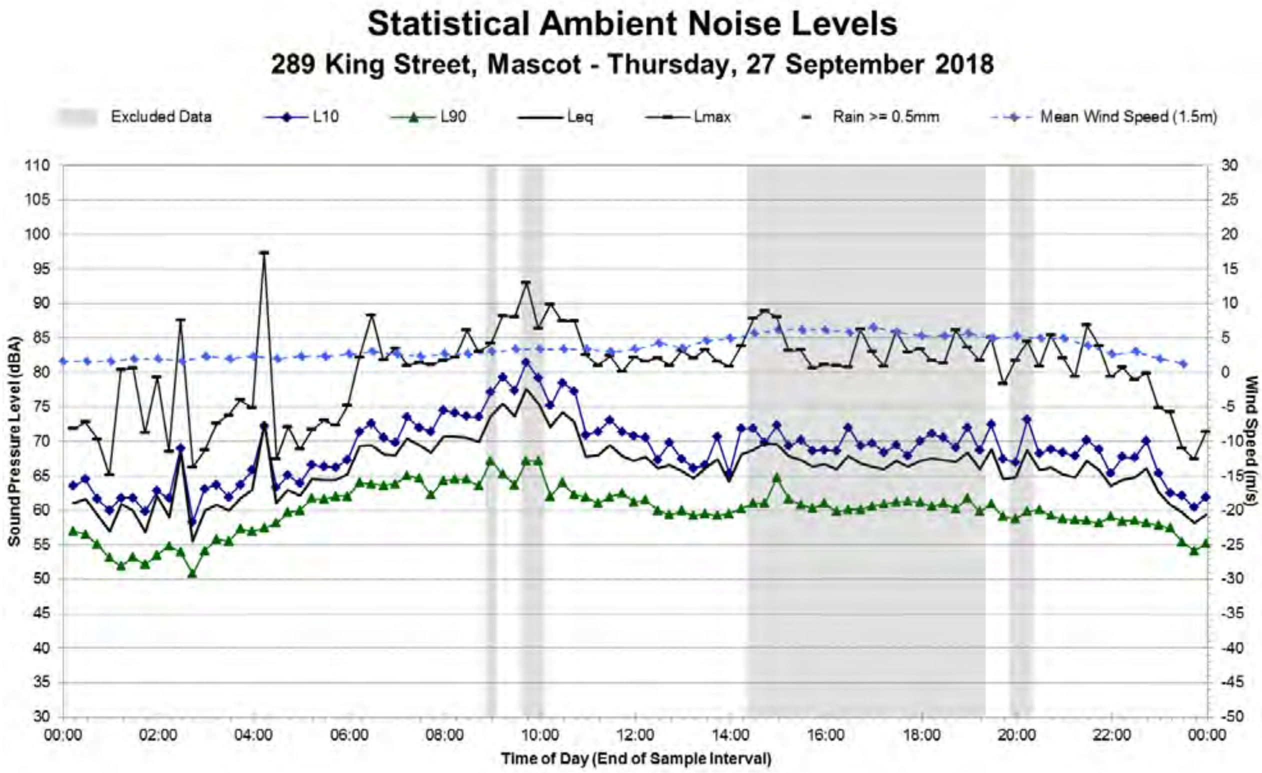

Statistical Ambient Noise Levels
289 King Street, Mascot - Monday, 24 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

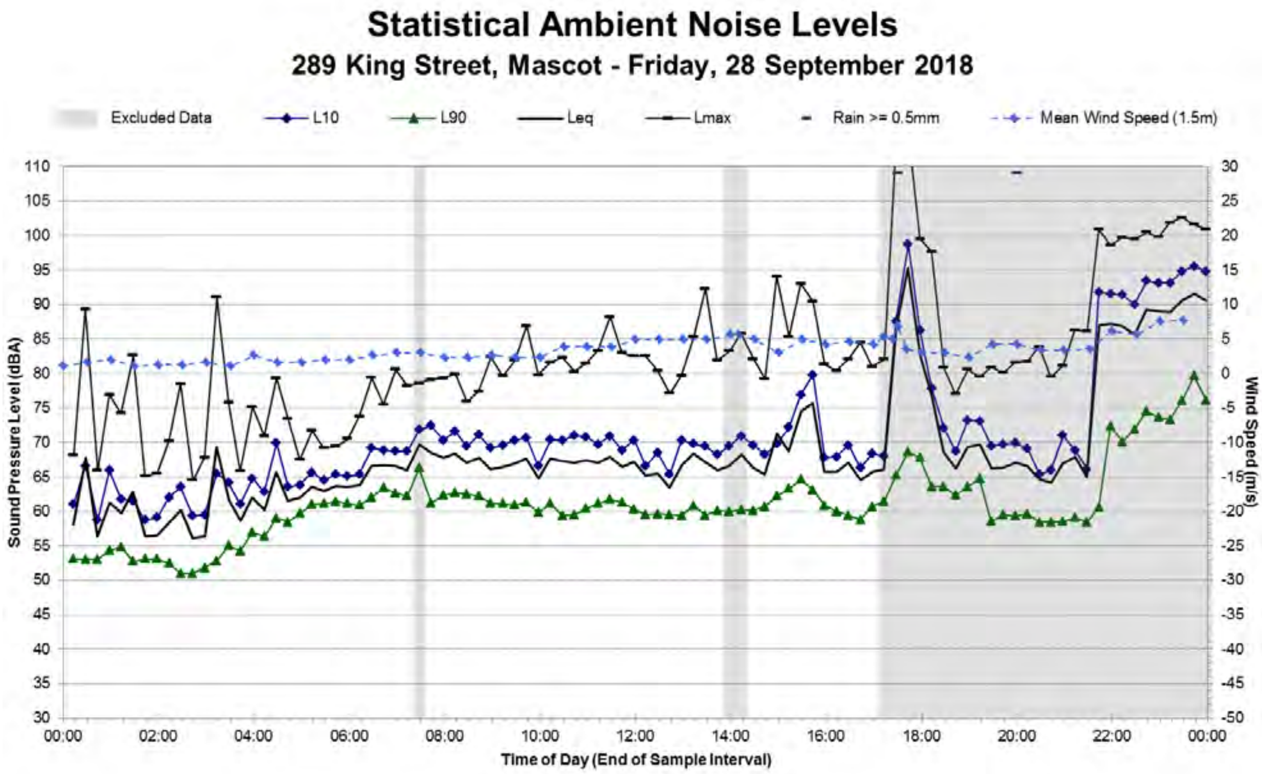


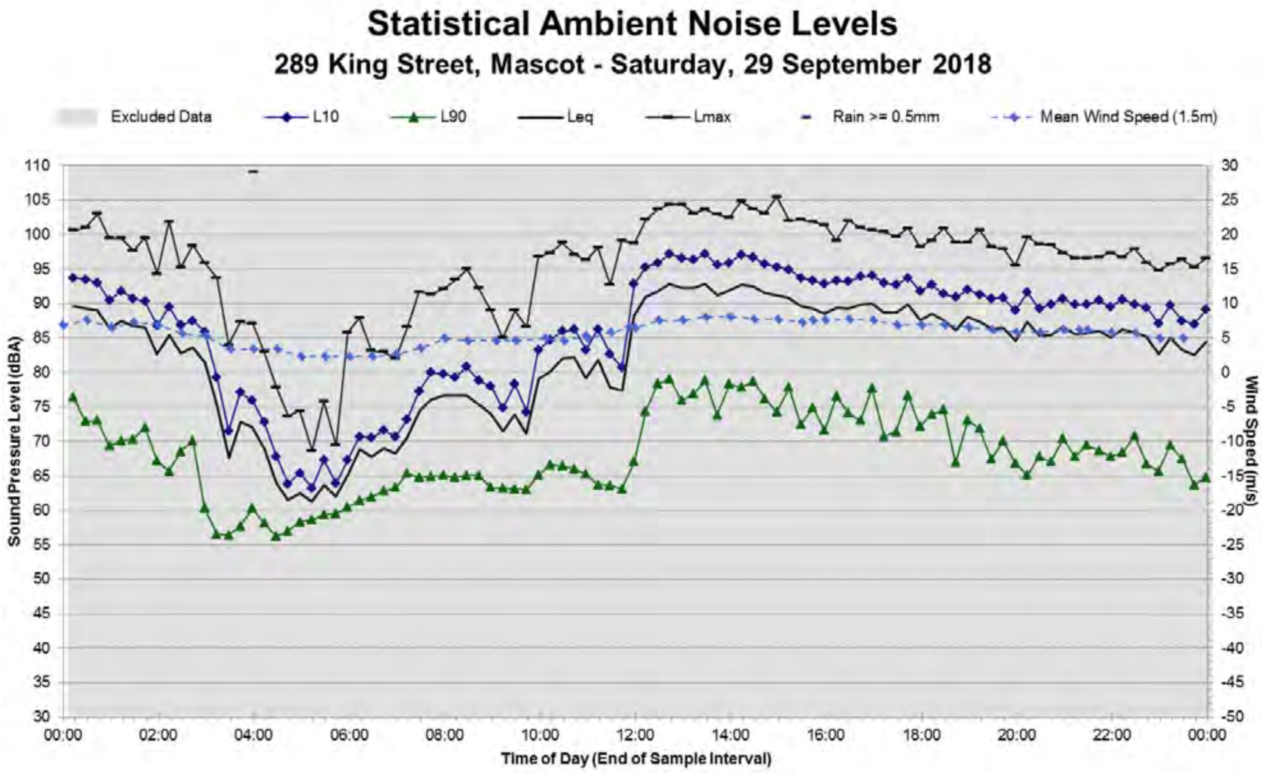
Statistical Ambient Noise Levels
289 King Street, Mascot - Tuesday, 25 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

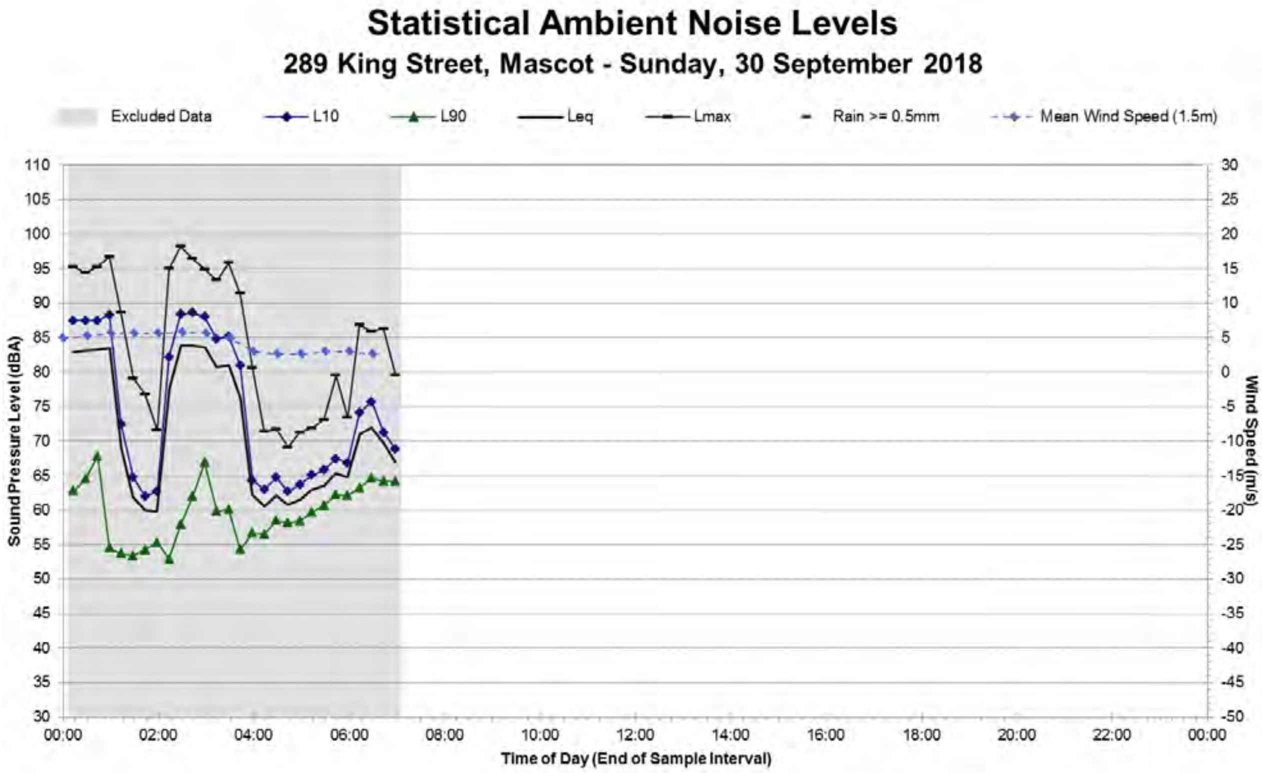


Statistical Ambient Noise Levels
289 King Street, Mascot - Wednesday, 26 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
289 King Street, Mascot - Thursday, 27 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
289 King Street, Mascot - Friday, 28 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
289 King Street, Mascot - Saturday, 29 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
289 King Street, Mascot - Sunday, 30 September 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

Noise Monitoring Location	L.09
Noise Monitoring Address	**105 Baxter Road, Mascot**

Logger Device Type: Svantek 957, Logger Serial No: 20668
Sound Level Meter: Brüel and Kjær 2250L, Sound Level Meter Serial No: 2414604

Ambient noise logger deployed at residential address 105 Baxter Road, Mascot.

Attended noise measurements indicate the ambient noise environment at this location is influenced by infrequent light-vehicles on Baxter Street and freight rail pass bys. Aircraft flyovers from Sydney Airport and steady state road traffic noise from O'Riordan Street to the west also contributed to the noise at this location.

Measured Attended Noise Levels (LAmax):
19/09/18: Light vehicles on Baxter Street: 71-75, steady traffic from surrounding roads: 50-55 dBA, aircraft 76 dBA, freight train pass: 60-68 dBA

Map of Noise Monitoring Location

Ambient Noise Logging Results – NPfI Defined Time Periods

Monitoring Period	**Noise Level (dBA)**			
	RBL	**LAeq**	**L10**	**L1**
Daytime	54	67	70	76
Evening	51	65	65	75
Night-time	45	62	59	70

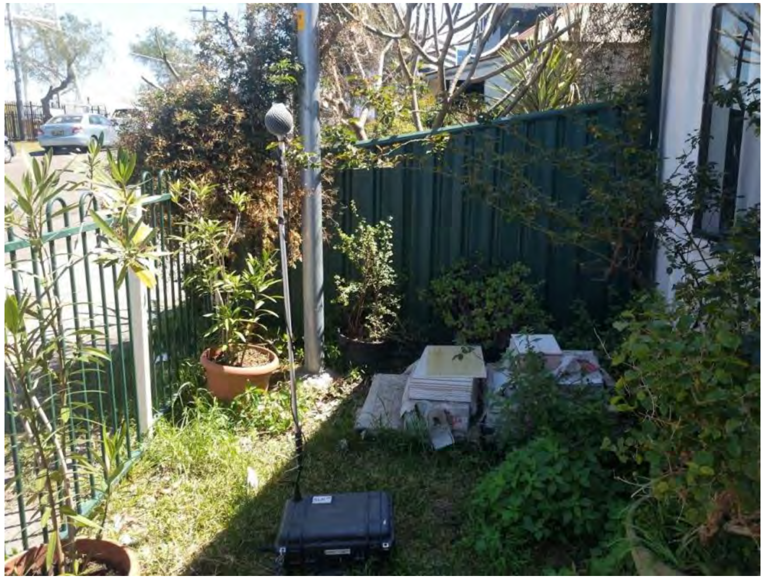
Ambient Noise Logging Results – RNP Defined Time Periods

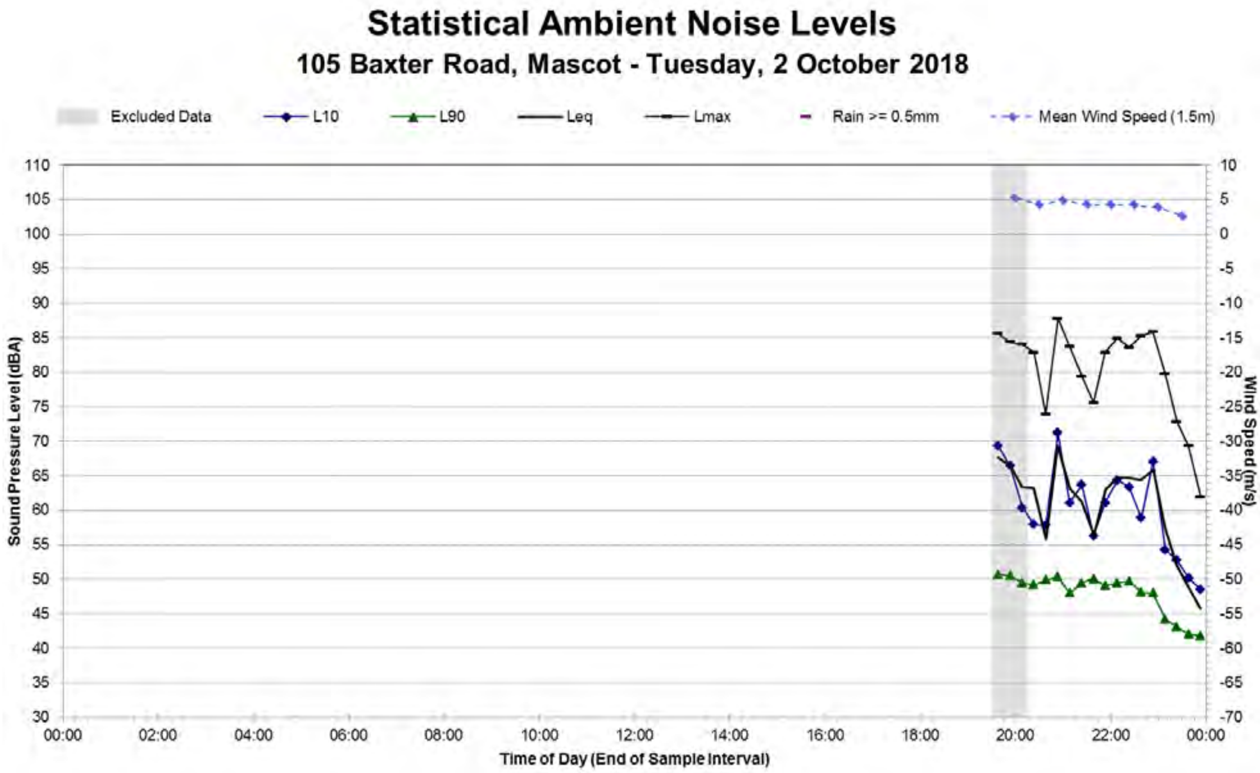
Monitoring Period	**Noise Level (dBA)**	
	LAeq(period)	**LAeq(1hour)**
Daytime (7am-10pm)	-	-
Night-time (10pm-7am)	-	-

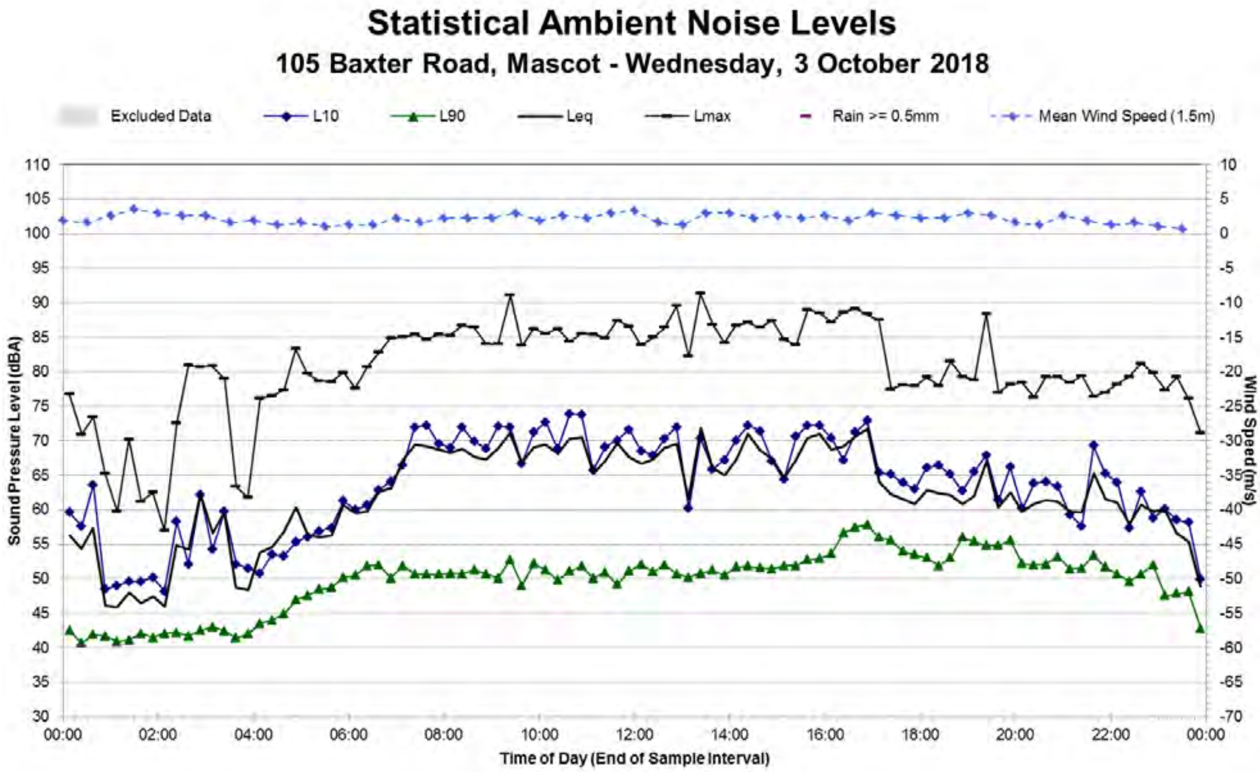
Attended Noise Measurement Results

Date	**Start Time**	**Measured Noise Level (dBA)**		
		LA90	**LAeq**	**LAmax**
19/09/18	18:00	52	63	78

Photo of Noise Monitoring Location

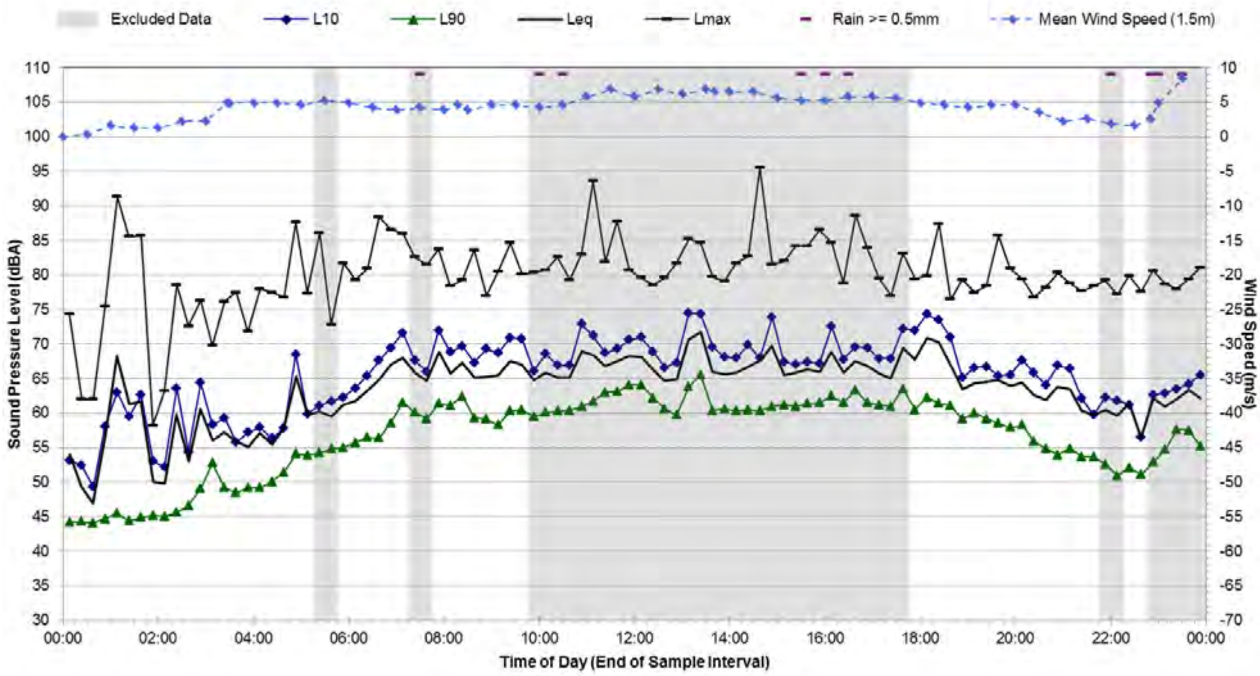



Statistical Ambient Noise Levels
105 Baxter Road, Mascot - Tuesday, 2 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00


Statistical Ambient Noise Levels
105 Baxter Road, Mascot - Wednesday, 3 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)
00:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
00:00

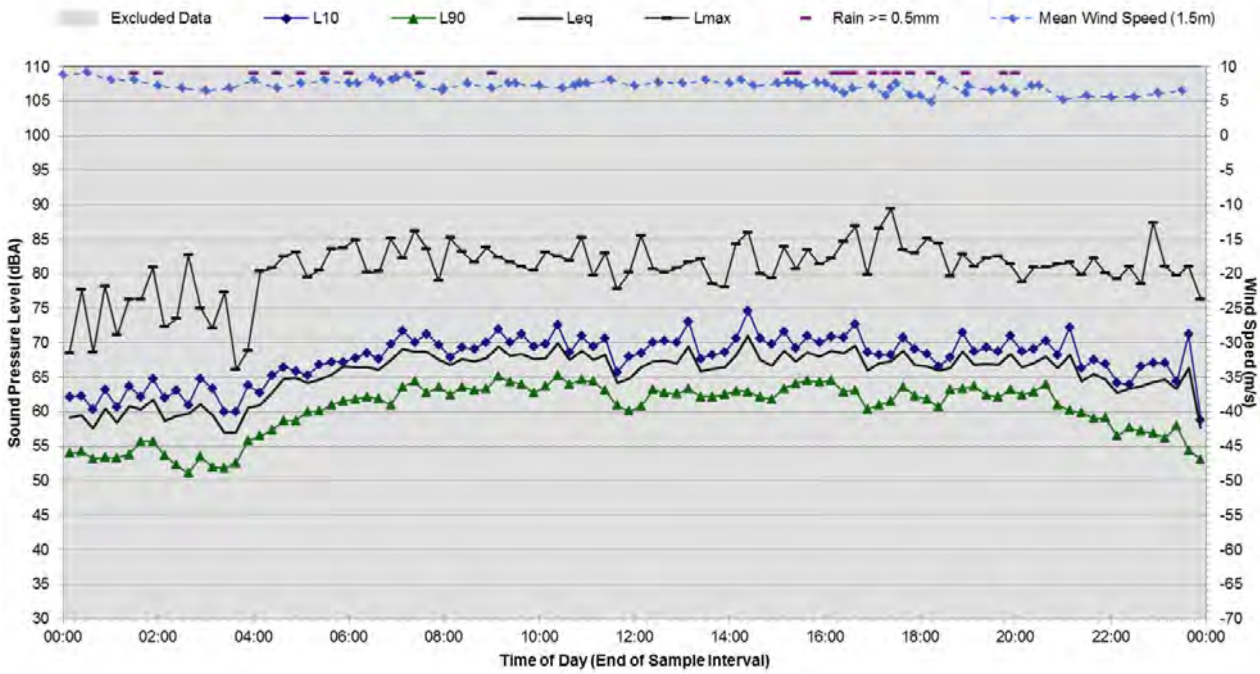
Statistical Ambient Noise Levels

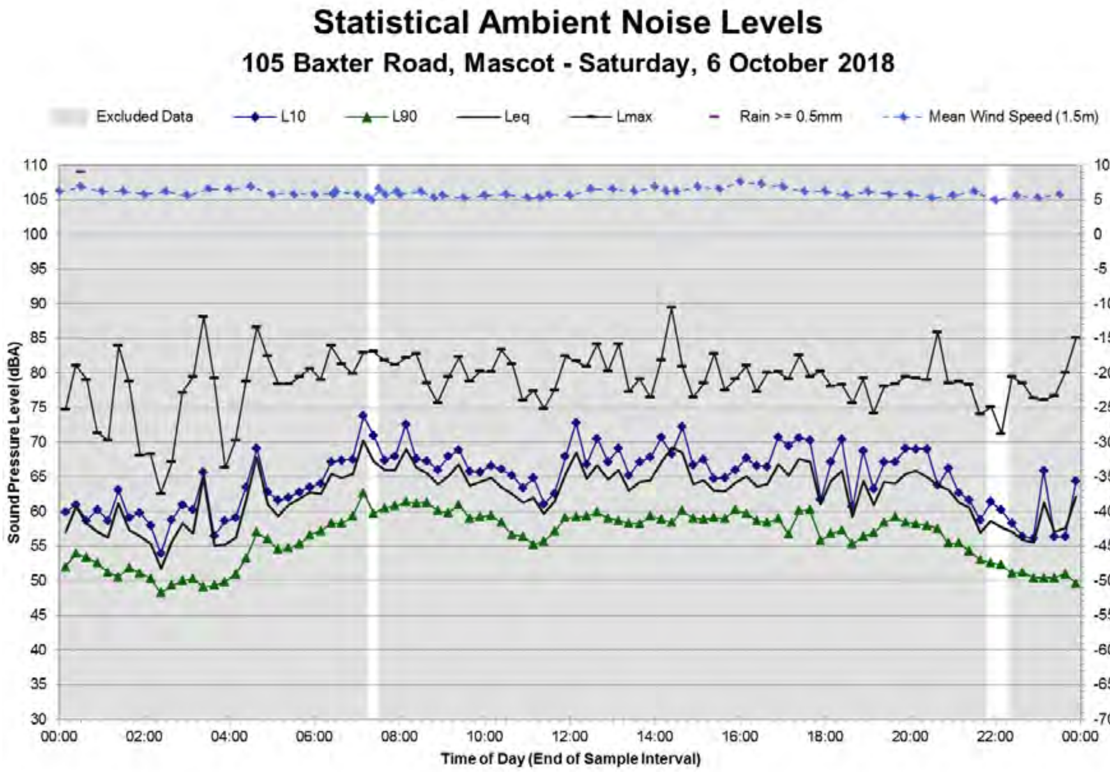
105 Baxter Road, Mascot - Thursday, 4 October 2018

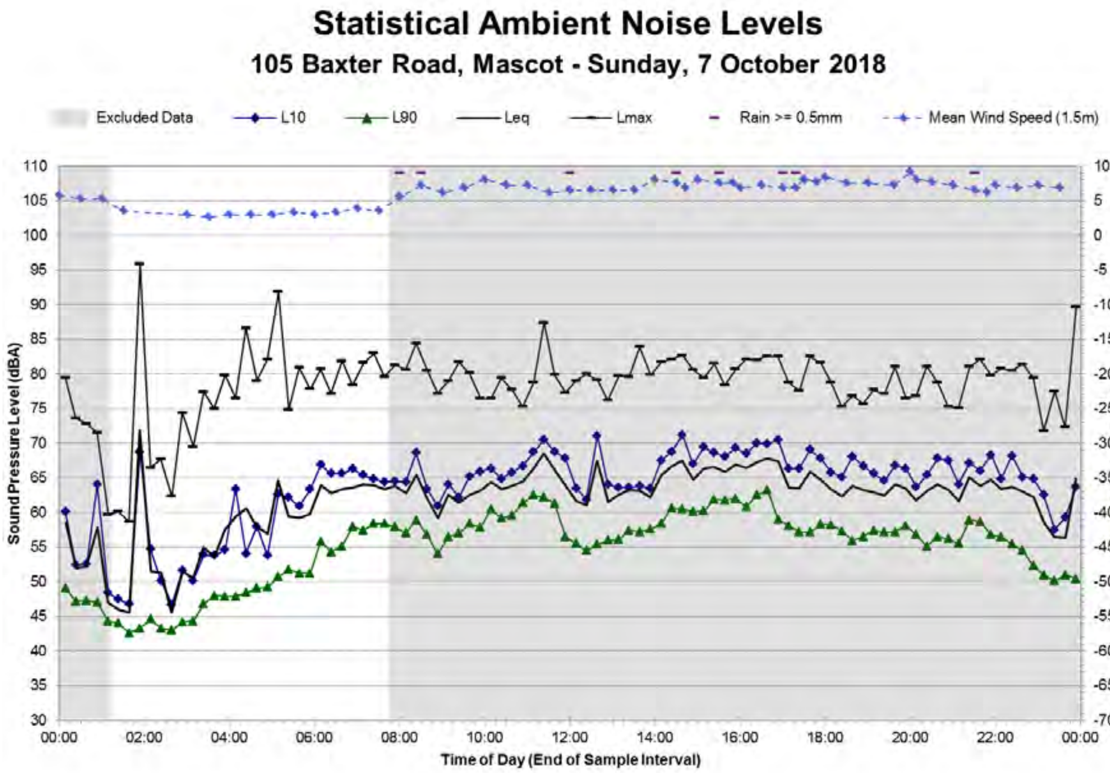


Statistical Ambient Noise Levels

105 Baxter Road, Mascot - Friday, 5 October 2018

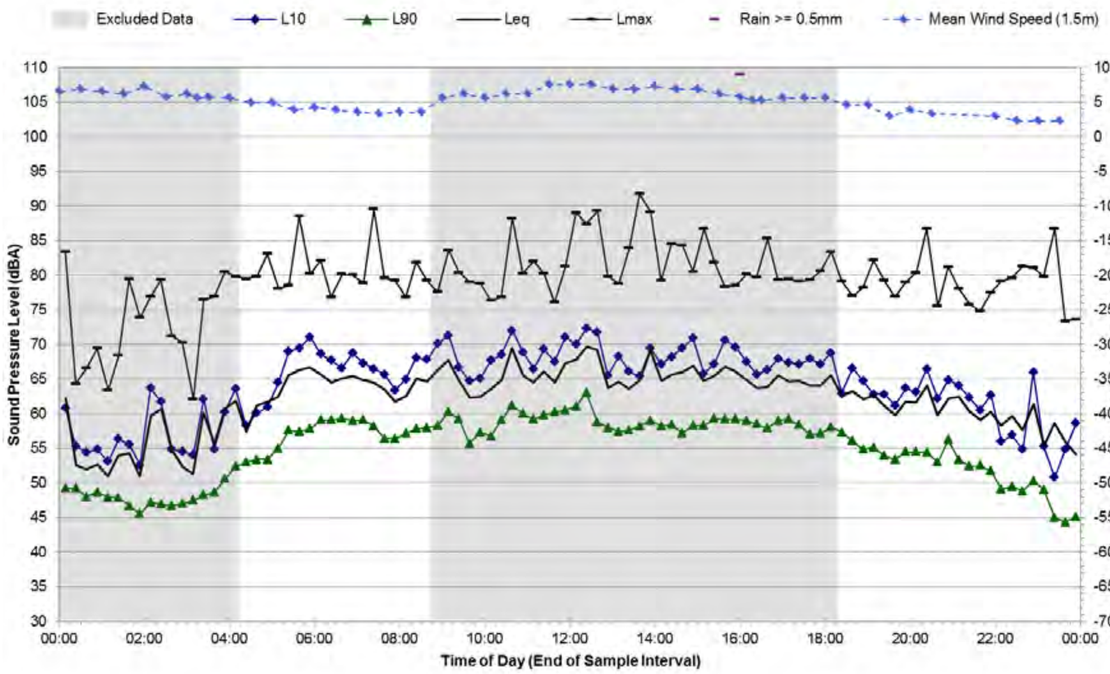



Statistical Ambient Noise Levels
105 Baxter Road, Mascot - Saturday, 6 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
105 Baxter Road, Mascot - Sunday, 7 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

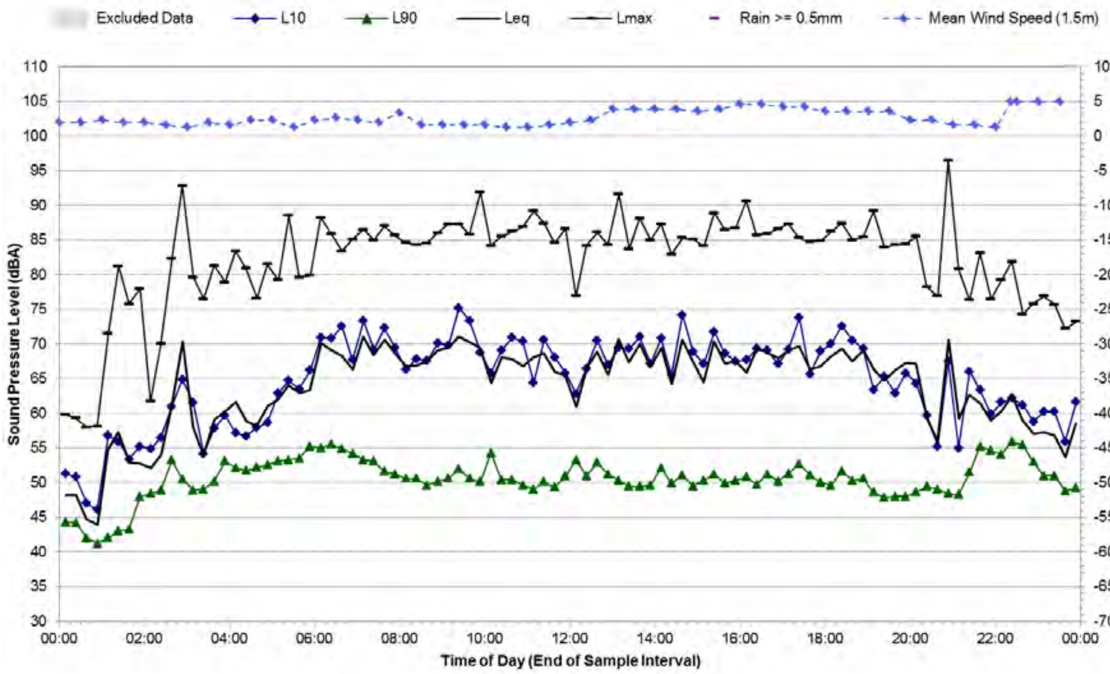
Statistical Ambient Noise Levels

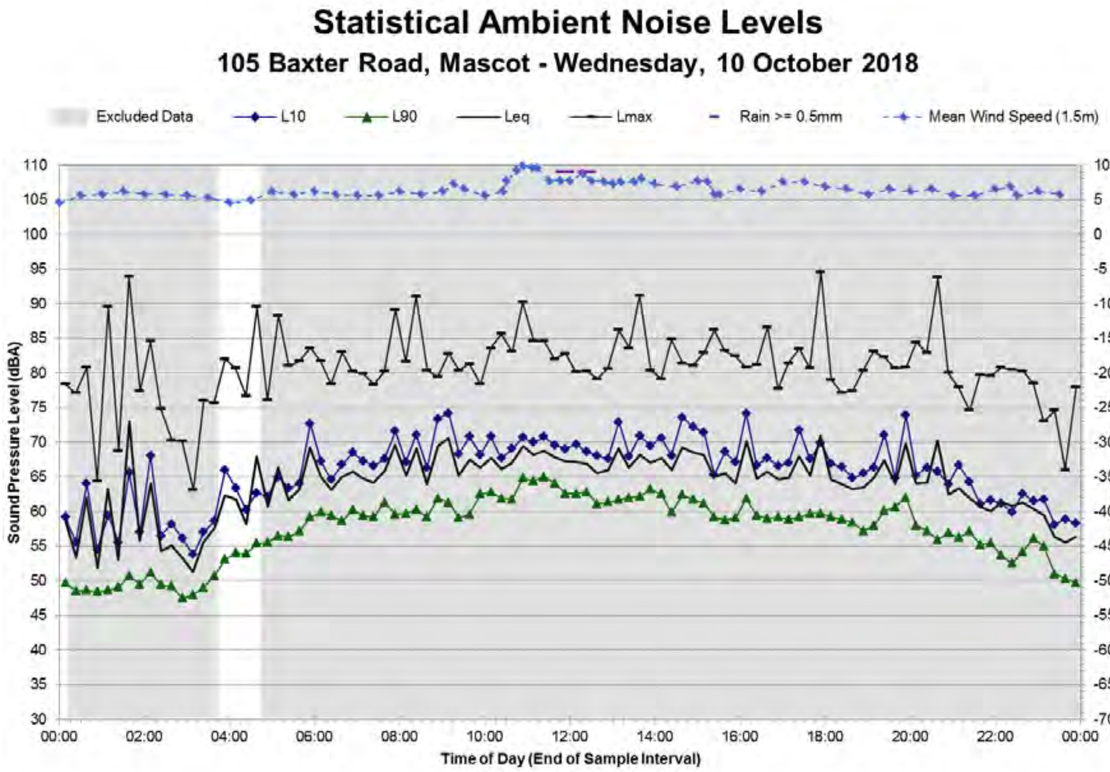
105 Baxter Road, Mascot - Monday, 8 October 2018

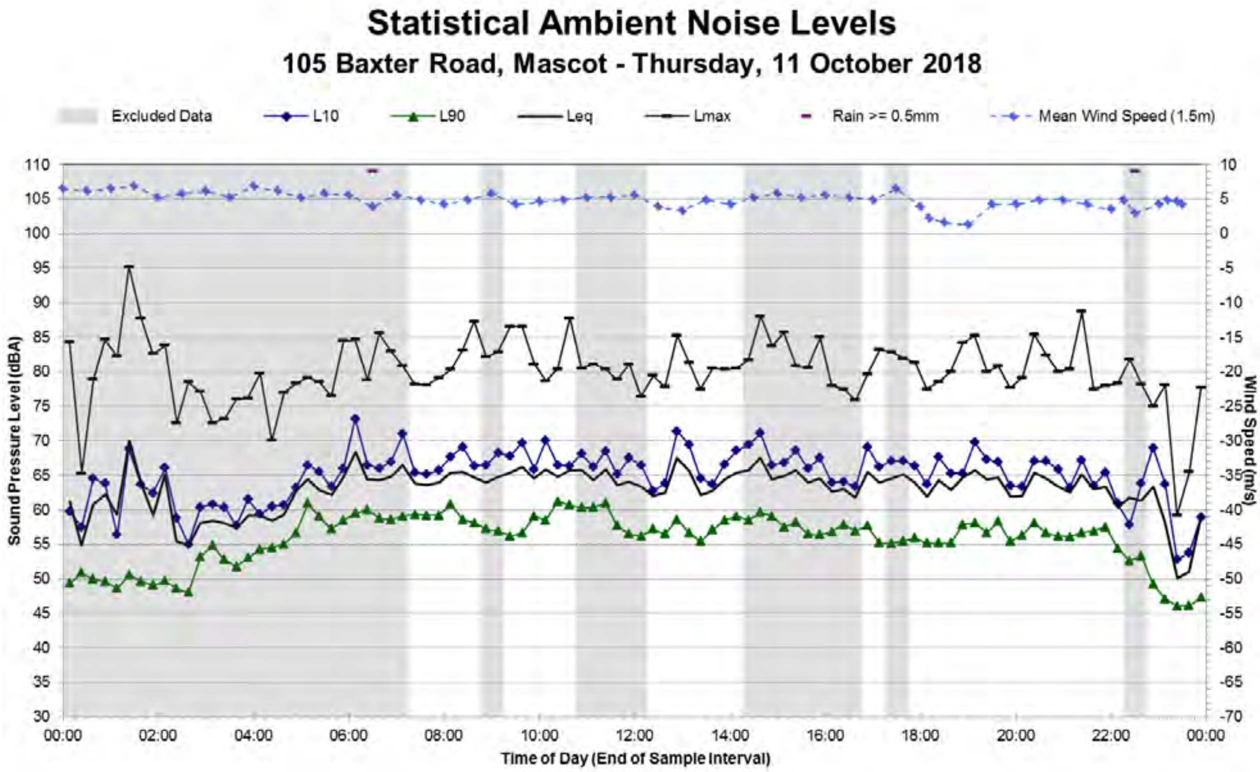


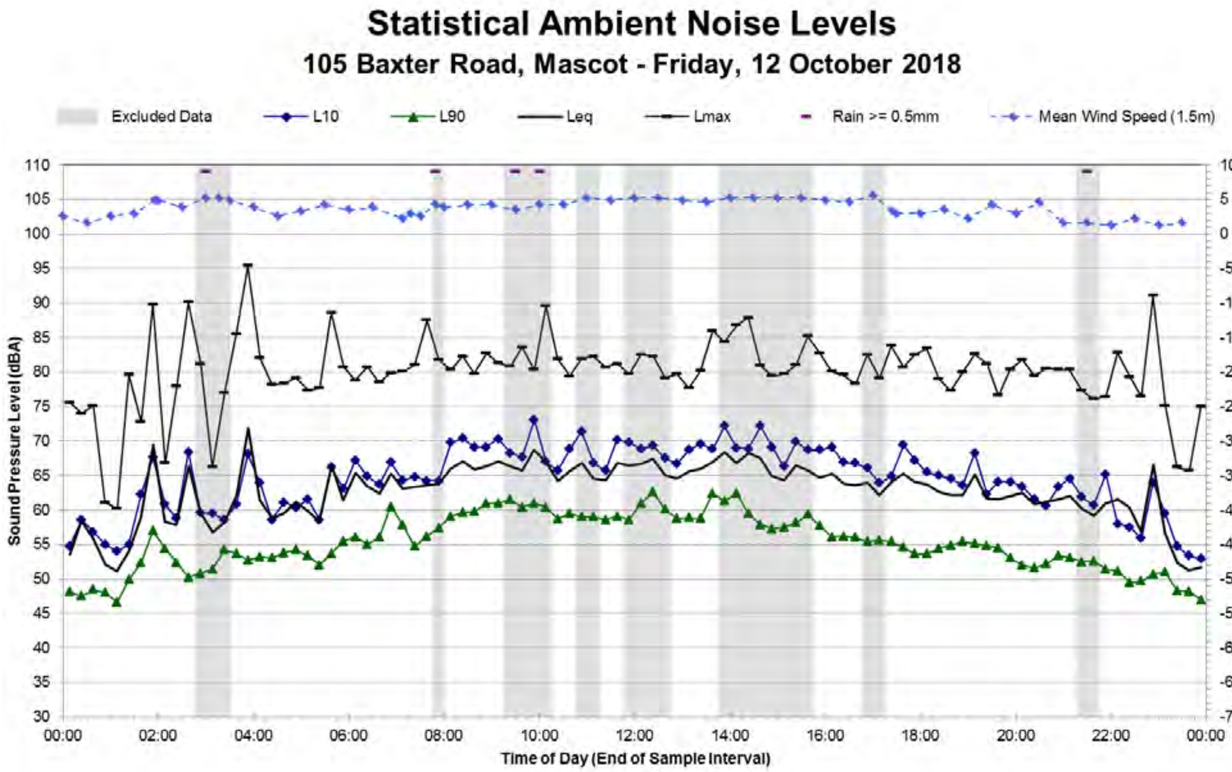
Statistical Ambient Noise Levels

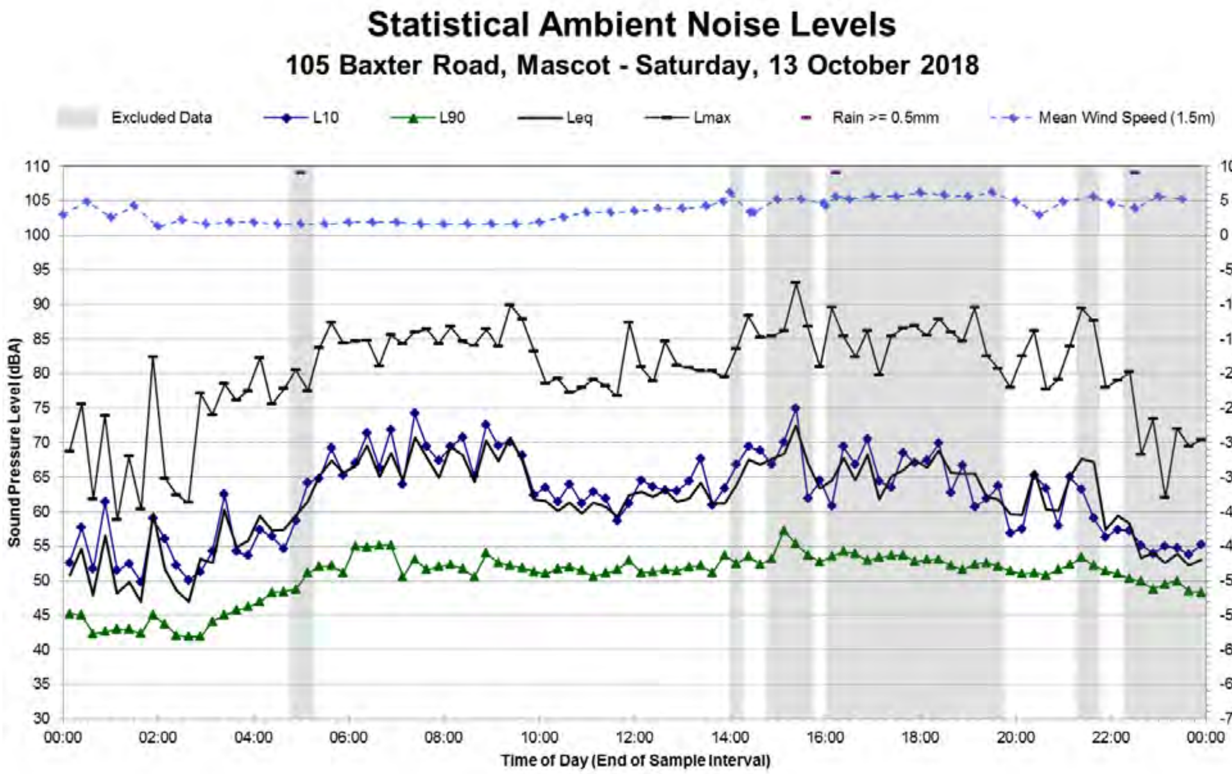
105 Baxter Road, Mascot - Tuesday, 9 October 2018

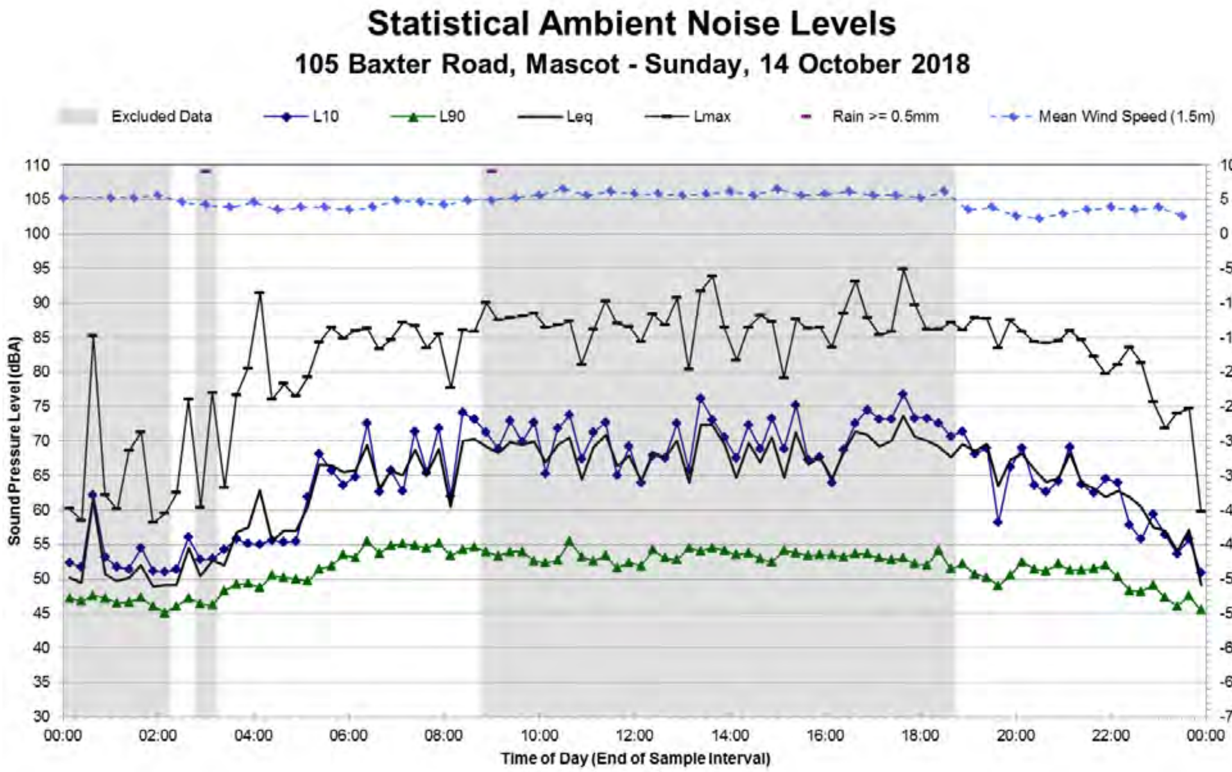



Statistical Ambient Noise Levels
105 Baxter Road, Mascot - Wednesday, 10 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

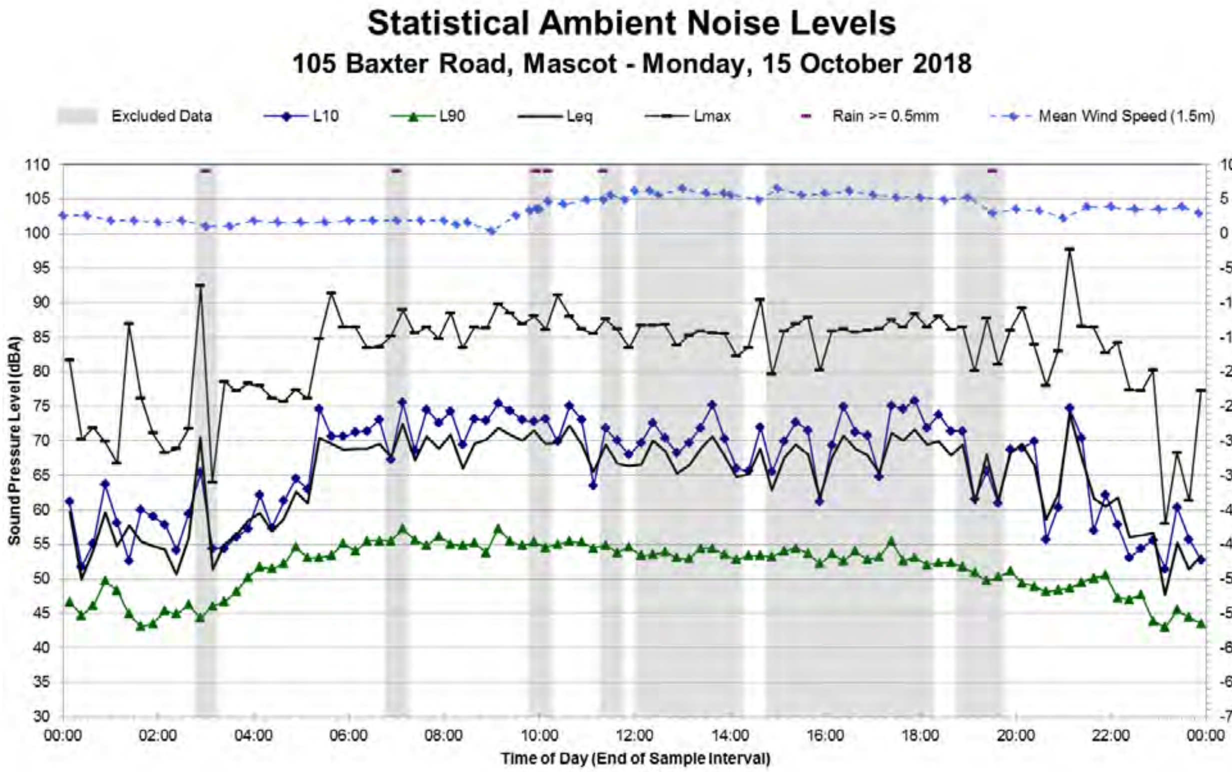

Statistical Ambient Noise Levels
105 Baxter Road, Mascot - Thursday, 11 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
105 Baxter Road, Mascot - Friday, 12 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

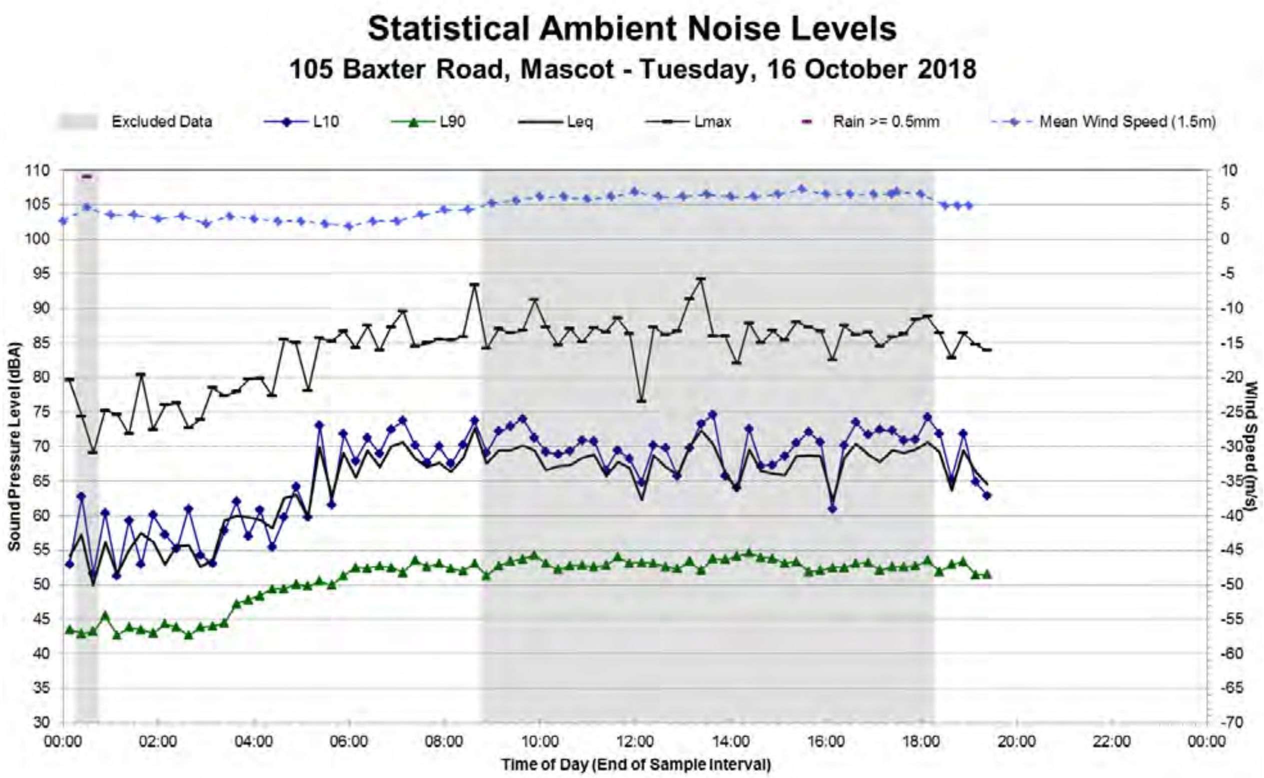

Statistical Ambient Noise Levels
105 Baxter Road, Mascot - Saturday, 13 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)



Statistical Ambient Noise Levels
105 Baxter Road, Mascot - Sunday, 14 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)



Statistical Ambient Noise Levels
105 Baxter Road, Mascot - Monday, 15 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)


Statistical Ambient Noise Levels
105 Baxter Road, Mascot - Tuesday, 16 October 2018
Excluded Data
L10
L90
Leq
Lmax
Rain >= 0.5mm
Mean Wind Speed (1.5m)
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of Sample Interval)

Appendix H
Construction and operational noise impact maps

Figure 1 Predicted Impacts 'Scenario 1a, Enabling Works – Peak' in All Locations (Night-time)

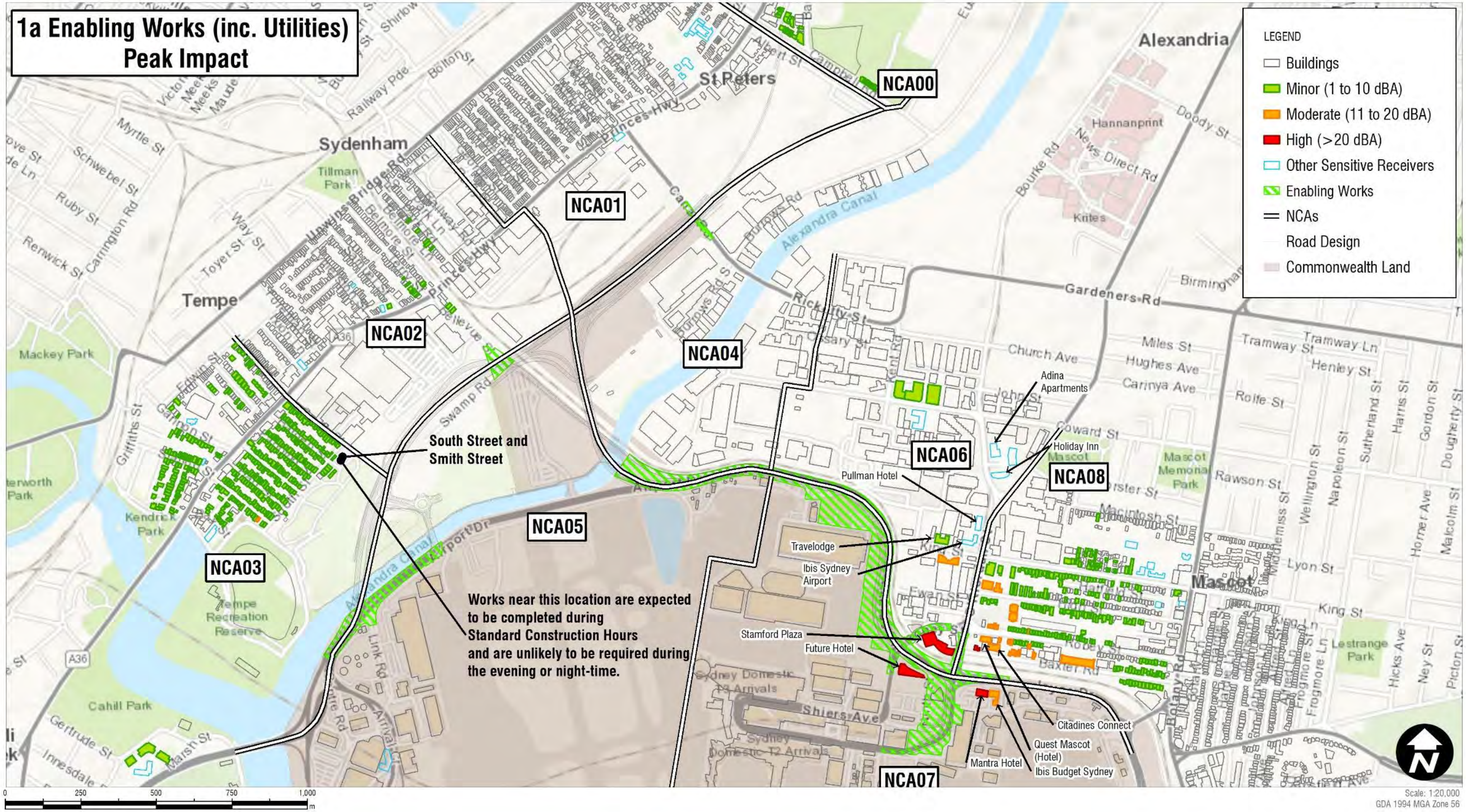


Figure 2 Predicted Impacts 'Scenario 1b, Enabling Works – Typical' in All Locations (Night-time)

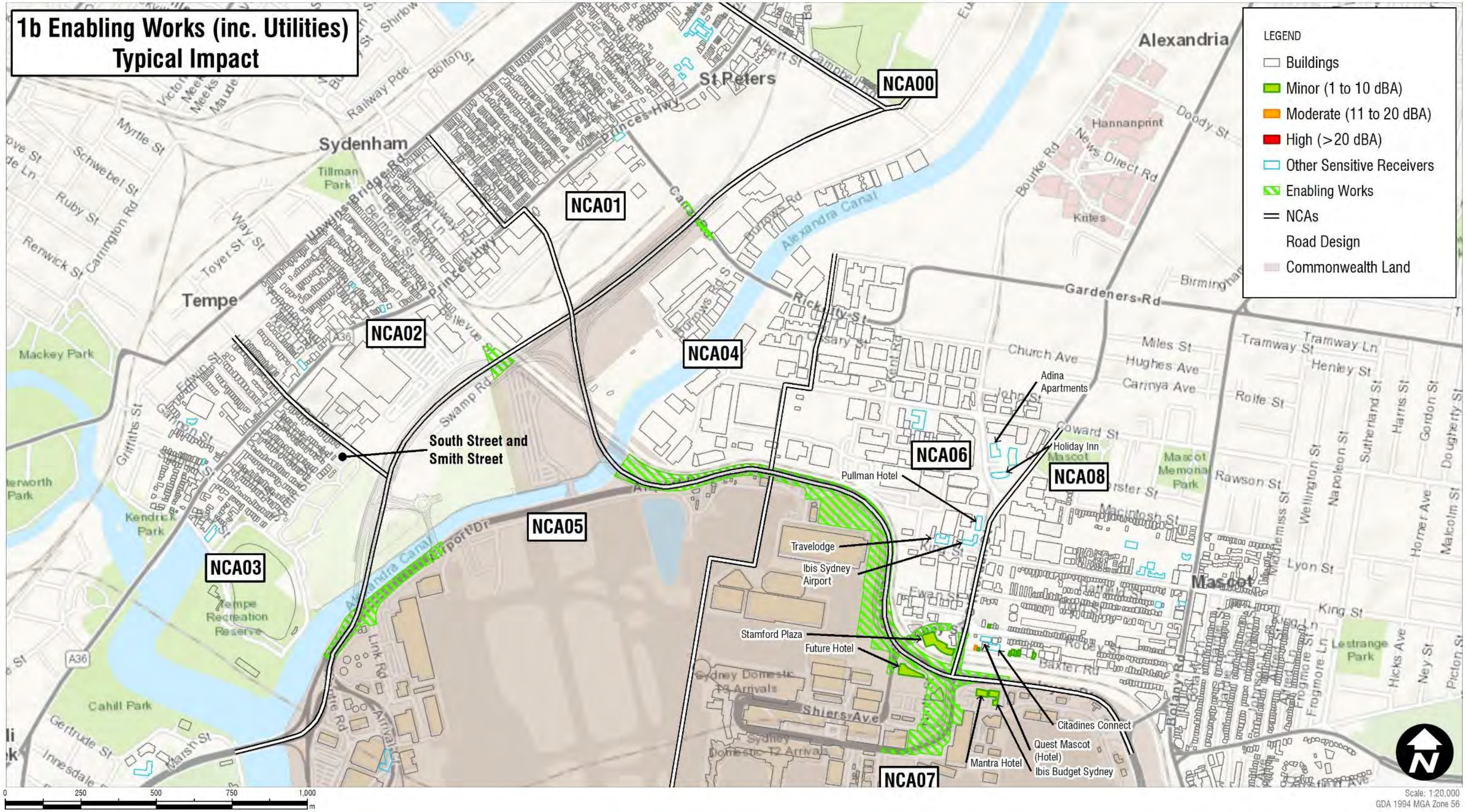


Figure 3 Predicted Impacts ‘Scenario 2c, Compound Operation’ in All Locations (Night-time)

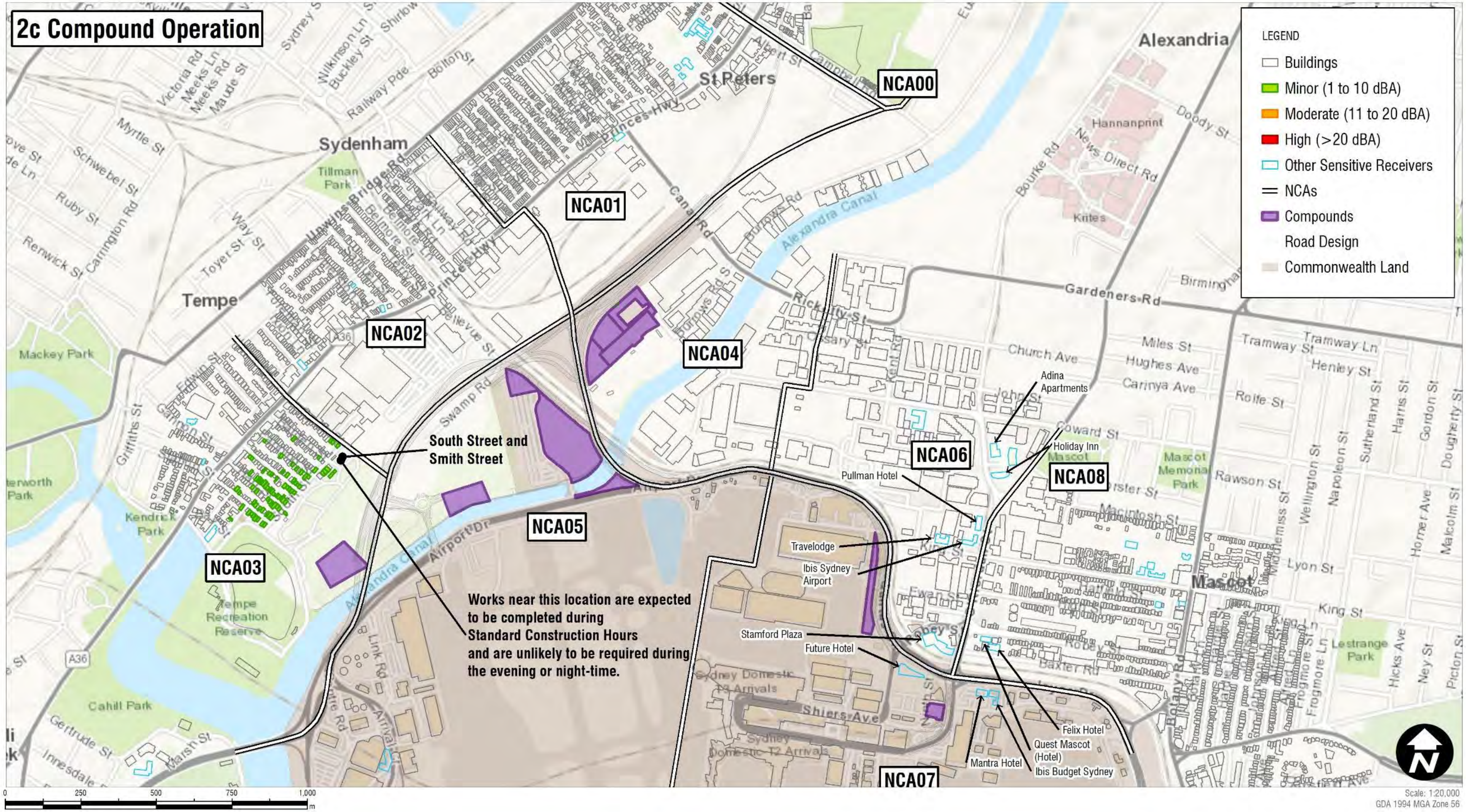


Figure 4 Predicted Impacts 'Scenario 6a, Road Works – Peak' in All Locations (Night-time)

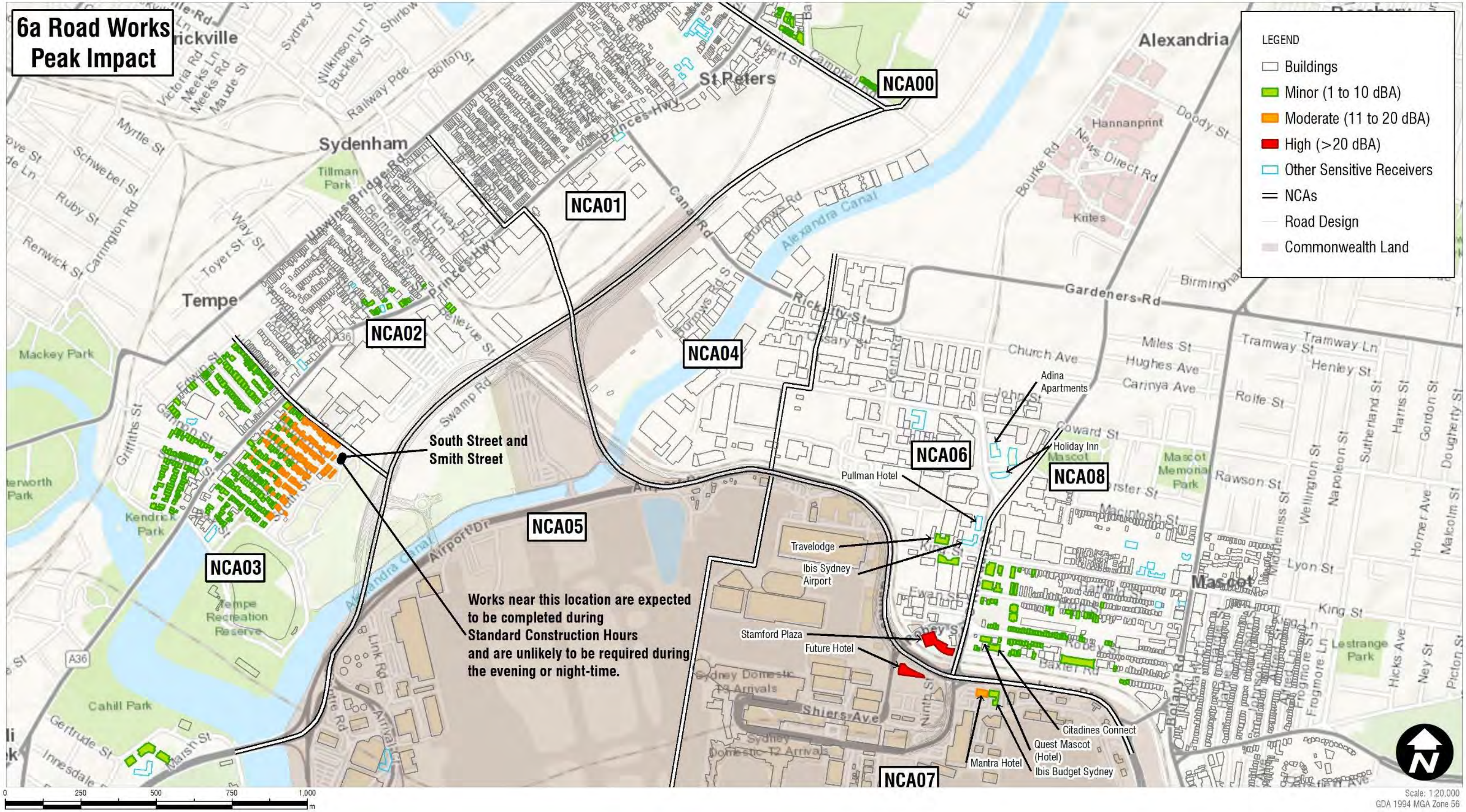


Figure 5 **Predicted Impacts 'Scenario 6b, Road Works – Typical' in All Locations (Night-time)**

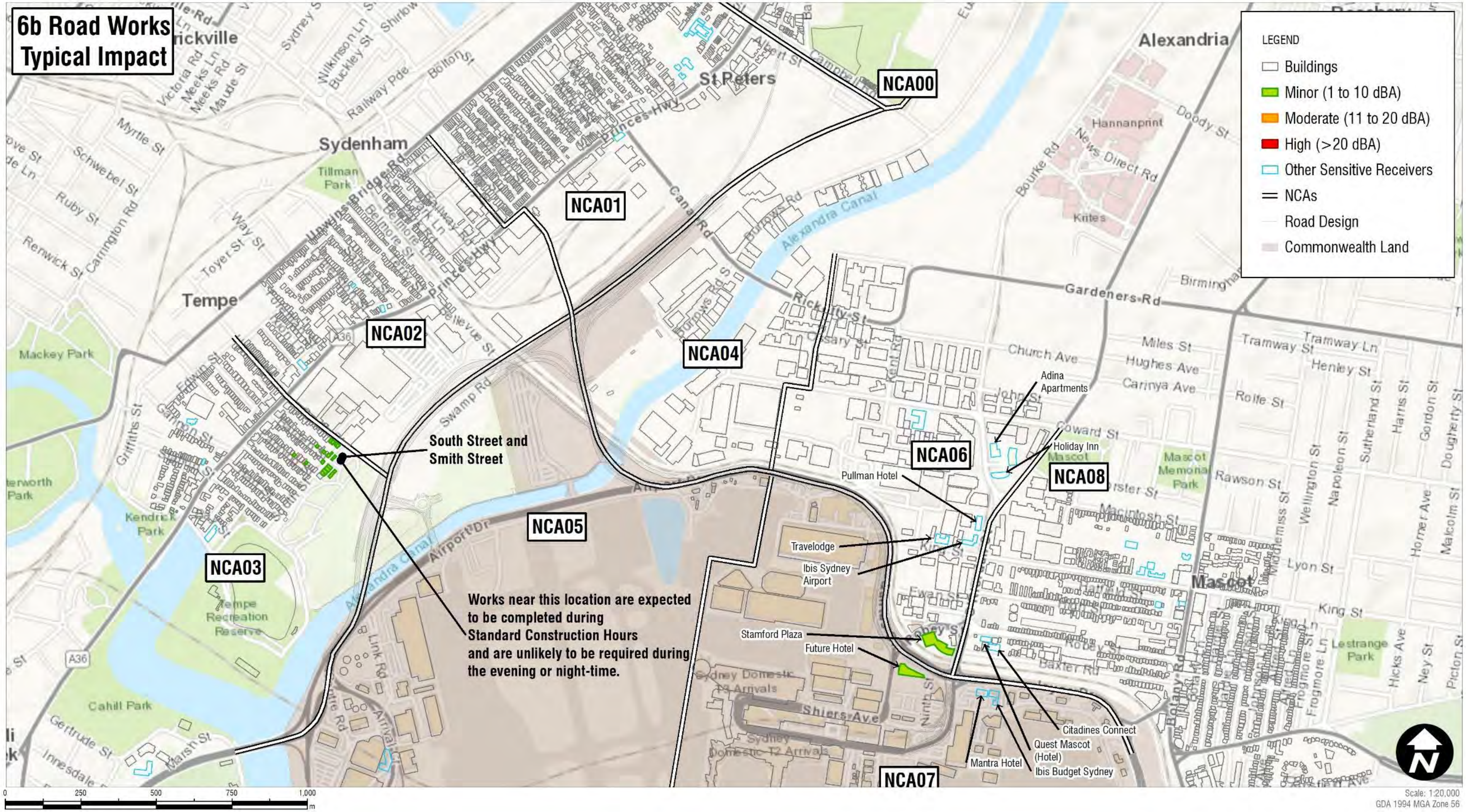


Figure 6 Predicted Worst-case Impacts for Works in One Location (Night-time)

Figure 7 Predicted Worst-case Impacts – Other Sensitive Receivers

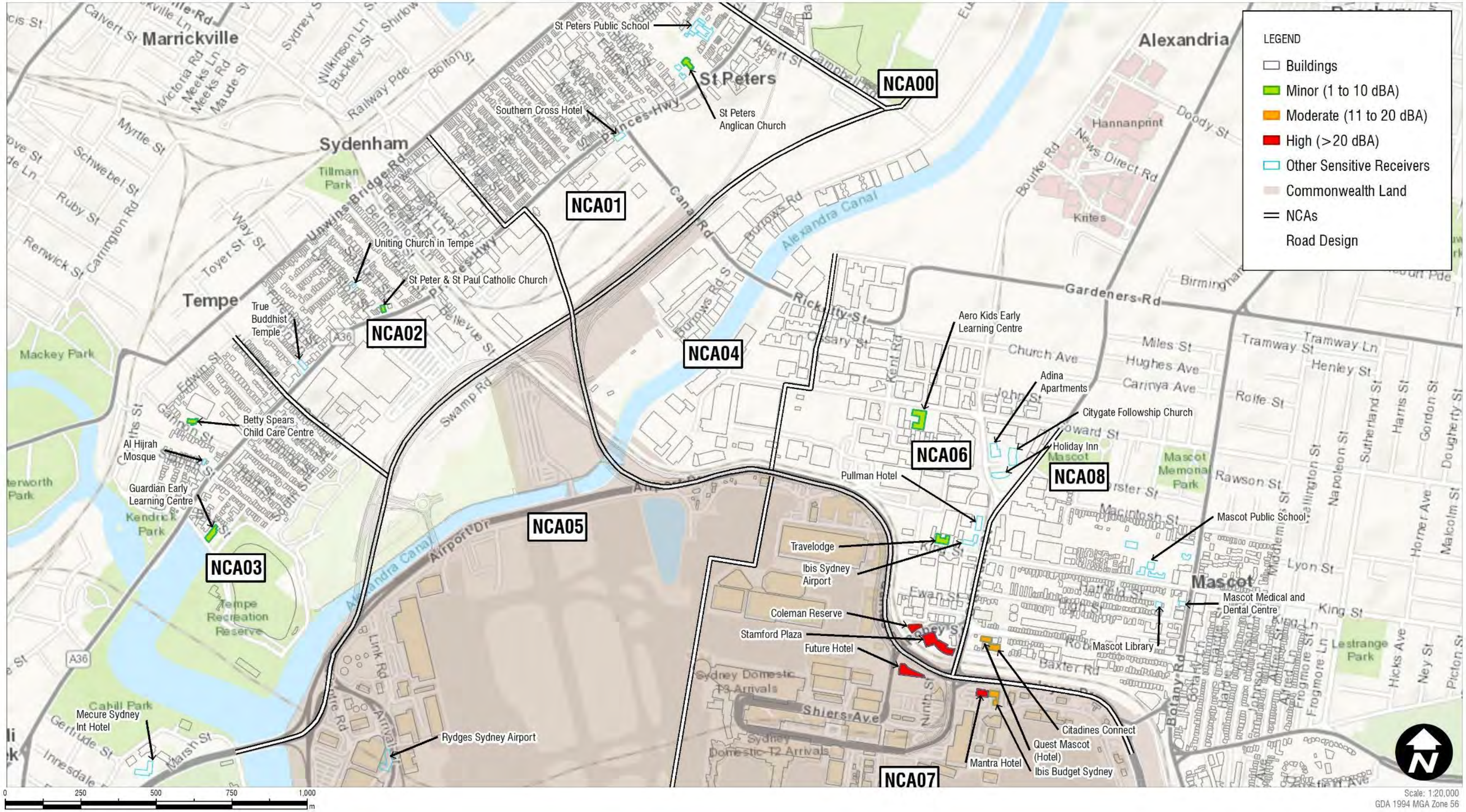


Figure 8 Predicted Worst-case Impacts at Commercial Receivers

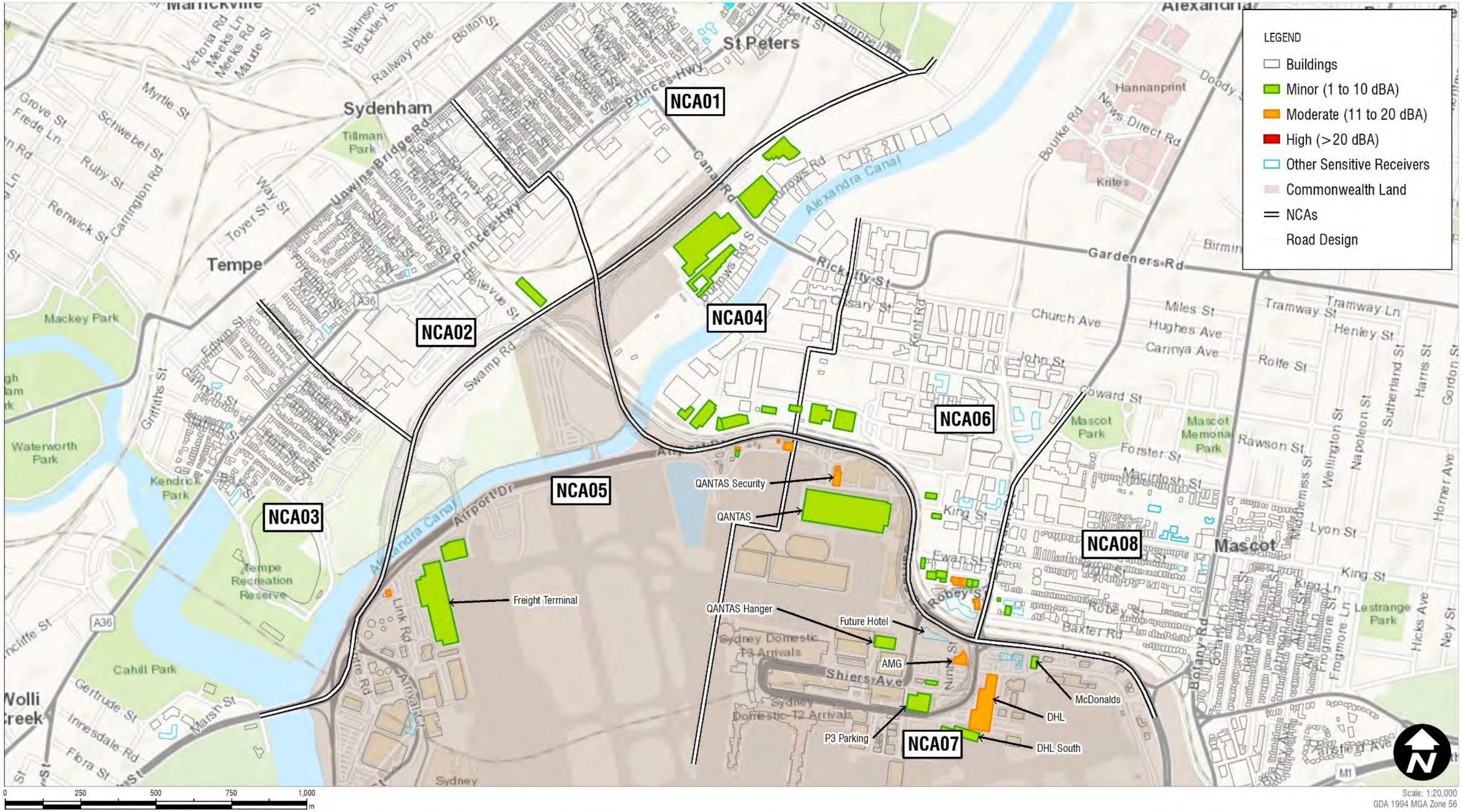


Figure 9 Impact Piling – Daytime, Standard Construction Hours

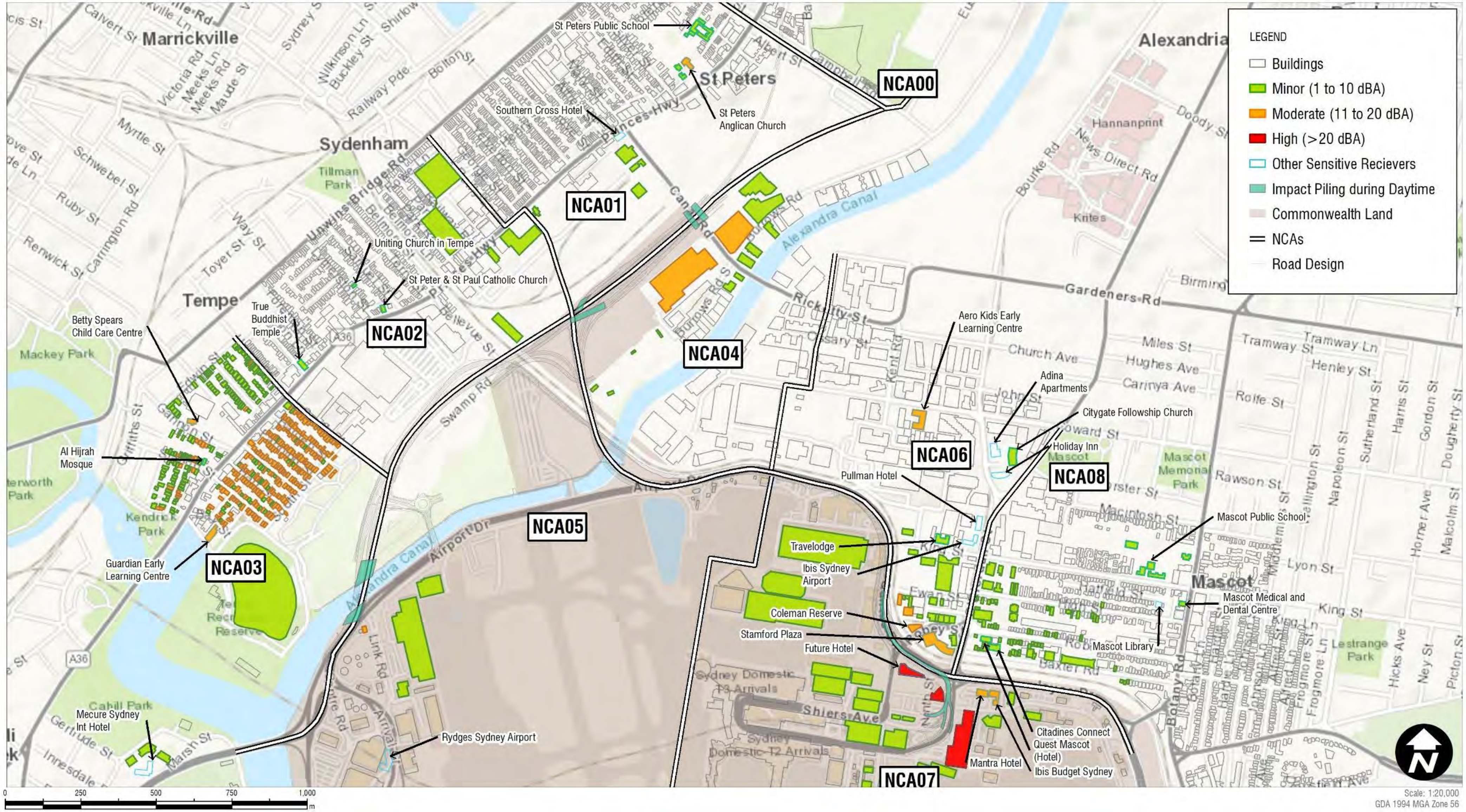


Figure 10 Impact Piling – Night-time, Out of Hours Works

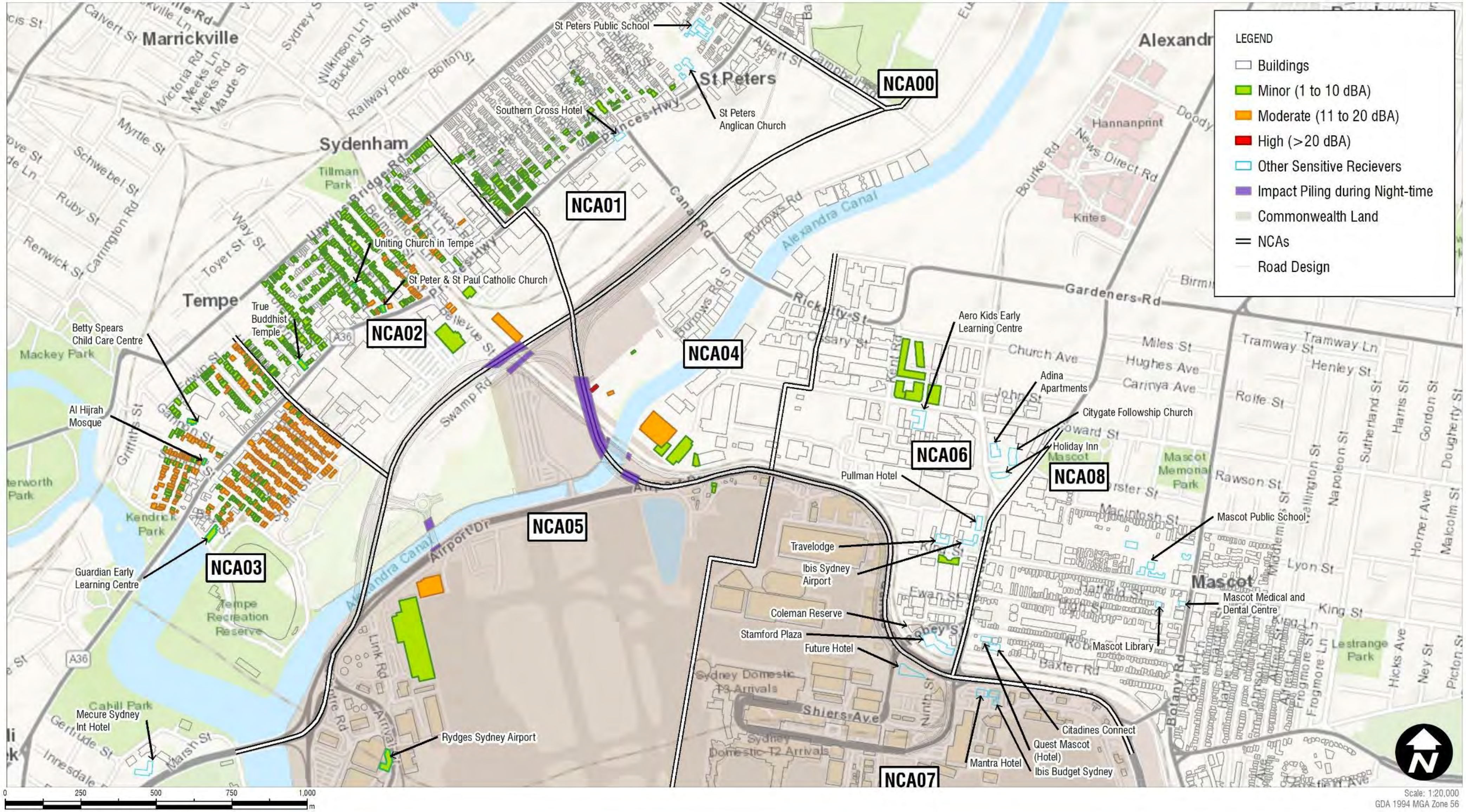


Figure 11 Construction Vibration Assessment – Minimum Working Distances

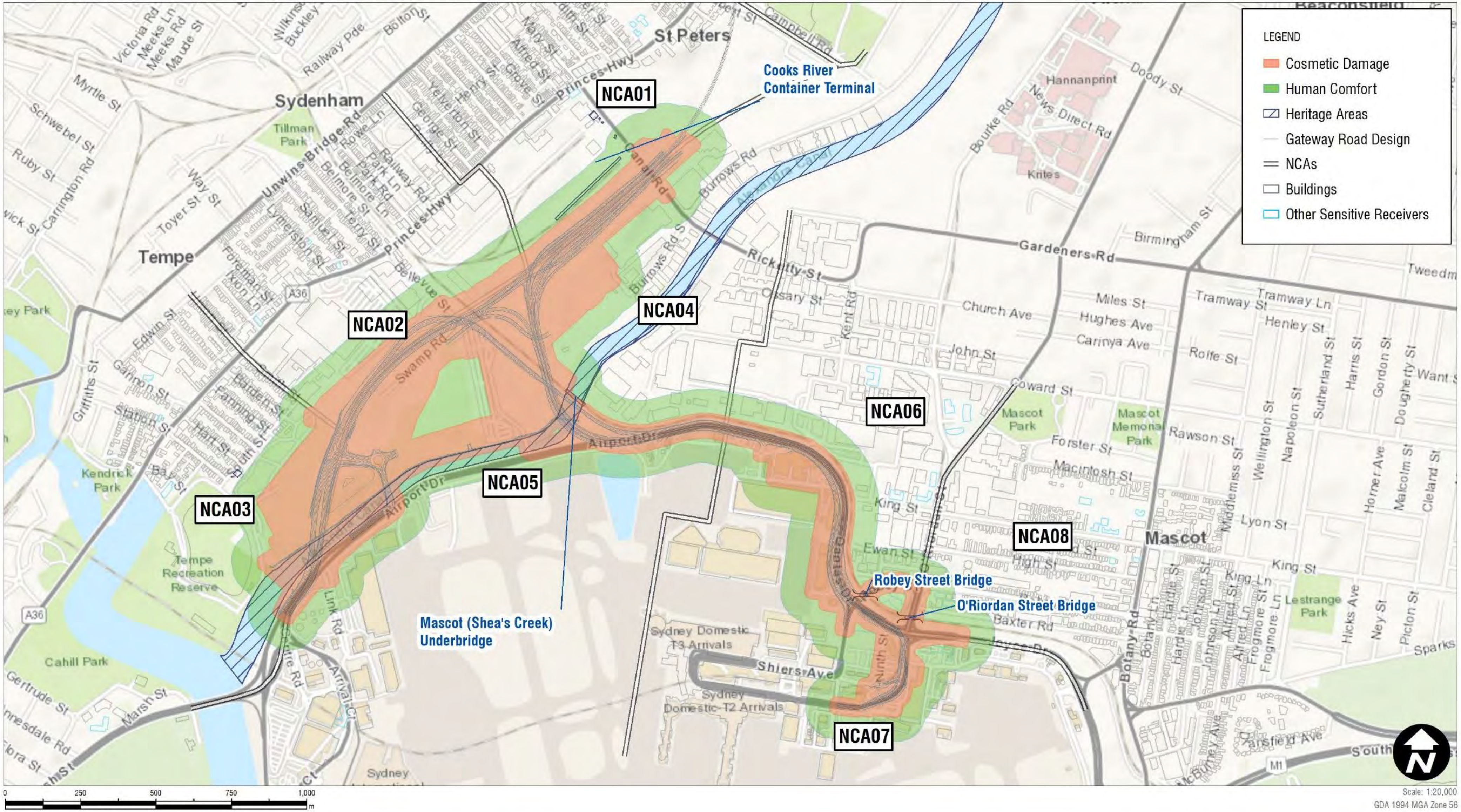


Figure 12 Construction Vibration Assessment – Buildings within Minimum Working Distances

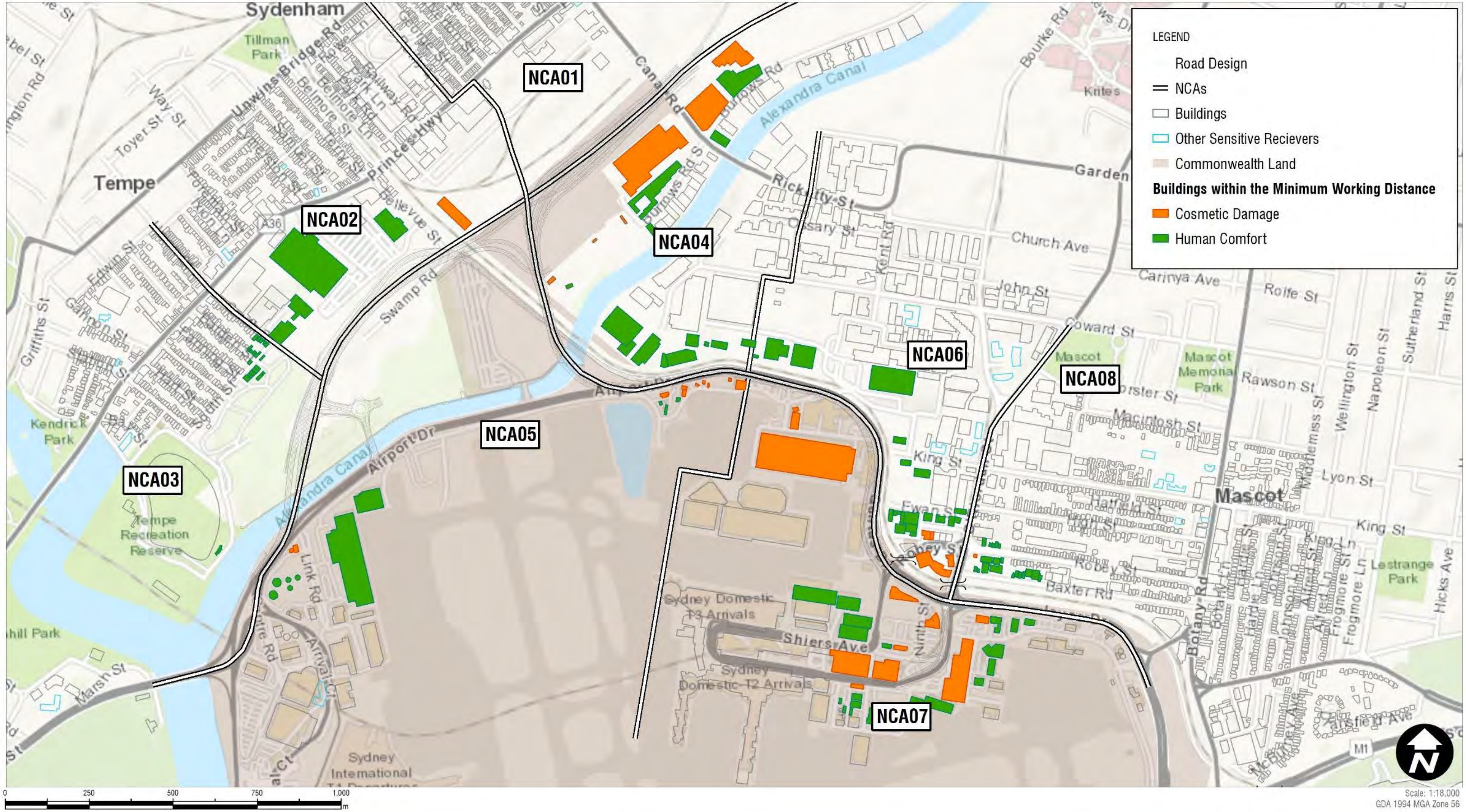


Figure 13 Construction Ground-borne Noise Assessment – Large Rockbreaker

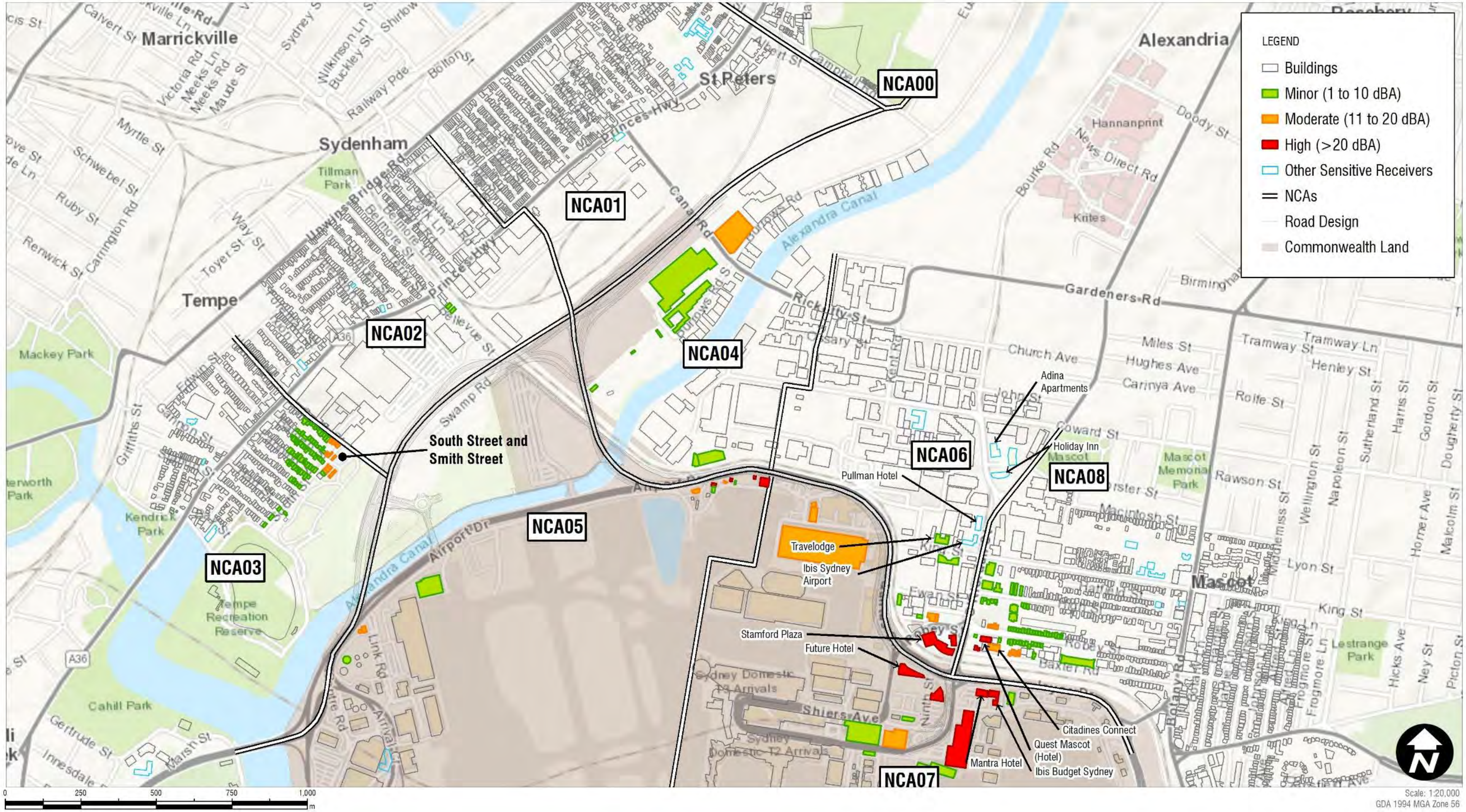


Figure 14 Construction Traffic Assessment – Predicted Change in Road Traffic Noise Levels

Figure 15 Indicative Worst-case Additional Mitigation Measures for All Construction Activities during the Daytime

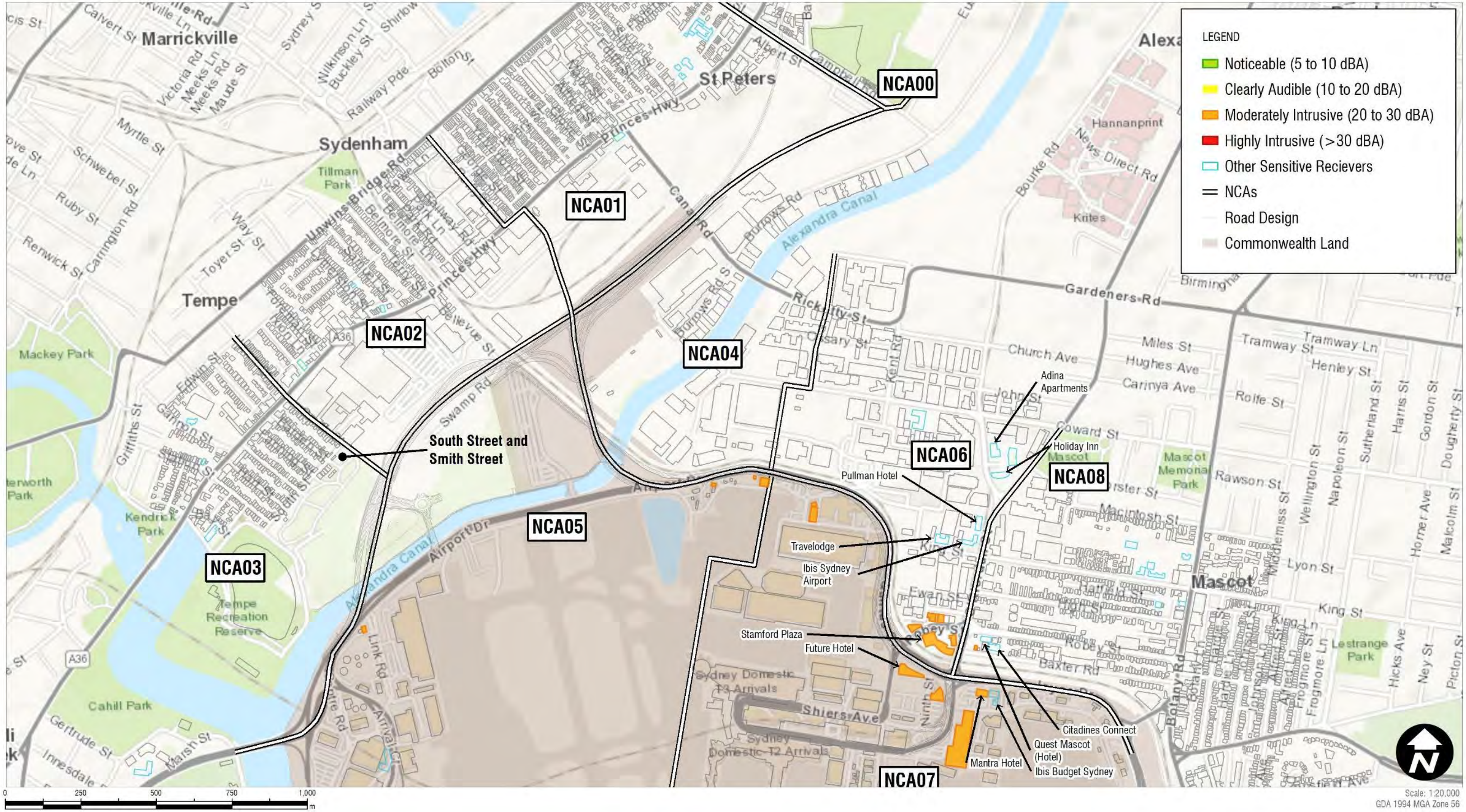


Figure 16 Indicative Worst-case Additional Mitigation Measures for All Construction Activities during the Night-time

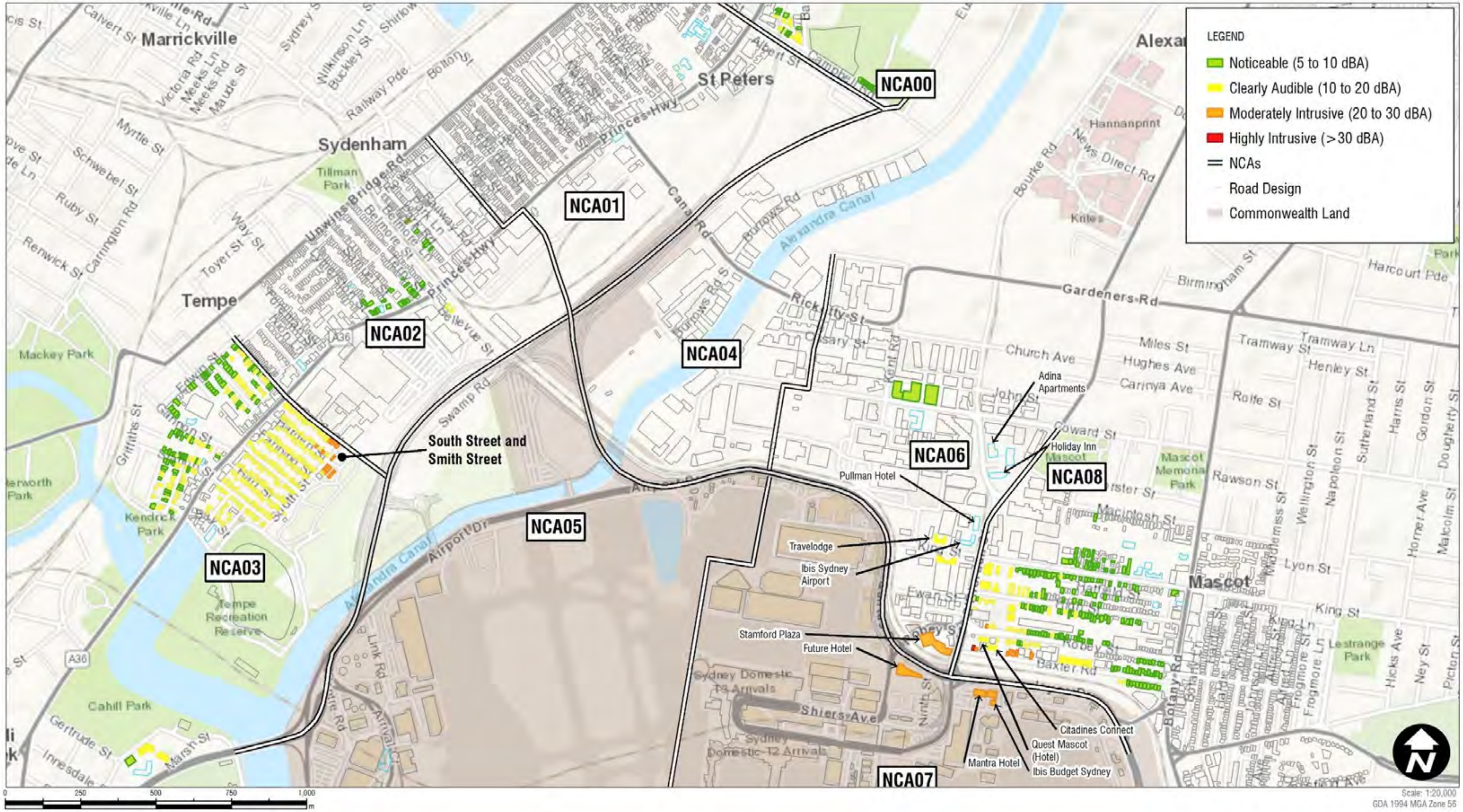


Figure 1 Worst-case Predicted Operational Noise Levels (2036 Night-time, Build)

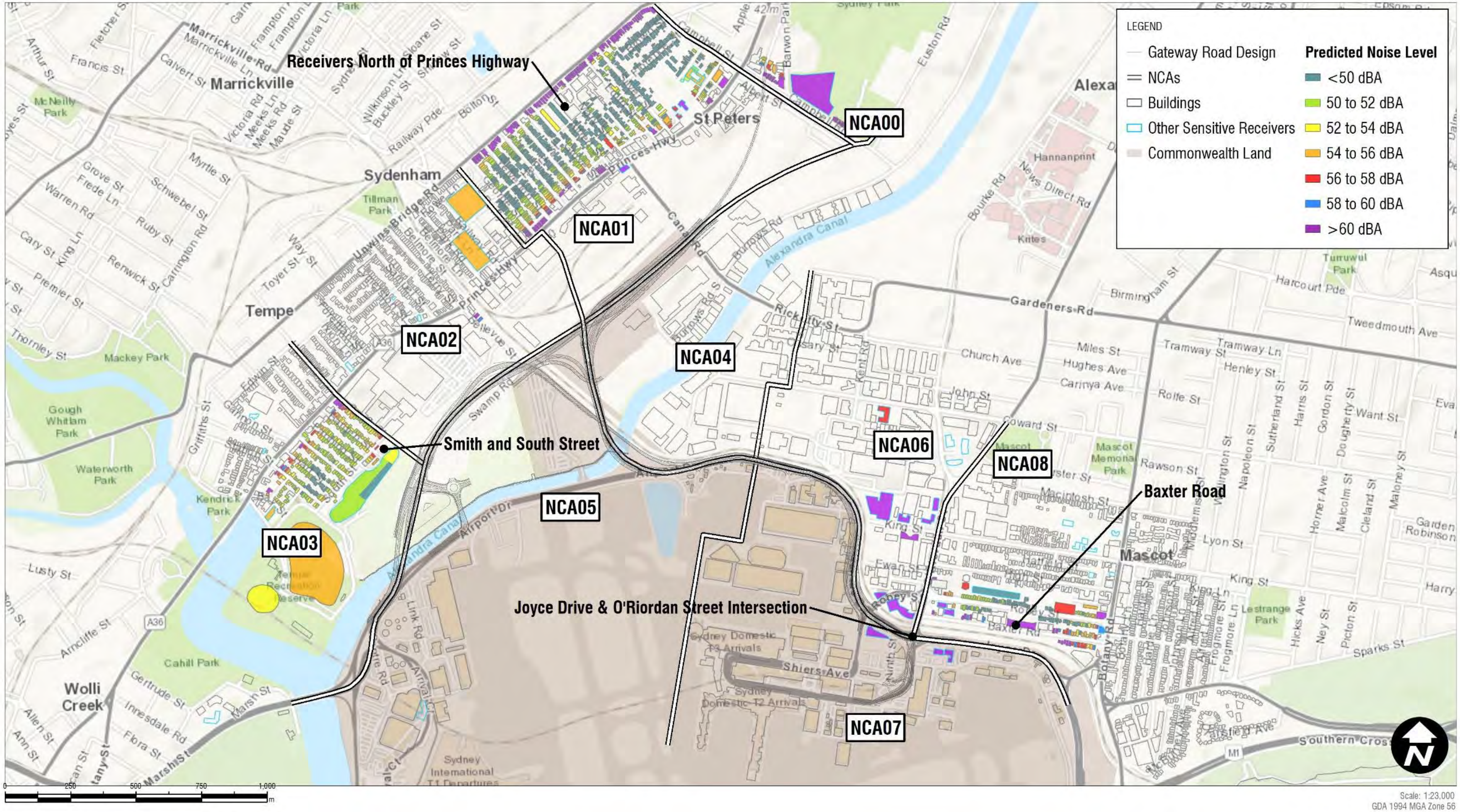


Figure 2 Worst-case Predicted Change in Operational Noise (2036 Night-time, Build minus No Build)

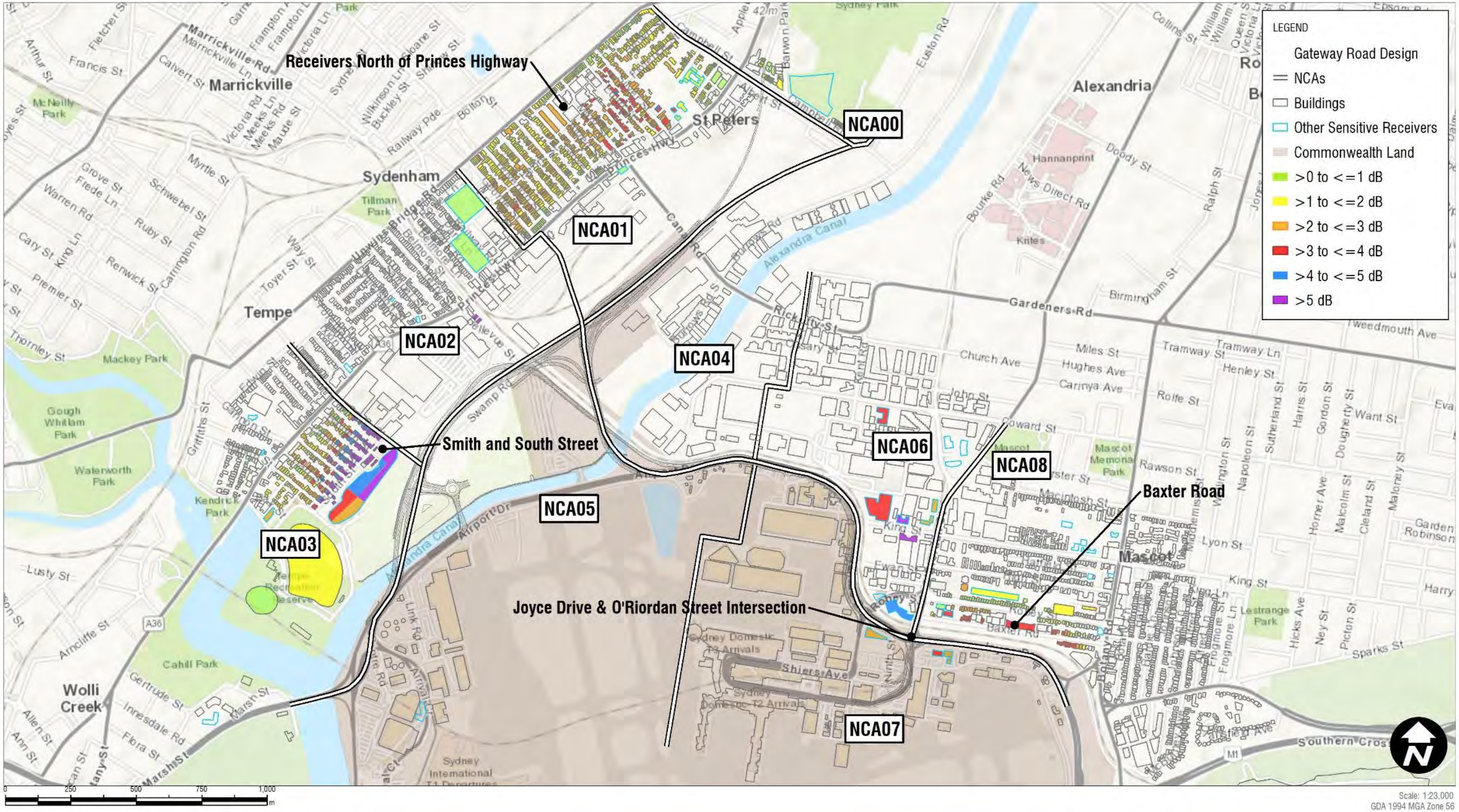


Figure 3 Receivers Eligible for Consideration of Additional Mitigation

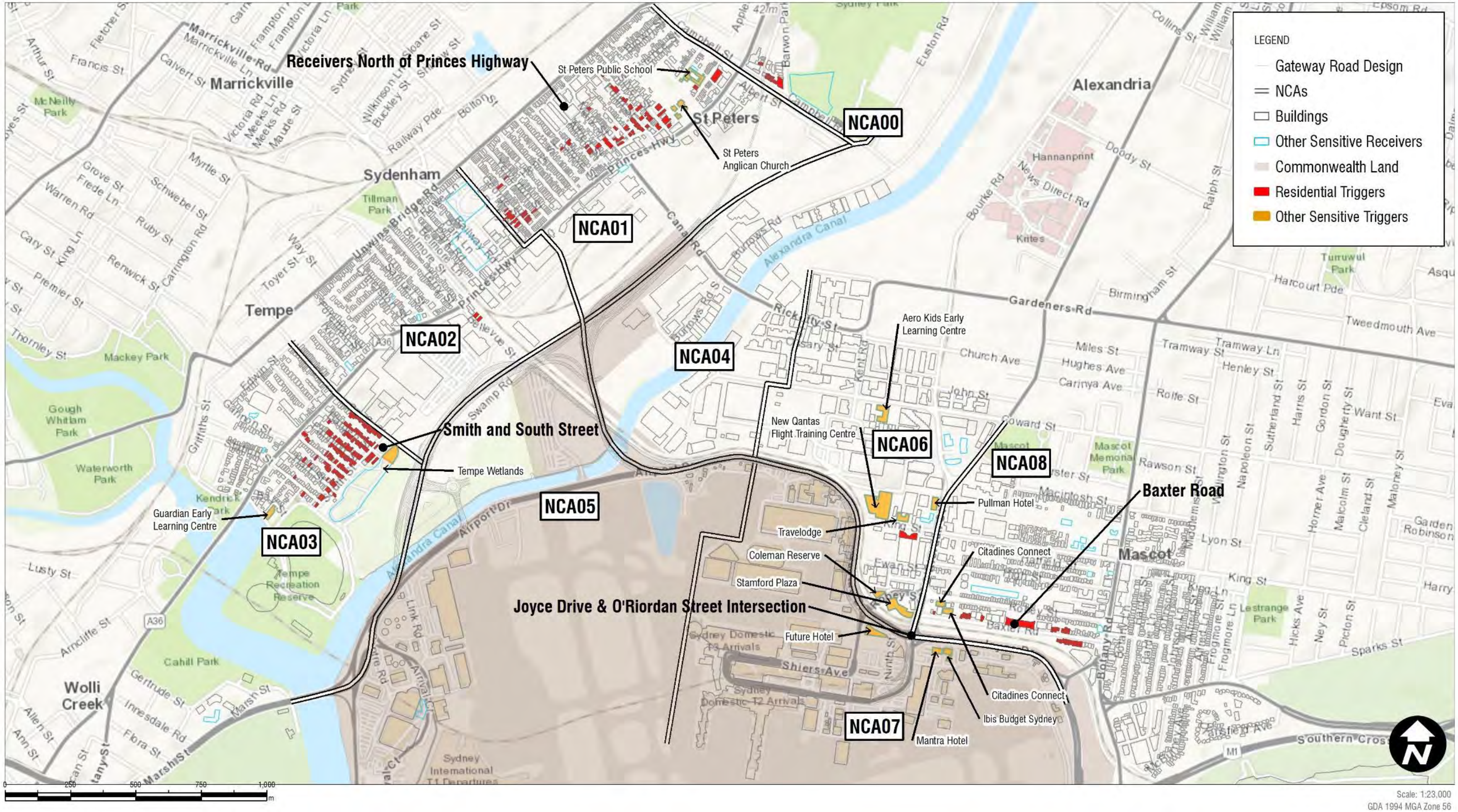


Figure 4 Grid Noise Maps – 2036 Build Daytime

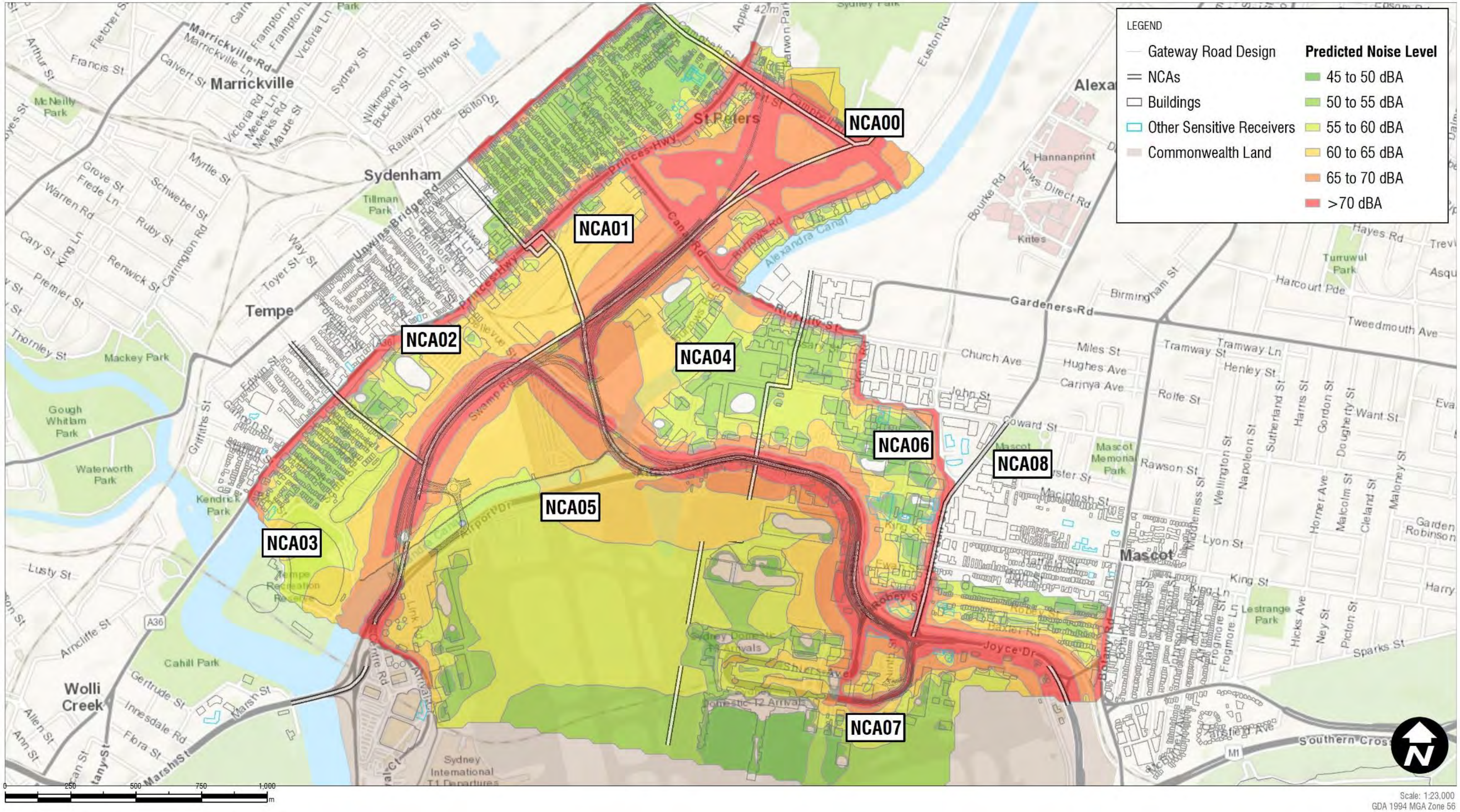


Figure 5 Grid Noise Maps – 2036 Build Night-time

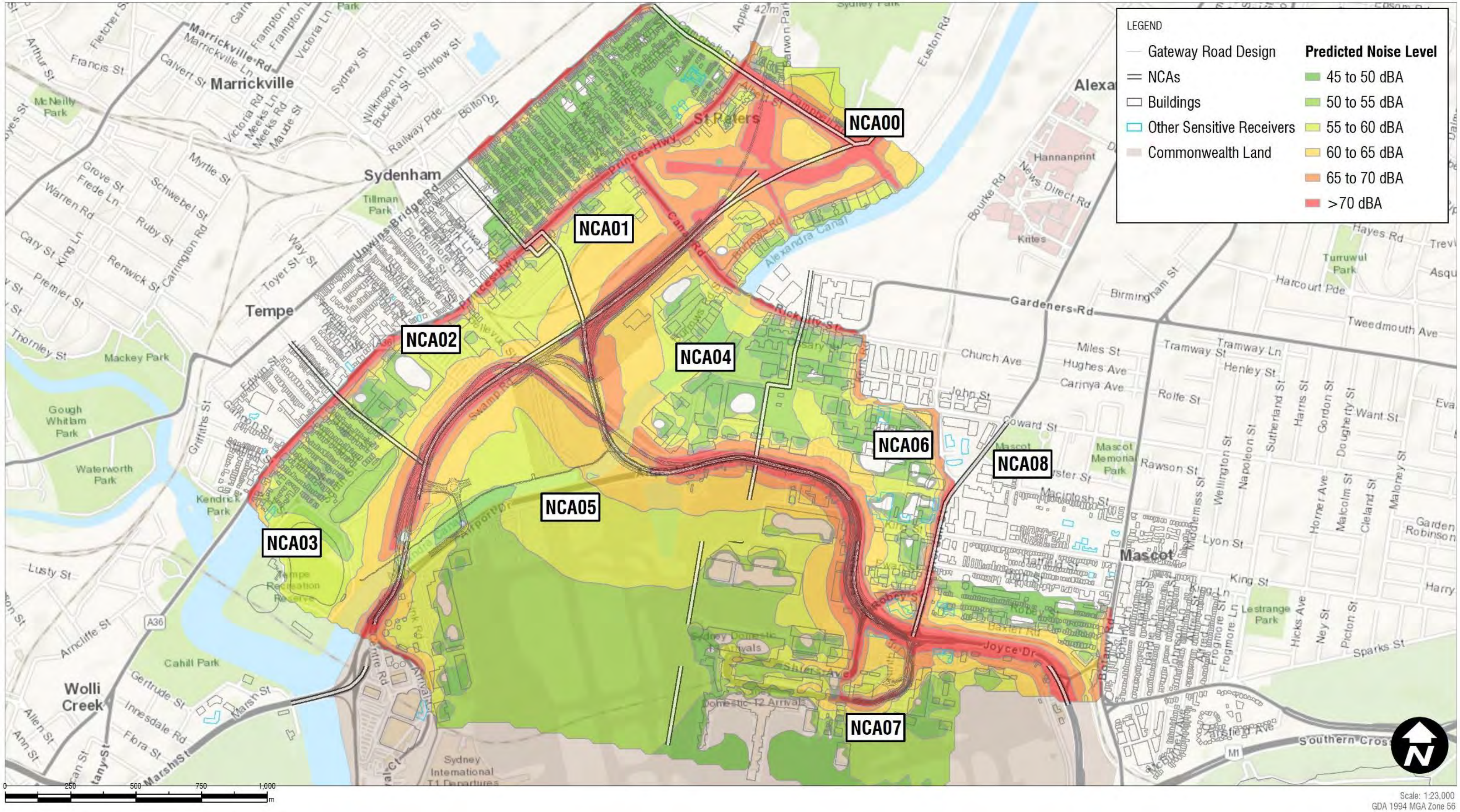
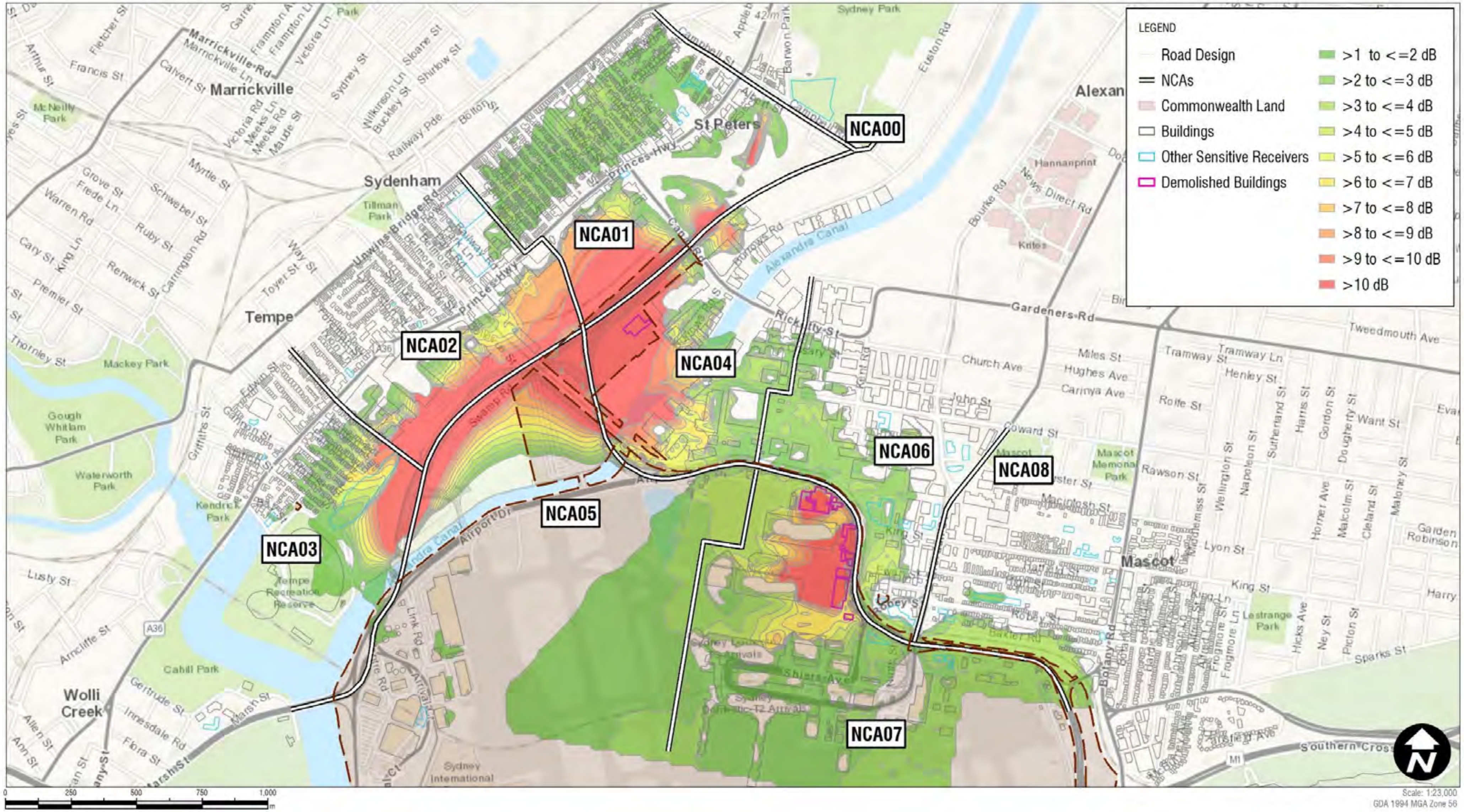


Figure 6 Change in Noise Level Across the Project – Commonwealth Land



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