Transport for NSW/Sydney Airport Corporation Limited

Sydney Gateway Road Project

Major Development Plan

Refinements and Clarifications

Section 4 Updated construction description

2020

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4. Updated construction description

4.1 Overview

4.1.1 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 4.2. 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 4.3.

Ancillary facilities and compounds required to support construction are described in section 4.4. Indicative construction resources, workforce, transport and access arrangements, and utility works are described in sections 4.5 to 4.6.4.

Sections 4.2 to 4.7 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.

4.1.2 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 of the EIS/MDP and in more detail on Figure 4.2 to Figure 4.6 in section 4.2) are subject to the assessment and approval process of the Airports Act. Other parts of the project (as shown on Figure 1.3 of the EIS/MDP and in more detail on Figure 4.2 to Figure 4.6 in section 4.2) are subject to the assessment and approval process of the EP&A Act. For completeness and readability, construction is described as a whole in sections 4.2 to 4.7.

4.1.3 Construction footprint and work areas

The land required to construct the project (the construction footprint) is shown on Figure 4.1 to Figure 4.6. 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 4.2 to Figure 4.6.

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 4.6.4), 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 4.1.

4.2 Indicative construction methodology

4.2.1 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 4.7 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.

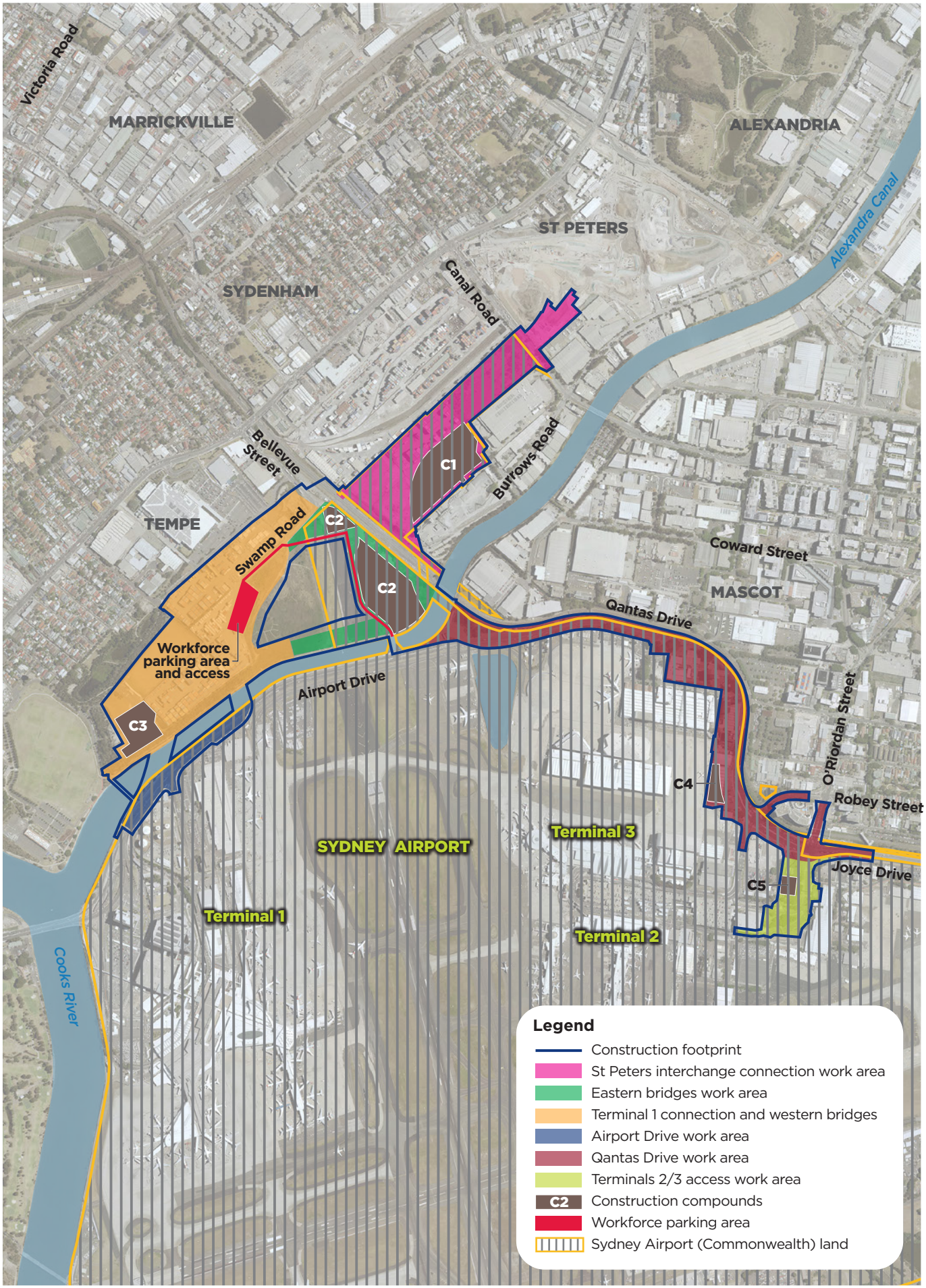


Figure 4.1 **Construction footprint, work areas and facilities – overview**

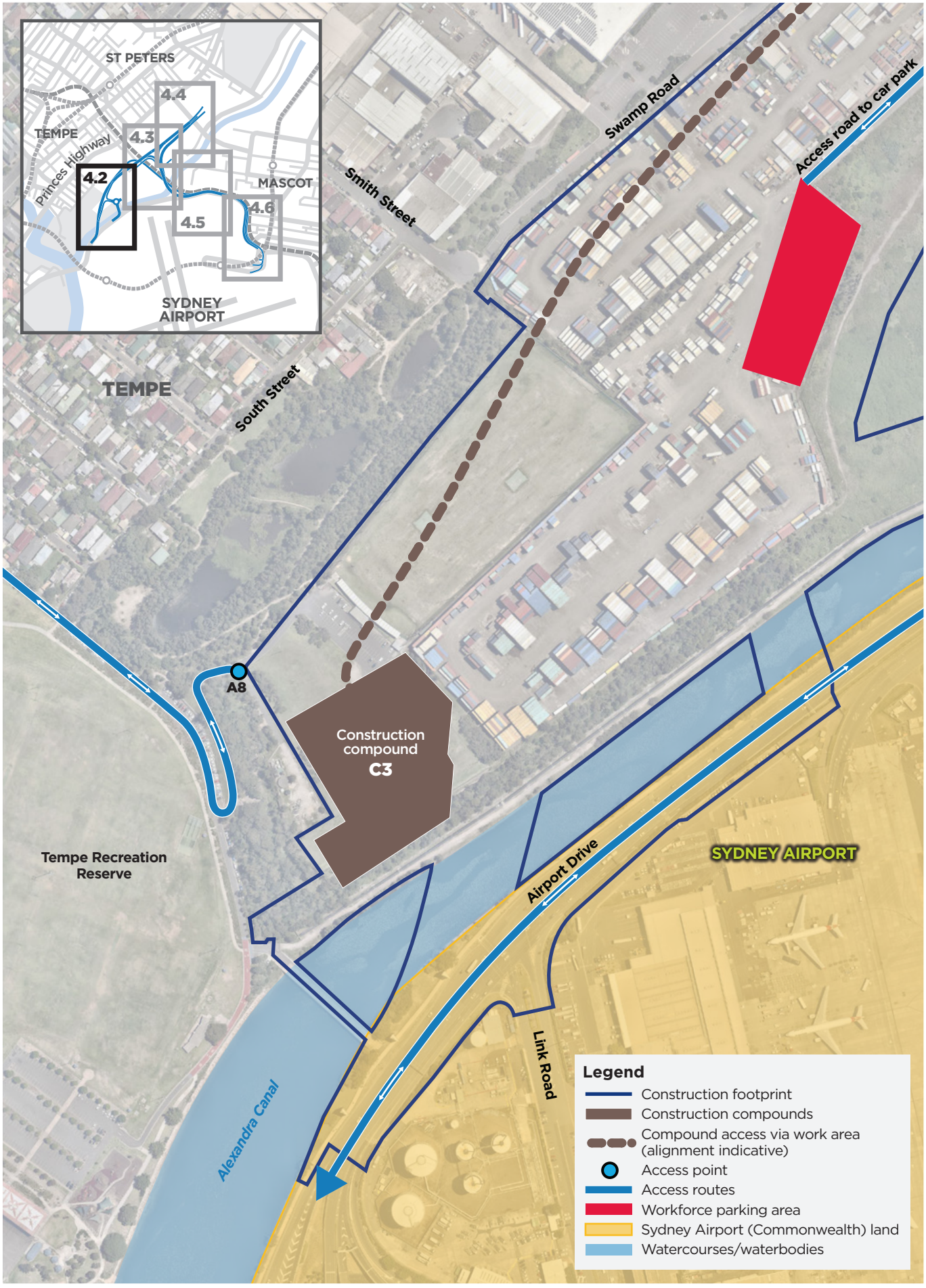


Figure 4.2 **Construction footprint, work areas and facilities - map 1**

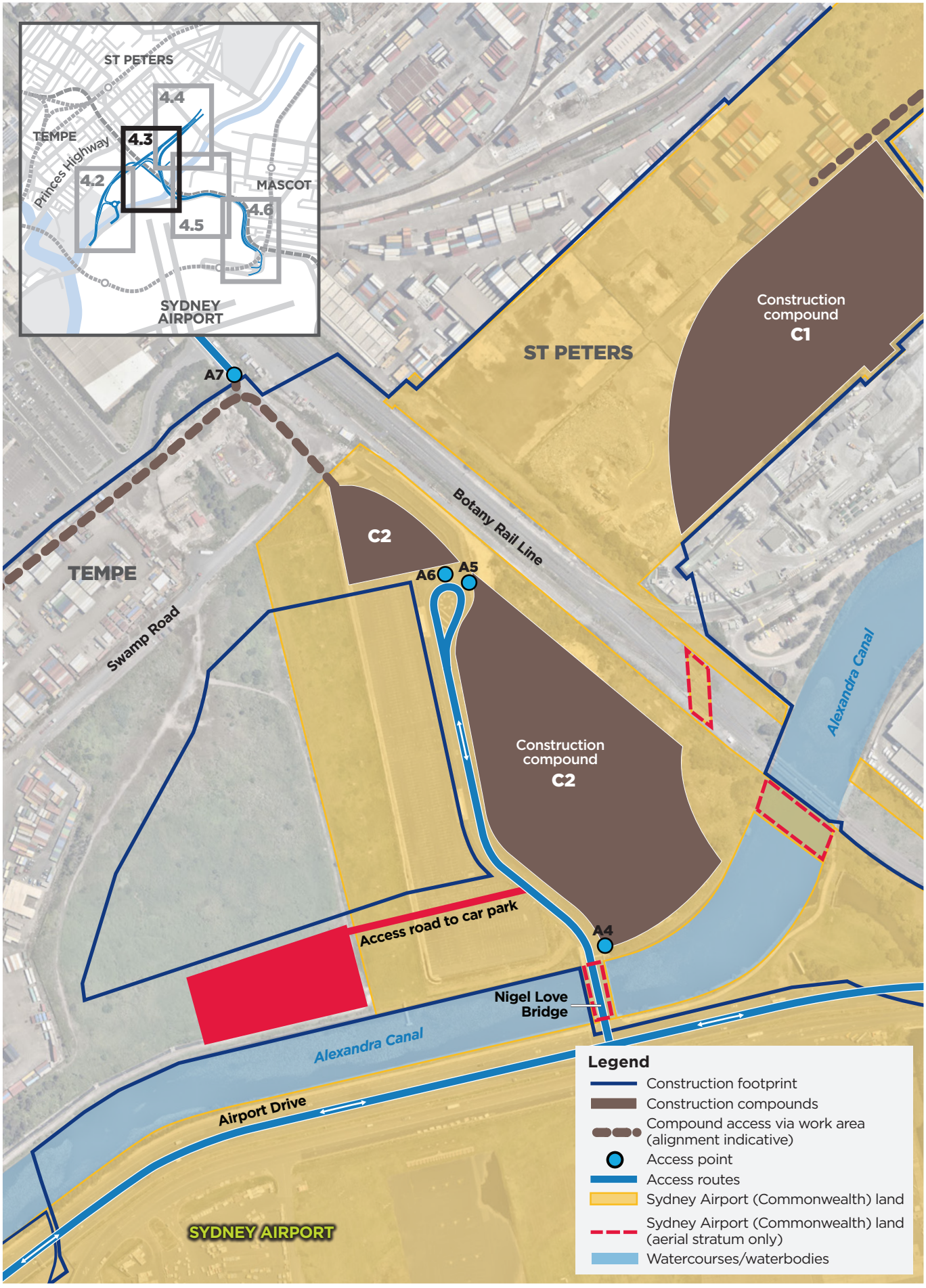


Figure 4.3 **Construction footprint, work areas and facilities - map 2**

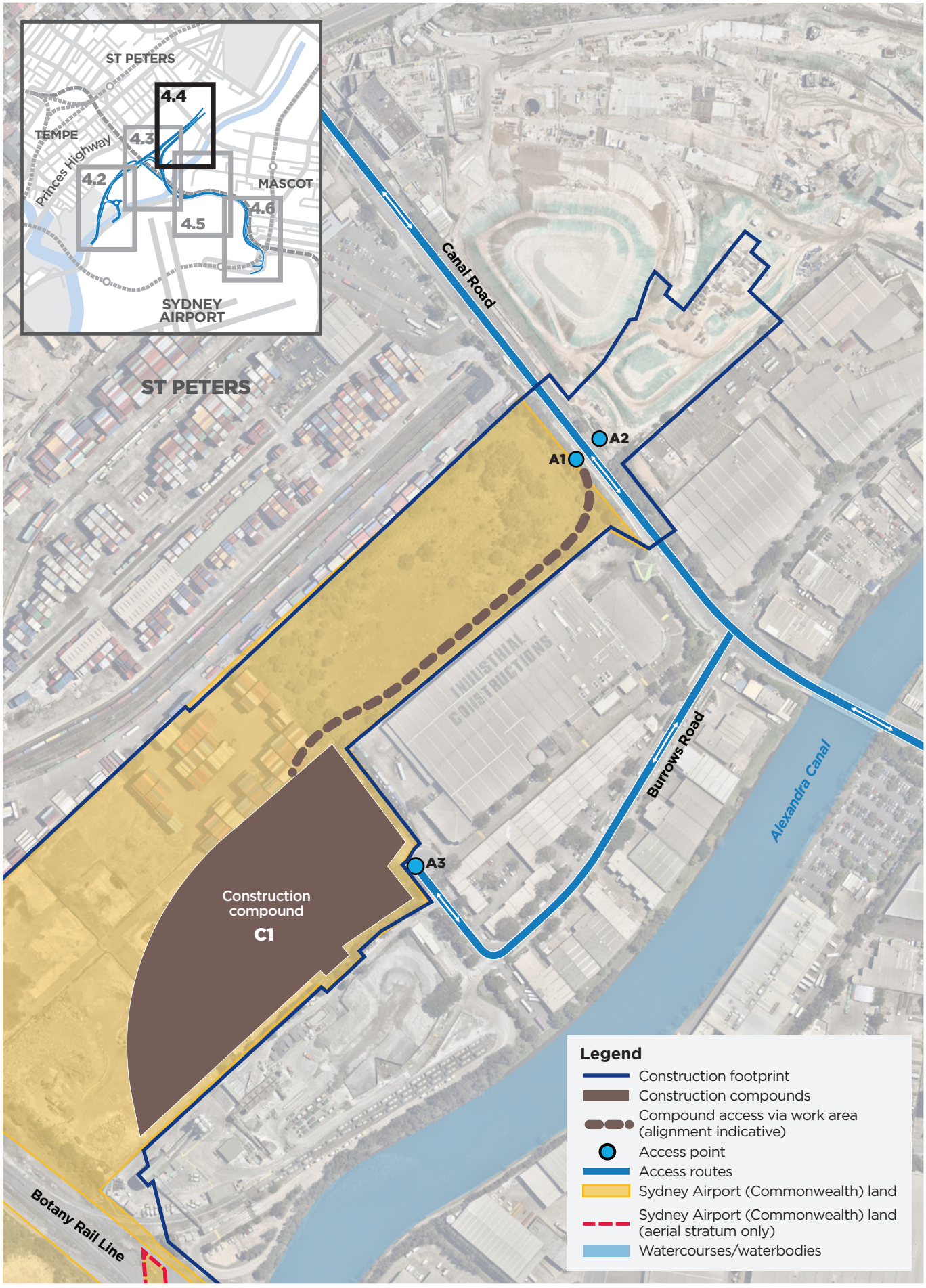


Figure 4.4 **Construction footprint, work areas and facilities - map 3**

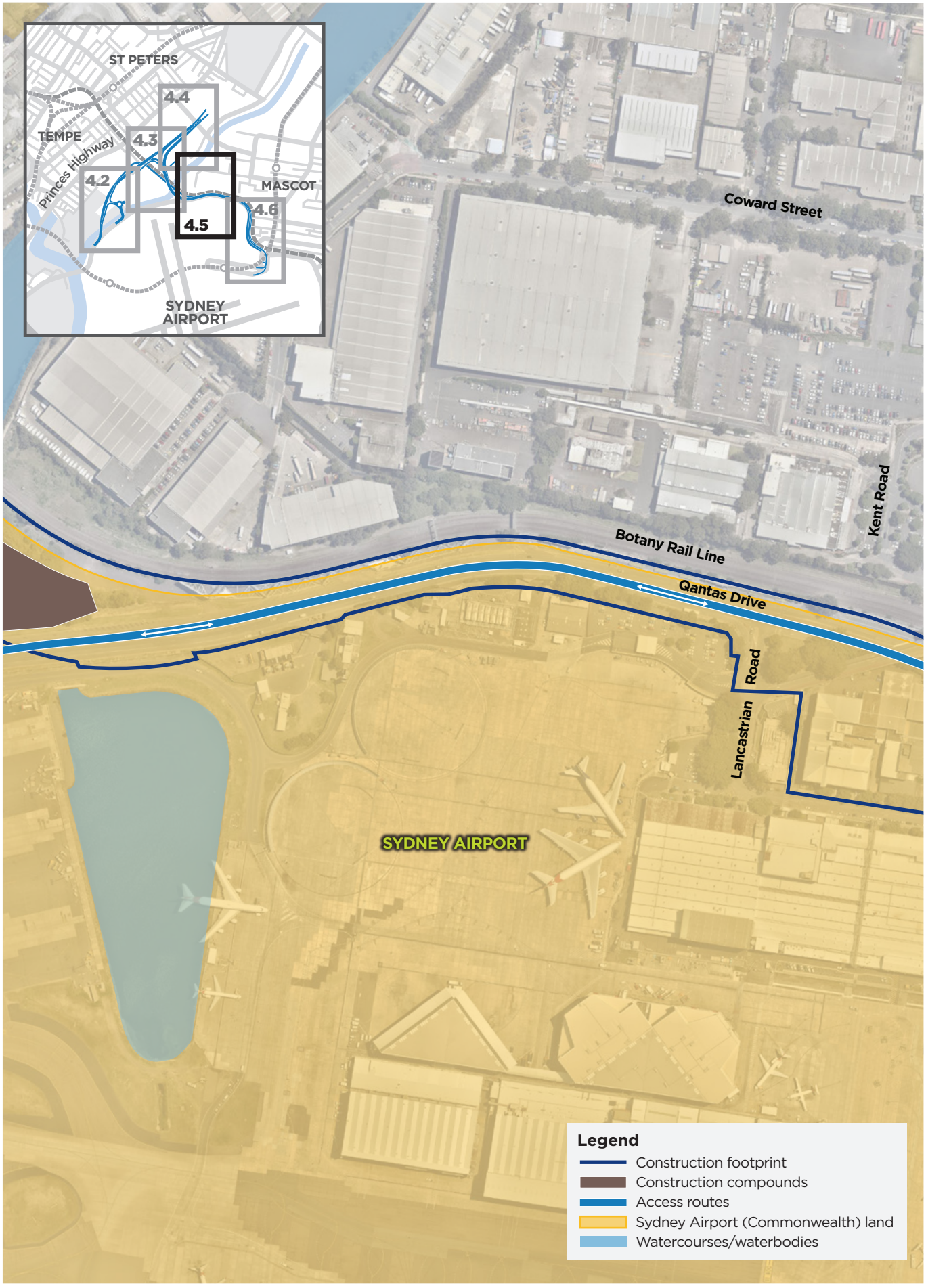


Figure 4.5 **Construction footprint, work areas and facilities - map 4**

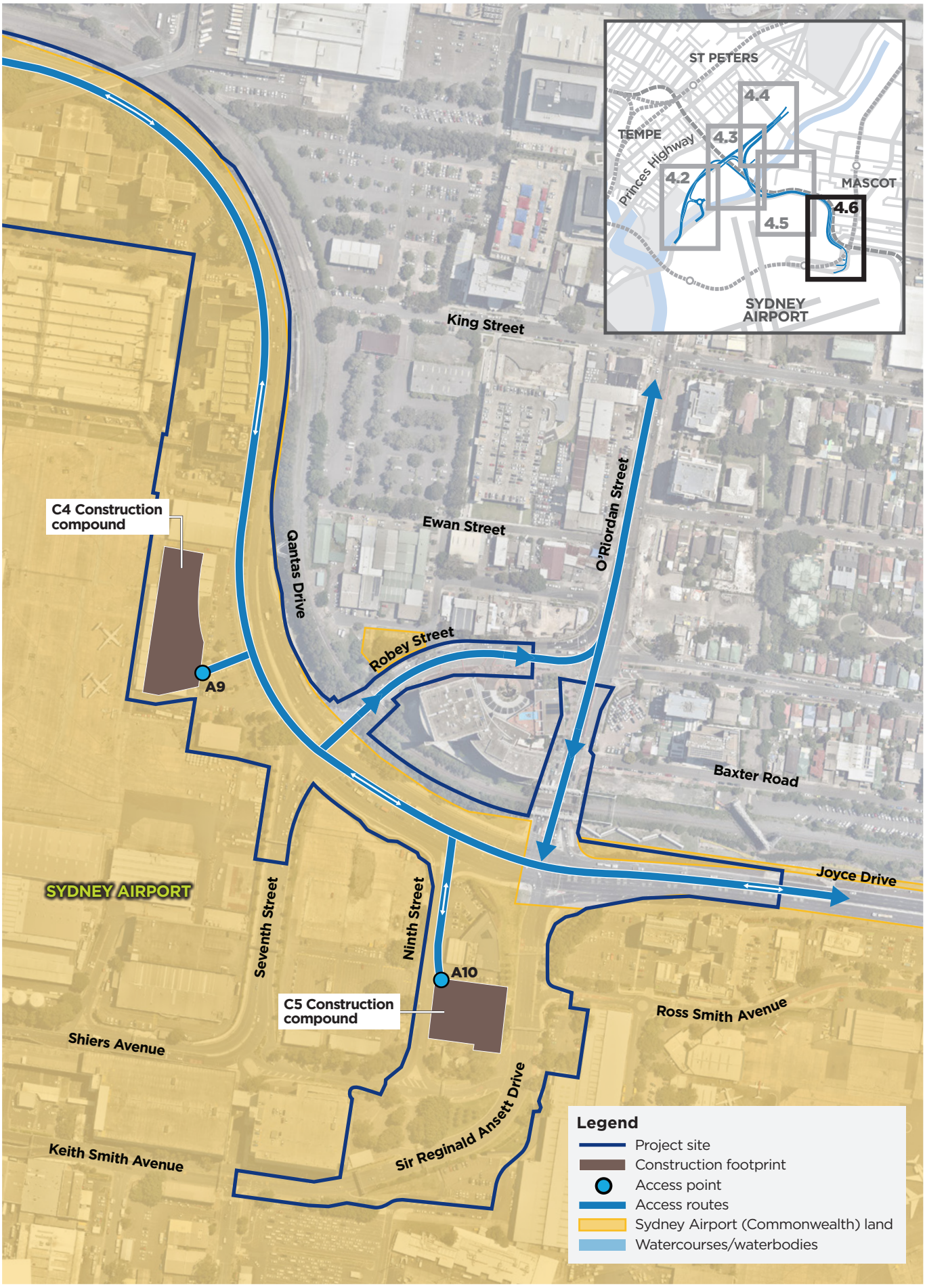


Figure 4.6 **Construction footprint, work areas and facilities - map 5**

4.2.2 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.

4.2.3 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 4.1 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) of the EIS/MDP.

Table 4.1 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 4.2. 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 4.2 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 3.10.2)
- 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) of the EIS/MDP.

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

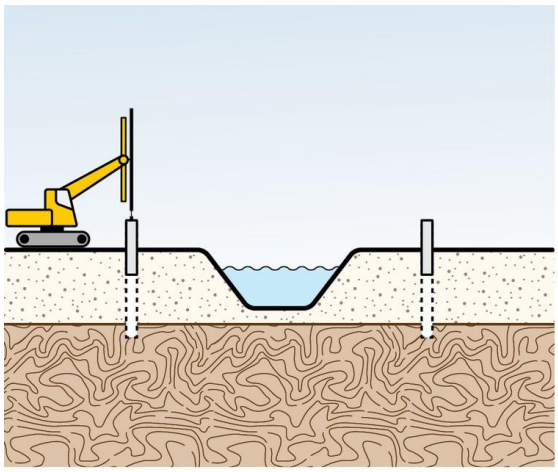
As described in section 6.5.2 of the EIS/MDP three main types of bridge structure are proposed - balanced cantilever, super-T or box girder and steel tied arch. The indicative construction methods for these structure types are summarised in Table 4.3. Following construction of the bridge structures, 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.

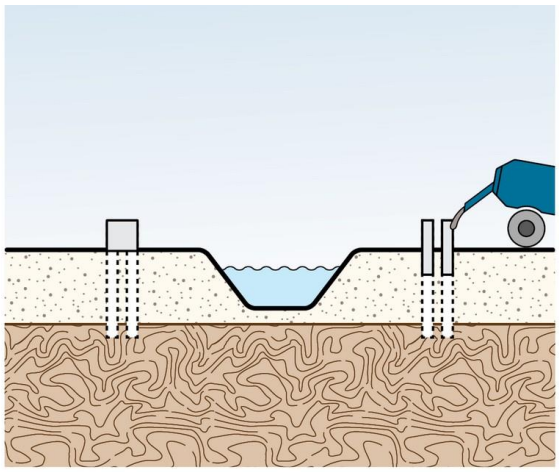
To minimise the potential for aviation hazards, activities involving the use of tall machinery and equipment (such as cranes) would be subject to approval by Sydney Airport Corporation. The use of this equipment would generally be undertaken when flights are not operating; this would generally occur during Sydney Airport's curfew hours. Further information is provided in section 4.2.5.

Table 4.3 Indicative construction methods for bridge/overpass superstructures

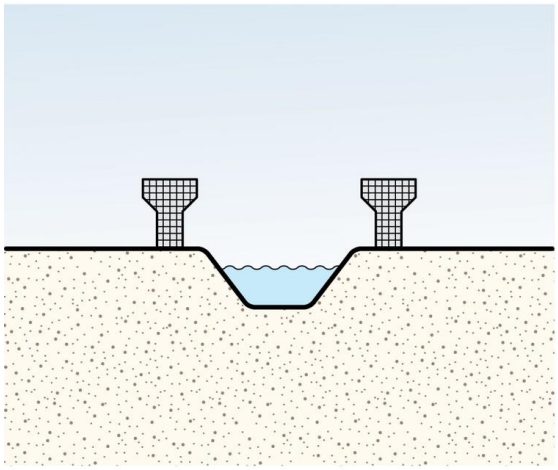
Type	Applicable bridges/overpasses	Indicative construction method
Balanced cantilever	Terminal 1 connection bridge Qantas Drive bridge	Two alternative methods are available: lifting pre-cast concrete segments into place using a crane; or casting sections in situ using mobile formwork. By constructing 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 4.7 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 4.8 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.



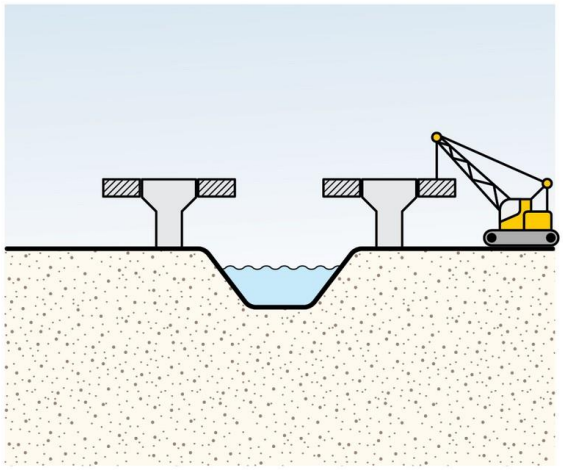
1. Drill and install piles



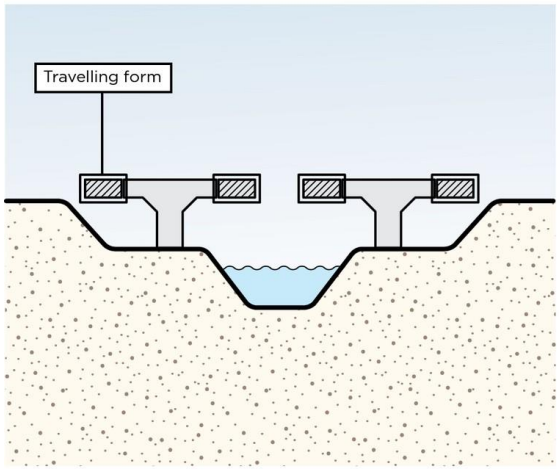
2. Form and pour columns



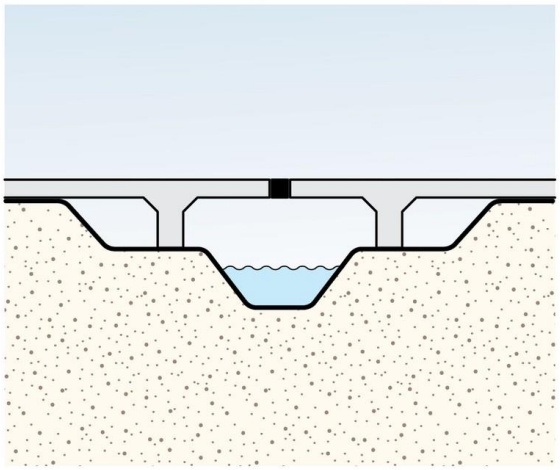
3. Form and pour headstocks



4. Lift segments into place at each end

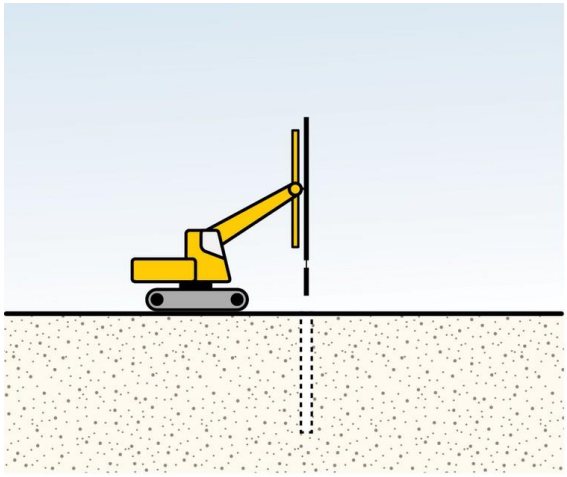


5. Travelling form used to install and fix segments in place

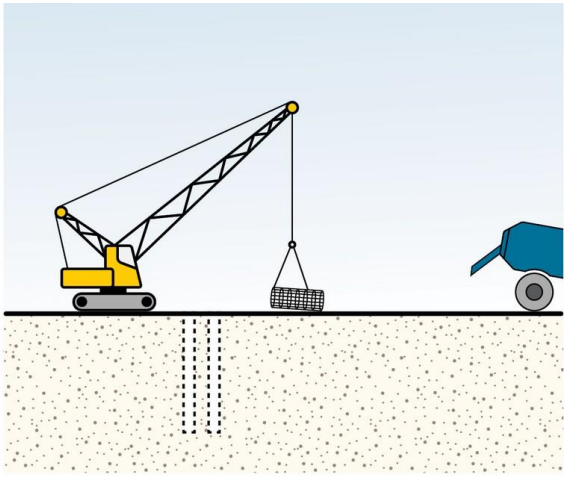


6. Individual spans meet at centre with final segment placed

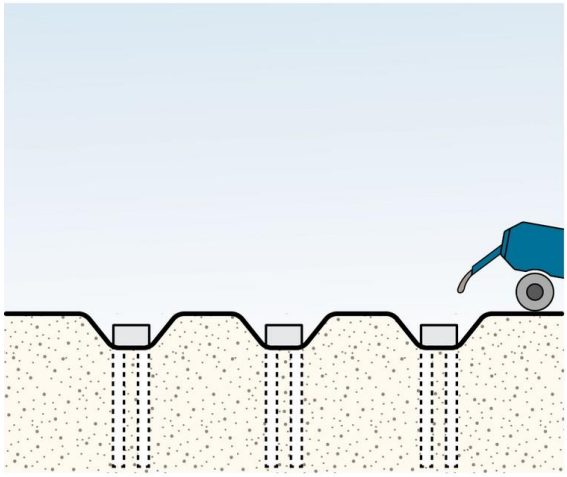
Figure 4.7 Typical construction process for a balanced cantilever concrete bridge



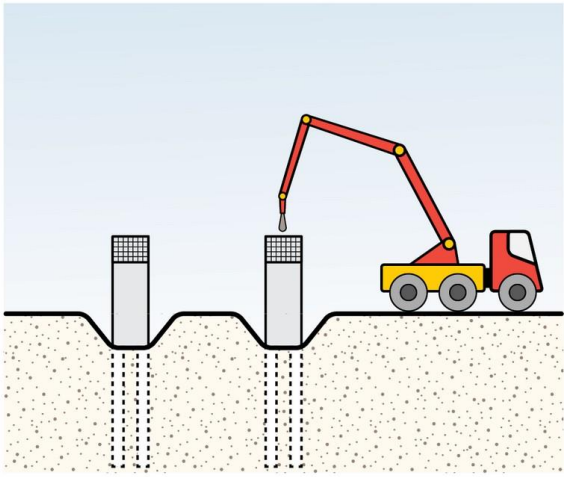
1. Drill holes with rotary piling rig



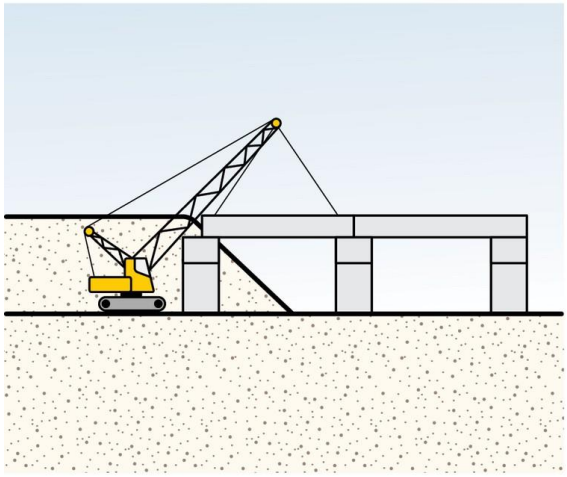
2. Install reinforcing cage and pour concrete



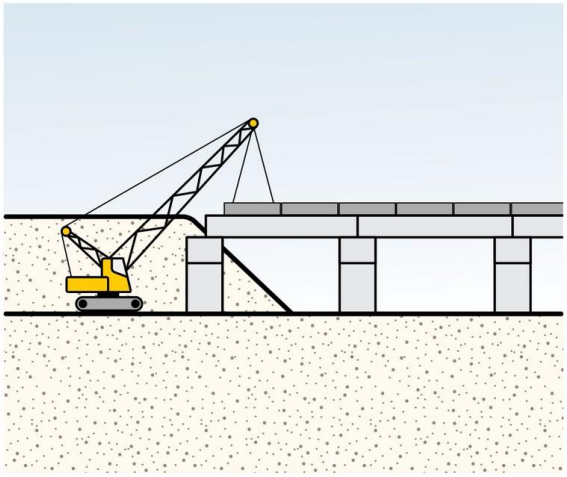
3. Form and pour pilecaps



4. Extend and complete headstocks



5. Install superstructure beams with mobile crane



6. Pour bridge deck and install side barriers, finishes etc

Figure 4.8 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 4.9 shows the typical process used to construct a reinforced soil retaining wall.

Drainage

Constructing the proposed drainage infrastructure would generally involve:

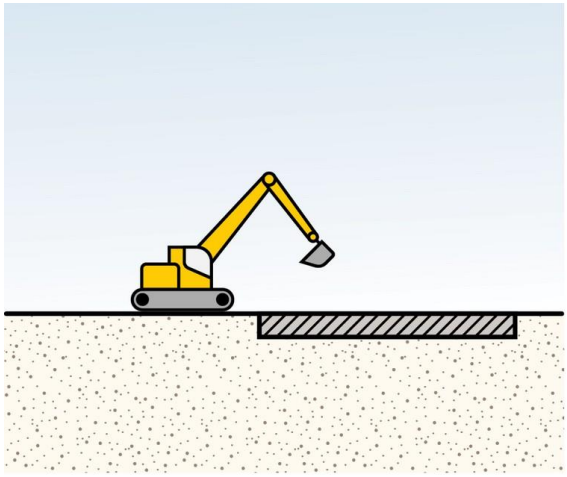
- Removing and reconstructing/altering existing pits and pipes
- Installing new pits and pipes
- Connecting new drainage infrastructure to the existing drainage network
- Constructing new drainage outlets and scour protection at Alexandra Canal
- Constructing the flood detention basin for use during construction and operation.

New drainage outlets

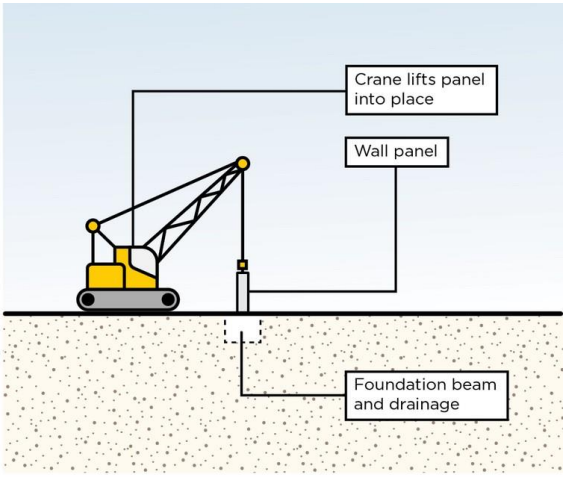
Constructing the drainage outlets at Alexandra Canal would require installation of silt curtains around each outlet location. Where works are required below the water level in Alexandra Canal, works would generally involve:

- 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.

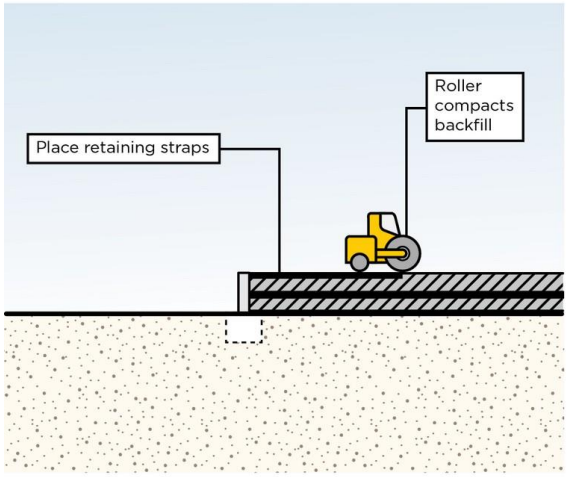
As a result of the presence of contaminated sediments and the existing remediation order for Alexandra Canal, all works associated with the outlets would be undertaken in accordance with a management plan approved by Department of Planning, Industry and Environment in consultation with the NSW EPA and 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) of the EIS/MDP.



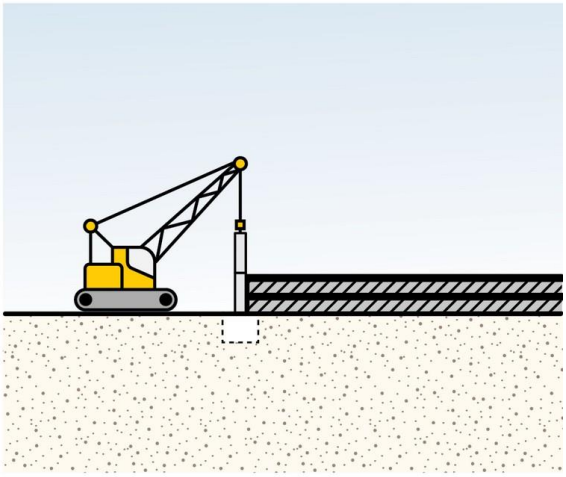
1. Excavate and install foundation and drainage



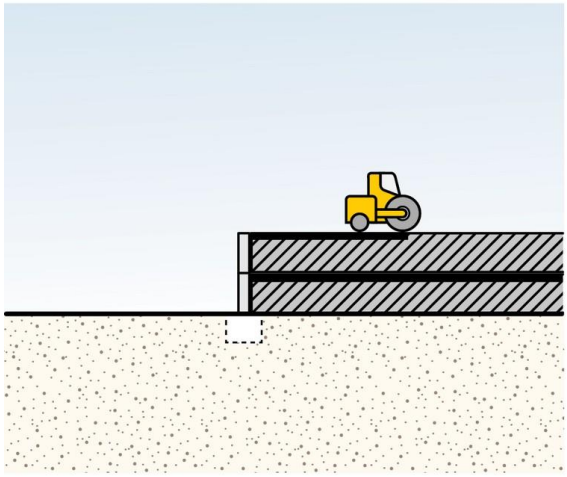
2. Install bottom panels



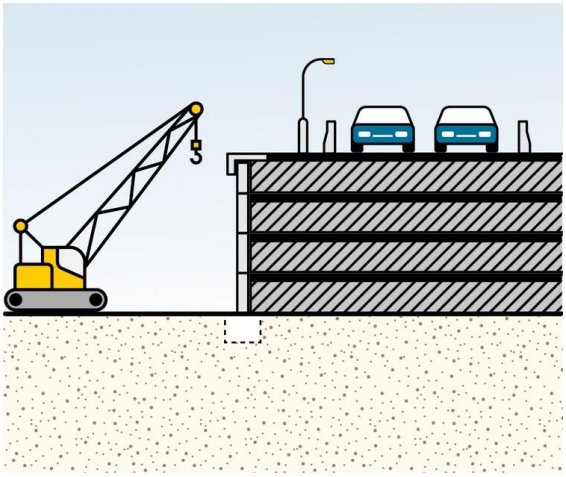
3. Backfill and place retaining straps



4. Install next panel row



5. Backfill next layer, place retaining straps and compact



6. Place edge beam, complete construction

Figure 4.9 Typical construction process for a reinforced soil wall

4.2.4 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.

4.2.5 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) of the EIS/MDP, 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 4.10.

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 of the EIS/MDP. Proposed working hours are outlined in section 4.3.3 of this document.

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 4.3.3.

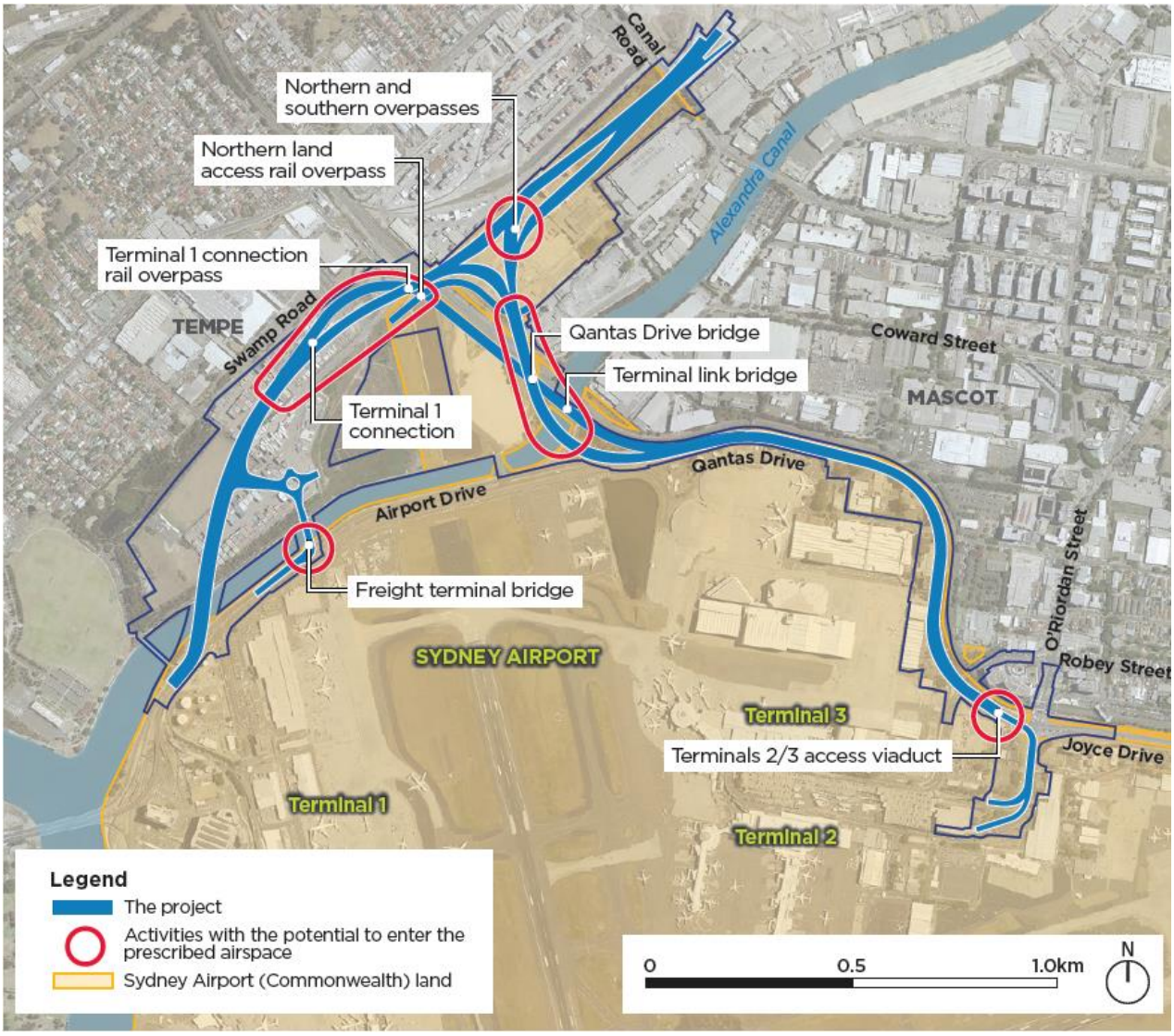


Figure 4.10 Location of intrusions into the prescribed airspace at Sydney Airport

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 3.10.2). 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) of the EIS/MDP.

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.

4.3 Construction program and timing

4.3.1 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 4.11.

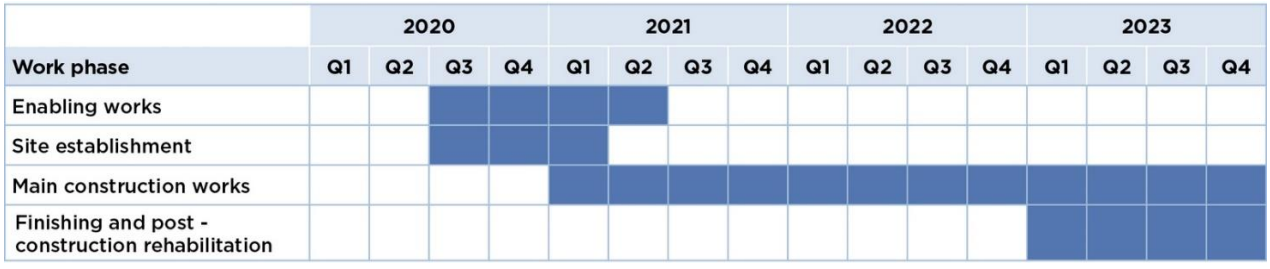


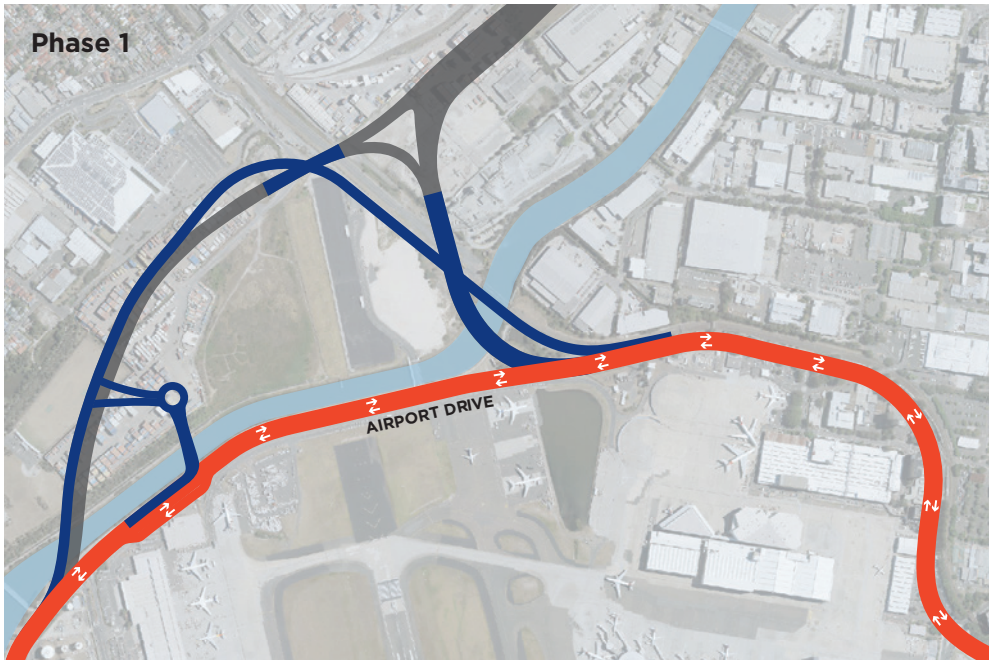
Figure 4.11 Indicative construction program

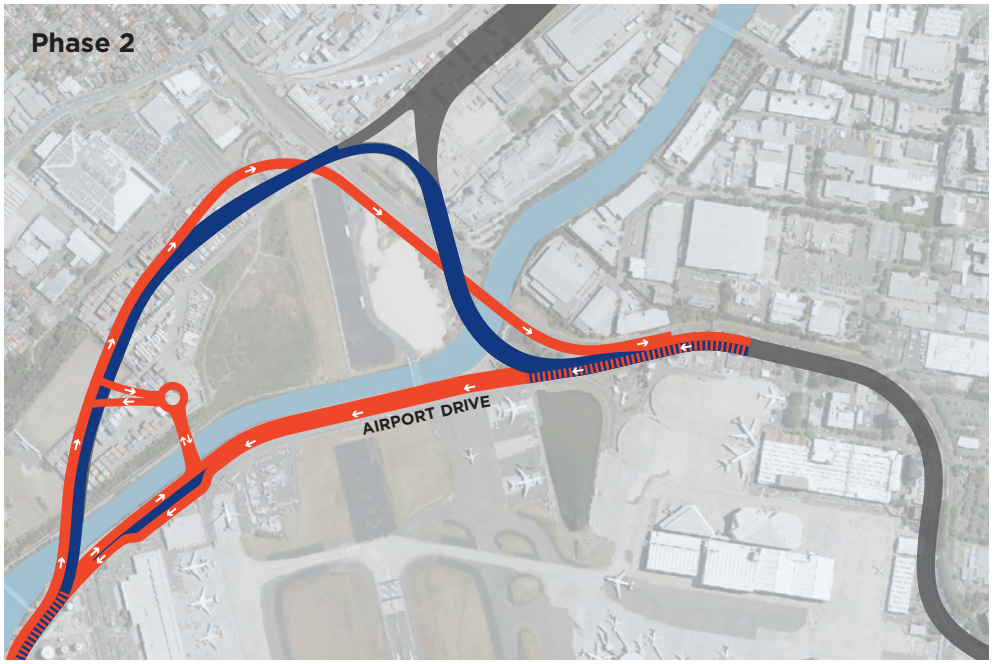
4.3.2 Phased delivery

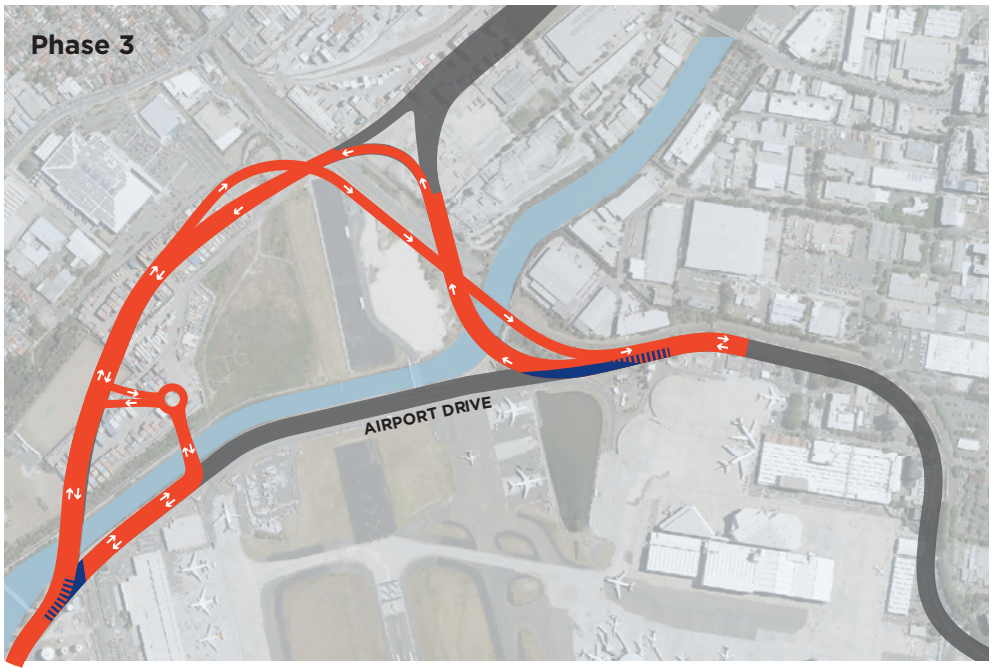
The project would be delivered in phases as shown on Figure 4.12. The phased delivery approach is proposed to:

- 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.







Legend

- Under construction
- Live traffic
- Night works – Construction under traffic

CONCEPTUAL ONLY

NOT TO SCALE

Figure 4.12 **Phased delivery of the project**

4.3.3 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 4.4 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 4.13. 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) of the EIS/MDP.

Table 4.4 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

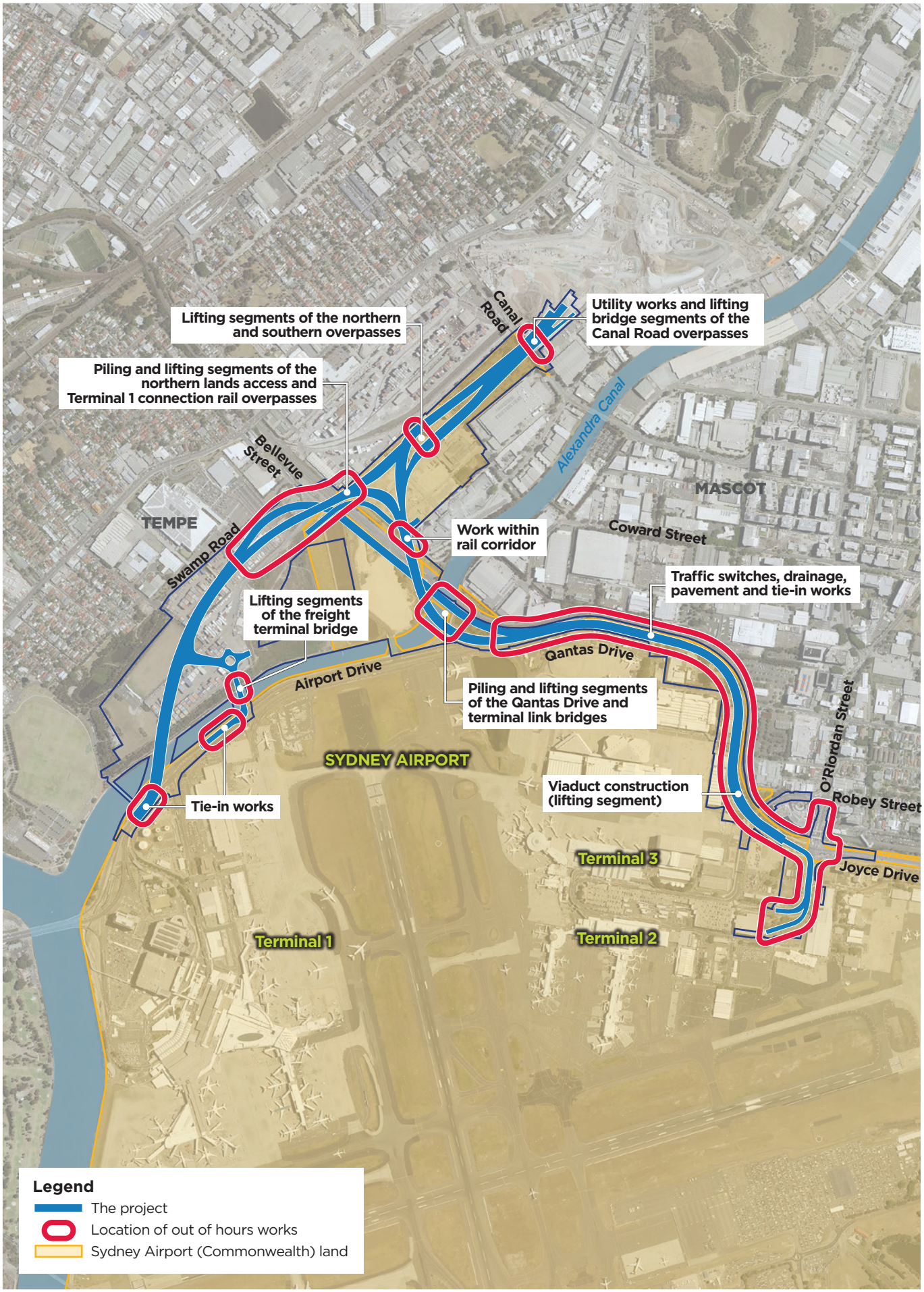


Figure 4.13 **Proposed locations of out-of-hours work**

4.3.4 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 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.

4.4 Construction ancillary facilities

4.4.1 Temporary land requirements

In addition to the project's anticipated permanent land requirements (see section 3.11.2), 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 4.5, 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) of the EIS/MDP.

Table 4.5 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.

4.4.2 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 4.1 to Figure 4.6. 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 4.14.

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.

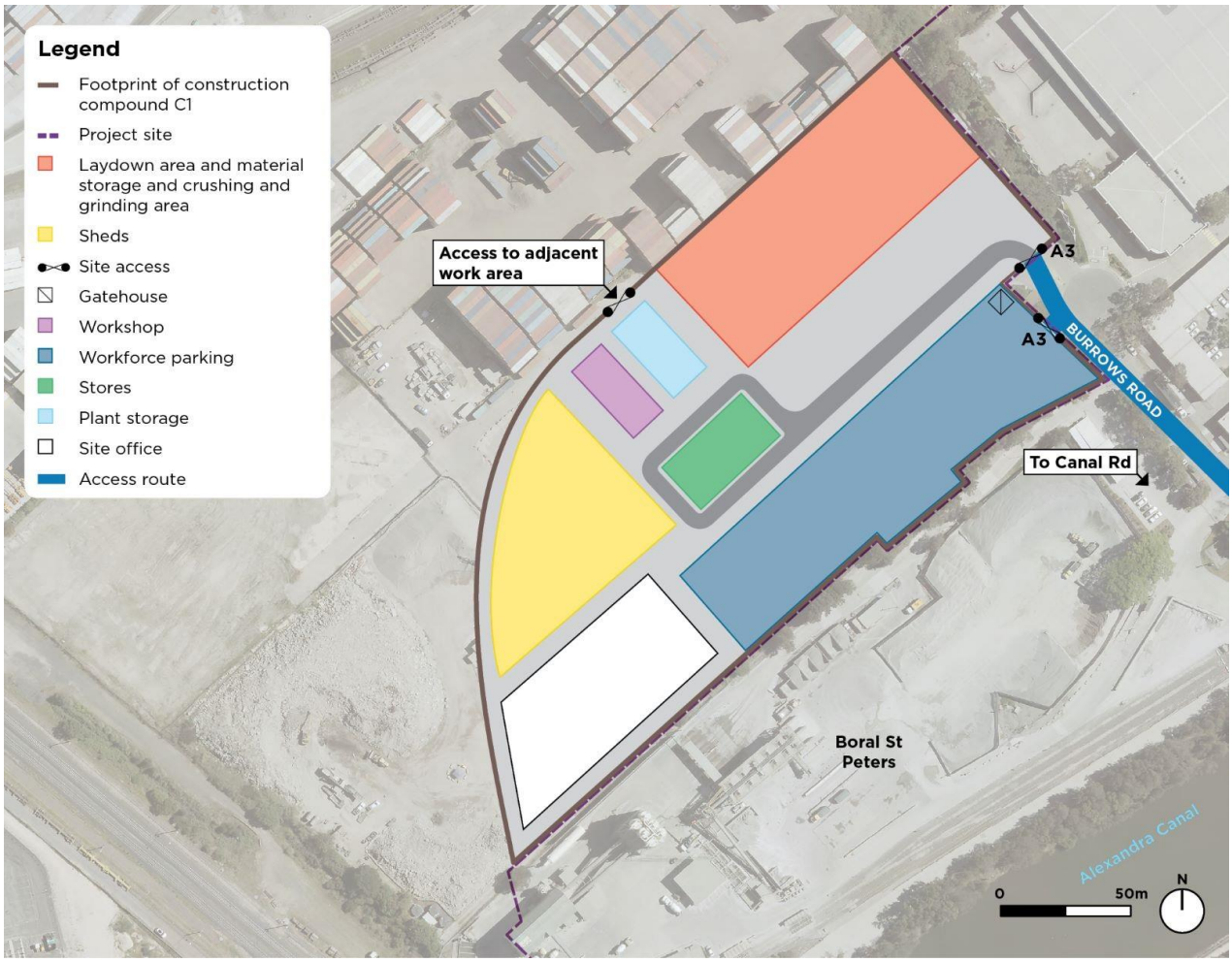


Figure 4.14 Indicative layout of the St Peters interchange connection compound (C1)

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 4.15.

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 4.3.2. A temporary access route would be provided from A7 to the compound via the work area, as shown on Figure 4.3 and Figure 4.15.

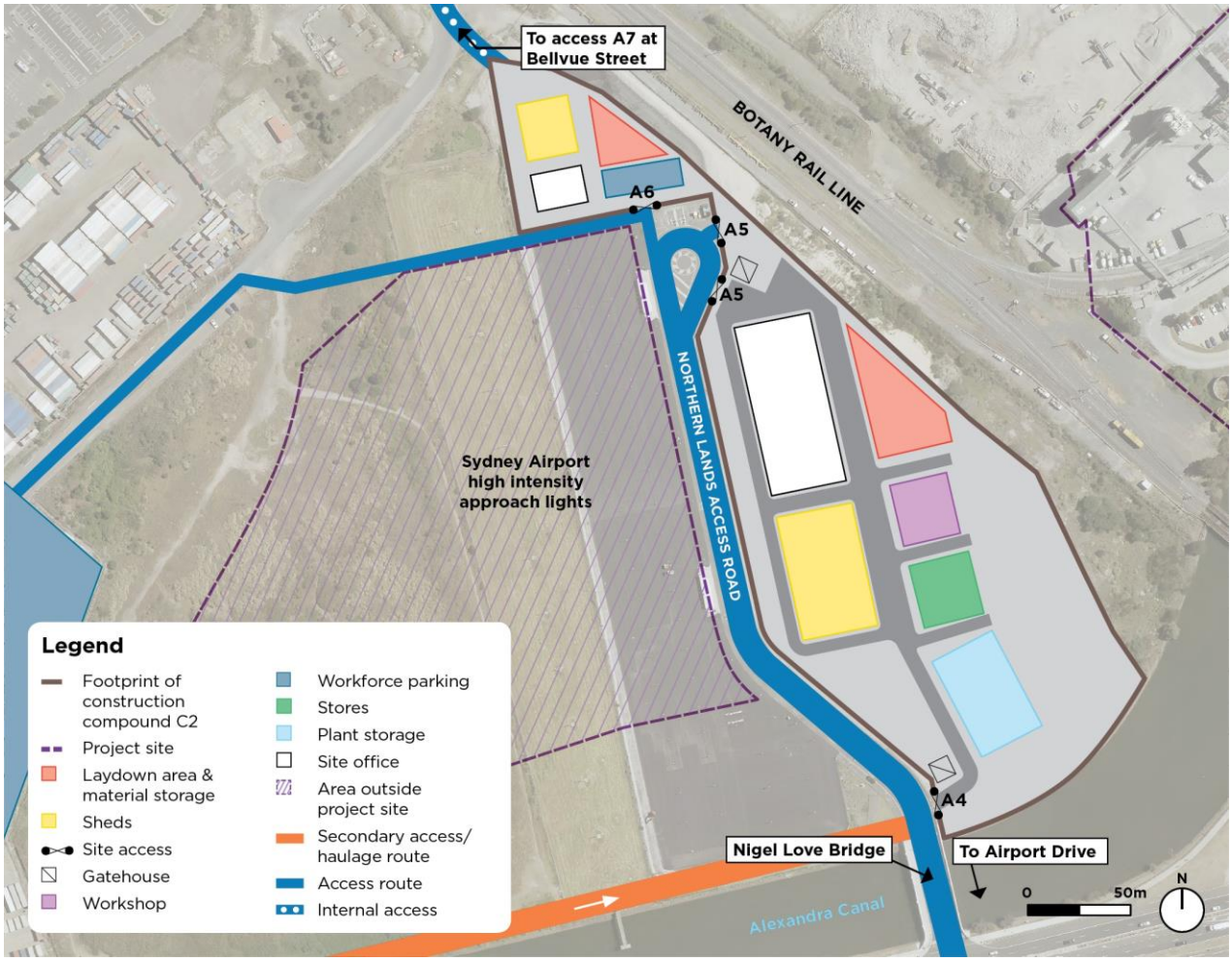


Figure 4.15 Indicative layout of the eastern bridges compound (C2)

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 4.16.

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 (shown on Figure 4.3). 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 (shown on Figure 4.16).

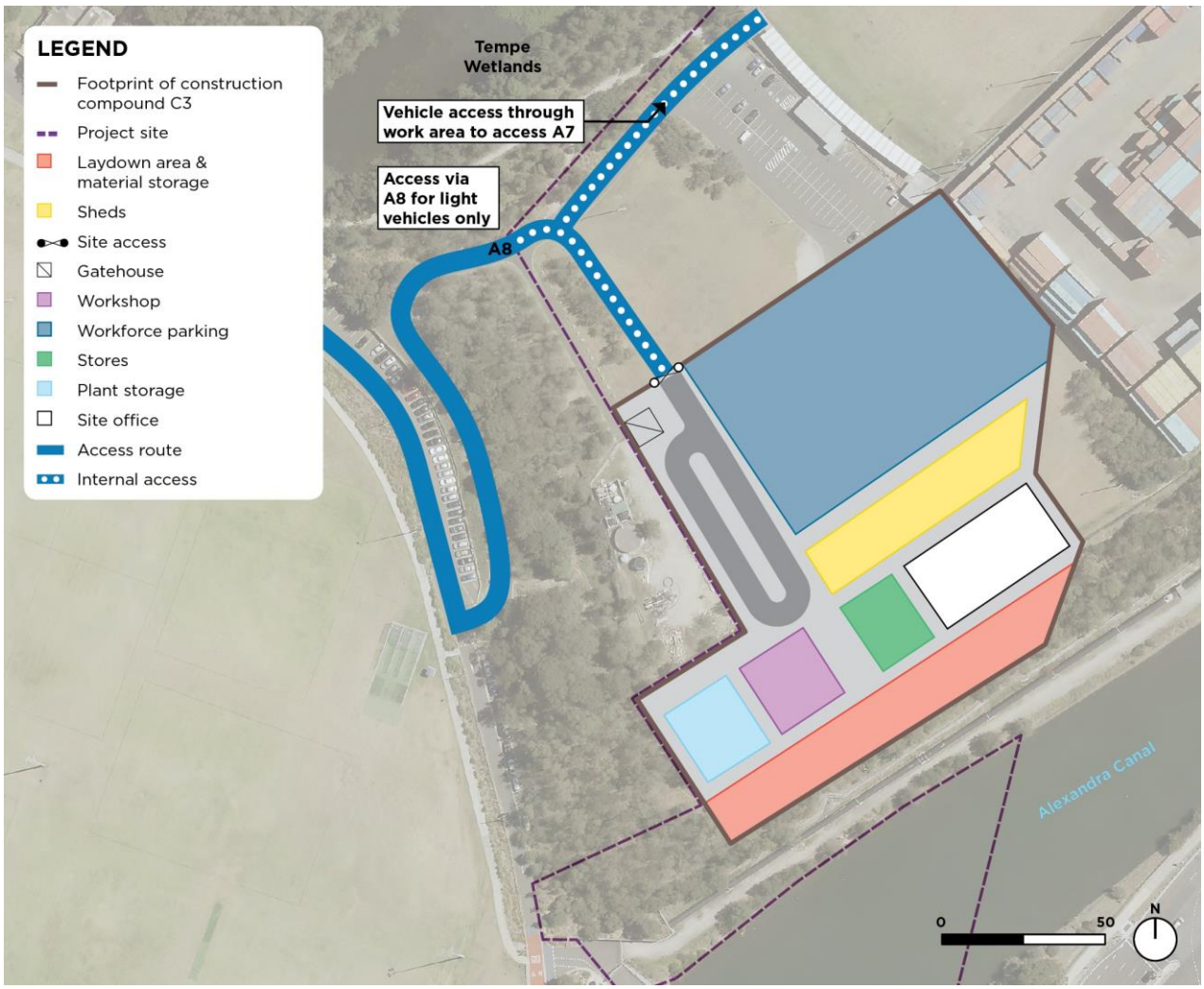


Figure 4.16 Indicative layout of the western bridges compound (C3)

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 4.17.

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.

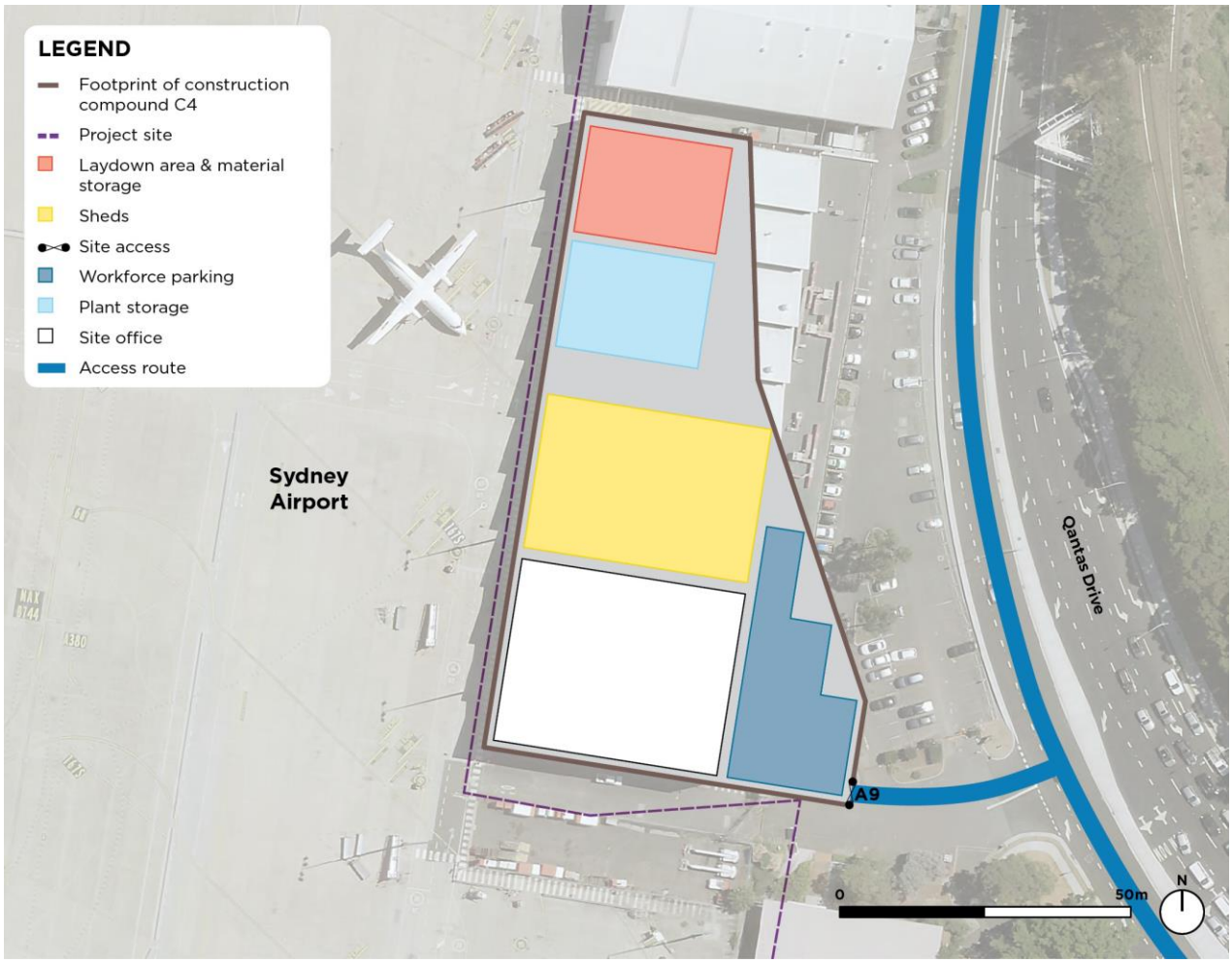


Figure 4.17 Indicative layout of the Qantas Drive compound (C4)

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 4.18.

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 4.19).

Figure 4.18 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.

4.5 Construction workforce and resources

4.5.1 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).

4.5.2 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).

4.5.3 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 4.6.

Table 4.6 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)

4.6 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) of the EIS/MDP.

4.6.1 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 4.19. 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 4.14 to Figure 4.18) 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 4.19.

Figure 4.19 **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 4.3.2) 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.

4.6.2 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 4.7 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 4.6.1.

Table 4.7 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
Terminals 2/3 access, including compound C5	A10	100	20	100	20

Work area	Access points	Morning peak vehicle volumes (vehicles per hour)		Afternoon peak vehicle volumes (vehicles per hour)	
		Light	Heavy	Light	Heavy
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 4.8 provides the estimated vehicle volumes associated with earthworks movements. These movements would be in addition to those outlined in Table 4.7. Vehicle movements would be via the haulage routes described in section 4.6.1.

Table 4.8 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

4.6.3 Construction workforce parking

Parking for the construction workforce would be provided within the construction footprint. Table 4.9 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 4.14 to Figure 4.18. 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) of the EIS/MDP.

Table 4.9 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**

4.6.4 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 4.20. 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.

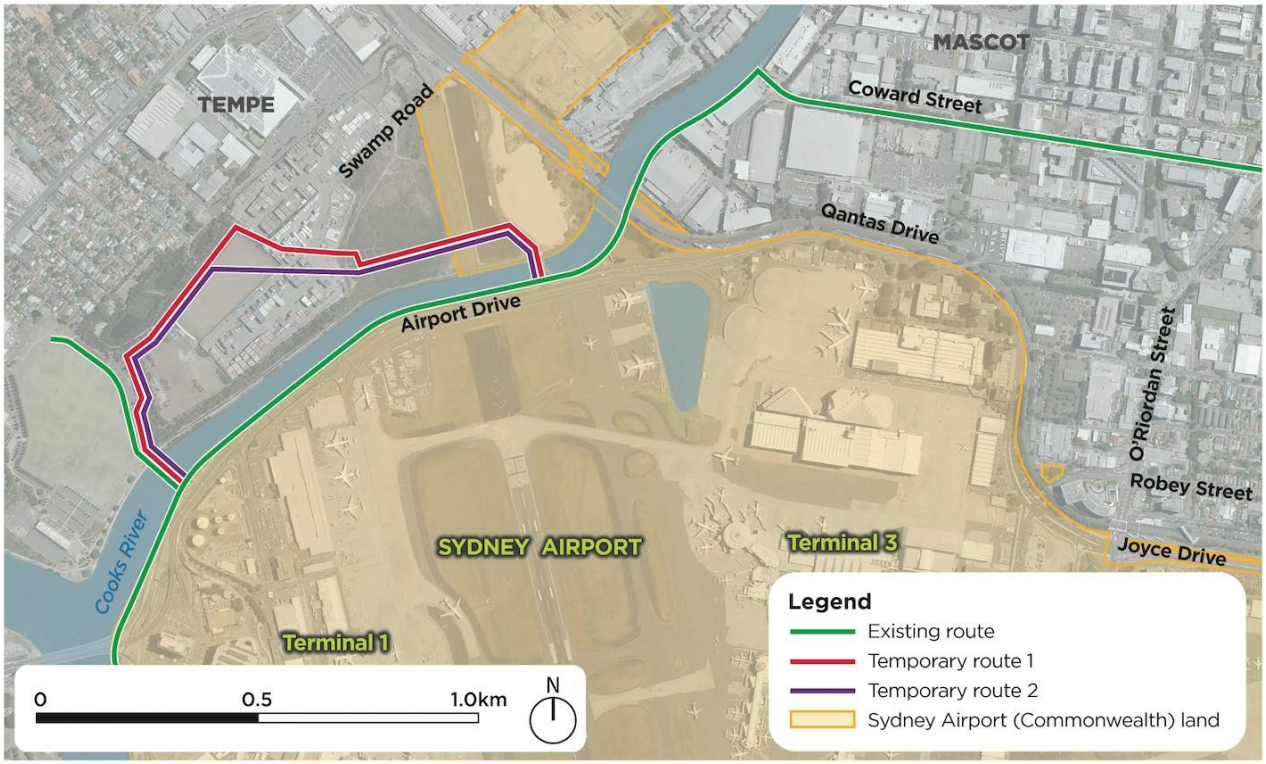


Figure 4.20 Temporary active transport link

4.6.5 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) of the EIS/MDP). 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 4.10 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 4.10 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 4.6.4.
	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 4.11. 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 4.11, 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 4.11 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 4.11 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 4.12.

Table 4.12 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.

4.7 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 4.21):

- Airport Drive/Qantas Drive
- Sir Reginald Ansett Drive and Shiers Avenue
- Sydney Airport internal services.

Figure 4.21 **Key utility work areas**

Table 4.13 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 4.13 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.