# 5. Project description

This chapter describes the proposed scope of work, including the route alignment, main project elements, ancillary facilities, design standards and construction activities.

This EIS was prepared based on the design as described in this Chapter. If approved, the project would be carried out generally in accordance with the description in this EIS and in accordance with any conditions of approval, and taking into account the submissions report and preferred infrastructure report (as required). Subject to the project's approval, the project's design and construction methodology would be refined by the contractor in conjunction with Roads and Maritime before works begin.

**Table 5-1** outlines the SEARs and **Table 5-2** outlines the Commonwealth EIS guidelines related to the project description.

Table 5-1 SEARs (project description)

| Secretary's requirements | Where addressed |
|---|---|
| 2. Environmental Impact Statement | |
| 1. The EIS must include, but not necessarily be limited to, the following:<br>b. a description of the project, including all components and activities (including ancillary components and activities) required to construct and operate it | The project scope and key design elements are discussed in **Section 5.1** through to **Section 5.23**<br>The construction of the project is discussed in **Section 5.24** |
| q. relevant project plans, drawings, diagrams in an electronic format that enables integration with mapping and other technical software. | Relevant plans, drawings and diagrams are provided throughout this EIS and attached in appendices<br>Electronic formats to be submitted separately |

Table 5-2 Commonwealth EIS guidelines (project description)

| Commonwealth requirements | Where addressed |
|---|---|
| Project description | |
| 4. The title of the action, background to the development and current status | The title of the action is provided in **Chapter 1**<br>Background to the project, its development and current status are provided in **Chapter 1, Section 2.1, Chapter 3** and **Chapter 4** |
| 5. The precise location and description of all works to be undertaken (including associated offsite works and infrastructure), structures to be built or elements of the action that may have impacts on matters of national environmental significance (MNES). | The project scope and key design elements are discussed in **Section 5.1** through to **Section 5.23**<br>The construction of the project is discussed in **Section 5.24** |
| 7. How the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts on MNES. | Design parameters for structures and elements that may impact on MNES (threatened species) are discussed in **Section 5.2**<br>How the works are proposed to be carried out is discussed in **Section 5.24**<br>Discussion of how some elements of the project may have impacts on MNES (threatened species) is provided in **Section 7.1** |

## 5.1 Project scope

Roads and Maritime proposes to build the M12 Motorway between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham, over a distance of about 16 kilometres. The project would provide the main access from the Western Sydney Airport at Badgerys Creek to Sydney's motorway network and is expected to be opened to traffic before the opening of the Western Sydney Airport. The timing of opening of the M12 Motorway is subject to planning approval and completion of detailed design. However, the project is expected to open in 2025.

The project would include the following key features:

- A new dual-carriageway motorway between the M7 Motorway and The Northern Road with two lanes in each direction with a central median allowing future expansion to six lanes
- Motorway access via three interchanges/intersections:
  - A motorway-to-motorway interchange at the M7 Motorway and associated works (extending about four kilometres within the existing M7 Motorway corridor)
  - A grade–separated interchange referred to as the Western Sydney Airport interchange, including a dual-carriageway four–lane airport access road (two lanes in each direction for about 1.5 kilometres) connecting with the Western Sydney Airport Main Access Road
  - A signalised intersection at The Northern Road with provision for grade separation in the future
- Bridge structures across Ropes Creek, Kemps Creek, South Creek, Badgerys Creek and Cosgroves Creek
- Bridge structure across the M12 Motorway into Western Sydney Parklands to maintain access to the existing water tower and mobile telephone/other service towers on the ridgeline in the vicinity of Cecil Hills, to the west of the M7 Motorway
- Bridge structures at interchanges and at Clifton Avenue, Elizabeth Drive, Luddenham Road and other local roads to maintain local access and connectivity
- Inclusion of active transport (pedestrian and cyclist) facilities through provision of pedestrian bridges and an off-road shared user path including connections to existing and future shared user path networks
- Modifications to the local road network, as required, to facilitate connections across and around the M12 Motorway including:
  - Realignment of Elizabeth Drive at the Western Sydney Airport, with Elizabeth Drive bridging over the airport access road and future passenger rail line to the airport
  - A realignment of Clifton Avenue over the M12 Motorway, with associated adjustments to nearby property access
  - Relocation of Salisbury Avenue cul-de-sac, on the southern side of the M12 Motorway
  - Realignment of Wallgrove Road north of its intersection with Elizabeth Drive to accommodate the M7 Motorway northbound entry ramp
- Adjustment, protection or relocation of existing utilities
- Ancillary facilities to support motorway operations, smart motorways operation in the future and the existing M7 Motorway operation, including gantries, electronic signage and ramp metering
- Other roadside furniture including safety barriers, signage and street lighting
- Adjustments of waterways, where required, including Kemps Creek, South Creek and Badgerys Creek
- Permanent water quality management measures including swales and basins
- Establishment and use of temporary ancillary facilities, temporary construction sedimentation basins, access tracks and haul roads during construction
- Permanent and temporary property adjustments and property access refinements as required.

The key features of the project are shown in **Figure 5-1**.

A detailed description of the project, including details of proposed permanent and temporary works, property access and acquisition, design criteria and construction work is provided in **Sections 5.2** to **5.24**.

## 5.2 Design criteria

Roads and Maritime is committed to providing high quality, safe and efficient infrastructure and has adopted recognised standards and criteria to guide the development of the project, providing a design for a high standard motorway that provides sufficient road corridor width to accommodate design development and refinement opportunities during detailed design. The road design aims to:

- Conform to the design criteria
- Optimise road user safety
- Achieve flood immunity requirements
- Maintain access to existing and proposed utilities, culverts and bridge structures
- Avoid or minimise impacts on property and maintain property accesses where possible
- Avoid or minimise impacts on biodiversity, Aboriginal and non-Aboriginal heritage impacts
- Avoid or minimise impacts on amenity such as noise, air, landscape character and visual impacts
- Avoid or minimise social and economic impacts
- Avoid unacceptable impacts on utilities
- Provide a value for money design solution
- Provide a road corridor suitable for construction and operation that minimises impacts on property owners, where possible.

The design was developed based on:

- Austroads Guides (with appropriate Roads and Maritime supplements)
- Australian Standards
- Roads and Maritime technical directions, standards, and model drawings
- Australian Rainfall and Runoff: A Guide to Flood Estimation (Institution of Engineers, Australia, 1987)
- Relevant international standards and best practice.

The design criteria that guided the project's design are summarised in **Table 5-3**. Design criteria that were followed specifically for intersections and interchanges, are summarised in **Table 5-4**.

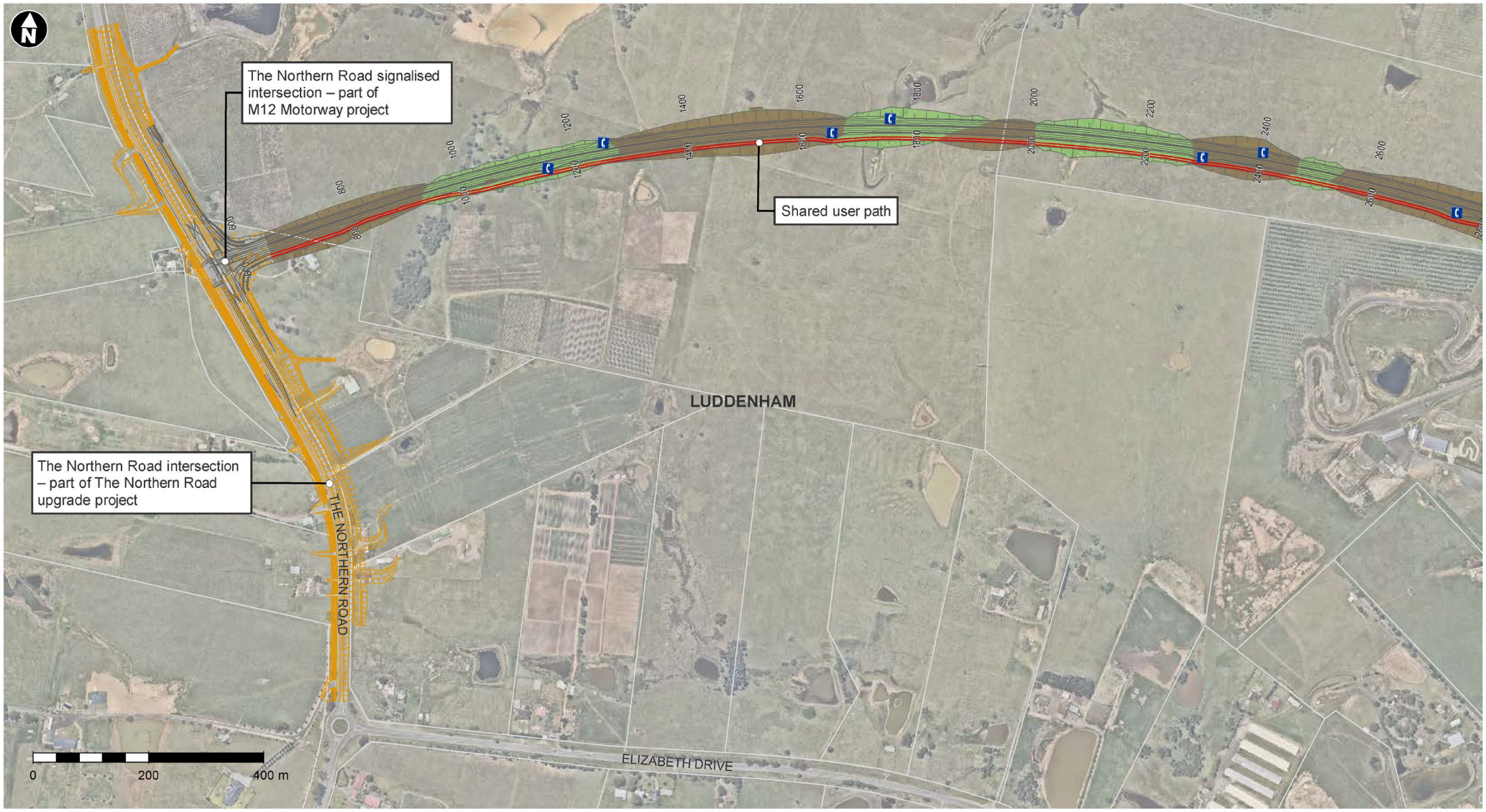


Figure 5-1 Key features of the project



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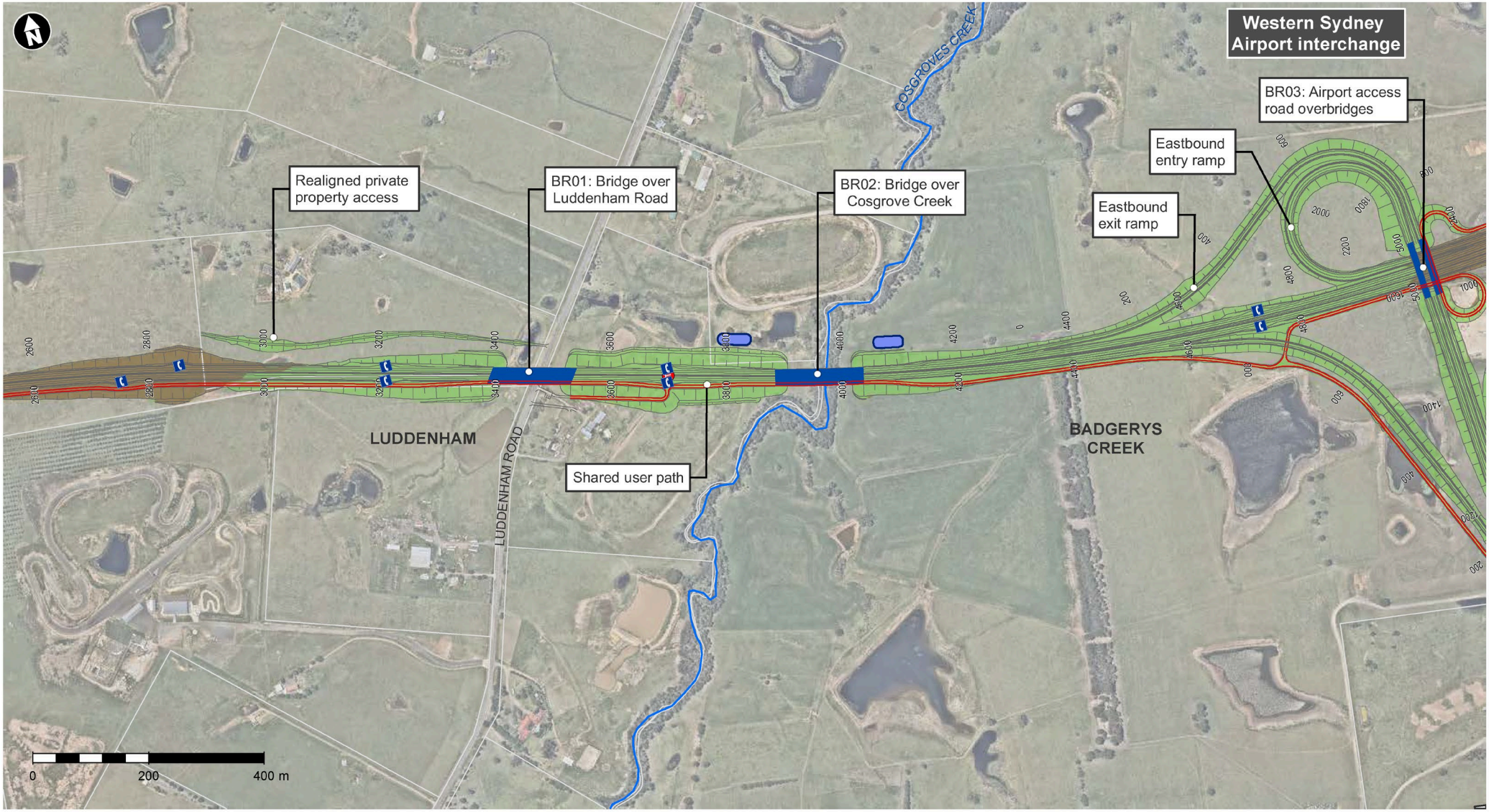


Figure 5-1 Key features of the project



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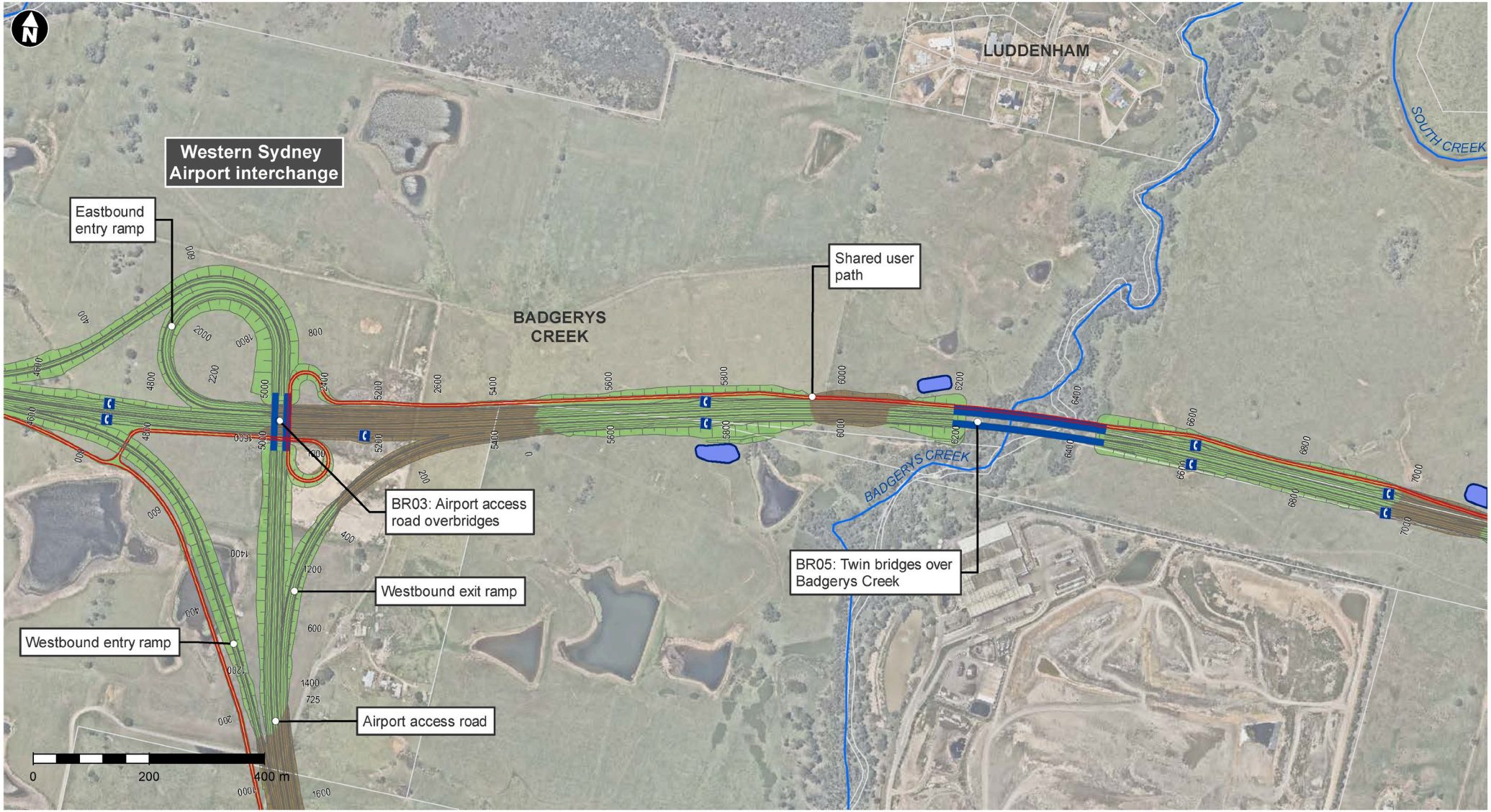


The project
Part of The Northern Road upgrade project
Shared user path
Existing roads

**Emergency crossovers and breakdown bays**

Emergency telephone bay

Waterways
Bridges
Proposed location of operational water quality basins

**Cut / Fill**

Cut
Fill

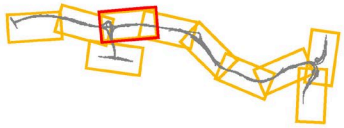


Figure 5-1 Key features of the project



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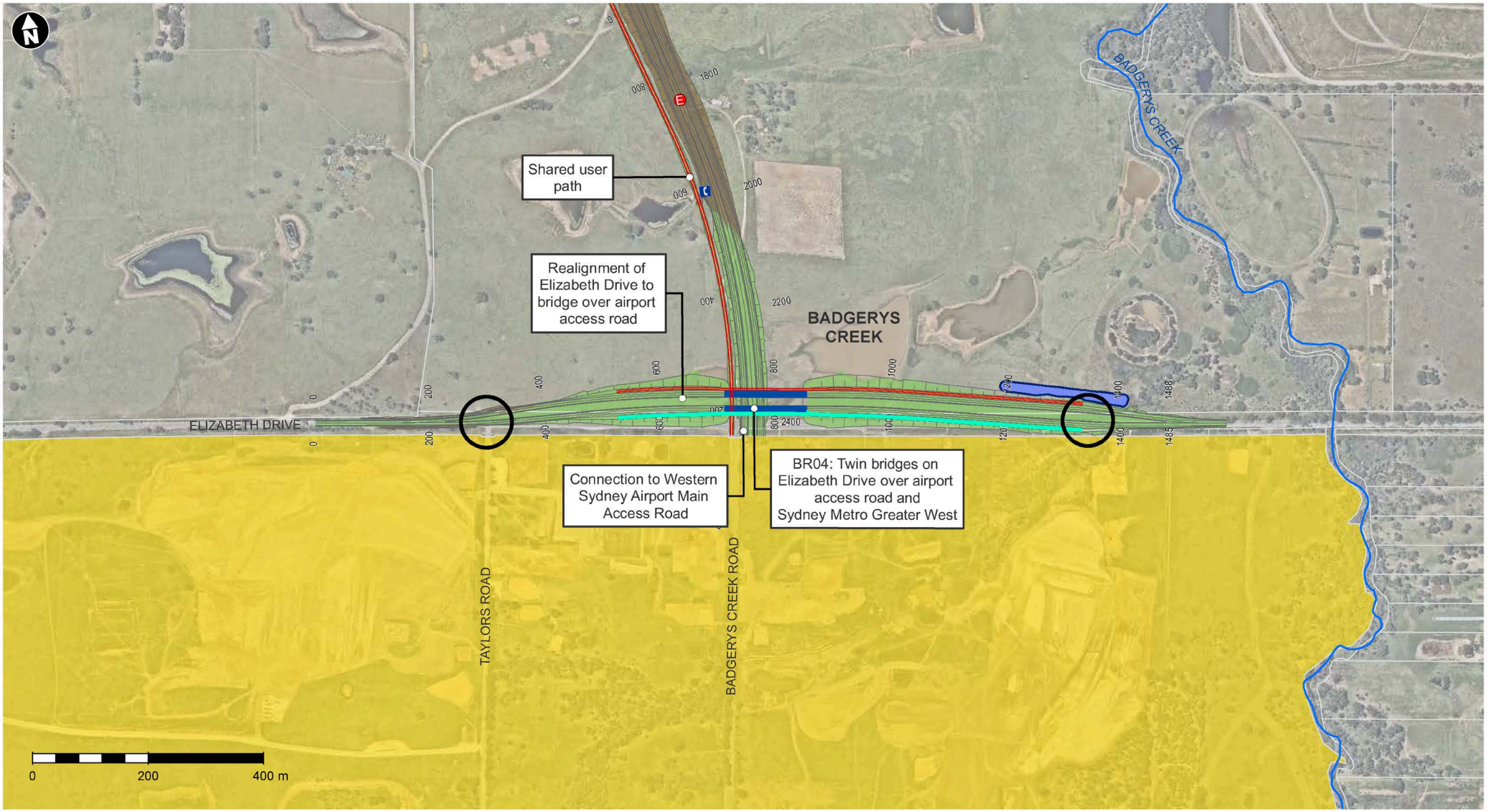


The project
Part of The Northern Road upgrade project
Shared user path
Future shared user path (by others)
Existing roads

**Emergency crossovers and breakdown bays**
Emergency crossover
Emergency telephone bay

Waterways
Bridges
Western Sydney Airport
Proposed location of operational water quality basins

**Cut / Fill**
Cut
Fill

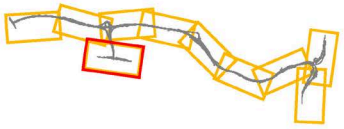


Figure 5-1 Key features of the project



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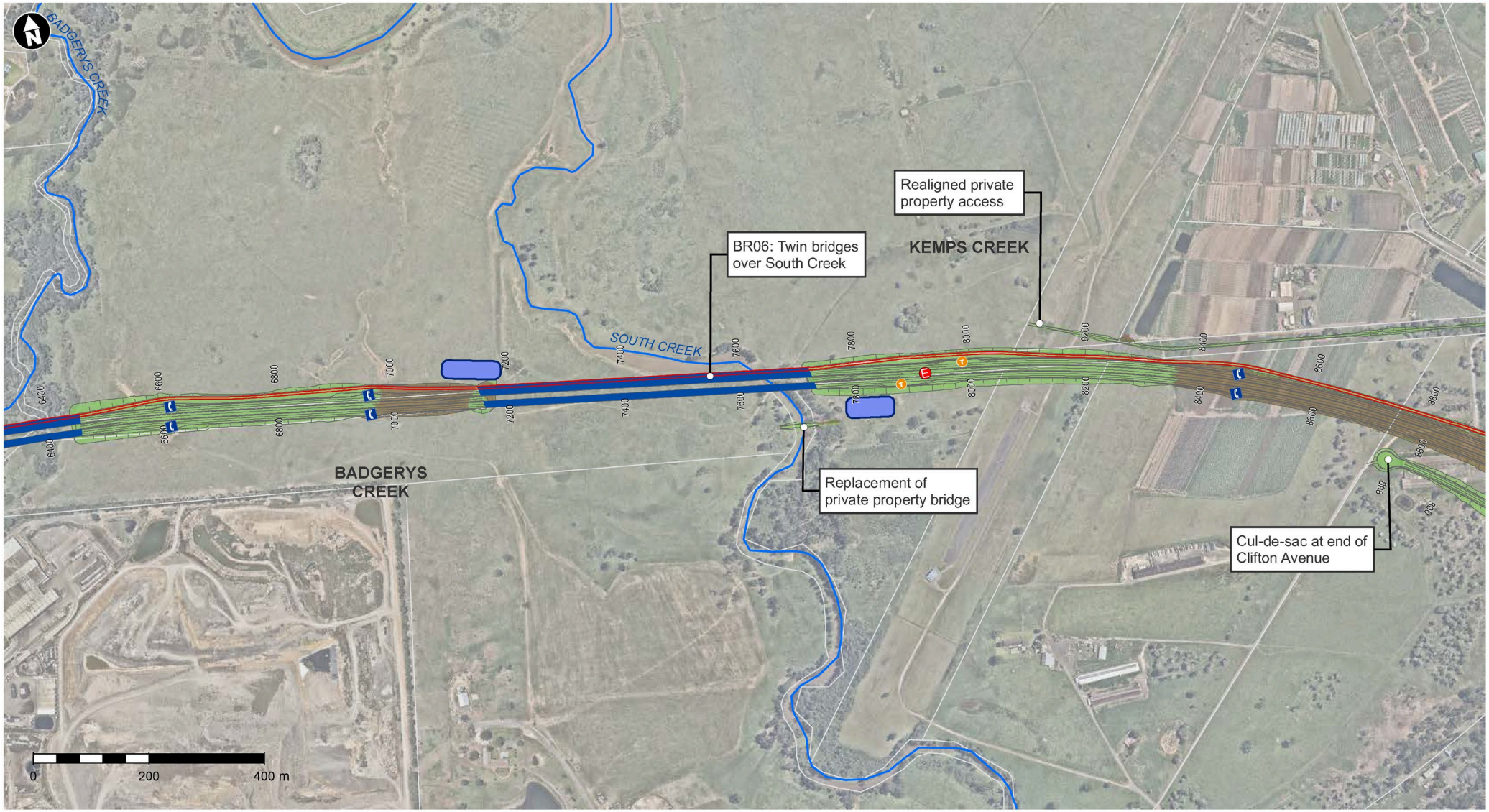


Figure 5-1 Key features of the project



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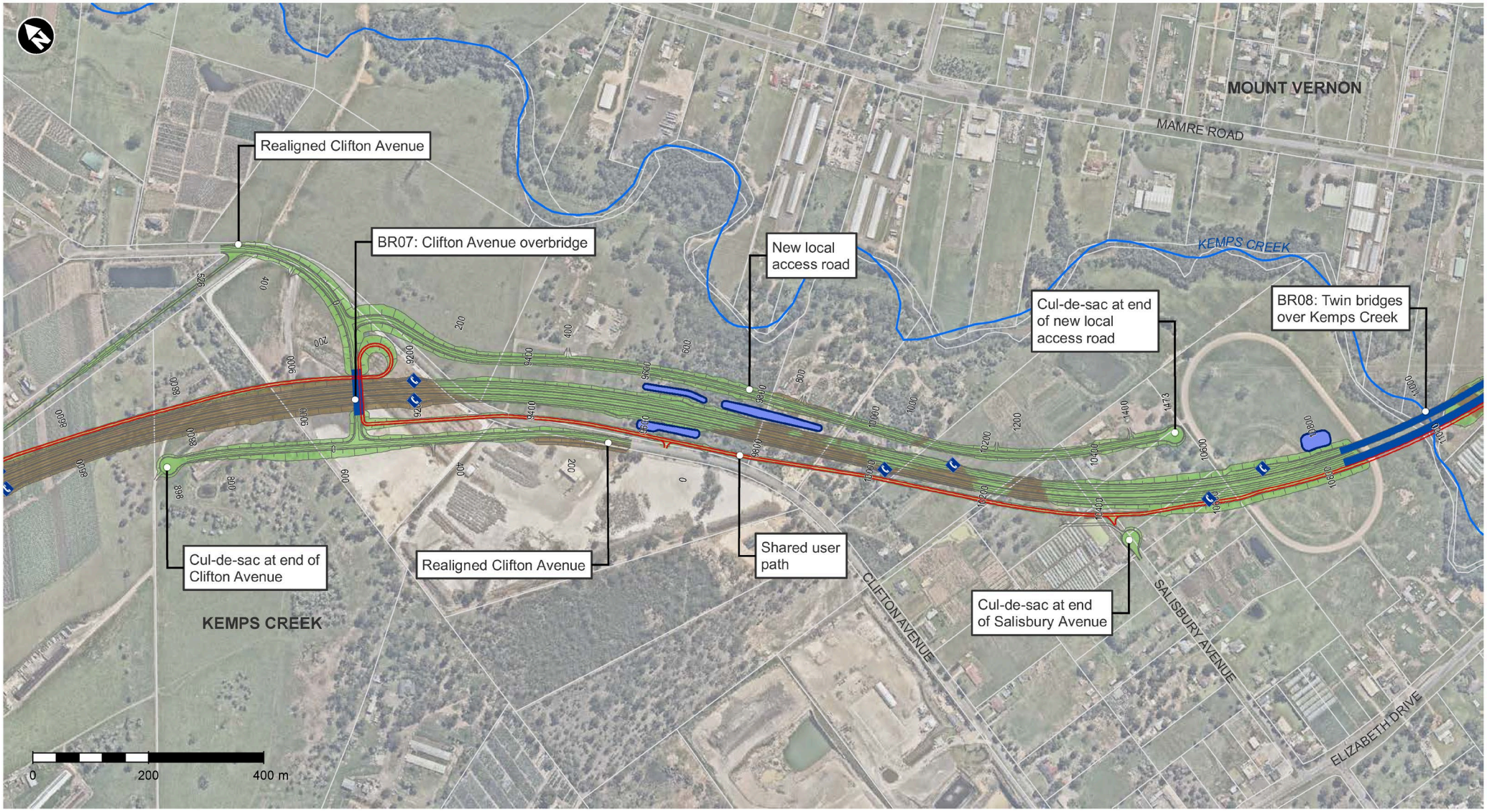


Figure 5-1 Key features of the project



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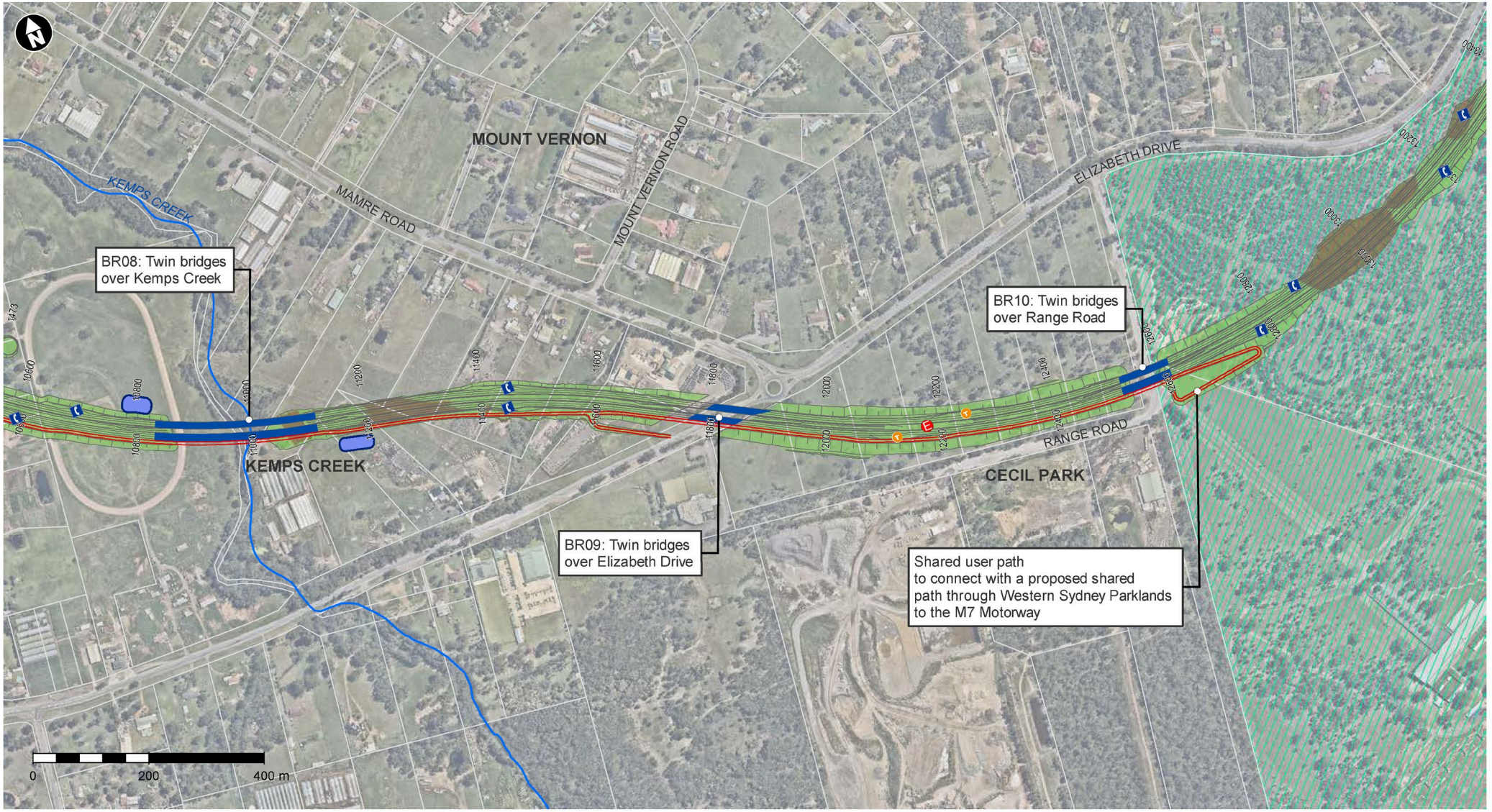


Figure 5-1 Key features of the project



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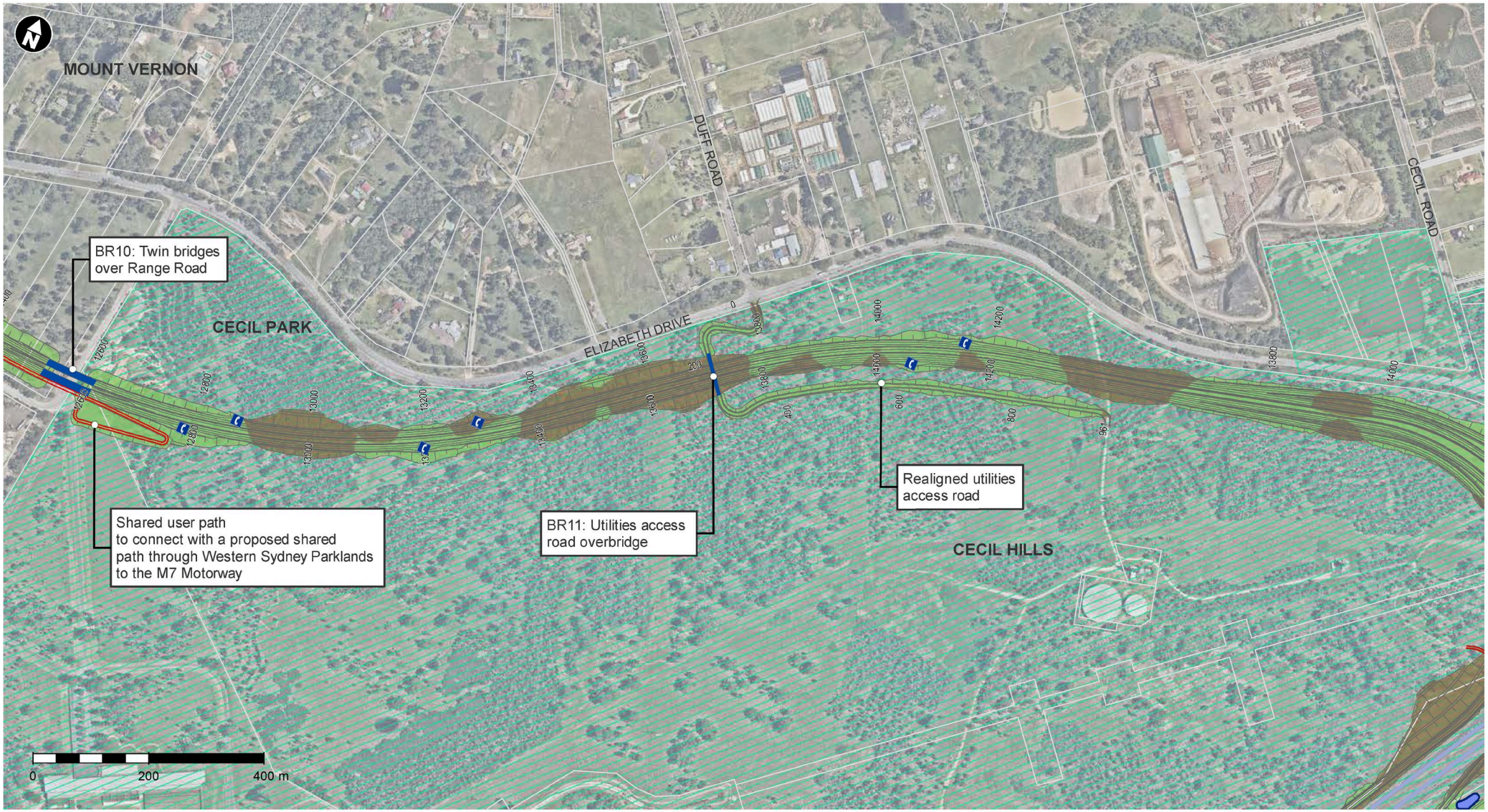


The project
Part of The Northern Road upgrade project
Shared user path
Existing roads

**Emergency crossovers and breakdown bays**

Emergency telephone bay
Bridges
Western Sydney Parklands
Proposed location of operational water quality basins

**Cut / Fill**

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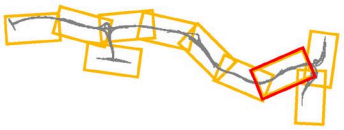


Figure 5-1 Key features of the project

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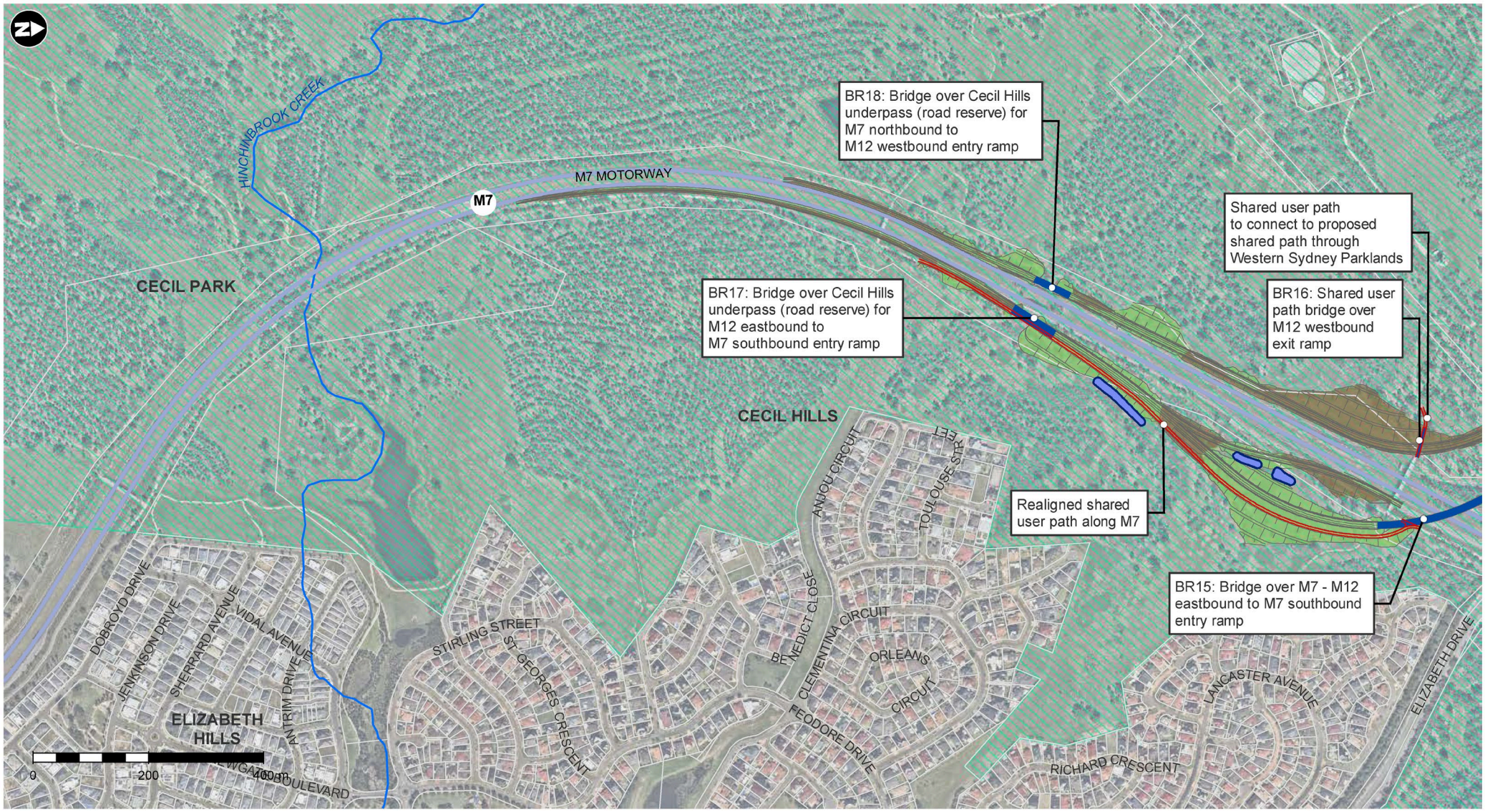


Figure 5-1 Key features of the project



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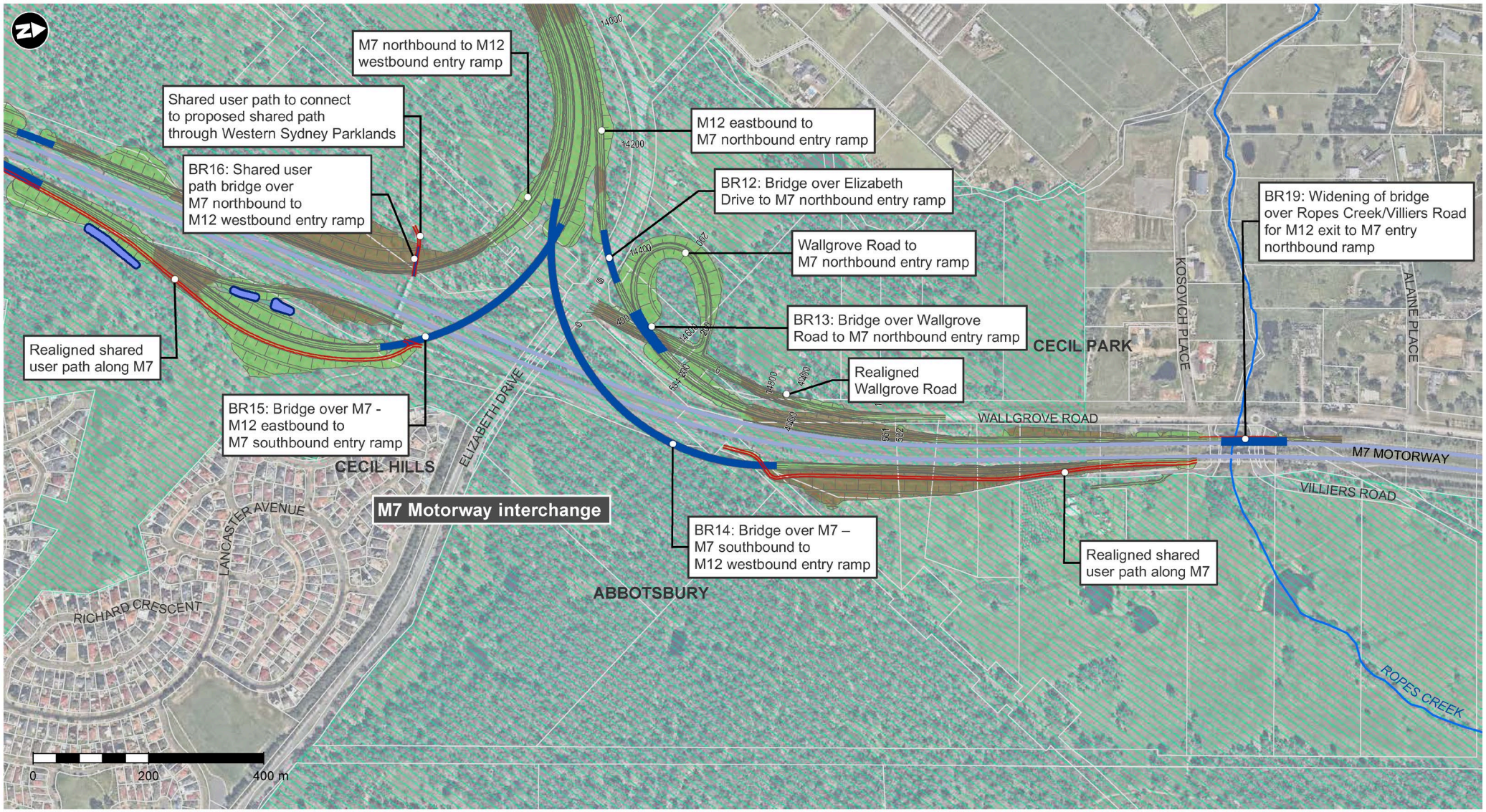


Figure 5-1 Key features of the project



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Table 5-3 M12 Motorway design criteria

| Design parameter | Design criteria |
|---|---|
| Design speed | 110 kilometres per hour |
| Posted speed limit | 100 kilometres per hour |
| Minimum general traffic lane width | 3.5 metres |
| Minimum auxiliary lane width | 3.3 metres |
| Minimum shoulder width | Nearside (left) 2.5 metres to 3 metres<br>Offside (right) 1 metre<br>Ramp nearside (left) 2.5 metres |
| Median width | 12 metres |
| Minimum grade | 0.5 per cent |
| Maximum grade | 1.5 per cent desirable<br>3 per cent maximum |
| Cut batter slope | 2 (horizontal) to 1 (vertical) |
| Fill batter slope | 4 (horizontal) to 1 (vertical) up to 2.5 metres high<br>2 (horizontal) to 1 (vertical) when greater than 2.5 metres high |
| Bench width (in cuttings) | 4.5 metres |
| Design vehicle | 36 metre B-triple |
| Vertical clearance to overhead structures | 5.4 metres for concrete structures<br>Minimum of 6.1 metres for steel structures<br>Minimum of 5.5 metres for pedestrian bridges |
| Flood immunity | 100-year average recurrence interval (ARI) – motorway<br>1-year ARI – shared user path |
| Shared user path width | 4 metres |
| Minimum horizontal curve | 1200 metres |
| Pavement design life | 20 years |

Table 5-4 Intersection and interchange specific design criteria

| Design parameter | Design criteria |
|---|---|
| Maximum grade (interchange ramp) | 5 per cent |
| Posted speed limit | 80 kilometres per hour with the exception of:<br>• M12 Motorway/Western Sydney Airport interchange eastbound entry and exit ramps – advisory posted speed of 55 kilometres per hour<br>• M12 Motorway/Western Sydney Airport interchange westbound entry ramp – 70 kilometres per hour |
| Design speed | Generally 90 kilometres per hour with the exception of:<br>• M12 Motorway/Western Sydney Airport interchange eastbound entry and exit ramps – 65 kilometres per hour<br>• M12 Motorway/Western Sydney Airport interchange westbound entry ramp – 80 kilometres per hour |
| Design vehicle | • M12 Motorway – 36 metre B-triple<br>• M12 Motorway to the M7 Motorway and airport access road – 36 metre B-triple<br>• M12 Motorway to The Northern Road – 36 metre B-triple<br>• Mamre Road – 36 metre B-triple<br>• Clifton Avenue – 19 metre Single Articulated<br>• Reservoir access road – 19 metre Single Articulated |

Table 5-5 Bridge design criteria

| Design parameter | Value adopted in the design |
|---|---|
| Design life | 100 years |
| Minimum vertical clearance to overhead structures | • 5.4 metres for concrete structures<br>• 6.1 metres for steel structures<br>• 5.5 metres for pedestrian bridges |
| Drainage | Flow must not extend into the traffic lane for rainfall events up to a one in five year ARI event |

## 5.3 Urban design objectives and principles

Urban design objectives were prepared to guide the design as set out in this document and consider how the project would integrate physically and visually with the surrounding environment.

The urban design objectives and principles for the project are consistent with:

- Beyond the Pavement (Roads and Maritime, 2014)
- The M12 Motorway: Strategic Urban Design Concept (Roads and Maritime/Aurecon 2016a). The report identified the following vision for the project:

  *"The M12 Motorway would be a memorable, world class gateway from the planned Western Sydney Airport at Badgerys Creek to the Sydney metropolitan area, to New South Wales and to Australia. It would celebrate the unique sense of place and the journey from the Mountains to the City through considered alignment, views, art and interpretation. The M12 Motorway would be a truly integrated and sustainable design that not only draws upon the natural, cultural and social elements, but also encompasses a flexible approach to the changing land uses, transport modes and technologies."*

- Roads and Maritime Urban Design Guidelines
  - Bridge aesthetics design guidelines: Design guideline to improve the appearance of bridges in NSW (Roads and Maritime, 2012a)
  - Landscape design guideline: Design guideline to improve the quality, safety and cost effectiveness of green infrastructure in road corridors (Roads and Maritime, 2018b)
  - Noise wall design guideline: Design guideline to improve the appearance of noise walls in NSW (Roads and Maritime, 2016d)
- Strategic objectives of the Western Sydney Parklands Plan of Management (Western Sydney Parklands Trust, 2018a)

The following overarching urban design objectives were developed for the project (see **Appendix G**):

- Create a unique and distinct identity interpreting the rich sense of place, Aboriginal and cultural heritage
- Utilise structures, bridges and earthworks as expressions of identity, place, values and sustainability
- Provide connectivity and access along and across the study area
- Accentuate natural patterns through revegetation and express the new through contrasting landmark plantings
- Create an enjoyable experience with diverse and distinctive views and sense of journey and arrival
- Design a simple, cohesive and sustainable motorway that offers a flexible and diverse choice of transport modes
- Engage with the community and stakeholders.

Further detail regarding the project's urban design objectives and principles is provided in **Section 7.3** and **Appendix G**.

## 5.4 Protection of airspace around Western Sydney Airport

The airspace surrounding the Western Sydney Airport is protected to maintain a safe operating environment for aircraft near the airport. Criteria are set for aircraft operating under visual flight conditions and non-visual (instrument) operations.

### 5.4.1 Obstacle limitation surface

Obstacle limitation surfaces (OLS) are a series of surfaces that set the height limits of objects around an airport.

The OLS for a runway provides protection for aircraft operating in visual flight conditions. Criteria for determining the OLS for airports are established by the International Civil Aviation Organisation (ICAO). In Australia the Civil Aviation Safety Authority (CASA) publishes these criteria in the Manual of Standards for Part 139 of the Civil Aviation Safety Regulations.

The OLS are the virtual surfaces around a runway, which establish the height limits for objects in and around an airport. It identifies the lower limits of an airport's airspace, which should be kept free of obstacles that may endanger aircraft during take-off, preparation to land and landing.

Development of the OLS includes assessment of surrounding terrain and obstacles to provide protection to a height of 300 metres for take-off and landing operations. The OLS is protected under Part 12 of the *Airports Act 1996* and the Airports (Protection of Airspace) Regulations 1996.

A plot of the OLS for Western Sydney Airport is provided in **Figure 5-2**. The project falls within the approach height envelope of the northern runway, requiring all structures within the project to be below this surface.

The project was designed in accordance with the OLS. The main design elements that need to consider encroachment on the OLS is the Western Sydney Airport Interchange and the realignment and grade separation of Elizabeth Drive over the airport access road and Sydney Metro Greater West alignment.

The motorway and associated infrastructure would maintain a minimum 15 metre clearance from the OLS which would allow for articulated vehicles to safely use the motorway without impacting on airport operations.

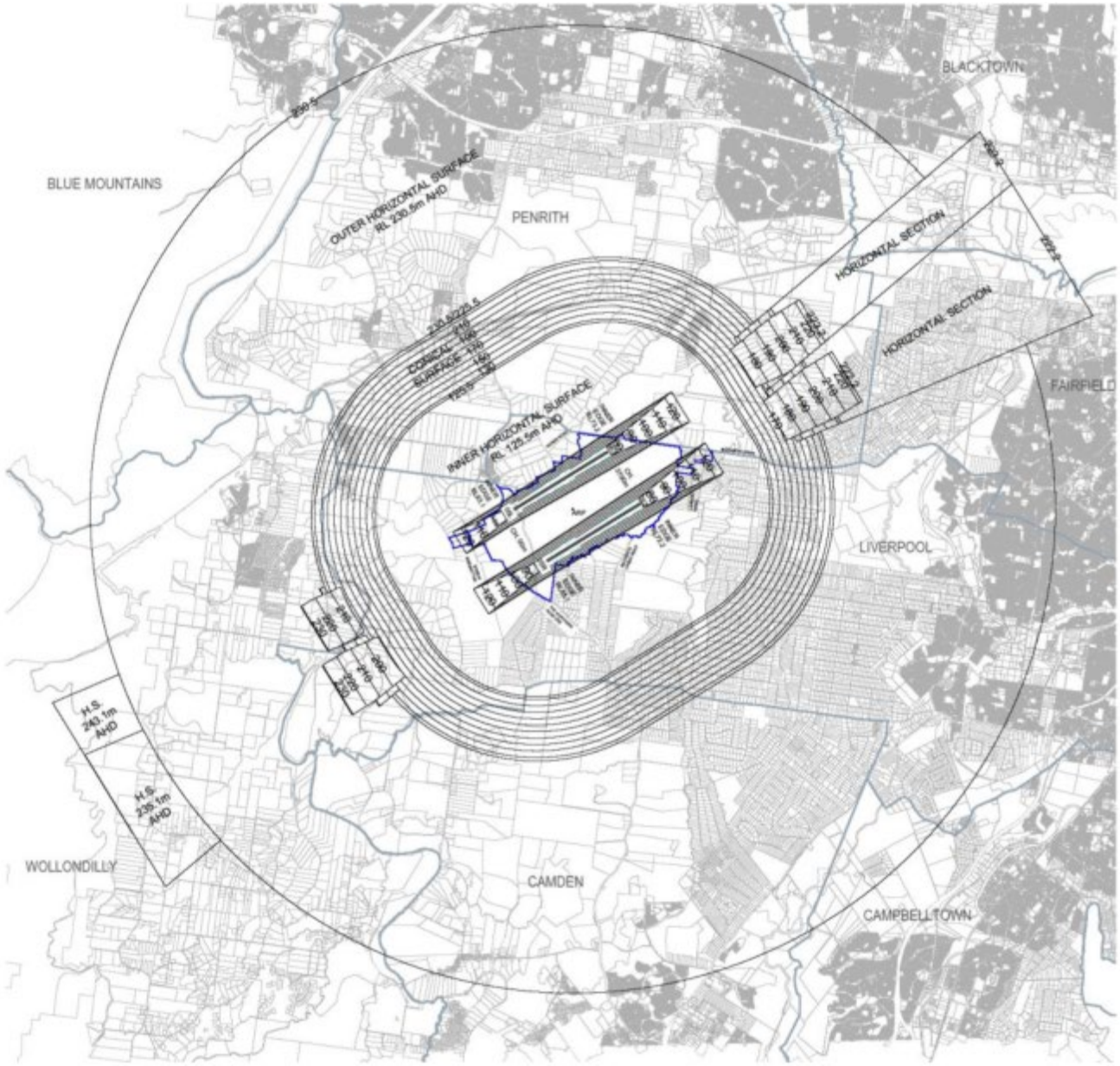
### 5.4.2 Procedures for Air Navigation Services – Operations surfaces

To protect the stages of take-off, landing or manoeuvring when aircraft are operating in non-visual (instrument) conditions, criteria for safe airspace are established by ICAO and published in the Procedure for Air Navigation Services – Operations (PANS-OPS).

Surfaces determined by the PANS-OPS criteria are used to establish take-off, landing and approach procedures and are designed to prevent aircraft from colliding with obstacles when flying on instruments. PANS-OPS surfaces are protected from intrusions under the Airports (Protection of Airspace) Regulations 1996. Minimum safe altitudes are established, and obstacles are not permitted into the PANS-OPS.

## 5.5 National Airports Safeguarding Framework

The National Airports Safeguarding Framework (NASF) provides guidance to State, Territory and local Governments on the management and regulation of safety risks and amenity issues near airports and strategic helicopter landing sites.




Source: Australian Government Department of Infrastructure and Regional Development (DIRD), 2017

Figure 5-2 Western Sydney Airport Obstacle Limitation Surfaces (OLS)

The NASF includes a set of guidelines with the aim to provide for a best practice land use planning focus across the following key considerations:

- Managing intrusion by aircraft noise
- Risk of building-generated windshear and turbulence at airports
- Risk of wildlife strikes near airports
- Risk of wind turbine farms as physical obstacles to air navigation
- Risk of distractions to pilots from lighting near airports
- Risk of intrusions into the protected operational airspace of airports
- Protection of on and off-airport communication, navigation and surveillance equipment
- Protection of strategically important helicopter landing sites
- Public safety areas at the end of runways.

The following NASF guidelines are relevant to the project and require ongoing consideration during design development.

### 5.5.1 Guideline C – Managing the Risk of Wildlife Strikes in the Vicinity of Airports

This document provides guidance on the management of the risk of collisions between wildlife and aircraft at or near airports where that risk may be increased by the presence of wildlife-attracting land uses.

Relevant considerations for the project may include the appropriateness of species to be used in landscaping close to the airport and proposed locations for detention basins to mitigate an unacceptable increase in the risk of bird strike.

### 5.5.2 Guideline E – Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports

CASA has the authority under the *Civil Aviation Act 1988* to determine the potential impact of ground lighting within a six-kilometre radius of an airport where they may have the potential to cause confusion or distract pilots during take-off and landing operations.

Consideration would need to be given to the type of light fittings proposed and the proposed lighting intensities within the six-kilometre buffer radius from the airport (applied from the centre point of each runway).

### 5.5.3 Guideline F – Managing the Risk of Intrusions into the Protected Airspace of Airports

This document provides guidance on the process, roles and responsibilities and sets out a series of steps for ensuring compliance with the requirements of the OLS (described in **Section 5.4.1**) and PANS-OPS (described in **Section 5.4.2**).

### 5.5.4 Guideline G – Protecting Aviation Facilities – Communications, Navigation and Surveillance (CNS)

Communications, navigation and surveillance (CNS) facilities enable pilots to navigate, communicate with other pilots and air traffic control, and allow air traffic control to monitor and confirm aircraft locations. The CNS facilities are protected by building restricted areas (BRA) to ensure their effectiveness.

The BRA is defined as the area in which development has the potential to cause unacceptable interference to CNS facilities and is intended to trigger an assessment of potential impacts on CNS facilities.

The project includes construction of infrastructure, bridges and motorway overpasses, which is listed in the guideline as development which may trigger an assessment.

### 5.5.5 Guideline I – Public Safety Areas (PSAs)

Public safety areas (PSA) are designated areas of land at the ends of runways (including potential areas beyond an airport boundary) that are intended to restrict certain types of development to control the number of people congregating on the ground and therefore at risk of injury or death in the event of an aircraft accident during take-off or landing operations. Where an interaction with an identified PSA is likely, planning for new transport infrastructure would need to consider the potential to attract significant static traffic to the area.

The Airport Plan for the Western Sydney Airport identified a nominal 1000 metre trapezoid-shaped PSA off the end of each runway. Whilst the trapezoid model was identified in the Airport Plan, it was prepared prior to Guideline I being considered by the Transport and Infrastructure Council and incorporated into the National Airports Safeguarding Framework in November 2018.

Guideline I has a specific section on Western Sydney Airport and recognises that opportunities exist to review the model provided to determine which model is most appropriate for the Airport. An alternative to the trapezoid model, the UK model (which models the 1:10,000 and 1:100,000 risk contour) is also provided.

It is yet to be determined which model is to be applied to land use planning decisions around Western Sydney Airport and Roads and Maritime would continue to consult with WSA Co and NSW Government during detailed design to ensure that the relevant guidelines from the NASF are considered appropriately as the design is refined and developed further.

## 5.6 Alignment

The M12 Motorway would run from the M7 Motorway at Cecil Hills in the east, to The Northern Road at Luddenham in the west.

At the eastern end of the project, the M12 Motorway would connect with the M7 Motorway via a grade–separated interchange at about the same location as the existing M7 Motorway interchange with Elizabeth Drive. The M12 Motorway to M7 Motorway interchange would provide a free-flowing connection for all movements between the M12 Motorway and the M7 Motorway.

Between the M7 Motorway and Range Road the M12 Motorway would proceed in a westerly direction for about three kilometres, close to the edge of the Western Sydney Parklands, on the southern side of Elizabeth Drive.

From Range Road, the M12 Motorway would continue in a generally north–westerly direction for about four kilometres, bridging over Elizabeth Drive and Kemps Creek. Clifton Avenue would be realigned to overpass the M12 Motorway, before the motorway turns generally west and bridges over South Creek.

The M12 Motorway would pass to the north of the SUEZ Kemps Creek Resource Recovery Park before bridging over Badgerys Creek and continuing west through a grade–separated interchange providing access to the Western Sydney Airport – referred to as the Western Sydney Airport interchange. The Motorway would then bridge over Cosgroves Creek and Luddenham Road and connect to The Northern Road via an at-grade intersection located about 850 metres north of the existing roundabout with Elizabeth Drive and about 1.4 kilometres south of Littlefields Road.

The M12 Motorway airport access road would run north–south from the Western Sydney Airport interchange for a distance of about 1.5 kilometres providing connection with the main access road that is being built as part of the Western Sydney Airport. Immediately to the north of the Western Sydney Airport, Elizabeth Drive would be modified as part of the project to bridge over the M12 Motorway airport access road and the future Sydney Metro Greater West.

An off-road shared user path would run alongside the M12 Motorway from The Northern Road to Range Road. From Range Road to the M7 Motorway an option for a shared user path that deviates from the M12 Motorway alignment was considered preferable due to the steeper grade in this section of the alignment. The shared user path is described in **Section 5.21**.

## 5.7 Road grade and lane widths

### 5.7.1 Road grade

The gradient of the main alignment would generally be between about 0.5 per cent and three per cent. However, the ramps to and from interchanges may be steeper, with gradients up to about five per cent.

### 5.7.2 Lane widths

From the M7 Motorway interchange to the Western Sydney Airport interchange, the project would be built as a dual-carriageway motorway with two lanes in each direction and a central median to separate opposing traffic flows. This section of the project would generally provide:

- Two lanes in each direction – 3.5 metres wide
- A shoulder in each direction – one to three metres wide
- Generally, a median with safety barriers where needed – 12 metres wide.

The project provides for future widening of the motorway from two lanes in each direction, to three lanes in each direction between the M7 Motorway interchange and the Western Sydney Airport interchange. Allowance has also been made in the design, as set out in this document, to provide enough space between the carriageways to widen bridge structures and approaches in the future as part of any future widening in this section of the project. Future widening does not form part of this EIS and would be subject to a separate environmental assessment.

Between the Western Sydney Airport interchange and The Northern Road, the M12 Motorway would be built as a dual carriageway with two lanes in each direction and a narrow, 2.6 metre wide divided median separating the eastbound and the westbound lanes. This section of the project would generally provide:

- Two lanes in each direction – 3.5 metres wide
- A shoulder in each direction – one to three metres wide
- Generally, a median with safety barriers – 2.6 metres wide.

If the Outer Sydney Orbital is built in the future, the median barrier constructed for the M12 Motorway would be demolished and the M12 Motorway eastbound and westbound carriageways would form the (future) Outer Sydney Orbital westbound carriageway. A separate parallel eastbound carriageway would then be built for the Outer Sydney Orbital and a future median separating the two carriageways would be built.

Typical cross sections of the project are presented in **Figure 5-3** and **Figure 5-4**.

## 5.8 Operational footprint

The operational footprint generally includes the M12 Motorway and additional areas required for operation and maintenance of the project, and comprises the following elements:

- Main project alignment
- Interchanges, tie-ins and ramps
- Earthworks, including fill embankments and cuttings
- Culverts and drainage structures
- Water quality control measures, including basins and swales
- Landscape works
- Maintenance access
- Fencing
- Shared user path
- Other associated project elements required during operation of the project (eg intelligent transport systems (ITS) and utilities, variable message signs (VMS), and relocated or additional M7 Motorway tolling facilities).

The total operational footprint is about 285 hectares and is shown in **Figure 5-5**. The width of the operational footprint is largely determined by the proposed cross section of the M12 Motorway and varies between about 70 metres wide and 160 metres wide. Wider areas of the operational footprint would be associated with interchanges, deep cuttings, high embankments and permanent water quality basins.

The construction footprint, which is the total area required to construct the project, is also shown in **Figure 5-5** and is described and discussed in **Section 5.24**.

## 5.9 Pavement

The road pavement would likely vary for each of the following components of the project:

- The main carriageway
- Entry and exit ramps
- Intersections and interchanges
- Arterial and local roads
- Property access roads
- Shared user paths and footpaths
- Median islands.

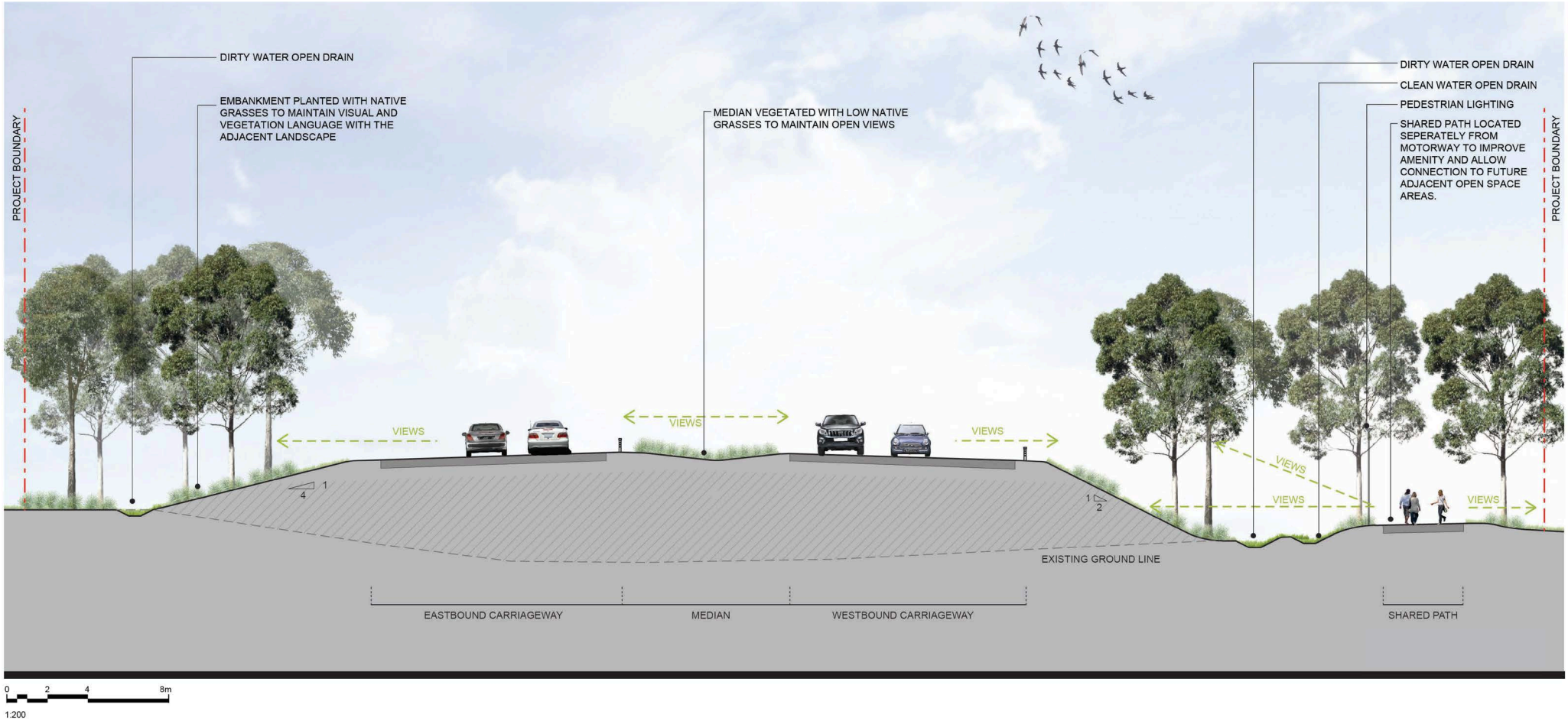



Figure 5-3 Typical cross section of the M12 Motorway on embankment (four-lane dual carriageway with wide median)

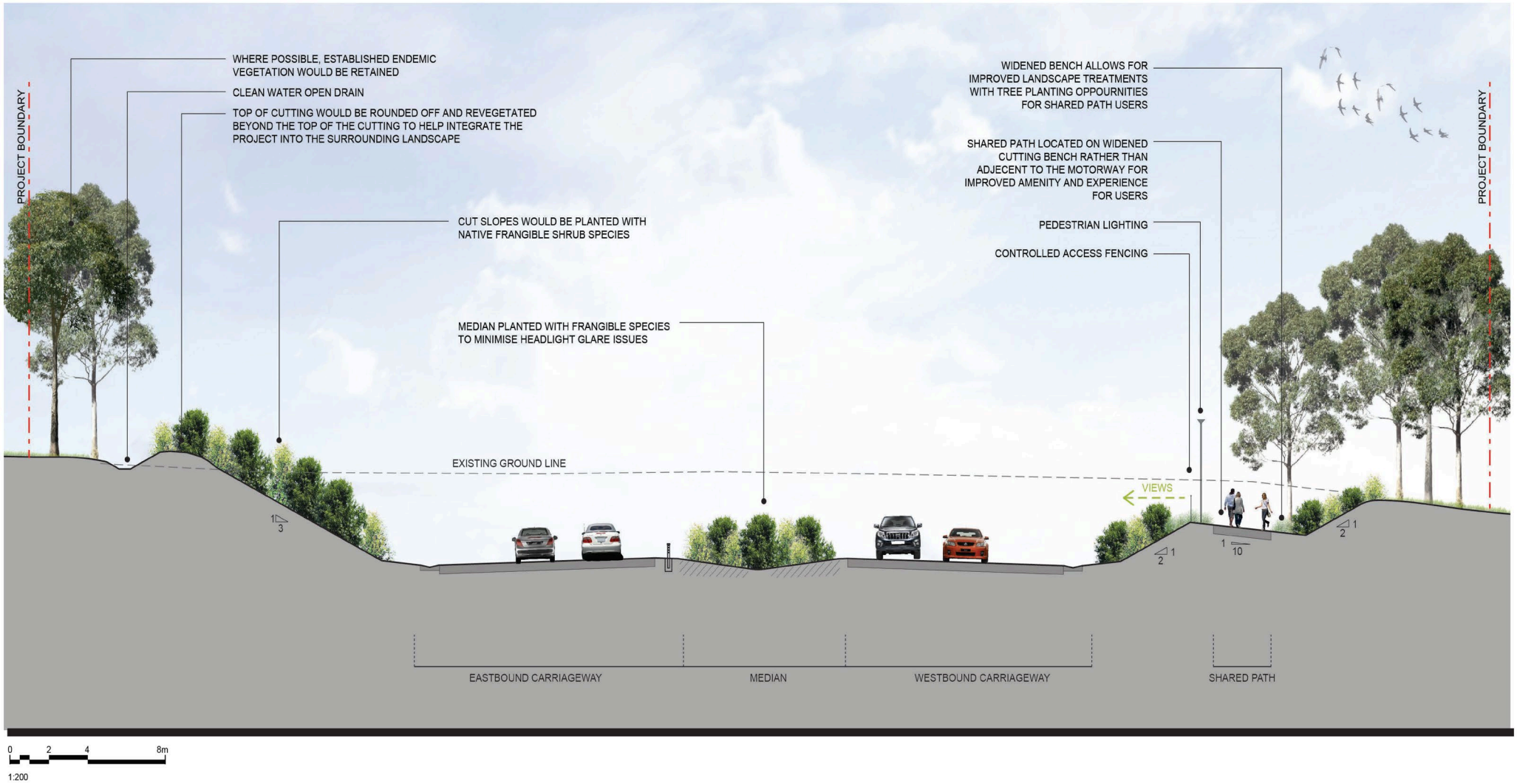



Figure 5-4 Typical cross section of the M12 Motorway in cutting (four-lane dual carriageway with wide median)

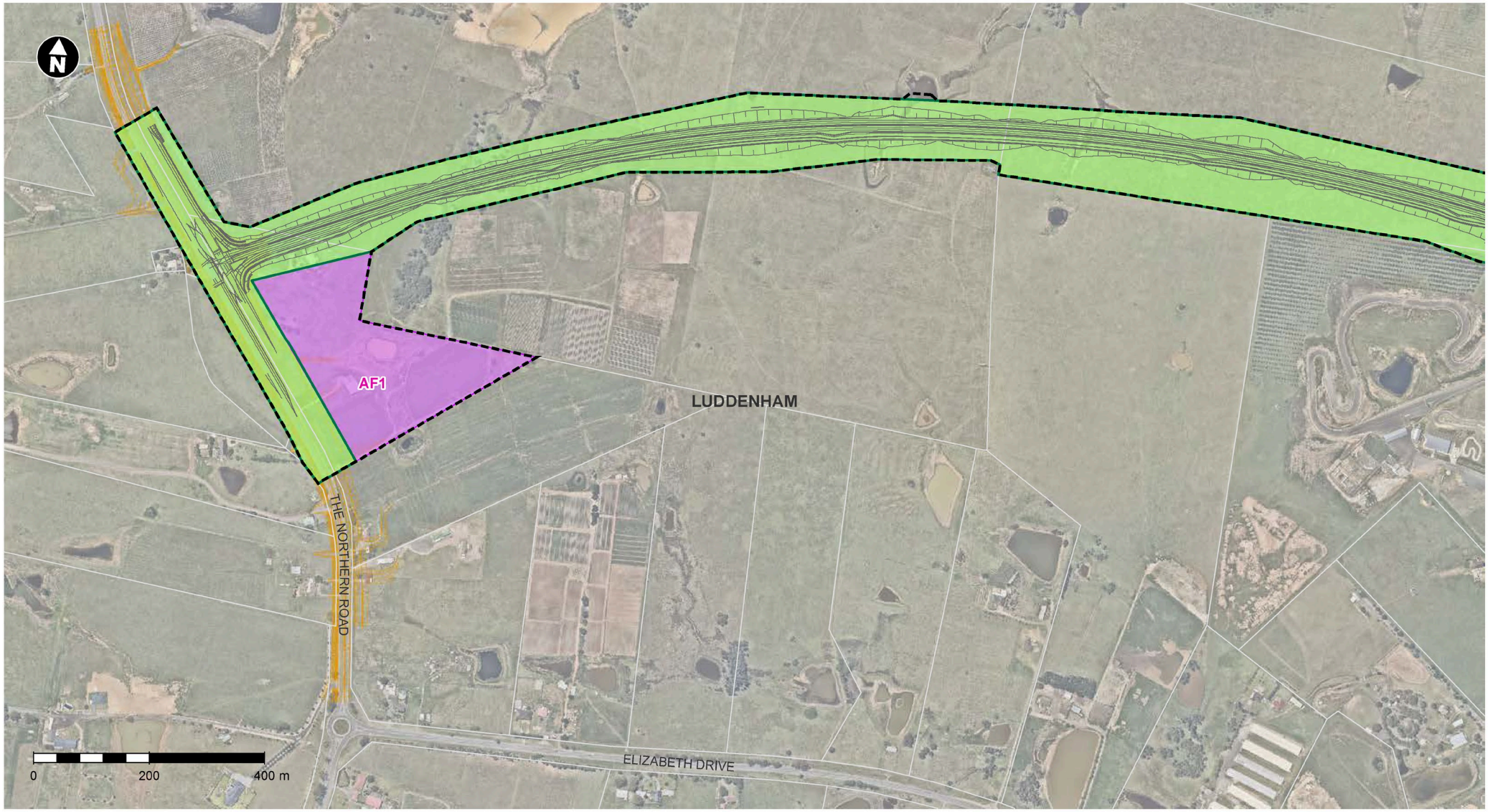



Figure 5-5 Operational and construction footprints for the project



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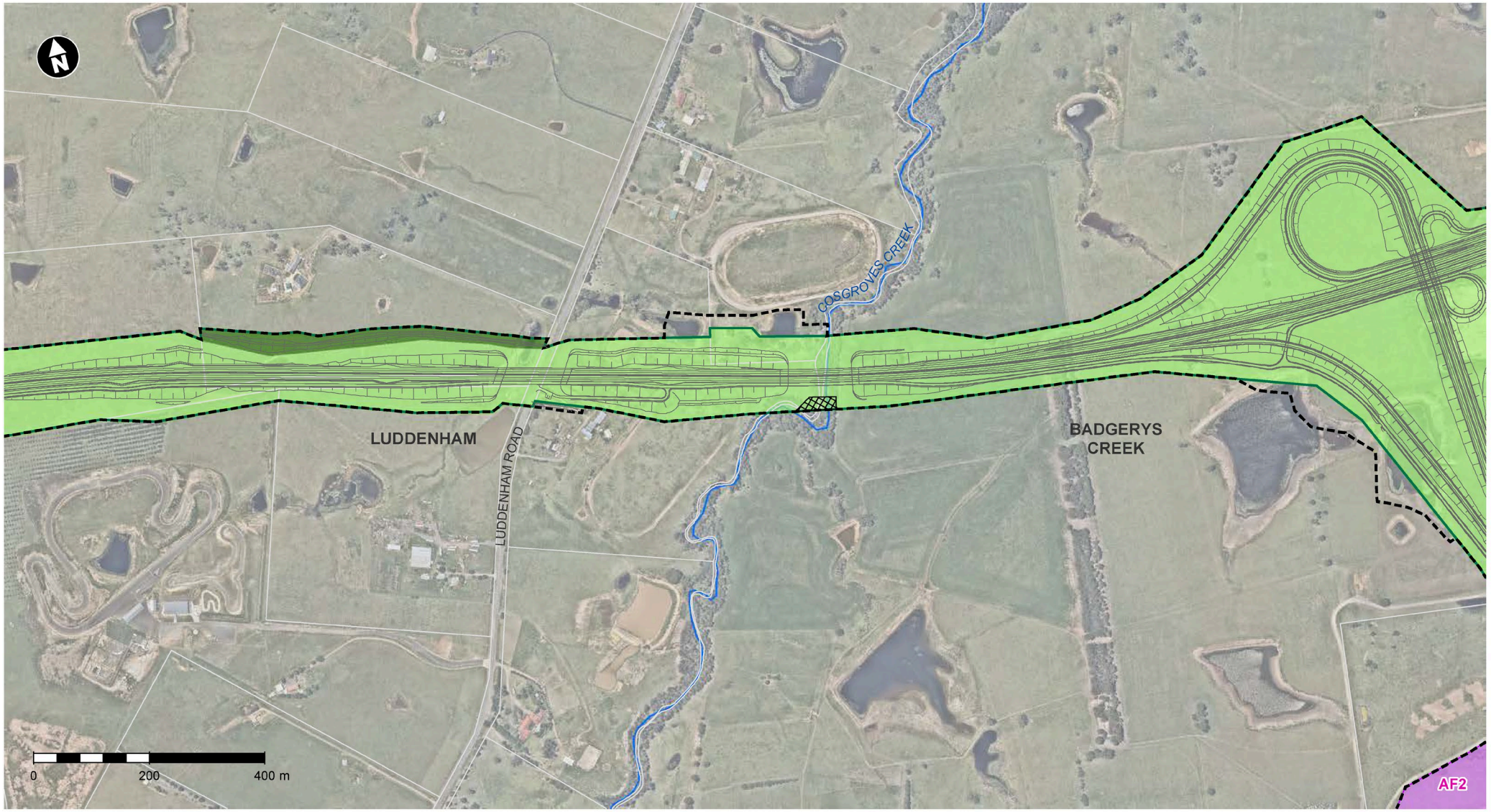


The project
Part of The Northern Road upgrade project
Waterways
Cadastre

**Construction footprint**
The project construction footprint
Ancillary facilities
Exclusion zones

**Operational footprint**
The project operational footprint
RMS road reserve
Proposed permanent work areas

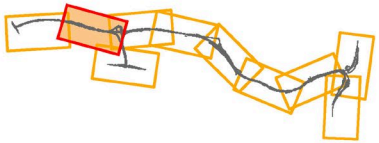


Figure 5-5 Operational and construction footprints for the project



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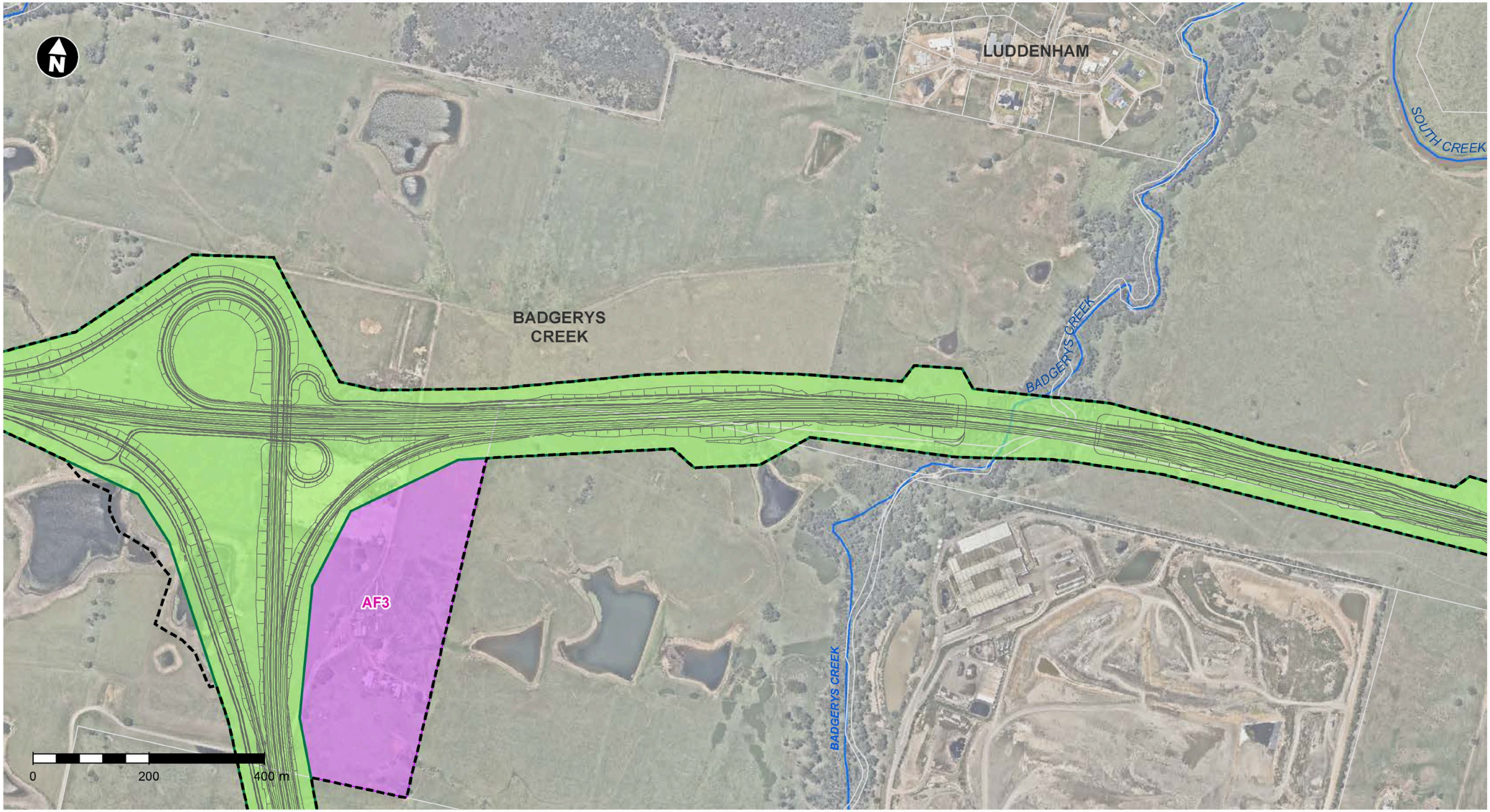


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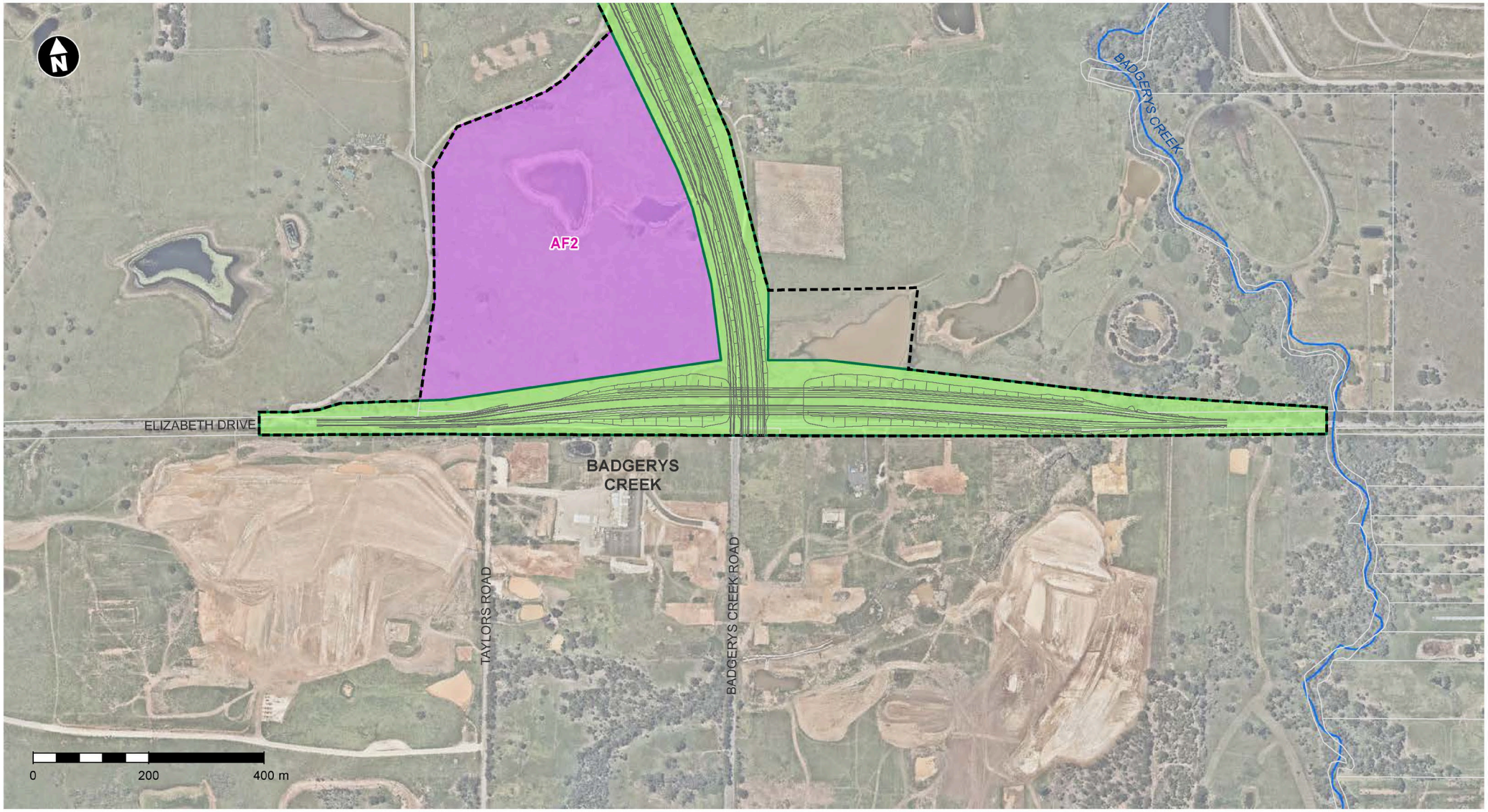
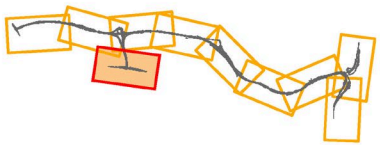



The project
Part of The Northern Road upgrade project
Waterways
Cadastre
**Construction footprint**
The project construction footprint
Ancillary facilities
**Operational footprint**
The project operational footprint
RMS road reserve

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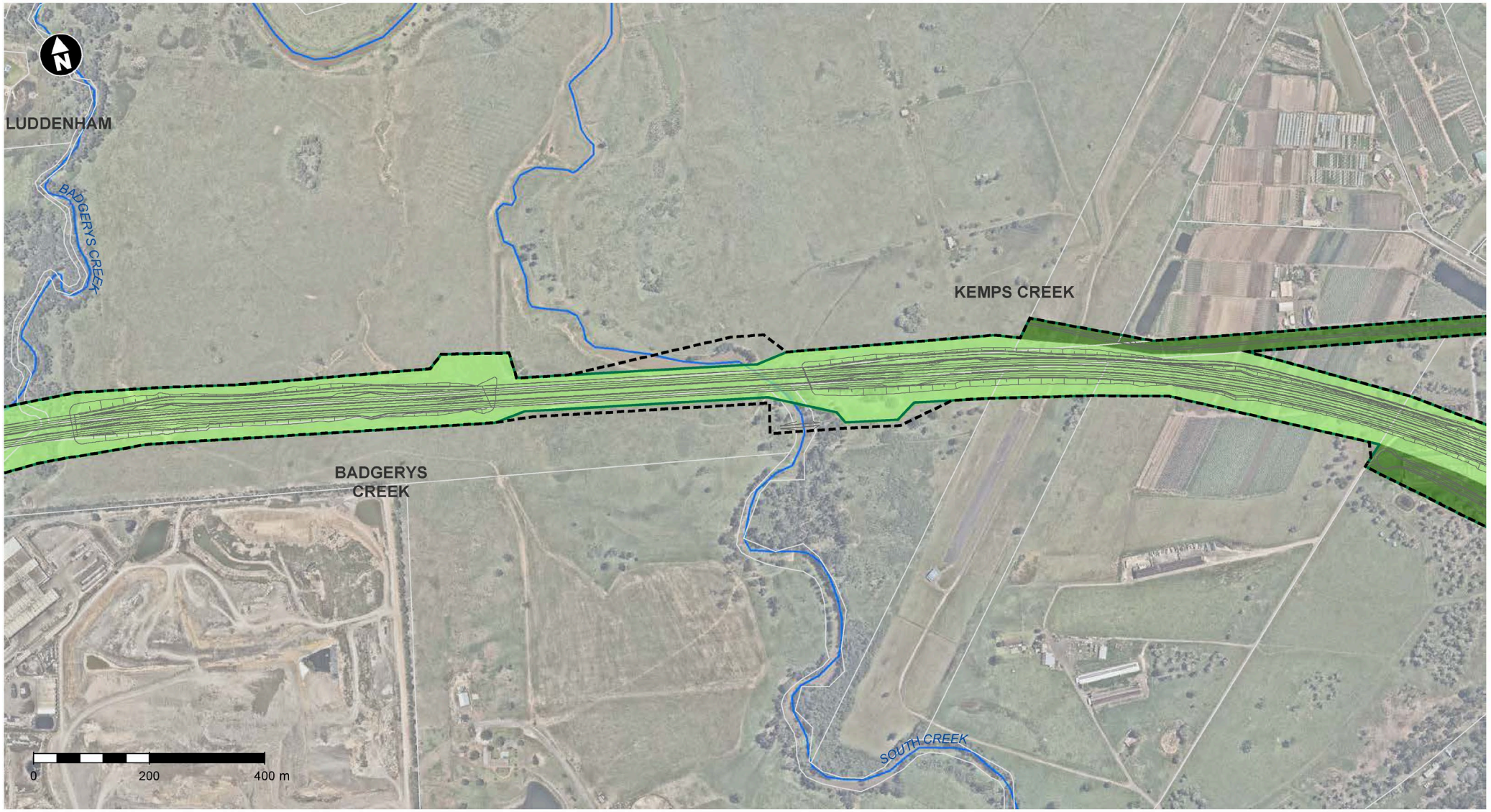


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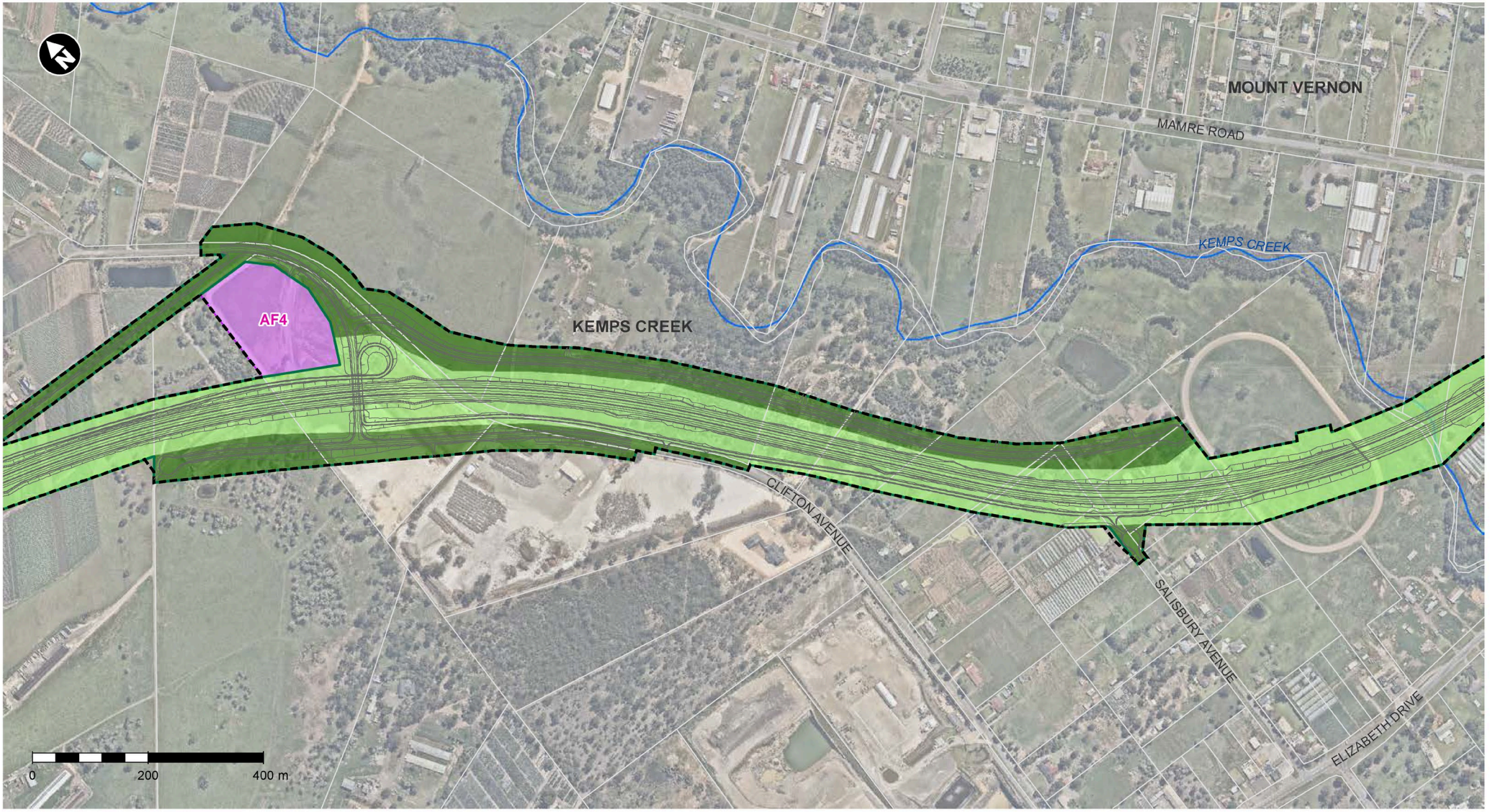
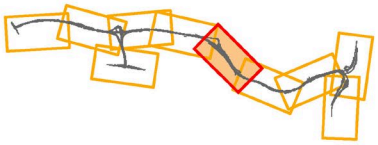
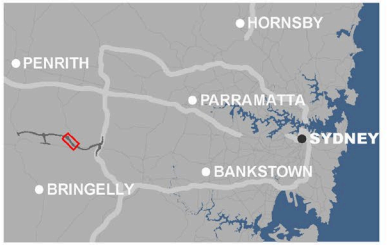



The project
Part of The Northern Road upgrade project
Waterways
Cadastre
**Construction footprint**
The project construction footprint
Ancillary facilities
**Operational footprint**
The project operational footprint
RMS road reserve
Proposed permanent work areas



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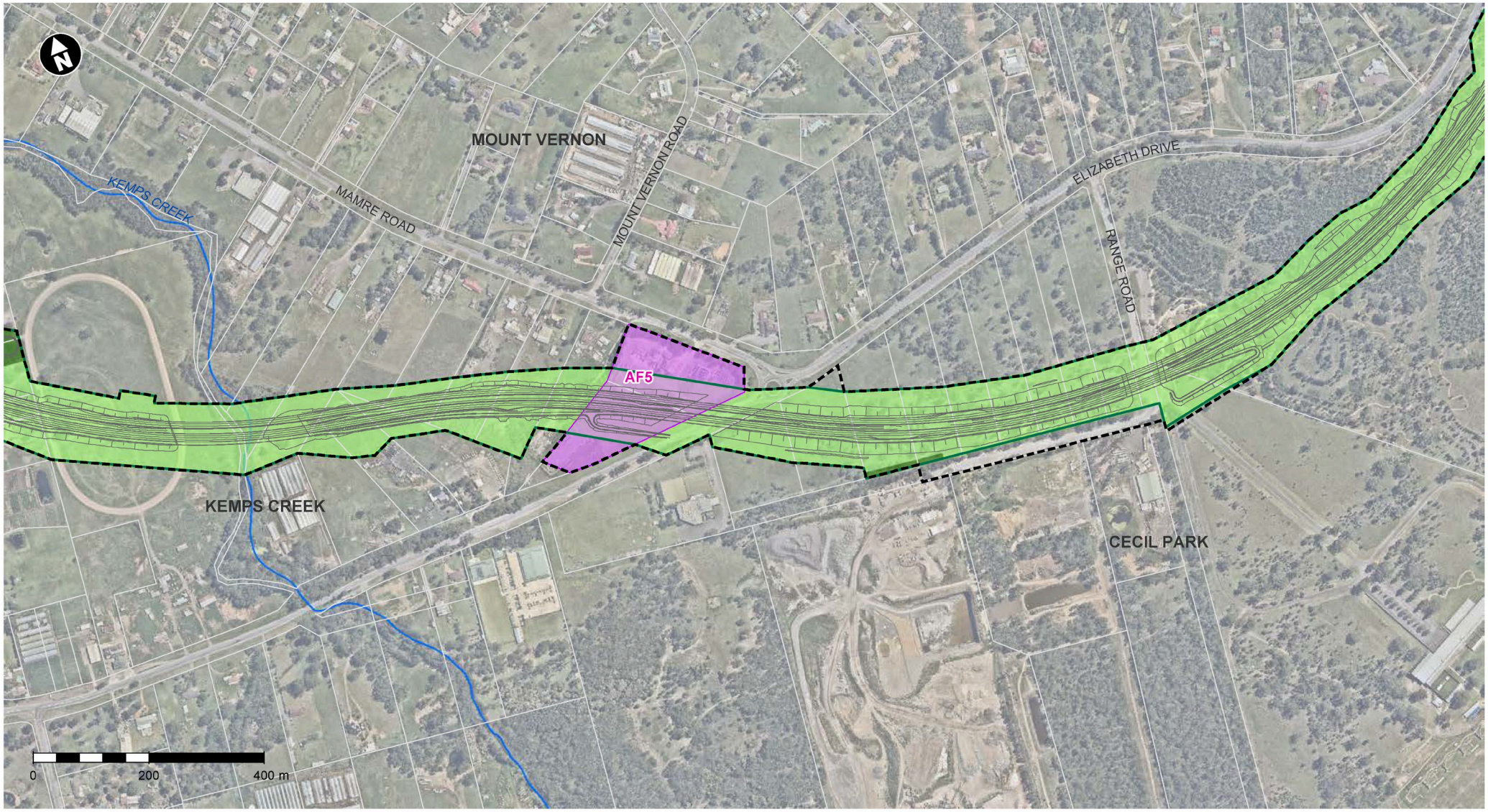


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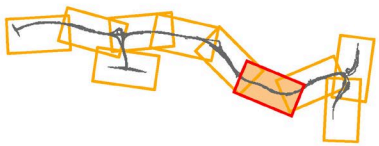


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The project operational footprint
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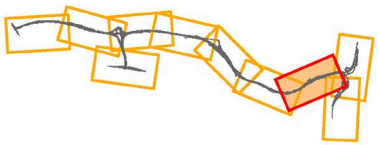


Figure 5-5 Operational and construction footprints for the project



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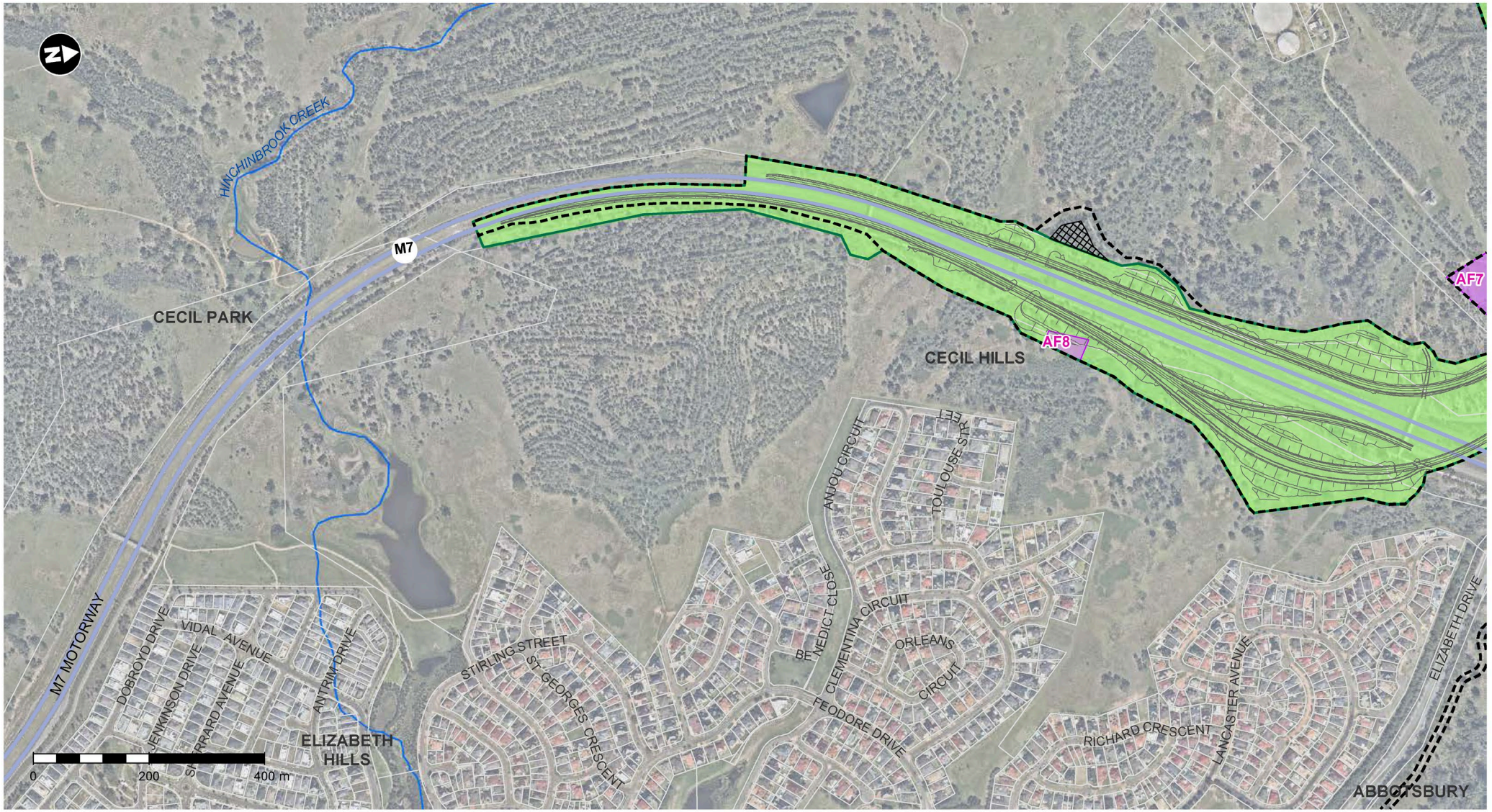


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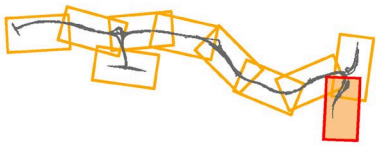

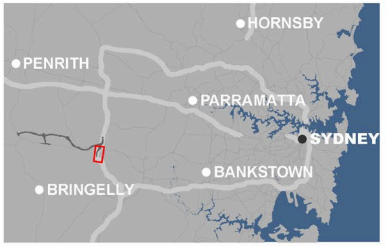


Figure 5-5 Operational and construction footprints for the project



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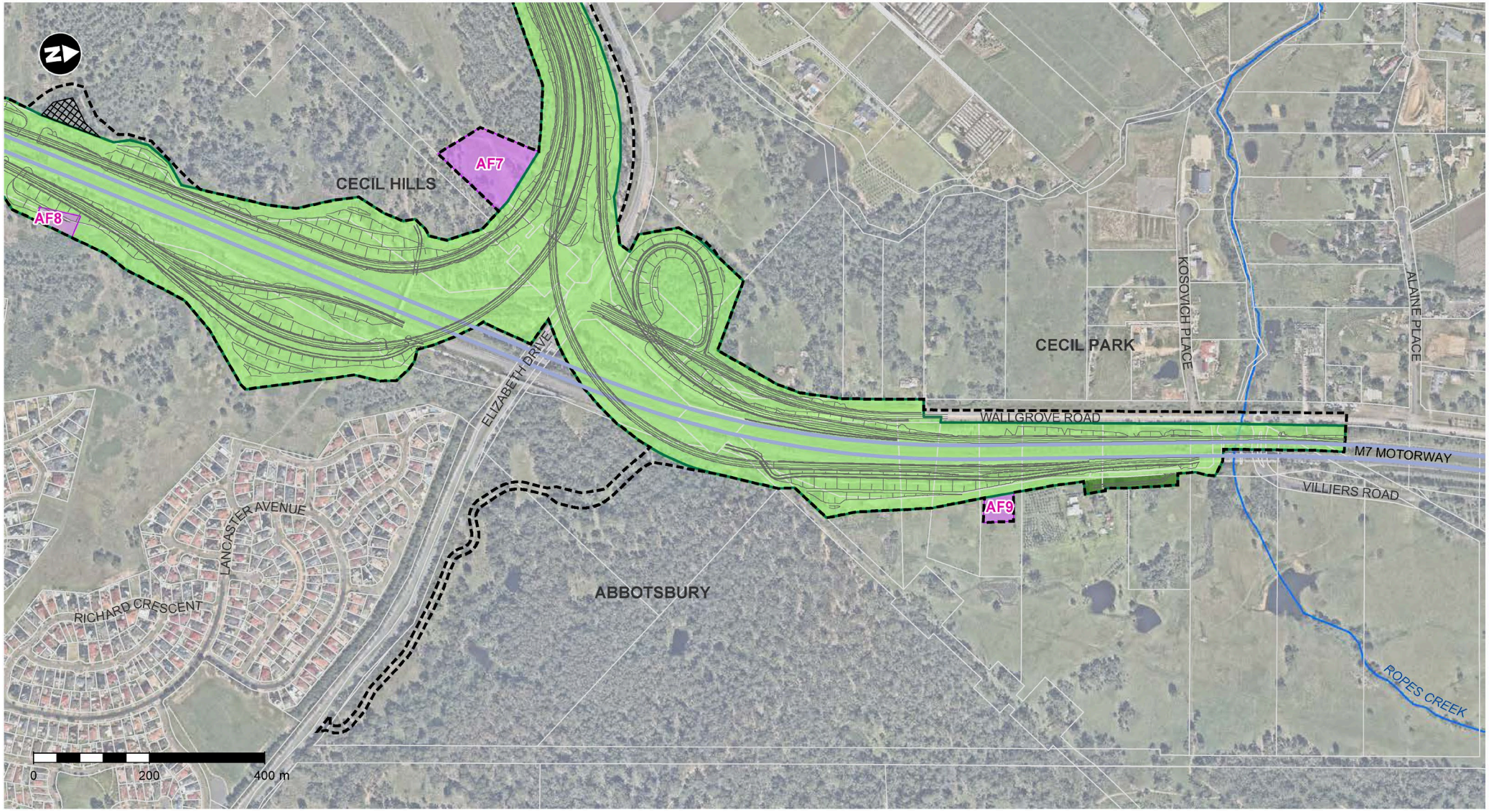


Figure 5-5 Operational and construction footprints for the project



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Several pavement options may be suitable for the main carriageway, such as concrete pavement, dense graded asphalt (DGA), or open graded asphalt (OGA). The choice of pavement type would be based on material availability, local experience, noise mitigation and whole of life cost.

The project involves some adjustments to local roads (both widening and realignment). Widened pavement is required to match the existing pavement composition, as a minimum, subject to satisfying the pavement design life requirements (20 years).

Pavements would be designed to minimise material wastage, and would include reusing or recycling pavement where practicable. Should asphalt be used, the specification that would be used for the project would allow for the incorporation of recycled asphalt into the pavement mixture.

## 5.10 Intersections and interchanges

The project was designed with direct connections to main roads, and not to preclude future connections with local roads including to Mamre Road and Devonshire Road. The project includes three key intersections and interchanges, as shown in **Figure 5-1**:

- The M7 Motorway interchange – a grade-separated interchange to facilitate free-flowing connectivity between the M12 Motorway and the M7 Motorway
- The Western Sydney Airport interchange – a grade-separated interchange to facilitate free-flowing access between the M12 Motorway and the airport access road to the Western Sydney Airport
- The Northern Road intersection – an at-grade signalised intersection providing a connection between the M12 Motorway and The Northern Road allowing all left and right turning movements.

In addition to the new roadworks at intersections and interchanges, the project would also include the erection of tolling gantries at all entry and exit ramps to and from the M7 Motorway.

These intersections and interchanges are described in further detail below.

### 5.10.1 M7 Motorway interchange

The M12 Motorway interchange with the M7 Motorway would be a grade-separated interchange to provide a free-flowing connection to and from the M7 Motorway which, in turn, links to the wider Sydney motorway network that includes the M5 Motorway, the M4 Motorway and the M2 Motorway. The exit and entry ramps for this interchange are described below, along with the proposed treatment of the existing ramps to Elizabeth Drive. An artist's impression of the M7 Motorway interchange is presented in **Figure 5-6**.

#### *M7 Motorway northbound exit ramp*

The northbound exit ramp from the M7 Motorway to the M12 Motorway westbound would be a two-lane exit. An auxiliary lane about 300 metres long, and starting about 900 metres south of the existing exit to Elizabeth Drive, would be provided. The two-lane section of ramp would diverge from the M7 Motorway about 700 metres south of the existing exit to Elizabeth Drive. The ramp would run parallel to the M7 Motorway before curving to the west to merge with the M12 Motorway.

A new pedestrian and cycle footbridge would be provided, in line with the existing M7 Motorway pedestrian and cycle footbridge just south of Elizabeth Drive to span across the new exit ramp. This would maintain Western Sydney Parklands' connectivity with the M7 Motorway shared user path.

Note: Artist's impression, illustrating the anticipated final built urban design outcome in its setting with established vegetation at approximately 10 years after planting. Subject to change during detailed design.

Figure 5-6 Artists impression of the M7 Motorway interchange

The M7 Motorway northbound exit ramp would also include construction of a new bridge alongside the existing M7 Motorway bridges over an existing access way that passes under the M7 Motorway about 900 metres south of Elizabeth Drive.

The existing northbound M7 Motorway exit ramp to Elizabeth Drive would remain unchanged.

#### *M7 Motorway northbound entry ramp*

The entry ramp connecting the M12 Motorway eastbound to the M7 Motorway northbound would be a two-lane ramp from the M12 Motorway, bridging over Elizabeth Drive and Wallgrove Road. The entry ramp would merge with the M7 Motorway in about the same location as the existing Wallgrove Road connection to the M7 Motorway. The ramp would run parallel to the existing M7 Motorway lanes for about 400 metres before merging with the M7 Motorway through lanes. The M7 Motorway northbound entry ramp would also include the widening of an existing bridge over Villiers Road and an adjacent private property access, about 1.3 kilometres north of Elizabeth Drive.

The existing Wallgrove Road connection to the M7 Motorway, which also functions as the M7 Motorway entry ramp from Elizabeth Drive, would no longer exist in its current form. Wallgrove Road would be realigned, and a connection would be provided to the M7 Motorway via a loop ramp joining the M12 Motorway to the M7 Motorway entry ramp. Access from Elizabeth Drive to the M7 Motorway would be maintained via the realigned Wallgrove Road.

#### *M7 southbound exit ramp*

The southbound exit ramp from the M7 Motorway to the M12 Motorway westbound would diverge from the M7 Motorway about 360 metres north of the existing exit to Elizabeth Drive. The ramp would run parallel to the M7 Motorway before curving west and bridging over the M7 Motorway to form the start of the M12 Motorway westbound carriageway.

The existing southbound exit ramp from the M7 Motorway to Elizabeth Drive would remain unchanged. However, the existing shared user path running alongside the M7 Motorway in this location would need to be realigned slightly to accommodate the new exit ramp to the M12 Motorway. The existing shared user path would require relocation to the east for about two kilometres between Villiers Road and south of Elizabeth Drive. The relocated path would tie into the existing M7 Motorway shared user path north and south of Elizabeth Drive as shown in **Figure 5-1**.

#### *M7 southbound entry ramp*

The southbound entry ramp to the M7 Motorway from the M12 Motorway would be a two-lane ramp starting as a continuation of the M12 eastbound carriageway after the exit ramp to the M7 Motorway northbound. It would curve to the south, passing under the M7 Motorway southbound exit ramp. It would then bridge over the existing Elizabeth Drive northbound exit, the M7 Motorway main alignment and the existing M7 Motorway shared user path.

The existing southbound entry ramp from Elizabeth Drive to the M7 Motorway would be slightly realigned to merge with the new M7 Motorway southbound entry ramp.

The ramp would also include a new bridge over an existing access way that passes under the M7 Motorway about 900 metres south of Elizabeth Drive.

### 5.10.2 Western Sydney Airport interchange

The Western Sydney Airport interchange would be located near the mid-point of the project and would provide a free-flowing connection to the airport access road. The exit and entry ramps for this interchange

are described below. An artist's impression of the Western Sydney Airport interchange is presented in **Figure 5-7**.

#### *M12 eastbound exit ramp*

The eastbound exit ramp from the M12 Motorway to the airport would be a single-lane ramp, leaving the motorway after the bridge over Cosgroves Creek. The ramp would diverge from the motorway and curve to the south, crossing over the M12 Motorway main alignment and merging with the airport access road.

#### *M12 eastbound entry ramp*

The eastbound entry ramp from the airport to the M12 Motorway would be a two-lane continuation of the airport access road northbound lanes, crossing over the M12 Motorway next to the eastbound exit ramp bridge. After it crosses over the M12 Motorway main alignment, it would curve to the west before looping back to the east to run parallel to the M12 Motorway for about one kilometre before merging with the main eastbound carriageway.

#### *M12 westbound exit ramp*

The westbound exit ramp from the M12 Motorway to the airport would be a two-lane exit, diverging from the M12 Motorway after the bridge over Badgerys Creek. The ramp would curve to the south to merge with the airport access road.

#### *M12 westbound entry ramp*

The westbound entry ramp from the airport would be a single-lane ramp, which would diverge from the airport access road about 700 metres north of Elizabeth Drive. The ramp would curve west to merge with the westbound carriageway of the M12 Motorway just before the bridge over Cosgroves Creek.

The Sydney Metro Greater West would cross the M12 Motorway about 400 metres east of the Western Sydney Airport interchange. Roads and Maritime is working with Sydney Metro to coordinate the details of this crossing between the two projects. The current design allows for the Sydney Metro alignment to pass under the M12 Motorway, but an option is being considered to lower the Western Sydney Airport interchange so the Metro can pass over the M12 Motorway. The preferred option would be confirmed and assessed as part of the submissions and preferred infrastructure report.

### 5.10.3 The Northern Road intersection

The M12 Motorway intersection with The Northern Road would be an at-grade intersection located at the western end of the project. The intersection would be signalised and would provide access to and from The Northern Road in all directions.

The key features of this intersection would include:

- A signalised intersection on The Northern Road – turning lanes would be provided to enter and exit the M12 Motorway in both directions
- Signal controlled pedestrian crossings across The Northern Road in an east–west direction – this would provide connectivity between the shared user path on the western side of The Northern Road and the shared user path on the southern side of the M12 Motorway.


Note: Artist's impression, illustrating the anticipated final built urban design outcome in its setting with established vegetation at approximately 10 years after planting. Subject to change during detailed design.

Figure 5-7 Artists impression of the Western Sydney Airport interchange

The Northern Road is being upgraded as part of the WSIP. Some enabling works at The Northern Road intersection with the M12 Motorway would be completed under The Northern Road project approval to ensure future work by the M12 Motorway project would minimise safety risks and traffic disruptions.

**Figure 5-1** shows those parts of the intersection that would be constructed as part of the upgrade of The Northern Road and those elements that would form part of this project. An artist's impression of The Northern Road intersection is presented in **Figure 5-8**.

## 5.11 Local road changes and upgrades

Several local roads would be affected by the project. Some of these roads would be overpassed while others would be intersected, upgraded or changed to ensure safe and efficient connections with the M12 Motorway.

Roads to be intersected, upgraded or changed to facilitate the project include the following:

- Wallgrove Road, Cecil Park
- Salisbury Avenue, Kemps Creek
- Clifton Avenue, Kemps Creek
- Elizabeth Drive, Badgerys Creek
- The Northern Road, Luddenham.

### 5.11.1 Road intersections and upgrades

#### *Wallgrove Road, Cecil Park*

Wallgrove Road would be realigned to the west from its intersection with Elizabeth Drive for about 600 metres. This would create space for the M12 Motorway to M7 Motorway northbound entry ramp. About 200 metres north of Elizabeth Drive an intersection would be provided to connect Wallgrove Road to the loop ramp on to the M7 Motorway northbound.

#### *Salisbury Avenue, Kemps Creek*

Salisbury Avenue is an existing no-through road. The road would end with a new cul-de-sac about 65 metres south of the existing cul-de-sac (to the south of the M12 Motorway).

#### *Clifton Avenue, Kemps Creek*

Clifton Avenue would be realigned from about 1200 metres north of Elizabeth Drive for about 800 metres. One lane in each direction would be provided running parallel to the southern boundary of the M12 Motorway. The northern section of Clifton Avenue would be realigned to overpass the M12 Motorway and connect to the realigned Clifton Avenue on the southern side of the M12 Motorway with a T-intersection.

This realignment would maintain connectivity to the properties on the northern side of the M12 Motorway. A new local access road would be provided parallel to the northern edge of the M12 Motorway to maintain access to properties previously serviced directly from Clifton Avenue.


Note: Artist's impression, illustrating the anticipated final built urban design outcome in its setting with established vegetation at approximately 10 years after planting. Subject to change during detailed design.

Figure 5-8 Artists impression of The Northern Road intersection

#### *Elizabeth Drive, Badgerys Creek*

Elizabeth Drive would be realigned and upgraded from about 1000 metres east of the airport access road for about 1800 metres and would bridge the airport access road and future Sydney Metro Greater West corridor. The upgrade would include three lanes in each direction, with allowance for future provision of intersections for two new access roads into the Western Sydney Airport on-site business parks, from Elizabeth Drive. Elizabeth Drive would revert to the existing single-lane in each direction at either side of the proposed intersections.

The cross section of the realigned Elizabeth Drive would accommodate the future upgrade of Elizabeth Drive and include parallel three-lane twin bridges. The full integration of the Elizabeth Drive design and airport access intersection would be considered as part of the Western Sydney Airport design.

#### *The Northern Road, Luddenham*

The M12 Motorway would terminate at a signalised T-intersection with The Northern Road. Some enabling works for this intersection would be built as part of The Northern Road upgrade. The M12 Motorway project would connect to the intersection and include pavement works, installation of traffic signals and road signs, and line marking.

### 5.11.2 Local road overpasses

Where the project crosses over a local road on a bridge structure, no works are expected to be required on those roads. Roads that would be overpassed include the following:

- Range Road, Cecil Park
- Elizabeth Drive, Cecil Park
- Luddenham Road, Luddenham.

#### *Range Road, Cecil Park*

Range Road would be overpassed by the M12 Motorway about 350 metres south of its intersection with Elizabeth Drive. The existing alignment and level of Range Road would be maintained, with the M12 Motorway passing over on a bridge.

#### *Elizabeth Drive, Cecil Park*

Elizabeth Drive would be overpassed by the M12 Motorway about 100 metres west of the existing roundabout intersection of Elizabeth Drive and Mamre Road. The existing alignment and level of Elizabeth Drive would be maintained, with the M12 Motorway passing over on a bridge. The proposed bridge would be long enough to allow any future upgrade of Elizabeth Drive to underpass the bridge without modification.

#### *Luddenham Road, Luddenham*

Luddenham Road would be overpassed by the M12 Motorway about 1500 metres north of its intersection with Elizabeth Drive. The existing alignment and level of Luddenham Road would be maintained with the M12 Motorway passing over on a bridge. The proposed bridge would be long enough to allow any future upgrade of Luddenham Road to underpass the bridge without modification.

## 5.12 Bridges

The project would include 19 bridge structures (see **Figure 5-9**). The potential details of the bridges are summarised in **Table 5-6**, and include the following structure types:

- Multi-span precast concrete Super-T girder
- Precast segmental box girder
- Incrementally launched concrete box girder
- Voided slab structure
- Cast in-situ box girder
- Precast plank girder
- Composite steel box girder
- Steel truss shared user path bridge.

The urban design of the proposed bridges is detailed further in **Section 7.3**. The design of bridges would not preclude accessibility to the creek lines for active transport and potential future north/south pedestrian connectivity.

All bridge details are based on the design as set out in this document and are subject to change during detailed design.

Cross sections and an image of each bridge type are provided in **Figure 5-10** to **Figure 5-15**.

Table 5-6 Description of proposed bridges

| Bridge reference and location | Description | Indicative structure type | Indicative length and width |
|---|---|---|---|
| **BR01**<br>Bridge over Luddenham Road | A combined westbound and eastbound bridge is proposed over Luddenham Road, Luddenham.<br>The bridge width would accommodate the main alignment and a shared user path on the southern side.<br>The bridge would maintain a vertical clearance of at least 5.4 metres over Luddenham Road and the structure would be long enough to accommodate the existing Luddenham Road and about 45 metres of flood opening on the western side of Luddenham Road. | Multi-span precast concrete Super-T girder<br>An example of this structure is presented in **Figure 5-10** | L = about 135 m<br>W = about 28 m |
| **BR02**<br>Bridge over Cosgroves Creek | A combined westbound and eastbound bridge is proposed over Cosgroves Creek, Luddenham.<br>The bridge width would accommodate the main alignment and a shared user path on the southern side.<br>The bridge structure would be long enough to accommodate about 110 metres opening for flooding. | Multi-span precast concrete Super-T girder<br>An example of this structure is presented in **Figure 5-11** | L = about 140 m<br>W = about 28 m |

| Bridge reference and location | Description | Indicative structure type | Indicative length and width |
|---|---|---|---|
| **BR03**<br>Airport access road overbridges | Twin bridges are proposed for the airport access road to pass over the M12 Motorway at the Western Sydney Airport Interchange.<br>The bridge widths would accommodate the airport interchange eastbound ramps and a shared user path on the eastern side.<br>The bridges would provide a vertical clearance of at least 5.4 metres over the M12 Motorway. | Multi-span precast concrete Super-T girder<br>An example of this structure is presented in **Figure 5-12** | L = about 88 m<br>W = about 10.5 m and 12.5 m |
| **BR04**<br>Twin bridges on Elizabeth Drive over airport access road and Sydney Metro Greater West | Twin bridges are proposed for Elizabeth Drive to pass over the airport access road, shared user path and proposed Sydney Metro Greater West corridor.<br>The bridge width would accommodate the Elizabeth Drive traffic lanes and a potential future shared user path that may be built as part of a future Elizabeth Drive upgrade.<br>The bridges would provide a vertical clearance of at least 5.4 metres over the airport access road and at least 6.5 metres vertical clearance over the proposed Sydney Metro Greater West corridor. | Precast concrete Super-T girder or pre-cast concrete segmental construction method<br>An example of this structure is presented in **Figure 5-13** | L = about 130 m<br>W = about 2 x 17 m |
| **BR05**<br>Twin bridges over Badgerys Creek | Westbound and eastbound bridges are proposed over Badgerys Creek.<br>The bridges would incorporate the main alignment and the shared user path on the northern side of the eastbound (northern) bridge. The bridges would be long enough to accommodate about a 250 metre opening for flooding.<br>Minor creek modification or realignment may be required to maintain an open creek channel between the bridge piers. | Multi-span precast concrete Super-T girder<br>An example of this structure is presented in **Figure 5-11** | L = about 252 m<br>W = about 11 m and 16.5 m |
| **BR06**<br>Twin bridges over South Creek | Westbound and eastbound bridges are proposed over South Creek.<br>The bridges would incorporate the main alignment and the shared user path on the northern side of the eastbound (northern) bridge. The bridges would be long enough to accommodate about 520 metres opening for flooding.<br>Minor creek modification or realignment may be required to maintain an open creek channel between the bridge piers.<br>The existing private access bridge over South Creek (on private land) is proposed to be demolished and replaced with a similar bridge to the south of the M12 Motorway. | Multi-span precast concrete Super-T girder<br>An example of this structure is presented in **Figure 5-11** | L = about 562 m<br>W = about 11 m and 16.5 m |

| Bridge reference and location | Description | Indicative structure type | Indicative length and width |
|---|---|---|---|
| **BR07**<br>Clifton Avenue overbridge | Clifton Avenue is proposed to be realigned with a new north–south bridge crossing over the M12 Motorway.<br>The bridge would provide at least 5.4 metres vertical clearance above the M12 Motorway and be wide enough to accommodate the main alignment and a shared user path on the eastern side. | Multi-span precast concrete Super-T girder<br>An example of this structure is presented in **Figure 5-12** | L = about 66 m<br>W = about 16.5 m |
| **BR08**<br>Twin bridges over Kemps Creek | Westbound and eastbound bridges are proposed over Kemps Creek.<br>The bridges would incorporate the main alignment and the shared user path on the southern side of the westbound bridge. The bridges would be long enough to accommodate about 220 metres opening for flooding.<br>Minor creek modification or realignment may be required to maintain an open creek channel between the bridge piers. | Multi-span precast concrete Super-T girder<br>An example of this structure is presented in **Figure 5-11** | L = about 244 m<br>W = about 11 m and 19 m |
| **BR09**<br>Twin bridges over Elizabeth Drive | Westbound and eastbound bridges are proposed on the M12 Motorway to cross over the existing Elizabeth Drive at Kemps Creek.<br>The westbound bridge would be wide enough to accommodate the main alignment and the shared user path on the southern side. Vertical clearance of at least 5.4 metres would be provided over Elizabeth Drive.<br>The bridges would be long enough to provide for a potential future upgrade and widening of Elizabeth Drive. | Voided slab or precast concrete segmental construction method<br>An example of this structure is presented in **Figure 5-10** | L = about 130 m<br>W = about 11m and 16.5 m |
| **BR10**<br>Twin bridges over Range Road | Westbound and eastbound bridges are proposed over Range Road, Cecil Park.<br>The bridges would be long enough to span over Range Road with allowance for a potential future path on the western side of Range Road.<br>The shared user path would be on the southern side of the westbound (southern) bridge. | Multi-span precast concrete Super-T girder<br>An example of this structure is presented in **Figure 5-10** | L = about 77 m<br>W = about 11 m and 19 m |
| **BR11**<br>Water reservoir and utilities access road overbridge | The existing water reservoir access road at Cecil Hills is proposed to be realigned with a new north–south bridge crossing over the M12 Motorway.<br>The bridge would provide at least 5.4 metres vertical clearance above the M12 Motorway and be wide enough to facilitate utility access requirements. | Multi-span precast concrete Super-T girder<br>An example of this structure is presented in **Figure 5-12** | L = about 63 m<br>W = about 6 m |

| Bridge reference and location | Description | Indicative structure type | Indicative length and width |
|---|---|---|---|
| **BR12**<br>Bridge over Elizabeth Drive to M7 northbound | A two-lane ramp bridge would be provided for the M12 Motorway to the M7 Motorway northbound entry ramp over the existing Elizabeth Drive at Cecil Park.<br>The bridge would provide at least 5.4 metres vertical clearance above Elizabeth Drive and be long enough to accommodate future widening of Elizabeth Drive. | Precast concrete segmental construction method or incrementally launched box girder.<br>An example of this structure is presented in **Figure 5-15** | L = about 71 m<br>W = about 11 m |
| **BR13**<br>Bridge over Wallgrove Road to M7 northbound | A two-lane ramp bridge would be provided for the M12 Motorway to the M7 Motorway northbound entry ramp over the re-aligned Wallgrove Road at Cecil Park. This would be located about 70 metres north of bridge BR12.<br>The bridge would provide at least 5.4 metres vertical clearance above Wallgrove Road. At least 6.1 metres was provided to allow for maintenance of an indicative steel structure. | Composite steel box girder<br>An example of this structure is presented in **Figure 5-10** | L = about 56 m<br>W = about 18 m (average) |
| **BR14**<br>Bridge over M7 for M7 southbound exit ramp to M12 | A two-lane ramp bridge would be provided for the M7 Motorway southbound exit ramp to the M12 Motorway.<br>The bridge would be long enough to cross over the existing M7 Motorway main alignment, existing Elizabeth Drive, existing M7 Motorway northbound exit ramp; and the (new) M7 Motorway southbound entry ramp.<br>Vertical clearance of at least 5.4 metres would be provided above all road crossings. | Precast concrete segmental construction method or incrementally launched box girder<br>An example of this structure is presented in **Figure 5-15** | L = about 680 m<br>W = about 12 m |
| **BR15**<br>Bridge over M7 for M12 to M7 southbound entry ramp | A two-lane ramp bridge would be provided for the M12 Motorway to the M7 Motorway southbound. The bridge would be long enough to cross over the existing M7 Motorway northbound exit ramp to Elizabeth Drive, the existing M7 Motorway southbound entry ramp and the M7 Motorway main alignment.<br>Vertical clearance of at least 5.4 metres would be provided above all road crossings. | Precast concrete segmental construction method or incrementally launched box girder.<br>An example of this structure is presented in **Figure 5-15** | L = about 440 m<br>W = about 12 m |
| **BR16**<br>Shared user path bridge over M7 northbound exit ramp | The existing M7 shared user path bridge at Cecil Hills would be lengthened to span over the proposed M7 Motorway northbound exit ramp.<br>Vertical clearance of at least 5.5 metres would be provided above the M7 Motorway northbound exit ramp. | Steel truss shared pedestrian and cycle bridge<br>An example of this structure is presented in **Figure 5-14** | L = about 46 m<br>W = about 4 m |

| Bridge reference and location | Description | Indicative structure type | Indicative length and width |
|---|---|---|---|
| **BR17**<br>Bridge over Cecil Hills underpass (road reserve) for M12 to M7 southbound entry ramp | A two-lane bridge would be provided along the M12 Motorway to M7 Motorway southbound entry ramp to the east of the existing M7 Motorway underpass at Cecil Hills (south of the existing Elizabeth Drive interchange).<br>The bridge would be of a similar form and provide similar clearance to the existing M7 Motorway underpass. | Multi-span precast concrete Super-T girder<br>An example of this structure is presented in **Figure 5-10** | L = about 47 m<br>W = about 10.5 m |
| **BR18**<br>Bridge over Cecil Hills underpass (road reserve) for M7 to M12 northbound exit ramp | A two lane bridge would be provided along the M7 Motorway to the M12 Motorway northbound exit ramp to the west of the existing M7 Motorway underpass at Cecil Hills.<br>The bridge would be of a similar form and provide similar clearance to the existing M7 Motorway underpass. | Multi-span precast concrete Super-T girder<br>An example of this structure is presented in **Figure 5-10** | L = about 47 m<br>W = about 10.5 m |
| **BR19**<br>Bridge over Villiers Road and Ropes Creek | The existing M7 Motorway bridge over Villiers Road and Ropes Creek, north of Elizabeth Drive, would be widened on its western side to accommodate the M12 Motorway to M7 Motorway northbound entry ramp.<br>The bridge would be of the same form as the existing bridge. | Multi-span precast concrete Super-T girder<br>An example of this structure is presented in **Figure 5-11**. However, BR19 would comprise only a single (northbound) structure, not a twin bridge as shown. | L = about 118 m |

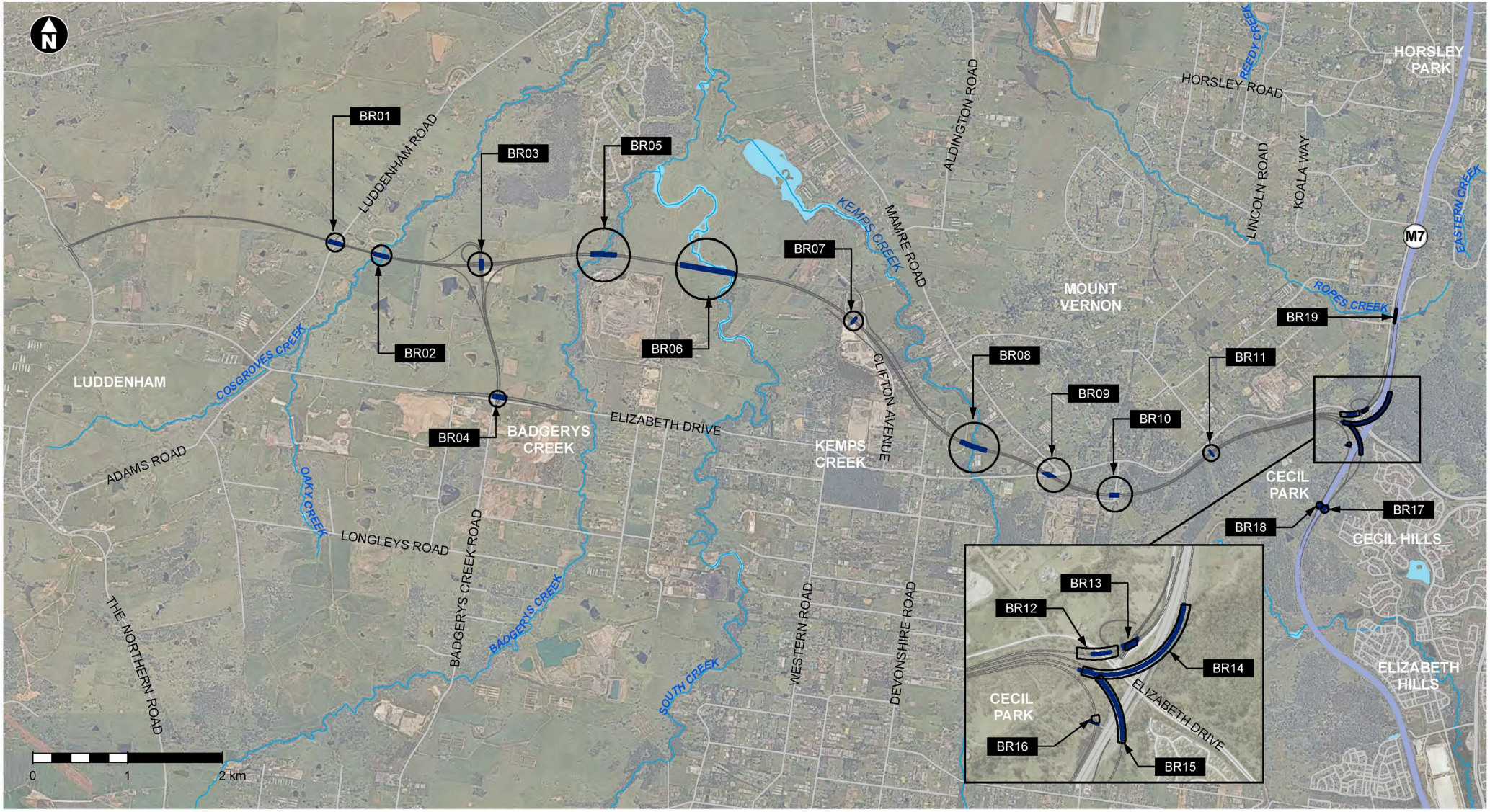


Figure 5-9 Project bridges

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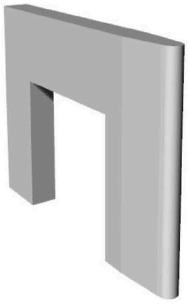
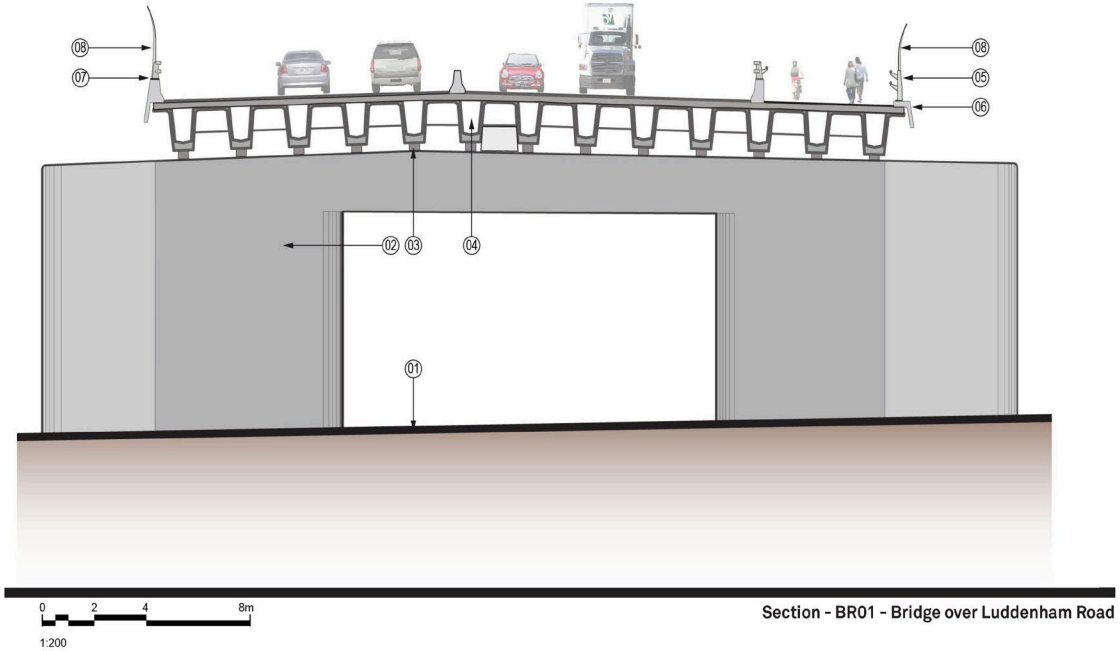
Created by : HK | QA by : AA

M12 over local roads

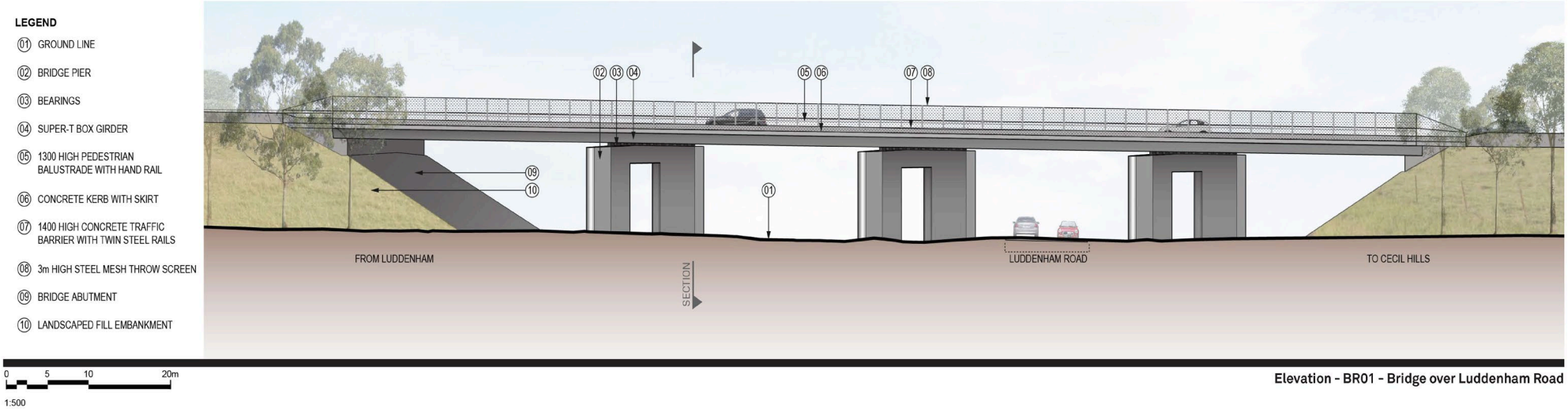
Newcastle Inner City Bypass - Shortland to Sandgate



Pier detail




Section - BR01 - Bridge over Luddenham Road




Elevation - BR01 - Bridge over Luddenham Road

Figure 5-10 Indicative cross section and image of BR01 and similar structures BR09, BR10, BR13, BR17 and BR18

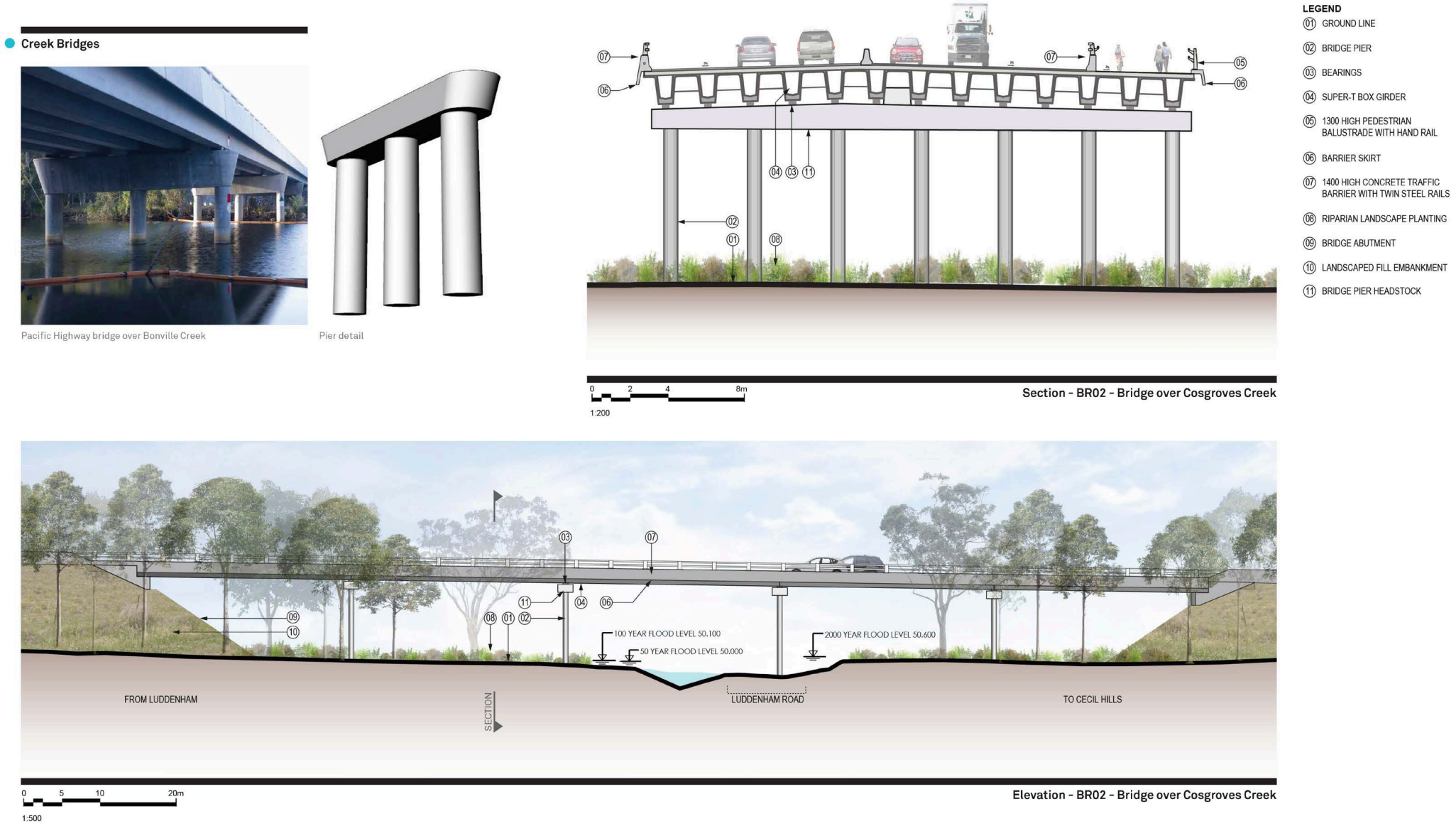



Figure 5-11 Indicative cross section and image of BR02 and similar structures BR05 BR06, BR08 and BR19

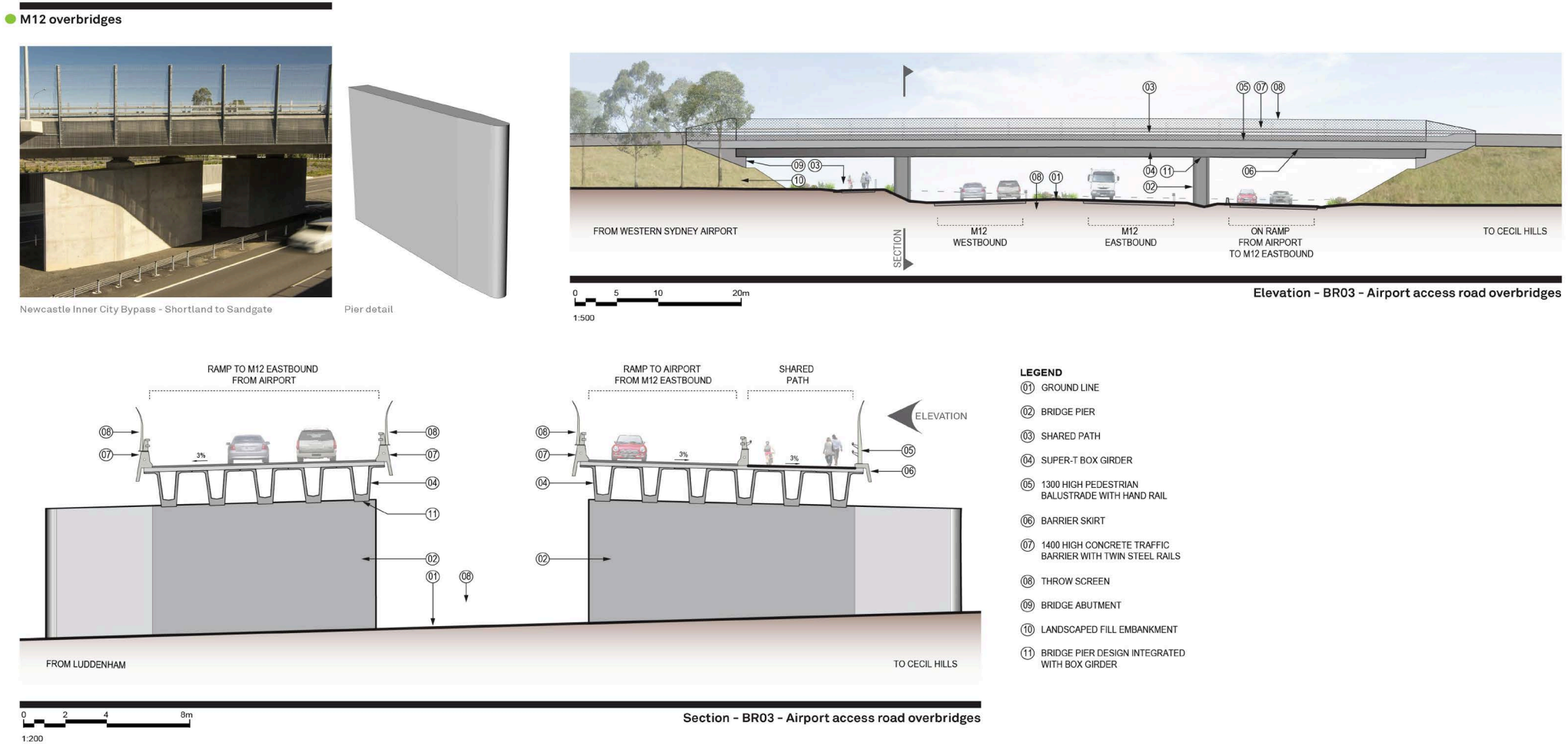



Figure 5-12 Indicative cross section and image of BR03 and similar structures BR07, and BR11

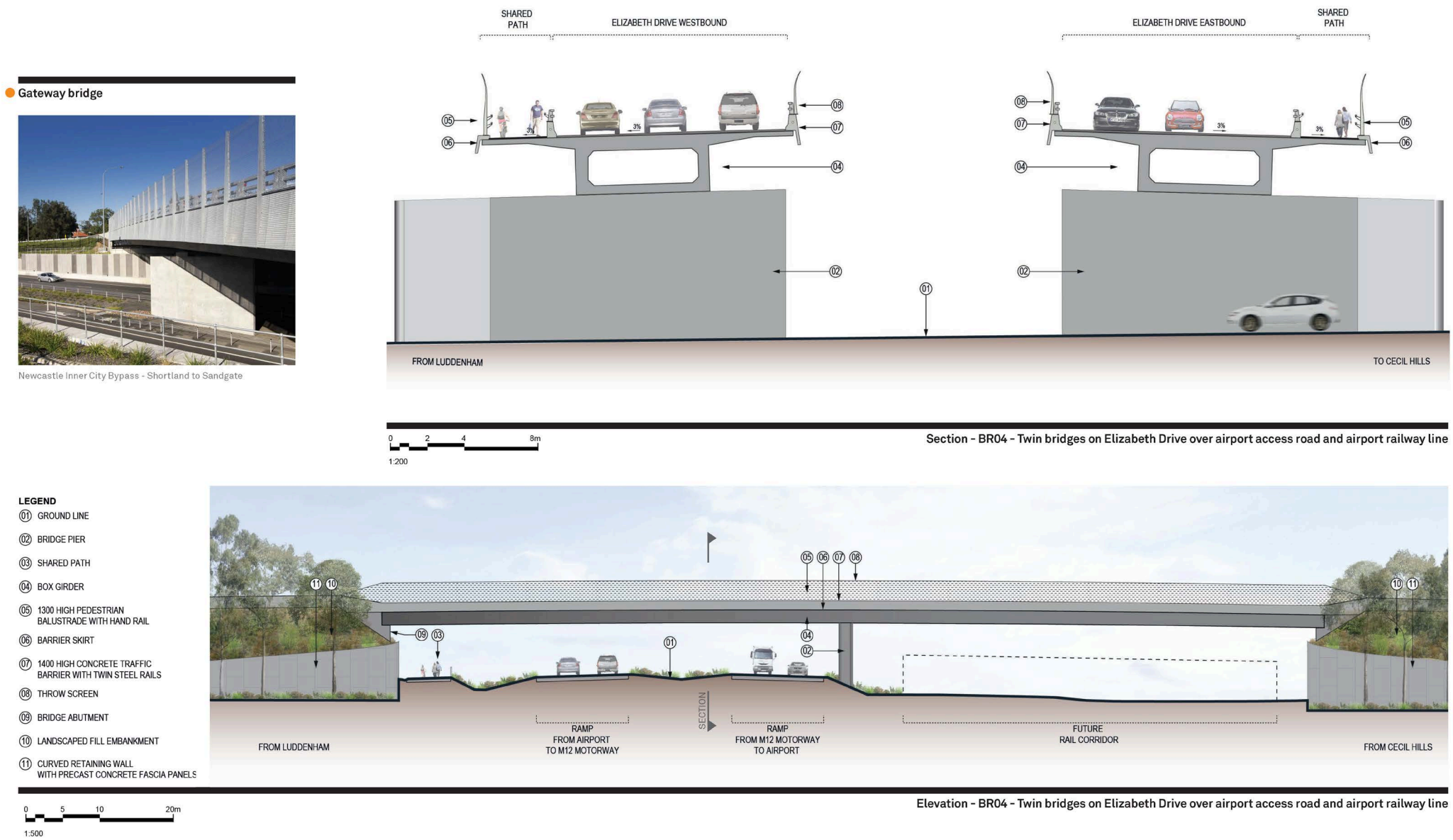



Figure 5-13 Indicative cross section and image of BR04

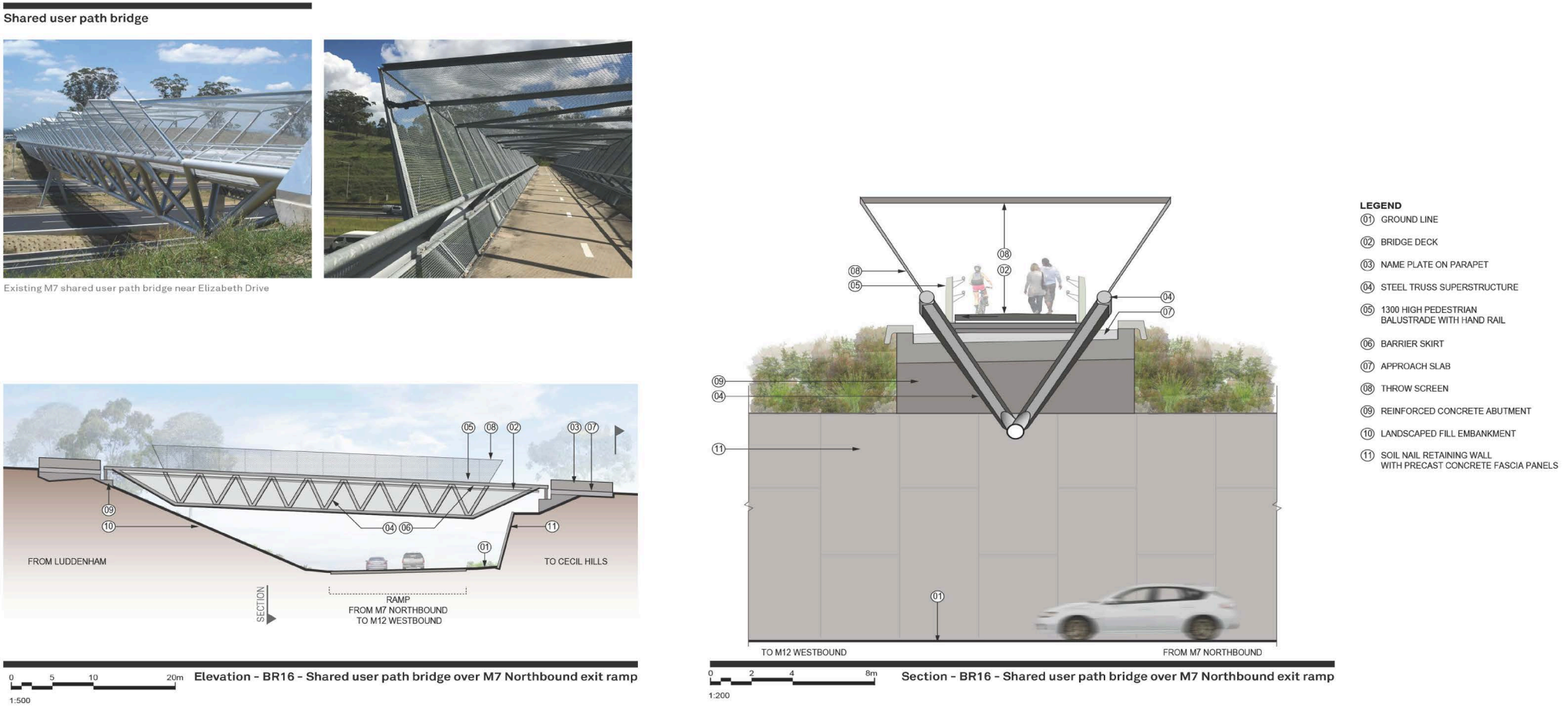



Figure 5-14 Indicative cross section and image of BR16

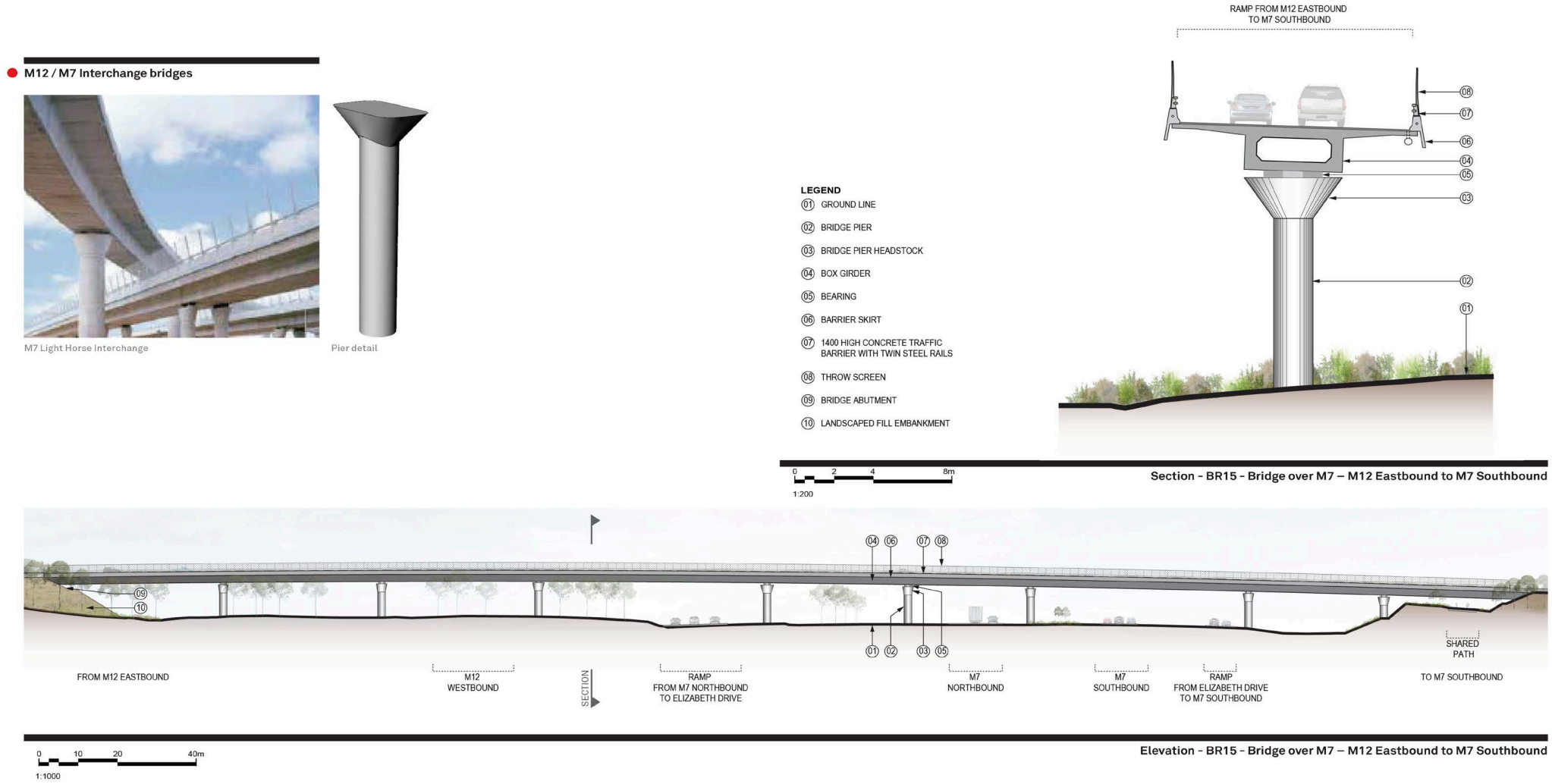



Figure 5-15 Indicative cross section and image of BR12 and similar structures BR14 and BR15

# 5.13 Water management

## 5.13.1 Drainage and stormwater management

### *Water management design criteria*

Drainage, stormwater management and flood mitigation infrastructure that would be installed or modified for the project are discussed below. This infrastructure would generally comply with criteria outlined in **Table 5-7**. The table shows the average recurrence interval, which is used to describe the frequency or probability of floods occurring, that would be managed by the various water management structures.

Table 5-7 Design criteria for water management structures

| Drainage infrastructure | Design criteria |
|---|---|
| Channels and open drains | 5-year ARI<br>(18.1 per cent annual exceedance probability (AEP)) |
| Piped system (including pits) | 10-year ARI (9.5 per cent AEP) |
| Culverts where surcharge is allowable | 50-year ARI (2 per cent AEP) |
| Structures where surcharge is undesirable | 100-year ARI (1 per cent AEP) |
| Nil width of flow spread onto traffic lanes1 | 10-year ARI (9.5 per cent AEP) |
| Gross pollutant traps | 1-year ARI (63.2 per cent AEP) |
| Pavement drainage wearing surface | 10-year ARI (9.5 per cent AEP) |
| Major storm event checks for no property damage | 100-year ARI (1 per cent AEP) |
| Major storm event checks for no structural damage | 2000-year ARI (0.05 per cent AEP) |
| Shared user path | 1-year ARI (63.2 per cent AEP) |
| Temporary Drainage | 2-year ARI (39.3 per cent AEP) |
| Permanent water quality basins | Designed to contain 20,000 litre spill |

[1] *Flow must not encroach into traffic lanes for the given event (ie it must be contained in the shoulder/gutter)*

### *Drainage stormwater and flood mitigation infrastructure*

In addition to the bridge structures outlined in **Section 5.11** that would carry the motorway over waterways and floodplains, numerous cross drainage structures are required to convey water under the motorway. These generally consist of concrete box culverts and pipes.

A strategy was developed to mitigate the impact of the project on flooding behaviour and scour potential and provide a minimum level of flood immunity to the M12 Motorway above the one in 100 year ARI. The final design and configuration of flooding infrastructure would be confirmed during detailed design.

An assessment of flooding is presented in **Section 7.8** and in **Appendix L**. In addition to the bridges discussed in **Section 5.11**, proposed flood management measures are outlined in **Table 5-8**.

Table 5-8 Summary of other[1] flood management measures

| Catchment | Proposed drainage strategy |
|---|---|
| Tributaries of Ropes Creek | About 17 multi-cell reinforced concrete pipe culverts up to 1500 millimetre diameter or box culverts up to 1800 millimetres x 1800 millimetres |
| Kemps Creek and tributaries | About 9 reinforced concrete pipe culverts up to 1500 millimetre diameter. |
| South Creek and tributaries | One three-cell 1500 millimetres diameter reinforced concrete pipe culvert |
| Tributaries of South Creek between The Northern Road and west of Luddenham Road | About six reinforced concrete pipe culverts sized between 900 millimetre diameter and 1050 millimetre diameter. |
| Cosgroves Creek and tributaries | About eight reinforced concrete pipe culverts sized between 450 millimetre diameter and about three similar culverts sized at 1350 millimetre diameter. |
| Badgerys Creek and tributaries | About eight single or multi cell reinforced concrete pipe culverts sized between 675 millimetre diameter and 1200 millimetre diameter. |

[1] *Bridges are discussed in **Section 5.12** and are not included in this table*

The drainage system for the motorway, ramps and local roads would be designed to meet criteria listed above and may include the following to ensure water quality is managed:

- Road surface runoff into adjacent basins or swales, including stormwater detention basins
- Drainage inlets and pipe networks
- Scour protection and/or energy dissipation
- Spill containment structures and water quality basins
- Reuse of existing drainage infrastructure at connections with existing roads.

Permanent water quality measures for the operational phase of the project are discussed further in **Section 5.13.2**.

Longitudinal road and pavement drainage (ie draining that runs lengthwise rather than across the motorway) would consist of drainage pits, pipes and open drains. These structures were designed to collect and convey stormwater runoff from the road pavement and to manage overland flow from surrounding catchments. They were designed to manage potential water quality impacts.

The proposed road drainage network would either connect to the existing council drainage network (in the case of local road adjustments) or discharge at defined locations to operational water quality management controls before discharging to waterways or existing overland flow paths.

Most of the motorway would be constructed in greenfield areas where there is no existing drainage system. In the areas where the motorway intersects with existing drainage systems, alterations or adjustments would be made to appropriately manage drainage from the motorway.

In addition, consideration of stormwater detention basins may be warranted, subject to further analysis during detailed design where there are more highly developed urban land uses situated in or close to minor drainage lines downstream of the project.

### 5.13.2 Operational water quality controls

A strategy to ensure an appropriate water quality outcome was developed for the project and forms the basis of the design criteria for drainage structures. The water quality objectives for the project are described in **Section 7.9** and **Appendix M**.

Permanent water quality measures for the operational phase of the project are outlined in **Table 5-9**.

Table 5-9 Operational water quality controls

| Control | Description | Indicative location | Benefits |
|---|---|---|---|
| Water quality basins | Water quality basins are stormwater detention systems that promote settlement of sediments by slowing down and temporarily detaining flows. | Water quality basins would be used where they can be accommodated within the operational footprint and the topography is not excessively steep. | Water quality basins remove total suspended solids, ie solids in water that can be trapped by a filter, and associated pollutants. |
| Vegetated swales | Vegetated swales are open channels that convey stormwater runoff and provide water quality treatment. | Vegetated swales would be used in various locations along the length of the project. | Vegetated swales achieve nutrient removal through the capture of suspended solids and nutrient uptake by plants. |
| Spill containment | Spill containment would be provided through the use of water quality basins. Basins would be designed to contain 20,000L spill. | Spill containment would be provided in areas considered to be sensitive receiving environments including:<br>• Cosgroves Creek<br>• Badgerys Creek<br>• South Creek<br>• Kemps Creek<br>• Ropes Creek<br>• Hinchinbrook Creek. | The water quality controls described in this table would use a combination of bunds, negatively graded pipes and baffle boards to trap spilled liquids (particularly hydrocarbons) while allowing stormwater to continue to be discharged during rain events. |

The majority of water quality treatment on the project would be implemented through vegetated swales designed to convey runoff to the receiving waterway or overland flow path. The vegetated swales would be designed and vegetated in accordance with water sensitive urban design principles.

The amount of water quality treatment would depend on the length and slope of the swale, with wider swales providing more opportunity for treatment. The swales would incorporate rock check dams to provide additional treatment by slowing down the runoff and allowing it to temporarily pond during storm events. An indicative cross section of a vegetated swale is shown in **Figure 5-16**.

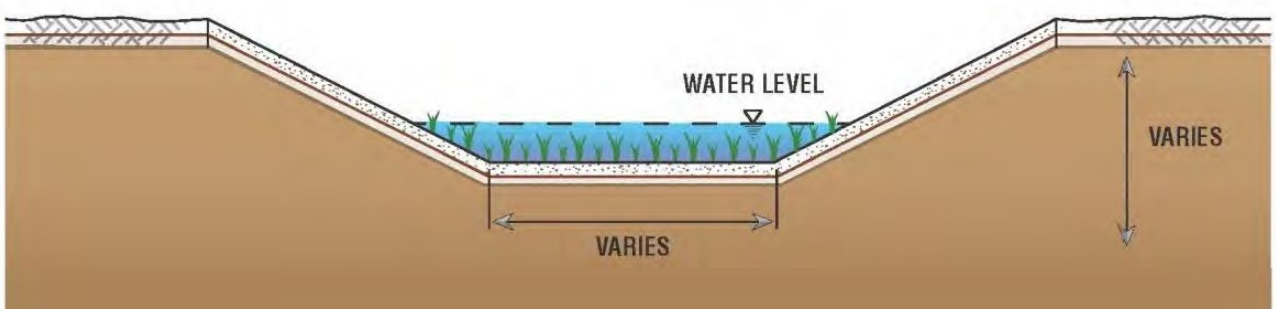



Figure 5-16 Indicative cross-section of a vegetated swale

Permanent water quality basins are proposed in locations where the receiving waterway is considered a sensitive receiving environment (see **Section 7.9**) or where there is insufficient space to accommodate a sufficiently long vegetated swale to provide the required level of water quality treatment. The proposed locations of permanent water quality basins are shown in **Figure 5-1**. The location, design and size of all permanent water quality basins would be subject to refinement during detailed design.

The water quality control measures that would be used for the project are discussed in more detail in **Section 7.9**, together with an assessment of water quality performance achieved by those controls.

Scour protection and/or energy dissipation measures (such as rock rip rap, rock mattress, geotextile layers) would be engineered during detailed design for the specific requirements of each culvert; where required, the engineered treatments would extend downstream from the culvert outlet to the project's operational boundary.

Water quality control measures that are proposed during construction, including temporary sedimentation basins, are described in **Section 5.24**.

### 5.13.3 Potential waterway adjustments

The permanent adjustment of waterways would be avoided where possible, but may be required at Kemps Creek, South Creek and Badgerys Creek. The potential extent of the adjustments of these creeks are shown in **Figure 5-17**, **Figure 5-18** and **Figure 5-19**.

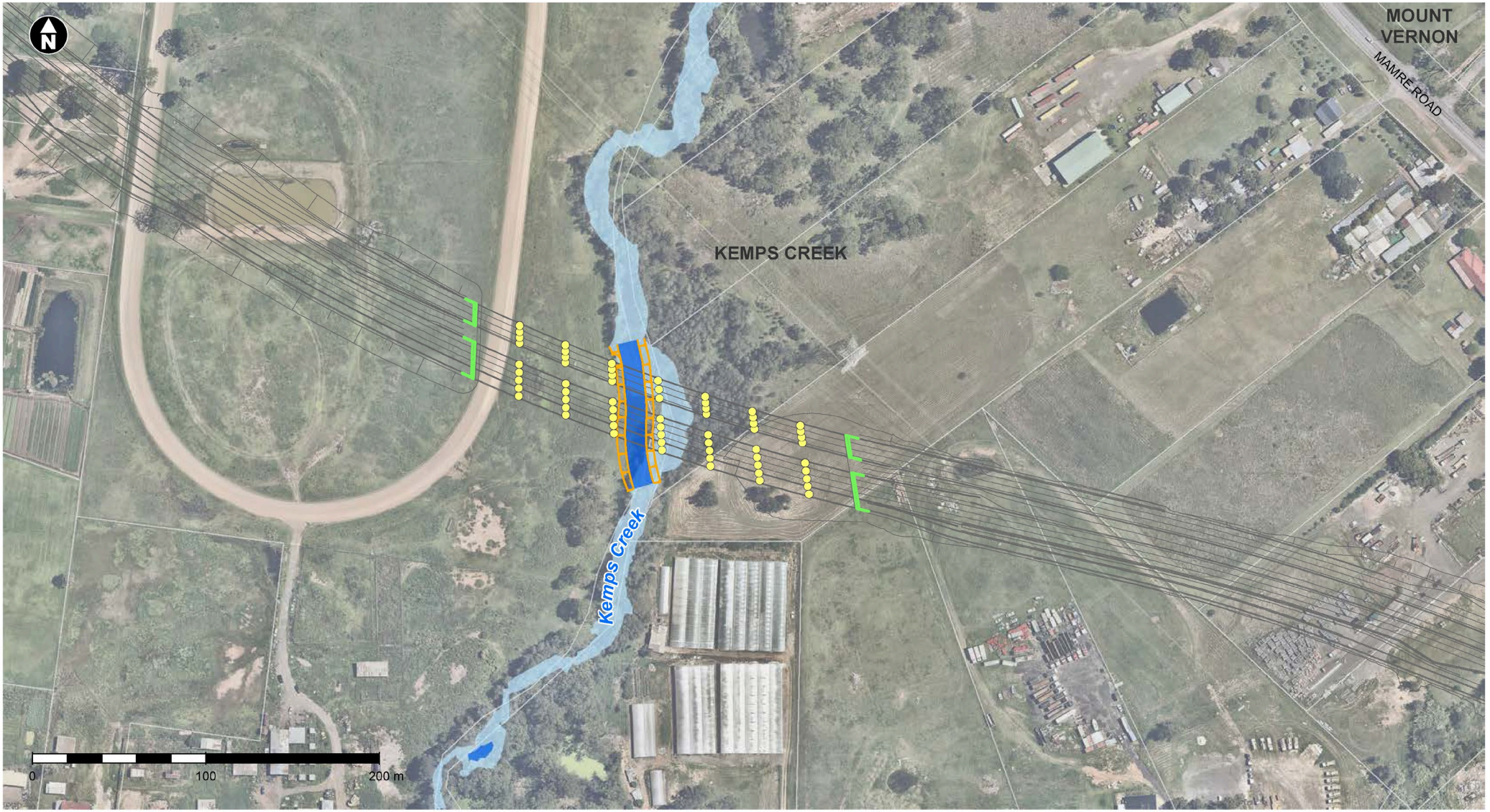
The potential creek adjustments may be required in order to:

- Reduce risk of erosion around bridge piers
- Coordinate with bridge pier locations
- Provide suitable flood conveyance
- Reduce the number of times the creeks would be disturbed during construction
- Minimise shading of the creeks.

The need for, extent and design of potential creek adjustments would be reconsidered during detailed design with the aim of minimising the adjustments to the natural creek alignment and form.

The potential creek adjustments would have a similar waterway capacity to the existing creek channels and would be designed as far as practicable in a way that mimics natural flow conditions. The creek corridors would be vegetated with native riparian vegetation suitable for the local area, in accordance with the requirements of the policy and guidelines for fish habitat conservation and management (NSW Department of Primary Industries, 2013). The creek channels would be rehabilitated following active construction works in accordance with the landscape plans for the project.

The potential creek adjustments are discussed in more detail in **Section 7.9** and potential ecological impacts are assessed in **Section 7.1**.




The project
Cadastre
Existing creek alignment
Proposed creek adjustment

**Proposed creek realignment**
Bridge piers
Bridge abutments
Earthworks associated with proposed creek realignment

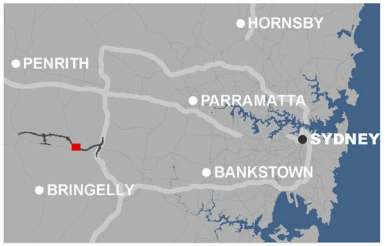



Figure 5-17 Kemps Creek adjustment

**Data sources**
Existing creek alignment, cadastre
- DFSI Spatial Services, NSW

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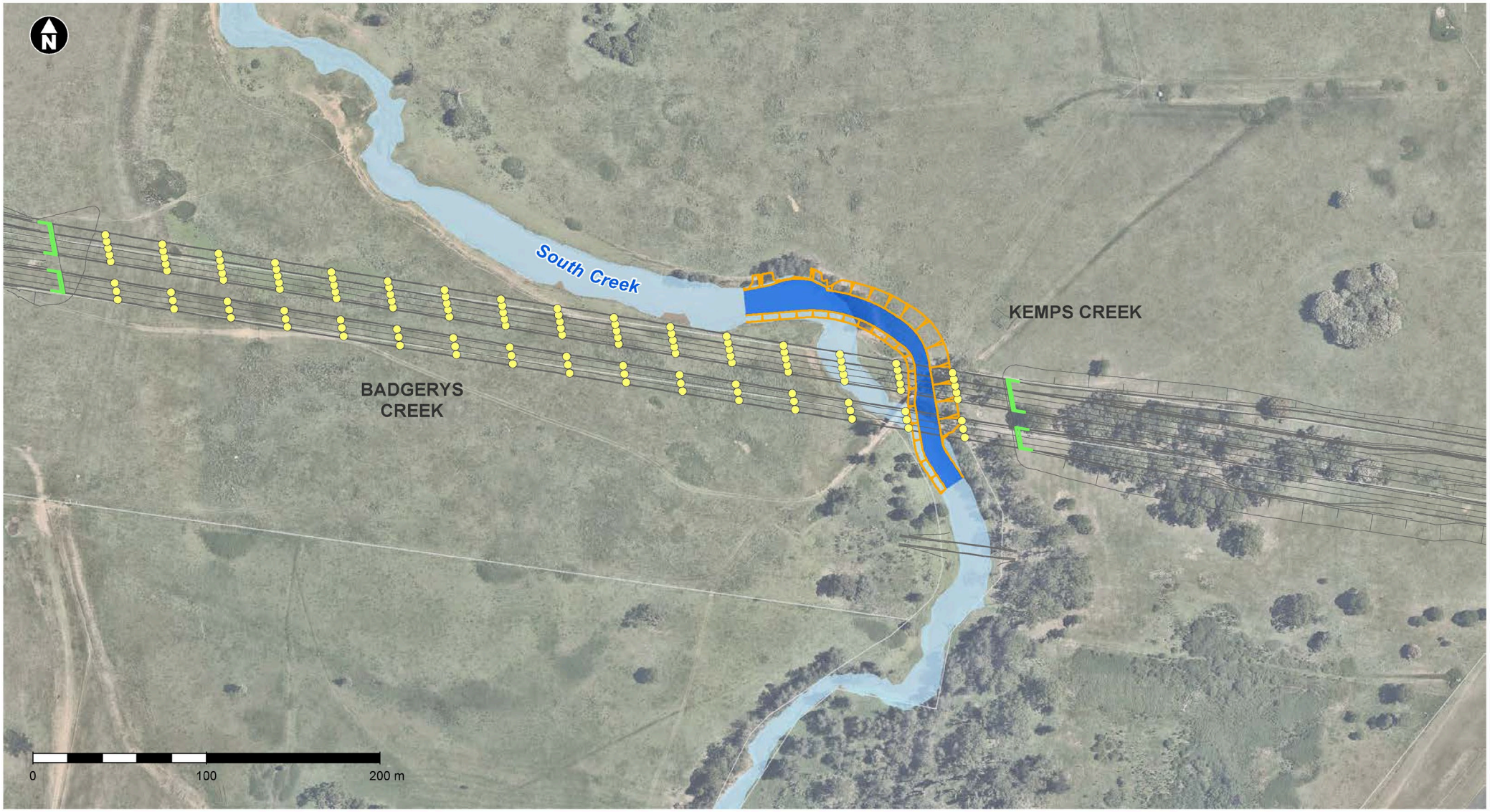


Figure 5-18 South Creek adjustment

**Data sources**
Existing creek alignment, cadastre
- DFSI Spatial Services, NSW

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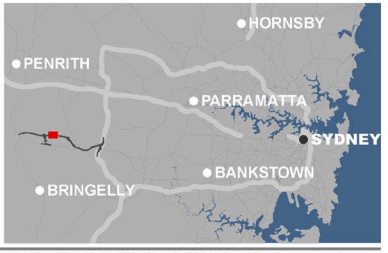
Created by : AA | QA by : ZW


The project
Cadastre
Existing creek alignment
Proposed creek adjustment

**Proposed creek realignment**
Bridge piers
Bridge abutments
Earthworks associated with proposed creek realignment




**Data sources**
Existing creek alignment, cadastre
- DFSI Spatial Services, NSW

Figure 5-19 Badgerys Creek adjustment

Date: 28/06/2019 Path: J:\IE\Projects\04_Eastern\IA145100\08 Spatial\GIS\Directory\Templates\MXDs\Figures\EIS\Chapters\Chapter5_ProjectDescription\FinalEIS\JAJV_EIS_Chap5_F004_CreekRealignments_r5v1.mxd
Created by : AA | QA by : ZW

## 5.14 Fencing (including fauna exclusion fencing)

Fencing would be provided for the full length of the M12 Motorway along the boundary of the Roads and Maritime road reserve. Two types of fencing would be used; fauna exclusion fencing and controlled access fencing. The precise locations and extents of the fencing are subject to detailed design. However, fences would generally be installed according to the following requirements:

- Fauna exclusion fencing – This would be installed about 150 metres either side of the creeks and along the southern boundary of the M12 Motorway within the Western Sydney Parklands. The fencing would funnel fauna toward the creeks and prevent fauna from accessing the motorway. Where the fauna fencing ends, a fence return would be included to direct fauna away from the motorway.
- Controlled access fencing – This would be installed along the Roads and Maritime road reserve boundary in any locations where fauna exclusion fencing is not used. The controlled access fence would integrate with the adjacent land use and is intended to separate the motorway from local roads and nearby private properties to prevent unauthorised access to the motorway.

## 5.15 Cuttings and embankments

Cuttings would generally have a slope of two (horizontal) to one (vertical) (about 27 degrees). Benches (flat steps in the slope) would be provided at regular intervals (generally every seven to 10 metres) to improve the stability of deep cuttings.

Where space permits embankments would have a slope of 4 (horizontal) to 1 (vertical) (about 14 degrees) up to a height of 2.5 metres. Embankments above a height of 2.5 metres would have steeper slopes at two (horizontal) to one (vertical) (about 27 degrees) to reduce the overall footprint. Benches would be provided at regular intervals (generally every 10 metres) to improve the stability of high embankments.

Cuttings and embankments are shown in **Figure 5-1**. The cuttings are subject to change following geotechnical analysis and design development. The location and dimension of cuttings and embankments would be confirmed during detailed design.

The depth of cuttings would vary, with the deepest cut expected to be about 32 metres, where the project is proposing to widen an existing cut to the west of the M7 Motorway. Embankments would range in height up to about 13 metres. Large cuttings and embankment fills are not proposed along local roads.

Where space is limited or there is a need to reduce land take or vegetation clearing, retaining walls would be constructed in place of earthworks batters to minimise the project footprint. This would be confirmed during detailed design.

## 5.16 Roadside furniture, line marking and lighting

Roadside furniture, line marking and lighting infrastructure that would be installed or modified for the project are discussed below.

### 5.16.1 Safety barriers

Safety barriers would be provided in the following instances:

- At the top of embankment batter slopes equal to or steeper than 2 (horizontal) to 1 (vertical)
- On approach to bridges

- At median cross overs
- At bridge piers in the median
- At drainage headwalls
- At water quality basins
- At retaining walls
- At large, non-frangible, traffic signs
- At other objects within the clear zone that are considered a hazard (ie non-frangible/non-traversable).

Four potential types of safety barrier are proposed:

- Four-rope wire rope safety barriers
- Single sided concrete barriers
- Double sided concrete barriers
- Steel safety barriers.

### 5.16.2 Line marking

Line marking would be provided in accordance with Roads and Maritime design and construction specifications.

The proposed line marking would comprise longitudinal markings (lane lines, edge lines, continuity lines), transverse markings (stop/hold lines, give way lines), posted speed numerals and pavement arrows to provide clear driver information. Symbols, lettering and numerals would be clearly drawn at a size that is easily readable from a distance while travelling at the nominated speed limit.

Line marking for the shared user path would also be provided, in accordance with TfNSW and Roads and Maritime guidelines.

### 5.16.3 Signposting

The signposting scheme for the project would provide clear and unambiguous direction and information to motorists, achieving a safe and compliant design. Signs would be installed to enforce road rules and regulations, indicating items such as the direction of travel, posted speed limits, and parking restrictions. Directional signs would also be provided to advise of key destinations, places of interest and through routes.

Variable messaging and speed limit signs would be an integral part of the overall signposting strategy and would be erected on the M12 Motorway for synchronised and integrated operation with variable messaging signs across the broader road network.

Additional variable information signs and variable speed signs would be provided as outlined in **Section 5.17**.

### 5.16.4 Lighting

Lighting would be provided in the following locations for the project:

- At entry and exit ramp merge and diverge areas at the Western Sydney Airport interchange
- At entry and exit ramp merge and diverge areas at the M7 Motorway interchange
- For 500 metres along the M12 Motorway in advance of The Northern Road intersection

- At the Elizabeth Drive realignment over the airport access road (consideration would be given to lighting types and pole heights in accordance with the airport's obstacle limitation surfaces and safe lighting requirements)
- Along the full length of the shared user path.

The project would comply with CASA requirements for lighting near airports.

## 5.17 Operational ancillary facilities and traffic management

Systems for monitoring and managing traffic would include variable message signs, closed circuit television (CCTV), traffic sensors and power and communications backbone cabling for the provision of intelligent transport systems.

### 5.17.1 Speed and lane use management

Integrated speed limit and lane use signs (ISLUS) would be provided on lightweight gantry structures and variable speed limit signs would be installed in pairs on roadside posts. Gantries would be provided in and adjacent to the Western Sydney Airport interchange to support effective incident management at this interchange.

Along the rest of the length of the M12 Motorway, variable speed limit signs (VSLS) would be provided at nominal 1000 metres spacing to act as lead-in to lane control around the Western Sydney Airport interchange and to manage speed along the length of the operational footprint. Designs for the ISLUS and VSLS are provided in **Figure 5-20** and **Figure 5-21**. Designs are subject to change during detailed design.

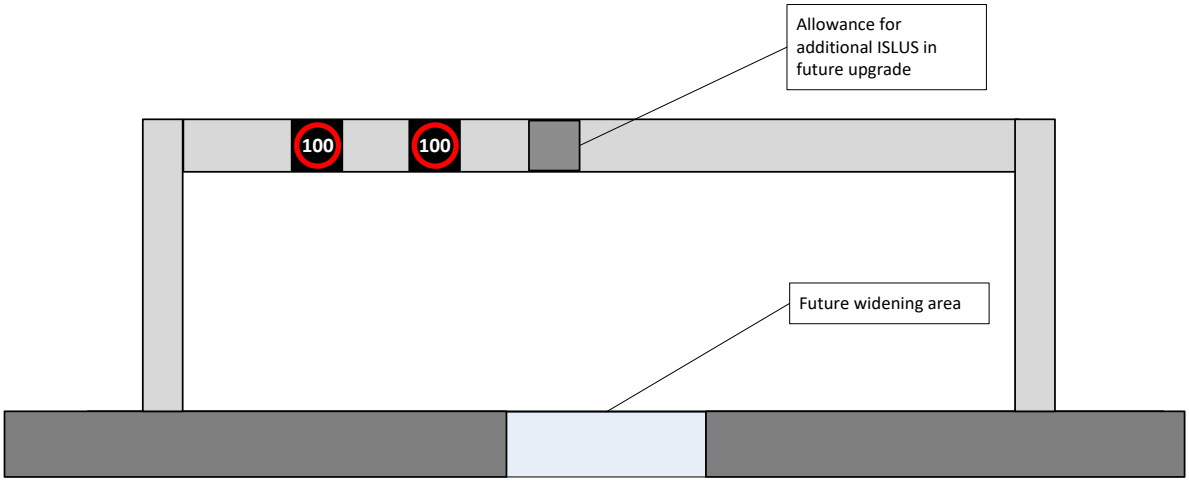



Figure 5-20 Gantry at select locations along the M12 Motorway

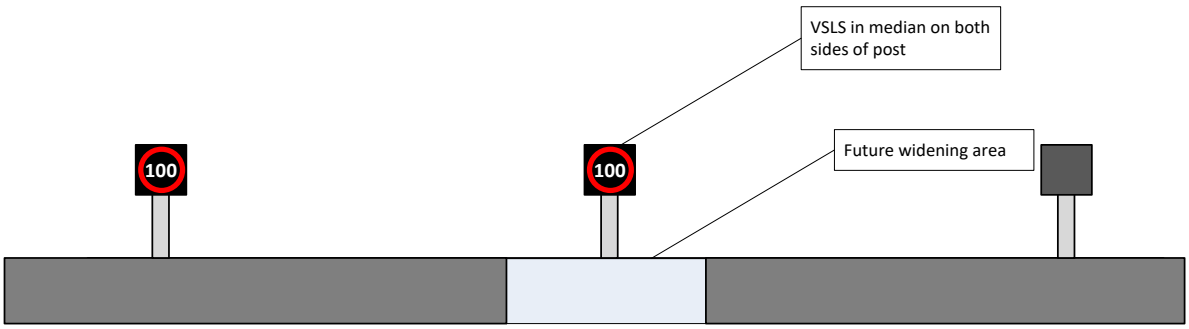



Figure 5-21 Post-mounted variable speed limit signs

## 5.17.2 Flow monitoring

In-pavement vehicle detector loops would be provided to monitor traffic flow and perform functions including motorway performance monitoring and travel-time calculations. Loop detector sites would be positioned 10 metres downstream of integrated speed limit and lane use signs and variable speed limit sign sites and would be supported from the same roadside cabinet as the integrated speed limit and lane use signs or variable speed limit signs. Additional monitoring sites are required to support ramp metering functionality. These sites would be installed as part of any future ramp metering deployment.

## 5.17.3 Traveller information – variable message signs

Variable message signs would provide real-time information at strategic or important decision making locations to inform motorway users about current or future road conditions. The M12 Motorway would be provided with variable message signs in advance of each decision point (exit) on the motorway. Variable message signs would be mounted on dedicated cantilever structures with adjacent stopping bays.

## 5.17.4 Ramp metering

Space would be provided for future ramp metering at the following locations:

- M7 Motorway northbound entry ramp
- M7 Motorway southbound entry ramp.

Ramp metering would be implemented in the future when required by the traffic volumes.

## 5.17.5 Video surveillance: closed circuit television

The M12 Motorway would be equipped with 100 per cent overlapping closed circuit television (CCTV) coverage of the motorway. This means that if any single camera fails within the operational footprint, no coverage is lost as adjacent cameras can cover the area without the failed camera. A Pan Tilt Zoom CCTV camera would be provided at each integrated speed limit and lane use sign and additional cameras would be provided around interchanges. This level of deployment would facilitate viewing of any intelligent transport system device or sign face during any single camera failure, based upon each camera having a useful viewing range of up to 1.5 kilometres.

### 5.17.6 Intelligent transport system

Power and communications cabling would be installed along the length of the project to connect and operate the infrastructure required to support the implementation of an intelligent transport system in the future.

## 5.18 Emergency or incident facilities

Emergency crossovers and heavy vehicle stopping bays would be provided at required intervals and would be appropriately located where road geometry allows for suitable visibility and sufficient space for vehicles.

Emergency cross overs would be provided at the following locations:

- About 3.1 kilometres east of the intersection with The Northern Road
- About 1.2 kilometres west of the M12 Motorway overpass of Clifton Avenue
- About 200 metres east of the M12 Motorway overpass of Elizabeth Drive
- About 500 metres north of the Elizabeth Drive overpass of the airport access road.

Emergency telephone bays would be provided at each integrated speed limit and lane use sign location. Each bay would be designed to allow a car to park clear of the motorway shoulder and safely access the emergency telephone.

The proposed locations of emergency cross overs and breakdown bays are shown in **Figure 5-1**.

## 5.19 Noise mitigation

Noise mitigation would be installed where measures are required to address noise impacts associated with operation of the M12 Motorway. The need for, type and location of potential mitigation measures would be reviewed as part of detailed design with due consideration for the provision of measures that are reasonable and feasible given the benefits expected.

The implementation of treatments would be carried out in accordance with Roads and Maritime guidelines and may include low-noise pavements, noise barriers or at-property treatments. The noise assessment carried out for the project and preliminary discussion of reasonable and feasible measures is outlined in **Section 7.7**.

## 5.20 Utility services

Utility works would be carried out in accordance with the utilities strategy prepared for the project in consultation with asset owners.

The following existing utilities were identified along or near the proposed operational and construction footprints:

- Electricity – including high and low voltage transmission and distribution lines:
  - 11 kV Endeavour Energy overhead connections and low voltage local connections
  - 33 kV Endeavour Energy major transmission line on Elizabeth Drive
  - 132 kV Endeavour Energy overhead transmission line crossing Elizabeth Drive perpendicular to its alignment
  - 132 kV Endeavour Energy overhead transmission line crossing the proposed M12 Motorway west of Range Road

- Current TransGrid access arrangements to assets
  - 330 kV TransGrid transmission line crossing the proposed M12 Motorway between The Northern Road and Luddenham Road
  - 500 kV TransGrid transmission line crossing the proposed M12 Motorway west of Mamre Road
  - 330 kV TransGrid transmission line crossing the proposed M12 Motorway in Western Sydney Parklands
- Water – WaterNSW mains including the Upper Canal in a tunnel below Western Sydney Parklands and the M7 Motorway, and a Sydney Water reservoir in Western Sydney Parklands
- Gas – including:
  - The Eastern Gas Pipeline in Western Sydney Parklands, crossing Elizabeth Drive and running parallel to Wallgrove Road
  - Wilton – Horsley trunk main in Western Sydney Parklands, crossing Elizabeth Drive and the M7 Motorway
- Telecommunications – including optic fibre and coaxial cables and several mobile phone towers
- Sewer – no sewer mains were identified on the Sydney Water Dial Before You Dig database. However, it is known that there is limited sewer infrastructure in the area and some properties use septic systems
- Intelligent transport systems (ITS) – the M7 Motorway ITS backbone is located within the M7 Motorway shared user path and would be relocated in areas.

Several utilities and services would be impacted by the project and some may need to be modified, protected or relocated. Potential utility modifications, protection measures and relocations are outlined in **Table 5-10**. As the extent of impact cannot be confirmed until the detailed design is finalised, these details are preliminary only and subject to change. Roads and Maritime is undertaking ongoing consultation with utility providers with a view to refining potential utility modifications and utility protection measures during detailed design. These consultations will also consider future proposals to upgrade or expand utility services, for example to service the Western Sydney Airport, the Western Sydney Aerotropolis, or other urban or infrastructure developments.

Table 5-10 Potential utility modifications, protection measures and relocations

| Asset owner | Asset type | Location | Potential impact and indicative protection strategy |
|---|---|---|---|
| Endeavour Energy | Overhead powerlines – 11 kV | Wallgrove Road – powerline runs north–south along western verge of Wallgrove Road. | Relocate powerline in new northern verge along Wallgrove Road in proposed utilities corridor. |
| Endeavour Energy | Overhead powerlines – 11 kV | Elizabeth Drive – From Western Sydney Parklands Gate F maintenance road running north–south to the Sydney Water reservoirs | Relocate powerline underground to the west of the existing access track, under the M12 Motorway. |
| Endeavour Energy | Overhead transmission line 132 kV | Range Road – transmission line runs north–south about 150 metres west of Range Road. Located near Bridge BR10 at Chainage 12425 | M12 Motorway does not achieve clearance to powerline. Powerline to either be relocated underground or raise its level over the M12 Motorway along current alignment. |
| Endeavour Energy | Overhead powerlines – 33 kV | Elizabeth Drive – powerline runs east–west parallel to the road along the northern verge. Located near proposed Bridge BR09 | Relocate powerline underground along a similar path to the existing powerline to avoid Bridge BR09. |

| Asset owner | Asset type | Location | Potential impact and indicative protection strategy |
|---|---|---|---|
| Endeavour Energy | Overhead powerlines – 11 kV | Elizabeth Drive – powerline runs east–west parallel to the road along the southern verge. Located near proposed Bridge BR09 | Relocate powerline underground along a similar path to the existing powerline to avoid Bridge BR09. |
| Endeavour Energy | Overhead powerlines | Salisbury Avenue – powerline runs north south along Salisbury Avenue western verge. | Remove and partially relocate to service properties at northern end of Salisbury Avenue. Northern properties to be serviced by utilities corridor north of property access track from Clifton Avenue in the west. |
| Endeavour Energy | Overhead powerlines – 11 kV above 415 kV | Clifton Avenue – powerline runs Northeast–Southwest parallel to the road along the eastern verge. Located near proposed Bridge BR07 | Relocate powerline along Clifton Avenue Northern Access Road and underground to Clifton Avenue southern side to pass under the M12 Motorway. |
| Endeavour Energy | Overhead powerline – 11 kV | Elizabeth Drive – powerline runs east–west parallel to the road along the northern verge. Located under proposed Bridge BR04 and runs west. | Relocate powerline to the southern verge and under the existing 33 kV powerline to avoid clashing with Elizabeth Drive upgrade and Airport Access Road.<br>Powerlines in front of the Western Sydney Airport would need to be relocated underground to minimise impacts on the OLS. |
| Endeavour Energy | Overhead powerline – 11 kV and 33 kV | Elizabeth Drive – powerline runs east–west parallel to the road along the northern verge. Existing powerline ends 100 metres east of the Badgerys Creek Road intersection | Relocate powerline to the southern verge and the existing 33 kV powerline to avoid clashing with Elizabeth Drive upgrade and Airport Access Road.<br>Powerlines in front of the Western Sydney Airport would need to be relocated underground to minimise impacts on the OLS. |
| Endeavour Energy | Overhead powerline – 33 kV | Elizabeth Drive – powerline runs east–west parallel to the road along the southern verge. Located near proposed Bridge BR04 | Upgrade poles to carry relocated power from the northern verge. Powerline would be relocated under the M12 Motorway alignment under the proposed Bridge BR04 to avoid crossing. |
| Endeavour Energy | Overhead powerline – 11 kV | Badgerys Creek Road – low voltage powerlines that run north–south from the Elizabeth Drive intersection to service properties located along Badgerys Creek Road. | Powerline to be removed as Badgerys Creek Road is within Western Sydney Airport and will be upgraded. An alternative supply to be provided as part of the Western Sydney Airport design. |
| Endeavour Energy | Overhead power line 11 kV | About one kilometre north of Elizabeth Drive – powerline runs through properties on northern side of Elizabeth Drive. Crosses proposed airport access road twice | Relocate powerline underground along a similar path to the existing powerline under the airport access road. |

| Asset owner | Asset type | Location | Potential impact and indicative protection strategy |
|---|---|---|---|
| Endeavour Energy | Overhead power lines – 11 kV | Luddenham Road – powerline runs north–south parallel to the road along the western verge. The powerline would cross the M12 Motorway at location of Bridge BR01 | Would be impacted by the M12 Motorway bridge over Luddenham Road. Relocate underground below the M12 Motorway Bridge BR01. |
| Jemena | Jemena trunk (gas) pipeline Wilton to Horsley Park | Western Sydney Parklands north-east of the M7 Motorway | Would be overpassed by the proposed realignment of the shared user path. |
| Jemena | Jemena trunk (gas) pipeline Wilton to Horsley Park | Western Sydney Parklands south-west of the M7 Motorway | Overpassed by the M7 Motorway northbound to M12 interchange ramp embankment.<br>Pipeline would be protected potentially with a reinforced concrete protection slab. |
| Jemena | Eastern Gas Pipeline | Western Sydney Parklands, crossing beneath Elizabeth Drive on western side of the M7 Motorway | Overpassed by the M7 Motorway interchange ramp embankments.<br>Pipeline would be protected potentially with a reinforced concrete protection slab. |
| Optus | 1 x 100 mm conduit containing copper and optic fibre | Elizabeth Drive – From Western Sydney Parklands Gate F maintenance road running north–south to the Sydney Water reservoirs | Relocate communication line to the west of the existing access track, under the M12 Motorway at the cut/fill interface. |
| Sydney Water | 500 mm diameter water main | Wallgrove Road/ Elizabeth Drive intersection – water main runs south-west to north-east, parallel to the Upper Canal across Elizabeth Drive and then along west side of Wallgrove Road | Protect areas in fill west of Elizabeth Drive, Relocate section along Wallgrove Road. |
| Sydney Water | 450 mm diameter water main | Elizabeth Drive – From Western Sydney Parklands Gate F maintenance road running north–south to the Sydney Water reservoirs | Relocate water main line to the west of the existing access track, under the M12 Motorway at the cut/fill interface. |
| Sydney Water | 300 mm diameter water main | Elizabeth Drive – From Western Sydney Parklands Gate F maintenance road running north–south to the Sydney Water reservoirs | Relocate water main line to the west of the existing access track, under the M12 Motorway at the cut/fill interface. |
| Sydney Water | 150 mm diameter water main | Mamre Road – water main north–south along the western verge and diagonally across Elizabeth Drive. Located near proposed Bridge BR09 | Relocate water main perpendicular to Elizabeth Drive to avoid proposed Bridge BR09 piers. |

| Asset owner | Asset type | Location | Potential impact and indicative protection strategy |
|---|---|---|---|
| Sydney Water | 100 mm diameter water main | Salisbury Avenue – water main runs north–south along the eastern verge from Elizabeth Drive and terminates 0.5 kilometres north. The M12 Motorway would impact on the water main about 500 metres north of Elizabeth Drive | Terminate the northern portion of the water main before it crosses the M12 Motorway alignment. |
| Sydney Water | 200 mm diameter water main | Clifton Avenue – water main runs north–south parallel to the road along the eastern verge. Located near proposed Bridge BR07 | Relocate water main along Clifton Avenue Northern Access Road and under the M12 Motorway to Clifton Avenue southern side to avoid the M12 Motorway. |
| Telstra | Overhead - Telstra | Wallgrove Road – communication runs north–south along western verge of Wallgrove Road. | Relocated communication line underground in new proposed utilities corridor along Wallgrove Road. |
| Telstra | 2 x 100 mm conduits | Conduits run east–west along southern boundary of Elizabeth Drive. | Relocate conduits closer to Elizabeth Drive. |
| Telstra | 1 x 100 mm conduit containing copper and optic fibre | Elizabeth Drive – From Gate F maintenance road running north–south to the Sydney Water reservoirs | Relocate to the west to make way for proposed M12 Motorway cutting. |
| Telstra | Direct buried copper cable | Elizabeth Drive – opposite Duff Road running north–south to the Water Canal | Relocate to the west to make way for proposed M12 Motorway cutting. |
| Telstra | Overhead – Telstra | Elizabeth Drive – Telstra cable runs on electrical poles east–west parallel to the road along the northern verge. Located near proposed Bridge BR09 | Relocate underground into existing Telstra conduits in the southern verge. |
| Telstra | Overhead – Telstra | Elizabeth Drive – Telstra cable runs on electrical poles east–west parallel to the road along the southern verge. Located near proposed Bridge BR09 | Relocate underground into existing Telstra conduits in the southern verge. |
| Telstra | Overhead – Telstra | Salisbury Avenue – communication line runs north–south along the eastern verge from Elizabeth Drive | Terminate the northern portion of the communication line before it crosses the M12 Motorway alignment. |
| Telstra | Overhead - Telstra | Clifton Avenue – conduit runs north–south parallel to the road along the eastern verge. Located near proposed Bridge BR07 | Relocate conduit along Clifton Avenue Northern Access Road and under M12 Motorway to Clifton Avenue southern side to avoid the M12 Motorway. |

| Asset owner | Asset type | Location | Potential impact and indicative protection strategy |
|---|---|---|---|
| Telstra | 1 x 35 mm, 2 x 100 mm conduits containing copper and optic fibre | Elizabeth Drive – cables run east–west parallel to the road along the northern verge. Located near proposed Bridge BR04 | Relocate underground to the southern verge along Elizabeth Drive. |
| Telstra | 1 x 35 mm conduit containing copper cable | Elizabeth Drive – Conduit runs north–south to service properties just north of the Badgerys Creek Intersection and connects on the south-western corner. | Remove conduit as Badgerys Creek Road is within Wester Sydney Airport and will be upgraded. An alternative supply to be provided as part of the Western Sydney Airport design. |
| TransGrid | 330 kV overhead transmission line | Luddenham – transmission line runs north–south between The Northern Road and Luddenham Road | No impact. Minimum clearance to transmission line is achieved. |
| TransGrid | 500 kV overhead transmission line | Kemps Creek – transmission line runs north–south, crossing Elizabeth Drive west of Mamre Road | No impact. Minimum clearance to transmission line is achieved. |
| TransGrid | 330 kV overhead transmission line | Cecil Hills – transmission line runs north–south through Western Sydney Parklands, crossing Elizabeth Drive to the west of Duff Road | No impact. Minimum clearance to transmission line is achieved. |
| Uecomm | Overhead | Wallgrove Road/Elizabeth Drive intersection – line runs east–west, along the south-west verge of Elizabeth Drive | Relocate underground to avoid M7 Motorway southbound entry ramp from M12 Motorway over Elizabeth Drive bridge. |
| M7 Motorway | ITS communications power supply | Shared user path on the east side of the M7 Motorway between existing bridge over Villiers Road/Ropes Creek and Elizabeth Drive | Relocate the communications and power supply to below the realigned shared user path parallel to the M7 Motorway southbound to M12 Motorway exit ramp. |
| M7 Motorway | ITS communications power supply | Shared user path on the east side of the M7 Motorway between Elizabeth Drive and a point about 1.9 kilometres south of Elizabeth Drive. | Relocate the communications and power supply to below the realigned shared user path parallel to the M12 Motorway to M7 Motorway southbound entry ramp. |
| M7 Motorway | Underground power supply (streetlighting) | M7 interchange, northbound entry ramp | Remove the existing underground power supply. |
| M7 Motorway | Underground power supply (streetlighting) | M7 interchange, southbound entry ramp | Remove the existing underground power supply. |

## 5.21 Provisions for pedestrians and cyclists

A shared user path about four metres wide would be provided alongside the M12 Motorway as shown in **Figure 5-1**. The shared user path would be grade–separated at all road crossings and floodplains and would generally run alongside the M12 Motorway from Range Road to The Northern Road, separated by a barrier. At the Western Sydney Airport interchange the shared user path would underpass the airport access road.

Between The Northern Road and the Western Sydney Airport interchange the shared user path would be located on the southern side of the M12 Motorway. It would then cross under the airport to the M12 Motorway westbound entry ramp before overpassing the M12 Motorway at the Western Sydney Airport interchange and continuing along the northern side of the M12 Motorway as far as Clifton Avenue. At Clifton Avenue, the shared user path would again cross the motorway along the proposed Clifton Avenue bridge and then continue along the southern side of the M12 Motorway to Range Road.

The shared user path would extend along the western side of the airport access road up to the boundary of the Western Sydney Airport and would tie into a future shared user path along Elizabeth Drive.

From Range Road to the M7 Motorway an option for a shared user path that deviates from the M12 Motorway alignment is considered preferable due to the steeper grade in this section of the alignment.

The preferred option for the shared user path in this section is to connect the M12 Motorway shared user path at Range Road to a future proposed pedestrian and cycleway through the Western Sydney Parklands that would then connect to the existing M7 Motorway shared user path network. This proposed path would be delivered by the Western Sydney Parklands Trust and would be subject to a separate environmental assessment. Consultation with Western Sydney Parklands Trust regarding this option is ongoing to ensure the shared user path alignment integrates with the Parklands long-term plans.

If it is decided during consultation that this proposed shared user path connection through the Parklands will not be delivered, Roads and Maritime would provide an alternative alignment for the shared user path in this section via either Elizabeth Drive, or alongside the M12 Motorway from Range Road to the M7 Motorway shared user path network.

Connections to local roads and places of interest would be provided as part of the shared user path including a connection to Clifton Avenue in Kemps Creek.

## 5.22 Provision for public transport

Buses would be able to use the M12 Motorway once opened. There would be no specific allowance for public transport along the M12 Motorway. The realignment of Elizabeth Drive, including the bridge over the airport access road and future passenger rail link to the airport, could accommodate bus lanes in each direction along Elizabeth Drive.

# 5.23 Property access and acquisition

## 5.23.1 Property access

Access would be maintained to all properties where existing access arrangements are impacted by the project. Property access provisions were developed based on the following principles:

- Maintain existing north–south access across the project's operational footprint where possible
- Maintain the current level of access to properties
- Provide alternative access to landlocked land parcels by designing new local access roads
- Ensure access to existing utility assets is not impacted; if access is impacted, provide an alternative access route where required.

In some cases, existing access arrangements would be modified through provision of local service roads adjacent to the project, designed to serve multiple properties and provide access equivalent to that currently existing. The locations of the service roads and modified accesses are shown in **Figure 5-1**. Proposed access routes and arrangements are outlined in detail in **Section 7.2** and **Appendix F**.

Access to all existing and proposed infrastructure for maintenance purposes would be provided by maintaining existing access arrangements where possible or developing alternative maintenance access arrangements where required. This includes a new unsealed access road from Elizabeth Drive through Western Sydney Parklands to the existing water tower and other service towers on the Cecil Hills ridgeline to the west of the M7 Motorway.

## 5.23.2 Property acquisition

The project was designed and aligned to minimise impacts on property where reasonably practicable. Where a property may be subject to partial acquisition due to the project not impacting the whole of the property, consideration was given to ensuring that residual land holdings remain viable.

Land acquisition would be required for the project and would be carried out in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991*, the Land Acquisition Information Guide (NSW Government, 2014) and the ***land acquisition reforms*** announced by the NSW Government in 2016.

Properties impacted by acquisition or adjustments are listed in **Table 5-11** and are shown in **Appendix H**.

The extent of property impacts would be confirmed during detailed design in consultation with the property owners. For partial acquisitions, property adjustment plans would be developed in consultation with the property owner. Following consultation with property owners, some of the lots listed as requiring partial acquisition may be totally acquired.

Properties required to accommodate ancillary facilities during the project's construction would be subject to temporary lease. Properties subject to temporary leases generally include those affected by partial acquisition. Properties likely to be affected by temporary lease are summarised in **Table 5-11** and are shown in **Appendix H**.

In addition to the properties listed in **Table 5-11**, there are about 16 parcels of land that are currently owned by Roads and Maritime and used as road reserves that would be impacted by the project.

Table 5-11 Properties to be acquired for the project

| Property ID | Lot (lot or section/ DP) | Ownership | Existing land use[1] | Total property area (hectares) | Proportion of property within operational footprint (per cent) | Proportion of property within construction footprint (hectares/ per cent) | Infrastructure affected (eg dwellings, sheds, farm dams, shade houses) |
|---|---|---|---|---|---|---|---|
| 1 | 1/DP200435 | Private | Agriculture (The Honey Shed), home based business (transport company), utilities (mobile phone tower) | 10.4 | 3.2 (30.4%) | 10.4 (100%) | Dwelling(s), internal roads/ tracks |
| 2 | 1/DP1240402 | Private (company) | Rural | 315.2 | 13.5 (4.3%) | | - |
| 3 | 26/DP604586<br>1/DP228498 | Private | Agriculture – grazing | 48.3 | 16.1 (33.3%) | | - |
| 4 | 25/DP604586 | Private | Agriculture – grazing | 12.8 | 4.7 (36.4%) | | Farm dams (two) |
| 5 | 2/DP529885 | Private (company) | Commercial (Luddenham Raceway) | 37.8 | 0.5 (1.4%) | | Olive trees |
| 6 | 1/DP235124 | Private (now owned by Roads and Maritime) | Commercial (former Karingal Training Stables – no longer operating) | 17.6 | 5.2 (29.8%) | 5.6 (32.1%) | Sheds, horse paddocks/stables, farm dams, training facilities, training track, internal roads/tracks |
| 7 | 35/DP211842 | Private | Agriculture – intensive animal husbandry (horses) | 11.3 | 1.0 (8.7%) | 1.6 (14.2%) | Farm dams |
| 8 | 101/DP848215 | Private (company) | Agriculture – grazing, commercial (quarrying, waste management and/or resource recovery) | 343.4 | 47.2 (13.7%) | 60.6 (17.6%) | Farm dams, quarry, farm dams (two), internal roads/tracks |
| 9 | 63/DP1087838<br>62/DP1087838<br>3/DP164242<br>1/DP74574<br>21/DP258414<br>1/DP88836 | Private | Rural land – The University of Sydney farms | 343.9 | 30.9 (9.0%) | 58.8 (17.1%) | - |
| 10 | 2/DP88836 | Private (company) | Model aircraft airstrip/ rural land, commercial (radio testing) | 25.3 | 1.6 (6.2%) | | - |

| Property ID | Lot (lot or section/ DP) | Ownership | Existing land use[1] | Total property area (hectares) | Proportion of property within operational footprint (per cent) | Proportion of property within construction footprint (hectares/ per cent) | Infrastructure affected (eg dwellings, sheds, farm dams, shade houses) |
|---|---|---|---|---|---|---|---|
| 11 | 55/DP734584 | Private | Agriculture – horticulture | 10.1 | 0.04 (0.4%) | 0.05 (0.5%) | - |
| 12 | 1/DP587135 2/DP587135 7/DP812284 | Private (company) | Agriculture – horticulture, grazing (identified for future urban development) | 88.1 | 10.8 (12.2%) | | Horticultural gardens, internal roads, stables |
| 13 | 47/DP734584 | Private (company) | Rural land | 10.7 | 6.1 (56.8%) | 9.1 (84.9%) | - |
| 14 | 3/DP812284 | Private (company) | Recycling facility, commercial (TreeServe) | 12.8 | 0.8 (6.3%) | | - |
| 15 | 6/DP812284 | Private | Agriculture – grazing | 16.3 | 6.4 (39.1%) | | Sheds, internal roads/tracks |
| 16 | 5/DP812284 | Private | Wrecked caryard | 6.1 | 1.7 (27.5%) | | - |
| 17 | 4/DP812284 | Private | Rural land | 5.7 | 1.8 (30.9%) | | - |
| 18 | 41/DP734584 | Private | Agriculture – horticulture | 13.1 | 2.2 (17.1%) | | Horticultural gardens, shed |
| 19 | 1/DP981721 | Private | Rural residential | 2.1 | 1.3 (60.6%) | | Dwelling, sheds |
| 20 | 1/DP981720 | Private | Agriculture – horticulture | 2.1 | 0.19 (9.0%) | 0.16 (7.7%) | Shade houses, farm dam |
| 21 | 1/DP736951 | Private | Commercial (horse training) | 1.9 | 1.1 (56.8%) | | Dwellings (two), sheds/ stables, horse paddocks |
| 22 | 2/DP736951 | Private | Rural residential | 1.9 | 1.9 (100.0%) | | Dwelling, sheds, horse paddocks |
| 23 | B/DP416720 39/A/DP2566 | Private | Rural, commercial (horse training facility – Bara Lodge) | 2.2 | 1.0 (45.4%) | | Horse paddocks, shed, internal roads/tracks |
| 24 | B/DP102214 | Private (now owned by Roads and Maritime) | Horse training facilities | 18.8 | 4.0 (21.5%) | | Training track, farm dam, internal roads/tracks |
| 25 | 29/DP30265 | Private (company) | Commercial (Vac Group Australia) | 2.4 | 0.3 (12.4%) | | - |

| Property ID | Lot (lot or section/ DP) | Ownership | Existing land use[1] | Total property area (hectares) | Proportion of property within operational footprint (per cent) | Proportion of property within construction footprint (hectares/ per cent) | Infrastructure affected (eg dwellings, sheds, farm dams, shade houses) |
|---|---|---|---|---|---|---|---|
| 26 | 8/DP737052 | Private | Residential | 2.1 | 0.8 (35.9%) | | - |
| 27 | 7/DP737052 | Private (company) | Commercial | 2.1 | 0.5 (22.7%) | | - |
| 28 | 17/DP30265 | Private | Rural residential | 2.9 | 0.02 (0.6%) | | - |
| 29 | 18/DP30265 | Private | Rural residential | 3.1 | 0.5 (15.0%) | | - |
| 30 | 19/DP30265 | Private | Rural residential | 3.2 | 1.0 (31.7%) | | - |
| 31 | 20/DP30265 | Private (company) | Rural residential | 2.3 | 0.2 (7.6%) | | - |
| 32 | 21/DP30265 | Private | Rural residential | 2.3 | 0.6 (23.9%) | | - |
| 33 | 22/DP30265 | Private (company) | Commercial | 2.3 | 0.9 (40.6%) | | Hardstand |
| 34 | 23/DP30265 | Private (company) | Commercial – Western Safety Fences | 2.3 | 1.3 (55.2%) | | - |
| 35 | 24/DP30265 | Private | Rural residential | 2.0 | 0.8 (39.9%) | | Shed |
| 36 | 26/DP30265<br>25/DP30265 | Private | Commercial (Hi-Quality Group Head Office) | 4.2 | 2.2 (51.6%) | 4.1 (96.1%) | Shed, office, hardstand |
| 37 | 9/DP1054778<br>8/DP1054778<br>7/DP1054778<br>6/DP1054778<br>5/DP1054778<br>4/DP1054778<br>3/DP1054778<br>2/DP1054778<br>1/DP1054778 | Private | Agriculture - grazing | 18.9 | 8.3 (43.7%) | | - |
| 38 | 3/DP1087825<br>1/DP875790<br>2/DP922940<br>28/DP654786<br>1/DP308358<br>6/DP629798<br>5/DP629798<br>1/DP1041390<br>2/DP1041390<br>10/DP1021940<br>11/DP1021940<br>12/DP1021940<br>14/DP1021940 | Public | Western Sydney Parklands | 773.3 | 45.9 (5.9%) | 6.8% | Wylde Mountain Bike Trail and other recreation uses, International Shooting Centre, vegetated areas |

| Property ID | Lot (lot or section/ DP) | Ownership | Existing land use[1] | Total property area (hectares) | Proportion of property within operational footprint (per cent) | Proportion of property within construction footprint (hectares/ per cent) | Infrastructure affected (eg dwellings, sheds, farm dams, shade houses) |
|---|---|---|---|---|---|---|---|
| 39 | 21/DP1109551<br>26/DP1109551<br>22/DP1109551 | Public | WaterNSW | 9.5 | 2.0 (20.9%) | | - |
| 40 | 13/DP1021940 | Private | Rural | 10.7 | 0.2 (2.1%) | | Orchard trees |
| 41 | 2/DP1230172<br>1/DP129674<br>2/DP996420<br>1/DP996420 | Public[2] | Elizabeth Drive road reserve | 0.3 | 0.3 (99.7%) | | - |

[1] *Information on existing land use is based on a review of aerial photography and visual inspection*

[2] *Roads and Maritime early market acquisition.*

## 5.24 Construction

Detailed construction planning would be carried out during detailed design. Planning would consider specific work methods and scheduling to manage community and environmental issues including noise, access, amenity and general disruption, and ensure concurrence with Work Health and Safety legislation.

Equipment and plant requirements would be confirmed during detailed design and during the development of the construction methodology by the construction contractor. The construction methods and management measures to minimise environmental impacts would be detailed in the CEMP, which would be prepared by the construction contractor.

### 5.24.1 Construction footprint

The construction footprint is the total area required to construct the project. The construction footprint is generally broader than the operational footprint, and includes those areas required for roadworks, bridge works, access for construction vehicles and plant, drainage infrastructure, temporary sediment basins, utilities and services adjustments, temporary stockpiles, property adjustments and temporary ancillary facilities (such as construction compounds and batching plants).

The construction footprint was established to minimise environmental impacts while providing sufficient room to allow the project to be constructed in a safe manner. The total construction footprint (including ancillary facilities) is about 350 hectares and is shown in **Figure 5-5**.

Where sensitive environmental constraints fall within the construction footprint, environmental protection exclusion zones were established to exclude these areas as part of the definition of “construction footprint” and would be protected for the duration of construction.

The construction footprint is indicative only and would be subject to refinement during detailed design and construction. Some factors that could affect the final construction footprint include the location and size of water quality basins, the construction methodology, and access arrangements made with directly affected landowners.

## 5.24.2 Overview of construction works

Construction of the project would generally include the following key activities:

- Site establishment and mobilisation
- Early works and property adjustments
- Relocation of existing or installation of additional utilities and services
- Demarcation and fencing of the construction footprint and any environmental protection exclusion areas within the footprint
- Clearing, grubbing and topsoil stripping within the construction footprint
- Demolition of existing buildings where required within the construction footprint
- Earthworks and haulage of material
- Stockpiling and storage of materials
- Traffic management and access
- Construction of the M12 motorway, intersections, interchanges and road widening
- Construction of bridges
- Construction of drainage structures
- Installation of noise mitigation measures
- Changes to property access
- Installation of signposting, lighting and roadside furniture
- Landscape works and rehabilitation
- Finishing works including demobilisation.

It is expected that many of these construction activities would occur concurrently and consecutively across different locations within the construction footprint. More information about the main components of these construction activities is provided in the following sections.

## 5.24.3 Construction ancillary facilities

Ancillary facilities would be required at different locations across the construction footprint to support the construction of the project. They may include material and earthworks stockpiling areas (including early stockpiling), construction support areas for bridges, a main project office and compound area, material testing laboratories, secondary offices located as needed along the length of the construction footprint, workshops for servicing plant and equipment, double-handling and laydown areas, concrete precast elements casting yards and concrete and/or asphalt batching plants.

The ancillary facilities would generally comprise:

- Temporary buildings including offices and meeting rooms, amenities and first aid facilities (the size and number of office facilities at the main compound would be greater than at the secondary compounds)
- Hardstand parking areas with sufficient space to accommodate the numbers of construction workers expected at any site
- Materials laydown, storage and handling areas, including purpose-built temporary structures as required and appropriately bunded storage for hazardous and non-hazardous substances
- Secure perimeter fencing, including visual screening of construction compounds where necessary
- Bridge construction support areas
- Workshops with appropriate safety and environmental controls for servicing plant and equipment.

Where Roads and Maritime acquires or leases a property that includes buildings or sheds in a nominated ancillary facility location, those buildings may be reused as site offices or compound facilities.

Areas of land that are leased by Roads and Maritime for the purposes of construction would be rehabilitated upon completion of construction and restored to their existing condition, or as otherwise agreed with the landowner.

Temporary ancillary facilities would be progressively rehabilitated where possible to minimise soil exposure and the potential for dust generation, erosion and sedimentation, and visual impacts.

Potential locations for the indicative construction ancillary facilities are presented in **Figure 5-5**. Indicative site layouts shown in **Figure 5-22** and indicative details of the size and purpose of each facility is provided in **Table 5-12**. The final type, use, location and number of ancillary facilities would be determined by the construction contractor and identified in a site establishment management plan.

Where possible, ancillary facilities identified in this EIS are nominated in locations that:

- Are more than 50 metres from a waterway
- Are within or adjacent to land where the project is being carried out
- Have ready access to the road network
- Minimise the need for heavy vehicles to travel through residential areas
- Are on relatively level land
- Are separated from nearest residences by at least 200 metres (or at least 300 metres for a temporary batching plant)
- Do not require vegetation clearing beyond that already required for the project
- Avoid and minimise impact on heritage items (including areas of archaeological sensitivity)
- Do not unreasonably affect the land use of adjacent properties
- Are above the one in 20–year ARI flood level unless a contingency plan to manage flooding is prepared and implemented
- Provide sufficient area for the storage of raw materials to minimise, to the greatest extent practical, the number of deliveries required outside standard construction hours.

An assessment of the proposed ancillary facilities against the considerations above is summarised in **Table 5-13**.

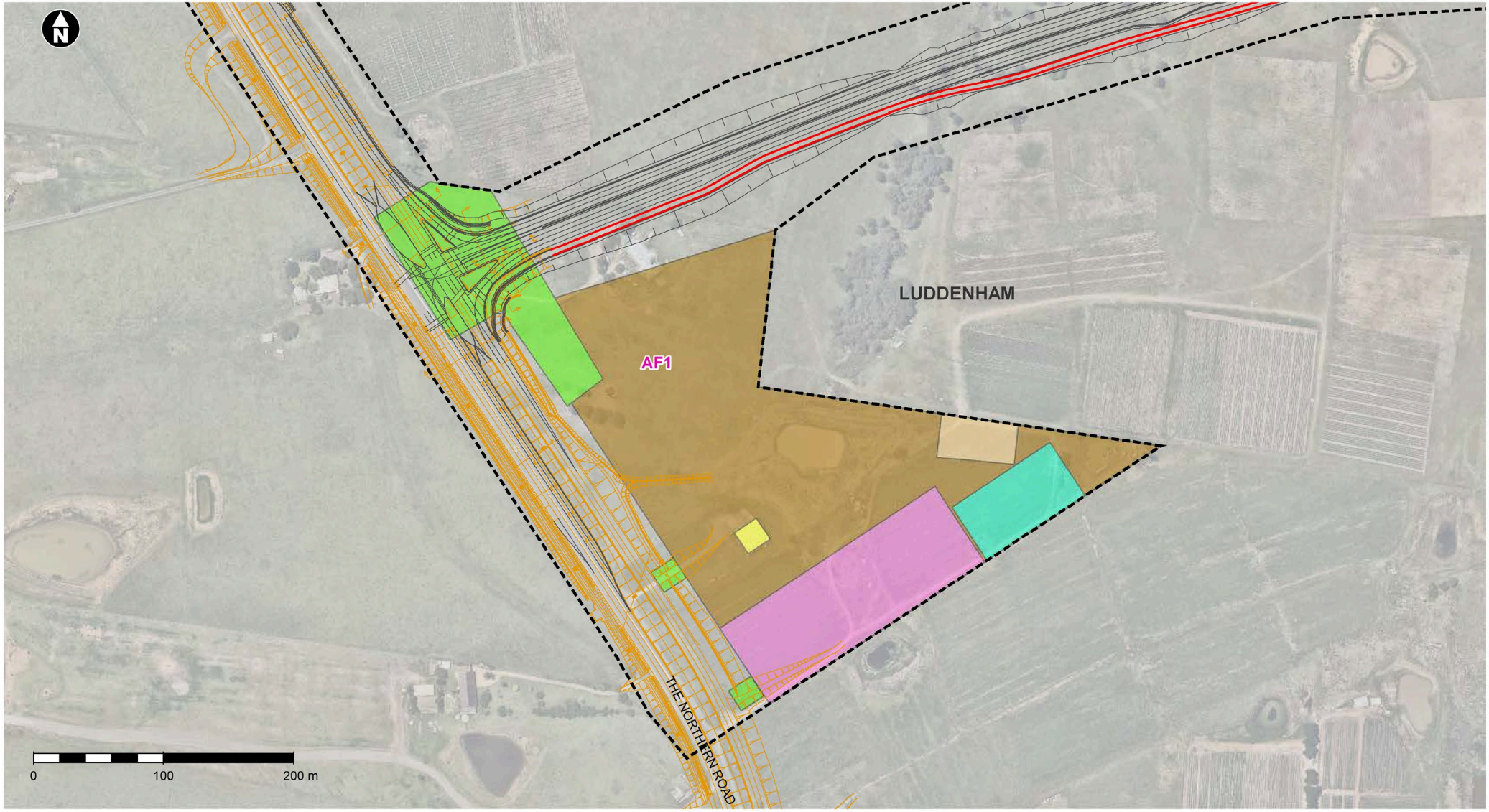



Figure 5-22 Indicative layout of ancillary facilities



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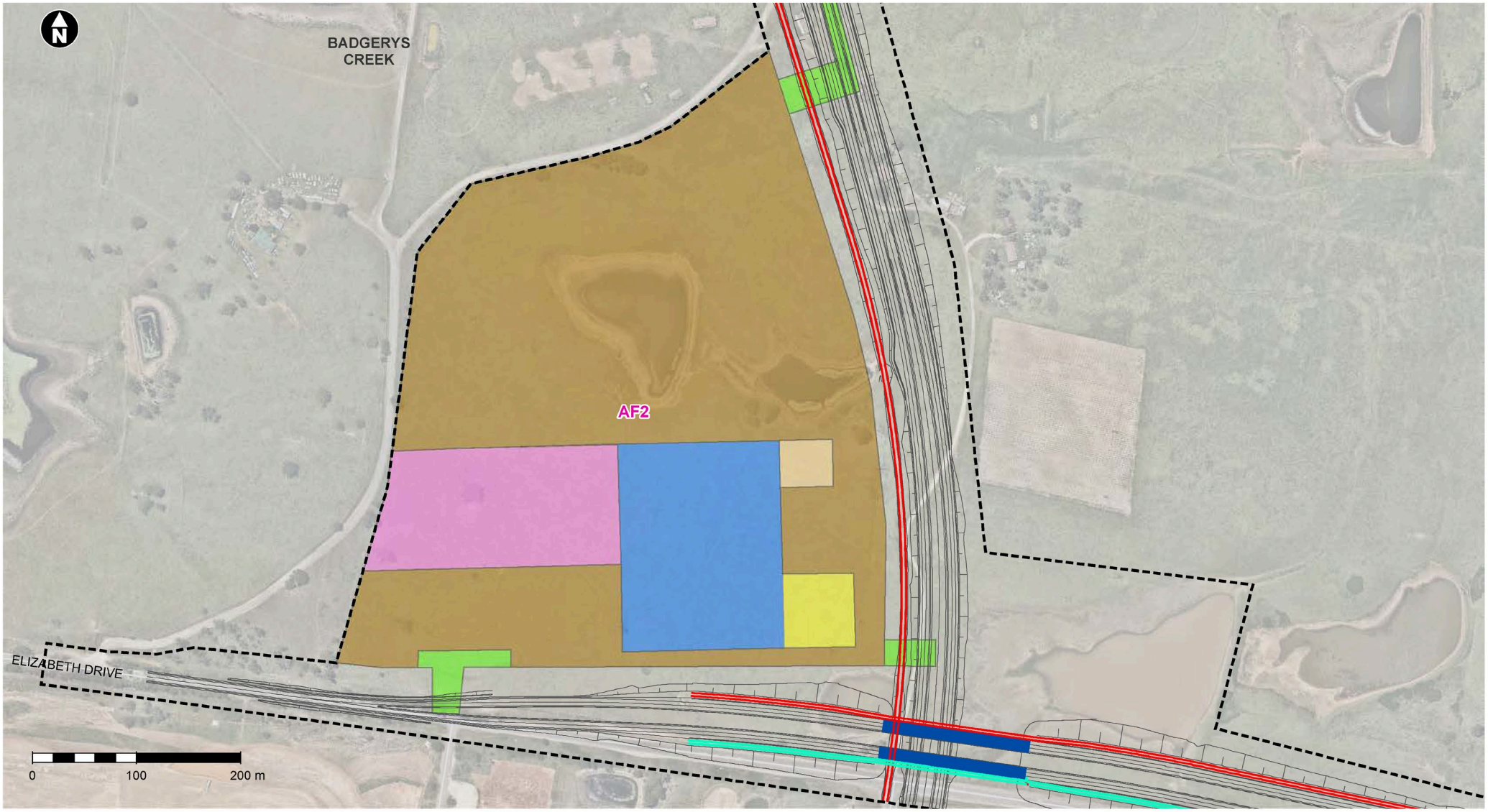


Figure 5-22 Indicative layout of ancillary facilities



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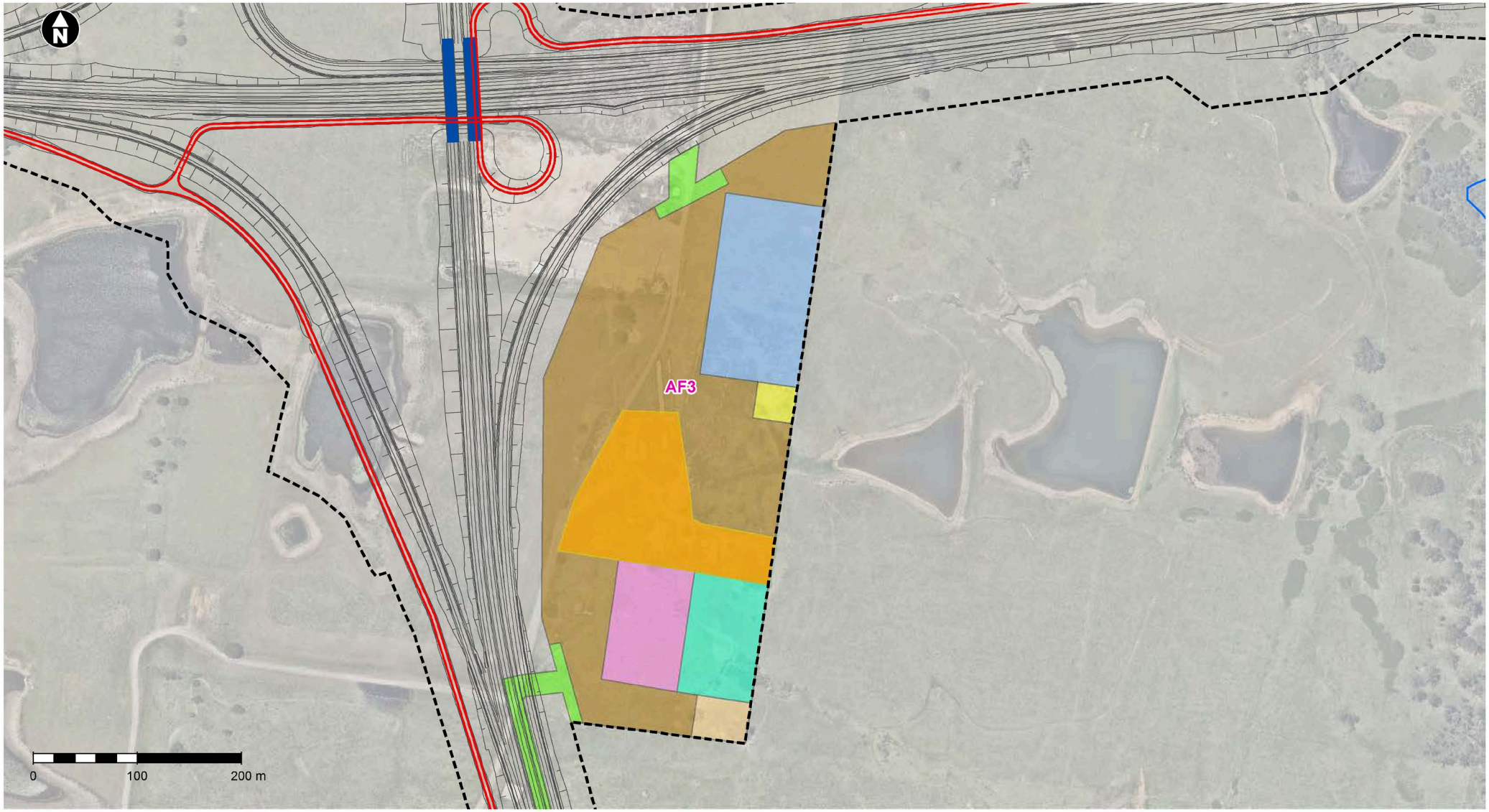


The project
Shared user path
Waterways
Bridges
The project construction footprint
Amenities
Car park
Concrete/asphalt batching plant
Stockpile and laydown area
Secondary offices
Plant servicing workshop
Vehicular access to ancillary facilities
Area of potential re-use of existing structures

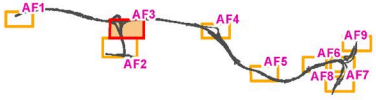



Figure 5-22 Indicative layout of ancillary facilities



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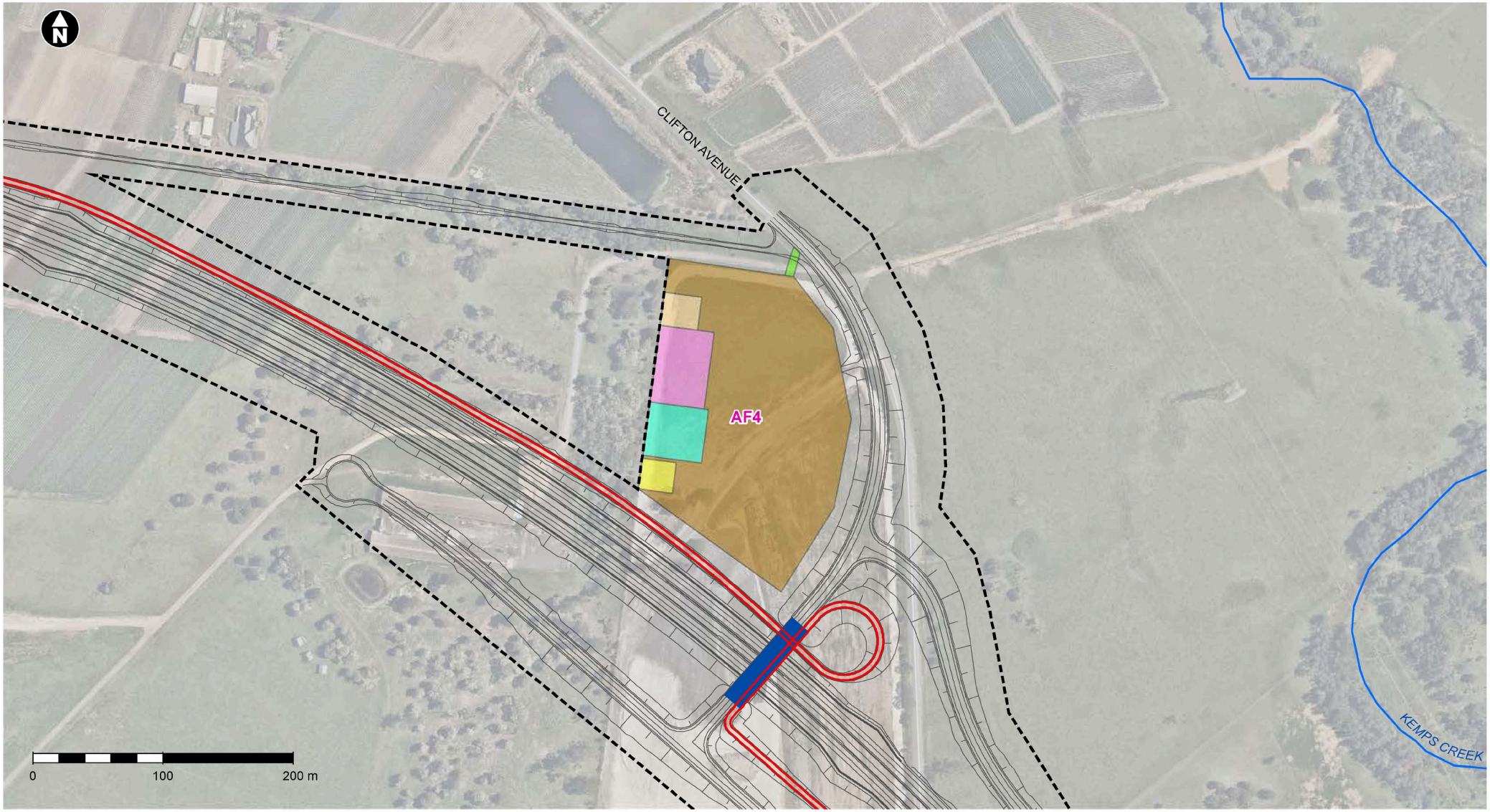


Figure 5-22 Indicative layout of ancillary facilities



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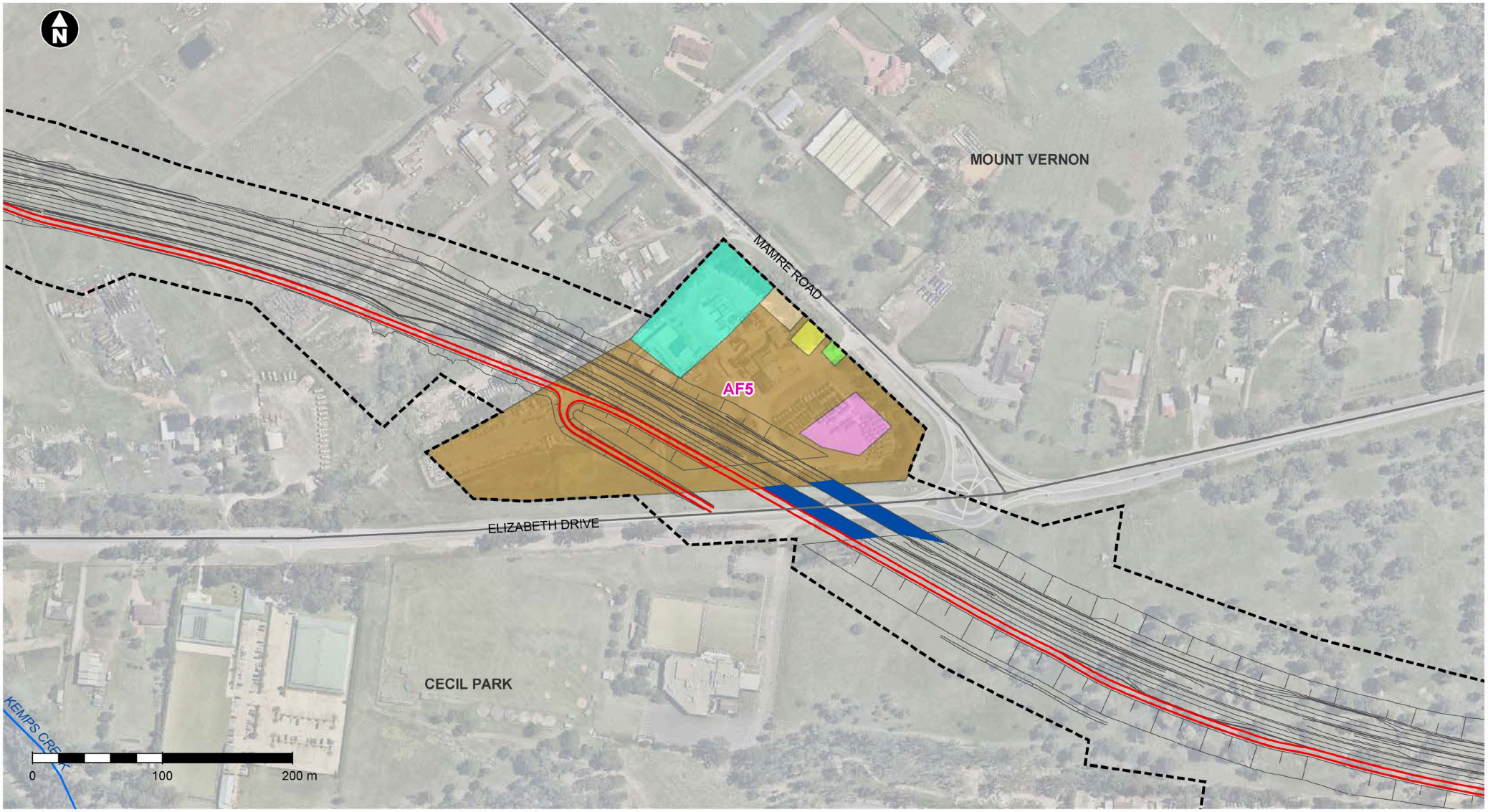


The project
Shared user path
Waterways
Bridges
The project construction footprint
Amenities
Car park
Stockpile and laydown area
Secondary offices
Plant servicing workshop
Vehicular access to ancillary facilities

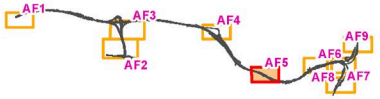



Figure 5-22 Indicative layout of ancillary facilities



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Figure 5-22 Indicative layout of ancillary facilities



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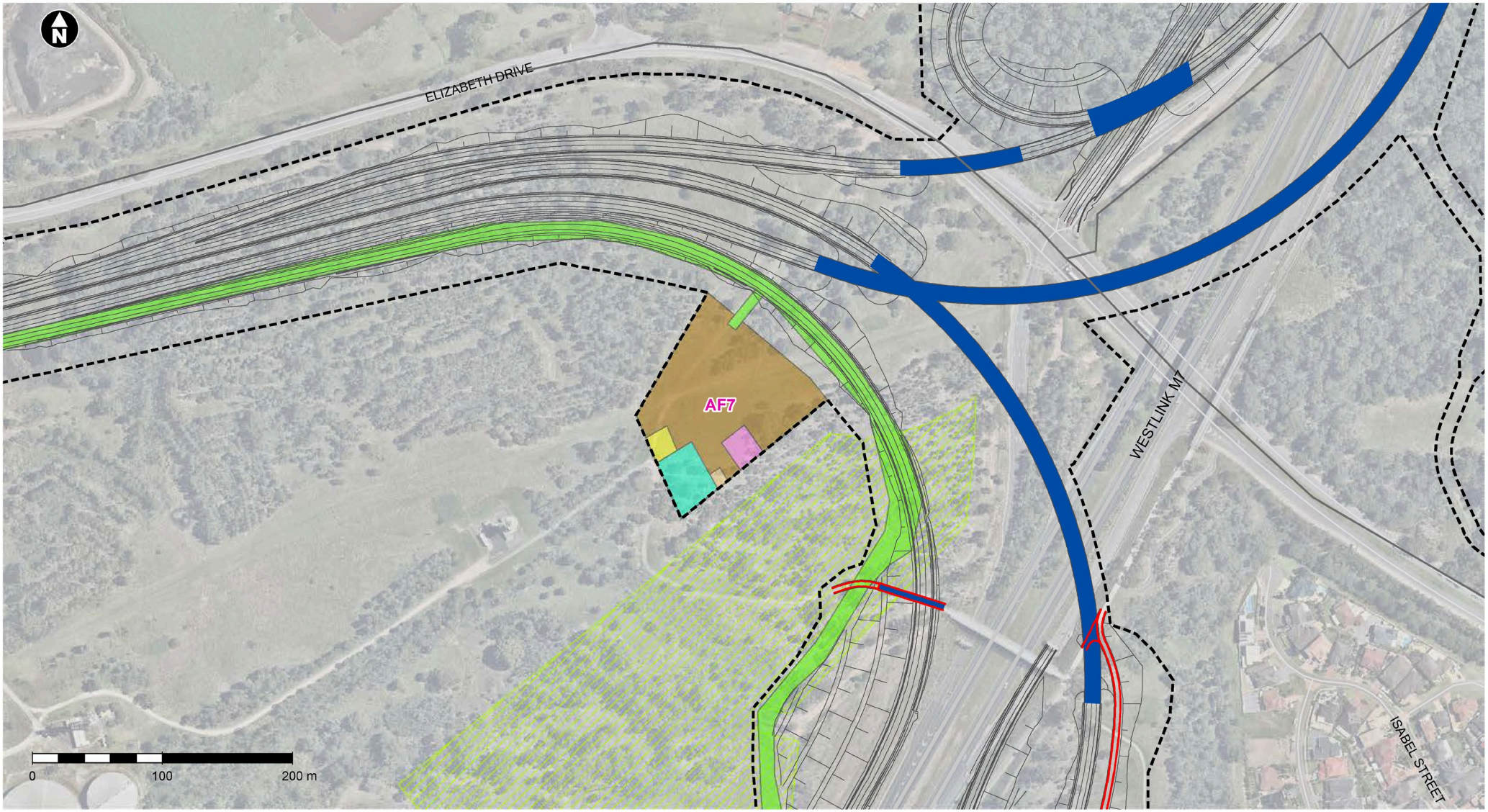


Figure 5-22 Indicative layout of ancillary facilities



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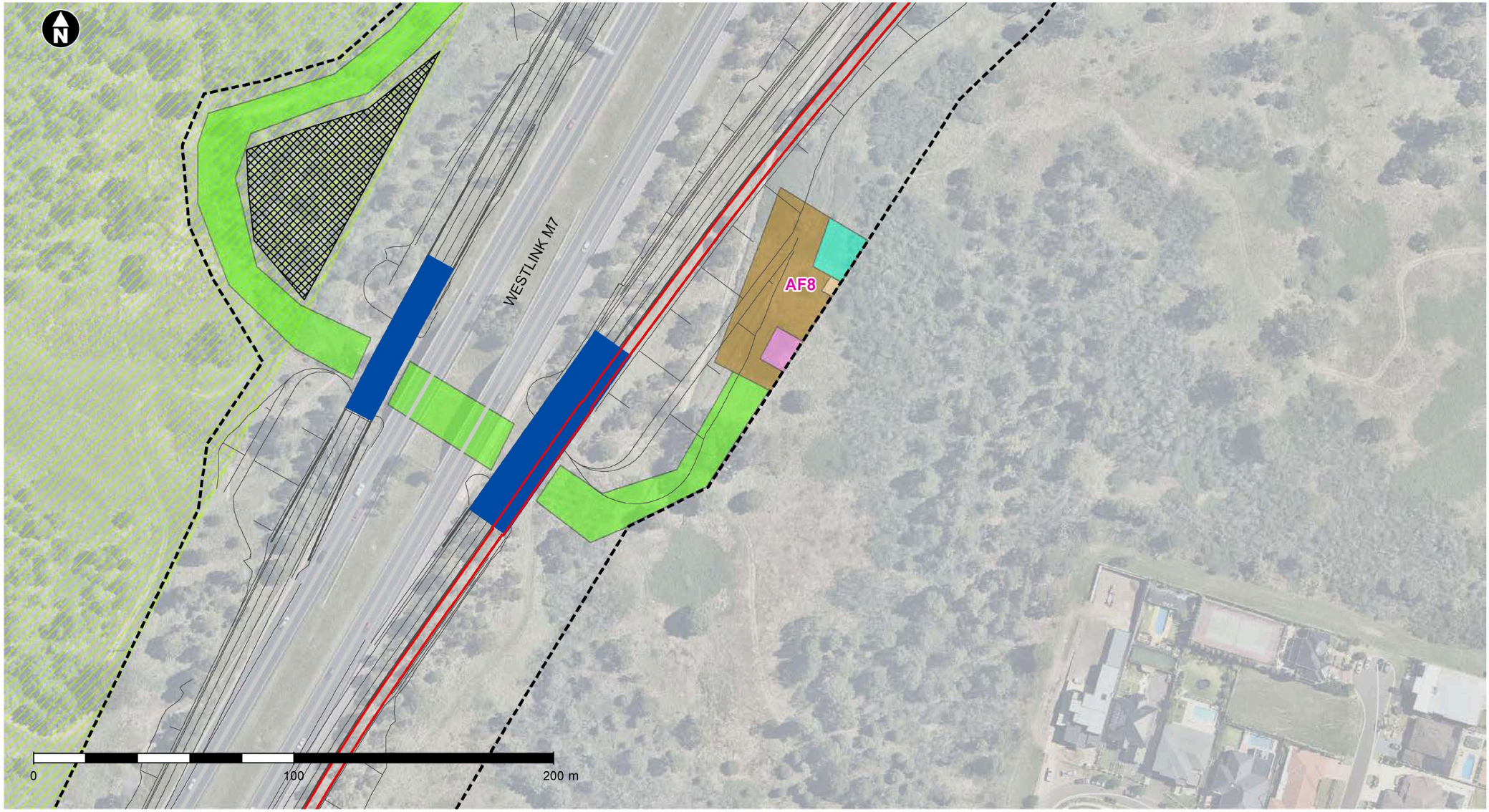


Figure 5-22 Indicative layout of ancillary facilities



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The project
Shared user path
The project construction footprint
Amenities
Car park
Stockpile and laydown area
Secondary offices
Vehicular access to ancillary facilities


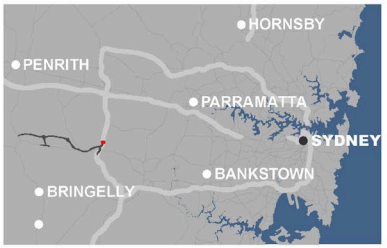


Figure 5-22 Indicative layout of ancillary facilities



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Table 5-12 Proposed construction ancillary facility (AF) locations and uses

| Ancillary facility (AF) number and location | Approximate size (ha) | Proposed ancillary facility use | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Concrete and/or asphalt batching plants | Material and earthworks stockpile | Bridge construction support | Main project offices | Plant servicing workshop | Double-handling laydown | Secondary office |
| AF 1 – East of The Northern Road | 6.4 | | ✓ | ✓ | | ✓ | ✓ | ✓ |
| AF 2 – North of Elizabeth Drive opposite the Elizabeth Drive/Badgerys Creek Road intersection | 23.2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| AF 3 – North of Elizabeth Drive between proposed Airport Access Road and Sydney Metro Greater West | 11.8 | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |
| AF 4 – West of Clifton Avenue, north of proposed main line | 3 | | ✓ | ✓ | | ✓ | ✓ | ✓ |
| AF 5 – West of Mamre Road North of Elizabeth Drive | 4.1 | | ✓ | ✓ | | ✓ | ✓ | ✓ |
| AF 6 – South of Elizabeth Drive opposite Duff Road | 1.9 | | ✓ | ✓ | | ✓ | ✓ | ✓ |
| AF 7 – West of the M7, North east corner of Western Sydney Parklands | 1.3 | | ✓ | ✓ | | ✓ | ✓ | ✓ |
| AF 8 – East of the M7, south of Elizabeth Drive | 0.2 | | ✓ | ✓ | | ✓ | ✓ | ✓ |
| AF 9 – East of the M7, north of Elizabeth Drive | 0.2 | | | ✓ | | ✓ | | ✓ |

Table 5-13 Environmental considerations when selecting ancillary facilities

| Consideration | AF 1 | AF 2 | AF 3 | AF 4 | AF 5 | AF 6 | AF 7 | AF8 | AF9 |
|---|---|---|---|---|---|---|---|---|---|
| Located more than 50 metres from a waterway | N | Y | Y | Y | N | Y | Y | Y | Y |
| Located within or next to land where the project is being carried out | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Ready access to the road network | Y | Y | N<br>Access via AF 2 or via construction footprint | Y | Y | Y | N<br>Access via AF 6 or via construction footprint | N<br>Access via AF 6 or via construction footprint | Y |
| Located to minimise the need for heavy vehicles to travel through residential areas | Y<br>Noting access is via The Northern Road with some residences adjacent | Y<br>Noting there are some residences located adjacent to Elizabeth Drive | Y<br>Noting there are some residences located adjacent to Elizabeth Drive | N<br>Access via Clifton Avenue | N<br>Access via Mamre Road and Elizabeth Drive | Y<br>Noting access via Elizabeth Drive passes some residences | Y<br>Noting access via Elizabeth Drive passes some residences | Y | Y<br>Noting access via local road east of the M7 and Kosovich Place, Cecil Park passes some residences |
| Sited on relatively level land | Y | Y | Y | Y | Y | Y | N | N | Y |

| Consideration | AF 1 | AF 2 | AF 3 | AF 4 | AF 5 | AF 6 | AF 7 | AF8 | AF9 |
|---|---|---|---|---|---|---|---|---|---|
| Separated from nearest residences by at least 200 metres (or at least 300 metres for a temporary batching plant) | N | N | Y | Y | N | N | Y | Y | N |
| Not requiring vegetation clearing beyond that already required by the project | Y | Y | Y | N<br>Contains about 0.4 ha of Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland of the Cumberland Plain, Sydney Basin Bioregion | Y | N<br>Contains about 0.14 ha amounts of Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion | N<br>Contains about 0.2 ha of Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion and 0.12 ha of 'Revegetation' | Y | Y |
| Avoiding and minimising impact on heritage items (including areas of archaeological sensitivity) | Y | N<br>McGarvie-Smith Farm impacted | N<br>McMaster Field Station impacted | Y | Y | Y | Y | Y | Y |

| Consideration | AF 1 | AF 2 | AF 3 | AF 4 | AF 5 | AF 6 | AF 7 | AF8 | AF9 |
|---|---|---|---|---|---|---|---|---|---|
| Not unreasonably affecting the land use of nearby properties | Y | Y | Y | Y | Y | Y | Y | Y | Y<br>Noting local road would be affected for construction regardless of the location of this AF |
| Above the 20–year ARI (five per cent AEP) flood level unless a contingency plan to manage flooding is prepared and implemented | Y | Y | Y | Y | N<br>Small sections of the site are within the 20–year ARI (5 per cent AEP) flood extent | Y | Y | Y | Y |

### 5.24.4 Early works

There would be some mobilisation and site establishment activities before the main construction activities begin. The purpose of these activities would be to prepare the site, gather additional information and install any environmental controls required during construction. These works fall into two main categories for assessment and approval purposes. They are described below.

***Early works excluded from the project definition***

As previously mentioned in **Section 2.1.1**, the Minister for Planning and Public Spaces has declared the project as critical state significant infrastructure (CSSI). Typically CSSI declarations catalogue a list of works that are excluded from the definition of the project and can be carried out as exempt development or through Part 5, Division 5.1 of the EP&A Act assessment process. These works are therefore not bound to the assessment and approval process for the project, or subject to the conditions of approval. Such works may include surveys, test drilling, test excavations, geotechnical or contamination investigations or other tests, utility location identification or surveys, sampling or investigation for the purposes of the design or assessment of the project.

***Early works controlled by the approval***

Some early works that are not able to be carried out as exempt development or through Part 5, Division 5.1 of the EP&A Act assessment process may still take place before the formal approval of construction management plans by the Secretary of DPIE, and before the main construction work begins. These early works (or pre-construction activities) would be carried out in accordance with the standard NSW Conditions of Approval for State Significant Infrastructure projects and would be managed by either separate early works environmental management plans or environmental work method statements depending on the scope of the activity.

Pre-construction activities for the project would generally include:

- Installation of construction and advisory signs
- Installation of environmental controls
- Adjustment, relocation and protection of public utilities and services
- Site establishment activities, such as establishment of:
  - Construction ancillary facilities, including minor clearing, minor earthworks, installation of office accommodation, utilities and other facilities
  - Construction site fencing, signage and lighting
  - Construction site access points, traffic management measures, alternative public access routes and diversions, including any minor road modifications
- Relocation or removal of farm infrastructure (including farm dams) as required and in consultation with affected landowners
- Stockpiling of fill that may be available before construction starts (such as fill available from other projects)
- Removal of waste and remediation of contaminated land for site preparation
- Activities prior to vegetation clearing:
  - Pre-clearing surveys
  - Marking out ‘no go’ zones and protection measures
  - Identifying fauna habitat trees and fauna release areas through pre-clearing surveys
  - Establishing temporary drainage and sedimentation and erosion control measures
- Aboriginal and non-Aboriginal heritage salvage.

### 5.24.5 Earthworks

Earthworks would be required along the entire length of the project and would occur in relation to:

- Topsoil stripping
- Cut and fill
- Construction of retaining walls
- Preparation of site for construction of all bridges
- Installation of road drainage infrastructure.

Material excavated during project earthworks would be reused in construction where possible. Potential for spoil reuse would be confirmed during detailed design.

It is estimated that the project earthworks are likely to result in a net deficit of fill material of about two million cubic metres. **Table 5-14** outlines the indicative types and volumes of materials that would be managed during construction and provides the recommended management approach for each material.

Table 5-14 Approximate total bulk earthwork quantities

| Type of material | Approximate quantity ($m^3$) | Management approach |
|---|---|---|
| Total fill material required | 3,128,000 | Where possible, source on site from cuts required for the project. Alternatively, use imported material, to be sourced locally where practical. |
| Total cut material to be excavated | 1,396,000 | It is anticipated that all suitable excavated material would be reused within the site as general fill either within the same section of work or elsewhere along the project.<br>Cut-to-fill haulage of this nature would generally be carried out using internal haul roads, so that haulage does not contribute to traffic volumes on existing roads. Where it cannot be reused on site, material would be managed in the following order of priority:<br>1. Transfer to other Roads and Maritime projects for reuse in accordance with the NSW EPA's excavated public road resource recovery order and exemption<br>2. Transfer to an approved Roads and Maritime stockpile site for reuse on a future project if a specific project was identified and statutory/regulatory requirements under the POEO Act are met<br>3. Transport off site for reuse by a third party in accordance with relevant NSW EPA resource recovery order and exemption or to a NSW EPA licensed waste recovery facility<br>4. Dispose at an accredited materials recycling or waste disposal facility.<br>Where excavated material is deemed unsuitable for reuse or emplacement due to contamination, it would be taken to a waste facility licensed to accept the waste. |
| Total fill deficit to be imported | 1,732,000[1] (total fill material minus total cut material) | Import material, locally sourced where practical |
| Topsoil (balance) | 1,820,000 | Where possible, topsoil stripped would be reused on site. Any material to be removed from site would be managed in accordance with the measures outlined in **Section 8.5**. |

| Type of material | Approximate quantity ($m^3$) | Management approach |
|---|---|---|
| Selected material zone (SMZ) (import) | 127,000 | Import material, locally sourced where practical |
| Pavement (import) | 200,000 | Import material, locally sourced where practical |

It is possible that asbestos containing material (ACM) may be encountered during earthworks. Where this occurs, a potential management approach may be to contain the material on site and encapsulate it under the road pavement in high fill areas, such as between Elizabeth Drive and Range Road. Alternately, the preferred management approach may be to remove the material for disposal offsite. The preferred management approach, and the need for encapsulation and identification of suitable encapsulation areas would be further investigated during detailed design and construction.

The potential for encountering ACM and possible management measures are discussed further in **Section 8.1**.

### 5.24.6 Demolition

The project would require the demolition and removal of existing buildings and infrastructure located within the construction footprint, for example where they are not able to be reused as ancillary facilities during construction. This would include:

- Buildings (including residences), sheds or farm infrastructure – properties where buildings are to be demolished would be acquired. The need for and impact of acquisitions are considered in **Section 7.4**. All buildings would be demolished in accordance with Australian Standard AS2601: The Demolition of Structures (AS 2601).
- Bridges – a bridge over South Creek on private property would be demolished as it is situated in the location of the twin motorway bridges proposed over South Creek. The demolition would be carried out in accordance with Australian Standard AS2601: The Demolition of Structures (AS 2601). The (private) bridge would be replaced with a new structure, a short distance upstream of the existing bridge.
- Road adjustments – adjustments would be required at The Northern Road, Elizabeth Drive, Salisbury Avenue, Clifton Avenue and Wallgrove Road to accommodate the project. Road adjustments would also be required where the new entry/exit ramps to and from the M7 Motorway merge with or diverge from the existing motorway. At completion of construction, road surfaces and their function would be reinstated to their current standards or better.

Demolition waste would be taken to an appropriate facility for recycling or reuse as appropriate.

### 5.24.7 Pavements

Pavement construction would typically involve:

- Placing selected material (usually crushed rock, natural gravels or suitable soils)
- Placing, compacting and finishing the pavement.

In areas where the project would modify existing roads, pavements would potentially be subject to widening, changes in configuration, removal, milling and pavement build-up and resurfacing.

New pavement would be marked in accordance with Roads and Maritime requirements to delineate travel lanes, traffic merges and vehicle movements permitted at intersections. Pavement on the shared user path would be marked in accordance with Roads and Maritime requirements and the NSW Bicycle Guidelines (RTA, 2005a).

## 5.24.8 Bridge works

Bridges to be constructed as part of the project are described in **Section 5.10.3**. All bridge structures would be designed and configured to follow industry accepted construction practices. Potential construction methods and the construction program were considered in the design of bridges. Construction of the bridges would generally involve:

- Construction of substructures, including piles, abutments, piers and headstocks
- Construction of superstructures including beams, girders, decks and barriers
- Installation of anti-throw screens where required.

Bridge construction methods are discussed, below.

### *Substructures*

Geotechnical investigations carried out to date at the proposed bridge locations indicate that each bridge could be supported on bored pile footings into medium strength or better siltstone bedrock. The depth to medium strength bedrock typically varies from six to 10 metres below existing ground surface levels at creek crossings.

Bridge foundations and substructures (including piles, abutments and piers) would be constructed using standard bridge building techniques.

Construction of substructures near existing roads is likely to typically require temporary lane closures and traffic diversions. Full road closures over extended periods will not be required, but closures over short periods may be required to facilitate critical construction activities that cannot otherwise be practically carried out.

### *Superstructures*

The design for bridge superstructures was developed and includes pre-stressed concrete super T-girders, spaced planks, steel box girders, cast in-situ concrete, precast segmental or incrementally launched concrete box girder construction (**Section 5.10.3**). Other superstructure types may be adopted during the detailed design should these be shown to be more appropriate.

Precast elements of the bridges would be prepared off site at dedicated casting yards and transported to the project site by road. A crane would be used to lift the beams and girders into place directly onto the abutments and pier headstocks once the bridge bearings are constructed. Temporary bracing may be required between the girders. Alternatively, a launching gantry may be used to place precast elements.

The bridge deck and barriers would typically be constructed from reinforced concrete. In some cases, precast units may be used for the barriers. Concrete bridge decks would require temporary formwork to be installed before pouring. The formwork would typically be supported directly from the bridge girders.

The abovementioned techniques describe common bridge construction scenarios. Site specific opportunities and constraints identified during detailed design may require alternative construction techniques.

The design and construction of the bridges would consider the requirements of the Policy and guidelines for fish habitat conservation and management (NSW Department of Primary Industries, 2013).

Construction of the bridges would not require full closures of roads for extended periods. However, they may require temporary road and/or lane closures during suitable times and traffic diversions to allow safe execution of works near the following of roads:

- Luddenham Road north of Elizabeth Drive where the project crosses Luddenham Road
- Elizabeth Drive, near Badgerys Creek Road
- Clifton Avenue, where the project crosses the realigned Clifton Avenue
- Elizabeth Drive, west of the roundabout with Mamre Road
- Range Road, south of Elizabeth Drive where the project crosses Range Road
- Elizabeth Drive, west of Wallgrove Road where the exit ramp from the M12 Motorway eastbound to the M7 Motorway northbound crosses Elizabeth Drive
- Wallgrove Road, north of Elizabeth Drive where the exit ramp from the M12 Motorway eastbound to the M7 Motorway northbound crosses Wallgrove Road
- Villiers Road, east of Wallgrove Road.

Construction of the bridge structures at the interchange with the M7 Motorway may have one or a combination of the following impacts on the M7 Motorway carriageway and ramps:

- Speed reductions on the M7 Motorway and ramps
- Temporary lane closures during the launching of girders above the M7 Motorway lanes or ramps
- One directional carriageway closure of the M7 Motorway during off-peak time.

Detailed assessment of bridge options would be carried out during detailed design to minimise the impact on the M7 Motorway operations, as much as practically possible.

### 5.24.9 Drainage works

#### *Drainage infrastructure*

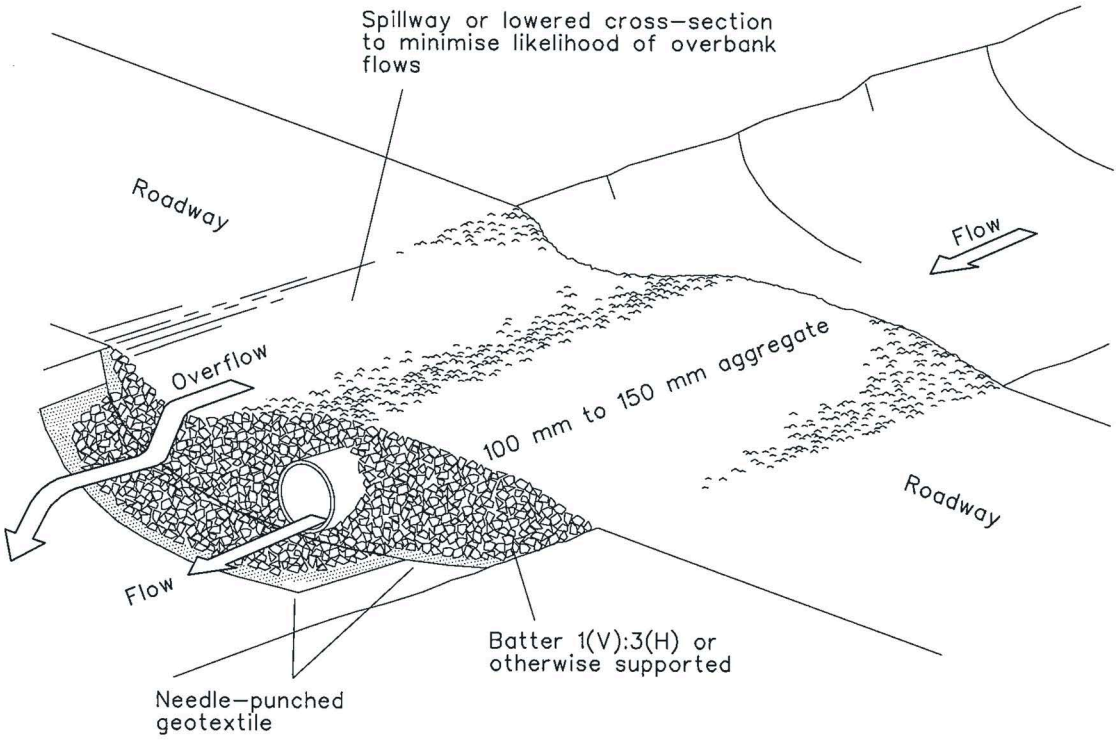
The project would require the construction of new drainage infrastructure and alterations to existing drainage infrastructure, as described in **Section 5.13**. Construction of drainage works would involve localised excavation, compaction and installation of drainage culverts, pipes and pits, and construction of table drains and swales.

As the road formation is being constructed, drainage structures such as culverts and pipes would be installed to enable natural flows to be maintained. Where required, temporary diversion channels would be constructed to enable the installation of culverts and pipes. Appropriate controls would be implemented for the diversion channels to minimise the potential for scour. After the culvert or pipe is installed, the drainage line would be reinstated, and the temporary channels removed.

Generally, the construction of new surface drainage on the outside of the carriageways would be carried out in parallel with the earthworks required for road construction.

#### *Temporary creek crossings*

Temporary crossings are likely to be required at watercourses for the construction of haul roads within the construction footprint and temporary construction access tracks. These watercourse crossings would likely comprise a temporary causeway with culverts or pipes installed to maintain the low flows, and they would likely be maintained for the duration of construction. An example of a typical temporary watercourse crossing is provided in **Figure 5-23**.




## Construction Notes

1. Prohibit all traffic until the access way is constructed.
2. Strip any topsoil and place a needle-punched textile over the base of the crossing.
3. Place clean, rigid, non polluting aggregate or gravel in the 100 mm to 150 mm size class over the fabric to a minimum depth of 200 mm.
4. Provide a 3-metre wide carriageway with sufficient length of culvert pipe to allow less than a 3(H): 1 (V) slope on side batters.
5. Install a lower section to act as an emergency spillway in greater than design storm events.
6. Ensure that culvert outlets extend beyond the toe of fill embankments.

**TEMPORARY WATERWAY CROSSING** **SD 5-1**

Figure 5-23 Typical temporary watercourse crossing (Landcom, 2004)

If required, the temporary crossings would:

- Maintain low flow conditions in the watercourse
- Be certified by the road designer to confirm no adverse flooding impacts would occur during design flood events
- Be removed in full and the area rehabilitated following completion of construction.

Temporary waterway crossings would be designed in accordance with the requirements of the Policy and guidelines for fish habitat conservation and management (NSW Department of Primary Industries, 2013).

#### *Farm dam de-watering and infilling*

Up to 15 farm dams may require de-watering and either full or partial infilling to construct the project. A typical de-watering sequence Involves the following steps:

- Pre-clearing survey are carried out, and aquatic fauna relocated (or pest species removed – see below)
- Bunds to divert overland flow are installed
- Erosion controls (eg silt fence and/or geotextile fabric) are installed
- The pump pad is prepared
- The pump intake head is secured on a floating device over the deepest part of the dam (this would be done when the dam is full due to difficulty in moving the pipe when the water is low
- A test discharge and diversion is carried out to ensure no erosion or sedimentation occurs downstream
- Water is pumped and either irrigated overland at a rate that allows infiltration to the soil, pumped to another dam, or used for onsite dust suppression
- Sediment controls are checked if the soil becomes saturated and surface runoff is generated
- Pumping rates are adjusted accordingly (should saturation occur).

De-watering would be supervised by an aquatic ecologist trained and experienced in the rescue, relocation and management of pest species in such operations, and holding appropriate permits. The aquatic ecologist would be on standby to assist in the event of any aquatic fauna rescue and relocation during de-watering and would be updated as the process progresses.

Procedures for the safe relocation of native aquatic fauna, and euthanasia of pest species would be developed as part of a construction flora and fauna management plan (CFFMP) during de-watering. To allow rapid fauna rescue, the pump inlet would be large enough to allow sediment to pass but would include the use of an appropriate mesh to cover the pump but prevent macroinvertebrates, fish, tadpoles and frogs from being pumped out. This aquatic fauna would be relocated or, in the case of aquatic pest species, euthanised. Aquatic pest species (eg Eastern Gambusia – *Gambusia holbrooki*) would be euthanised according to best practice guidelines (Sharp, 2016) as currently approved by DoEE.

As the water level drops, the dam wall would be partially and progressively removed and stabilised to prevent refilling. A ramp would be graded as the wall is removed to allow any fauna in the bottom sediment to escape. This ramp would be left in place for two nights.

When the water pump-out is complete, the bottom sediment and the remaining dam wall would be removed, and the dam would be backfilled, and the area rehabilitated as agreed with the property owner or in accordance with construction specifications where the dam is located within the operational footprint.

## 5.24.10 Potential waterway adjustments

If potential permanent creek adjustments at Badgerys Creek, South Creek and Kemps Creek are required they would be carried out in stages.

Following the installation of erosion and sediment control measures to protect the existing creek, the bulk earthworks for the adjustment would be carried out offline to minimise interruption of the existing creek flow. The new section of creek would be kept free of flowing water to allow the planting and establishment of local native riparian vegetation and placement of rock for scour protection.

When works are complete and the new channel is established, flow would be introduced to the new channel during a period of low flow in the existing creek.

While the adjusted creek channel is becoming established, water would be allowed to flow along both the old section of creek and the adjusted section. This would allow for a final assessment and checking of the works before the final diversion of all flows to the new creek channel. Once the diversion works are complete, the old creek channel would be backfilled.

Temporary diversions of other minor drainage lines may be required for the installation of culverts as discussed in **Section 5.24.9**.

As noted in **Section 5.13.3**, the need for, extent and design of the creek adjustments would be reconsidered during detailed design, taking into account the potential environmental benefits of minimising any changes to the creeks' natural geomorphology.

## 5.24.11 Temporary works

### *Work platforms*

Work platforms would be required at bridge sites to provide a working area for bridge pier and abutment construction including piling. Platforms may also be required along the length of the bridge to provide a stable platform for the crane when erecting girders between the bridge piers.

The exact number and location of the working platforms would depend on the construction contractor's preferred construction method and equipment for the bridge works and may differ depending on the bridge type and bridge length. The number and location of work platforms required would be identified in the CEMP.

### *Hard-stand areas*

Hard-stand areas would be required at the main project office and ancillary facilities detailed in **Section 5.24.3**. These hardstand areas are required to accommodate ancillary facilities, construction staff parking and construction machinery. Hardstand areas would also be required to store some construction material (including culverts and steel reinforcement), and chemicals and fuel within bunded areas.

### *Temporary sediment basins*

The location and size of sediment basins were determined in accordance with the Blue Book criterion of 'minimum 150 cubic metres of annual sediment loss' (Soils and Construction, 2008 Volume 2D Main Road) (DECC 2008b). This criterion indicates that if the estimated annual soil loss from a disturbed catchment is less than 150 cubic metres, then a sediment basin may not be required, provided that other erosion and sediment controls are implemented.

Based on the design as set out in this document, it is expected that about 85 temporary sediment basins would be required to treat water during construction. Further information regarding the proposed temporary sediment basins is presented in **Section 7.9**.

The detailed design of erosion and sediment controls required during construction may result in changes to basin locations, sizing and/or the number of basins.

Most temporary sediment basins would be removed at the end of construction. However, some would be retained or modified to provide permanent water quality treatment and/or onsite detention capacity during operation.

Permanent basins are discussed in **Section 5.13.2** and shown in **Figure 5-5**.

Progressive erosion and sediment control plans would be prepared for the project to outline the type and location of other required erosion and sediment controls.

#### *Temporary leases*

Temporary leases for construction would be negotiated in accordance with the requirements of the site access schedule. Details of properties that may be temporarily leased are shown in **Table 5-15**. The number and location of leases would be confirmed during detailed design and in consultation with property owners.

Table 5-15 Potential properties subject to temporary leases during construction

| Potential properties subject to temporary leases | Lot/plan | Existing land use |
|---|---|---|
| Ancillary facility 1 | Lot 1 DP200435 | Rural/agriculture |
| Ancillary facility 2 | Lot 1 DP1087838 | Rural/agriculture |
| Ancillary facility 3 | Lot 101 DP848215 | Rural/agriculture |
| Ancillary facility 4 | Lot 7 DP734584 | Rural/agriculture |
| Ancillary facility 5 | Lot 25 DP30265<br>Lot 26 DP30265 | Commercial |
| Ancillary facility 6 | Lot 3 DP1087825 | Western Sydney Parklands |
| Ancillary facility 7 | Lot 3 DP1087825 | Western Sydney Parklands |
| Ancillary facility 8 | Lot 3 DP1087825<br>Lot 12 DP1041391 | Western Sydney Parklands<br>Western Sydney Parklands |
| Ancillary facility 9 | Lot 12 DP1021940 | Western Sydney Parklands |

## 5.24.12 Finishing works

Finishing works would be completed towards the end of each stage of the construction program. The main finishing works expected for the project would typically include:

- Line marking
- Installation of directional signage and roadside furniture, such as street lighting
- Landscape works
- Site demobilisation and rehabilitation of construction ancillary facilities and other areas of construction disturbance.

## 5.24.13 Construction workforce

The size and composition of the construction workforce would vary over the construction period depending on the activities carried out and the staging strategy. There may be several different work crews active on the project at any one time.

The core workforce would comprise a range of professional staff, supervisors and tradespeople who would typically be sourced from within the construction contractor's own organisation. Some of the workforce could be sourced from the local area and would include a wide range of subcontractors and suppliers.

Any recruitment of construction personnel by the construction contractor would consider opportunities for Aboriginal employment in accordance with NSW Government policy on Aboriginal participation in construction (NSW Government, 2018b).

The estimated total workforce to be employed over the course of the project would peak between about 600 to 800 personnel (or average about 400 per year over a three-year construction period). The workforce excludes part-time, offsite workers and delivery truck drivers.

## 5.24.14 Construction work hours

Where reasonable and feasible, construction would be carried out during standard working hours as defined by the Interim Construction Noise Guideline (DECC, 2009a) and presented in **Table 5-16**. Most of the noisiest activities would be able to be carried out during standard construction hours.

Table 5-16 Standard working hours

| Day | Start time | Finish time |
|---|---|---|
| Monday to Friday | 7am | 6pm |
| Saturday | 8am | 1pm |
| Sunday and public holidays | No work | |

## 5.24.15 Extended construction hours

The Interim Construction Noise Guidelines (DECC, 2009a) state that public infrastructure works are one of the five categories of works that may need to be carried out outside the recommended standard hours.

Roads and Maritime is seeking approval for standard construction hours plus additional time at the start and end of each day (Monday to Friday) and Saturday afternoon, referred to as 'extended construction hours'. Extended construction hours would apply across the project and Roads and Maritime would carry out targeted consultation with affected residents before work starts, as part of the construction environmental management plan and community involvement framework.

Extended construction hours would include an extra hour at the start and end of each day Monday to Friday and an extra four hours on a Saturday as outlined in **Table 5-17.**

Table 5-17 Extended construction hours

| Day | Start time | Finish time |
|---|---|---|
| Monday to Friday | 6am | 7pm |
| Saturday | 8am | 5pm |
| Sunday and public holidays | No work | |

Where possible, activities conducted during extended working hours near sensitive receivers would be limited to less noisy activities such as refuelling, light vehicle movements and briefing of the workforce (toolbox talks).

Noisy activities, such as those involving noisy machinery, would be deferred to standard working hours where possible.

Extended construction hours at the start and finish of each working day are considered to be in the public interest as they would be expected to:

- Shorten the overall construction period by up to about eight months (about 23 per cent of the total duration). This would minimise disruption to the surrounding communities and road network and minimise any adverse impacts on local and regional businesses during construction.
- Reduce the public's exposure to changed traffic conditions during construction where the project interfaces with local roads and the existing motorway network, reducing the extent and duration of delays and potentially improving safety.

An assessment of the likely noise impacts resulting from extended construction hours is presented in **Section 7.7**. The assessment identifies the management measures that would be implemented to minimise these impacts.

### 5.24.16 Out-of-hours work

In addition to standard working hours and extended construction hours, some construction activities would need to be carried out 'out-of-hours'.

The Interim Construction Noise Guidelines identify five categories of work that might be carried out outside the recommended standard hours:

- The delivery of oversized plant or structures that police or other authorities determine require special arrangements to transport along public roads
- Emergency work to avoid the loss of life or damage to property, or to prevent environmental harm
- Maintenance and repair of public infrastructure where disruption to essential services and/or considerations of worker safety do not allow work within standard hours
- Public infrastructure works that shorten the duration of construction and are supported by the affected community
- Works where a proponent demonstrates and justifies a need to operate outside the recommended standard hours.

These five categories were considered in predicting the need for out-of-hours work. Typical activities that may need to be carried out out-of-hours include:

- Installation of traffic controls, such as concrete barriers
- Construction of bridges over existing roads including Luddenham Road, Elizabeth Drive, Range Road and the M7 Motorway; activities would include installing bridge girders, concrete decking, and barriers
- Construction works interfacing with the M7 Motorway, including construction of overbridge piers for the M12 Motorway entry and exit ramps and ramp tie-ins with the M7 Motorway
- Construction works interfacing with The Northern Road, including construction of pavement, surfacing, line markings, kerbs and traffic islands, traffic signs and signals
- Operation of concrete and asphalt batching plants and concrete and asphalt pouring
- The operation of concrete and asphalt batching plants and concrete and asphalt pouring across the alignment
- Resurfacing of asphalt pavement on existing roads
- Utility modifications, relocations or protection measures works
- Removal of existing static signage and installation of new signs
- Removal of existing traffic barriers and installation of temporary and permanent traffic barriers
- Removal of existing lane marking and application of new lane marking on existing roads
- Delivery of plant and materials that is required outside these hours as requested by police or other authorities for safety reasons (eg oversized deliveries)
- Any work that does not cause noise emissions to be audible at any sensitive receiver
- Emergency work to avoid the loss of lives, property and/or to prevent environmental harm.

Out-of-hours construction activities would be supported by out-of-hours operation of temporary ancillary facilities. The exact timing of out-of-hours work would depend on construction activities, construction techniques and constraints imposed by the affected communities or the relevant authorities (utility authorities or road/motorway operators), and would be subject to the requirements of the construction contractor.

## 5.24.17 Traffic management and access

### *Traffic management*

At several locations, the construction footprint would intersect with or run adjacent to the existing road network. Construction traffic moving to and from work sites could impact traffic on the existing road network. Where possible, construction traffic would be contained within the construction footprint and would use temporary internal haul roads to move around the project, to minimise impacts on the public road network.

Construction activities would generally be completed while maintaining traffic movements either on existing roads or detoured routes. Access would be maintained, or alternative access provided to properties with impacted access during the construction and operation of the project. Alternative provisions would be agreed with affected property owners where required.

Temporary traffic management measures would be implemented at various stages of the project in accordance with traffic control at work sites (Roads and Maritime, 2018c). These measures would include:

- Modification of lane widths to facilitate the safe entry, exit and movement of plant and materials, and to allow for construction staging of work near existing roads
- Placement of separation barriers to protect road users and construction personnel

- Reduced speed zones on roads adversely modified by construction work
- Reduced shoulder widths to allow for tie-in work to be completed
- Traffic detours and switches.

Potential temporary traffic management measures on each of the interfacing local roads are summarised in **Table 5-18**, overleaf. The temporary traffic management measures would vary at each location and are indicative only.

Temporary directional and advisory signs, along with variable message signs, would be used throughout construction where necessary. It is envisaged that the contractor would maintain the current level of serviceability with only minor disruptions to traffic during final road surfacing and line marking.

### *Construction access*

Construction access would be from the existing road network including The Northern Road, Luddenham Road, Elizabeth Drive west of the airport access road, Clifton Avenue, Mamre Road via Elizabeth Drive, Range Road via Elizabeth Drive, the utility access road at Elizabeth Drive near Duff Road, Wallgrove Road and via the existing M7 Motorway underpass opposite Kosovich Place, Cecil Park. These roads would be used or crossed for:

- Importing materials to work areas
- Hauling materials from one work area to another
- Providing access for the delivery of all construction materials and consumables
- Providing access for the workforce to the various locations along the project, particularly to the project laydown areas and project site office.

Access for construction of the bridge piers for the M7 Motorway southbound exit ramp would be via an access track to be constructed as part of the project. The access track would run from the northern side of Elizabeth Drive (via an existing access point near the Plough and Harrow picnic area of the Western Sydney Parklands) to the base of the proposed bridge piers.

Table 5-18 Temporary traffic management measures

| Road | Location details | Temporary traffic management measures | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Traffic switches | Detours | Lane width adjustments and relocation | Shoulders reduced | Reduced speed zones | Separation barriers | Temporary road closures |
| The Northern Road | Intersection with the M12 Motorway | | | | ✓ | ✓ | ✓ | |
| Luddenham Road | Where the M12 Motorway overpasses | | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Elizabeth Drive | Grade separation over the airport access road | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Clifton Avenue | Grade separation over the M12 Motorway | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Salisbury Avenue | Where the M12 Motorway crosses | | | ✓ | | ✓ | ✓ | ✓ |
| Elizabeth Drive | Where the M12 Motorway overpasses near Mamre Road | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Range Road | Where the M12 Motorway overpasses | | | ✓ | | ✓ | ✓ | ✓ |
| Elizabeth Drive | Where the M12 Motorway to M7 Motorway interchange ramps overpass | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Wallgrove Road | Between Elizabeth Drive and the existing M7 Motorway northbound entry ramp from Wallgrove Road | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| M7 Motorway | Where the M12 Motorway to M7 Motorway interchange ramps overpass | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |

A semi-formal access track currently runs through this area. It is used to inspect the M7 Motorway retaining wall. This track would be upgraded to function as construction access for the project. Upgrading the track is expected to require some minor vegetation trimming and clearing, and some regrading and surface stabilisation to allow piling rig and construction equipment access. The access track would be left in place following construction and used for future inspections and maintenance of the bridge piers.

Access for construction of the bridge piers in the median of the M7 Motorway would be carried out within the motorway median, with workers protected by temporary barriers. This work site (the median) would be accessed from the M7 Motorway.

Access for construction of the bridge pier between the M7 Motorway and the southbound exit ramp to Elizabeth Drive would be from the off ramp to Elizabeth Drive. Adjustment of the traffic lane arrangement within the off ramp may be required and the work area would be protected by traffic barriers.

Construction access would also be through the ancillary facilities. The development of haulage routes on public roads was based on minimising impacts on local roads and on the Elizabeth Drive/M7 Motorway/ Wallgrove Road interchange. The proposed access to the ancillary facilities is described in **Table 5-19**.

Proposed construction access is indicative only and may be adjusted by the contractor to improve safety and accessibility.

Table 5-19 Proposed access to ancillary facilities

| Ancillary facility | Access |
|---|---|
| Ancillary facility 1 (AF1) | Access from The Northern Road via an existing property access |
| Ancillary facility 2 (AF2) | Access from Elizabeth Drive opposite the existing Elizabeth Drive/Taylors Road intersection, opposite the northern boundary of the Western Sydney Airport. This may require local roadworks on Elizabeth Drive to provide for safe left and right turns into and out of AF2 |
| Ancillary facility 3 (AF3) | Access via AF2 and then through the construction footprint (ie from Elizabeth Drive opposite the existing Elizabeth Drive/Taylors Road |
| Ancillary facility 4 (AF4) | Access from Clifton Avenue via an existing property access |
| Ancillary facility 5 (AF5) | Access from Elizabeth Drive to an existing driveway access in Mamre Road |
| Ancillary facility 6 (AF6) | Access from an existing utilities access road that connects to Elizabeth Drive near Duff Road. This may require local roadworks on Elizabeth Drive to provide for safe left and right turns into and out of the utilities access road |
| Ancillary facility 7 (AF7) | Access through the construction footprint along the proposed project alignment from AF6 |
| Ancillary facility 8 (AF8) | Access via an internal haul route from AF7, then via an existing underpass beneath the M7 Motorway |
| Ancillary facility 9 (AF9) | From Wallgrove Road and via the existing M7 Motorway underpass opposite Kosovich Place, Cecil Park |

### *Haulage routes and heavy vehicle movements*

During the construction period, haulage of bulk earthwork materials is expected to be the main contributor to additional vehicle movements in the area. Where possible, haulage of materials would generally be carried out within the construction footprint along internal haul roads to minimise construction vehicle movements on public roads. In addition, where possible, transport movements would be scheduled to ensure that the number of vehicle movements would be minimised during the morning and evening peak traffic periods. Scheduling of construction transport movements will be detailed in the construction transport and traffic management plan (CTTMP) as part of the CEMP (see **Section 7.2.8**).

Haulage through the construction footprint would be subject to scheduling for construction of the bridges spanning over local roads such as Luddenham Road, Elizabeth Drive and Range Road. Prior to the completion of bridge works, at-grade or alternative haulage routes along public roads may be used.

Haulage arrangements at key locations within the construction footprint are described in **Table 5-20** and shown in **Figure 5-24**.

Table 5-20 Haulage arrangements at key locations within the construction footprint

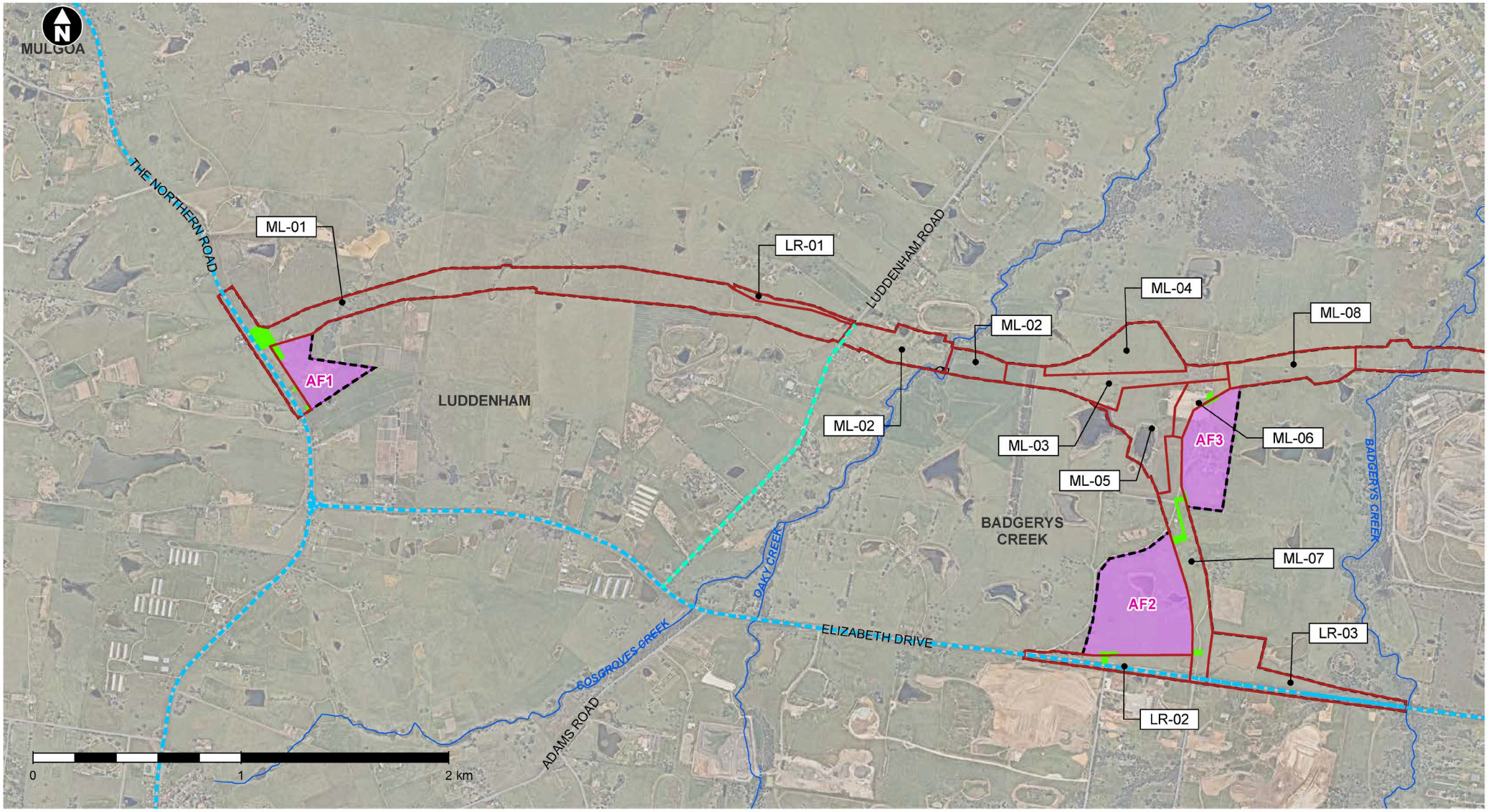
| Key location | Haulage arrangements |
|---|---|
| Luddenham Road | A haulage route would cross Luddenham Road. Prior to the completion of the bridge[1] at this location, construction vehicles would cross Luddenham Road at grade under traffic control.<br>It is anticipated that Luddenham Road would be used for hauling materials associated with the construction and erection of the main line bridge over Luddenham Road. |
| Cosgroves Creek, Badgerys Creek, South Creek and Kemps Creek | Temporary creek crossings would be established to haul material along the alignment and enable construction of the bridges spanning these creeks |
| Clifton Avenue | A haulage route would cross Clifton Avenue to haul materials along the alignment. Prior to completion of the bridge[1] at this location, construction vehicles would cross Clifton Avenue at grade under traffic control.<br>Clifton Avenue would also be used as a haulage route to access the site via AF4. |
| Mamre Road to Range Road | Prior to the completion of the bridge[1] over Elizabeth Drive, materials would be transported along the public road network between Mamre Road and Range Road using Elizabeth Drive. Once the proposed bridge over Elizabeth Drive and Range Road is complete and connected, this route would no longer be required. |
| Range Road | A haulage route would traverse Range Road to haul materials along the alignment. Prior to completion of the bridge[1] at this location, construction vehicles would cross Range Road at grade under traffic control.<br>Range Road would also be used as a haulage route to access the site. |
| Wallgrove Road and the existing M7 underpass (opposite Kosovich Place) | Materials would be hauled to the north eastern area of the construction footprint from Elizabeth Drive, along Wallgrove Road and via the existing M7 Motorway underpass (opposite Kosovich Place). |

[1]*The proposed indicative schedule of bridge construction is shown in* ***Figure 5-25****.*

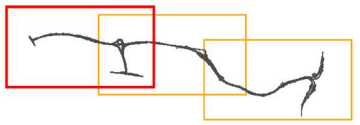
In addition to haulage within the construction footprint, construction vehicles would be required to import materials to the construction site along the public road network. A summary of the key haulage routes and truck numbers associated with importing materials (including bulk earthworks materials, selected material zone materials and concrete for pavements) is provided in **Table 5-21**.

The proposed haulage routes and truck numbers are based on an assessment of bulk earthwork quantities required in each work zone (as shown in **Figure 5-24**) and an assumed productivity rate (ie how much material can be moved each day based on the number and size of trucks and work crews).

The estimates are based on an overall construction period of about 3.5 years with bulk earthworks completed in about three years. The numbers are estimates only and may vary based on several factors including detailed design, the locations of the source material, site conditions during construction and suitability of materials for reuse on site.




Waterways
Work zones
Ancillary facilities
Haulage routes
Temporary haulage route for bridge construction
Vehicular access to ancillary facilities
Exclusion zones
The project construction footprint



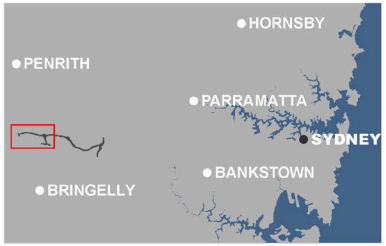



Figure 5-24 Work zones and site access locations

Page 1 of 3

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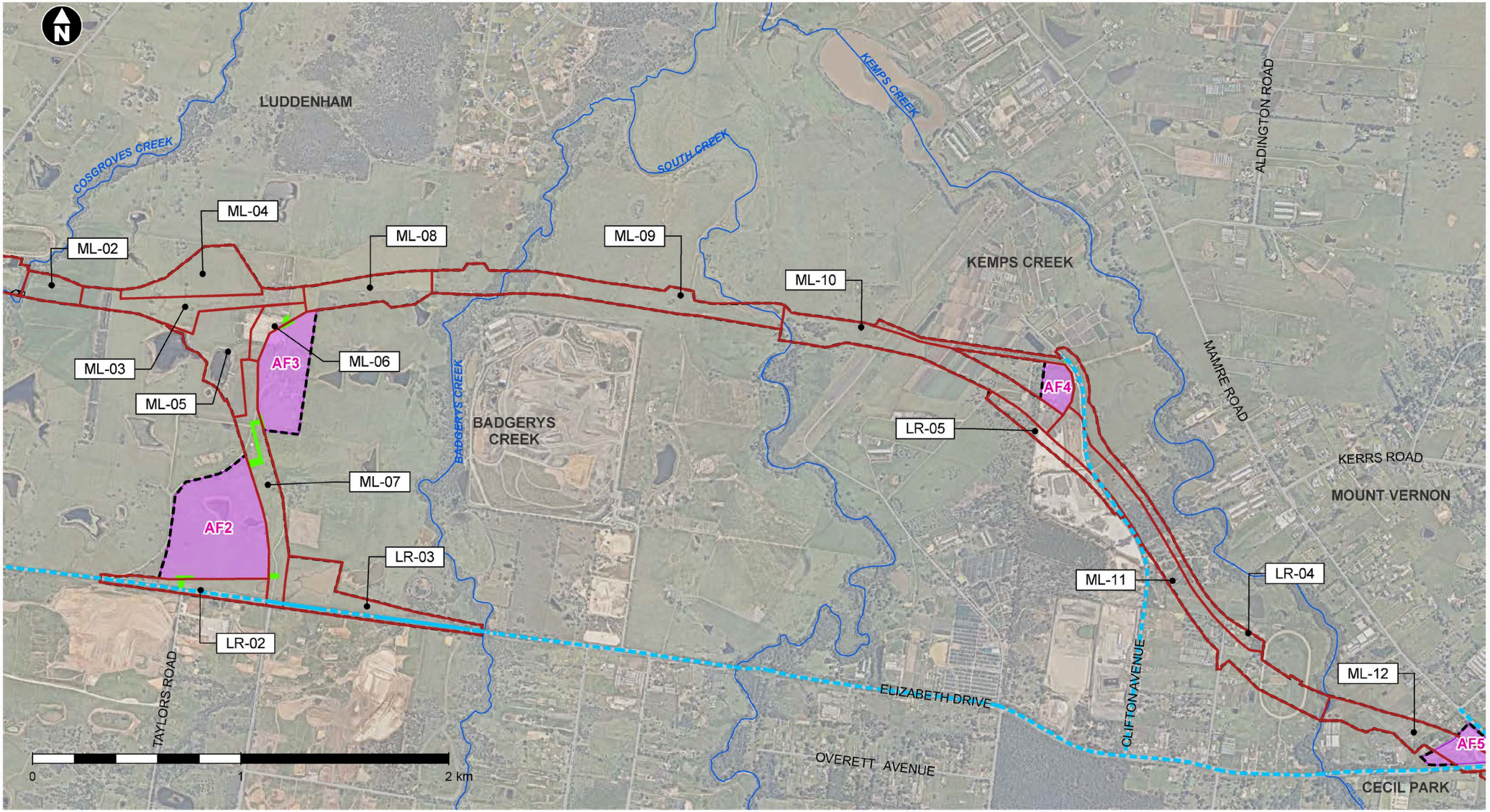


Figure 5-24 Work zones and site access locations



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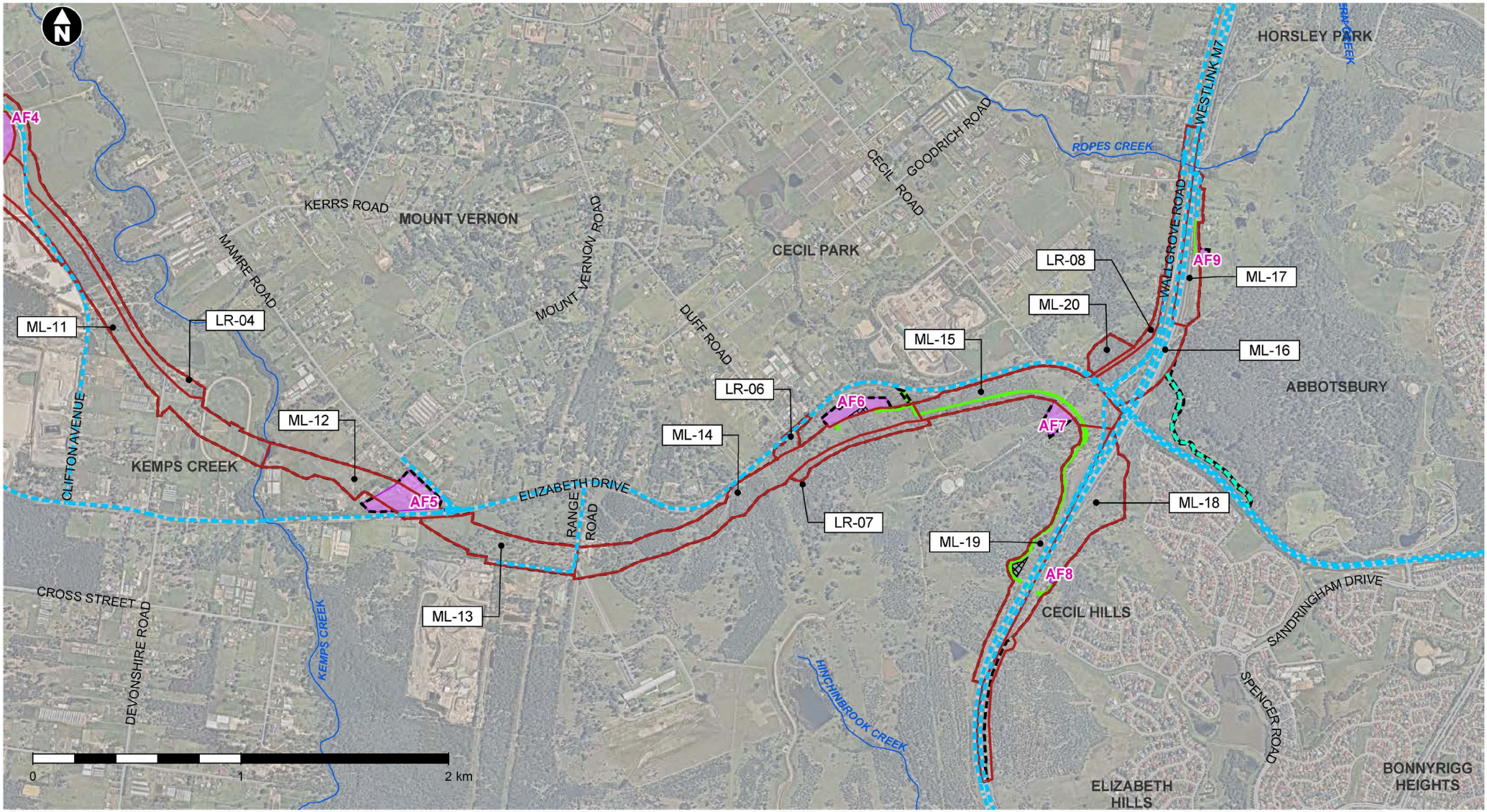


Waterways
Work zones
Ancillary facilities
Haulage routes
Temporary haulage route for bridge construction
Vehicular access to ancillary facilities
Exclusion zones
The project construction footprint

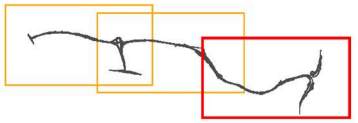


Figure 5-24 Work zones and site access locations

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Table 5-21 Key haulage routes and predicted truck movements outside the construction footprint

| Haulage Routes | Site access via | Work zone | Work location | Approximate total truck movements |
|---|---|---|---|---|
| M7 Motorway, Elizabeth Drive and The Northern Road | AF1 | ML-01 | The Northern Road to Luddenham Road | 7856 |
| | | ML-02 | Luddenham Road to South Creek bridge | |
| M7 Motorway and Elizabeth Drive | AF2 (and AF3) | ML-03, ML-05, ML-06, ML-08 | South Creek bridge to Badgerys Creek | 83,065 |
| | | ML-04 | Airport interchange north of the M12 Motorway main line | |
| | | ML-07 | Western Sydney Airport access road | |
| | | LR-02 | Elizabeth Drive, west of the Western Sydney Airport access road | |
| | | LR-03 | Elizabeth Drive, east of the Western Sydney Airport access road | |
| | | ML-09 | Badgerys Creek to South Creek bridge | |
| M7 Motorway, Elizabeth Drive and Clifton Avenue | AF4 | ML-10 | South Creek bridge to Clifton Avenue | 12,893 |
| | | LR-05 | Clifton Avenue south of the M12 Motorway main line | |
| | | LR-04 | Clifton Avenue north of the M12 Motorway main line | |
| | | ML-11 | Clifton Avenue to Kemps Creek | |
| M7 Motorway, Elizabeth Drive and Mamre Road | AF5 | ML-12 | Kemps Creek to Elizabeth Drive | 3805 |
| M7 Motorway, Elizabeth Drive and Range Road | Range Road | ML-13 | Elizabeth Drive to Range Road | 26,498 |
| M7 Motorway and Elizabeth Drive | AF6 | ML-14 | Range Road to existing utility access road | 16,074 |
| | | ML-15 | Existing utility access road to M7 interchange ramp bridges | |
| | | ML-19 | M7 Motorway northbound exit ramp | |
| | | ML-18 | M7 Motorway southbound entry ramp | |

| Haulage Routes | Site access via | Work zone | Work location | Approximate total truck movements |
|---|---|---|---|---|
| M7 Motorway, Elizabeth Drive, Wallgrove Road and the existing M7 Motorway underpass opposite Kosovich Place | AF9 | ML-17 | M7 Motorway southbound exit ramp | 4567 |
| M7 Motorway and Elizabeth Drive | Wallgrove Road | ML-16 | M7 Motorway northbound entry ramp | 9244 |
| | | LR-08 | Wallgrove Road | |
| | | ML-20 | Wallgrove Road G-loop ramp | |

Construction is expected to result in an average of 1560 truck movements per day. The haulage and delivery of materials may occur during extended construction hours, and the delivery of oversized structural elements requiring police or other escorts may occur out of work hours.

Construction vehicle movements would occur throughout the project, and moderate fluctuations in traffic volumes are likely in response to the construction program and key activities in each location. Traffic impacts are discussed in **Section 7.2**.

### *Light vehicle movements and other construction traffic*

Light vehicle construction access (eg staff and smaller deliveries) would also contribute to traffic on the local road network. Construction traffic would also be generated by deliveries of general materials and consumables, deliveries of oversize loads, other infrequent deliveries and subcontractor support vehicles. The contribution of light vehicles to traffic on roads in the project area is assessed in **Section 7.2**.

### *Plant and equipment*

Construction activities expected for the project and the typical plant and equipment required are outlined in **Table 5-22**. The expected duration of each construction activity indicates the intensity and scale of the construction effort. The final equipment and plant profile would be determined by the construction contractor.

Table 5-22 Plant and equipment requirements

| Construction activity | Main plant and equipment required | Approximate duration |
|---|---|---|
| Mobilisation and site establishment | Plant: Small cranes and lifting equipment, excavators, front-end loaders, concrete trucks, road trucks, light vehicles<br>Equipment and materials: Fences, portable sheds, portable ablutions, fuel storage, generators, waste tanks | 3 months |
| Relocation and protection of existing services | Plant: Excavators, backhoes, front-end loaders, dump trucks, concrete trucks, road trucks, light vehicles, agitator trucks and piling rigs<br>Equipment: Jackhammers, concrete saws and other small hand-held equipment | 9 months |

| Construction activity | Main plant and equipment required | Approximate duration |
|---|---|---|
| Clearing, grubbing and topsoil stripping | Plant: Excavators, dozers, graders, water carts, front-end loaders, dump trucks, fuel trucks, road trucks, scrapers, and light vehicles<br>Equipment: Small hand-held equipment | 9 months |
| Demolition of buildings and bridges, and deconstruction and removal of redundant roads | Plant: Excavators, front-end loaders, road trucks, light vehicles, dozers<br>Equipment: Jackhammers, concrete saws and other small hand-held equipment | 9 months |
| Bulk earthworks and haulage of materials | Plant: Excavators, dozers, graders, water carts, front-end loaders, vibratory rollers, dump trucks, road trucks, scrapers, fuel trucks, light vehicles<br>Equipment: Hand-held compactors | 36 months |
| Pavement works | Plant: Excavators, dozers, graders, water carts, front-end loaders, compaction equipment, road sweepers, fuel trucks, asphalt pavers, bituminous spray sealing trucks, vibratory rollers, concrete trucks, road trucks, line-marking machines, and light vehicles<br>Equipment: Hand-held compactors, jackhammers, concrete saws and other small hand-held equipment | 30 months |
| Construction of drainage structures | Plant: Excavators, elevated work platforms, mobile cranes, agitator trucks, piling rigs, concrete trucks, concrete pumps, vibratory rollers, road trucks, light vehicles<br>Equipment: Hand-held compactors and other small tools | 33 months |
| Construction of bridges – most likely including heavy vehicle deliveries of over-sized loads | Plant: Piling rigs, mobile cranes, precast girder launch gantries, concrete trucks, concrete pumps, semi-trailers, excavators, dozers, dump trucks, elevated work platforms, asphalt pavers, bituminous spray sealing trucks, line-marking machines, light vehicles<br>Equipment: Heavy jacking equipment, post tensioning jacks and plant | 36 months |
| Changes to property access | Plant: excavators, graders, water carts, front-end loaders, road sweepers, asphalt pavers, bituminous spray sealing trucks, vibratory rollers, concrete trucks, road trucks, line-marking machines, light vehicles<br>Equipment: Hand-held compactors, jackhammers, concrete saws and other small hand-held equipment | 9 months |
| Signposting | Plant: Excavators, elevated work platforms, mobile cranes, agitator trucks, concrete trucks, road trucks, light vehicles<br>Equipment: Hand-held compactors, jackhammers and other small tools | 6 months |
| Installation of lighting and roadside furniture | Plant: Excavators, elevated work platforms, mobile cranes, agitator trucks, concrete trucks, road trucks, light vehicles<br>Equipment: Hand-held compactors and other small tools | 12 months |
| Landscape works, waste disposal and rehabilitation of disturbed areas with no future use | Plant: Excavators, dozers, water carts, front-end loaders, graders, road trucks, light vehicles<br>Equipment: Small tools | 12 months |

## 5.24.18 Construction materials

A range of materials and pre-cast elements would be used to build the project. These would include:

- General fill and selected material for earthworks
- Sand and soils for landscape works
- Geotextile materials
- Pavement materials including road base and sub-base
- Materials for lining drainage lines
- Aggregate for concrete, asphalt and bitumen
- Cement and concrete
- Steel elements including reinforcement, girders, trusses, sign supports, gantries and fencing
- Wood, aluminium and steel for use in formwork and other temporary structures
- Water
- Pre-cast concrete including girders, pipes, culvert segments, pits, wall segments and roadside barriers
- Mechanical and electrical equipment.

These materials are discussed in more detail below.

#### *Steel*

Reinforcing steel for structures would be sourced by the construction contractor depending on volumes, quality and performance requirements of the project.

#### *Rock*

Rock for drainage blankets, bridging layers, gabion walls, scour protection and pavement gravels would be sourced from local quarries where possible. Crushing of rock would take place at the source and not at the project site.

#### *Concrete*

Concrete would be required for pavements, bridges and road surface sub-base. It is expected that concrete would be sourced from a concrete batching plant located at AF2 and/or AF3 if required (see **Section 5.24.3**). However, concrete may also be hauled in agitator trucks to the construction footprint from other locations including local suppliers, if required.

#### *Utilities*

A number of utilities and services may be impacted by the project; some may need to be realigned. The extent of impact and associated construction material cannot be confirmed until the detailed design is finalised but is anticipated to include plastic, metal and/or concrete pits and pipes and cabling.

#### *Water*

Water would be used during construction for a range of purposes including but not limited to dust suppression, earthworks compaction, wheel washing, machinery, concrete/asphalt batching, curing structures and for amenities (toilets, sinks, showers, and drinking). Indicative construction water use is estimated in **Table 5-23**. Construction water sources would be confirmed during detailed design but are likely to include a combination of potable mains supply and recycled water, drawn from sources internal and external to the construction footprint.

A water balance for ground and surface water and the sources of water expected for the project are discussed in **Section 7.9** and **Section 7.10**.

Table 5-23 Estimated water use during construction

| Construction activity | Water use volume (megalitres) |
|---|---|
| Dust suppression | 270 |
| Earthworks compaction | 270 |
| Concrete/asphalt batching plants for pavements | 38 |
| Potable water at main ancillary facility | 10 |
| Potable water at outpost sites (eight sites) | 16 |
| Concrete batching plants for bridges | 63 |
| Wheel washing (nine sites) | 9 |
| Total | 676 |

#### *Fuel*

For major earthworks, typical fuel usage is about one litre per cubic metre. However, if smaller equipment is used, this can increase to 1.2 to 1.4 litres per cubic metre. In addition, the size of equipment or on-road versus off-road haulage would change these values.

Over a three-year bulk earthworks construction period, it is estimated that 10 million litres of fuel would be used to construct the project.

Where a generator is required, about 43 litres per hour would be used, based on a 200 kVA generator.

#### *Electricity*

Electricity consumption during construction would vary, and would depend on the contractor's proposed site use, facilities, staffing numbers and equipment. Electricity needs on the site would be relatively low and are envisaged to include lighting, air-conditioning and office equipment. Connecting the offices to the local power grid would be sufficient for these purposes.

Generators may be necessary for emergency power supply and at some ancillary facilities where connection to the local power supply is not readily available. Similar recent projects have used a 200 kVA generator to supply the main site office.

Power consumption by the proposed concrete/asphalt batching facility would vary, and would depend on the size of the plant. A typical medium-sized batching plant draws about 110 kilowatts per hour.

### 5.24.19 Spoil and waste disposal

Various waste streams would be generated during construction including:

- Excavated material, including rock, gravel, clay and sand

- Demolition waste, including building materials, bridge removal materials, vegetation, kerbs and road surfaces
- Vegetation waste from the removal of trees, shrubs and groundcovers
- Packaging materials, including crates, pallets, cartons, plastics and wrapping materials
- Liquid wastes
- Construction materials
- General waste from construction sites, including office wastes, scrap materials and biodegradable waste.

Potential waste types expected to be generated by the project and the proposed measures for the management of waste are provided in **Section 8.5**.

### 5.24.20 Construction program

Construction of the project is expected to begin in the first quarter of 2022 and conclude in 2025 (with decommissioning potentially occurring into the first quarter of 2026), with works occurring across the full length of the construction footprint during this period. The actual start date and overall duration of the project would depend on:

- Timing and outcomes of key decisions regarding procurement, such as early works and contract packaging
- The project delivery method (that is, whether it is ‘design and construct’ or ‘design only’ and then ‘construct only’)
- Onsite conditions such as rain events and ground conditions encountered during construction.

An indicative construction sequence is provided in **Table 5-24**, overleaf. The possible construction sequence would be subject to change.

The indicative duration of construction activities is outlined in **Table 5-25**, overleaf and the indicative construction program for the project is outlined in **Figure 5-25**. The program is based on a single design and construct contract. The start and duration of activities are indicative only and are subject to change. The timing and duration of construction would be confirmed once a construction contractor is appointed to the project.

Table 5-24 Indicative construction sequence

| Phase No. | Construction phase | Activities |
|---|---|---|
| 1 | Site establishment and enabling works | • Set up ancillary facilities as needed<br>• Erect temporary fencing around construction footprint perimeter<br>• Establish temporary crossings of Luddenham Road, Clifton Avenue and Elizabeth Drive to permit haulage routes<br>• Construct a turning head for Salisbury Avenue<br>• Construct local access roads for properties divided by the M12 Motorway<br>• Carry out early stockpiling of fill |
| 2 | Bulk earthworks, drainage and structures, bridge construction, pavement works | • Construct all areas of the project from The Northern Road (including civil works for the intersection formation and minor works and signalisation at the intersection to control site access) to the extent of the M12 Motorway interchange with the M7 Motorway<br>• Construct bridges at Luddenham Road (BR01), over the future rail line (BR05), Clifton Avenue (BR08), Range Road (BR11) and the bridge over the main line for water reservoir access (BR12)<br>• Construct bridges at Cosgroves Creek (BR02), Badgerys Creek (BR06), South Creek and Kemps Creek (BR09)<br>• Construct Western Sydney Airport interchange including the bridge over the main line for the Western Sydney Airport access road (BR03)<br>• Detour Wallgrove Road to construct offline sections of the M12 Motorway interchange with the M7 Motorway, including the interchange bridges (BR13, BR14, BR15, BR16, BR17 and BR18)<br>• Construct the Elizabeth Drive northern bridge crossing the Western Sydney Airport access road (BR04)<br>• Construct the Elizabeth Drive southern bridge crossing the Western Sydney Airport access road (BR04)<br>• Construct the Western Sydney Airport access road to the Western Sydney Airport property boundary line<br>• Construct tie-in works for the M12 Motorway entry to and exit from the M7 Motorway<br>• Construct the bridge over Elizabeth Drive (BR10) |
| 3 | Finishing works | • Complete all remaining work on the M12 Motorway including signage and line marking<br>• Decommission and rehabilitate all temporary watercourse crossings and local road haulage crossings<br>• Vacate, decommission and rehabilitate all ancillary facilities<br>• Finalise the tie-in works at Elizabeth Drive grade separation over the Western Sydney Airport access road and switch traffic<br>• Finalise the tie-in works at Elizabeth Drive/Mamre Road intersection and switch traffic<br>• Finalise works at The Northern Road |

Table 5-25 Indicative duration of construction activities

| Construction activity | Work outside standard hours Yes/No | Haulage at night (per centage of total haulage) |
|---|---|---|
| Early works | Yes | Less than 1 per cent |
| Earthworks | No | N/A |
| Road work (carriageways, intersection, intersections and tie-ins) | Yes | About 10 per cent |
| Bridges | Yes | About 15 per cent |
| Drainage | Yes | About 1 per cent |
| Pavements | Yes | About five per cent |
| Utility relocation | Yes | About one per cent |
| Finishing work | Yes | About one per cent |

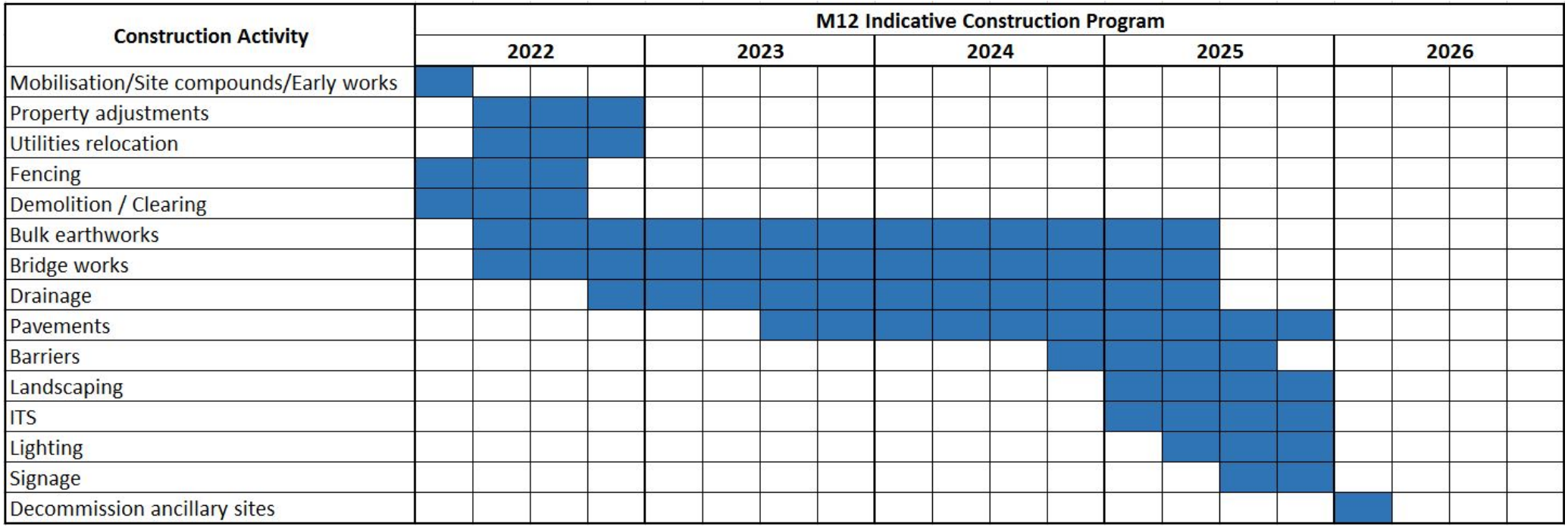


Figure 5-25 Indicative construction program based on a single design and construct contract

# 6. Consultation

This chapter presents an overview of the community and stakeholder activities carried out to inform the design and during the preparation of this EIS. It outlines the approach for future consultation activities to be carried out for the project. This chapter also presents a summary of issues raised by the community and stakeholders and where they are addressed in this EIS.

A Community and Stakeholder Engagement Plan was prepared to support the development of the project. It outlines the objectives, delivery and potential issues for the project to manage. The Plan is discussed in **Section 6.1**.

**Table 6-1** presents the SEARs that relate to consultation with government, other relevant stakeholders and the community, and identifies where they are addressed in this EIS.

Table 6-1 SEARs (consultation)

| Secretary's requirement | Where addressed in EIS |
|---|---|
| 4. Consultation | |
| 1. The project must be informed by consultation, including with relevant government agencies, infrastructure and service providers, special interest groups, affected landowners, businesses and the community. The consultation must be undertaken in accordance with the current guidelines. | Consultation carried out before EIS display to inform the project is outlined in **Section 6.1** and **Section 6.2**<br>Current guidelines that were applied to the consultation process are outlined in **Section 6.1**<br>Consultation to be carried out during public exhibition of the EIS is outlined in **Section 6.3.** Future consultation to be carried out before construction is outlined in **Section 6.4** |
| 2. The Proponent must document the consultation process, and demonstrate how the project has responded to inputs received. | An overview of the consultation process for the project is provided in **Section 6.1** to **Section 6.4**<br>Feedback received to date and how it is responded to, including where it is discussed in the EIS, is outlined in **Section 6.2.2** |
| 3. The Proponent must describe the timing and type of community consultation proposed during the design and delivery of the project, the mechanisms for community feedback, the mechanisms for keeping the community informed, and procedures for complaints handling and resolution. | An overview of the consultation process for the project is provided in **Section 6.1**<br>Consultation before EIS display is outlined in **Section 6.2**<br>Consultation after EIS display and through construction, including complaints handling and resolution, is outlined in **Section 6.3, Section 6.4** and **Section 6.5** |

## 6.1 Community and stakeholder engagement overview

The consultation and engagement activities carried out for the project have occurred in four main phases, as shown in **Figure 6-1**:

- Consultation carried out before public exhibition of the EIS (mid-2015 to 2019), including consultation carried out during:
  - Project development – This involved activities carried out from the early planning phase in mid-2015; the NSW Government's announcement of the start of the M12 Motorway investigations in August 2015; shortlisting of the route options in early 2016; announcement of the preferred route in November 2016; and the announcement of the preliminary design and access strategy in early 2018
  - Preparation of the EIS – This included the submission of a scoping report and State Significant Infrastructure (SSI) application to the NSW DPIE, in July 2018; the submission of an EPBC referral to the Commonwealth Department of Environment and Energy (DoEE) in July 2018; the carrying out of the various technical studies and preparation of the EIS for public exhibition
- Consultation to be carried out during the public exhibition of the EIS (2019) – This includes the display of the EIS and the preparation of a submissions report. A preferred infrastructure report (PIR) would be prepared if required
- Future planned consultation activities to be carried out after preparation of the submissions report and PIR (if required). This would include consultation activities to be carried out before construction
- Future planned consultation activities to be carried out during construction.

The consultation phases within the overall project development and delivery phases are shown in **Figure 6-1**. Consultation was carried out in accordance with the following guidelines:

- Roads and Maritime Services Community Engagement and Communications Manual (Roads and Maritime, 2012b)
- Land Acquisition Information Guide (NSW Government, 2014) and land acquisition reforms announced by the NSW Government in 2016 which can be found online here: https://www.finance.nsw.gov.au/sites/default/files/NSW_Government_Response.pdf
- Property Acquisition. A Guide for Residential Owners (NSW Government, 2019)
- Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010a)
- NSW Sustainable Design Guidelines Version 4.0 (TfNSW, 2017a)
- Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) (Roads and Maritime, 2011a).

The main objectives of consultation activities are to provide regular and targeted information to community and stakeholders about the likely impacts and benefits of the project. Ongoing consultation activities are designed to ensure community and stakeholder views are captured and incorporated into the project as it develops. Collaboration with government agencies and local councils is also important to ensure a whole-of-government approach.

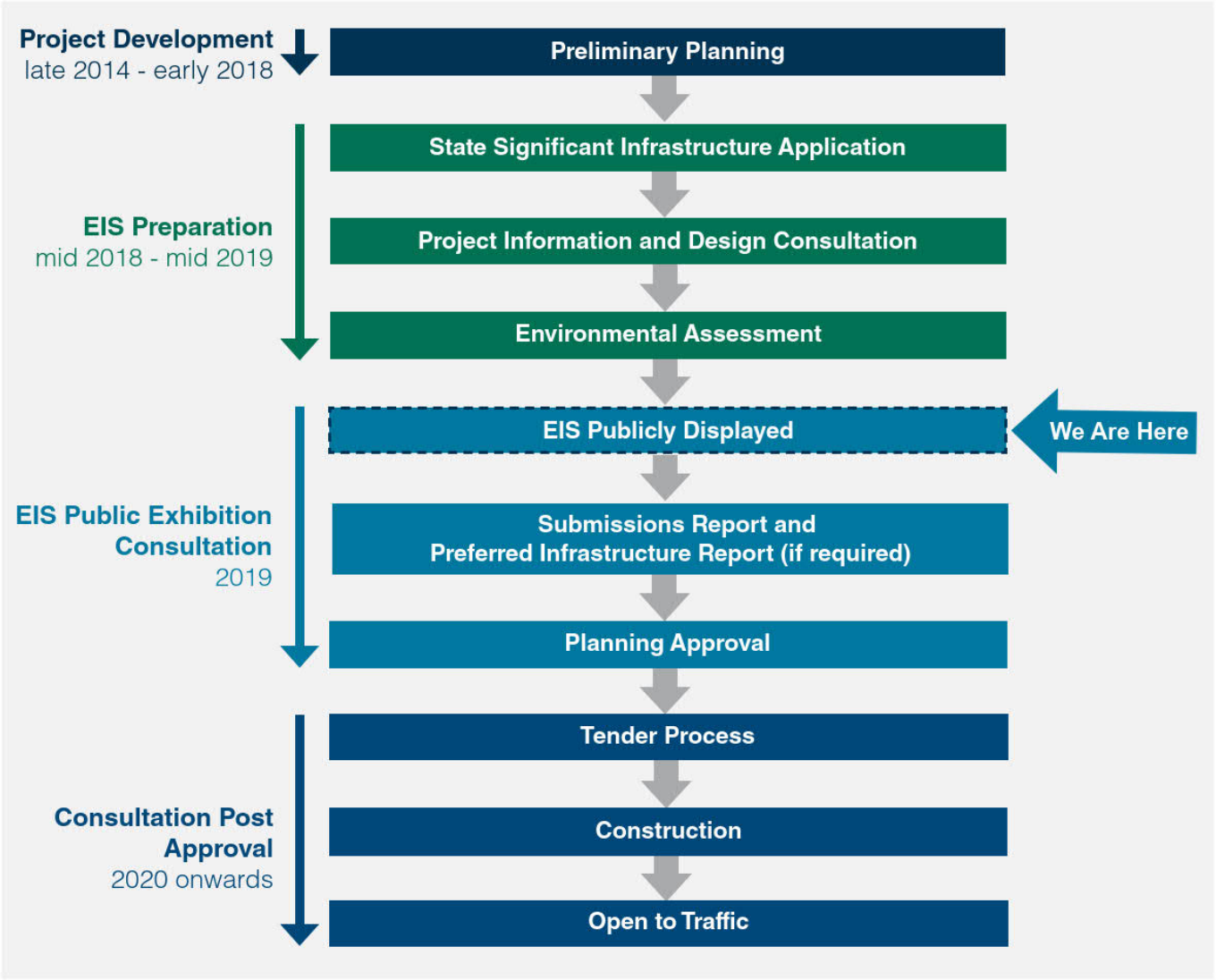


Figure 6-1 Consultation process within the project delivery

Stakeholders were identified as those parties that may have an interest in or have the potential to be affected by the project. The key stakeholders engaged for the project include:

- Landowners and residents potentially directly or indirectly affected by the project
- Government stakeholders including:
  - Local, State and Commonwealth agencies including the Western Sydney Parklands Trust
  - Local councillors
  - State and Federal members of parliament (MPs)
- Local Government Area councils
- NSW Government Architect
- WSA Co
- Western Sydney Planning Partnership
- Utility and service providers
- Local Aboriginal Land Councils

- Other relevant industry and stakeholders such as:
  - Directly and indirectly affected businesses
  - Community members and groups such as Bicycle NSW
  - Environmental groups
  - Educational facilities
  - Places of worship
  - Emergency services
  - Transport centres.

A number of engagement channels were established for the project to seek input from stakeholders and communities and facilitate ongoing community and stakeholder engagement. These include:

- A project email address to receive feedback from the community and provide updates to subscribers – m12motorway@rms.nsw.gov.au
- A toll-free project phone number for feedback, enquiries and complaints – 1800 517 155
- A postal address to receive written feedback (M12 Motorway, PO Box 973 Parramatta NSW 2124)
- A project website (www.rms.nsw.gov.au/m12) that provides background information on the project, along with maps, project updates and announcements, and information on how to provide feedback on the project.

Other tools that were used to facilitate consultation and engagement, include:

- Community newsletters delivered via letterbox drop
- Project posters
- Doorknocking
- Community information and feedback sessions
- A project webpage which presents the latest project information
- The online portal for the WSIP, which was updated with project information
- Media releases
- Newspaper and digital advertisements
- Postcard advertising community information sessions
- Electronic variable message signs (VMS)
- Reminder short messaging services (SMS), which were sent to stakeholders at the start of consultation and on the day before each information session.
- Emails, which were sent to general stakeholders (community members and groups), local MPs and other government stakeholders to raise awareness of the consultation and information sessions
- Aboriginal Focus Group (AFG) meetings
- Stakeholder briefings and one-on-one meetings with residents, business and property owners
- Value management workshops
- Social media posts.

# 6.2 Consultation prior to public exhibition of the EIS

## 6.2.1 Activities carried out before public exhibition of the EIS

Activities during the project development stage (ie before public exhibition of the EIS) involved:

- Early planning – pre-2015
- Investigation of potential route options – 2015
- Eight shortlisted route options – February 2016
- Preferred corridor route selection – November 2016
- Route amendments – May 2017
- Preferred design – February 2018
- Concept design development – mid-2017 to mid-2019.

During this stage, a number of consultation activities were carried out with a range of stakeholders including the local community, landowners, residents, government agencies, local councils, utility and service providers, the Aboriginal community, business and industry. These consultation activities are detailed below.

### *Community consultation*

Community consultation was carried out during the project development stage (between 2015 and August 2019) to ensure community members were given the opportunity to learn about the project and provide feedback before the public exhibition of the EIS.

Consultation involved with the milestones listed above primarily included four main stages:

- 13 July – 14 August 2015: An announcement was made of the start of the M12 Motorway investigations and study area, as well as the start of the strategic route options analysis study. Feedback was sought from the community on the constraints near the project and for input into the strategic route options
- 15 February – 11 March 2016: Community feedback was sought on the eight shortlisted route options for the project for incorporation into the final route selection
- November 2016 – A community newsletter that announced the selection of the modified orange option as the preferred corridor route
- 22 February – 23 March 2018: Community feedback was sought on the modified preferred corridor, the preliminary design of the project and the preliminary access strategy.

The community consultation activities carried out during these stages are summarised in **Table 6-2**. Community consultation reports were issued following each main consultation stage listed above and are available on the Roads and Maritime website.

Table 6-2 Community consultation activities

| Key consultation purpose or outcome | Consultation activity and communication summary |
|---|---|
| July to August 2015 – announcement of the M12 investigations, study area and route options analysis | |
| Inform community members and stakeholders about the project and collect feedback and suggestions from the community before developing a concept design of the preferred option<br><br>This included, providing information on the preliminary investigations and how options were being developed | • Community newsletters were distributed at community information sessions and via letterbox drop (about 4550 local residences). The newsletter provided a general overview of the project, study area, key features, benefits of the project and information on how to provide feedback.<br>• Project posters were displayed at various public locations within the local government area (LGA).<br>• 590 homes were door knocked to notify potentially impacted home owners and residents of the project and provide dates for the upcoming community information sessions. Where the door knock was unsuccessful a 'Sorry We Missed You' flyer was left.<br>• Six community information and feedback sessions were held to introduce the project to the community:<br>– Wednesday 22 July, from 4pm to 8pm **Penrith Anglican College Gymnasium**<br>– Saturday 25 July, from 12pm to 3pm **Bringelly Community Centre**<br>– Wednesday 29 July, from 3pm to 7pm **Holy Family Primary School Hall**<br>– Saturday 1 August, from 11am to 2pm **Glenmore Park Youth and Community Centre**<br>– Thursday 6 August, from 3pm to 7pm **Kemps Creek Public School Hall**<br>– Saturday 8 August, from 12pm to 3pm **Holy Family Primary School Hall**.<br>• The project webpage was updated with the latest project information including all relevant community update newsletters and how to submit feedback. A total of 3856 unique page visitors were recorded during the consultation period.<br>• The interactive web portal (WSIP Portal) developed two new videos during this consultation period. There was a total of 1674 unique visitors to the M12 Motorway webpage during the consultation period.<br>• A media release was distributed at the beginning of the consultation period that encouraged local community members and stakeholders to get involved in the consultation process.<br>• Eleven newspaper advertisements were placed in newspapers including the Penrith Press, Penrith Gazette, Penrith Western Weekender, South-west Advertiser, Macarthur Chronicle, Liverpool Leader, Liverpool Champion, The Sydney Morning Herald and The Daily Telegraph to inform the community of the information sessions.<br>• A postcard was mailed to 47,000 local residences which included project information on how to provide feedback and dates of information sessions.<br>• Eight VMS were displayed along The Northern Road, Elizabeth Drive and Bringelly Road to notify the community about upcoming information sessions.<br>• SMSs were sent to stakeholders on the stakeholder and community database at the start of consultation and on the day before each community information and feedback session.<br>• Emails were sent to general stakeholders (community members and groups), local MPs and other government stakeholders regarding information sessions and the closing date for consultation. |

| Key consultation purpose or outcome | Consultation activity and communication summary |
|---|---|
| | • Stakeholder briefings were held as well as one-to-one meetings with potentially affected property owners and residents. |
| February to March 2016– announcement of shortlisted route options | |
| Inform community members and stakeholders about the proposed shortlisted route options for the project and seek feedback for incorporation into the final route selection | • A community newsletter was distributed at community information sessions and via letterbox drop to about 2100 local residences. It detailed the eight shortlisted route options from the Strategic Route Options Analysis report.<br>• Project posters were displayed at various public locations within the LGA.<br>• 160 homes were door knocked to notify potentially impacted property owners and residents of the next stage of the project and provide dates for the upcoming community information sessions. A 'Sorry we missed you' flyer was left at 87 of the properties that were door knocked where no one was available to speak with the project team.<br>• Four community information and feedback sessions were held to discuss the preferred corridor route held:<br>– Wednesday 24 February, from 5pm to 8pm **Holy Family Primary School** (77 attendees)<br>– Saturday 27 February, from 10am to 1pm **Kemps Creek Public School** (65 attendees)<br>– Wednesday 2 March, from 3pm to 6pm **Kemps Creek Public School** (45 attendees)<br>– Saturday 5 March, from 10am to 1pm **Holy Family Primary School** (33 attendees)<br>• The project webpage was updated during this consultation period with the latest project information including all relevant community update newsletters and how to submit feedback. There was a total of 1906 unique page visitors during the consultation period<br>• A media release was distributed to all major Sydney metropolitan and western Sydney media publications that encouraged local community members and stakeholders to get involved in the consultation process<br>• Eleven newspaper advertisements were placed in newspapers including *Liverpool Leader, Liverpool Champion, Penrith Press, Penrith Gazette, Penrith, Western Weekender* and *Macarthur Chronicle* to inform the community of the information sessions.<br>• A digital advertisement was placed on News Local online; 219 individuals clicked on the advertisement.<br>• Seven VMS were displayed along The Northern Road, Elizabeth Drive and Bringelly Road to notify the community about upcoming information sessions.<br>• SMSs were sent to stakeholders on the stakeholder and community database on the day before each information session.<br>• Direct emails were sent to general stakeholders (community members and groups), local MPs and other government stakeholders to regarding information sessions and the closing date for consultation during this consultation period.<br>• Government stakeholder briefings were held with:<br>– State and Federal MPs – Friday 12 February<br>– Fairfield Council – Tuesday 16 February<br>– Liverpool Council – Thursday 18 February<br>– Penrith Council – Monday 22 February.<br>• Stakeholder briefings were held with agencies and major landholders including:<br>– M7 Motorway operator |

| Key consultation purpose or outcome | Consultation activity and communication summary |
|---|---|
| | – Western Sydney Parklands Trust<br>– University of Sydney. |
| November 2016 – announcement of preferred route option corridor | |
| Inform relevant stakeholders and community about the preferred corridor route | • A community newsletter was distributed at community information sessions and via letterbox drop to about 2,100 local residences. It announced the selection of the preferred corridor route for the project. Further information relating to the route option development is provided in **Section 4.2**. |
| February to March 2018 – release of the M12 Motorway preliminary design and access strategy | |
| Seek feedback from relevant stakeholders and community on the preliminary design and access strategy for the project | • The M12 Motorway preliminary design and access strategy was released on the former Roads and Maritime website.<br>• A community newsletter was made available on the former Roads and Maritime website and distributed at community information sessions and via letterbox drop to about 4000 local residences in Badgerys Creek, Kemps Creek, Cecil Park and Luddenham. The newsletter detailed amendments made at the eastern end of the route, through the Western Sydney Parklands. The newsletter was also mailed directly to emergency services, schools and universities, large businesses, religious centres and community groups in the local area.<br>• More than 234 properties were doorknocked to ensure residents and businesses near the project were aware of the preliminary design and access strategy. A 'Sorry we missed you' flyer was left at 82 of the properties that were door knocked where no one was available to speak with the project team.<br>• Two community information and feedback sessions were held to discuss route changes through the Western Sydney Parklands:<br>– Saturday 3 March, from 10am to 1pm<br>Kemps Creek Public School (76 attendees)<br>– Wednesday 14 March, from 4:30pm to 7:30pm<br>Kemps Creek Sporting and Bowling Club (122 attendees)<br>• Three social media posts were uploaded with project updates. The posts received 626 interactions including likes, shares and comments.<br>• The project webpage was updated with the latest project information including M12 Motorway online portal and community update newsletter.<br>• A media release was released on the preliminary design.<br>• Five newspaper advertisements were taken out in various newspapers to inform the community of the preliminary design and access strategy and upcoming information sessions.<br>• SMSs were sent to stakeholders on the stakeholder and community database on the day before each information session.<br>• Direct emails were sent to 1140 stakeholders regarding information sessions and the closing date for consultation.<br>• The following stakeholder briefings were held:<br>– Western Sydney Parklands Trust<br>– Kemps Creek Bowling and Sporting Club<br>– M7 Motorway operator<br>– University of Sydney<br>– Large landholders affected by the M12 Motorway. |

### *Directly impacted landowners and residents*

Roads and Maritime would need to acquire privately owned land as part of the project. Residents and landowners who may be potentially impacted by land acquisition were notified via letter and consultation has begun.

All acquisition required for the project would be carried out in accordance with the requirements set out in the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW) (Just Terms Act), the Land Acquisition Information Guide (NSW Government, 2014), and the land acquisition reforms announced by the NSW Government in 2016.

Roads and Maritime has appointed a Personal Manager – Acquisition (PMA) to assist landowners and residents who may be affected by acquisition requirements for the project. The PMA door knocks and maintains regular contact with potentially impacted landowners and residents to provide updates on the process and respond to queries and concerns. The PMA would work with the affected landowners and residents once acquisition requirements are confirmed to offer assistance and support through the acquisition process (see **Section 7.4**).

### *Government agencies and Members of Parliament*

Consultation with Commonwealth and State Government agencies has occurred both before and during the development of the EIS. **Table 6-3** presents a summary of the consultation activities carried out.

In addition to regular project updates, government agencies were also invited to attend three value management workshops that were held during the project development (as discussed in **Chapter 4**), including:

- In October 2015, a value management workshop was held to review constraints and opportunities identified against a long list of route options for the project
- In April 2016, a value management workshop was held to obtain stakeholder input into the relative benefits of each of the eight shortlisted route options, and to recommend a preferred route corridor
- Following consultation with the Greater Sydney Commission and Western Sydney Parklands a supplementary value management workshop was held in June 2017. It outlined alternative options for the corridor through the Western Sydney Parklands.

The workshops included the following stakeholders:

- Commonwealth Department of Infrastructure, Transport, Cities and Regional Development
- NSW Department of Planning, Industry and Environment
- NSW Office of Environment and Heritage
- NSW Government Architect
- Penrith, Fairfield and Liverpool City councils
- Western Sydney Parklands Trust
- Greater Sydney Commission
- In May 2018, an EIS planning focus meeting for agencies was held to provide government agencies with an opportunity to raise concerns or issues to be assessed as part of the EIS.

Table 6-3 Government agency consultation activities

| Stakeholder | Purpose of consultation | Date |
|---|---|---|
| Government agencies | | |
| TfNSW | • Regular briefings to discuss project updates, campaign material, future transport corridors and organising property access<br>• Held partners display at information sessions<br>• Participation in planning focus meeting to allow stakeholders involved to raise concerns /issues or particular areas of interest they wish to have assessed in the EIS | Ongoing since June 2015 |
| NSW Department of Planning, Industry and Environment (former NSW Department of Planning and Environment) | • Regular briefings to discuss project updates, campaign material and organising property access<br>• Attendance at project information sessions.<br>• Participation in planning focus meeting to allow stakeholders involved to raise concerns /issues or particular areas of interest they wish to have assessed in the EIS<br>• Ongoing attendance at regular WSIP steering committee meetings | Ongoing since July 2015 |
| Office of Environment and Heritage | • Briefing to discuss the WSIP projects and EIS planning and proposed timeframes<br>• Involvement in supplementary value management workshop.<br>• Ongoing attendance at regular WSIP steering committee meetings | Ongoing since July 2015 |
| Greater Sydney Commission | • Ongoing consultation regarding the project<br>• Meeting to discuss opportunities to improve green grid connections in Western Sydney as part of planning for transport corridors<br>• Meeting to discuss district plans for the Badgerys Creek area and on how best to integrate the development of transport projects with the GSC's strategic planning for the Western Parkland City<br>• Meetings to discuss urban design and landscaping<br>• Planning Partnership meetings | Ongoing since March 2017 |
| UrbanGrowth NSW | • Project updates via email | Ongoing since June 2015 |
| Infrastructure NSW | • Project updates via email | Ongoing since July 2015 |
| NSW Environment Protection Authority | • Project updates via email<br>• Ongoing attendance at regular WSIP steering committee meetings | Ongoing since October 2016 |
| NSW Department of Primary Industries | • Regular project updates<br>• Participation in planning focus meeting to allow stakeholders involved to raise concerns/issues or particular areas of interest they wish to have assessed in the EIS | Ongoing since July 2015 |
| NSW Treasury | • Project updates via email | Ongoing since June 2015 |
| Civil Aviation Safety Authority | • Project updates | Ongoing since October 2016 |

| Stakeholder | Purpose of consultation | Date |
|---|---|---|
| South-western Sydney Health District | • Project updates via email | Ongoing since February 2018 |
| NSW Health – Nepean Blue Mountains Health District | • Project updates via email | Ongoing since October 2016 |
| Department of Defence | • Project updates | Ongoing since June 2015 |
| Western Sydney Parkland Trust | • Briefings regarding preliminary investigation, project design, impacts on bike trails, preferred corridor route, parkland access, biodiversity surveys<br>• Planning focus meeting to allow stakeholders involved to raise concerns/issues or particular areas of interest they wish to have assessed in the EIS | Ongoing since 2015 |
| Commonwealth Department of Infrastructure, Transport, Cities and Regional Development | • Monthly project updates through management review group meetings<br>• Monthly Road and Rail Forum teleconferences<br>• Planning focus meeting to allow stakeholders involved to raise concerns /issues or particular areas of interest they wish to have assessed in the EIS | Ongoing since July 2015 |
| Transport Management Centre | • Project updates<br>• Briefing on project design<br>• Attendance at design workshops | Ongoing since November 2016 |
| Sydney Metro Greater West | • Regular interface meetings to discuss project development, design integration and share information | Ongoing since December 2018 |
| NSW Government Architect | • Attendance at value management workshops<br>• Briefings and regular meetings to discuss strategic urban design concept and accessibility. | Ongoing since May 2016 |
| WSA Co | • Regular interface meetings to discuss project development, design integration and share information | Ongoing since December 2017 |
| Western Sydney Planning Partnership | • Briefings and regular meetings to discuss strategic planning, road hierarchy, project development, urban design and accessibility<br>• Conducted a review of the 80% concept urban design report and provided comments/feedback. | Ongoing since August 2018 |
| State and Federal Members of Parliament | | |
| Local Member for Mulgoa, Tanya Davies | • Briefings as required | Ongoing since July 2015 |
| NSW Minister for Western Sydney, Stuart Ayres. | • Briefings as required | Ongoing since July 2015 |
| State and Federal MPs | • Briefings as required | Ongoing since July 2015 |
| Federal Member for Lindsay, Fiona Scott / Emma Husar | • Briefings as required | Ongoing since July 2015 |

### *Councils*

Regular consultation with Fairfield City Council, Liverpool City Council and Penrith City Council was ongoing since the announcement of the project in 2015. The purpose of council consultation was to:

- Brief the councils on the project
- Discuss shortlisted route options and preferred route options
- Discuss affected landowners and potential property impacts
- Discuss impacts on Western Sydney Parklands
- Discuss the design of the project including flooding, drainage, landscaping and infrastructure that will be under the care of the respective council.

Consultation with councils has included the following:

- Project updates via email
- Project briefings on the following dates:
  - July 2015 (Penrith, Liverpool)
  - February 2016 (Penrith, Fairfield, Liverpool)
  - June 2016
  - December 2016 (Liverpool)
  - June 2017 (Liverpool)
  - May 2018 (Liverpool, Penrith)
  - September 2018
  - October 2018 (Penrith)
  - November 2018 (Fairfield)
  - December 2018 (Liverpool)
- Participation in value management workshop in April 2016, June 2017 and May 2018.

Consultation with the Mayor of Liverpool City Council was also carried out on 13 May 2016. Another meeting was held with Liverpool City Council officers in December 2016 regarding Range Road, Kemps Creek Sporting and Bowling Club, potential interchanges and impacts on the Western Sydney Parklands. Consultation with Western Sydney Regional Organisation of Councils (WSROC) has also been ongoing since July 2015.

### *Utility and service providers*

Consultation with utility and service providers was carried out before the development of the EIS to discuss potential impacts on existing and future utility supply, adjustments and project timing. Consultation was ongoing with the following utility providers, and would continue should the project be approved:

- Airservices Australia
- WaterNSW
- Sydney Water
- Jemena Gas
- Telstra Corporation Limited
- Optus/Uecomm
- TransGrid Energy
- Endeavour Energy
- NBN Co (National Broadband).

### *Aboriginal cultural heritage consultation*

The project is located within the Gandangara Local Aboriginal Land Council (LALC) and the Deerubbin LALC areas.

Roads and Maritime has developed the PACHCI (Roads and Maritime, 2011a) to provide a consistent means of effective consultation with Aboriginal communities about activities that may impact on Aboriginal cultural heritage values and ensure a consistent assessment approach for Roads and Maritime activities across NSW.

Aboriginal stakeholder engagement was carried out to address the requirements of the PACHCI in accordance with relevant statutory requirements and Government policies, including the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010a). Further details relating to Aboriginal community consultation is provided in **Section 7.5**.

The following Aboriginal community consultation was carried out:

- Identification of relevant stakeholders and LALCs through Native Title searches and register of Aboriginal land claims
- Notification letters to government agencies including Native Titles Services Corporation, Native Title Tribunal – New South Wales Registry, the Registrar General Manager (*Aboriginal Lands Right Act 1983*), Office of Environment and Heritage, Fairfield City Council, Penrith City Council, Liverpool City Council, Greater Sydney Local Lands Services, Gandangara LALC and Deerubbin LALC.
- Engagement of LALCs to carry out site visits in July and September 2017
- Letters sent to LALCs in October 2017 inviting registration of Aboriginal parties for the project
- Advertising in two local newspapers (Liverpool Leader and National Indigenous Times) for registered stakeholders in October 2017
- Compilation of a Register of Aboriginal Parties (RAPs) based on the responses to letters and advertisements
- Provision of proposed archaeological assessment methodology to project RAPs in January 2018 (allowing a 28-day review) outlining the methodology to prepare the Aboriginal Cultural Heritage Assessment Report (ACHAR)
- Engagement of Aboriginal site officers in January 2018 to carry out test excavations between 21 February and 27 June 2018
- Three AFG meetings (January 2018, August 2018 and February 2019) to discuss assessment methodology, the test excavation program and results of investigation, the ACHAR and detailed mitigation strategies to manage impacts on Aboriginal heritage values
- Provision of the draft ACHAR to Aboriginal stakeholders in March 2019 for a 28-day review and comment period. Comments received from Deerubbin and Gandangara LALCs were incorporated into the final ACHAR (**Appendix I**)
- Ongoing consultation with the Aboriginal community.

### *Other industry and stakeholders*

Consultation with other industry and stakeholders started before the development of the EIS. **Table 6-4** provides a summary of all consultation during the development of this EIS.

Consultation with other industry and stakeholders would continue during design and construction, should the project be approved.

Table 6-4 Consultation with other stakeholder

| Stakeholder | Purpose of consultation | Date |
|---|---|---|
| Businesses | | |
| Kemps Creek Sporting and Bowling Club | Project updates via letter. Several meetings to discuss project impacts on property and access | Ongoing since July 2015 |
| SUEZ Kemps Creek Resource Recovery Park | Project updates via letter | Ongoing since December 2018 |
| Sydney International Shooting Centre | Project updates and property access | Ongoing since October 2015 |
| Austcorp Pty Ltd | Project updates. Several meetings to discuss project impacts on property and access for preliminary geotechnical investigations. | Ongoing since July 2015 |
| Brandown Pty Ltd | Project updates and discussion regarding property impacts | Ongoing since May 2015 |
| Luddenham Raceway (LPG Holdings)<br>Hi-Quality Group/Tranteret Pty Ltd<br>Ron Medich Properties Pty Ltd<br>Muhammadi Welfare Assoc<br>Kadjil Pty Ltd<br>Cosbea Pty Ltd<br>Spinozzi Holdings Pty Ltd<br>Seveve Pty Ltd<br>Ozsource Pty Ltd | Project updates and discussion regarding property impacts and access | Ongoing since February 2016 |
| ATPT Pty Ltd | Project updates and discussion regarding property impacts and access | Ongoing since November 2016 |
| Clifton Avenue Holdings Pty Ltd/Damjanovic Holdings Pty Ltd | Project updates and meetings to discuss property impacts and gaining access to site.<br>Meeting to discuss potential impact of the project on planned developments | Ongoing since August 2015 |
| DNH Super Pty Ltd | Project updates and discussion regarding property impacts and access | Ongoing since August 2015 |
| Homebush Management Pty Ltd | Project updates and discussion regarding property impacts and access | Ongoing since November 2016 |
| Imam Ali Ltd | Project updates and discussion regarding property impacts and access | Ongoing since November 2016 |
| Madfouni Fut Pty Ltd | Project updates and discussion regarding property impacts and access | Ongoing since November 2016 |
| KWC Capital Partners | Project updates and meetings to discuss property impacts and gaining access to site. | Ongoing since February 2016 |

| Stakeholder | Purpose of consultation | Date |
|---|---|---|
| University of Sydney | Project updates and discussion of potential impacts and access.<br>Several meetings to discuss property, flooding impacts and connectivity impacts. | Ongoing since July 2015 |
| Community groups | | |
| Western Sydney Business Connection | Project updates | Ongoing since July 2015 |
| NSW Business Chamber, Western Sydney | Project updates | Ongoing since February 2016 |
| Bicycle NSW | Project updates and discussion regarding proposed cycling infrastructure and impacts on Western Sydney Parklands | Ongoing since July 2015 |
| Camwest | Project updates | Ongoing since July 2015 |
| Pedestrian Council of Australia | Project updates | December 2018 |
| Western Sydney Cycling Network | Project updates | Ongoing since July 2015 |
| Unions NSW | Project updates | Ongoing since July 2015 |
| Stop the Orbital and Rail Corridor (STORC) | Project updates | November 2016<br>December 2018 |
| Educational facilities | | |
| Luddenham Public School | Project updates | Ongoing since July 2015 |
| Kemps Creek Public School | Project updates | Ongoing since July 2015 |
| Christadelphian Heritage College Sydney | Project updates | Ongoing since July 2015 |
| Irfan College | Project updates and discussion of potential impacts | Ongoing since 2015 |
| Places of worship | | |
| Sacred Heart Parish Luddenham – Warragamba | Project updates | December 2018 |
| St James Church of England, Luddenham – Anglican Parish of Mulgoa | Project updates | December 2018 |
| Uniting Church in Australia – Congregation of Luddenham | Project updates | December 2018 |
| Our lady Queen of Peace Catholic Church | Project updates | December 2018 |
| Lim Yim Buddhist Institute Chinese | Project updates | December 2018 |

| Stakeholder | Purpose of consultation | Date |
|---|---|---|
| Emergency Services | | |
| Warragamba Fire Station | Project updates | December 2018 |
| NSW Rural Fire Service | Project updates | Ongoing since November 2016 |
| NSW Police Force - Green Valley Local Area Command | Project updates | Ongoing since October 2016 |
| NSW State Emergency Service (SES) | Project updates and flood modelling information | Ongoing since November 2016 |
| Ambulance Service of NSW | Project updates | Ongoing since July 2015 |
| Transport services | | |
| M7 Motorway (NorthWestern Roads) | • Project updates and property access.<br>• Attendance at value management workshop<br>• Monthly meetings to consider and assess construction and operational traffic and transport matters that could affect the future operation of the project and/or M7 and their interface, with the aim of developing a safe and efficient extension of the motorway network. | Ongoing since November 2015 |
| NRMA | Project updates | December 2018 |
| National Road Transport Association | Project updates | December 2018 |
| Roads Australia | Project updates | December 2018 |
| Bus operators:<br>• Busways<br>• Hillsbus/CDC Bus Services<br>• Busabout<br>• Ezi Drive Coaches and Mini Buses<br>• Western Sydney Buses (State Transit Authority) | Project updates | Ongoing since July 2015 |
| NSW Taxi Council | Project updates | December 2018 |

## 6.2.2 Feedback received before public exhibition of the EIS

Feedback provided by government agencies, councils, key stakeholders and the wider community was recorded and considered during the preparation of the EIS. A summary of feedback received from relevant stakeholders and community members is presented below.

### *Government agencies and utility providers*

A summary of the feedback received from State and Commonwealth Government agencies up to March 2018 and where the issues were addressed in this EIS is provided in **Table 6-5**.

Table 6-5 Feedback from government agencies

| Stakeholder | Feedback | Where addressed in this EIS |
|---|---|---|
| Greater Sydney Commission | The GSC requested that the project to be developed consistent with GSC vision for the Western Parkland City. | The project would directly address and support Planning Priority W8 within the Western City District Plan, which aims to deliver jobs in western Sydney through the Western Sydney Airport and the surrounding Western Sydney Aerotropolis, and the transport links that would be created to service these areas<br>This is discussed in **Chapter 3** |
| Western Sydney Parklands Trust | Western Sydney Parklands Trust requested provision of clear and legible access points for pedestrians, cyclists and vehicles into the Parklands current and future facilities. | Key features of the proposed cycleway are provided in **Chapter 5** |
| | The Trust requested that the Wylde Mountain Bike Trail remains a high quality and memorable recreation experience, equal to or better than the existing facility. | Roads and Maritime is in discussions with Western Sydney Parklands Trust to relocate the Wylde Mountain Bike Trail, and Western Sydney Parklands Trust will endeavour to complete the relocation before has begun consultation with Western Sydney Parklands Trust in relation to the redesign and relocation of the mountain bike trail. Consultation would continue during the detailed design and construction phases of the project<br>Roads and Maritime will continue to work with Western Sydney Parklands Trust to support their delivery of a replacement for the Wylde Mountain Bike Trail before construction. Consultation with Bike NSW and Western Sydney Parklands Trust would continue during detailed design; this is discussed in **Chapter 5** and **Section 7.4** begun |
| | The Trust requested that the project ensure shared user path connectivity under the motorway within the Parklands | The existing M7 Motorway shared user path overbridge connections would remain in place. Access to the shared user path would also remain during construction<br>Key features of the proposed shared user path, including connections are provided in **Chapter 5** |
| | The Trust requested that, where possible, existing bushland be protected and enhanced. | The project was designed where possible to mitigate impacts on visual amenity including the bushland character of the local area through additional landscaping<br>Landscape and visual impacts are discussed in **Section 7.3** |
| NSW Government Architect | The NSW Government Architect has provided feedback throughout the development of the project.<br>Issues raised included accessibility and connectivity to the creeks for active transport/ pedestrians. | Roads and Maritime has addressed issues raised in **Appendix G**<br>Roads and Maritime would continue to consult with the NSW Government Architect throughout project development |

| Stakeholder | Feedback | Where addressed in this EIS |
|---|---|---|
| Western Sydney Planning Partnership | The Partnership has provided feedback for the preparation of the EIS. The feedback provided by the Planning Partnership Office on the 80% concept Urban Design Report was provided on behalf of the GSC, WSPP and Western City Deal Delivery Office.<br><br>Some issues raised included accessibility, Aboriginal cultural heritage values, options for noise mitigation and tree canopy cover. | Roads and Maritime has addressed issues raised in **Appendix G** and provided a response to comments to WSPP<br><br>Roads and Maritime would continue to consult with the Planning Partnership as they further develop strategic plans for western Sydney |
| WaterNSW | WaterNSW supports the change shown in the preferred option as the WaterNSW Upper Canal is located underground where the project crosses the canal alignment. | The project would involve the construction of a grade–separated interchange over the State-heritage listed Upper Canal System (SHR # 01373)<br><br>The project would not directly impact on the sections of the canal that are located underground, however there is potential for indirect impact from vibration due to nearby bridge pier piling<br><br>Potential impacts on non-Aboriginal heritage, including the State heritage listed WaterNSW Upper Canal are discussed in **Section 7.6** |
| Sydney Water | Sydney Water requested that it be informed and involved during the development of the M12 Motorway to ensure water supply to its customers is maintained, its assets are protected, any adjustments have appropriate approvals, and consideration of future maintenance to assets is carried out. | Roads and Maritime would continue to work closely with utility service providers including Sydney Water during the detailed design and future phases of the M12 Motorway as the project progresses. Potential impacts on utilities are discussed in **Section 5.20** |
| Jemena | Jemena advised there are high-pressure trunk gas mains in the vicinity of the development. | Roads and Maritime would continue to work closely with utility service providers including gas providers during the concept road design and future phases of the M12 Motorway as the project progresses. Potential impacts on utilities are discussed in **Section 5.20** |

### *Councils*

A summary of the feedback received from Fairfield City Council, Liverpool City Council and Penrith City Council up to March 2018 and where the issues were addressed in this EIS is provided in **Table 6-6**.

Table 6-6 Feedback from councils

| Feedback | Where addressed in EIS |
|---|---|
| Fairfield City Council | |
| Council requests that consultation should be undertaken with the affected property owners and consideration should be given to minimising the impact on how much land is acquired and what impact this has on utilisation of the residual parcel to the land owner. | The project was designed to minimise impact on property to the extent reasonable and practical.<br>Potential impacts on property access and property acquisitions required as a result of the project are discussed in **Section 7.4** . |
| Council has concerns regarding impacts on residential amenity and lifestyle by increased traffic as a result of the project. | The increases in traffic volumes were considered and are discussed in **Chapter 3** and detailed in **Section 7.2**.<br>The project was designed where possible to mitigate impacts on visual amenity including the bushland character of the local area through additional landscaping. Landscape and visual impacts are discussed in **Section 7.3**. |
| Council requests that consideration should be given for the provision of a bus corridor on the M12 Motorway for rapid bus service to the Western Sydney Airport. | The project has not made specific allowance for public transport however the M12 Motorway would be able to accommodate bus services in the future should these be proposed. Future upgrade of Elizabeth Drive may accommodate bus infrastructure.<br>Public transport is discussed in **Section 7.2**. |
| Council is concerned about the impact on the entry ramp from Wallgrove Road to the M7 Motorway as a result of the proposed ramp from the M12 to the M7 as part of the project. | The entry ramp would merge with the M7 Motorway as a two-lane entry ramp in the same location as the existing Wallgrove Road connection to the M7 Motorway.<br>Temporary traffic management measures to minimise traffic impacts at Wallgrove Road during construction are listed in **Chapter 5** and **Section 7.2**. |
| Council seeks confirmation regarding tolling and consideration of traffic volumes on Elizabeth Drive | The project would not be tolled.<br>The traffic volumes on Elizabeth Drive were considered and are discussed in **Chapter 3** and detailed in **Section 7.2**. |
| Liverpool City Council | |
| The project would affect the northern portion of the Western Sydney Parklands close to the M7 Motorway. It is recommended that design and construction methods should include further options such as elevated road through the Parklands and extensive native landscaping to further minimise this impact. | In March 2017, Roads and Maritime committed to investigate alternative corridor options through the Western Sydney Parklands, between Mamre Road and the M7 Motorway, to reduce impacts on connectivity within the Western Sydney Parklands and to ensure impacts on the Parklands recreation facilities are minimised.<br>Roads and Maritime has, and would continue to, work with the Western Sydney Parklands to develop appropriated mitigation of potential impacts on the Parklands.<br>Consideration of vertical alignment gradings and other design refinements that were incorporated into the project design to minimise impacts on Western Sydney Parklands are discussed in **Chapter 4**. Management measures to mitigate landscape and visual impacts are discussed in **Section 7.3**. |

| Feedback | Where addressed in EIS |
|---|---|
| Council suggests a grade–separated interchange at the M12 Motorway/realigned Devonshire Road/Mamre Road intersection to improve access to the Western Sydney Airport, South-west Growth and South-west Priority Land Release Areas. | While the Mamre Road and Devonshire Road connection is outside the current scope of the project, the current design does not preclude this connection in the future. The project description is detailed in **Chapter 5.**<br>The NSW DPIE is currently reviewing the Structure Plan for the Western Sydney Aerotropolis. This review would identify future road upgrades required. |
| Council requests that consideration be given to preserve land for future grade–separated connection to the project with The Northern Road. | While a grade–separated interchange with The Northern Road is outside the current scope of this project, the current design does not preclude a future interchange in this location. Land required for a future grade–separated interchange would be part of the OSO corridor preservation. This interchange is detailed in **Chapter 5.** |
| Council seeks confirmation regarding tolling and consideration of traffic volumes on Elizabeth Drive | The project would not be tolled. New gantries for the M7 Motorway tolling are described in **Chapter 5**. Projected traffic volumes for Elizabeth Drive with and without the project are described in **Section 7.2.6**. |
| Penrith City Council | |
| Council requests that Roads and Maritime ensure the route of the project does not diminish the future potential economic use and development of land within the Western Sydney Aerotropolis, particularly the most strategically significant land at the northern gateway of the Western Sydney Airport. | The project was considered as a part of the Western Sydney Aerotropolis Stage 1 Structure Plan. It is identified as one of the proposed transport corridors in the area (see **Section 3.1.5**). |
| Council requests that the project provide effective access to the Western Sydney Airport and Western Sydney Aerotropolis | The project would provide a direct connection to the Western Sydney Airport and support development of surrounding areas (see **Section 3.3**). |
| Council requests that Roads and Maritime ensure the route of the project is informed by an integrated road network plan that considers all existing and proposed motorways and main roads in the region, including the Outer Sydney Orbital | The layout of The Northern Road intersection and the design of the M12 Motorway considered future transport corridors in the area including plans for the proposed Outer Sydney Orbital. Roads and Maritime are continuing to work with TfNSW to integrate the project with the Outer Sydney Orbital. This is discussed in **Chapter 4**. |
| Council requests that the project minimise potential adverse impacts on the regionally important Western Sydney Parklands | The proposed project corridor was developed in close consultation with Western Sydney Parklands Trust to minimise adverse impacts. This included shifting the corridor to the current alignment (see **Chapter 4** for further details).<br>Roads and Maritime would continue to work closely with the Western Sydney Parklands Trust throughout the design, construction and operation of the project to sensitively manage impacts on open space and ensure this important community space is maintained and protected. |

| Feedback | Where addressed in EIS |
|---|---|
| Council requests that the project avoid, where possible, and minimise potential adverse environmental, economic and social impacts relating to biodiversity, South Creek, heritage and noise | The project was designed to minimise environmental impacts where possible. An evaluation of the environmental impacts for each route option, including design refinements that were applied to the project in response to environmental considerations is provided in **Chapter 4**.<br>Where potential impacts could not be avoided, mitigation measures are nominated.<br>This EIS identifies potential impacts of the project and mitigation measures, including impacts related to:<br>• Biodiversity (**Section 7.1**)<br>• Socio-economic (**Section 7.4**)<br>• Aboriginal heritage (**Section 7.5**)<br>• Non-Aboriginal heritage (**Section 7.6**)<br>• Noise and vibration (**Section 7.7**)<br>• Surface water quality and hydrology (**Section 7.9**). |
| Council requests that Roads and Maritime actively engage with landowners, the community and stakeholders on the planning and design for the project | **Chapter 6** provides details on the project's community and stakeholder engagement process. |

### *Other stakeholders and community*

**Table 6-7** presents a summary of the feedback provided by community members, special interest groups, business and adjoining, affected landowners and stakeholders before exhibition of the EIS. This table also provides a response or indicates where this topic was addressed in the EIS.

Table 6-7 Feedback from the community

| Summary of feedback | Response or where addressed in EIS |
|---|---|
| Project alignment | |
| Comments regarding the justification of the project and the preferred route option. | The project is required to support the opening of the Western Sydney Airport by connecting Sydney's motorway network to the airport and to facilitate the growth and development of the Western Sydney Aerotropolis and the Western Sydney Employment Area (WSEA). Further details regarding the strategic context and need for the project are discussed in **Chapter 3**.<br>The preferred route for the project was selected based on the relative overall performance against select criteria when compared with other options. Criteria included impact on existing land use, impacts on threatened or endangered ecological communities, impact on utilities and impacts on existing roads. Further details relating to the preferred route are provided in **Chapter 4**. |
| Various questions raised regarding planning considerations for population growth, location and types jobs, assumed means of transport, future impact of energy usage and energy choices and the project. | Planning of the project takes into consideration the future land use changes, including employment generation, associated with Western Sydney Aerotropolis, South West Growth Area and Western Sydney Employment Area.<br>The benefit and impacts of the project in terms of planning considerations are discussed in **Section 7.4**. |

| Summary of feedback | Response or where addressed in EIS |
|---|---|
| Design | |
| Queries and concerns relating to the design including:<br>• Road connections<br>• Intersections<br>• Grade separation<br>• Lane configuration<br>• Free-flow ramps<br>• Construction impacts on Western Sydney Parklands. | The project design, including existing road connections and free-flow ramps, is outlined in **Chapter 5**.<br>The alternatives to the project considered are discussed in **Chapter 4**.<br>Traffic modelling to support lane configuration for the project is discussed in **Section 7.2**.<br>The project would include construction impacts on Western Sydney Parklands, including (but not limited to) earthworks (cut and fill), establishment of ancillary facilities and general road construction. Construction impacts associated with the project are discussed in **Chapter 5**. |
| Concerns about impacts on the existing M7 Motorway entry and exit locations | The entry ramp would merge with the M7 Motorway as a two-lane entry ramp in the same location as the existing Wallgrove Road connection to the M7 Motorway.<br>Traffic modelling to support lane configuration for the project is discussed in **Section 7.2**.<br>Temporary traffic management measures to minimise traffic impacts at Wallgrove Road during construction are listed in **Chapter 5** and **Section 7.2**. |
| Property impacts – residents and landowners | |
| Questions and concerns from residents and landowners about property impacts such as:<br>• Access<br>• Land use and viability<br>• Acquisition. | The project was designed to minimise impact on property to the extent reasonable and practical.<br>Roads and Maritime would be responsible for acquisition of properties required for the project in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991*, the Land Acquisition Information Guide (NSW Government, 2014) and the land acquisition reforms announced by the NSW Government in 2016.<br>Property access and property acquisitions as a result of the project are discussed in **Section 7.4**. |
| Business impacts | |
| Questions and concerns regarding business impacts such as:<br>• Access roads and connections to planned employment area<br>• Future development potential<br>• Acquisition<br>• Agricultural land uses (including changes to dam and water supply)<br>• Economic potential and viability**.** | The alternatives considered to the project are discussed in **Chapter 4**.<br>Access arrangements throughout construction and operation of the project are discussed in **Chapter 5** and **Section 7.2**.<br>Property access, property acquisitions and impacts on business and agricultural land uses as a result of the project are discussed in **Section 7.4**. |

| Summary of feedback | Response or where addressed in EIS |
|---|---|
| Impacts on Western Sydney Parklands | |
| Comments regarding impacts on the Wylde Mountain Bike Trail | Roads and Maritime is in discussions with Western Sydney Parklands Trust to relocate the Wylde Mountain Bike Trail, and Western Sydney Parklands Trust will endeavour to complete the relocation before has begun consultation with Western Sydney Parklands Trust in relation to the redesign and relocation of the mountain bike trail. Consultation would continue during the detailed design and construction phases of the project.<br>This is discussed in **Chapter 5**, **Section 7.3** and **Section 7.4**. |
| Recommendations to maintain and minimise the loss of public green space and subsequent impact on local communities | Roads and Maritime would continue to work closely with the Western Sydney Parklands Trust and Greater Sydney Commission throughout the design, construction and operation of the project to sensitively manage impacts on open space and ensure this important community space is maintained and protected.<br>This is discussed in **Section 7.3**. |
| Concerns regarding connection to the Western Sydney Parklands during construction | Changes to a number of access routes would be required to enable construction of the project. The community and other relevant stakeholders would be consulted in advance of any changes so that suitable alternative arrangements can be put in place.<br>This is discussed in **Chapter 5**, **Chapter 6** and **Section 7.2**. |
| Traffic management | |
| Concerns regarding the existing congestion on the M7 Motorway and how the project may increase traffic volumes | Impacts of the project on the existing road network and the broader surrounding environment are discussed in **Section 7.2**. While it is forecast that there would be an increase in traffic volume on the M7 Motorway, this reflects the substantial increase in land use in the surrounding area associated with the Western Sydney Aerotropolis and South West Growth Area. |
| Impacts on cycling | |
| Request for consideration of the following features:<br>• Full, safe, separated parallel cycleway<br>• Connections to M7 shared user path, local residential areas and Wylde Mountain Bike Trail<br>• Grade separated cycleways at all intersections where the roadway is also grade–separated<br>• Cycleway to be minimum three metres wide<br>• Proper on path signage, with a centre line<br>• Directional signage<br>• Adequate night time lighting and safety for riders during construction must be considered | A shared user path would be provided as part of the project. The shared user path (ie pedestrian/cycle facilities) would be grade–separated at all road crossings and floodplains and would underpass the airport access road. This would provide a link to adjacent existing bicycle networks, including through the Western Sydney Parklands and the M7 Motorway.<br>Key features of the shared user path, including line marking and lighting, are discussed in **Chapter 5**. |

| Summary of feedback | Response or where addressed in EIS |
|---|---|
| Desire to maintain access to the Wylde Mountain Bike Trail during construction. | Roads and Maritime is working closely with Western Sydney Parklands Trust to ensure a replacement Wylde Mountain Bike Trail is completed before the start of construction. Western Sydney Parklands Trust will ensure it integrates with the existing facilities and future plans for the Parklands. A separate environmental impact assessment for the replacement trail will be prepared separate to this EIS.<br>The impact on the Wylde Mountain Bike Trail is discussed in **Section 7.4**. |
| Noise impacts | |
| Questions and concerns about noise impacts during construction and operation of the project as a result of the natural topography of the area. | A noise and vibration assessment was prepared for the project (**Appendix K**). Noise and vibration impacts, and mitigation measure are discussed in **Section 7.6.7**. |
| Comments regarding the use of landscape design and road surfacing to minimise noise and visual intrusion. | The project was designed where possible to mitigate impacts on visual amenity including the bushland character of the local area through additional landscaping. Quieter noise pavement types are being considered for the project.<br>Landscape and visual impacts are discussed in **Section 7.3** and operational noise impacts are discussed in **Section 7.6.5**. |
| Biodiversity | |
| Concerns about impacts of vegetation clearing on endangered ecological communities and TSC-listed Varied Sittella. | An assessment of the potential impact on threatened flora, threatened fauna and endangered ecological communities within the vicinity of the project are discussed in **Section 7.1**. |
| Requests to include extensive native landscaping to further minimise any impacts on the Parklands. | Roads and Maritime has and would continue to work with the Western Sydney Parklands to develop appropriated mitigations for the impacts on the Parklands.<br>An Urban Design and Landscape Plan (UDLP) and tree management strategy would be developed for the project which would include measures to minimise tree removal and re-vegetation requirements utilising native species. Landscape and visual impacts are discussed further in **Section 7.3**. |
| Non-Aboriginal heritage | |
| Concern about impacts on the State Heritage listed Upper Canal corridor | The project would minimise impact on the Upper Canal corridor.<br>Relevant conservation policies outlined in the Upper Canal CMP (NSW Public Works Government Architect's Office 2016) will be incorporated into the construction cultural heritage management plan (CCHMP) to ensure heritage fabric is not impacted by the project.<br>A safe working distance exclusion zone would be established around the exposed tunnel air shaft in the M7 Motorway median in accordance with the process outlined in noise and vibration management measures NV09 - NV10.<br>Roads and Maritime would continue to work with WaterNSW through detailed design in regard to avoidance of impact on the Upper Canal.<br>Potential impacts on non-Aboriginal heritage are discussed further in **Section 7.6** and **Section 7.7**. |

| Summary of feedback | Response or where addressed in EIS |
|---|---|
| Airport connections and public transport | |
| Questions regarding the implementation of the following:<br>• Provision of bus corridor<br>• Light rail<br>• Other people moving systems | The project has not made specific allowance for public transport however the M12 Motorway would be able to accommodate bus services in the future. Future upgrade of Elizabeth Drive may accommodate bus infrastructure.<br>Provision for public transport is discussed in **Chapter 5** and **Section 7.2**.<br>TfNSW would also construct the Sydney Metro Greater West, a rail link to the Western Sydney Airport and the Western Sydney Aerotropolis. Both projects would be fully integrated. |
| Questions regarding rail access to the new airport. | Roads and Maritime recognises that in order to service the transport needs for the Western Sydney Airport, a multi-modal approach would be required, and no transport mode on its own could meet all of those needs. TfNSW will construct the Sydney Metro Greater West, a rail link to the Western Sydney Airport and the Western Sydney Aerotropolis. |
| Tolling | |
| Concerns around the possible tolling of the project and resulting traffic impacts on the existing network. | The project would not be tolled. |
| Emergency response | |
| Concerns regarding lack of emergency exit from the motorway to the Western Sydney Airport. | Emergency crossover locations and the provision of an emergency telephone are discussed in **Chapter 5**. |
| Consultation | |
| Dissatisfaction with the community consultation process, including proposed route selection materials. | The route options analysis process is detailed within four reports being the Options Identification Report (2015), Shortlisted Options (February 2016) Report, Preferred Corridor Route Report (November 2016) and Value Management Report (December 2018). These reports are available on the Roads and Maritime website.<br>**Chapter 4** outlines the route options analysis process.<br>This chapter outlines the consultation process applied by the project. |
| Other upgrades and road naming | |
| Questions regarding The Northern Road upgrade and the inclusion of a bypass of Luddenham. | Roads and Maritime is currently upgrading The Northern Road in stages, including a bypass of Luddenham. The Northern Road EIS is available on the Roads and Maritime website. |
| Concerns regarding upgrades to Elizabeth Drive. | Elizabeth Drive was identified for a potential future upgrade as part of the Western Sydney Aerotropolis. However, upgrades to Elizabeth Drive are outside the scope of the project. |
| Questions around the renaming of the F3 Freeway | The F3 Freeway was renamed in 2013 to the M1 Pacific Motorway to suit an Australia-wide alpha numeric numbering system which tells motorists whether they are travelling on a motorway (M), or a route of national (A) or state significance (B). |

### *Aboriginal community*

Consultation with the Aboriginal community was carried out in accordance with the Roads and Maritime PACHCI (Roads and Maritime, 2011a). The outcomes of consultation with the Aboriginal community are outlined in **Section 7.5** and **Appendix I**.

## 6.3 Consultation during public exhibition of the EIS

### 6.3.1 Display of the EIS

DPIE will place this EIS on public exhibition for a minimum of 28 days in accordance with the EP&A Regulation 2000. During the exhibition period, government agencies, project stakeholders and community members will be able to review the EIS and provide feedback via a written submission to DPIE for consideration in its assessment of the project.

Advertisements will be placed in newspapers to advise the community of the public exhibition and other relevant information. This will include locations where the EIS can be viewed and details of planned consultation activities and information sessions.

Copies of the EIS would be available for viewing at the following locations:

- Roads and Maritime office: 20-44 Ennis Road, Milsons Point NSW 2061
- Department of Planning, Industry and Environment: 320 Pitt Street, Sydney NSW 2000
- Nature Conservation Council: 14/338 Pitt Street, Sydney 2000
- Western Sydney Airport Experience Centre: Eaton Road, Luddenham 2745
- Service NSW Centres (electronic copies available only)
- Council offices:
  - Fairfield City Council: 86 Avoca Road, Wakeley 2176
  - Liverpool City Council: 33 Moore Street, Liverpool 2170
  - Penrith City Council: Civic centre 601 High Street, Penrith NSW 2750
  - Camden Council: 70 Central Ave, Oran Park, NSW, 2570
- Libraries:
  - St Clair Library: Shop 12, St Clair Shopping Centre, Bennett Road and Endeavour Avenue 2759
  - Wetherill Park Library: 561–583 Polding St, Wetherill Park 2164
  - Carnes Hill Library: 600 Kurrajong Rd, Carnes Hill 2171.

Electronic copies of the EIS will be made available for viewing and download from the DPIE website.

### 6.3.2 Supporting EIS display

Activities planned to support the display of the EIS include:

- Project updates via community update letterbox drop
- Local newspaper notices and advertisements to promote the exhibition of the EIS and community information sessions
- Roadside signage (variable message signs)
- Media releases
- Email and/or SMS to contacts on the established distribution list

- Community information sessions and ‘pop-up’ information stands (discussed below)
- Website updates – visit ***http://rms.nsw.gov.au/m12***
- Facebook updates – visit ***http://www.facebook.com/nswroads***
- A project email address (m12motorway@rms.nsw.gov.au) and phone number (1800 703 457) to manage enquiries and provide information on the EIS.

Roads and Maritime will be hosting a series of community information sessions and ‘Pop-up’ information stands to enable community members to discuss the EIS with technical specialists, ask questions, and learn about the submission process.

### 6.3.3 Preparation of the submissions report

During the public exhibition period, community members, government agencies and other interested parties may send written submissions regarding the project to the Department of Planning and Environment.

At the end of the public exhibition period, Roads and Maritime will review any submissions received and prepare a submissions report and/or preferred infrastructure report if required. These reports would respond to the issues raised and outline any proposed changes to the project. This report will be made available to the public.

Refer to **Chapter 2** for further information on the approvals process following EIS exhibition.

## 6.4 Consultation before construction

Based on the expected timeframes for the project, the main construction activities are likely to begin in 2022 with some early works following project approval. Roads and Maritime would continue to carry out further investigations and surveys before construction.

Roads and Maritime would continue to update the local community and identified stakeholders about relevant activities and other project updates using the following engagement channels:

- Website updates
- Notifications to affected receivers
- One-on-one landowner consultation.

## 6.5 Consultation during construction

### 6.5.1 Approach to consultation during construction

Roads and Maritime and the construction contractor would be responsible for consultation with stakeholders and the community.

The community and stakeholder consultation carried out during construction would include project updates on planned construction activities and the construction program. Consultation would seek to minimise potential impacts where possible and respond to enquiries and concerns in a timely manner.

A summary of the objectives of ongoing communications and consultation are as follows:

- Keep the community informed about the project including construction activities, program of works, and associated impacts
- Ensure there are avenues for the community to provide feedback or to register complaints and impacts, and that the community is aware of these avenues
- Provide a process to resolve complaints and issues raised.

During construction, a dedicated community relations team would carry out the following:

- Provide updates to the project webpage (www.rms.nsw.gov.au/m12) on project news, community updates, community consultation reports, environmental assessment documents and construction management documents
- Notify residents, business owners and other stakeholders before any construction work is started in a new location. Specific notification is required before any night work starts. Consultation for out-of-hours work would be implemented in accordance with Roads and Maritime's Construction Noise and Vibration Guideline (2016e) and the Environment Protection Licence for the project
- Issue project updates to announce the start of construction and announce key construction milestones and community engagement activities
- Conduct site tours during construction to familiarise the community and stakeholders with the project and construction processes (optional). These would be coordinated by the contractor working with Roads and Maritime
- Set up pop-up information stalls at local shops, markets and events
- Conduct door knocking to discuss individual issues with residents
- Advertise in the local media to announce the start of construction and significant milestones; and major detours, traffic disruptions or controls and work outside normal construction working hours. Advertisements about construction impacts would appear at least five days before the change
- Use VMS signs to communicate traffic changes to road users
- Maintain the project email address (***m12motorway@rms.nsw.gov.au***) to provide an avenue for the community and stakeholders to contact the Roads and Maritime project team
- Maintain a 24-hour, toll-free project information and complaints line, a dedicated email address and postal address
- Prepare and implement a detailed Community Communication Strategy to detail the processes to facilitate communication and feedback between the project team and the community.

### 6.5.2 Complaints management procedure

During the development and delivery of the project, a dedicated community relations team would handle and investigate complaints.

All contact relating to the project, including suggestions and complaints, would be collected, documented and stored in the Consultation Manager database. This would include incoming and outgoing correspondence, phone and verbal contact, written submissions and any corresponding actions taken.

Regular reports summarising community issues and complaints would be used to help inform the delivery process. Consultation Manager would be used to record, track and respond to enquiries and would include the following details:

- Method of communication
- Full name, address and contact details of enquirer
- Date and time of enquiry
- Nature of the enquiry
- Names of people involved throughout
- Sentiment.

The following details would be recorded as part of the Complaints Management Record:

- Date and time complaint received
- Type of communication (letter/email/phone call)
- Name, address and contact number for complainant
- Nature of the complaint
- Action taken in response, including follow up with the complainant
- Details on whether a resolution was reached
- Details on whether mediation was required/used
- Monitoring to confirm the complaint was resolved.

Complaints would be acknowledged within one working day. When a complaint cannot be responded to immediately, a follow-up verbal response on what action is proposed would be provided to the complainant or enquirer within three working days. A written response to the person raising a complaint would also be provided within 10 working days.

Regular meetings between the Roads and Maritime Community and Stakeholder Engagement team and the dedicated contractor community relations team would help provide a forum for peer review and a basis for continual improvement in complaint management response.

Follow-up monitoring would be carried out to ensure any issues/complaints were resolved satisfactorily.

The complaints management procedure outlined above would be in place for the duration of construction.

Roads and Maritime would also offer community engagement training to assist and improve the skills of the construction contractor's dedicated community relations team.

### 6.5.3 Managing complaint fatigue

The extent and impacts of complaint fatigue would be considered by:

- Identifying regular complainants from previous and current projects in close proximity to the construction footprint (including the Western Sydney Airport)
- Analysing the cause of and solution provided to each previous complaint made by the regular complainants
- Determining whether the project would result in similar or overlapping impacts with other projects, which are likely to result in a complaint.

The community relations team would build a working relationship with the project teams for other major projects that would be under construction at the same time as the project to identify stakeholders and community members who may be susceptible to complaint fatigue.

The project team would ensure a number of different complaint mechanisms are provided to cater to different needs and preferences. Complaint management tools for the project are outlined above in **Section 6.5.1**.

### 6.5.4 Managing regular complainants

Given the pace of growth and development in western Sydney and that multiple large scale projects would be happening at the same time, there is a possibility for some community members to feel the impacts of such change more sensitively than others. They may reach out to multiple project teams regularly which would require careful monitoring and management of the community member.

The extent and impacts of consultation fatigue would be considered by:

- Identifying potentially impacted stakeholders and community members by both previous/current projects (including the Western Sydney Airport, nearby rail projects, trunk utilities etc) and the project
- Analysing the type, extent and timing of consultation for the project and other projects that was or would be received by these community members
- Considering what determining factors may also be contributing to multiple complaints from a single community member
- Determining whether consultation for the project is likely to result in overload or disinterest for community members.

The community relations team would build a working relationship with the project teams for other major projects in the area to identify those persons or organisations who may be susceptible to consultation fatigue. Inter-agency working groups would also assist the community relations teams working in the same area to share information, plan combined community engagement events and network.

The project team would work to develop an integrated approach to contacting persons or organisations that may experience consultation fatigue. The project team would also determine which communication mechanisms stakeholders prefer.

### 6.5.5 Managing construction fatigue

The extent and impacts of construction fatigue would be assessed by:

- Identifying where the project would have sustained impacts on stakeholders or community members
- Identifying whether the project would result in similar or overlapping impacts with other projects, to the same stakeholders or community members
- Analysing whether the project would increase the magnitude and intensity of overlapping impacts on any stakeholders or community members
- Analysing the duration of extended impacts for stakeholders or community members.

Project activities which could lead to construction fatigue, the potentially impacted persons or organisations and a summary of the mitigations proposed to address these issues are provided in **Section 7.4**. Mitigation measures relating to noise and vibration impacts during construction are provided in **Section 7.6.5**.

During construction of the project, the community relations team would build a working relationship with the project teams for other major projects to identify stakeholders or community members who may be susceptible to construction fatigue. The project team would ensure the expectations of these stakeholders or community members are managed for the project.