Transport
for NSW

Epping Bridge Project

Review of Environmental Factors

Ref–A61965309

August 2024

Acknowledgement of Country

Transport for NSW acknowledges the Wallumedegal people of the Dharug Nation, the traditional custodians of the land on which the Epping Bridge Project is proposed.

We pay our respects to Elders past and present and celebrate the diversity of Aboriginal people and their ongoing cultures and connections to the lands and waters of NSW.

Many of the transport routes we use today – from rail lines, to roads, to water crossings – follow the traditional Songlines, trade routes and ceremonial paths in Country that our nation's First Peoples followed for tens of thousands of years.

Transport for NSW is committed to honouring Aboriginal peoples' cultural and spiritual connections to the land, waters and seas and their rich contribution to society.

Connecting with Country Statement

Transport for NSW have engaged an Aboriginal consultant to provide advice on connecting with Country and to carry out Aboriginal engagement for the Epping Bridge Project through a Design with Country Strategy.

The Epping Bridge Project aims to:

- share Aboriginal cultural knowledge with the broader community in a manner that educates and increases understanding about Aboriginal culture and heritage where appropriate
- contribute to strengthening Aboriginal culture and the first economy through increased engagement of Aboriginal knowledge holders in transport projects and services
- use the tools in storytelling to share Aboriginal culture and heritage with our customers and the wider community and promote greater awareness and understanding
- improve outcomes for Aboriginal people by restoring Country through strengthening language and culture, enhance sustainability and address disadvantage.

The Design with Country Strategy will guide and inform the design criteria for the Project by identifying opportunities for co-designing with Country and partnering with local knowledge holders and businesses throughout the project lifecycle.

Through engagement with the Metropolitan Local Aboriginal Land Council, Aboriginal cultural knowledge holders and identified Aboriginal groups, this strategy will provide an authentic voice and perspective of Aboriginal people from Aboriginal community representatives and provide opportunities to lead with Aboriginal knowledge to better connect with Country during planning and design of the project.

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Prepared by Mott MacDonald and Transport for NSW.

Executive summary

Overview

The Australian and NSW governments are jointly providing $220 million in funding to replace Epping Bridge to ease congestion, increase safety and improve travel times and connectivity for road users.

The Epping Bridge Project (the 'Proposal') would support the Epping Town Centre Urban Activation Program and complement Epping Town Centre (town centre) road and intersection upgrades completed by Transport for NSW (Transport) in 2018 to improve traffic flow and congestion in the area.

The Proposal would provide a well-designed infrastructure element that makes a positive contribution to the town centre, which would:

- improve safety and reduce traffic congestion across the bridge
- improve pedestrian and cyclist safety
- improve access to the town centre for the local community, road users and businesses
- increase westbound lane capacity through the town centre
- provide for future bike and pedestrian connectivity through the town centre.

The Proposal would include the following key features:

- staged removal of the bridge
- construction of a new bridge, which would include:
  - an additional westbound traffic lane
  - an additional right turn lane southbound from Beecroft Road onto Blaxland Road
  - a pedestrian and cyclist shared path
  - a raised central median, with additional eastbound and westbound lanes
  - installation of new bridge safety screens
  - installation of new traffic signals
  - installation of new streetlights
- signalling and communications modifications within the rail corridor
- upgrade of approaches to the new bridge from Epping Road, Beecroft Road and Blaxland Road
- road and footpath adjustments to Bridge Street, High Street and Langston Place
- ancillary work including site stabilisation, protection and relocation of existing services and utilities, installation of new services and utilities, handrails, fencing, security measures, signage and wayfinding
- landscaping and site rehabilitation
- site remediation.

Subject to approval, construction is expected to commence in mid-2025 and take approximately five years to complete. Transport would look for opportunities to reduce the construction duration during detailed design.

The Proposal has been developed in accordance with the Transport Environment and Sustainability Plan and the Environment and Sustainability Policy. Avoiding and minimising impacts is a key objective of the Proposal.

A detailed description of the Proposal is provided in Chapter 3 of this Review of Environmental Factors (REF).

An overview of the Proposal is shown in Figure 0-1.

Figure 0-1 Key features of the Proposal (indicative only, subject to detailed design)

Need for the Proposal

The Proposal is needed to support the growth of the town centre identified by NSW Government's Urban Activation Precincts Program by increasing road capacity to support future growth and renewal. The Proposal would provide well-designed infrastructure that makes a positive contribution to the town centre. The Proposal aligns with future road and rail plans.

Section 2 of this REF further describes the need for the Proposal and outlines the options considered in developing the design.

Statutory and planning framework

Transport is the government agency responsible for the delivery of major transport infrastructure proposals in NSW and is the proponent for the Proposal.

This REF has been prepared to assess all matters affecting or likely to affect the environment by reason of the construction and operation of the Proposal under the provisions of Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Development consent from council is not required.

Community and stakeholder consultation

Community consultation activities for the Proposal would be undertaken during the public display period of this REF with the public invited to submit feedback on the Proposal to Transport. The REF would be displayed for a period of three weeks. Further information about these specific consultation activities is included in Section 5 of this REF.

Submissions received during the public consultation period would be addressed in a Determination Report and if a decision is made to proceed with the Proposal, would be considered during detailed design.

Transport would review and assess all feedback received during the public consultation period, prior to determining whether or not to proceed with the Proposal. Should the Proposal proceed to construction, the community would be kept informed as project planning continues and throughout the duration of the construction period.

Figure 0-2 shows the planning approval and consultation process for the Proposal. All REF documents are available as PDF files on the Transport Epping Bridge Project website at www.transport.nsw.gov.au/epping-bridge

Submissions must be received before the close of the public consultation period for the REF. Submissions would be managed in accordance with the Transport Privacy Statement which can be found here: www.transport.nsw.gov.au/about-us/transport-privacy or by contacting privacy@transport.nsw.gov.au for a copy.

During the display period a proposal information line (1800 979 577) and email address (parramatta@transport.nsw.gov.au) would also be available for members of the public to make enquiries and provide submissions.

In accordance with the requirements of the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Transport and Infrastructure SEPP), consultation is required with local councils and/or public authorities in certain circumstances, including where council managed infrastructure is affected.

Consultation has been undertaken with the following stakeholders during the development of design options and the preferred option:

- Sydney Trains
- Sydney Metro Northwest Operations & Metro Trains Sydney (MTS)
- City of Parramatta Council
- NSW Trainlink
- NSW Taxi Council
- External Utilities Providers
- Transport for NSW Design Review Panel
- Transport's Planning and Programs, Greater Sydney
- Transport's Community and Place, Greater Sydney
- Transport's Network and Safety Services
- Transport's Active Transport Team
- Transport's Planning - Bus Operators
- Transport's Roads and Traffic Engineering
- Transport's Infrastructure and Place Network Assurance Committee
- Transport's Asset Management Branch

Consultation with these stakeholders would continue through the detailed design and construction of the Proposal.

Feedback can be sent to:

a) parramatta@transport.nsw.gov.au

b) Epping Bridge Project

Director Environment and Sustainability (Rail Development and Delivery)

Transport for NSW

4 Parramatta Square

12 Darcy Street

Parramatta NSW 2150

Or submitted:

c) in person at a proposal community information session

d) via www.nsw.gov.au/have-your-say

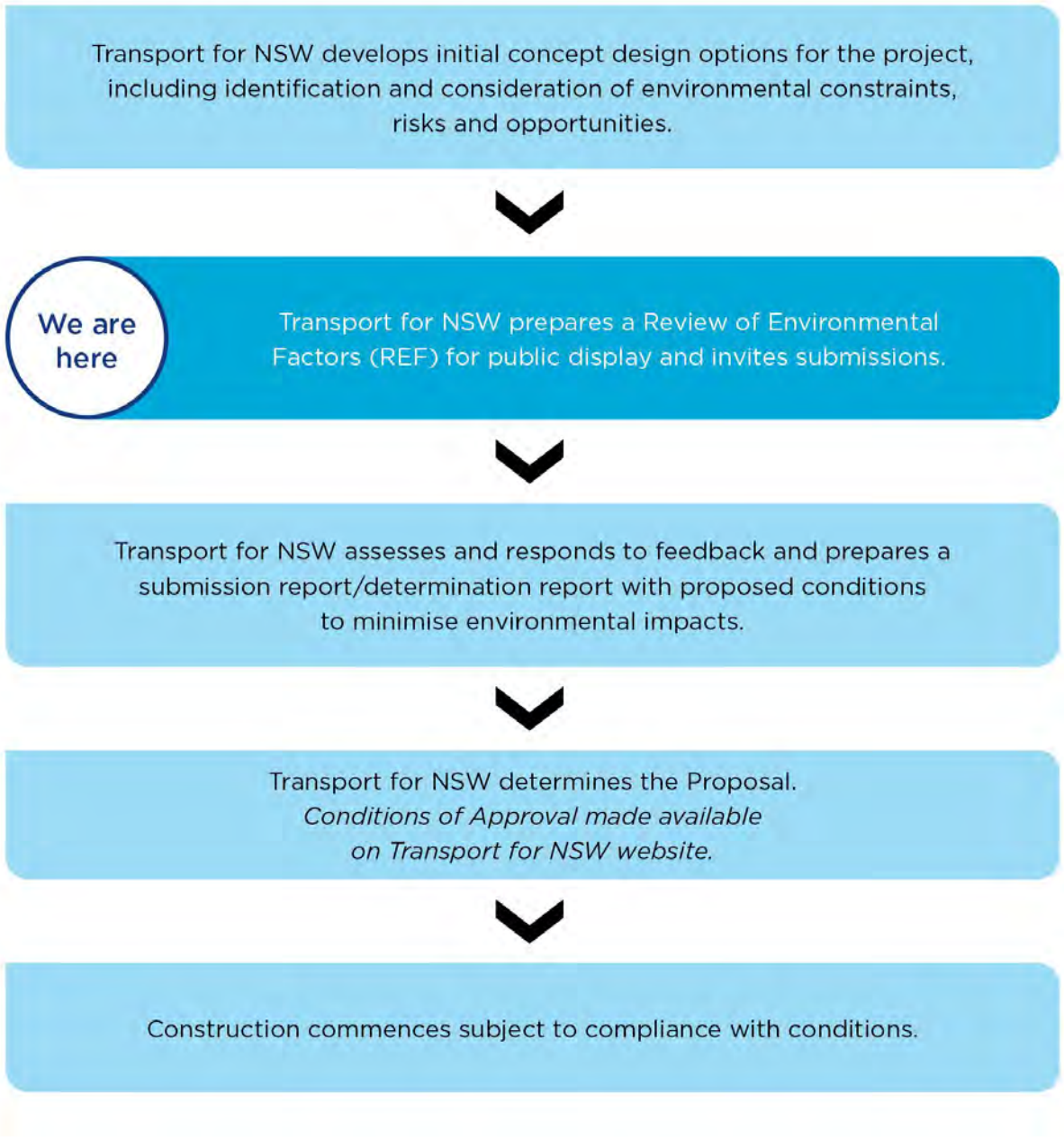

Figure 0-2 Planning approval consultation process for the Proposal

Environmental impacts

This REF identifies the potential environmental benefits and impacts of the Proposal and outlines the mitigation measures that would be used to reduce identified impacts.

The Proposal would provide the following benefits:

- increased road capacity to meet future traffic growth and housing development
- improved road safety through the delivery of a new central median and traffic lanes
- improved cyclist and pedestrian safety through the delivery of a pedestrian and cyclist shared path, and new safety screens
- improved access to the town centre and integration between transport modes

- improved connectivity to residential, recreational, and commercial areas within and around Epping
- enhanced active transport links and access to public transport
- reduced maintenance requirements and operational costs.

Should the Proposal proceed, there are potential impacts on the local community and road users during construction. These are associated with traffic, transport, visual amenity, vegetation removal, noise and vibration.

Key impacts include:

- temporary reduction of road network capacity due to construction staging
- temporary impacts on local traffic flow due to construction traffic and speed limit reductions
- temporary rail and road closures during construction
- changes to bus stop locations
- temporary disruption to pedestrian and shared path access during construction
- temporary reduction in secure bicycle parking capacity at Langston Place due to the partial removal of the opal bike shed during construction
- temporary impacts to heritage due to the construction works associated with the Proposal
- temporary adverse impacts to visual amenity of the local environment due to the construction works associated with the Proposal
- minor impacts to the visual environment from the introduction of new elements, such as safety screens and retaining walls, and from the removal of 28 existing planted native and exotic trees
- temporary noise and vibration impacts to adjacent residential and business areas during construction, including periods of weekend work.

No adverse long-term operational impacts would be expected as a result of the Proposal.

Further information regarding these construction and operational impacts is provided in Chapter 6 of this REF.

Justification and conclusion

This REF has been prepared having regard to sections 5.5 and 5.7 of the EP&A Act, and section 171 of the EP&A Regulation, to ensure that Transport takes into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The detailed design of the Proposal would also be designed in accordance with the *NSW Sustainable Design Guidelines – Version 4.0* (Transport, 2019c) taking into account the principles of ecologically sustainable development (ESD).

Should the Proposal proceed, any potential associated adverse impacts would be appropriately managed in accordance with the mitigation measures outlined in this REF, and the Conditions of Approval imposed in the Determination Report. This would ensure the Proposal is delivered to maximise benefit to the community and minimise any adverse impacts on the environment and the community.

In considering the overall potential impacts and proposed mitigation measures outlined in this REF, the Proposal is unlikely to significantly affect the environment including critical habitat or threatened species, populations, ecological communities or their habitats.

Figure 0-3 Photomontage of the Proposal in operation (indicative only, subject to detailed design)

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1. Introduction

Transport for NSW (Transport) is responsible for strategy, planning, policy, procurement, regulation, funding allocation, and other non-service delivery functions for all modes of transport in NSW including road, rail, ferry, light rail, point to point, cycling and walking.

Transport is the proponent for the Epping Bridge Project (the 'Proposal').

1.1 Proposal Overview

1.1.1 The need for the Proposal

Epping town centre is a part of the NSW Government's Urban Activation Precincts Program, which aims to deliver more homes in places with access to infrastructure, transport, services and jobs. There has been major investment in public transport development in the town centre to support growth, with the upgrade of Epping Station in 2013, complemented by the new Sydney Metro Northwest, which began operating on 26 May 2019.

In 2013, the Department of Planning & Environment, now Department of Planning, Housing and Infrastructure (DPHI) released the Epping Town Centre Structure Plan and Planning Report as part of the NSW Government's Urban Activation Precinct Program.

From funding received from the DPHI Housing Acceleration Fund (HAF) Transport was able to plan and deliver the town centre road upgrades to improve traffic flow and reduce congestion to support population growth in the town centre.

The completed town centre road upgrades are:

- Beecroft Road and Carlingford Road intersection upgrade
- Epping Road upgrade, including widening Epping Road westbound between Blaxland Road and Essex Street and upgrading the intersection of Epping Road and Essex Street.

In July 2018, the NSW Government announced the widening of the bridge as the third town centre road infrastructure proposal to support new housing growth in line with the Epping Town Centre Urban Activation Precinct Program (Epping Activation Program).

In May 2022, a joint announcement by the Australian and NSW governments was made, which detailed an election commitment of a split 50:50 funding for the Proposal.

The Proposal aligns with future road and rail plans and is needed to:

- support the provision of additional houses in places with access to infrastructure and transport provided by the Epping Activation Program, through increasing road capacity for future growth and renewal
- replace the existing structure of the bridge which has deteriorated.

1.1.2 Key features of the Proposal

The Proposal would replace the existing bridge with a new wider bridge. An overview of the Proposal is presented in Figure 1-1.

Key features of the Proposal include:

- staged removal of the bridge
- construction of a new bridge which would include:
  - an additional westbound traffic lane
  - an additional right turn lane southbound from Beecroft Road onto Blaxland Road
  - a pedestrian and cyclist shared path

  - a raised central median, with additional eastbound and westbound lanes
  - installation of new bridge safety screens
  - installation of new traffic signals
  - installation of new streetlights
- signalling and communications modifications within the rail corridor
- upgrade of approaches to the new bridge from Epping Road, Beecroft Road and Blaxland Road
- road and footpath adjustments to Bridge Street, High Street and Langston Place
- ancillary work including site stabilisation, protection and relocation of existing services and utilities, installation of new services and utilities, handrails, fencing, security measures, signage and wayfinding
- landscaping and site rehabilitation
- site remediation.

Subject to planning approval, construction is expected to commence in mid-2025 and take approximately five years to complete.

A detailed description of the Proposal is provided in Chapter 3 of this REF.

Figure 1-1 Overview of the Proposal (indicative only - subject to detailed design)

1.1.3 Location of the Proposal

The bridge is located within Epping town centre, in the Parramatta Local Government Area (LGA), approximately 16 kilometres northwest of Sydney's Central Business District (CBD).

The Wallumedegal People of the Dharug Nation are the Traditional Custodians of the lands on which the project is located.

The bridge spans the Northern Railway line south of Epping Station and connects to Beecroft Road, Epping Road and Blaxland Road. Epping Station and the Epping Bus Interchange are located approximately 100 metres north of the Proposal. The location of the bridge and its regional context is presented in Figure 1-2 and an aerial image of the location is presented in Figure 1-3.

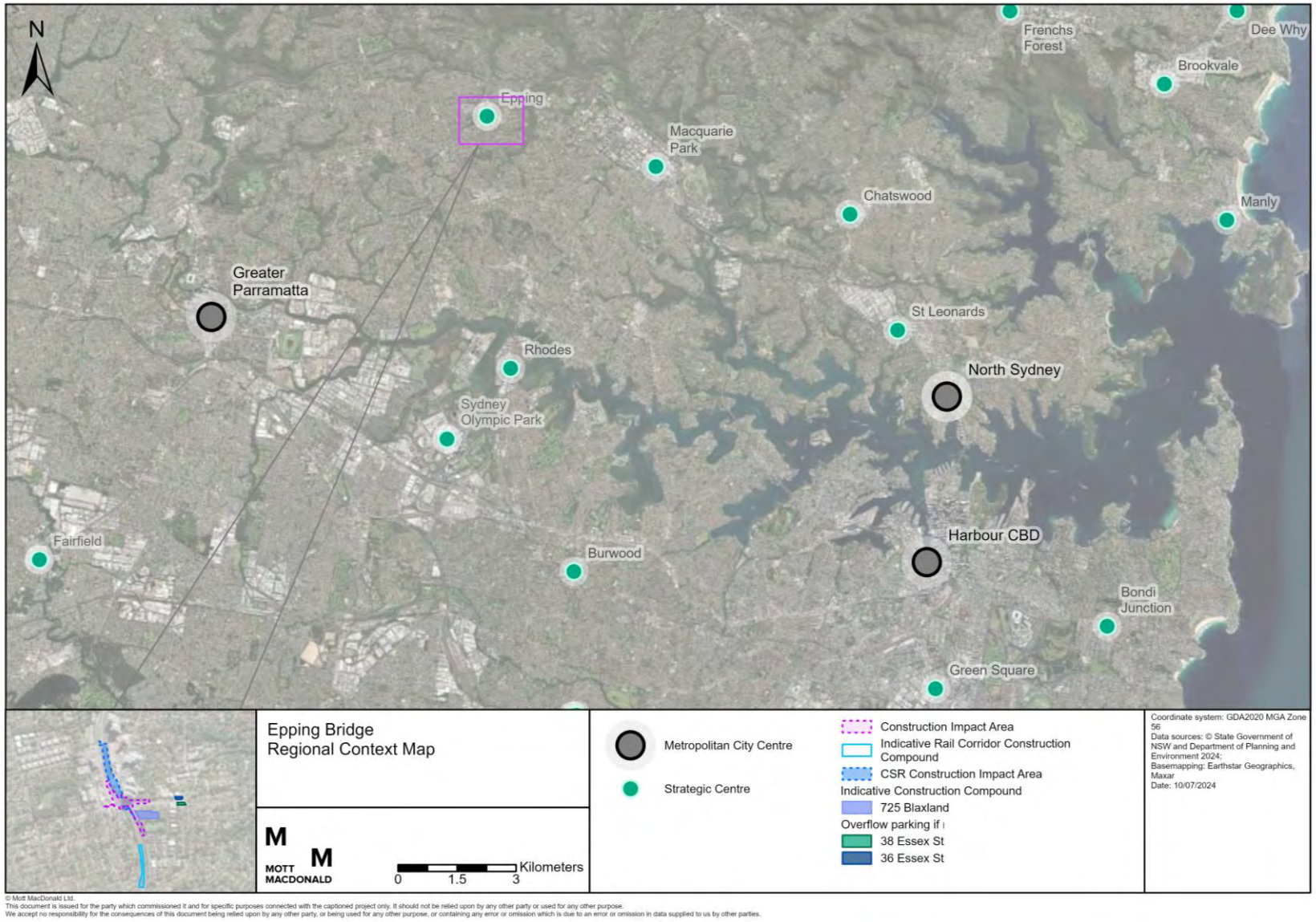

Figure 1-2 Regional context of the Proposal

Figure 1-3 Aerial image of Epping Bridge (Transport, 2024)

1.1.4 Existing Infrastructure and land uses

Epping Bridge

The bridge is a Transport asset operated and maintained by Sydney Trains. It is a three-span structure with two piers, originally built in 1936. It has undergone various modifications throughout its design life. Inspections carried out by Transport in October and November 2022 indicated that it requires significant maintenance or renewal. The bridge allows car and pedestrian traffic to cross the Northern Rail Line. Overhead wires and rail signals for the rail line are attached to the underside of the bridge. The Northern Rail Line is used by suburban rail, intercity, regional and freight services, see Figure 1-5 and Figure 1-6. The bridge has three lanes of eastbound traffic, two lanes westbound traffic and pedestrian footpaths on both sides.

The bridge provides connection to three state roads: Epping Road, Beecroft Road and Blaxland Road. Three local roads, High Street, Langston Place and Bridge Street connect to the major state roads in proximity to the bridge.

Land uses

The Proposal is situated on land zoned under the Parramatta Local Environment Plan 2023 (Parramatta LEP), Figure 1-7 shows the relevant land zones. The Proposal is located within land zoned:

- SP2 Classified Road
- SP2 Rail Infrastructure Facility
- R4 High Density Residential
- E1 Local Centre
- R2 Low Density Residential

The Proposal is located within and adjacent to the town centre, a commercial suburban centre with a range of businesses including medical centres, gyms, restaurants, retail stores and a hotel. The southern extent of the Proposal is surrounded by a mixture of different residential land uses including detached dwellings, medium density strata apartment blocks and high rise residential buildings. Land zoned for public recreation known as Forest Park, is adjacent to the southeastern portion of the Proposal along Blaxland Road.

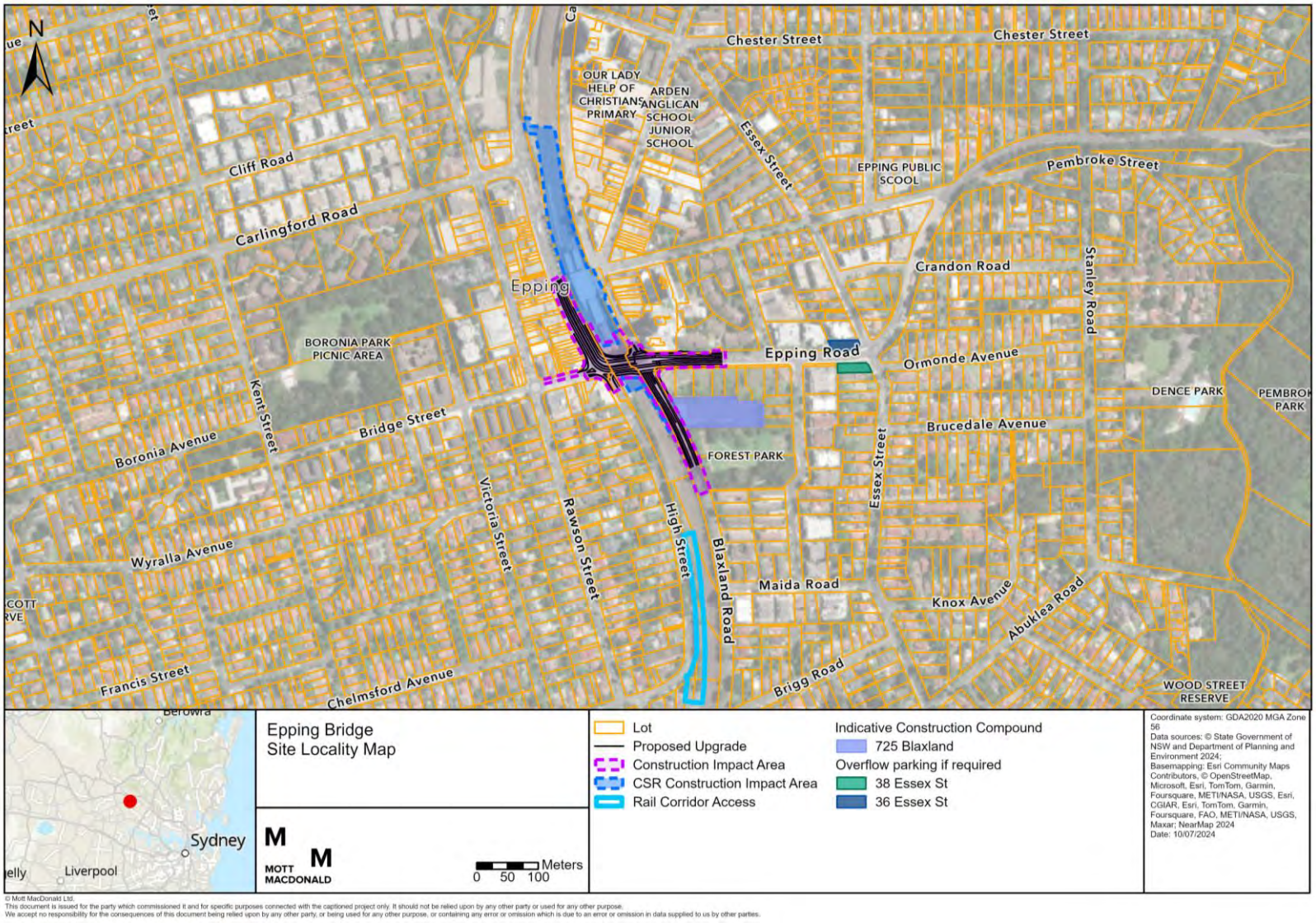

Figure 1-4 Proposal locality map

Figure 1-5 View of Epping Bridge looking south from Epping Station

Figure 1-6 View of Epping Bridge looking north from the rail corridor

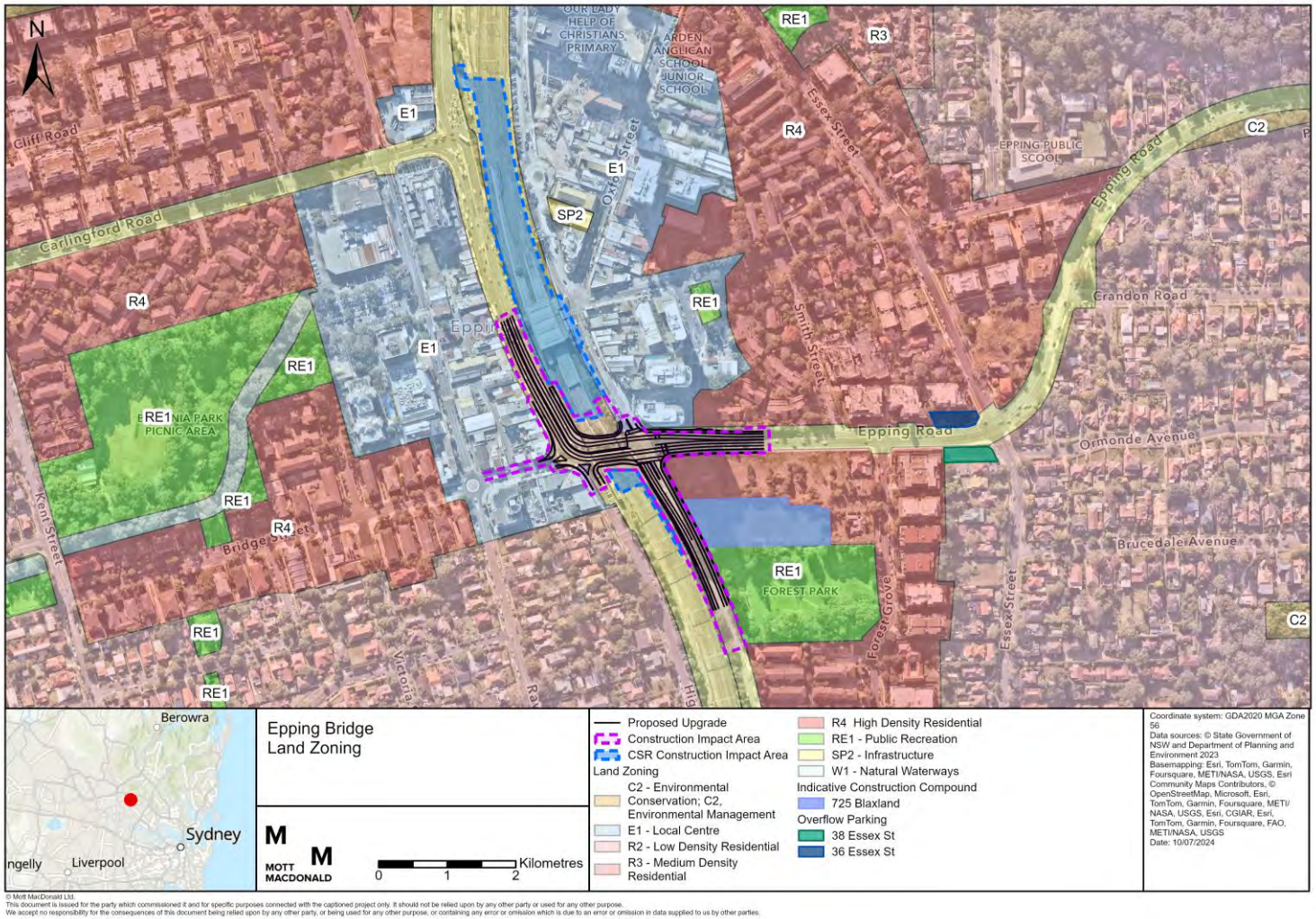

Figure 1-7 Land zoning map

1.2 Purpose of the report

This REF has been prepared by Mott MacDonald on behalf of Transport to assess the potential impacts of the proposed Epping Bridge Project. Transport is the proponent and the determining authority under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The purpose of this REF is to describe the Proposal, to assess the likely impacts of the Proposal having regard to the provisions of Section 5.5 of the EP&A Act, and to identify mitigation measures to reduce the likely impacts of the Proposal. This REF has been prepared in accordance with section 171 of the *Environment Planning and Assessment Regulation 2021* (EP&A Regulation).

This assessment has also considered the relevant provisions of other relevant environmental legislation, including the *Biodiversity Conservation Act 2016* (BC Act), *Fisheries Management Act 1994* (FM Act) and the *Roads Act 1993* (Roads Act).

Having regard to the provisions of the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), this REF considers the potential for the Proposal to have a significant impact on matters of National Environmental Significance (NES) or Commonwealth land, and the need to make a referral to the Australian Department of Agriculture, Water and the Environment for any necessary approvals under the EPBC Act.

Refer to Chapter 4 for more information on statutory considerations.

2. Need and options considered

Chapter 2 discusses the need of the Proposal in terms of its strategic setting and operational need. It identifies the various options considered and the selection of the preferred option for the Proposal. This chapter also provides a summary of the options that have been considered during development of the Proposal and why the preferred option has been chosen.

2.1 Strategic need for the proposal

Improving transport customer experience is the focus of the NSW Government's transport initiatives. The Proposal, the subject of this REF, would complement Epping town centre road and intersection upgrades completed by Transport in 2018 to improve traffic flow and traffic congestion in the area. In addition to this, Table 2-1 provides an overview of NSW Government policies and strategies relevant to the Proposal.

Table 2-1 Key NSW Government policies and strategies applicable to the Proposal

Policy / Strategy	Overview	How the Proposal aligns
Future Transport Strategy (Transport, 2022a)	The Future Transport Strategy is an update of NSW's Future Transport 2056 and NSW's Long Term Transport Master Plan. It is a suite of strategies and plans for transport to provide an integrated vision for the state. The Strategy works to deliver against three high level outcomes: • connecting customers' whole lives • successful places for communities • enabling economic activity The Future Transport Strategy identifies 14 strategic directions in response to these outcomes to guide transport investment in Greater Sydney. These include transport providing convenient access, supporting attractive places and providing 30-minute access for customers to their nearest centre by public transport. The aspects of the strategy relevant to the Proposal include increased active transport uptake, embedding resilience and corridor preservation.	The Proposal would contribute to the performance focus of developing a strong economy by improving traffic flows across the bridge and enabling the efficient transport of goods and people delivering services. In addition, the Proposal would support the focus of creating the metropolitan 30-minute city by improving active transport links to and across the town centre, including access to Epping Station and Metro Station. It is anticipated that the Proposal would improve the safety of the road network in the locality through greater separation of the road and active transport traffic. This would be in accordance with the performance focus to deliver a safe and reliable network with zero trauma.
Disability Inclusion Action Plan (2021-2025) (NSW Government, 2021e)	The Disability Inclusion Action Plan 2021-2025 was developed by Transport in consultation with the Accessible Transport Advisory Committee, which consists of representatives from peak disability and ageing organisations within NSW. The Disability Plan identifies the challenges, the achievements to date, the considerable undertaking that is required to finish the job, and provides a solid and practical foundation for future progress over the next five years.	The Proposal has been designed to enable accessibility as much as possible. It is noted that the footways and shared paths would not comply with Disability Discrimination Act 1992 (DDA) requirements, as they follow the grades of the roads and underlying topography which are steeper than the maximum grades required to meet DDA requirements and constrained by the surrounding urban environment to allow adjustment. This is applicable at the following locations: • Beecroft Road southbound/eastbound nearside footpath

Policy / Strategy	Overview	How the Proposal aligns
		• Blaxland Road southbound nearside footpath A preliminary DDA assessment would be undertaken to assess the accessibility of the concept design.
A Metropolis of Three Cities - Greater Sydney Region Plan (Greater Sydney Commission, 2018)	The Greater Sydney Region Plan is the NSW Government's 40-year land use plan for Sydney. It establishes a vision for a metropolis of three cities – the Eastern Harbour City, Central River City and Western Parkland City. The Plan presents a range of objectives that must be met to improve the liveability, productivity and sustainability of the region. The plan also presents objectives to create a city supported by infrastructure and is collaborative across the three cities.	The Proposal would align with a range of the Plan's objectives. This would primarily be achieved through the provision of improved infrastructure that supports future growth and enables improved active transport. The Proposal would align with the following objectives: • Objective 1: Infrastructure supports the three cities • Objective 3: Infrastructure adapts to meet future needs • Objective 6: Services and infrastructure meet communities' changing needs
Central City District Plan (Greater Sydney Commission, 2018)	Epping is a metropolitan centre within the Central River City as such the Central City District Plan applies to the Proposal. The central city district is anticipated to grow substantially as the geographic centre of Greater Sydney. The Plan has 10 directions and 22 planning priorities to improve the liveability, productivity and sustainability of the region.	The Proposal would align with a range of the Plan's planning priorities. This would be primarily achieved through the provision of improved infrastructure that would support future growth and enables improved active transport. The Proposal would align with the following objectives: • Planning Priority C1. Planning for a city supported by infrastructure. • Planning Priority C3. Providing services and social infrastructure to meet people's changing needs
Building Momentum – State Infrastructure Strategy 2018-2038 (Infrastructure NSW, 2018)	The State Infrastructure Strategy 2018-2038 makes recommendations for each of NSW's key infrastructure sectors including transport. The strategy sets out Infrastructure NSW's advice on the infrastructure needs and priorities of the State for the next 20 years, and beyond. Section 10 of the Strategy discusses the recommendation to integrate infrastructure, land use and service planning.	The Proposal would align with aspects of section 10 as it would be located in an area with land use zoning that enables denser residential development, has existing infrastructure capacity (Sydney Metro, suburban rail line) and enables the preservation of an existing transport corridor. In addition, recommendation 47 of the strategy states that infrastructure should actively reflect history, culture and heritage. The Proposal would achieve this through design of bridge screens that reflect the area's heritage.
Local Strategic Planning Statement City Plan 2036 (City of Parramatta Council, 2020)	The local strategic planning statement (LSPS) provides strategic direction on how the City of Parramatta is planning for the next 20 years. The plan presents priorities, policy directions and actions to help achieve the goals of the regional and district plan in a local context. Many of these are related to transport and active travel.	Planning Priority 10 of the LSPS is to improve active walking and cycling infrastructure and access to public and shared transport. The Proposal would align with this priority as it aims to improve active transport connections to the Epping Town Centre and public transport.
Parramatta Bike Plan (City of Parramatta Council, 2017)	The Parramatta Bike Plan presents the vision for cycling to support the liveability of Parramatta. The plan aspires to enhance productivity and	The Proposal would support this plan through the provision of improved active travel infrastructure across the bridge.

Policy / Strategy	Overview	How the Proposal aligns
	liveability of Parramatta through creating safer cycling options for residents. The plan aims to increase the proportion of people cycling to work by 5% and all trips ending in the CBD by 10%.	The new widened pedestrian and cyclist shared path would create safer travel.

2.1.1 Epping Town Centre Urban Activation Precinct Program (Epping Activation Program)

The Epping Town Centre Study 2011 was jointly initiated by the then NSW Department of Planning and Infrastructure (DPI), Hornsby Shire Council and City of Parramatta Council (Planning and Infrastructure 2013a). The study explored the potential for the town centre precinct to accommodate increased residential and employment growth by identifying future development options, planning controls and investment needed to accommodate such growth. The study also considered traffic impacts and ways to maximise the benefits of State Government infrastructure investment, in particular the rail lines converging at Epping.

The study was a key background document to the integrated land use and transport planning put forward in the Epping Activation Program. The precinct is focussed around Epping Station, as it is on the T9 Northern Line, is part of the Epping to Chatswood Rail Link, and connects with Sydney Metro Northwest. The station also serves as an interchange for a range of public and private bus services.

A range of plans and reports were prepared by DPI to enable the rezoning of 165 hectares of land surrounding the town centre. An increase to the amount of land zoned as the town centre would enable mixed used development in the town centre and would increase the area of medium and high density residential zoned land.

The NSW Government's Urban Activation Precincts Program, identified key road and intersection upgrades from the *Epping Town Centre Study* 2011 for funding:

- Epping Road/Essex Street intersection
- Epping Road/Blaxland Road intersection
- carriageway widening – Epping Road
- Carlingford Road/Beecroft Road intersection
- a third westbound lane and pedestrian/cycle footbridges over the rail line.

Roads and Maritime (now Transport for NSW) has implemented road and intersection upgrades within the town centre to support the Epping Activation Program. These road proposals aimed to improve traffic flow and road safety and reduce congestion. The proposed upgrade of the bridge would complete planned upgrades at Epping town centre.

2.2 Proposal objectives

The specific objectives of the Proposal are to:

- support the Epping Activation Program by increasing road capacity for future growth and renewal
- improve safety and reduce traffic congestion across the bridge
- improve cyclist and pedestrian safety through the delivery of a pedestrian and bicycle shared path, and new bridge safety screens
- improve access to the town centre for the local community, road users and businesses
- increase westbound lane capacity through the town centre
- provide for future cycle and pedestrian connectivity through the town centre
- provide a 'no regrets' investment that aligns with future road and rail plans

- provide a well-designed infrastructure element that makes a positive contribution to the town centre.

2.3 Alternatives and options considered

2.3.1 Design development

In 2019, Future Rail prepared design options for the widening or replacement of the existing bridge (Future Rail, 2019). A business case for the Proposal was prepared by Transport and in 2022 it was determined that replacement was the preferred option. In 2023, Mott MacDonald was engaged by Transport to prepare a concept design for replacement of the existing bridge. A design optioneering phase was undertaken and the following options were assessed:

- future rail definition baseline option
- option 1 – two spans (with centre pier)
- option 2 – single span (no centre pier)
- option 3 – two structures, single span (no centre pier)

A multi-criteria analysis (MCA) was undertaken to systematically evaluate and compare the different bridge options based on multiple criteria or factors such as design departures, deliverability, cost, Proposal objectives, safety, place and visual amenity.

2.3.2 Methodology for selection of preferred option

As discussed in Section 2.3.1, the design options were assessed in a MCA that included consideration of factors such as design departures, deliverability, cost, Proposal objectives, safety, place and visual amenity to select a preferred option. The options assessed are presented below:

The 'do nothing' approach

Under a 'do-nothing' option, existing access to the bridge would remain the same and there would be no changes to the way the bridge currently operates.

The NSW Government has identified the need for improving the bridge through the Epping Activation Program. In addition, the Sydney Trains Bridge Examination Report from 2022 concluded that the bridge is in a deteriorated condition.

The 'do nothing' option was not considered a feasible alternative as it is inconsistent with the NSW Government's objectives and would not meet the needs of the Epping community.

Future rail definition design baseline option

- two span steel girder bridge approximately 30.5 metres long
- a centre pier requiring a significant number of rail corridor possessions to move rail utilities
- multiple staging sequence required to allow for five lanes of traffic on the bridge to be open at all times, resulting in an extended program
- community fatigue and higher capital costs may be associated with the extended program duration.

Option 1 – two spans (with centre pier)

- two spans, single span & two structure
- design required concessions with road lane widths and required stopping sight distances

Option 2 – single span (no centre pier)

- single span (no centre pier)
- simpler construction with no centre pier, requiring less rail corridor possessions

Option 3 – two structures, single span (no centre pier)

- two structures – one for westbound traffic and pedestrian and cyclist shared path, one for eastbound traffic
- through trusses with load transferred to trusses with transverse girders
- may be more difficult to construct with impacts on program
- more visually intrusive with structure above road level.

2.4 Preferred option

The MCA process identified option 2 – Single Span (no centre pier) as the preferred option. Option 2 scored the best in a weighted and unweighted process. It was considered to have the lowest capital cost, reduced maintenance costs, provide more opportunities for offsite prefabrication and a moderate decrease in the complexity of construction when compared with the other options.

Option 2 was endorsed by all stakeholders involved in the MCA process to progress to concept design. This option is the basis for the Proposal that is assessed in this REF.

3. Description of the proposal

Chapter 3 describes the Proposal and summarises key design parameters, construction method, and associated infrastructure and activities. The description of the Proposal is based on the concept design and is subject to detailed design.

3.1 The proposal

As described in Section 2, the Proposal involves upgrading the bridge. The bridge is required to be replaced due to the deterioration of the existing structure and to increase the road network capacity and provide safe active transport links in the town centre.

The Proposal would include the following key features:

- staged removal of the bridge
- construction of a new bridge, which would include:
  - an additional westbound traffic lane
  - an additional right turn lane southbound from Beecroft Road onto Blaxland Road
  - a pedestrian and cyclist shared path
  - a raised central median, with additional eastbound and westbound lanes
  - installation of new bridge safety screens
  - installation of new traffic signals
  - installation of new streetlights
- signalling and communications modifications within the rail corridor
- upgrade of approaches to the new bridge from Epping Road, Beecroft Road and Blaxland Road
- road and footpath adjustments to Bridge Street, High Street and Langston Place
- ancillary work including site stabilisation, protection and relocation of existing services and utilities, installation of new services and utilities, handrails, fencing, security measures, signage and wayfinding
- landscaping and site rehabilitation
- site remediation.

3.2 Scope of work

3.2.1 Bridges and structures

The road and rail requirements have informed the bridge design. The required clearance of the bridge is about 5.5 metres above the Hornsby bound rail line and about 5.2 metres above the city bound rail line. The bridge would be a single span bridge with an approximate deck width of 31 metres at mid-span. The bridge design is based on seven traffic lanes, a shared path on the southern side of the bridge and a footpath on the northern side of the bridge.

The single span bridge comprises girders supporting a bridge deck. The deck would be slightly higher and thicker than the existing bridge, and would be wider to accommodate the 7 lanes, shared path and footpath.

Cast in-situ concrete piles would be installed behind the existing abutment walls to support the new abutments. The original bridge abutments would be kept in place on both sides and tied back with anchors behind the new abutments for structural stability.

3.2.2 Road

The Proposal area includes six roads that provide vehicle and pedestrian connectivity around the town centre. Epping Road, Beecroft Road and Blaxland Road are state arterial roads and Langston Place, Bridge Street and High Street are local roads.

The key road upgrades of the Proposal include:

- widening of the bridge to provide a third westbound lane and a southbound right turn lane into Blaxland Road
- shifting the southbound lanes and central median on Beecroft Road to the west, and utilising the existing parking lane for the third northbound lane on Beecroft Road
- realignment of the northbound lane on Beecroft Road to achieve a tie-in prior to the pedestrian overpass
- realignment of the lanes on the bridge to provide lane widths of about 3.3 metres minimum for each through lane
- provision of a raised median of about 1.8 metres width and a shared path of about 4 metres width on the southern side on the bridge
- widening of the eastbound carriageway of Epping Road, and provision of a wide raised central median in this location
- reconfiguration of the Bridge Street and Beecroft Road intersection including the addition of a stop sign to control traffic flows
- intersection adjustments at High Street and Beecroft Road
- road work to tie in Blaxland Road and Beecroft Road to the bridge, including excavation, filling and re-grading
- replacement of traffic signals at the intersection of Epping Road, Blaxland Road and Langston Place adjustment of pedestrian crossings to connect with realigned and adjusted roads
- reconfiguration of the bus interchange around Epping station including relocation of bus stop(s).

More details of the proposed road upgrades are provided in Section 6.1. Table 3-1 details pedestrian footpaths and shared path associated with the Proposal.

Table 3-1 Pedestrian footpaths and pedestrian and cyclist shared path

Road Name	Type	Side of Road	Approximate Width
Beecroft Road/Epping Road (Epping Bridge)	Shared path	Southern	4.6m
Beecroft Road (Epping Bridge)	Footpath	Northern	1.8m
Epping Road	Shared path	Southern	3m
Epping Road	Footpath	Northern	2m
Blaxland Road	Footpath	Eastern	3m
Beecroft Road	Footpath	Western	3m
Beecroft Road	Footpath	Western	Ranges from 1.8m to 5m

The footpath and shared path pavement on the bridge would be concrete. Footpath pavement off the bridge would tie into the surrounding street materials and/or the town centre materials palette.

3.2.1 Revised bus interchange configuration

The Proposal would require relocation of bus stops at the Epping bus interchange. Bus stand C on the eastern side of Beecroft Road and bus stands G and H on the western side of Beecroft Road are proposed to be relocated. Alternate bus stand locations have been identified following Transport's consultation with bus operators, see Figure 3-1.

The preferred relocation strategies are:

- Bus Stand C would be relocated to the northern side of the pedestrian overbridge. This is currently an on-street parking bay up to 50 metres in length. It is also used for rail replacement bus operations during night-time or weekend rail closures
- relocation of northbound bus stands D, E and F about 49 metres further north along the western kerb of Beecroft Road, to accommodate G and H, north of the pedestrian overbridge.

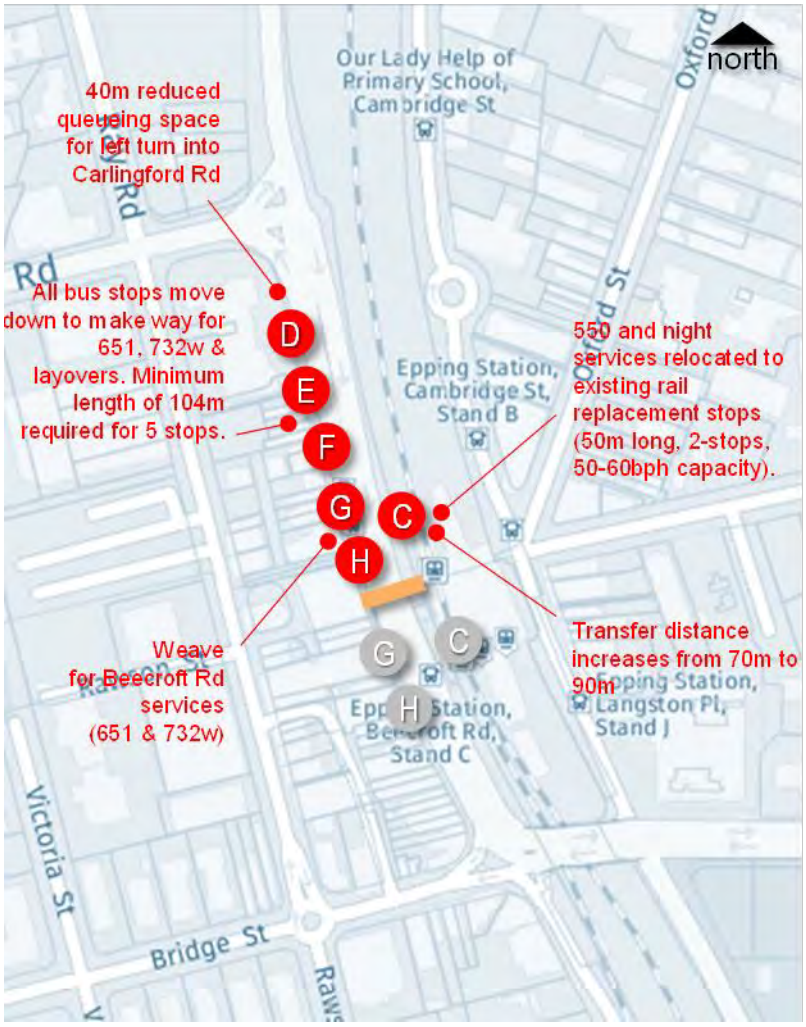

Figure 3-1 Revised bus interchange configuration

Discussion of relocation strategies of the Bus Interchange surrounding Epping Station with stakeholders and service providers has been ongoing during concept design development.

3.2.2 Pedestrian crossing

A new staged pedestrian crossing is proposed across the eastern approach to the signalised intersection of Epping Road and Blaxland Road and Langston Place. A staged crossing includes an island in the middle of the road to allow pedestrians refuge in the middle of the road. The staged crossing allows greater flexibility with signal phasing at the busy intersection and safer pedestrian movements.

The existing crossings at High Street and Bridge Street are to be upgraded to raised pedestrian (zebra) crossings. The raised platform gives further prominence to pedestrians and encourages motorists to slow down on approach to the crossing.

All other pedestrian crossings would operate in the same function as the existing arrangement.

3.2.3 Road furniture

The Proposal includes the replacement of the following roadside furniture:

- kerbing
- signposting
- safety barriers
- street lighting
- boundary fencing.

3.2.4 Rail infrastructure

The Proposal would not involve any changes to the existing rail alignment. However, reconfiguration of existing infrastructure within the rail corridor would be required as follows:

- overhead wiring would be removed from the existing bridge and reinstalled on the new bridge
- a freestanding anchor mast (FSAM) that supports overhead wiring would be removed from the southern side of the bridge and replaced by a new FSAM on the northern side of the bridge
- to enable the construction of the Proposal and the ongoing use of the rail corridor, the existing combined services route (CSR) for signalling, communications, optic fibre and 425V AC power cables would be replaced and relocated
- to enable the construction of the Proposal and the ongoing use of the rail corridor, the existing rail signals mounted on the bridge structure would be removed and replaced in the equivalent location on the new bridge structure
- the Sydney Metro tunnel ventilation system, contained within the South Services building, would require modification during the construction stage of the Proposal due to the proximity of the proposed bridge to the existing ventilation system infrastructure. It is proposed to modify the ventilation system so that it is not impeded by the bridge. The modification would not alter the location of the South Services building or result in significant changes to the structure.

3.2.5 Drainage

Key features of the proposed drainage design include:

- modification of the existing pits on Epping Road (westbound lanes)
- addition of pits alongside the median on Epping Road (eastbound lanes)
- installation of drains on the bridge alongside the median on the westbound lane and pits on the eastern and western end kerb on the eastbound lane
- addition of pits on Beecroft Road alongside the median and addition of pits alongside the western northbound kerb
- addition of pits on Blaxland Road alongside the northbound and southbound road kerb.

The Proposal has been designed in accordance with Transport for NSW standards, Australian and New Zealand Standards and Austroads *Guide to Road Design Part 5A Drainage*. Pipes have been sized to convey the 10 percent Annual Exceedance Probability (AEP) storm event.

3.2.6 Utilities

A utilities management plan (UMP) (AUS, 2023) has been prepared to manage utilities during construction and operation of the Proposal. The UMP provides measures for the relocation and protection of utilities to ensure there would be no disruption to the network and its customers.

Table 3-2 details key utilities assets within the Proposal area that would require protection or relocation.

Table 3-2 Key utilities assets identified within the Proposal area which would require protection or relocation.

Owner	Asset Type	Key Assets Identified[1]
Sydney Water	Potable Water	• 3 x DN375 • 3 x DN250 • 2 x DN150 • Property Connections
Sydney Water	Sewer	• Nil
Jemena	Gas	• 3 x Medium Pressure Mains (210 kPa) • Property Connections
Ausgrid	Electricity	• 2 x LV OH Networks • 1 x LV UG Conduit Bank • 8 x Poles • 8 x Streetlights
Endeavour Energy	Electricity	• 1 x HV OH Networks • 2 x LV OH Networks • 2 x LV UG Conduit Bank • 16 Poles • 13 x Streetlights
Telstra	Telecommunications	• 9 Pits • Varying Optic Fibre in Conduits • Fibre size ranges from 12 – 312. • Local Overhead Networks • Third Party Carriers includes TPG, AARnet & NBN Optus fibres
NBN Co	Telecommunications	• Subducted into Telstra Network Varying NBN Property Connection conduits (P20, P35)
Optus	Telecommunications	• 2 x Optic Fibre Overheads Underground network P100 size Fibre size ranges from 12 – 144. 1 x Pit
AARnet	Telecommunications	• Underground network in Telstra subducts Fibre Size ranges from 12-120.
TPG	Telecommunications	• Underground network in Telstra subducts Fibre Size ranges from 24 – 312.

1 Traffic Control Signals and Sydney Trains assets are not included in this table

3.2.7 Land acquisition

Based on the concept design and subject to negotiations in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW), the partial acquisition of land within 2 – 16 Epping Road, would be required to enable the construction and operation of the Proposal. Details are provided in Table 3-3.

Table 3-3 Land Acquisition Requirements

Address	Lot and DP	Approximate property acquisition (m^2)
2 - 16 Epping Road Epping NSW 2121	Lot and DP: Lot 10 / DP1204058, SP16921	Around 146m^2 subject to final design

3.2.8 Enabling works

Various activities would be required to facilitate construction of the Proposal, these include the relocation of:

- the chiller unit attached to the Sydney Metro South Services building (South Services building)
- Sydney Trains signals and communications services.

Relocation of the chiller unit

To enable the Proposal, the chiller unit attached to the South Services building on High Street needs to be relocated. The chiller unit provides spot cooling of the Epping Station Sydney Metro platforms.

In its current location the chiller unit would be impacted by the new, widened bridge. It is proposed to relocate the chiller unit to a new compound on the southern end of the South Services building, presented in Figure 3-2.

Mechanical, electrical, communications and hydraulic services would be adjusted and repurposed to the new compound location.

The relocation would include the following:

- site establishment, including construction fencing
- partial demolition of fencing and vehicle barrier in new chiller unit location
- construction of a new chiller unit enclosure, including minor earthworks/cut, new footing/foundations, deck, acoustic enclosure cladding, ventilation louvres and doors, and access ways
- adjustment of services
- relocation of the existing chiller unit to the new enclosure and connection at the new location
- demolition and removal of redundant services
- demolition of existing chiller unit (7.5 metres long and 4.7 metres wide), including ancillary structures and fencing
- construction of new fencing and site rectification at the location of the existing chiller unit.

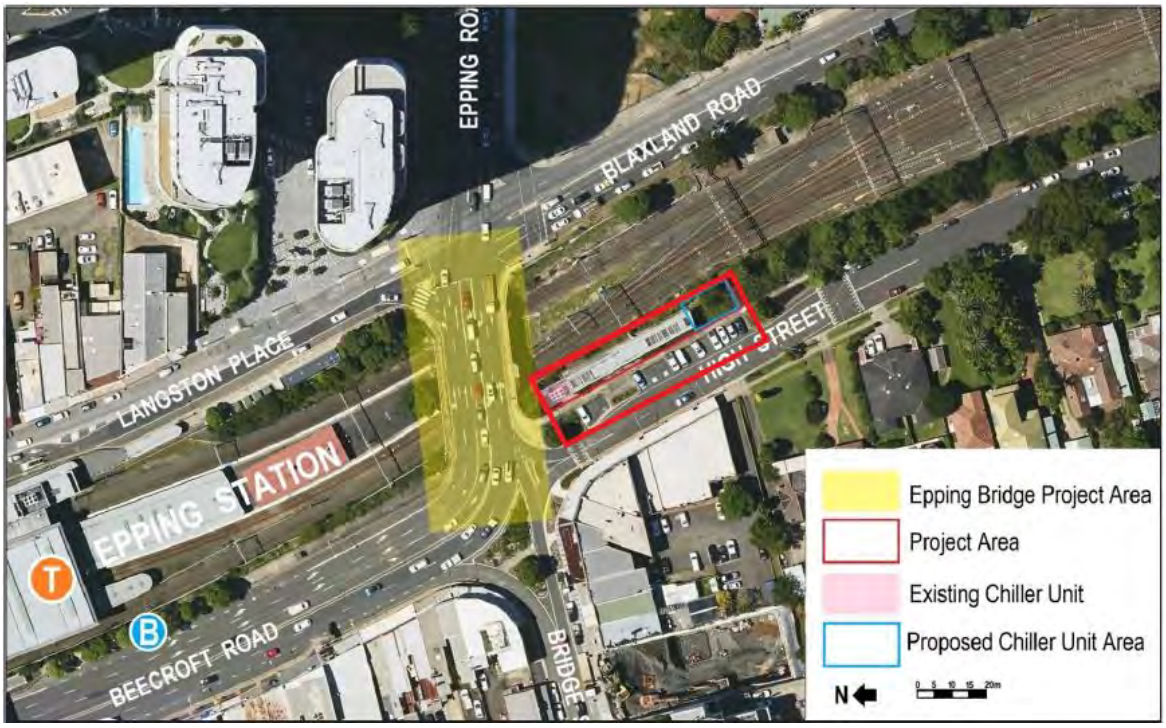

Figure 3-2 Chiller relocation from north to south end of the South Services building

The chiller unit relocation work is required to be completed prior to the commencement of the main Epping bridge work and is time critical.

The chiller unit services the Epping Station Sydney Metro (Metro) platforms and operates when the ambient air temperature at the chiller unit or on the Metro platform reaches 28 degrees Celsius and provides non-critical spot cooling to the Metro platforms.

The work is required to be undertaken in cooler months when there is less requirement for cooling, to minimise impacts to Metro platform passengers.

The work is subject to a separate approval under Division 5.1 of the EP&A Act and would be completed under a separate contract ahead of this Proposal.

Relocation of the Combined Services Route

Sydney Trains signal and communication services, known as the CSR, would require relocation to facilitate the construction stage of the Proposal. It is proposed to modify the alignment of the existing aboveground galvanised steel troughing (GST) on the rail corridor north of the bridge to clear the location of new and temporary abutments. The new route would remain within the rail corridor, north of the bridge as a permanent relocation.

The existing signals and communications GST within the rail corridor south of the bridge, (which also runs through the southern side bridge footpath) would be relocated into an existing signals and communications route running through Epping Station platform. This area can be seen as the CSR Construction Impact Area in Figure 1-4. A separate impact area has been provided for this work as it is considered to have a lower impact than other proposed work. This is due to the work:

- being scheduled for two days during a rail possession
- being located in already disturbed land within the rail corridor
- requiring use of low impact plant to install GST or install new cables through existing routes.

The proposed relocation of the CSR is included as part of the Proposal.

3.2.9 Landscape

The Proposal would provide the opportunity to enhance the entrance to Epping town centre and strengthen its function as a major thoroughfare within the existing urban context.

Construction activities would require the removal of vegetation. To enable construction activities and to support revegetation, the following landscape principles have been identified for the Proposal:

- upgrade the existing retained landscape areas within the Proposal area and provide new landscaped areas where possible to enhance the town centre's entrance
- retain existing trees where possible
- replace trees and vegetation that would require removal in accordance with Transport for NSW *Biodiversity Policy and Tree and Hollow Replacement Guidelines (EMF-BD-GD-0129)*
- provide shade and reduce urban heat wherever possible by planting trees within landscape areas
- provide climate resilient planting of species that are predominately native, hardy and drought tolerant and require little maintenance post establishment
- enhance biodiversity with bird and bee attracting plant species selection.

Vegetation would be planted and maintained in a manner that retains significant views and vehicle sightlines.

3.2.10 Materials and finishes

The design would be submitted to Transport's Design Review Panel at various stages for independent review before being accepted by Transport. An Urban Design and Landscape Plan (UDLP) would also be prepared by the Contractor, prior to finalisation of detailed design for endorsement by Transport.

3.3 Design development

3.3.1 Design standards and guidelines

The Proposal has been designed having regard to the following design standards:

- Transport's Technical Direction and quality alerts
- Transport's supplements to Austroads Guides and Australian Standards
- Austroads Guide to Road Design (AGRD)
- Australian Standards
- utility authority requirements
- work health and safety requirements
- other Transport publications including Asset Management Branch (AMB) Standards, Specifications and Guidelines.

3.3.2 Engineering constraints

There are a number of constraints which have influenced the design development of the Proposal.

Existing structures: The placement and integrity of the suburban rail infrastructure, Sydney Metro infrastructure, the existing road network and private property constraints have been considered during the development of the design.

Sydney Trains' requirements: Both the modification of existing structures and new structures within the rail corridor are required to be designed and constructed with consideration of train impact loads, structural clearances to the track, and safe working provisions.

Utilities: A utilities management plan has been prepared based on utilities surveys and Dial Before You Dig (DBYD) searches.

Table 3-2 presents the details of key utilities assets identified within the Proposal area which would require protection or relocation.

Other considerations: The concept design has taken into consideration existing vegetation, Epping Station group listing on the NSW Transport Asset Holding Entity Section 170 Heritage Conservation Register and potential sources of contamination.

3.3.3 Sustainability in design

Transport is committed to minimising the impact on the natural environment and to the principles of sustainability through the development and use of Transport's Sustainable Design Guidelines version 4.0 (Transport, 2019c) (Sustainable Design Guidelines). The development of the concept design has been undertaken in accordance with the Sustainable Design Guidelines, which seek to deliver sustainable development practices by embedding sustainability initiatives into the planning, design, construction, operations and maintenance of transport infrastructure projects. The development of the guidelines has been influenced by Transport's Environment and Sustainability Policy. The guidelines incorporate the following key aims:

- minimising impacts on the environment, whether through transport operations, infrastructure delivery or maintenance
- procuring, delivering and promoting sustainable transport options that achieve value for money and reduced life cycle costs
- developing, expanding and managing the transport network that is sustainable and climate resilient.

3.4 Construction activities

3.4.1 Work methodology

Subject to approval, construction is expected to commence in mid-2025 and take approximately five years to complete. Transport would look for opportunities to reduce the construction duration during detailed design. The construction methodology would be further developed during the detailed design of the Proposal by the nominated Contractor in consultation with Transport.

The proposed construction activities for the Proposal are identified in Table 3-4. This staging is indicative and is based on the concept design and may change in response to the detailed design methodology and contractor's preferred methodology, program and sequencing of work once known.

The construction program is split into site establishment, three distinct construction stages, with stage 1 comprising two substages, and finishing works. These are presented in Table 3-4. Due to the complexities associated with existing infrastructure in the area, demolition and construction work would occur concurrently. The construction program has been developed in a manner that allows ongoing use of the bridge for the majority of the construction period to minimise potential impacts on road users.

Table 3-4 Indicative construction staging for key activities

Stage	Activities
Site establishment	• mobilise site and set up the compound locations • install construction signage, variable message signs and advisory signs (as appropriate) • identify sensitive areas and install environmental controls as defined by the REF and management plans.
Stage 1A – Construction of new southern portion of the bridge	• install a portion of the new bridge off the southern end of the existing bridge structure • construct roads tie-in on Bridge Street and High Street

Stage	Activities
	• construct the two western most northbound lanes of Beecroft Road including the construction of retaining walls on the corner of Bridge Street • construct retaining walls on the southern side of Epping Road and Blaxland Road in preparation for Epping Road to be raised in subsequent stages • grade Epping Road to tie-in with the existing bridge level on the north side of the bridge and proposed bridge level on the south side of the bridge.
Stage 1B – Relocation of water main and demolition of bridge kerb	• relocate Sydney Water main • demolish the southern footpath of the bridge and complete works to support traffic lane changes onto the completed stage 1A bridge structure • divert traffic onto the stage 1A of the bridge • construct the middle two lanes on Beecroft Road.
Stage 2 – Construction of northern portion of the bridge	• construct stage 2 of the bridge in a temporary location to the north of the existing bridge • remove the remaining redundant bridge structure during an extended rail track closure • slide stage 2 of the bridge into place from its temporary construction location to its final location • complete changes to the two southbound lanes on Epping Road • raise the entirety of Epping Road to its final level.
Stage 3	• install road medians and island • finish line marking on the road and shared path • install traffic signals.
Finishing works	• install new street lights • finish remaining sign posting • finish landscaping and rehabilitate disturbed areas • decommission ancillary sites • final site clean-up.

Temporary bridge construction platform

A temporary bridge construction platform is required to enable the construction of the new bridge deck for the northern portion of the bridge (stage 2). This methodology allows the existing bridge to stay in service while the new bridge is constructed, minimising disruption of traffic across the bridge.

The temporary platform would be constructed either side of the rail corridor and would consist of nine concrete piles of around 75 centimetres in diameter holding a steel frame structure on each side. These steel frame structures would act as temporary support for the bridge beams. The concrete piles would not impact the structural integrity of the retaining wall on the western side of the rail corridor neither would it impact the shotcrete wall on the eastern side. The temporary platform would be located to enable the ongoing use of the rail corridor by all train services.

The bridge beams would be lifted into place on top of the steel frame. Deck formwork, steel reinforcing and a temporary working platform would then be lifted into position from a 150 tonne crane established on Langston Place. Concrete would then be poured to form the deck of the bridge. Langston place would be used as the primary site for movement of material and establishment of a concrete pump.

Once completed the temporary working platform would be removed, the existing bridge components would be demolished, and the new bridge would be slid into place. The steel frame structure of the temporary bridge construction platform would be removed, and the concrete piles would be cut to ground level and left in-situ.

3.4.2 Construction hours and duration

Standard (NSW) Environment Protection Authority (EPA) construction hours apply for the Proposal, these are as follows:

- 7am to 6pm Monday to Friday
- 8am to 1pm Saturdays
- no work on Sundays or public holidays.

Due to the constrained working environment and the need to minimise road and rail disruptions, work would need to occur outside standard hours. This would include night work over multiple consecutive nights per week, and up to three or four consecutive nights per week during some stages of the construction program.

Work during nighttime and outside of standard hours would be scheduled and undertaken in accordance with the Construction Noise and Vibration Management Plan that would be developed in conjunction with the construction program for the Proposal and in accordance with the guidelines contained within the Epping Bridge Project Communications and Stakeholder Engagement Plan to minimise disruptions to customers, pedestrians, motorists and nearby sensitive receivers wherever possible.

Certain work may need to occur during routine rail possessions which are scheduled rail line closures that would occur regardless of the Proposal when part of the rail network is temporarily closed and trains are not operating. This would include out of hours work to minimise disruptions to customers and ensure the safety of rail workers and operational assets. It is estimated that approximately 14 rail possessions would be required to facilitate the following:

- relocation of overhead wires from the existing bridge to temporary structures
- relocation of the CSR
- construction of Blaxland Road and Beecroft Road retaining walls
- demolition of the existing bridge structure
- construction of the new bridge abutments
- sliding of the new bridge into place.

Out of hours works scheduled during rail possessions would be assessed and notified as outlined in the *Construction Noise and Vibration guideline (public transport infrastructure*) (Transport, 2023c). Out of hours work that is not related to a rail possession would also be required. Approval from Transport would be required for any out of hours work and the affected community would be notified as outlined in Transport's *Construction Noise and Vibration Guideline (Roads)* (Transport, 2023b). Section 6.3 provides further details on hours of work and noise assessments.

3.4.3 Plant and equipment

The plant and equipment likely to be used during construction includes

- 12t flat top hi-rail trucks with hiab
- 06t dump trucks
- 20t dump trucks
- 06t rubber tracked excavators
- 12t rubber tracked excavators
- 50t piling rig
- concrete boom pump
- line pump
- bobcats
- sucker truck (non-destructive digging)
- hi-rail excavator
- hi-rail dump trucks
- water cart
- demolition saw
- utility vehicles
- concrete truck
- hi-rail sucker truck
- hi-rail scissor lift
- boom lift
- hi-rail boom lift
- generators
- lighting tower
- smooth drum rollers
- road grader
- asphalt paving machine
- road profilers
- asphalt milling machine
- bitumen sprayer
- front end loader

- cranes.

3.4.4 Earthworks

Excavations and earthworks would generally be required as follows:

- placement of fill for raising and grading of Blaxland Road, Beecroft Road and Epping Road
- excavation and fill are required during the construction of retaining walls supporting Blaxland Road and Beecroft Road
- excavation for the piling and installation of bridge abutments.

Excavated material would be reused on site where possible or disposed of in accordance with relevant legislative requirements. Specific locations for spoil placement would be agreed with Transport and the Contractor during the delivery phase.

3.4.5 Source and quantity of materials

The source and quantity of materials would be determined during the detailed design phase of the Proposal and would consider the requirements of the *NSW Sustainable Design Guidelines – Version 4.0* (Transport, 2019c). Materials would be sourced from local suppliers where practicable. Reuse of existing and recycled materials would be undertaken where appropriate and practicable.

3.4.6 Traffic management and access

Traffic and transport impacts associated with the Proposal are assessed in Section 6.1 of this REF. The potential traffic and access impacts expected during the construction of the Proposal include:

- the capacity of the bridge would be reduced throughout construction impacting pedestrians, active transport, public bus services and all vehicles
- vehicle and pedestrian movements would be rerouted throughout the various stages of construction
- partial and full road closures of Epping Road, Blaxland Road, High Street, Langston Place, Beecroft Road and Bridge Street would occur periodically throughout the construction process.

3.5 Compound locations

A temporary construction compound, or compounds, would be required to accommodate a site office, amenities, construction workforce carparking, laydown and storage area for materials.

Indicative locations for construction compounds are identified below and are presented Figure 1-4:

- 725 Blaxland Rd
- 38 and36 Essex Street
- rail corridor access and construction compound off High Street.

Impacts associated with utilising these areas have been considered as part of this environmental impact assessment, including requirements for rehabilitation.

Given the location of the construction impact area, the construction haulage routes would need to utilise the existing local road network. The final construction haulage routes would be determined by the nominated Construction Contractor during the detailed design phase of the Proposal. Section 6.1 presents indicative proposed construction traffic routes.

3.6 Public utility adjustment

The Proposal would be designed to avoid relocation of services where feasible. Services relocation and adjustment would be required, and further investigation may be required during detailed design to establish the extent of the adjustments. The appropriate utility providers would be consulted during the detailed design phase. The existing utility owners and asset types that would be impacted by the works are detailed in Table 3-2.

All service relocation would occur within the Proposal area. Should work be required outside of the Proposal area, further assessment would be undertaken.

3.7 Property acquisition

Property acquisition within 2-16 Epping Road is proposed to enable the construction and operation of the Proposal. The proposed property acquisition boundary extends to the edge of the carriageway with an allowance of about three metres for construction and future maintenance where required. The extent of the proposed acquisition is summarised in Table 3-3. The final property acquisition area would be informed by further cadastral survey.

3.8 Operation and maintenance

The future operation and maintenance of the bridge would be subject to existing asset maintenance arrangements with maintenance responsibilities for Sydney Trains, Transport and City of Parramatta Council.

4. Statutory and planning framework

Chapter 4 provides a summary of the statutory considerations relating to the Proposal including a consideration of NSW Government polices/strategies, NSW legislation (particularly the EP&A Act), environmental planning instruments, and Commonwealth legislation.

4.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) establishes the system of environmental planning and assessment in NSW. This Proposal is subject to the environmental impact assessment and planning approval requirements of Division 5.1 of the EP&A Act. Division 5.1 of the EP&A Act specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as Transport, which do not require development consent under Part 4 of the Act.

In accordance with section 5.5 of the EP&A Act, Transport, as the proponent and determining authority, must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the Proposal.

Section 171 of the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation) defines the environmental factors which must be considered when determining if an activity assessed under Division 5.1 of the EP&A Act has or is likely to have a significant impact on the environment. Chapter 6 of the REF provides an environmental impact assessment of the Proposal in accordance with section 171 and Appendix A - Consideration of section 171(2) factors, section 171A factors and matters of national environmental significance and Commonwealth land specifically responds to the environmental factors for consideration under section 171(2).

4.1.1 State Environmental Planning Policies

State Environmental Planning Policy (Transport and Infrastructure) 2021

State Environmental Planning Policy (Transport and Infrastructure) 2021 (SEPP (Transport and Infrastructure)) is the key environmental planning instrument which determines the permissibility of a Proposal and under which part of the EP&A Act an activity or development may be assessed.

Chapter 2 (Infrastructure) of the SEPP (Transport and Infrastructure) aims to facilitate the effective delivery of infrastructure across the State.

Section 2.91 of the SEPP (Transport and Infrastructure) defines 'rail infrastructure facilities' as including elements such as '*bridges, embankments, level crossings and roads, pedestrian and cycleway facilities'.*

Section 2.92 of the SEPP (Transport and Infrastructure) states that:

> *'Development for the purpose of a railway or rail infrastructure facilities may be carried out by or on behalf of a public authority without consent on any land'.*

In addition, Section 2.109 permits development for the purpose of a road or road infrastructure facilities may be carried out by or on behalf of a public authority without consent on any land.

As the Proposal is for rail and road infrastructure and is to be carried out on behalf of Transport, it can be assessed under the provisions of Division 5.1 of the EP&A Act and development consent from City of Parramatta Council is not required.

Part 2.2, Division 1 of the SEPP (Transport and Infrastructure) contains provisions for public authorities to consult with local councils and other agencies prior to the commencement of certain types of development. Section 5.4 of this REF discusses the consultation undertaken under the requirements of the SEPP (Transport and Infrastructure).

The SEPP (Transport and Infrastructure) prevails over all other environmental planning instruments except where there is an inconsistency with State Environmental Planning Policy (Precincts – Central River City) 2021 (SEPP (Precincts)) or

certain provisions of State Environmental Planning Policy (Resilience and Hazards) 2021 (SEPP (Resilience and Hazards)). The Proposal does not require consideration under the SEPP (Precincts) however further consideration under the SEPP (Resilience and Hazards) is required as part of this REF.

State Environmental Planning Policy (Resilience and Hazards) 2021

Chapter 4 of *State Environmental Planning Policy (Resilience and Hazards) 2021* (SEPP (Resilience and Hazards)) provides a statewide approach to the remediation of contaminated land for the purpose of minimising the risk of harm to the health of humans and the environment. While consent for the Proposal is not required, the provisions of the SEPP have still been considered in the preparation of this REF. Section 6.9 of this REF contains an assessment of the potential contamination impacts of the Proposal. It is not expected that any category 1 remediation work would be required as part of the Proposal. The proposed land use would not differ from the existing use and therefore, would be unlikely to introduce greater sensitivity to any potential contaminants that exist. Impacts of contaminated lands and potential remediation are identified in Section 6.9.

4.1.2 Local Environmental Plans

Parramatta Local Environmental Plan 2023

The Proposal is located within the Parramatta LGA. As identified above, the SEPP (Transport and Infrastructure) prevails over all other environmental planning instruments (such as LEPs) except where there is an inconsistency with SEPP (Precincts) or certain provisions of SEPP (Resilience and Hazards). During the preparation of this REF, the provisions of *Parramatta Local Environmental Plan 2023* (Parramatta LEP) were considered (refer Table 4-1).

Table 4-1 Relevant provisions of the Parramatta LEP

Provision	Land Use	Relevance to the Proposal
2.3 – Zone Objectives and Land Use Table	SP2 - Classified Road	The Proposal is consistent with objectives of this zone as it provides road infrastructure.
	SP2 - Rail Infrastructure Facility	The Proposal is consistent with objectives of this zone as it provides rail infrastructure.
	E1 – Local Centre	The Proposal is consistent with the objectives of this zone as it would provide connections across the local centre enabling access to residential and commercial areas. In addition, roads are permitted with consent in this zone.
	R2 – Low Density Residential	The Proposal is consistent with the objectives of this zone as it would provide connections to residential areas. In addition, roads are permitted with consent in this zone.
	R4 – High Density Residential	The Proposal is consistent with the objectives of this zone as it would provide connections to residential areas. In addition, roads are permitted with consent in this zone.
	RE1 – Public Recreation	The Proposal is consistent with the objectives of this zone as it would not diminish the opportunity for the local parks to be utilised for recreational purposes.
5.10 – Heritage Conservation		Clause 5.10 of the Parramatta LEP provides for the protection of items, places and archaeological sites which have been identified in the Parramatta LEP as having heritage significance. A number of heritage items have been identified by the Parramatta LEP within the vicinity of the Proposal including individual sites and heritage conservation areas. Forest Park is listed in the Parramatta LEP as an item of local heritage (I71). The Epping/Eastwood Conservation Area is also listed in the Parramatta LEP. A heritage impact assessment has been undertaken for the Proposal however it is not expected that the Proposal would result in any direct impacts to items of heritage identified in the Parramatta LEP. A discussion of potential impacts to heritage is discussed in Section 6.5.
6.1 – Acid sulfate soils		Clause 6.1 of the Parramatta LEP ensures that acid sulfate soils are not disturbed, exposed, or drained causing environmental damage. The Proposal area has a low to extremely low probability of containing acid sulfate soils.

		A discussion of the potential to encounter acid sulfate soils is available in Section 6.9
6.2 - Earthworks		Clause 6.2 of the Parramatta LEP provides protection of environmental functions and processes of the surrounding environment by considering the impact of earthworks. Construction impacts of the Proposal have been considered for several environmental factors. A discussion of these potential impacts is available in Section 6.
6.5 – Stormwater management		Clause 6.5 of the Parramatta LEP provides protection of local stormwater drainage and impacts on the environment. The potential impacts of the Proposal on stormwater are discussed in Section 6.10

Land zoning is presented in Figure 1-7.

4.2 Other relevant NSW legislation

4.2.1 Transport Administration Act 1988

The *Transport Administration Act 1988* establishes Transport as a public authority who is to exercise its functions in a manner that promotes certain common objectives, including to promote the delivery of transport services in an environmentally sustainable manner.

This REF has been prepared having regard to, among other things, the specific objectives of Transport under the *Transport Administration Act 1988*, including:

2A Objects of Act

…

a. *to provide an efficient and accountable framework for the governance of the delivery of transport services,*
b. *to promote the integration of the transport system,*
c. *to enable effective planning and delivery of transport infrastructure and services,*
d. *to facilitate the mobilisation and prioritisation of key resources across the transport sector,*
e. *to co-ordinate the activities of those engaged in the delivery of transport services,*
f. *to maintain independent regulatory arrangements for securing the safety of transport services.*

2B Common objectives and service delivery priorities of public transport agencies

…

a. Environmental sustainability

To promote the delivery of transport services in an environmentally sustainable manner.

b. Social benefits

To contribute to the delivery of social benefits for customers, including greater inclusiveness, accessibility and quality of life.

4.2.2 Other NSW legislation and regulations

Table 4-2 provides a list of other relevant legislation applicable to the Proposal.

Table 4-2 Other legislation applicable to the Proposal

Applicable legislation	Considerations
Biodiversity Conservation Act 2016 (BC Act) (NSW)	The Proposal area does not contain suitable habitat for any listed threatened species or community and the Proposal would be unlikely to have a significant impact on any threatened species or community (refer Section 6.7). A microbat habitat survey was undertaken in accordance with Transport's Microbat Management Guidelines (Transport, 2023e) which did not identify any evidence of threatened microbat species using the bridge as habitat (refer Microbat Habitat Assessment specialist report).
Biosecurity Act 2015 (NSW)	Clause 22 requires any person who deals with a biosecurity matter has a duty to ensure that in so far as is reasonably practicable, the potential biosecurity risk is prevented, eliminated or minimised. Appropriate management methods would be implemented during construction if state and regional weeds are identified on site, as well as other weeds of concern (refer to Section 6.7).
Contaminated Land Management Act 1997 (CLM Act) (NSW)	Section 60 of the CLM Act imposes a duty on landowners to notify the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW), and potentially investigate and remediate land if contamination is above EPA guideline levels. The Proposal area has not been declared under the CLM Act as being significantly contaminated. A detailed site investigation (DSI) contamination assessment (JK Environments, 2024) was prepared for the Proposal. This identified soil and groundwater contamination in concentrations above the assessment criteria and the need for either an Environmental (Contamination) Management Plan or Remediation Action Plan to be prepared.
Crown Lands Act 1987 (NSW)	The Proposal does not involve work on any Crown land.
Disability Discrimination Act 1992 (DDA Act) (Cwlth)	The Proposal would be designed having regard to the requirements of this Act.
Heritage Act 1977 (Heritage Act) (NSW)	The Proposal would have temporary and permanent minor impacts on the setting of the Epping Station Group (item 4801911) listed on the Transport Asset Holding Entity (TAHE) Section 170 Heritage and Conservation Register. A number of additional heritage items have been identified by the Parramatta Local Environmental Plan 2023 (Parramatta LEP) within the vicinity of the Proposal including individual sites and heritage conservation areas (refer to Figure 6-21, Figure 6-23 and Figure 6-24) A heritage impact assessment has been undertaken for the Proposal and is summarised in Section 6.5. The archaeological assessment concluded that there is a low risk of exposing historical archaeological relics during construction and that no archaeological approvals under Section 139 would be required. However, if unexpected archaeological items are discovered during the construction of the Proposal, all work would cease and appropriate advice sought, in accordance with Transport's Unexpected Heritage Finds Guideline (Transport for NSW, 2021f). No items of state heritage significance were identified near the Proposal, and therefore an approval under Section 60 of the Heritage Act would not be required.
National Parks and Wildlife Act 1974 (NPW Act) (NSW)	Sections 86, 87 and 90 of the NPW Act require consent from DCCEEW for the destruction or damage of Aboriginal objects. The Proposal is unlikely to disturb any Aboriginal objects (refer Section 6.4). However, if unexpected archaeological items or items of Aboriginal heritage significance are discovered during the construction of the Proposal, all work would cease, and appropriate advice sought. Additionally, the Proposal would not involve impacts to land reserved, or adjacent to, land reserved under the NPW Act.
Protection of the Environment Operations Act 1997 (PoEO Act) (NSW)	The Proposal does not involve a 'scheduled activity' under Schedule 1 of the PoEO Act. Accordingly, an Environment Protection Licence (EPL) is not required for the Proposal. However, in accordance with Part 5.7 of the PoEO Act, Transport would notify the EPA of any pollution incidents that occur on site. This would be managed in the Construction Environmental Management Plan (CEMP) to be prepared and implemented by the Contractor.
Roads Act 1993 (Roads Act) (NSW)	Section 138 of the Roads Act requires consent from the relevant road authority for the carrying out of work in, on or over a public road. However, clause 5(1) in Schedule 2 of the Roads Act states that public authorities do not require consent for work on unclassified roads.

Applicable legislation	Considerations
	The Proposal would involve work on the following roads: • Epping Road (State – classified) • Blaxland Road (State - unclassified) • Beecroft Road (State - unclassified) • High Street (Local - unclassified) • Bridge Street (Local - unclassified) Consent under the Roads Act is required as Epping Road is a classified road. Internal Transport consultation protocols in accordance with Section 138 of the Road Act would be undertaken. Local roads surrounding the Proposal site are managed and maintained by the City of Parramatta Council (refer to Section 6.1). Construction on local roads would be undertaken in consultation with City of Parramatta Council including road occupancy licences for road works and temporary road or lane closures where required (refer to Section 6.1).
Sydney Water Act 1994 (NSW)	The Proposal would not involve discharge of wastewater to the sewer.
Waste Avoidance and Resource Recovery Act 2001 (WARR Act) (NSW)	Transport would carry out the Proposal having regard to the requirements of the WARR Act. A site-specific Waste Management Plan would be prepared.
Water Management Act 2000 (NSW)	The Proposal may require dewatering. This activity would be subject to licensing and exemptions under the *Water Management Act 2000* and *Water Management (General) Regulation 2018*. No other water use (from a natural source eg aquifer, river – only from the network), water management work, drainage or flood work, controlled activities or aquifer interference would be required for the Proposal.

4.3 Commonwealth legislation

4.3.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act* (EPBC Act) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places - defined in the EPBC Act as 'matters of National Environmental Significance (NES)'. The EPBC Act requires the assessment of whether the Proposal is likely to significantly impact on matters of NES or Commonwealth land. These matters are considered in full in Appendix A.

As the Proposal would not or is not likely to have a significant impact on any matters of NES or on Commonwealth land, a referral to the Commonwealth Minister for the Environment is not required.

4.3.2 Other relevant Commonwealth legislation

Other Commonwealth legislation applicable to the proposal is discussed in Table 4-3 below.

Table 4-3 Other Commonwealth legislation applicable to the proposal

Applicable legislation	Considerations
Aboriginal and Torres Strait Islander Heritage Protection Act 1984	There is an obligation on a person who discovers anything which he or she has reasonable grounds to suspect are Aboriginal remains to report that discovery to the Minister, giving particulars of the remains and their location. The Proposal does not include any previously identified Aboriginal sites and/or places (refer Section 6.5); however, considerations for unexpected finds further detailed in mitigation measures and applies to this Act.
Disability Discrimination Act 1992 (DDA)	This Act aims to eliminate as far as possible, discrimination against persons on the ground of disability in areas including access to premises and the provision of facilities, services and land. The Proposal would be designed having regard to the requirements of this Act. One objective of the Proposal is to improve active transport connections and accessibility, which is consistent with the objectives of this Act.

4.4 Ecologically sustainable development

Transport is committed to ensuring that its proposals are implemented in a manner that is consistent with the principles of ecologically sustainable development (ESD). The principles of ESD are generally defined under the provisions of section 193 of the EP&A Regulation as:

- the precautionary principle – if there are threats of serious or irreversible damage, a lack of full scientific uncertainty should not be used as a reason for postponing measures to prevent environmental degradation
- intergenerational equity – the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations
- conservation of biological diversity and ecological integrity – the diversity of genes, species, populations and their communities, as well as the ecosystems and habitats they belong to, should be maintained or improved to ensure their survival
- improved valuation, pricing and incentive mechanisms – environmental factors should be included in the valuation of assets and services.

The principles of ESD have been adopted by Transport throughout the development and assessment of the Proposal. Section 3.3.3 summarises how ESD would be incorporated in the design development of the Proposal. Section 6.14 includes an assessment of the Proposal on climate change and sustainability, and Section 7.2 lists mitigation measures to ensure ESD principles are incorporated during the construction phase of the Proposal.

5. Community and stakeholder consultation

Chapter 5 discusses the consultation undertaken to date for the Proposal and the consultation proposed for the future. It also discusses the consultation strategy adopted for the Proposal and the results of consultation with the community, relevant government agencies and stakeholders.

5.1 Consultation strategy

The consultation strategy for the Proposal has been developed to encourage community and stakeholder involvement and foster interaction between the community, stakeholders and the Project team. The consultation strategy has regard to the requirements of the planning process to ensure the community and stakeholders are consulted and informed of the Proposal and have the opportunity to provide feedback.

The objectives of the consultation strategy are to:

- provide accurate and timely information about the Proposal and REF process to the community and relevant stakeholders
- raise awareness of the various components of the Proposal and the specialist environmental investigations
- ensure that the community and stakeholders (including directly impacted stakeholders) are aware of the REF and consulted where appropriate
- provide opportunities for the community and stakeholders to express their views and provide feedback about the Proposal
- advise the community and stakeholders on how they can obtain further information about the Proposal and provide feedback
- understand and access valuable local community and stakeholder knowledge
- record details and input from community and stakeholder engagement activities
- build positive relationships with the community and identified community groups and stakeholders
- ensure a comprehensive and transparent approach.

5.2 Community engagement

Transport has been engaging with the community on proposed road upgrades around Epping town centre since 2014. Community feedback regarding upgrades to the bridge was received during the planning of road and intersection upgrades of Beecroft Road, Carlingford Road and Epping Road (between 2014 and 2018).

Feedback at this time included:

- the bridge is too narrow and needed to be widened
- the bridge was not performing effectively with increasing traffic
- crossing the bridge was challenging for pedestrians
- a second right turn into Blaxland Road was needed.

Concerns were also raised regarding the practicality of widening the bridge and if an upgrade would ease congestion.

Further information on feedback received from the community and stakeholders during the planning of upgrades on Beecroft Road, Carlingford Road and Epping Road can be found on the Epping Town Centre road and intersection upgrades project webpage at www.transport.nsw.gov.au/epping-town-centre-upgrades.

In July 2018, the NSW Government announced the widening of Epping Bridge as the third project in the series of road and intersection upgrade projects to be developed to support new housing growth in the Epping Town Centre Urban Activation Precinct.

Since this time, Transport has received ongoing requests from the community for information about what upgrades are proposed and when the bridge upgrade would be delivered. There is significant community support for an upgrade to the bridge. The community would be given an opportunity to provide feedback on the Proposal during the public display of this REF.

5.2.1 Public display

The REF display strategy adopts a range of consultation mechanisms, including:

- public display of the REF on the Epping Bridge Project webpage: transport.nsw.gov.au/epping-bridge and NSW Government Have your Say webpage: www.nsw.gov.au/have-your-say
- face-to-face and/or online information sessions would be held where suitable for canvassing community input into design and obtaining feedback on environmental management issues. Proposal team members would be available at these sessions to discuss issues and receive feedback on the Proposal including environmental management, final design and Proposal delivery
- emails to community members and stakeholders on the Epping Bridge Project email distribution list would be sent at the start and end of the consultation period
- community notifications to community members and stakeholders would be distributed via mail and/or letterbox
- doorknocking community members and stakeholders would be completed during consultation period
- posters placed at Epping Station during public display of the REF encouraging the community to provide feedback. The posters include QR code to the Epping Bridge Project webpage: www.transport.nsw.gov.au/epping-bridge
- advertisement of the REF public display in local newspapers with a link to Epping Bridge Project webpage: www.transport.nsw.gov.au/epping-bridge. Advertisement to include a summary of the Proposal and information on how to provide feedback
- advertisement of the REF public display on Transport for NSW social media
- consultation with City of Parramatta Council, Sydney Trains, Sydney Metro, NSW TrainLink, bus operators and other non-community stakeholders.

Community consultation activities for the Proposal would be undertaken during the public display of this REF. The display period of the REF would be advertised in the week that the public display commences. The REF would be displayed for a period of three weeks.

You can access the REF document in the following ways:

- Internet
- The REF document (and supporting documents) are available as PDF files on Transport's website at www.transport.nsw.gov.au/epping-bridge
- Copies by request
- Printed and electronic copies are available by contacting 1800 979 577 (during business hours) noting that there may be a charge for hard copies
- Community drop-in sessions and staffed displays
- Information on the Proposal is also available via the Infoline (1800 979 577) or by email - mailto:parramatta@transport.nsw.gov.au

Comments about the Proposal can be submitted via:

- Email: parramatta@transport.nsw.gov.au
- Mail: Epping Bridge Project

Director Environment and Sustainability (Rail Development and Delivery)

4 Parramatta Square,

12 Darcy Street,

Parramatta NSW 2150

- Telephone: 1800 979 577 (during business hours)

Submissions must be received within 25 days of the REF being put on public display. Submissions would be managed in accordance with Transport for NSW Privacy Statement. A copy of the Privacy Statement can be made available upon request.

Following consideration of feedback received during the public display period, Transport would determine whether to proceed with the Proposal and what conditions would be imposed on the Proposal should it be determined to proceed.

5.3 Aboriginal community engagement

An Aboriginal Heritage Information Management System (AHIMS) search was undertaken for the area covered by the Proposal (the area around the bridge) plus a 200 metre radius, on 8 April 2024. No Aboriginal sites were recorded in this area and therefore there are no known impacts of the Proposal. The extensive landscape modification that has occurred across the Proposal area suggests that intact evidence of Aboriginal land use is unlikely to occur within the boundaries of the Proposal area. Similarly, the high level of disturbance would suggest that the archaeological potential of the area is low. Therefore, it was not considered necessary to undertake specific Aboriginal consultation in relation to Aboriginal heritage.

Reconciliation calls for education, where all Australians embark on the opportunity to learn about Aboriginal history and culture. Transport is committed to creating a supportive learning environment that builds awareness of the Aboriginal culture and encourages truth telling. In the creation of transport infrastructure and networks, we recognise and value the importance of connecting to country. An Aboriginal business has been engaged to undertake targeted and meaningful Aboriginal community engagement, to provide design principles and identify opportunities to incorporate local Aboriginal and Torres Strait Islander knowledge, cultures, art, and heritage into the Proposal.

5.4 SEPP (Transport and Infrastructure) consultation

Part 2.2, Division 1 of the SEPP (Transport and Infrastructure) contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. Section 2.10, 2.11, 2.12, 2.13, 2.14 and 2.15 of the SEPP (Transport and Infrastructure) require that public authorities undertake consultation with councils and other agencies, when proposing to carry out development without consent.

Table 5-1 provides details of consultation requirements under the SEPP (Transport and Infrastructure) for the Proposal.

Table 5-1 Transport and Infrastructure SEPP 2021 consultation requirements

Clause	Clause particulars	Relevance to the Proposal
Section 2.10 | Consultation with councils – development with impacts on council related infrastructure and services	Consultation is required where the Proposal would result in: • substantial impact on stormwater management services • generating traffic that would place a local road system under strain • involve connection to or impact on a council-owned sewerage system • involve connection to and substantial use of council-owned water supply • significantly disrupt pedestrian or vehicle movement	The Proposal includes work that would: • require connections to or impacts the stormwater system • disrupt pedestrian and vehicle movements • impact on road pavements under council's care and control • impact on council-operated footpaths. Consultation with City of Parramatta Council has been undertaken and would continue throughout detailed design and construction.

Clause	Clause particulars	Relevance to the Proposal
	• involve significant excavation to a road surface or footpath for which council has responsibility.	
Section 2.11 | Consultation with councils – development with impacts on local heritage	Where the Proposal: • substantially impacts on local heritage item (if not also a State heritage item) • substantially impacts on a heritage conservation area.	The Epping Station group is not listed on the Parramatta LEP heritage schedule, however Forest Park is listed as an item of local heritage (I71) as is the Epping/Eastwood Conservation Area. A discussion of potential impacts to heritage is discussed in Section 6.5. Impacts of the Proposal are predicted to be minor and minimised further by the effective implementation of mitigation measures. However due to the ongoing development of the design and mitigation measures consultation with the local council in accordance with Clause 2.11 is required.
Section 2.12 | Consultation with councils – development with impacts on flood liable land	Where the Proposal: • impacts on land that is susceptible to flooding – reference would be made to the Floodplain Development Manual: the management of flood liable land.	The Proposal is not located on land that is susceptible to flooding. Accordingly, consultation with council is not required in regard to this aspect. Refer to Section 6.10.
Section 2.13 | Consultation with State Emergency Service – development with impacts on flood liable land	Where the Proposal: • impacts on flood liable land, written notice must be given (together with a scope of work) to the State Emergency Services (SES) and taken into consideration any response to the notice received from the SES within 21 days after the notice is given.	The Proposal is not located on land that is susceptible to flooding. Accordingly, consultation with the SES is not required in regard to this aspect. Refer to Section 6.10.
Section 2.14 | Consultation with councils – development with impacts on certain land within the coastal zone	Where the Proposal: • impacts on land within a coastal vulnerability area and is inconsistent with certified coastal management program that applies to that land.	The Proposal is not located within a coastal vulnerability area as defined by the *Coastal Management Act 2016*. Accordingly, consultation with council is not required regarding this aspect.
Section 2.15 | Consultation with public authorities other than councils	For specified development which includes (amongst others) consultation with the DCCEEW for development that is undertaken adjacent to land reserved under the National Parks and Wildlife Act 1974, and other agencies specified by the SEPP (Transport and Infrastructure) where relevant. Although not a specific SEPP (Transport and Infrastructure) requirement, other agencies Transport may consult with could include: • Sydney Trains • Sydney Metro • Bus operators • NSW Train Link • Heritage NSW.	Consultation with public authorities specified in this clause is not required. However, consultation with Sydney Trains and Sydney Metro would be ongoing through the next stage(s) of the Proposal.

5.5 Government agency and stakeholder involvement

Stakeholder engagement and interface management has been conducted by Transport and Mott MacDonald throughout the duration of the concept design process.

Stakeholders include Sydney Trains, Sydney Metro as well as internal Transport divisions and delivery partners working on interfacing proposals. The following stakeholders have been consulted with during the development of the concept design:

- Sydney Trains
- Sydney Metro Northwest Operations & Metro Trains Sydney (MTS)
- City of Parramatta Council
- NSW TrainLink
- NSW Taxi Council
- External Utilities Providers
- Transport for NSW Design Review Panel
- Transport for NSW Planning and Programs, Greater Sydney
- Transport for NSW Community and Place, Greater Sydney
- Transport for NSW Network and Safety Services
- Transport for NSW Active Transport Team
- Transport for NSW Planning - Bus Operators
- Transport for NSW Roads and Traffic Engineering
- Transport for NSW Infrastructure and Place Network Assurance Committee
- Transport for NSW Asset Management Branch.

The following stakeholder workshops have been undertaken as part of the concept design process:

- Familiarisation Workshop in May 2023
- Optioneering Workshop in June 2023
- Sustainability Workshop in June 2023
- Risk Workshop in September 2023
- Constructability Workshop in September 2023
- Value Management Workshop in September 2023
- Health Safety in design Workshop in September 2023
- Movement and Place Workshop in October 2023.

5.6 Ongoing consultation

At the conclusion of the REF public display period, Transport would acknowledge receipt of feedback from each respondent. Issues raised by respondents would be considered by Transport before determining whether to proceed with the Proposal.

Should Transport determine to proceed with the Proposal, the Determination Report would be made available on Transport's website at www.transport.nsw.gov.au/epping-bridge. The Determination Report would summarise the key impacts identified in this REF, demonstrate how Transport considered issues raised during the public display period, and include a summary of mitigation measures proposed to minimise the impacts of the Proposal.

Should Transport determine to proceed with the Proposal, the project team would keep the community, City of Parramatta Council and other key stakeholders informed of the process, identify any further issues as they arise, and develop additional mitigation measures to minimise the impacts of the Proposal.

6. Environmental assessment

Chapter 6 of this REF provides a detailed description of the likely environmental impacts associated with the construction and operation of the Proposal. For each likely impact, the existing environment is characterised and then an assessment is undertaken as to how the Proposal would impact on the existing environment.

All aspects of the environment, potentially impacted upon by the proposal, are considered. This includes consideration of:

- potential impacts on matters of national environmental significance under the EPBC Act.
- the factors specified in the Guideline for Division 5.1 assessments (DPE 2022) and as required under section 171 of the Environmental Planning and Assessment Regulation 2021. The factors specified in section 171 of the Environmental Planning and Assessment Regulation 2021 are also considered in Appendix A.

Site-specific mitigation measures are provided to mitigate the identified potential impacts.

6.1 Traffic and transport

6.1.1 Methodology

A Transport Impact Assessment (TIA) was prepared for the Proposal (Mott MacDonald, 2024b) to demonstrate the potential construction and operational impacts of the bridge's construction on general traffic and transport within the Proposal and surrounding areas. The findings of the assessment are summarised in this section.

6.1.2 Existing environment

The existing bridge connects several arterial roads that allow vehicles to travel across the rail corridor. The limited crossing opportunities across the rail corridor result in a staggered intersection. The bridge forms part of the main route between Epping and surrounding suburbs to the CBD. Epping Station is also a major interchange between the Sydney Trains and Sydney Metro rail lines. As Epping and surrounding suburbs continue to grow, more vehicle and pedestrian traffic is expected across the bridge.

Road network and traffic

Most of the roads that connect to Epping Bridge are designated as state roads with a speed limit of 60 kilometres per hour. This includes Beecroft Road to the north, Carlingford Road to the west, Blaxland Road to the south, and Epping Road to the east.

Automatic traffic counters installed on Beecroft Road, surveying hourly and daily traffic demand across the bridge during a week in October 2023, revealed the following trends:

- southbound peak hour movements were highest during the AM peak at 7:30am to 8:30am
- northbound peak hour movements were highest during the PM peak at 5:00pm to 6:00pm
- average weekday daily traffic flows were 26,284 vehicles per day (vpd) northbound and 28,118 vpd southbound
- average weekend daily traffic flows were 23,572 vpd northbound and 25,970 vpd southbound

The performance of the road network is directly associated with the delays experienced by drivers at key intersections within the network. This delay correlates with a Level of Service (LoS) grading from A to F that also considers the performance of traffic signals, roundabouts, give way signs and stop signs. This criteria, informed by the Guide to Traffic Generating Developments, is summarised in Table 6-1 (RTA, 2002).

Table 6-1 RTA Level of Service Criteria

Level of Service	Average Vehicle Delay (sec)		Traffic Signals, Roundabout	Give Way and Stop Signs
	Low	High		
A	0	14	Good operation	Good operation
B	15	28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29	42	Satisfactory	Satisfactory, but accident study required
D	43	56	Operating near capacity	Near capacity and accident study required
E	57	70	At capacity at signals, incidents would cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode
F	>71		The amount of traffic approaching exceeds that which can pass it	

Road users experience varying degrees of delays during the AM and PM peaks at intersections throughout the network. A summary of the delays experienced and the LoS performance of each intersection is provided in Table 6-2.

Table 6-2 Existing intersection performance across Epping Bridge and the connecting road network

Intersection	AM Peak Hour		PM Peak Hour	
	Delay(s)	LOS	Delay(s)	LOS
Carlingford Road, Ray Road and Rawson Street	82	F	30	C
Beecroft Road and Carlingford Road	24	B	30	C
Bridge Street and Rawson Street	16	B	12	A
Beecroft Road, High Street and Bridge Street [(1)]	2	A	3	A
Epping Road, Blaxland Road and Langston Place	42	C	49	D
Epping Road and Essex Street	31	C	40	C

Crash data

The results of crash data analysis associated with the Proposal area over a five-year period ending in 2022 revealed 29 crashes in the area, comprising:

- no fatal crashes
- four serious injury crashes
- 10 moderate injury crashes
- 15 minor/other injury crashes.

Spatial grouping of crashes suggests that there are safety concerns associated with eastbound movement on Epping Road, all movement along Beecroft Road, and westbound movements on Carlingford Road.

Parking

A survey of existing parking spaces within 400 metres of the Proposal area was undertaken in February 2024. This survey identified 651 parking spaces within the survey area, including 11 accessible spaces. Of the 651 spaces, 152 of these are off-street parking. The survey was undertaken in periods between 8:30am – 5:30pm on a weekday and found demand for parking was highest during midday. Parking availability ranged between 14% to 35% of car parking spaces available

throughout the survey period. Of the 11 accessible parking spaces, at least two parking spaces were available at any time.

Buses

There are eight stands for bus interchange with Epping Station that service 12 routes:

- Stands A and B on Langston Place outside the eastern station entrance
- Stand C on southbound Beecroft Road outside the western station entrance
- Stands D to H on northbound Beecroft Road, north and south of the pedestrian overbridge.

Figure 6-1 presents the layout of the bus interchange, bus stands and a list of services that utilise the interchange. Only three of the bus services utilise the bridge in their routes. The 550 route is the only day service that utilises the bridge in its route. The two night services (N80 and N92) are only active outside of the AM and PM peaks. More details of bus services is provided in Section 3.5 of the TIA.

Route	Destination	Stand
288	City Erskine St Epping to City Erskine St	A
290	City Erskine St Epping to City Erskine St via Macquane University & North Sydney	A
291	McMahons Point Epping to McMahons Point	A
295	North Epping Epping to North Epping (Loop Service)	B
541	Eastwood Epping to Eastwood	F
546	Parramatta Epping to Parramatta via North Rocks and Oatlands	E
549	Parramatta Epping to Parramatta via North Rocks	E
550	Macquarie Park Parramatta to Macquarie Park via Epping	C
550	Parramatta Parramatta to Macquarie Park via Epping	D
630	Blacktown Epping to Blacktown	F
651	Rouse Hill Station Epping to Rouse Hill Station via Castle Hill	G
N80	City Town Hall Hornsby to City Town Hall via Strathfield	C
N80	Hornsby City Town Hall to Hornsby via Strathfield	G
N92	City Town Hall Tallawong Station to City Town Hall	C
N92	Tallawong Station City Town Hall to Tallawong Station	G

Figure 6-1 Epping Station interchange

Rail

Epping railway station has five platforms, comprised of two island platforms and one side platform at ground level and two underground platforms for the Sydney Metro North West Line. In 2024, the Sydney Metro City and South West line from Chatswood to Sydenham will be operational, extending the existing Metro North West line and providing an additional direct connection from Epping into the city. Currently, Epping Station is served by three rail lines:

- Sydney Trains T9 Northern Line

- NSW TrainLink Central Coast and Newcastle Line
- Metro North West Line.

The service frequencies of the Epping Station lines are detailed in Table 6-3.

Table 6-3 Rail services and peak hour service frequency at Epping Station

Line	Direction	Frequency (number of services)	
		Weekday AM 7am – 9am	Weekday PM 4pm – 6pm
T9 Northern	Hornsby to North Shore Via City	24	19
	North Shore to Hornsby via City	17	21
Central Coast	Central via Strathfield	8	4
	Gosford and Newcastle via Hornsby	4	8
Metro	Chatswood to Tallawong	28	31
	Tallawong to Chatswood	31	28

Active transport

The existing pedestrian network within and around the Proposal area provides connectivity and accessibility around the precinct.

An approximately 3.5 metre shared path is located along the southern footpath of Epping Road approaching the bridge from the east. An approximately 4.6 metre wide shared path is located on the western approach that continues along the southern side of Bridge Street. Connecting these two paths is an existing bridge link that is a 1.8 metres wide concrete footpath.

Weekday peak hour pedestrian and cyclist counts were undertaken in September 2023 and indicate that cyclist use of the shared paths is low at two or less cyclists per hour at both the Epping Bridge southern footway and the eastern approach. The southern footway had a pedestrian count of 29 pedestrians per hour during weekday peaks. The Epping Road and Blaxland Road crossing count ranged between 160 to 200 pedestrians per hour.

Mode share

The town centre is accessible by multiple modes of transport as described in this section. To understand how residents and workers are using transport within and around the Proposal area, an assessment was undertaken using 2016 and 2021 journey to work data. The 2016 data was used as the 2021 data was heavily skewed to working from home due to COVID19 lockdowns. A majority of workers and residents of Epping use vehicles as their primary form of transport in the locality, this is presented in Table 6-4.

A full assessment breakdown of all mode share patterns for residents and workers of Epping is available in the TIA (Mott MacDonald, 2024b).

Table 6-4 Summary of Journey to Work analysis for 2016 and 2021 workers and residents of Epping

Mode	Residents Leaving Epping for Work		Workers Arriving in Epping for Work	
	2016	2021	2016	2021
Public Transport	35%	8%	16%	5%
Car	48%	25%	57%	29%
Other	18%	67%	27%	66%

6.1.3 Potential impacts

Traffic modelling has been undertaken to understand the construction and operational impacts of the Proposal on traffic throughout the Epping road network. The assessment methodology, assumptions and data requirements used for the modelling are detailed in the TIA (Mott MacDonald, 2024b).

Construction

During construction, traffic and transport impacts and risks would mainly be associated to delays and disruption caused by:

- construction staging and lane closures
- reduced speed limits
- construction traffic generation
- workforce access and parking
- bus service relocations
- reduced pedestrian access
- reduced amount of secure bike parking
- detours during Blaxland Road Closures.

Potential construction impacts are discussed in further detail below.

Traffic

During construction, traffic is primarily impacted by the reduced capacity of the road network due to lane closures and reduced speeds through the construction area that would result from traffic staging, see Figure 6-3.

Traffic staging

Traffic staging has been developed with the priorities of:

- maintaining community access, pedestrian, vehicular and public transport
- maximising road capacity during peak periods
- enabling the effective and efficient construction of the Proposal.

Due to the timeline and phasing of construction, each stage would have varied impacts on traffic within and around the Proposal area. These impacts are summarised below by stage in Table 6-5 and are further explained in the TIA (Mott MacDonald, 2024b). The construction stages that result in the most traffic disruption have been proposed to occur over two periods each of three weeks duration in Christmas holidays to minimise impacts on traffic.

In addition, staging drawings are provided in Appendix C of the TIA which visualise the traffic staging and the closure of lanes.

Table 6-5 Proposed road and traffic diversions per traffic stage and their anticipated impact

Stage	Road/Traffic Changes	Description of Impact	Average Network Delay increase from 2023 baseline[2]
Early works	• Speed limit changed to 40 km per hour within the construction zone • Relocation of northbound bus stands D, E and F further north to allow space for bus stand G and H, north of the pedestrian overbridge • Relocation of southbound bus stand C on Beecroft Road north of the pedestrian overbridge • Removal of central medians and splitter islands	Reduced speed and lane closures off peak to remove central medians and splitter islands.	8.8 secs
1A	Blaxland Road • Shifting three northbound lanes east • Reduction of the southbound carriageway to a single lane • Decommissioning of one in-road vehicle sensor (detector 6) and renumbering of remaining detectors Langston Place • Reconfiguration of southbound approach to the intersection to a dedicated left lane and single through lane	Capacity for through movements on the Langston Place approach would be reduced. Reduced southbound capacity at northern extent of Blaxland Road.	8.8 secs
1B	Blaxland Road • Same as above Epping Road • Closure of kerb-side lane on southern side to maintain shared path access • Decommissioning of one in-road vehicle sensor (detector 1) High Street • Full closure of northern portion of High Street for two weekends.	Capacity for through movements on the Langston Place approach would be reduced. No use of High Street during weekend closure.	8.8 secs
2	Blaxland Road • Temporary closure of Blaxland Road for a period of 2-3 weeks over Christmas holiday period The bridge • Closure of one eastbound lane Epping Road • Temporary closure of right turn lane	Closure of Blaxland Road for 2-3 weeks during Christmas period and diversion of traffic. Reduced capacity on the bridge. A local diversion would be in place whereby the travelling public would be diverted from Blaxland Road to Epping via Balaclava Road and Epping Road.	8.8 secs
3	Epping Road and Blaxland Road intersection layout would return to the Stage 1A and 1B configuration. High Street • Full closure of northern portion of High Street for a weekend.	Capacity for through movements on the Langston Place approach would be reduced. Reduced southbound capacity at northern extent of Blaxland Road.	8.8 secs

[2] Average network delay of 2023 base is 110.6 seconds

Stage	Road/Traffic Changes	Description of Impact	Average Network Delay increase from 2023 baseline[2]
4A&B	Blaxland Road • Approach to Epping Road intersection is shifted west into its ultimate configuration Epping Road • Westbound Epping Road approach to the intersection is realigned into its ultimate configuration High Street • Full closure of northern portion of High Street for three weekends. Langston Place • Full closure of Langston Place for a weekend to allow delivery of Stage 2 bridge girder.	Night works to occur in the middle of the Blaxland Road and Epping Road intersection. Access into Blaxland Road from the bridge would not be allowed. Access into Langston Place from Blaxland Road would not be allowed. No use of High Street during weekend closure. No use of Langston during weekend closure	10.5 secs
5	The bridge • Operational lanes across Epping Bridge are reduced to 4 over a Christmas shut down for approximately 3 weeks • The 4 lanes of traffic are diverted onto the completed southern side of the new bridge. Langston Place • Full closure of Langston Place for six days during Christmas shut down.	Substantial reductions in Epping Road eastbound capacity. Closure of left turn slip into Langston Place. Reconfiguration of Traffic signals. Eastbound shared through and left lane movements would be delayed by pedestrian traffic protection.	109.4 secs
6	Epping Road • Remaining road components raised to their final level • Eastern approach maintains two westbound lanes Langston Place • Approach adjusted to final configuration	Reduced capacity on Epping Road. Intersection work is completed under night works.	9.8 secs
7	All remaining traffic islands and final line marking are completed under night-time lane closures	Works completed under night works	9.8 secs

Lane closures and temporary road closures occurring during stages 1, 4, 5 and 6 would have the most substantial traffic impacts and were modelled to understand impacts on traffic performance.

The most restrictive lane closures and temporary road closures are planned during Christmas periods to reduce impacts. Data from 2017 found the demand during this period is approximately 80% of normal traffic.

Table 6-6 presents the AM peak hour intersection performance during the different construction stages and Table 6-7 present the PM peak hour performance. It indicates the majority of impacts would be associated with the Epping Road, Blaxland Road and Langston Place intersection with most impacts being associated with Stage 5. Stage 4 is also anticipated to reduce the performance of this intersection during the PM peaks from an LoS of D to E.

Most intersections located further away from the construction are anticipated to perform at a similar or better level during traffic stages apart from Stage 5. However, Stage 5 is planned to occur during a two week period around Christmas which is anticipated to be subject to lower levels of traffic, 80% of normal capacity, minimising impacts.

Table 6-6 AM Peak Hour Intersection Performance

Intersections	2023 Base	Stage 1A	Stage 4A	Stage 5	Stage 5 80%	Stage 6
Carlingford Road, Ray Road and Rawson Street	F	F	F	F	B	F

Intersections	2023 Base	Stage 1A	Stage 4A	Stage 5	Stage 5 80%	Stage 6
Beecroft Road and Carlingford Road	B	B	B	C	B	B
Bridge Street and Rawson Street	B	B	B	B	A	B
Beecroft Road, High Street and Bridge Street	A	A	A	A	A	A
Epping Road, Blaxland Road and Langston Place	C	C	C	E	C	C
Epping Road and Essex Street	C	B	B	B	B	B

Table 6-7 PM Peak Hour Intersection Performance

Intersections	2023 Base	Stage 1A	Stage 4A	Stage 5	Stage 5 80%	Stage 6
Carlingford Road, Ray Road and Rawson Street	C	C	C	C	B	C
Beecroft Road and Carlingford Road	C	B	B	B	B	B
Bridge Street and Rawson Street	A	A	A	A	A	A
Beecroft Road, High Street and Bridge Street	A	A	A	A	A	A
Epping Road, Blaxland Road and Langston Place	D	D	E	D	C	D
Epping Road and Essex Street	C	C	C	C	B	C

Traffic diversions

The temporary closure of Blaxland Road, as part of Stage 2, during a Christmas holiday period would require a diversion to operate traffic between the northern extent of Blaxland Road and Epping Road. The diversion of light and heavy vehicle movements in Blaxland Road would add 5.3 kilometres and about seven minutes to journey times and would be via the following routes:

- Balaclava Road and Epping Road to access Epping Road westbound
- Epping Road, Balaclava Road to access Blaxland southbound.

The diversion of B-double vehicle movements in Blaxland Road would add 3.7 kilometres and about nine minutes longer and would be via the following routes:

- Lane Cove Road and Epping Road to access Epping Road westbound
- Epping Road, Lane Cove Road to access Lane Cove Road westbound.

Temporary road closures for crane operations

Cranes operating in the roadway would be used to remove the existing bridge and construct the new bridge. The temporary cranes would be set up in three locations during possessions and would require specific traffic control measures.

Table 6-8 details the location of temporary cranes, associated construction activity, traffic stage and impact of the temporary crane. Figure 6-2 presents the locations and associated work area for each crane. Multiple cranes would not operate at the same time. Traffic staging has taken consideration of temporary crane locations.

Table 6-8 Details of temporary crane locations and impacts on traffic

Crane Location Number	Location	Construction Activity	Traffic Stage	Impact on traffic
1	Northern end of High Street	Construction of new bridge on southern side of existing	1b	Northern end of High Street would be closed on three separate possession weekends
		Removal southern footpath of existing	4a & 4b	
		Construction of southern shared path	4a & 4b	
2	Langston Place	Construction of temporary bridge	4a & 4b	Closure of Langston Place for a weekend possessions and traffic diversion as listed below
3	Epping Road and Blaxland Road Intersection	Removal of existing bridge	5	Crane location 3 is within the traffic stage 5 lane closures. However Langston Place would be closed for six days of the Christmas shut down.

During the closure of Langston Place the following diversions would be implemented:

- Epping Road eastbound, divert to Smith Street. Diversion would be 0.7 kilometres (2-min)
- Blaxland Road northbound, divert via Maida Road & Essex Street. Diversion would be 1.3 kilometres (4-minutes)

Figure 6-2 Temporary crane locations and work locations

The installation of temporary cranes is anticipated to impact the follow of traffic and may impact access to private properties during the possession period. Affected residents and businesses would be consulted in relation to property access on Langston and High Street during road closures. The mitigation measures presented in Section 6.1.4 and 7.2 would mitigate these impacts and allow the safe passage of traffic through the construction area.

Construction speed limits

Speed limits would be reduced to 40 kilometres throughout the main approaches to the Proposal area during construction. These zones are represented in Figure 6-3. It is estimated that these changes would impact free-flow traffic speeds between key points in the construction area (represented as A to D in Figure 6-3) by increasing travel time by approximately 26 to 29 seconds per vehicle. This change is considered to be the biggest cause of delays to traffic during construction.

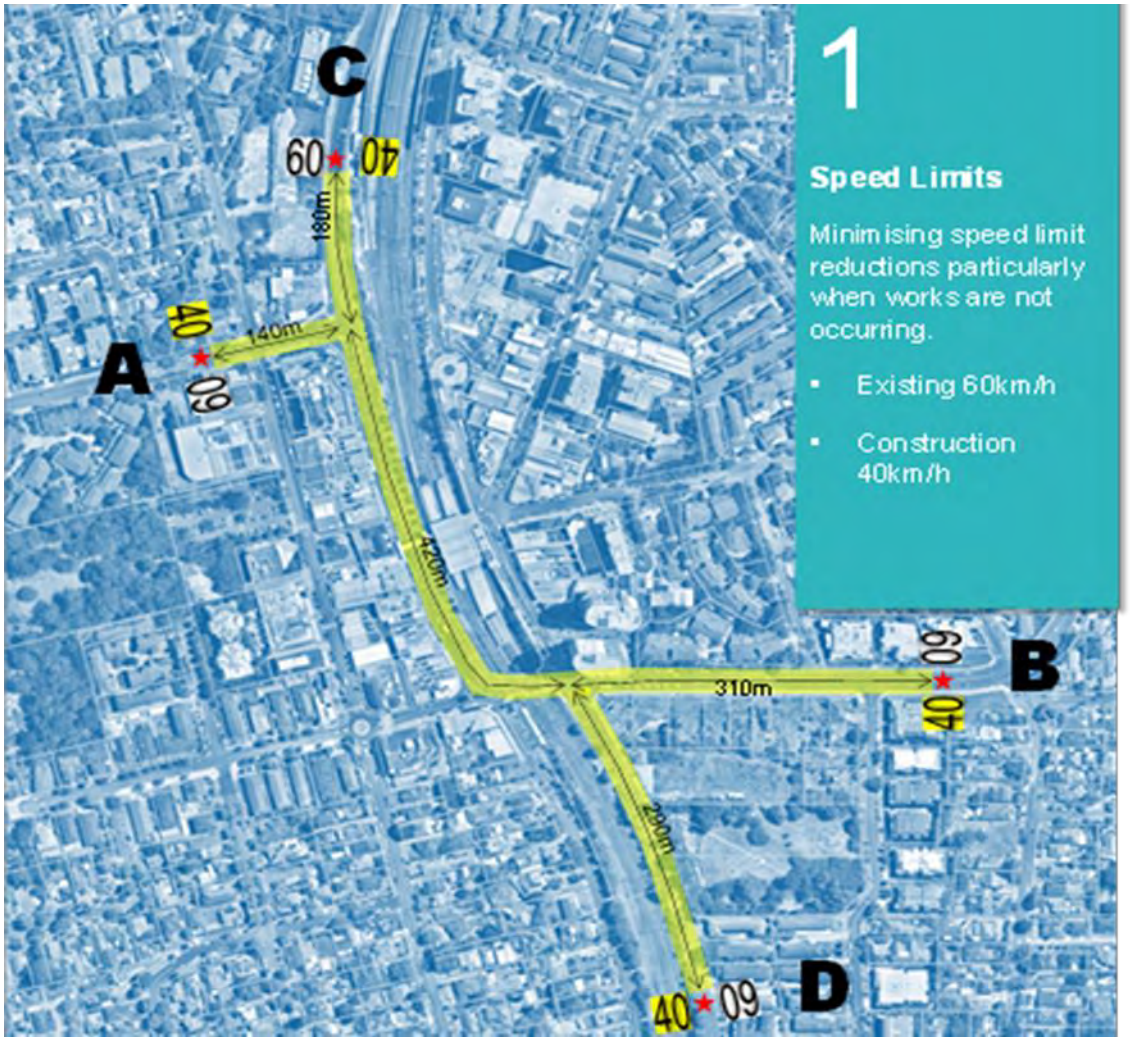

Figure 6-3 Extent of construction speed zone adjustments

Haulage and traffic generation

Heavy and light vehicles would require access to the construction site and indicative construction compounds at 725 Blaxland Road and the rail corridor construction compound off High Street. The location of these is presented in Figure 6-4. Estimates of light and heavy vehicle movements generated by construction activities is presented in Table 6-9. Light vehicles are AUSTROADS vehicle classification class 1 to 3 and heavy vehicles are AUSTROADS vehicle classification class 4 to 1. The increase on haulage roads is presented in Table 6-10.

Table 6-9 Traffic generation

Construction activities	Approximate number of Vehicles Per Day	
	Light Vehicles (LV)	Heavy Vehicles (HV)
1. Site setup / enabling work	12	10
2. Demolition - Road	12	10
3. Demolition - Bridge	40	60

Construction activities	Approximate number of Vehicles Per Day	
4. Piling	20	10
5. Earth works	20	40
6. Bridge construction	12	20
7. Road Works	20	20
8. Retaining Walls	12	10
9. Finishing works landscape	12	4

Construction of the Proposal is anticipated to slightly increase traffic for portions of the construction period. Light vehicle traffic is anticipated to increase within the range of about 0.07% to 0.19% and heavy vehicle traffic is anticipated to increase within the range of about 6.45% to 24% on haulage routes presented in Figure 6-5. This has potential to result in minor increases to wait times at local intersections. These figures are a worst-case scenario as it utilises the estimated increase in traffic from the most traffic intensive activity which is the bridge demolition, which would only occur for a short period of time.

Rail corridor compound construction traffic

A construction compound within the rail corridor is required to enable plant to be delivered to site, enable haulage of the demolished bridge structure and delivery of construction materials. This access would only be used during rail possessions during weekend and holiday periods. The compound would be accessed from High Street with heavy vehicles using the following haulage route presented in Figure 6-6. This route has been selected to keep heavy traffic off narrower tree lined local roads, reducing potential noise impacts on quiet streets and potential for collisions with low hanging branches. Use of the rail corridor compound is anticipated to increase traffic for portions of the construction period. Disruptions are anticipated to be short term due to the timing of the compound's use, the largest volume of additional traffic is expected during the bridge demolition stage.

Access for residents to the road network and private properties would be maintained throughout construction. The anticipated volume of heavy vehicle movements is considered unlikely to noticeably increase wait times at local intersections during relevant construction periods. To further manage and mitigate traffic impacts from construction traffic and haulage, a TMP must be prepared by the construction contractor.

Table 6-10 Increase in traffic on haulage roads

Road Link	Base Case – Total Daily		Construction Traffic - Daily		Total Daily		Percentage Increase	
	LV	HV	LV	HV	LV	HV	LV	HV
Beecroft Rd, North of Carlingford Rd	35740	490	40	60	35780	550	0.1%	12.2%
Carlingford Rd, west of Beecroft Rd	31650	800	40	60	31690	860	0.1%	7.5%
Beecroft Rd, south of Carlingford Rd	58870	930	40	60	58910	990	0.1%	6.4%
Epping Bridge	62060	970	40	60	62100	1030	0.1%	6.2%
Blaxland Rd, South	21600	250	40	60	21640	310	0.2%	24.0%

Road Link	Base Case – Total Daily		Construction Traffic - Daily		Total Daily		Percentage Increase	
	LV	HV	LV	HV	LV	HV	LV	HV
of Epping Rd								
Epping Rd, East of Blaxland Rd	41830	730	40	60	41870	790	0.1%	8.2%

Note: LV = Light vehicles AUSTROADS class 1 to 3, HV = Heavy vehicles AUSTROADS class 4 to 12

Workforce and parking

Approximations of the required workforce suggest that the required number of full-time equivalent workers would range from 20 to 80 depending on the construction stage. Further, it is estimated that throughout any of the stages, 25% of the workforce would arrive via public transport, 50% via carpool, and 25% as the sole driver of a private vehicle. To enable the workforce to access the construction site, a temporary parking area would be established at the compound area at the corner of Blaxland Road and Epping Road.

To accommodate workforce parking, it is anticipated that the compound would need the capacity to hold 40 personal vehicles when the workforce is at a maximum during the bridge demolition stage.

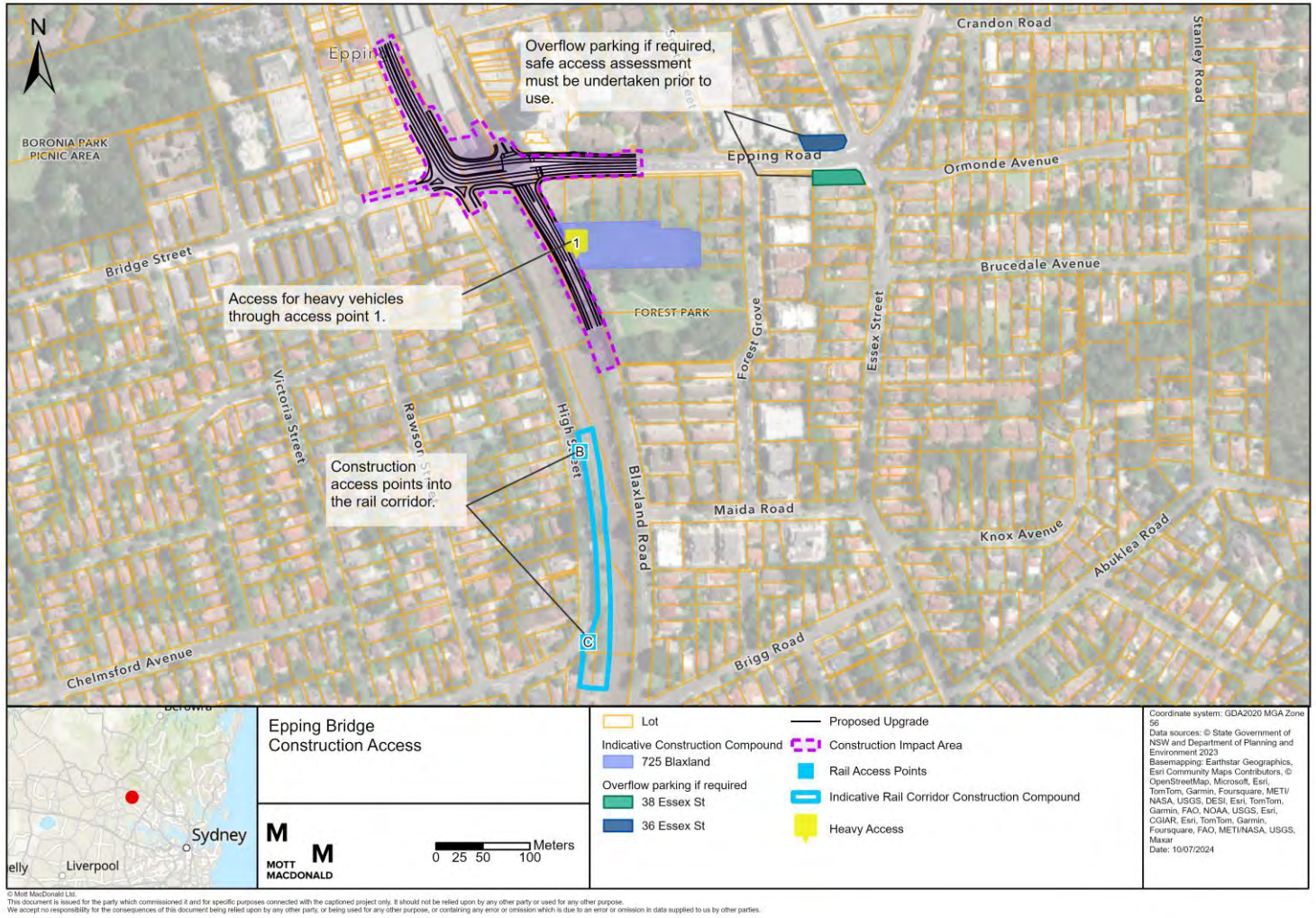

Figure 6-4 Construction site and construction compound access point

Figure 6-5 Construction and compound area haulage routes

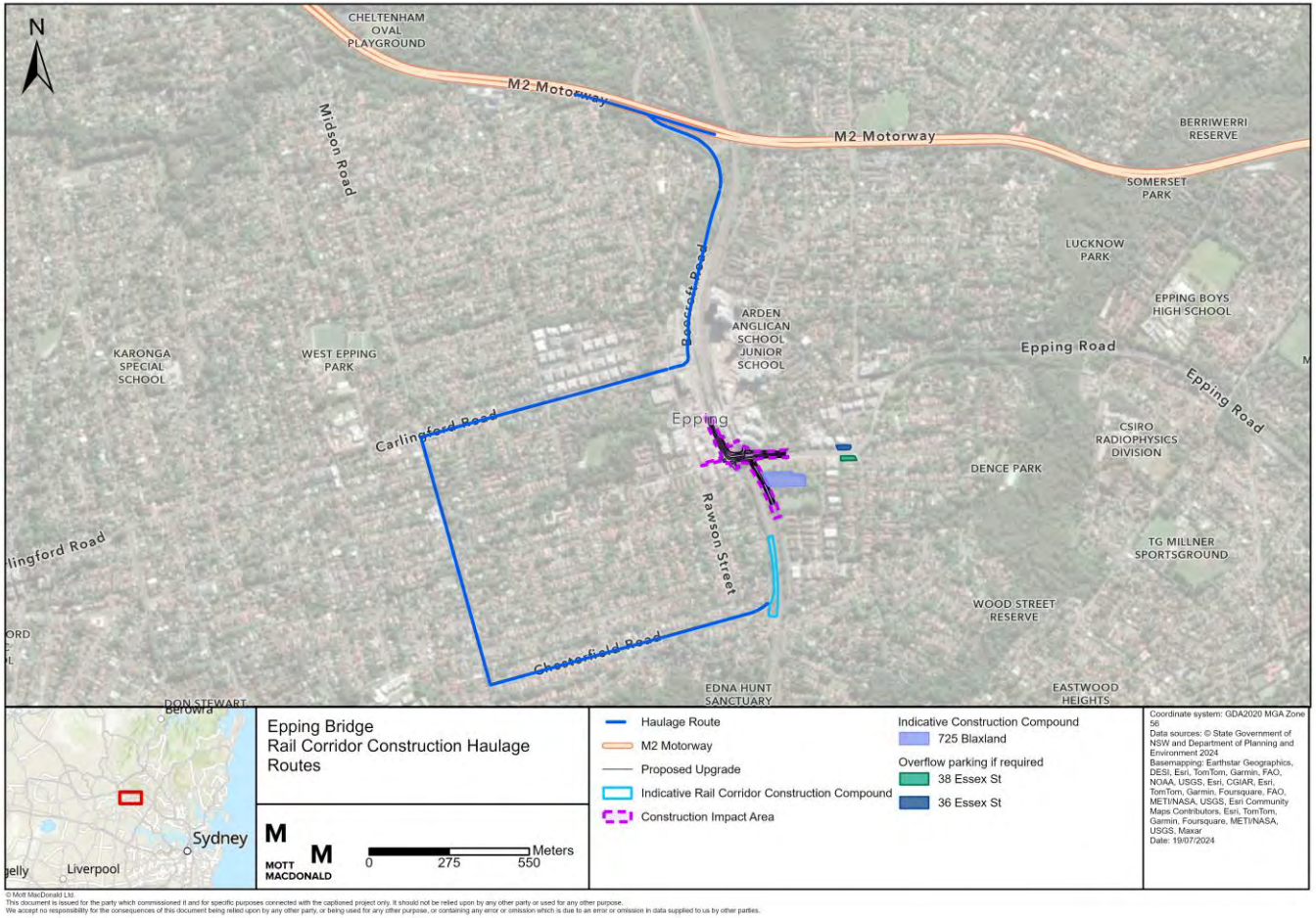

Figure 6-6 High street in-corridor compound area haulage routes

Buses

Bus services would continue to run during construction. As these services utilise the same road network, the delays outlined in Table 6-5 would also affect the operation of these services.

Several bus stops would be relocated during construction. Details of these relocations are discussed in Section 3.2.1. As a result, users would experience minor changes to pedestrian transfer times from rail and other bus services. However, these impacts are expected to be minor and no impacts to the frequency of existing bus services would occur. Mitigation measures are provided to ensure Transport, construction contractors and bus operators communicate to minimise disruptions to bus services.

Rail

Train services would be affected during construction of the Proposal during track possessions, although these are not specific to the project and would occur regardless. As such, impacts are not considered impacts arising from the Proposal.

Buses would replace trains during possession periods. The rail replacement buses would need to be relocated during the Proposal. Accordingly, any construction activities occurring during possessions must consider additional buses and users. This should be addressed as part of the TMP and Construction Environmental Management Plan (CEMP).

The Proposal is not anticipated to impact on the operation of the Sydney Metro services at Epping Station. The relocation of the chiller unit is part of enabling works and subject to a separate approval.

It should be noted that Sydney Metro would need to approve proposed works within the second reserve. The second reserve is one of two protection reserves, land that is subject to special approval to protect Sydney Metro infrastructure from adjacent development. If work is proposed within the second reserve an engineering assessment of the Proposal is required to demonstrate that induced effects on the underground rail infrastructure are acceptable to Sydney Metro. This must be in accordance with the performance requirements outlined in Section 9 of Sydney Metro Underground Corridor Protection Technical Guideline must be prepared and submitted during detailed design.

Active transport

Pedestrian and cyclist access to the bridge would be maintained on at least one side during construction, excluding the demolition stage. During this stage, pedestrians and cyclists would be diverted via the Epping Station overpass (cyclist would need to walk their bicycle as riding won't be permitted). Pedestrians impacted by the closures on Beecroft Road and Langston Place as a result of the temporary bridge construction platform would also utilise this diversion for approximately 18 months.

The shared path on the southern side of Epping Road would potentially require closure for approximately nine months. Access would remain available via diversions to the Epping Road and Essex Street crossing or via Forest Park. This closure is expected to impact only a small catchment of residents at the northern extent of Forest Grove.

The existing footpath at the southeast corner of the Blaxland Road and Epping Road intersection would be removed and renewed during construction. To maintain access, a temporary path would be created through the construction compound at 725 Blaxland Road.

Overall, impacts to pedestrians are expected to be minimal as access would be maintained throughout construction. When access would be impacted, convenient diversions are available.

Secure bike parking

The temporary bridge construction platform would require the partial removal of the Opal bike shed during construction. The detailed design would ensure cyclists have partial access to the existing facility.

As such the Proposal would impact cyclists with a decrease in secure bike parking spots available. It is anticipated that the Proposal would cause a 25% reduction in available bike parking spots. This impact would be temporary (about 18 months) and the entire Opal bike shed would be reinstated as early as possible.

Operation

Road

A comparison of the projected 2029 intersection and network performance was completed for traffic scenarios with and without the Proposal. The same analyses were conducted with 2039 growth predictions considered to understand the potential future performance of the Proposal.

The modelling revealed that the Proposal would unlock underutilised capacity in the existing precinct road network. Based on traffic modelling of the road network and performance analysis of key intersections within the network, the Proposal would have the following operational impacts:

- average vehicle speeds throughout the road network would be increased by 8.7% in the AM peak and 13.6% in the PM peak
- average vehicle delay throughout the road network would be reduced by 8.8% in the AM peak and 20.0% in the PM peak
- intersection performance would be anticipated to improve from level of service D to C at the opening year, during both the AM and PM peaks
- intersection performance at the Bridge Street left turn entry onto Beecroft Road in the PM peak would be anticipated to improve from level of service D to A at opening and would remain at level of service C for up to 10years.

A summary of the intersection analysis results is provided in Table 6-11. Refer to Table 6-1 for the level of service criteria requirements.

Table 6-11 Intersection performance and LoS with and without the Proposal

Traffic Performance Parameters	AM Peak Hour			PM Peak Hour		
	2029 Without Proposal	2029 With Proposal	2039 With Proposal	2029 Without Proposal	2029 With Proposal	2039 With Proposal
Carlingford Road, Ray Road and Rawson Street	F	F	F	F	F	F
Beecroft Road and Carlingford Road	B	B	B	C	C	C
Bridge Street and Rawson Street	D	C	C	C	C	E
Beecroft Road, High Street and Bridge Street	A	A	A	D	A	C
Epping Road, Blaxland Road and Langston Place	D	C	C	D	C	E
Epping Road and Essex Street	D	D	D	D	C	C

The additional right-turn lane onto Blaxland Road from the bridge provides further benefits to the Proposal. A review of the movements across the precinct showed the following:

- approximate two minute (47%) reduction in average southbound travel times between Beecroft Road and Blaxland Road during the AM peak
- approximate 10 minute (81%) reduction in average southbound travel times between Beecroft Road and Blaxland Road during the PM peak
- approximate one minute (12%) reduction in average eastbound travel times between Carlingford Road and Epping Road in the PM peak.

The Proposal would provide traffic impacts that align with the objectives of increasing road capacity, reducing traffic congestion across the bridge, and improving access to Epping town centre.

Buses

Bus stop relocations that would occur during construction would become permanent once the Proposal is operational. There would be no impacts to the number and frequency of services. The anticipated increases in pedestrian transfer times between rail and bus connections would continue to affect users but these impacts are expected to be minor.

Active transport

The Proposal would benefit pedestrian traffic within the town centre. Particularly, the inclusion of an additional staged crossing and the upgrades to the shared path across the bridge.

The staged crossing would be included at the intersection of Epping Road, Blaxland Road, and Langston Place. This crossing would increase the visibility of pedestrians from southbound traffic entering Epping Road from Langston Place. Further, the inclusion of the median would reduce exposure of pedestrians with restricted mobility by creating an opportunity for rest between crossing stages.

Upgrades to the Epping Road and Bridge Street shared paths would support pedestrian and cyclist use in the area by enhancing the safety, capacity, and connectivity of the existing paths. The Opal bike shed that would be impacted by construction would be reinstated as early as possible before the bridge is operational. Therefore, no further impacts would occur during operation.

6.1.4 Mitigation measures

A Construction Traffic Management Plan (CTMP) would be prepared by the Construction Contractor in consultation with Transport. The CTMP would be the primary tool to manage potential traffic and pedestrian impacts associated with each phase of construction. The site-specific mitigation measures outlined in Table 6-12 would also be implemented throughout the detailed design and construction phase of the Proposal.

Table 6-12 Site-specific traffic and transport mitigation measures

No.	Mitigation measure	Responsibility	Timing
16	Where feasible, vehicles performing construction deliveries or haulage should utilise the predetermined routes for the relevant construction area or compound to minimise impacts on the wider road network and residents.	Contractor	Construction
17	During construction, partial use of the Opal bike shed on Langston Place is to be maintained. The existing bike shed is to be reinstated as early as possible.	Contractor	Detailed design / Construction
18	Pedestrian access across the bridge must be maintained at all times during construction, excluding demolition. This includes the provision of temporary pedestrian paths when footpaths are obscured and no convenient and/or safe diversions are available.	Contractor	Construction
19	A Road Safety Audit would be undertaken as part of detailed design and upon completion of construction, and design amendments made as required.	Contractor	Detailed design / Construction
20	Access to private properties is to be maintained throughout construction.	Contractor	Construction
21	Prior to the use of overflow carparking at 36 and 38 Essex Street, a safe access assessment must be undertaken to ensure safety of workers, pedestrians and other road users.	Contractor	Construction
22	Queuing on public roads would be avoided by the use of two-way radios to call up haulage trucks from layover areas on a ‘just in time’ basis.	Contractor	Construction
23	Access to bus stops would be maintained during construction in consultation with the bus operators where feasible and reasonable, relocations would be managed in accordance with the TMP.	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
24	Construction deliveries and haulage would be timed to occur outside peak traffic times where feasible and reasonable to minimise impacts on the road network	Contractor	Construction
25	Sydney Metro would need to approve proposed works within the second reserve. An engineering assessment of the Proposal demonstrating that induced effects on the underground rail infrastructure are acceptable to Sydney Metro, in accordance with the performance requirements outlined in Section 9 of Sydney Metro Underground Corridor Protection Technical Guideline must be prepared and submitted to Sydney Metro during detailed design.	Contractor	Detailed design
26	Transport would work with stakeholders during Detailed Design to develop a revised rail replacement bus operations strategy to complement the Epping Bridge upgrade.	Transport and Contractor	Detailed design
27	Further consultation with stakeholders would be undertaken during the Detailed Design phase to refine the traffic configuration with the aim of retaining the location of the existing bus stands, where feasible.	Transport and Contractor	Detailed design

Refer to Section 7.2 for a full list of proposed mitigation measures.

6.2 Urban design, landscape and visual amenity

6.2.1 Methodology

A Landscape Character and Visual Impact Assessment (LCVIA) was prepared for the Proposal (DesignInc, 2024) to demonstrate the potential impacts of the Proposal on visual amenity and landscape character on the surrounding locality. The findings of the assessment are summarised in this section.

The assessment included a desktop analysis and site inspection to identify the potential visual impacts of the Proposal on views to the bridge from surrounding publicly accessible areas. Photomontages were prepared to provide an indication of what the proposed work may look like within the existing setting. The methodology used to undertake this assessment is provided in Section 4.1 of the LCVIA.

Both visual and landscape impacts were assessed using an impact grading matrix for sensitivity and magnitude. Sensitivity relates to the areas' capacity to absorb a change caused by the Proposal (such as the introduction of sight screens on the bridge) without adverse impact on its character. Magnitude relates to the degree of change affecting a landscape. Table 6-13 presents the matrix used to combine the ratings for sensitivity and magnitude to identify the overall impact for landscape character and visual impact.

Table 6-13 Landscape character and visual impact grading matrix

		Magnitude			
		High	Moderate	Low	Negligible
Sensitivity	High	High	High to Moderate	Moderate	Negligible
	Moderate	High to Moderate	Moderate	Moderate to Low	Negligible
	Low	Moderate	Moderate to Low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

6.2.2 Existing environment

Town centre's context

The town centre consists of predominantly low-rise two and three storey buildings. An area of taller eight storey buildings is located on the corner of Beecroft and Carlingford roads. In recent years, high-density mixed-use developments of between 15 to 30 storeys have been built at Langston Place, Cambridge Street and Oxford Street with commercial and retail businesses primarily located on ground floors and residential and office spaces above.

As discussed in Section 2.1.1, the town centre is an Urban Activation Precinct and is currently experiencing redevelopment, a strong housing market and unprecedented levels of growth. Details of the local growth in the locality are discussed in Section 6.6.

City of Parramatta Council is currently undertaking a planning review for the town centre. This includes preparing planning proposals to address key issues such as the:

- high density development interface with Heritage Conservation Areas
- increase to commercial floor space within the town centre
- provision of additional community facilities and open spaces.

Consideration of the future development of the area has been included in this assessment.

Proposal context

The Proposal is located in a heavily modified urban environment within the busy urban centre of Epping at the intersection of the local and regional road networks, the rail corridor and Epping Station. As discussed above, the

Proposal area is characterised by transport infrastructure, high and low density residential development, commercial and retail buildings.

The vegetation within and surrounding the Proposal area consists of planted native and exotic street trees, landscaped traffic islands, verges and gardens. Mature trees screen the rail corridor along the edge of Blaxland Road and High Street, which provide buffered views of the roadway. More detail on vegetation within proximity to the Proposal is provided in Section 6.7.

Forest Park, a locally listed heritage item (Item No. I71), is located to the east of Blaxland Road. The park is characterised by a war memorial, mature tree plantings, a brick boundary fence and formal entry way from Blaxland Road. More detail on non-Aboriginal heritage within proximity to the Proposal is provided in Section 6.5.

The bridge has a high level of visibility for both pedestrians and motorists on all approaches to the bridge and from Epping Station platform. The most constrained view of the bridge is from High Street, to the south of the bridge, where the Southern Services building and landscaping screens views into the rail corridor.

Landscape character

The LCVIA identified five distinct landscape character zones (LCZs) in proximity of the Proposal (DesignInc, 2024). A description of these LCZs is detailed in Table 6-14.

Table 6-14 Identified LCZs within proximity of the Proposal

Landscape Character Zone	Description
LCZ1 – Town Centre Zone	Western side of Epping Town Centre consisting of predominantly two to three storey retail and commercial buildings. The zone has an open spatial character and the vegetation in the area provides visual respite from its urban qualities.
LCZ2 – Station Zone	Railway corridor at the northern side of the bridge including the station area. The area is mostly built up in character and houses structures for rail function, including a heritage station building that is an important part of the character. Spatial character is open in this corridor and vegetation at the boundary provides visual respite.
LCZ3 – East Mixed Use Town Centre Zone	Eastern side of the railway corridor with an area developed for high density mixed use. Some new and established plantings provide relief for an otherwise urban dominant character.
LCZ4 – Vacant Residential and Recreational Space	Vacant residential lots at the corner of Epping and Blaxland Roads including the disused bowling greens. Currently has an open character but residential lots will be developed resulting in a built-up urban character. The heritage listed Forest Park is on the perimeter of this zone.
LCZ5 – South Railway Zone	Railway corridor immediately south of the bridge with views of a service building and limited vegetation. There are limited built-up elements and the zone mainly consists of railway infrastructure.

Figure 6-7 presents an overview of the LCZs in relation to the Proposal, while Figure 6-8 to Figure 6-12 presents photos which illustrate aspects representative of the character in these LCZs.

Figure 6-7 Landscape character zones assessed in LCVIA (DesignInc, 2024)

Figure 6-8 LCZ1 Town centre zone

Figure 6-9 LCZ2 Station zone

Figure 6-10 LCZ3 East mixed use town centre

Figure 6-11 LCZ4 Epping Road shared path and vacant residential

Figure 6-12 LCZ5 South of railway zone

Viewpoint assessment

The LCVIA assessed the impact of the Proposal on visual catchments. The assessment identified the sensitivity of an area associated with the quality of existing views and the magnitude of the change created by the Proposal and its impact on existing views.

Four viewpoints (VP) have been identified to represent key viewpoints to and from the Proposal, see

Figure 6-13. The identified VP are described as:

- VP1: looking south from the elevated pedestrian bridge at the station
- VP2: looking north from the shared path at the southern side of Epping bridge
- VP3: looking east toward Epping bridge from Bridge Street
- VP4: looking west from Epping Road north footpath

Figure 6-14 to Figure 6-17 show the existing viewpoints and indicative future viewpoints.

Figure 6-13 Viewpoint locations assessed in LCVIA (DesignInc, 2024)

Figure 6-14 VP1 from Epping Station existing and proposed (indicative only, subject to detailed design

Figure 6-15 VP 2 from shared pathway on Epping bridge existing and proposed (indicative only, subject to detailed design)

Figure 6-16 VP3 from Bridge Street existing and proposed (indicative only, subject to detailed design)

Figure 6-17 VP4 from Epping Road existing and proposed (indicative only, subject to detailed design)

6.2.3 Potential impacts

Construction

Construction of the Proposal would result in landscape character and visual impacts due to the removal of vegetation and the introduction of construction areas. Impacts as a result of construction would be temporary in nature.

The visual impact and impact to landscape character during construction depends on the scale and type of activities being undertaken and would vary over the construction period. Impacts are primarily associated with the progressive introduction of new structures, construction equipment and the removal of any vegetation.

During construction there would be a number of elements within the Proposal site that are necessary for construction activities and typical of construction of this scale. Equipment associated with construction activities, as detailed in Section 3.4.3, and can be expected to be on site for the approximate five year construction period.

The work areas and construction compounds would be lit at night for security. Generally, the character of the construction works and construction compound areas at night would be absorbed into the surrounding brightly lit environment of the station. There may be some lighting visible from nearby residential properties which overlook the site, such as the multistorey residential building at 22 Langston Place, strata buildings on Epping Road, and standalone residential dwellings near the indicative construction compounds described in Section 3.5.

Minor trimming of trees may be required where branches overhang the construction site and compounds. If tree trimming is required it would be assessed in accordance with Transport policies and procedures.

Temporary pedestrian access arrangements and footpath diversions may potentially reduce the legibility and accessibility of the town centre. There would also be reduced amenity and comfort due to the use of large-scale machinery. Overall, there would be a temporary, minor reduction in the landscape and urban design functionality of the town centre during construction. This precinct is of local sensitivity and there would be a minor adverse landscape impact during the construction of the Proposal.

The temporary bridge construction platform required for building of the bridge is located over the southern portion of the Epping Station platform. This is discussed in further detail within Section 6.3 and 6.5 of this REF. From a visual impact perspective this temporary structure would reduce the amenity for train passengers on the platform by creating a shaded area with limited natural light during the daytime and limited ambient light at night time. For safety purposes this area would require lighting. Additionally, the temporary platform would obscure the indirect views to the heritage listed Station Building from surrounding streets.

Mitigation measures would be implemented to minimise these impacts and can be found in Section 7.2.

Operation

The LCVIA assesses the landscape character and visual impact of the Proposal on the area. Landscape character is defined by a combination of landform, vegetation and the existing built form. The assessment identifies the sensitivity of the LCZs to changes and the magnitude of the change associated with the Proposal. The assessments are summarised in Table 6-15 below.

Table 6-15 Landscape character assessment summary

LCZ	Sensitivity	Magnitude	Impact
LCZ1	**Low** – due to the existing modified urban character of the zone.	**Moderate** – due to the scale of proposed change to traffic islands, addition of a retaining wall and removal of street tree.	**Moderate-Low**
LCZ2	**High** – due to the sensitivity of the existing landscape character setting that includes the heritage listed railway station. The sensitivity is assessed high despite the LCZ	**Moderate** – due to the proposed alterations to the built environment and existing landscape. These alternations	**High-Moderate**

	being a modified and mixed in character of the built form.	would include elements mostly at street level.	
LCZ3	**Low** – due to the existing modified character of the area and the LCZs capacity to absorb changes.	**Low** – due to the Proposal adjusting infrastructure mostly at street level.	**Low**
LCZ4	**Moderate** – due to the open character and the heritage listed Forest Park on its perimeter.	**Moderate** – due to the Proposal resulting in more hardscape elements in the public domain that would reduce the existing open character.	**Moderate**
LCZ5	**Low** – due to the proximity of rail infrastructure and the bridge.	**High** – due to the raised levels of the bridge and the shared paths are considered to be a prominent change to the area.	**Moderate**

Visual impact is concerned with what people see, and how the project might change views and outlooks. The visual impact assessment assessed the 4 VP as described previously and the results are summarised in Table 6-16, with impacts ranging from low to moderate.

Table 6-16 Visual impact assessment summary

Viewpoint	Sensitivity	Magnitude	Impact
Viewpoint 1 – Elevated pedestrian bridge	**Low** – This is associated to the low sensitivity of the viewer (Metro/Train customers and the wider community) and the existing built form that is dominated by the existing railway station. The distance to the bridge and the blending in of the bridge into the distant skyline also a factor in this sensitivity assessment.	**Low** – Although the coloured aluminium screens would be visible, the magnitude is assessed as low due to minimal change to the existing fabric of the station and surrounds.	**Low**
Viewpoint 2 – Epping Bridge	**Moderate** – The sensitivity of the existing view has been assessed as moderate attributed to the sensitivity of the viewer (pedestrians and cyclists) and the existing dominant built form which has vegetation creating a break between the foreground and background.	**Moderate** – The magnitude was assessed as moderate, this is associated to the prominence of the urban alterations including, the raised road level and the coloured aluminium screens.	**Moderate**
Viewpoint 3 – Bridge Street	**Moderate** – The sensitivity was assessed as moderate, this is associated to the prominence of the urban alterations including the raised road level and the coloured aluminium screens.	**Moderate** – The magnitude was assessed as moderate, this is associated to the prominence of the urban alterations including the raised road level and the coloured aluminium screens.	**Moderate**
Viewpoint 4 - Epping Road	**Low** – The sensitivity at this viewpoint is assessed as low due to the fleeting nature of view for road users.	**Moderate** – The magnitude is assessed as moderate due to the removal of vegetation, widening of the bridge and installation of coloured screens. However, this magnitude is reduced due to the positive landscape treatments of the planted islands being introduced.	**Moderate-Low**

The new bridge would be illuminated by new LED street lights in accordance with relevant standards and would contribute to security and safety at night. The new lighting may result in a more prominent view from residences overlooking the bridge. Generally, the visual character of the Proposal at night would be absorbed into the existing brightly lit environment and no additional light spill is anticipated on private properties.

Overall, the Proposal would be likely to create minor additional sky glow above the site due to the additional built form. Lighting would be designed in accordance with the requirements of the Australian Standards for the control of obtrusive lighting effects.

The proposal would require the removal of vegetation, reducing the visual amenity of the locality, this is discussed in further detail within Section 6.7. The trees within Forest Park, which frame views towards the bridge would be maintained. A replacement tree would be provided to Epping Station platform to maintain the existing character of the station.

During operation, there would be substantial improvements to accessibility within the town centre for vehicles, cyclists and pedestrians. The Proposal would improve legibility of the entrances to the town centre. This would include public realm enhancements with new paving, landscaping, lighting, furniture and signage.

The Proposal is anticipated to maintain and enhance the landscape character of the locality and not detract from the urban character and setting of the locality. Overall, there would be a noticeable improvement to the urban design functionality and character of the bridge precinct. This is subject to the implementation of mitigation measures detailed in Section 6.2.4 and 7.2.

6.2.4 Mitigation measures

During construction, standard Transport mitigation measures presented in Section 7.2, would minimise visual impacts and protect public amenity in proximity to the Proposal. This includes provision of hoardings, screening of compounds and removal of graffiti. Waste management mitigation measures presented in Section 7.2 would also help to manage impacts on public amenity during construction.

Standard Transport mitigation measures 11 to 14, presented in Section 7.2 would minimise visual impacts of the Proposal during operation. Mitigation measures specific to the Proposal that were identified in Chapter 3 of the LCVIA would also be followed and are detailed in Table 6-17.

Table 6-17 Site specific urban design, landscape, and visual impact mitigation measures

No.	Mitigation measure	Responsibility	Timing
33	Where feasible and reasonable, the design principles identified in the LCVIA would be incorporated into the detailed design of the Proposal.	Contractor	Detailed design
34	The existing tree on Epping Station platform is to be replaced to respect and retain the existing character of the station.	Contractor	Detailed design
35	Lights must be provided to luminate areas under the temporary bridge construction structure to ensure safety of passengers on Epping Station platform.	Contractor	During construction

Refer to Section 7.2 for a full list of proposed mitigation measures.

6.3 Noise and vibration

6.3.1 Methodology

An *Operational Traffic and Construction Noise and Vibration Impact Assessment* (Mott MacDonald, 2024a) (CNVIA) has been prepared by Mott MacDonald to assess the impact of the construction and operation of the Proposal. The assessment has been prepared to determine the background noise level of the existing environment, identify receivers, assess the potential noise and vibration impacts and recommend appropriate mitigation methods. The assessment:

- determined existing acoustic environment and existing traffic noise levels at receivers surrounding the Proposal
- established a noise and vibration criteria based on applicable noise and vibration guidelines
- compared the predicted increase in traffic noise and identified any required treatment

- quantified potential construction noise and vibration of construction scenarios and identified mitigations to minimise impacts.

6.3.2 Existing environment

Sensitive receivers and noise catchment areas

The Proposal area is predominately surrounded by residential receivers along Epping Road and High Street, commercial receivers along Beecroft Road and Langston Place, passive recreation (Forest Park) along Blaxland Road and a library located at Chambers Circuit.

The surrounding receivers are divided into three Noise Catchment Areas (NCA), described in Table 6-18 and visually represented in Figure 6-18.

Table 6-18 Noise catchment areas descriptions

NCA	Description
NCA 1	Receivers west and south-west of the bridge primarily fronting onto High Street.
NCA 2	Receivers east, north-east, west and south-west of the bridge including Forest Park. Primarily fronting onto Langston Place.
NCA 3	Receivers east of the bridge, including Epping Branch Library, fronting onto Epping Road.

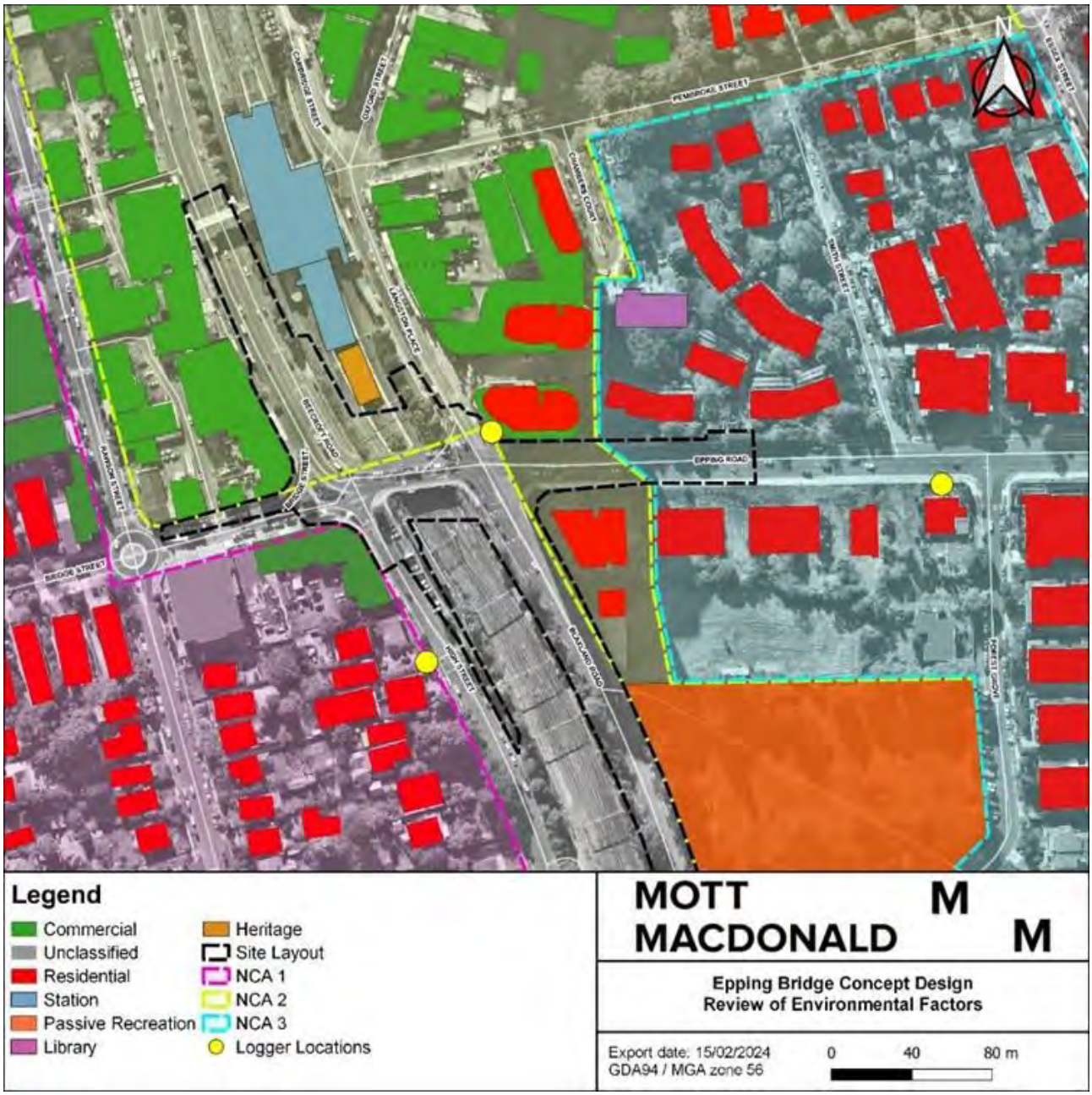

Figure 6-18 Noise catchment areas, noise monitoring locations and sensitive receivers

The most affected receivers for each NCA are represented in Table 6-19. These are primarily the closest receivers to the construction area around the bridge where the most intense construction would occur.

Table 6-19 Most affected receivers from each NCA

NCA	Type of Receiver	Address	Orientation From Bridge
NCA 1	Residential	23 High Street, Epping	Southwest
		22A High Street, Epping	Southwest
		22 High Street, Epping	Southwest
	Commercial	24 – 30 High Street & 4 – 12 Bridge Street, Epping	West
NCA 2	Residential	12 – 22 Langston Place, Epping (southern tower)	East
		12 – 22 Langston Place, Epping (central and northern tower)	Northeast
		2 Epping Road, Epping (future residential)	East
	Commercial	12 – 22 Langston Place, Epping (southern podium)	East
		12 – 22 Langston Place, Epping (northern podium)	Northeast
		33 – 36 Beecroft Road, Epping	West
	Passive recreation	Forest Park	South-west
NCA 3	Residential	7 Epping Road, Epping (western, central, and eastern building)	East
		4 – 16 Epping Road, Epping (future residential)	East
		18 Epping Road, Epping	East
		23 Epping Road, Epping	East
	Library	Epping Branch Library	Northeast

Background noise levels

Existing noise levels were measured to understand the existing background (or ambient) noise environment. Unattended noise monitoring was undertaken between Friday 21 July and Friday 4 August 2023 at locations that are representative of receivers that would potentially experience noise impacts from construction works and road traffic noise.

Rating Background Noise Levels (RBLs) are a measurement of the existing noise environment and are determined from measurement of LA90 noise levels. This is the noise level exceeded for 90 per cent of the monitoring period. A summary of the unattended noise monitoring results is provided in Table 6-20. Measurements were taken for the daytime, evening, and night-time periods in alignment with the EPA's Noise Policy for Industry 2017. The measured background noise levels differ between the catchments. NCA 1 has residential characteristics and is the quietest. NCA 2 is the noisiest of the existing environments, with consistently higher levels of noise during the day and evening periods, then a substantial drop during the night-time period. This is assumed to be associated to vehicle traffic and trains operating in the rail corridor. NCA 3 is quieter than NCA 2 during the day and is the quietest NCA during the night-time period.

Table 6-20 Summary of unattended noise logging results

NCA	Address	Rating Background Level (dB(A))		
		Daytime (7am - 6pm)	Evening (6pm - 10pm)	Night-time (10pm to 7am)
NCA 1	22A High Street, Epping	51	51	40
NCA 2	12-22 Langston Place, Epping	61	59	43
NCA 3	18 Epping Road, Epping	56	55	37

Structures with potential vulnerability to vibration

The Proposal area would be in close proximity to residential and commercial areas, as well as the Epping Station building that is listed on the TAHE Heritage and Conservation Register (Epping Railway Station Group - item

4801911). These structures would be vulnerable to impacts of vibration during construction and operation. A construction vibration impact assessment that addresses potential impacts is provided in Section 6.3.3.

6.3.3 Potential impacts

Noise

Construction

Construction noise criteria

The construction noise criteria are determined by the existing acoustic environment for the locality. The Transport Construction Noise and Vibration Guidelines for Roads (CNVG-R) (Transport, 2023b) provides guidance in establishing appropriate construction noise criteria and refers to the Interim Construction Noise Guideline (ICNG) (DECC, 2009). Noise management levels (NMLs) have been determined for receivers as per the procedures in the ICNG.

NMLs for residential receivers are calculated based on the RBL + 10 dB(A) for standard construction hours or the RBL + 5 dB(A) for periods outside recommended standard hours, also known as out of hours work (OOHW). The ICNG specifies a highly noise affected level of 75 dB(A) for residential receivers as the point above which there may be strong community reaction to noise.

Based on the RBLs for the Proposal area outlined in Table 6-20, the noise management levels for the Proposal can be determined for each period. These are summarised in Table 6-21.

Table 6-21 Construction NMLs for residential receivers as per the ICNG & CNVG-R

Receiver	Noise Management Level dB(A) $L_{eq\ 15\ min}$				
	HNA	SH	OOHW Periods		
			Daytime (7pm - 6pm)	Evening (6pm - 10pm)	Night-time (10pm to 7am)
NCA 1	75	61	56	56	45
NCA 2		71	66	64	48
NCA 3		66	61	60	42

Note: HNA = Highly Noise Affected; SH = Standard Hours; OOHW = Out of Hours Work

The ICNG provides maximum noise levels for premises other than residential receivers. External noise levels are assessed at the most affected point within 50 metres of the boundary. These are provided in Table 6-22.

Table 6-22 Construction NMLs for non-residential receivers (Source: Table 3 of the ICNG)

Receiver (applies when properties are being used)	NML dBA $L_{eq\ 15min}$
Passive recreation areas	60 (external)
Office, retail outlets	70 (external)
Libraries	50 (external)

Predicted construction noise impacts

The potential for noise impacts on sensitive receivers would depend on several factors, typically including:

- the type of equipment and number of simultaneously operating plant items
- topography and the presence of any other physical barriers
- proximity to sensitive receivers

- hours/duration of construction works
- the prevailing background noise level
- ground conditions.

Based on likely construction scenarios derived from the indicative construction program, the most noise intensive work associated with the bridge construction has been modelled at the most impacted receivers in each NCA to assess the potential impact of noise during construction. Nine construction scenarios are identified and presented in Table 6-23 alongside corresponding total sound power levels for each scenario informed by the CNVG-R. These scenarios are based on construction activities that would utilise similar plant.

Table 6-23 Indicative construction scenarios for the Proposal

Scenario Reference	Description	Period[1]	Approximate duration[3] (days)	Total Sound Power Level (dB(A))
S01	Site set up/enabling works	SH, OOHW 1 and OOHW 2	475	114
S02	Demolition – road (including vegetation, retaining walls, and road structures)	OOHW 1 and OOHW 2	14	126
S03	Demolition - bridge	SH, OOHW 1 and OOHW 2	111	125
S04	Piling (including establishment of permanent and temporary abutments and structural street furniture elements)	SH, OOHW 1 and OOHW 2	375	123
S05	Earthworks (includes preparation of road base and installation of stormwater)	SH, OOHW 1 and OOHW 2	16	116
S06	Bridge construction (including bridge screen construction)	SH, OOHW 1 and OOHW 2	407	121
S07	Road works (including paving, kerbing, foot paths and islands)	SH, OOHW 1 and OOHW 2	674	120
S08	Retaining walls	SH and OOHW 1	564	118
S09	Finishing work/landscaping (installation of street furniture)	SH, OOHW 1 and OOHW 2		121

[1]CNVG-R defines standard hours (SH) as Mon – Fri (7am to 6pm), Sat (8am to 1pm) and Out of Hours Work Period 2 (OOHW 2) as Mon – Fri (10pm to 7am), Sat (10pm to 8am), and Sun/Public Holiday (6pm to 7am).

[3] Some construction scenarios will overlap and some work within construction scenarios will not be undertaken on consecutive days.

The predicted noise levels due to construction at surrounding receivers for each of the scenarios listed above are summarised in Table 6-24. Exceedances above the highly noise affected (HNA) noise trigger level are identified in bold and as follows:

- Highlighted in **RED** exceed the SH (daytime), OOHW 1 (evening) and OOHW 2 (night) NML criteria
- Highlighted in **YELLOW** exceed the SH NML where applicable

Table 6-24 Modelled Highest Noise Level per Scenario dB(A) Leq, 15 min.

	Noise Management Level				Scenarios								
NCA	HA	SH	OOHW 1	OOHW 2	S01	S02	S03	S04	S05	S06	S07	S08	S09
Residential receivers													
NCA 1	75	61	56	45	**66**	**89**	**79**	**77**	**79**	**75**	**83**	**69**	**84**
NCA 2		71	64	48	**82**	**97**	**90**	**88**	**87**	**86**	**91**	**76**	**92**
NCA 3		66	60	42	**76**	**98**	**79**	**77**	**88**	**75**	**92**	**74**	**93**
Commercial receivers													
NCA 1	N/A	70	N/A	N/A	**77**	**110**	**101**	**99**	**100**	**97**	**104**	**80**	**105**
NCA 2	N/A	70	N/A	N/A	**84**	**115**	**90**	**88**	**105**	**86**	**109**	**86**	**110**
Library													
NCA 3	N/A	55	N/A	N/A	**62**	**78**	**70**	**68**	**68**	**66**	**72**	**56**	**73**
Passive recreation areas													
NCA 2	N/A	60	N/A	N/A	**68**	**110**	**71**	**69**	**100**	**67**	**104**	**83**	**105**

The predicted construction noise levels for each scenario are expected to exceed the NML for a large majority of noise receivers and in some cases the HNA level would be exceeded. Table 6-25 presents the total affected receivers in relation to each scenario and the magnitude of perception. Scenario 2 would have the most receivers with a noticeable perception with 6008 receivers during OOHW 1 and 2 and 42 receivers with a highly intrusive noise level and meeting the criteria for being highly affected. Scenario 1 and Scenario 8 have the least affected receivers with 29 noticeable for Scenario 1 and 41 noticeable for Scenario 8 during SH.

This impact is due to the magnitude of total sound power levels predicted in the construction scenarios and the proximity of sensitive receivers. The locations and extent of impacted residents are identified in Appendix C of the CNVIA (Mott MacDonald, 2024a).

It must be noted that the construction scenarios presented above represent the worst-case impacts and the noisiest works that would be expected to occur during construction. The modelled construction noise levels at most noise receivers would not be expected to be reached during typical construction activities. The contractor would be required to prepare a Construction Noise and Vibration Management Plan (CNVMP) that would develop detailed construction noise modelling. The CNVMP would identify opportunities to minimise construction noise and appropriate mitigations for impacted noise receivers that would align with the construction schedule that would be developed during the detailed design.

Site specific mitigation measures detailed in Section 6.3.4 and standard mitigation measures (as in Section 7.2) would minimise these impacts on the surrounding area.

Table 6-25 Total affected receivers by perception

Scenario	Period	Total Affected Receivers by Perception								
		Noticeable	Clearly Audible	Moderately Intrusive	Highly Intrusive	Highly Affected	Noticeable and Highly Affected	Clearly Audible and Highly Affected	Moderately Intrusive and Highly Affected	Highly Intrusive and Highly Affected
S01	SH	29	9	-	-	-	2	-	-	29
	OOHW 1	32	9	-	-	-	-	2	-	32
	OOHW 2	280	212	28	2	-	-	-	2	280
S02	OOHW 1	516	182	25	-	-	27	-	15	516
	OOHW 2	6008	3945	436	37	-	-	-	42	6008
S03	SH	194	62	6	-	-	9	-	-	194
	OOHW 1	208	66	5	-	-	8	-	1	208
	OOHW 2	4647	2569	178	9	-	-	-	9	4647
S04	SH	171	52	5	-	-	5	-	1	171
	OOHW 1	178	54	5	-	-	5	-	1	178
	OOHW 2	4232	1536	117	9	-	-	-	6	4232
S05	SH	56	20	-	-	4	37	-	1	56
	OOHW 1	62	43	9	-	-	6	-	3	62
	OOHW 2	1279	349	65	11	-	-	-	9	1279
S06	SH	85	22	4	-	-	4	-	-	85
	OOHW 1	87	23	4	-	-	4	-	-	87

Scenario	Period	Total Affected Receivers by Perception								
		Noticeable	Clearly Audible	Moderately Intrusive	Highly Intrusive	Highly Affected	Noticeable and Highly Affected	Clearly Audible and Highly Affected	Moderately Intrusive and Highly Affected	Highly Intrusive and Highly Affected
	OOHW 2	607	485	57	4	-	-	-	4	607
S07	SH	143	51	-	-	-	38	-	4	143
	OOHW 1	156	66	9	-	-	12	-	6	156
	OOHW 2	2896	877	116	15	-	-	-	18	2896
S08	SH	43	12	-	-	-	1	-	-	43
	OOHW 1	43	13	-	-	-	1	-	-	43
S09	SH	178	61	-	-	-	35	-	7	178
	OOHW 1	185	77	12	-	-	12	-	7	185
	OOHW 2	3539	1198	127	5	-	-	6	36	3539

Construction traffic noise impacts

Although on-site construction plant items and machinery would be the main noise impact, construction traffic associated with the delivery of materials for the Proposal has also been considered. Based on the area of works, construction vehicles would utilise the main roads (Epping Road and Beecroft Road) in preference to High Street to minimise the impact on surrounding residents.

Construction vehicles entering and exiting the in-corridor compound area would utilise haulage routes specified in Section 6.1 to minimise noise impacts on local roads and residents. The NVIA found that an increase in construction traffic is not expected to increase baseline traffic noise by more than 2dB due to the minimal amount of traffic generated by construction.

Sleep disturbance

The CNVG-R and *NSW Road Noise Policy* (DECCW, 2011) (RNP) provide a screening process to identify a maximum noise event that is likely to cause sleep disturbance. This assessment has adopted an external noise level of 65 dB(A) at a residential receiver as likely to cause sleep disturbance.

Appendix D of the NVIA provides noise maps that identifies receivers predicted to be at risk of sleep disturbance during each construction scenario. Scenarios 2, 5 and 9 are anticipated to put the most receivers at risk of sleep disturbance. While Scenarios 4 and 6 are anticipated to put the least receivers at risk of sleep disturbance.

As discussed above, the construction scenarios used to assess sleep disturbance present the worst-case impacts and the noisiest works that would be expected to occur during construction. The modelled construction noise levels at most noise receivers would not be expected to be reached during typical construction activities. The contractor would be required to prepare a CNVMP that would develop detailed construction noise modelling, identify opportunities to minimise construction noise and appropriate mitigations for sleep disturbance.

Site specific mitigation measures detailed in Section 6.3.4 and standard mitigation measures (as in Section 7.2) would minimise these impacts on the surrounding area.

Operation

The road reconfigurations for the Proposal have potential to increase noise due to the proposed increase traffic volumes and/or speeds which can increase noise to receivers. Changes to the road network are detailed in Section 3.2.2, specific components that have potential to increase traffic consists of the addition of one lane, road elevation changes and minor re-alignments of lanes throughout the proposal area. These changes are not expected to increase existing traffic volumes. The road noise criteria that would apply for determining impacts to residential and non-residential land uses is derived from the RNP and is summarised in Table 6-26.

Table 6-26 Road traffic noise criteria for residential and non-residential land uses

Type of Proposal/Land Use	Assessment Criteria (dB(A))	
	Day (7am - 10pm)	Night (10pm - 7am)
Freeway/arterial/sub-arterial roads (residential)	$L_{Aeq\ (15\ hours)}$ 60 (external)	$L_{Aeq\ (9\ hours)}$ 55 (external)
Open space (passive use)	$L_{Aeq\ (15\ hours)}$ 55 (external) when in use	-
Libraries	$L_{Aeq\ (1\ hours)}$ 55 (external) when in use	-
Commercial	$L_{Aeq\ (1\ hours)}$ 60 (external) when in use	-

Operational noise impacts of traffic using the surrounding roadways and the bridge have been modelled. This modelling has considered multiple factors, including local terrain, geometrical spreading and shielding from the terrain. The results of the model indicate an increase in traffic noise to noise receivers in each noise catchment area of as much as:

- 1.2 dB in NCA 1
- 1.1 dB in NCA 2
- 0.6 dB in NCA 3

The observed increases are typically attributed to minor lane adjustments and the repurposing of the dedicated left turn lane that would relocate road sources closer to receivers. These changes would be negligible and would be unlikely to result in any perceivable increase in traffic noise.

Vibration

Construction

The CNVG-R provides recommended minimum working distances for vibration intensive construction plant. Based on the construction scenarios identified in Table 6-23, the CNVIA Assessment (Mott MacDonald, 2024a) has identified preliminary vibration intensive equipment for each construction scenario. The identified plant items are summarised in Table 6-27 but should be revised with the approval of the construction schedule.

Table 6-27 Recommended minimum working distances for vibration intensive plant

Plant item	Scenario	Description	Minimum safe working distance	
			Cosmetic damage (BS 7385)	Human response (OH&E Vibration guideline)
Large hydraulic hammer	S02, S03	(1600 kg – 18 to 34 t excavator)	22 m	73 m
Pile boring	S04, S09	≤ 800mm	2 m (nominal)	4 m
Jackhammer	S02, S03	Handheld	1 m (nominal)	2 m
Vibratory roller	S07	>300 kN (>18 tonnes)	20 m	100 m

Receivers within minimum safe working distances based on the proposed equipment are identified in Table 6-28.

- Highlighted in **YELLOW** exceed the human response criteria.
- Highlighted in **RED** exceed the cosmetic damage and human response criteria.

Table 6-28 Minimum distances to affected receivers by construction scenario

NCA	Receiver	Approximate Distances to Receivers per Construction Scenario (m)								
		S01	S02	S03	S04	S05	S06	S07	S08	S09
1	Residential	N/A	**27**	**46**	46	N/A	N/A	**27**	N/A	27
	Commercial		**< 5**	**< 5**	**< 5**			**< 5**		**< 5**
2	Residential		**< 5**	**20**	20			**< 5**		**< 5**
	Commercial		**< 5**	**20**	20			**< 5**		**< 5**
3	Residential		**6**	**73**	73			**6**		6
	Library		**55**	98	98			**55**		55

The assessment indicates that the proposed construction could lead to building damage or negatively impact residential receivers.

The following equipment are identified as causing vibration impacts to any receivers within the minimum safe working distance identified in Table 6-28:

- large hydraulic hammer (1600 kg – 18 to 34 t excavator)
- vibratory roller (>300 kN (>18 tonnes))

- jackhammer
- pile borer

The use of this plant would require specific mitigation which would be identified and managed by the contractor in accordance with the CNVMP that would be prepared to align with the construction program and the detailed design. In addition, Section 6.3.4 provides specific mitigation measures to minimise the potential impacts associated to construction vibration.

Heritage structures

Heritage structures are considered to be more vulnerable to vibration impacts due to the age of the structures and potential for structural deterioration to have occurred over time. Table 6-27 indicates the minimum working distances for vibration intensive plant. The CNVG-R identifies that the safe working distances for vibration impacts are expected to increase for heritage sites.

The station building and brick retaining wall are part of the Section 170 heritage listing, Epping Railway Station – 4801911. The temporary bridge construction platform would be approximately one to two metres from the station building. However, this work area is not on the ground and would not produce vibration. The closest point of in-ground works is related to the concrete piles required for the temporary headstock. As shown in Figure 6-19, piling would occur about 12 metres from the station building on the western side and 13 metres on the eastern side. The temporary headstock on the western side of the rail corridor is in direct proximity to the brick retaining wall. This work has the potential to generate vibration impacts.

Section 6.3.4 provides specific mitigation measures to minimise the potential impacts associated to construction vibration. These measures would also apply to heritage structures. In addition, the non-Aboriginal heritage mitigation measures contained within Section 6.5.4 provide further measures to reduce potential vibration impacts on heritage buildings.

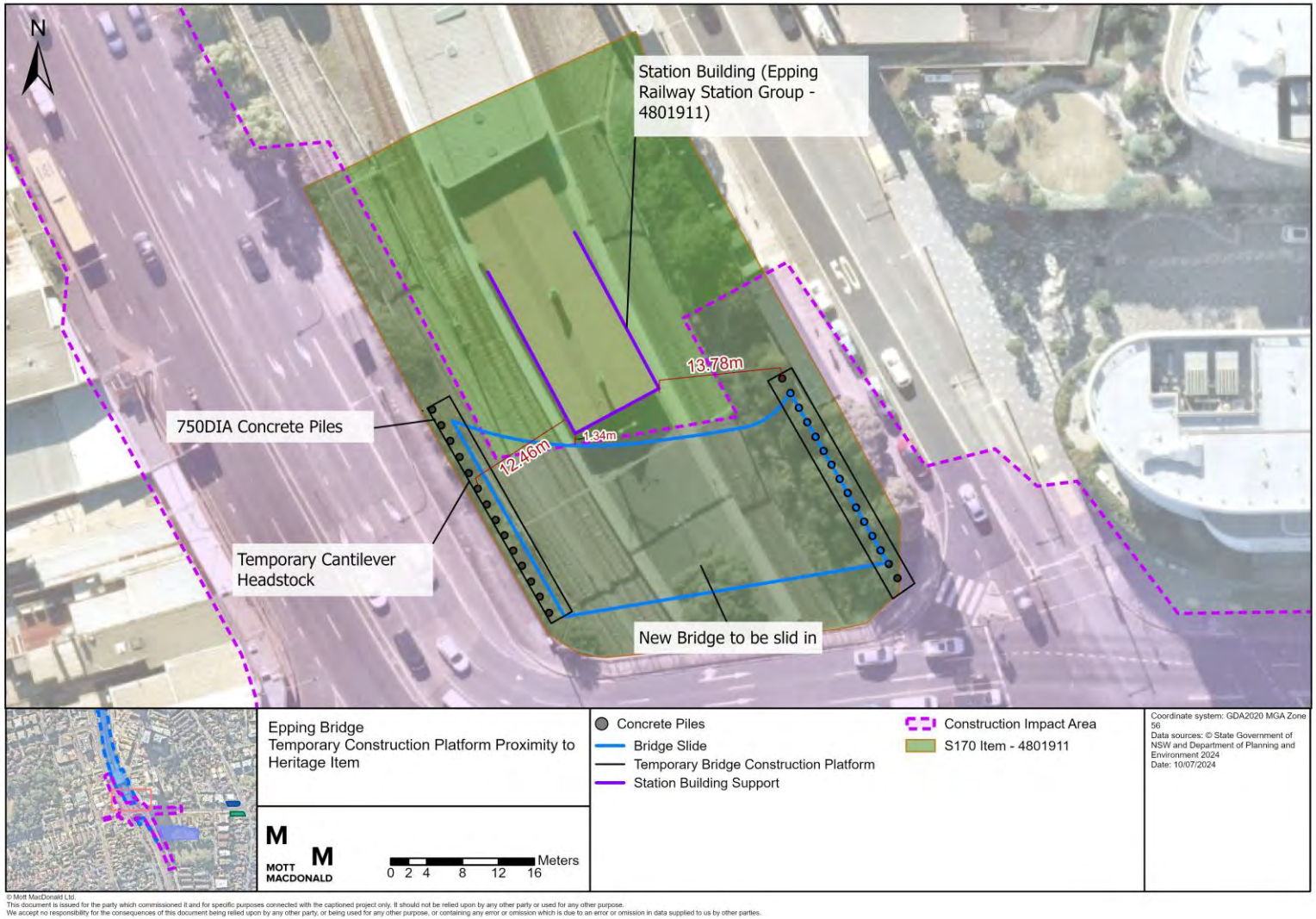

Figure 6-19 Proximity of heritage structures to temporary bridge construction platform and vibration intensive construction activities

Operation

During operation, traffic volumes are not expected to increase over the bridge and tie-in works. Traffic volumes would not directly impact vibration during bridge operation. Vehicles travelling over defects in the road or bridge joints may cause vibration, however this is unlikely to result in impacts to receivers. Therefore, provided that the road is properly maintained, no vibrational impacts are expected.

6.3.4 Mitigation measures

Due to the constrained working environment and the need to minimise road and rail disruptions, work would need to occur outside standard hours and would include night work over consecutive nights per week during some stages of construction. Work during night time and outside of standard hours would be scheduled and undertaken in accordance with the CNVMP for the Proposal and in accordance with the guidelines contained within the Epping Bridge Project Communications and Stakeholder Engagement Plan to minimise disruptions to customers, pedestrians, motorists and nearby sensitive receivers wherever possible.

The CNVG-R and ICNG outline measures to reduce the noise impact from construction activities. Prior to commencement of construction works, the contractor would prepare a CNVMP for the Proposal in accordance with the requirements of the CNVG-R. The site-specific noise and vibration mitigation measures that would be incorporated within the CNVMP are identified Table 6-29.

Table 6-29 Site specific noise and vibration mitigation measures

No.	Mitigation measure	Responsibility	Timing
43	Construction method revision would be undertaken to include lower source vibration level plant where feasible and reasonable	Contractor	Detailed design
44	Attended vibration verification monitoring would be undertaken at affected receivers at the commencement of works to confirm site-specific safe working distance	Contractor	Pre-construction / construction
45	Permanent vibration monitors with an alarm system (flashing light, audible alarm, SMS etc) to warn relevant parties when approaching vibration limits would be installed at affected receivers.	Contractor	Pre-construction
46	Noise barriers would be used around loud equipment such as hydraulic hammer, jackhammer and concrete saw cutting.	Contractor	Construction
47	Natural respite would be incorporated during operation of demolition equipment such as hydraulic hammers and jackhammer.	Contractor	Construction
48	Noise reducing shrouds on hydraulic hammer would be used during operation.	Contractor	Construction
49	Hydraulic hammer contact with reinforcing bar within concrete structures would be minimised.	Contractor	Construction

Standard mitigations that would be incorporated where feasible are adopted from the CNVG-R and are included in Section 7.2.

6.4 Aboriginal cultural heritage

6.4.1 Methodology

An assessment was undertaken for the Proposal with consideration of the requirements identified in the *Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (OEH, 2010). An Aboriginal cultural heritage assessment was undertaken to determine whether works proposed by Transport would likely impact Aboriginal cultural heritage. The assessment was informed by searches of publicly available heritage databases.

6.4.2 Existing environment

AHIMS extensive search, map, and site card

An extensive search for known Aboriginal heritage items in the vicinity of the Proposal was undertaken on 7 September 2023 utilising the Aboriginal Heritage Information Management System (AHIMS) database. The search confirmed there to be no known Aboriginal heritage items within 200 metres of the proposed construction impact and construction compound areas. A secondary search of the AHIMS register was completed on 8 April 2024 which confirmed no additional Aboriginal sites or items have been identified within 200 metres of the Proposal. The search area and results of these searches are shown in Figure 6-20.

Native Title Register

A review of the Native Title Register has not identified claims in the vicinity of the proposed construction impact area and compounds. The closest Native Title claim in the vicinity of the Proposal area is located approximately 24 kilometres to the south and was awarded to the South Coast People on the 31 January 2018 under Tribunal ID: NC2017/003.

Australian Heritage Database

A review of the Australian Heritage Database search has identified that the proposed construction impact area and compounds would be located within the boundary of a potential National Heritage List item with Aboriginal cultural heritage values. This potential item is known as *Sydney Cultural Crescent Rock Art* (Place ID 106369) and has an expansive curtilage ranging from Lake Macquarie in the north to Shell Cove in the south and as far inland as Pitt Town. The potential significance of this item is outlined in a preliminary assessment for the National Heritage List (2020-21).

As there are no sandstone outcrops or Aboriginal art sites identified within or in the vicinity of the Proposal area, the Proposal would not have the potential to impact *Sydney Cultural Crescent Rock Art* (Place ID 106369).

The listing is undergoing mandatory review and it is anticipated that determination would be given in 2025. As such, no statutory controls currently govern the potential heritage item.

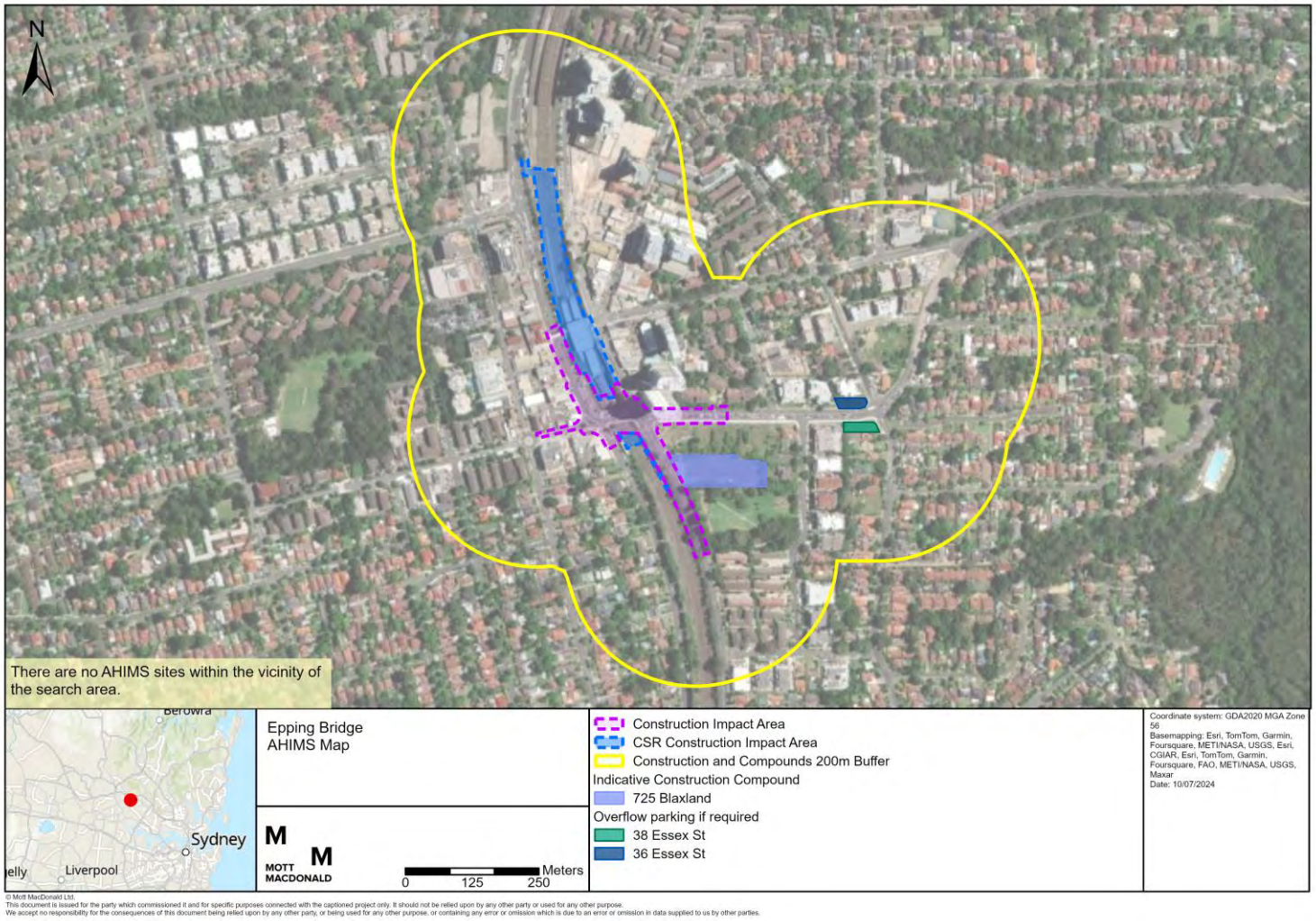

Figure 6-20 AHIMS Search - 200m buffer around the Proposal area

State Heritage Inventory (NSW)

A review of the State Heritage Inventory has identified three heritage items located within the boundary of the proposed construction impact area and compounds. A review of each of these listings has identified that they capture built heritage values and do not identify any specific Aboriginal cultural heritage values, places or objects.

The nearest Aboriginal Place (AP) is known as Moon Rock (Gazette No. 82) and is located approximately 15.5 kilometres to the north-east.

Summary

In total, a search of National, NSW and local heritage databases has identified that there are no Native Title Register and no National or Commonwealth heritage items that would be within or in the vicinity of the construction impact and compound areas.

6.4.3 Potential impacts

Construction

The construction impact and compound areas would not be located within the vicinity of landforms known to be associated with the potential to uncover Aboriginal objects or places. Further, there are no statutory registers that contain heritage listings with Aboriginal cultural heritage values within or in the vicinity of the construction impact area or compounds. An AHIMS search was undertaken on 21 March 2024 that included a 200-metre buffer around the site. This search returned no results.

A review of previous activities indicates that the construction impact area and construction compounds have undergone extensive landscape modification including timber felling, land clearing, market garden activities, main roads construction, residential development and cutting and filling to allow the construction of the main north railway line.

Given the above factors and the absence of recorded Aboriginal sites and places, the Proposal is not expected to impact any Aboriginal heritage objects or places and the archaeological potential of the area is low. Consequently, the Proposal is not anticipated to impact Aboriginal cultural heritage values.

Operation

Once in operation, there is no potential for the works to have further impact on Aboriginal cultural heritage values.

6.4.4 Mitigation measures

As it is not anticipated that Aboriginal objects or sites would be encountered during ground disturbance works, standard mitigation measures detailed in Section 7.2 would be followed to ensure correct management of Aboriginal heritage.

6.5 Non-Aboriginal heritage

6.5.1 Methodology

A *Statement of Heritage Impact* (SOHI) has been prepared for the Proposal (Mott MacDonald, 2023) to assess potential impacts of the Proposal on heritage items within the Proposal area. This section has been prepared in accordance with the principles and definitions as set out in the guidelines of *The Burra Charter: The International Council on Monuments and Sites ICOMAS Charter for Places of Cultural Significance* (ICOMAS, 2013), *Guidelines for preparing a statement of heritage impact* (2023) prepared by DPHI, and *Assessing Significance for Historical Archaeological Sites and 'Relics'* (Heritage NSW, 2009) published by the NSW Branch of the Department of Planning (now known as Heritage NSW).

This assessment includes a summary of impacts to non-Aboriginal heritage places both within and in the vicinity of the Proposal area, as identified in the findings of the *Epping Road Bridge Replacement Statement of Heritage Impact* (Mott MacDonald, 2023). The assessment also includes a review of historical archaeology, which is afforded blanket protection under the Relics provisions of the *Heritage Act 1977* (Heritage Act).

6.5.2 Existing environment

Listed heritage places

A search of historic heritage registers was undertaken to determine known historic heritage items in proximity to the construction impact and compound areas. This included a search of relevant state and federal statutory and non-statutory heritage registers:

- Commonwealth Heritage List
- National Heritage List
- State Heritage Register
- Parramatta LEP 2023
- Section 170 Heritage and Conservation Registers for:
    - Sydney Water
    - TAHE
    - Ausgrid
    - Department of Housing.
- Heritage Register of the NSW National Trust
- Register of Significant Buildings (Institute Architects)
- Engineering Heritage Register (Engineers Australia).

Heritage items located within and in the vicinity of the construction impact area and construction compounds can be seen in Figure 6-21 to Figure 6-24. Heritage listed items in and within the vicinity of the Proposal area are listed in Table 6-30.

Table 6-30 Listed heritage items in and within the vicinity of the Proposal area

Heritage Item	Address	Register	Place ID (Item No.)	Distance from the Proposal Area
Epping Railway Station Group	Beecroft Road, Epping	TAHE s170	4801911	Within the Proposal area
Epping/Eastwood Heritage Conservation area	Epping	Parramatta LEP 2023	-	Approximately 15 m from the Proposal area

Heritage Item	Address	Register	Place ID (Item No.)	Distance from the Proposal Area
Essex Street Conservation Area	Essex Street, Epping	Parramatta LEP 2023	-	Within the Proposal area
Forest Park	Blaxland Road, Epping	Paramatta LEP 2023	I071	Within the Proposal area
'Wurundjer'	Wurundjer' 42 Essex Street, Epping	Paramatta LEP 2023	I093	Approximately 15 m from Proposal area
'Asheldom'	47 Essex Street, Epping	Paramatta LEP 2023	I094	Approximately 15 m from compound

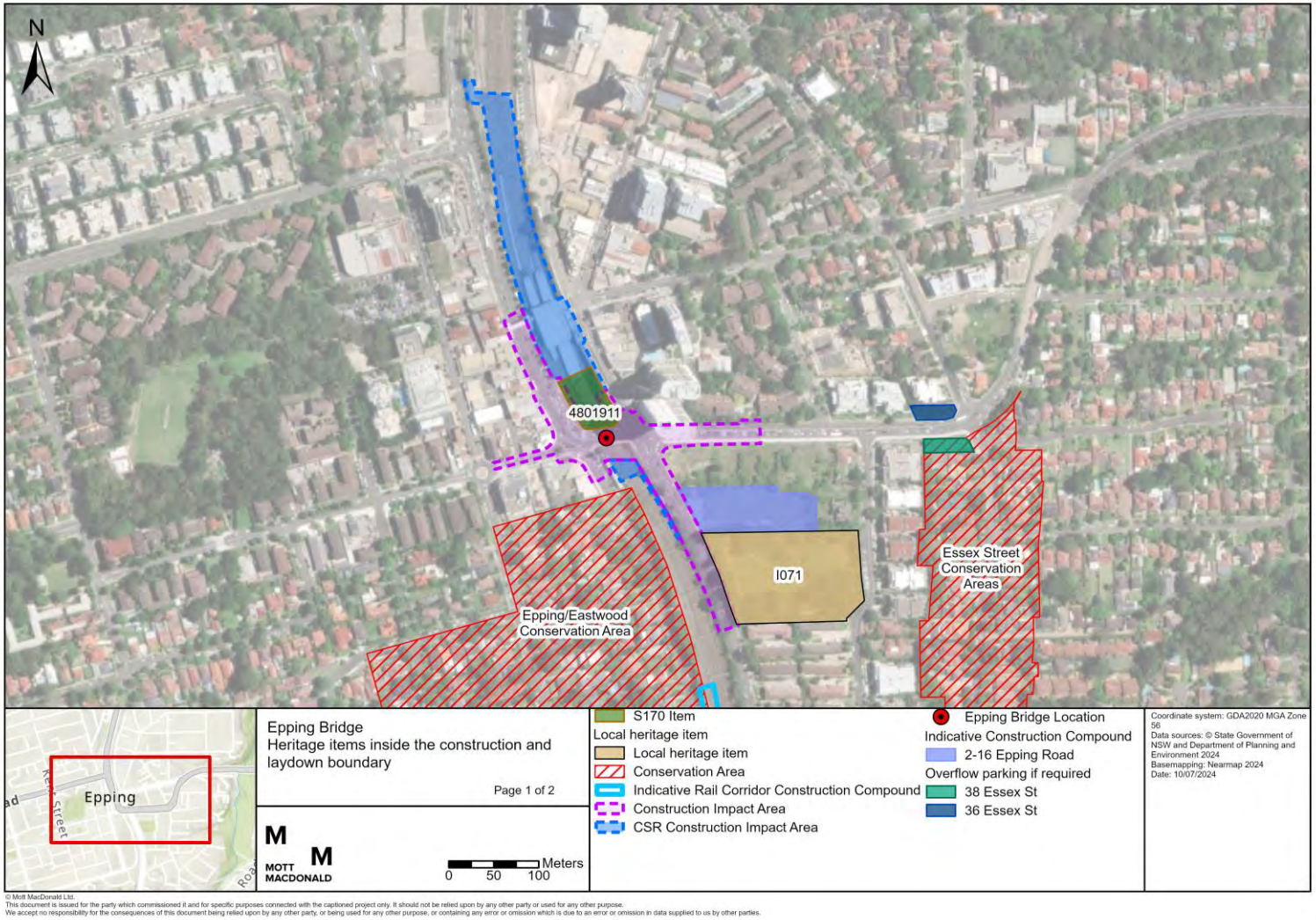

Figure 6-21 Heritage items inside the construction impact and compound areas

Figure 6-22 Heritage items inside the construction impact and compound areas

Figure 6-23 Heritage items in the vicinity of the in-corridor construction compound

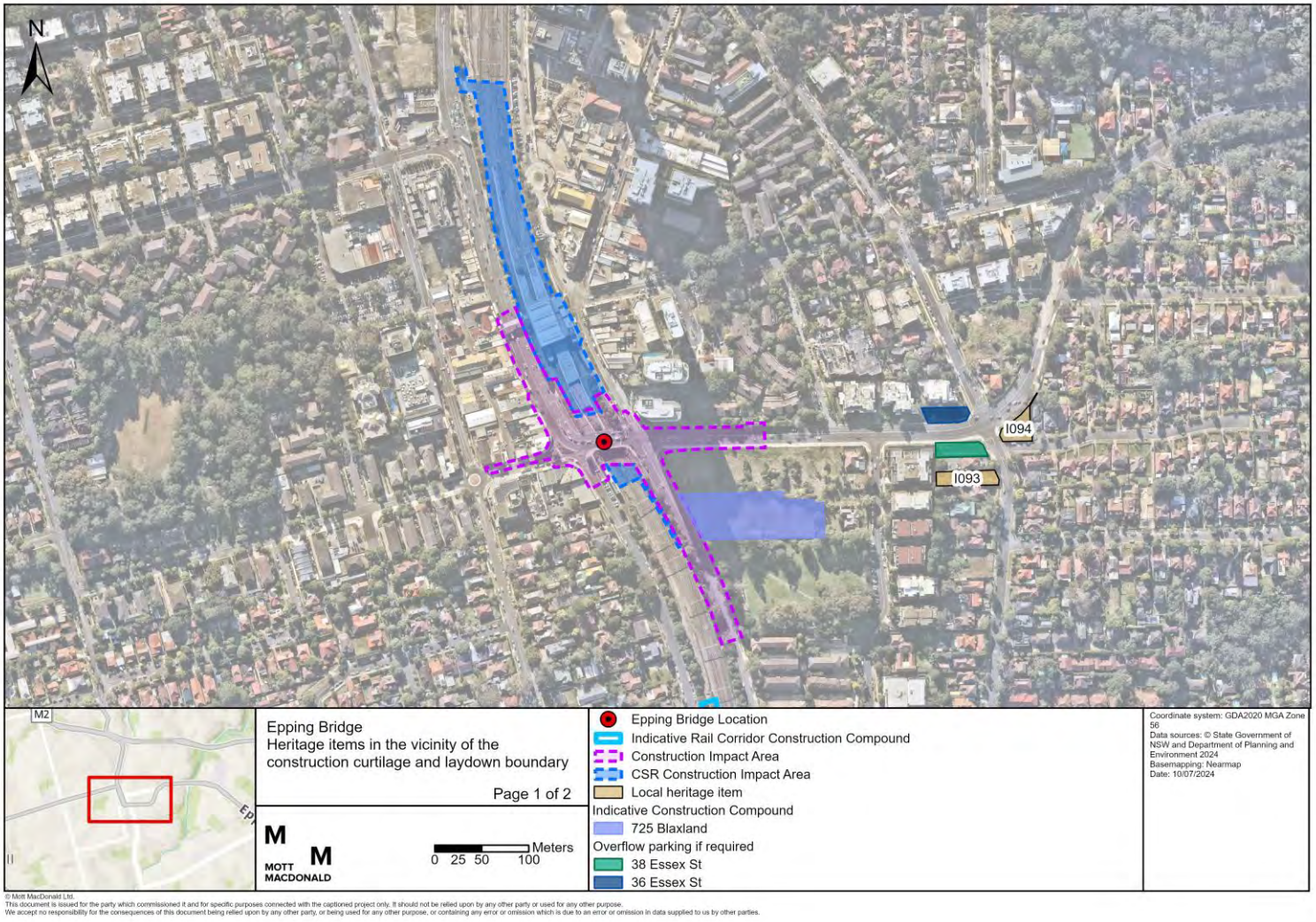

Figure 6-24 Heritage items in the vicinity of the construction impact and compound areas

6.5.3 Potential impacts

The activities associated with the works required for the Proposal are highly localised and represent the replacement of infrastructure in favour of modern equipment. These activities would have little to no impact on the heritage significance of the railway station, Forest Park, historical residences, or heritage conservation areas either inside or within the vicinity of the Proposal area. A summary of potential impacts on heritage items is presented in the Table 6-31 below.

Table 6-31 Summary of potential impacts on heritage items

Heritage Item and ID	Proximity to Proposal Area	Summary of heritage impacts
Epping Railway Station Group (Item No. 4801911)	Within the Proposal area	little to no physical impact minor setting impact moderate temporary impact
Epping/Eastwood Heritage Conservation Area (Item No. N/A)	Approximately 15 m from the Proposal area	little to no setting impact
Essex Street Conservation Area (Item No. N/A)	Within the Proposal area	little to no setting impact
Forest Park (Item No. I071)	Within the Proposal area	minor physical impact
'Wurundjer' (Item No. I093)	Approximately 15 m from Proposal area	little to no setting impact
'Asheldom' (Item No. I094)	Approximately 15 m from compound	little to no setting impact
Historical Archaeology	Within the construction area	no archaeological impact

A more detailed description of the potential impacts of the Proposal on heritage items is provided below.

Construction

Epping Railway Station Group

The new bridge deck would be wider and deeper, although would not appear larger than the bridge at present when viewed from the Epping Railway Station Group.

The bridge would also require new foundations on the western and eastern sides of its abutments. To allow this, part of the retaining wall that forms the cutting on the western side of Epping Station would need to be removed, along with the removal of the wingwall from that section of that cutting. The brick retaining wall, bridge wing walls, and bridge piers make a minor aesthetic contribution to the nineteenth century railway setting. Due to this, these features make a slight contribution to the significance of the Epping Railway Station Group but do not demonstrate any practices or technologies that were specific to the operations of the railways. Therefore, the loss of the fabric that is aesthetically sympathetic would result in a minor impact to the setting.

As detailed in Section 3.4.1, a temporary bridge construction platform is required over the southern end of Platform 1/2 at Epping Station to enable the construction of the new bridge. The insertion of concrete piles on either side of the platform would be vibration intensive and could have impacts on the heritage building on the platform. The platform would be located about one to two metres from the station building. However, this work area is not on the ground and would not generate vibration. The closest point of in-ground works is related to the concrete piles required for the temporary headstock. As shown Figure 6-19, piling would occur about 12 metres from the station building on the western side and about 13 metres on the eastern side.

The construction of the temporary bridge construction platform for the bridge deck in this location would also require partial closure of the southern section of the platform. The temporary bridge construction platform and the hoarding that would be required to secure the construction area would have temporary visual impacts on the station due to the views between the heritage station building and surrounding footpaths and buildings being obscured. A *Lophostemon confertus* (Brushbox) tree located on the platform would also be removed to enable the construction. The heritage significance of the tree has previously been investigated as part of the concept design and it has been identified that the planting has little to no heritage significance, although it does positively contribute to the presentation of the Epping Railway Station Group.

These works would result in a temporary moderate heritage impact to the Epping Railway Station Group. Additional mitigation measures have been included to control the monitoring and reporting process in the event of unexpected damage during construction.

Forest Park

The Proposal includes the regrading of Blaxland Road, and the replacement of the existing brick retaining wall on Forest Park in the same location but at revised levels. The primary heritage concern is the retention of trees within the Park as these contribute to the heritage significance of the listing.

The existing brick retaining wall along the western side of Forest Park is a minor contributory element that has an interwar style, which is historically concurrent with the planting of significant trees along the boundary. The loss of this fabric and form would have a minor impact on the heritage values of the park.

The Arboricultural Impact Assessment (Urban Arbor, 2023) prepared to assess the Proposal's impacts on trees found that significant trees along the Blaxland Road edge of Forest Park are able to be retained where root investigations and tree sensitive design are employed for the construction of the new retaining wall. These recommendations have been incorporated within the site specific mitigation measures for the Proposal.

Overall, the proposed works would have a minor physical impact to Forest Park and would have no substantial impact on its heritage values.

Epping/Eastwood Conservation Area

Works would take place in the vicinity of the Epping/Eastwood Conservation Area, as the heritage area is adjacent to the railway corridor and temporary construction compound on High Street. These works include the regrading and resurfacing of existing roads, tie-ins to the existing road network and the removal and re-establishment of planted median strips. The currently approved use of Epping Road as a high traffic area aligns with the Proposal's accommodation of additional vehicle traffic. The most notable roadway alterations would take place near commercial residences and do not present a meaningful alteration in the nature of the setting.

Overall, the works would result in little to no impact to the views and setting of the Epping/Eastwood Conservation Area.

Essex Street Conservation Area

The Essex Street Heritage Conservation Area covers the northern end of Essex Street and includes 36 Essex Street. This property has been identified as a potential construction compound, to be used for the storage of materials and vehicles during the construction of the Proposal.

In 2017 the dwelling located on the site was demolished and this lot has been vacant since that time. As the property would have all extraneous material removed and would be remediated to its current state following construction, its use as a potential temporary construction compound would have little to no impact on the Essex Street Conservation Area.

Wurundjer

Wurundjer is located two houses down from the proposed construction compound at 36 Essex Street This compound would be used as a secondary site for the storage of materials and vehicles. On completion of construction the area would have all unused materials removed and would be rehabilitated to its current condition as an open lot. As the use of 36 Essex Street as a construction compound would be temporary and a visual buffer is offered by adjoining houses, no impact to the heritage values of Wurundjer is expected.

Asheldom

Asheldom is located diagonally, across the Essex Street and Epping Road intersection, from the proposed construction compound at 36 Essex Street. This area would be used as a secondary site for the storage of materials and vehicles. On completion of construction the area would have all unused materials removed and would be rehabilitated to its current condition as an open lot. The use of this space and any associated impacts would be temporarily associated with the construction period and, as the property has high fences and is oriented away from Essex Street, would result in no impact on the heritage values of the residence.

Historical Archaeology

Archaeological impact during the construction phase was assessed to be minimal as the areas likely to be impacted are of low-to-nil archaeological potential. There is no potential in the compounds for encountering subsurface remains of archaeological significance based upon the layout of previous buildings and the extensive history of previous destructive development.

Due to the history of disturbance and development throughout the railway cutting, the likelihood of encountering relics or structures from early development is highly unlikely. A review of the historical archaeological potential has identified there is no potential for archaeological finds outside of twentieth century railway heritage which are not classified as relics under the *Heritage Act 1977*. Similarly, the compound areas show no archaeological potential due to the extensive history of development in the area. Overall, the proposed work would have no impact on archaeological value of the Proposal area including compounds.

Operation

Once the bridge is in operation, there is no potential for the works to have further impact on non-Aboriginal cultural heritage values.

6.5.4 Mitigation measures

The site specific recommendations proposed to mitigate potential impacts to heritage value that may result from the Proposal are presented in Table 6-32.

Table 6-32 Site specific non-Aboriginal heritage impact mitigation measures

No.	Mitigation measure	Responsibility	Timing
55	The location of heritage curtilages would be clearly shown on Environmental Control Maps (ECMs).	Contractor	Pre-construction
56	Stacking and storage would not take place on or against or within any heritage structures on both the Epping Railway Station Group and Forest Park. The movement of plant should be planned in accordance with Transport's T*emporary Works and Protection at heritage sites during construction Fact sheet* (EMF-HE-FS-0166). Appropriate fencing or barriers should be installed around (but not fixed to) heritage elements where	Contractor	Pre-construction / construction

No.	Mitigation measure	Responsibility	Timing
	construction processes come within close proximity to heritage elements.		
57	Any unexpected damage to any heritage elements associated with the Epping Railway Station Group or Forest Park Heritage Items would be reported to Transport's Project Manager. This reported unexpected damage would be documented and disclosed to Transport's Environment and Sustainability Representative.	Contractor / Transport Project Manager	Construction
58	To avoid damage to significant heritage plantings, the proposed retaining walls in proximity to Forest Park should adopt a design that is sensitive to surrounding tree roots as per the recommendations of the *Arboricultural Impact Assessment* Report 2023 prepared by Urban Arbor. The design of Blaxland Road should minimise level changes in proximity to Forest Park to retain the canopy of significant heritage plantings.	Contractor	Detailed design
59	Heritage Interpretation would be provided on construction hoarding and signage of the construction areas in proximity to heritage items. This is in order to mitigate temporary visual impacts to the Epping Railway Station Group and other items and should include the temporary bridge construction platform. Specialist Heritage Advice would be sought for heritage interpretation solutions on the hoarding, and integration with Transport's Community Engagement Plan for these works.	Contractor	Detailed design
60	Prior to works commencing, the construction contractor would undertake structural assessments of the station building and brick retaining wall on the western side of the rail corridor (Part of Station Building Listing) in order to determine the integrity and condition of these structures. Findings of these assessments must be used to determine safe working distances between plant and the structures, and this information would be incorporated into the noise and vibration management plan for the works. The vibration limits used to determine safe working distances would be based on the British Standard BS 7385:1993 for all structures which are considered sound by the inspection. Should the assessment find a structure to be of greater vulnerability to the impacts of construction vibration, due it's structural integrity, The German Standard DIN 4150 - Part 3 (2016) 'Vibration in buildings - Effects on Structures' (DIN 41503:2016) vibration limit of 2.5mm/s peak component particle velocity must be used to set the vibration limit for structures. Ways to mitigate vibration impacts should be considered, such as: • choosing alternative, lower impact equipment or methods where possible (bored piling, grip jacking or the use of a	Contractor	Pre-construction

No.	Mitigation measure	Responsibility	Timing
	hammer cushion if impact piling is unavoidable) • scheduling the use of multiple vibration-causing activities so that they do not occur at the same time • isolating the equipment causing the vibration on resilient dampening mounts where possible.		
61	The construction contractor must conduct vibration testing and monitoring, as per the Vibration Management Plan, both prior to and during vibration generating activities occurring during the construction process, to ensure that vibration limits set for each structure are not exceeded. The construction contractor must seek the advice of a heritage specialist on methods and locations for installing equipment used for vibration, movement and noise monitoring of heritage listed structures. In the event that the vibration testing and monitoring shows that the preferred values for vibration are likely to be exceeded, the construction contractor must review the construction methodology and where feasible and reasonable, implement additional mitigation measures. Should the screening vibration limits be exceeded during works, those works should cease and visual inspection to check for potential damage would be conducted. The contractor must then follow the steps above to review and implement additional mitigation measures. The effectiveness of additional mitigation measures would be monitored by a heritage specialist and any ongoing issues would be resolved in consultation with the heritage specialist and construction contractor.	Contractor	Pre-construction
62	The finishes of the bridge abutments and tie-in structures shall be detailed in the urban design and landscape plan (UDLP) to ensure that the new work is aesthetically appropriate for the nineteenth century railway setting	Contractor	Pre-construction

Refer to 7.2 for a full list of proposed mitigation measures.

6.6 Socio-economic

6.6.1 Existing environment

The Proposal is located within the southern end of the town centre, a highly urbanised and commercial environment within the local government area of City of Parramatta Council. The town centre is the commercial centre and public transport hub for the suburb of Epping and surrounding suburbs.

The town centre is an area of ongoing redevelopment as an Urban Activation Precinct, this is discussed in further detail in Section 2.1.1. Since the development of the Epping Activation Program in 2013 a strong housing market has seen the town centre experience unprecedented levels of redevelopment and growth. This includes exceeding the dwelling target of 3,560 dwellings by 2036 in 2018.

Population and demographics

A community profile for Epping was compiled and presented by .id (informed decisions). This material is a derivative of Australia Bureau of Statistics (ABS) census data of 2021. A summary of the community profile of Epping is provided below.

Population

The 2021 census data recorded the population of Epping as 29,704 residents from diverse backgrounds. With a high proportion of residents with Chinese, English and Australian heritage. The main family structure of Epping was families consisting of couples with children at 41.6%, which is above the average in Paramatta of 35.5%. This coincides with a reduction in the proportion of lone person households at 16.9% in Epping when compared to Parramatta as whole 21.5%.

Tenure and dwellings

Of the dwellings in Epping, 48.1% were high-density dwellings and 40.6% were separated houses. The most common tenure in Epping was privately rented dwellings (40%). Social housing renters were considerably lower at 1%.

Employment and mobility

The 2021 census data was collected during the Covid-19 pandemic, this is reflected in the employment and mobility data due to changes in the way people worked and continue to work. Therefore the 2016 data and the 2021 data for this section has been presented, as the current 2023 situation would sit somewhere in between these two data sets.

The employment data in the 2021 census was recognised as recording the highest number of employed away from work responses across Australia (ABS, 2022). This occurred as a result of the increased number of people who were employed but worked zero hours in the week prior to the census as a result of the Covid-19 pandemic. In addition, mobility data in the 2021 census was skewed towards people working from home due to the pandemic. It should be noted that working from home and hybrid working options are preferred by employers and employees (National Skills Commission, 2021) and it is considered unlikely that working from home data would return to low levels recorded pre-pandemic.

The 2016 census found that in Epping 46.7% of people used a private vehicle, 36.9% used public transport and 4.6% worked from home. The 2021 census found that in Epping 24.7% used a private vehicle, 8.2% used public transport and 52.5% worked from home. Analysis of the 2021 census data for car ownership shows 86.5% of households owned at least one car.

In 2021 the total proportion of Epping residents employed was 95.2%. This has increased from the 2016 census which was 94.1%. In 2021, an additional 1351 residents responded as participating in full time employment compared to 2016. However, the total proportion of full-time employment decreased from 60.3% in 2016 to 58.7% in 2021. This occurred due to the increase in the employed, away from work responses which increased from 3.7% to 10.2% in Epping.

Social infrastructure

The social infrastructure located in or adjacent to the Proposal area include health facilities, childcare facilities, places of worship, educational institutions, parks and open space and other community facilities, such as community centres, youth outreach centres and libraries. Local social infrastructure is mostly concentrated within the town centre to the north of Epping Road. A list of sensitive receptors is presented in Table 6-40.

6.6.2 Potential impacts

Construction

Access

The following access impacts have been identified:

- temporary lane closures on the bridge may result in increased traffic congestion and delays which may increase commuter travel time for motorists, cyclists and bus passengers travelling along Epping Road, Blaxland Road and Beecroft Road
- temporary partial road closures during construction may impact people travelling from the eastern side of the bridge requiring access to the town centre and businesses within close proximity to the bridge
- temporary closure of the footpath at the southern entrance of the bridge would impact pedestrian and cyclists access, however the northern side of the bridge would remain open to pedestrians
- the northbound bus stops on Beecroft Road may need to be relocated during construction works resulting in temporary short-term impact to bus passengers.

Section 6.1 includes further discussion about the potential traffic impacts of the Proposal.

Utility impacts

Services would require relocation (refer to Section 0) which has potential to cause temporary outages for local residences and businesses. A Utilities Management Plan (UMP) has been prepared by Australian Utilities Solutions as part of the concept design. The UMP discusses the provision of temporary utilities during the construction process which would be finalised in conjunction with the detailed design, construction staging and ongoing consultation with utility providers. The minimisation of utilities outages to the local community would be prioritised. The Proposal has potential to have temporary short-term impacts on the provision of utilities to the local community and businesses.

Business impacts

Businesses along Epping Road, Beecroft Road, Blaxland Road, Bridge Street, High Street and Langston Place have potential to be affected by the following temporary impacts:

- loss of business/income may occur if people avoid the area due to delays and inconvenience
- loss of business activity/income may occur during any downtime of utility services during utility relocation works
- footpath diversions may reduce customer access to businesses
- amenity impacts including noise, dust and vibration from construction activities
- reduced parking spaces for employees and customers.

During construction of the Proposal there would be an increase to noise and vibration during standard hours that may disrupt those working from home. Potential positive impacts on local businesses may occur during construction as the construction workforce would be likely to utilise local businesses for day-to-day needs.

Amenity

The properties in the immediate vicinity and adjacent to the works are likely to experience temporary amenity impacts including:

- increases in noise and vibration from construction activities
- visual impacts from construction activities

- minor increase in construction traffic
- potential light spill from night works
- potential dust disturbance.

There are a number of sensitive receivers located within 500 metres of the proposed works including several churches, several schools, a library and a retirement village, these have been listed in Table 6-40. Major impacts would be expected to affect residential receivers in close proximity to the work. Non-residential sensitive receivers may experience temporary minor noise impacts during construction. This is addressed further in (Section 6.3.3 and 6.11.2).

Operation

Access

The operation of the Proposal is anticipated to provide a range of benefits to the local community. The new shared path and installation of barriers to protect active transport users would improve accessibility and safety for motorists, pedestrians and cyclists within the town centre. The Proposal would improve travel time for both car and bus passengers travelling in a westbound direction with the addition of a new lane increasing the road capacity and reducing traffic congestion. Upgraded pedestrian facilities would improve access to public transport services and businesses within the area.

Parking

The Proposal would result in the permanent removal of 21 on-street parking spaces. The specific details of impacted parking spaces is presented in Table 6-33. However, parking surveys undertaken in January 2024 revealed that during peak weekday parking demand (11:30am), there were approximately 47 on-street, 36 off-street, and one to two accessible parking spaces available within 400 metres of Epping Station (Mott MacDonald, 2024b). There is adequate parking supply in the vicinity of the Proposal area to offset the losses.

Table 6-33 Parking impacts

Road	Location	Impact
Beecroft Road Southbound	South of Pedestrian overbridge	24 m of on street parking would be removed which is approximately 4 spaces
Beecroft Road Southbound	North of Pedestrian overbridge	50 m of on street parking would be removed which is approximately 8 spaces
Beecroft Road Northbound	North of Pedestrian overbridge	40 m of on street parking would be removed which is approximately 6 spaces
High Street Southbound	First three parks Southbound	First three car parks, one of which is an accessible space.

Community Values

The Proposal would have an indirect positive impact on community values as it would enable the ongoing regeneration of the area. This would encourage further investment by companies, promote the provision of jobs in the area and increase services and facilities for residents.

The widened road would have a visual impact which may impact negatively on the communities' values. The visual impact of the bridge has been assessed within the LCVIA (refer to Section 6.2.3) and would result in a low to moderate impact. These impacts would be mitigated in accordance with the relevant mitigation measures outlined in this REF.

Property acquisition

As discussed in Section 0 land acquisition is proposed to enable the construction and operation of the Proposal. To enable the project Transport is required to acquire 139 square metres of Lot 10 DP 1204058 and 7 square metres of SP16921. This land is located on the corner of Epping Road and Blaxland Road and allows the road and footpath to move slightly southeast to enable improved alignment of the new bridge, shared path and traffic lanes.

Property adjustment plans would be developed in consultation with the affected property owners. All land acquisitions would be conducted in accordance with the Transport Land Acquisition Policy and compensation would be based on the requirements of the *Land Acquisition (Just Terms) Compensation Act 1991.*

6.6.3 Mitigation measures

The mitigation of traffic and transport, urban design, landscape and visual amenity, noise and vibration and air quality would reduce many of the impacts identified in this chapter. For these mitigations measures refer to Sections 6.1.4, 6.2.4, 6.3.4 and 6.11.3.

In addition, the mitigation measures proposed to manage site specific socio-economic impacts that are not addressed in other sections are presented in Table 6-34.

Table 6-34 Site specific socio-economic impact mitigation measures

No.	Mitigation measure	Responsibility	Timing
69	Property adjustment plans would be developed in consultation with the affected property owners	Transport	Pre-construction
70	All land acquisitions would be conducted in accordance with Transport's Land Acquisition Policy and compensation would be based on the requirements of the *Land Acquisition (Just Terms) Compensation Act 1991*	Transport	Pre-construction
71	The recommendations of the connecting to Country consultation report would be incorporated into the detailed design for the Proposal wherever it is reasonable and feasible to do so. This would include incorporation of connecting with Country elements into the Urban Design and Landscape Plan.	Contractor	Detailed design

Refer to Section 7.2. for a full list of proposed mitigation measures.

6.7 Biodiversity

6.7.1 Methodology

An Arboricultural Impact Assessment (AIA) (Urban Arbor, 2023) was undertaken to assess the impact of the Proposal on trees. A Microbat Habitat Assessment (Narla Environmental, 2023) was completed to identify the potential for habitat for threatened microbat species to occur within the existing bridge. A desktop review of relevant database records (e.g. threatened flora and fauna species, populations and ecological communities, and weed profiles) and previous studies within the locality was undertaken to identify Commonwealth and State listed threatened species, populations and ecological communities.

6.7.2 Existing environment

Flora

The Proposal area is highly urbanised and existing vegetation includes planted native and exotic species. Planted vegetation comprises planted street trees, landscaped traffic islands, and planted road verges. In addition, gardens associated with residential strata buildings and trees within Forest Park are located adjacent to the Proposal area. Self-seeded weed species are located within the rail corridor. No remnant native vegetation has been identified within the Proposal area or the town centre.

The indicative rail corridor access and construction compound is comprised of typical rail corridor vegetation, including planted species, weeds and some remnant native vegetation. The area is one of a number of scattered patches of remnant bushland within the rail corridor that consist only of a few scattered native trees, mixed with planted and self seeded ornamental trees (such as Camphor Laurel). The location is identified as Blue Gum High Forest (BGHF) within the *Sydney Trains Blue Gum High Forest and Sydney Turpentine Ironbark Forest Management Plan, Main North Line and North Shore Line 2017* prepared by Niche Environment and Heritage. Further investigation of BGHF in this location would occur before establishment of the in-corridor compound.

Trees

A total of 83 trees are wholly or partially located within the Proposal area. A summary of these trees has been assessed in the AIA (Urban Arbor, 2023) report and can be seen in Figure 6-25 to Figure 6-29. A majority of the trees within the Proposal area were found to be in good overall health and condition consistent with their species, age class and growing environment. This excludes one dead tree, one tree in fair condition, and one tree in poor condition. The trees are not representative of any threatened species or endangered ecological community. No habitat hollows or cavities were observed within trees during the field survey.

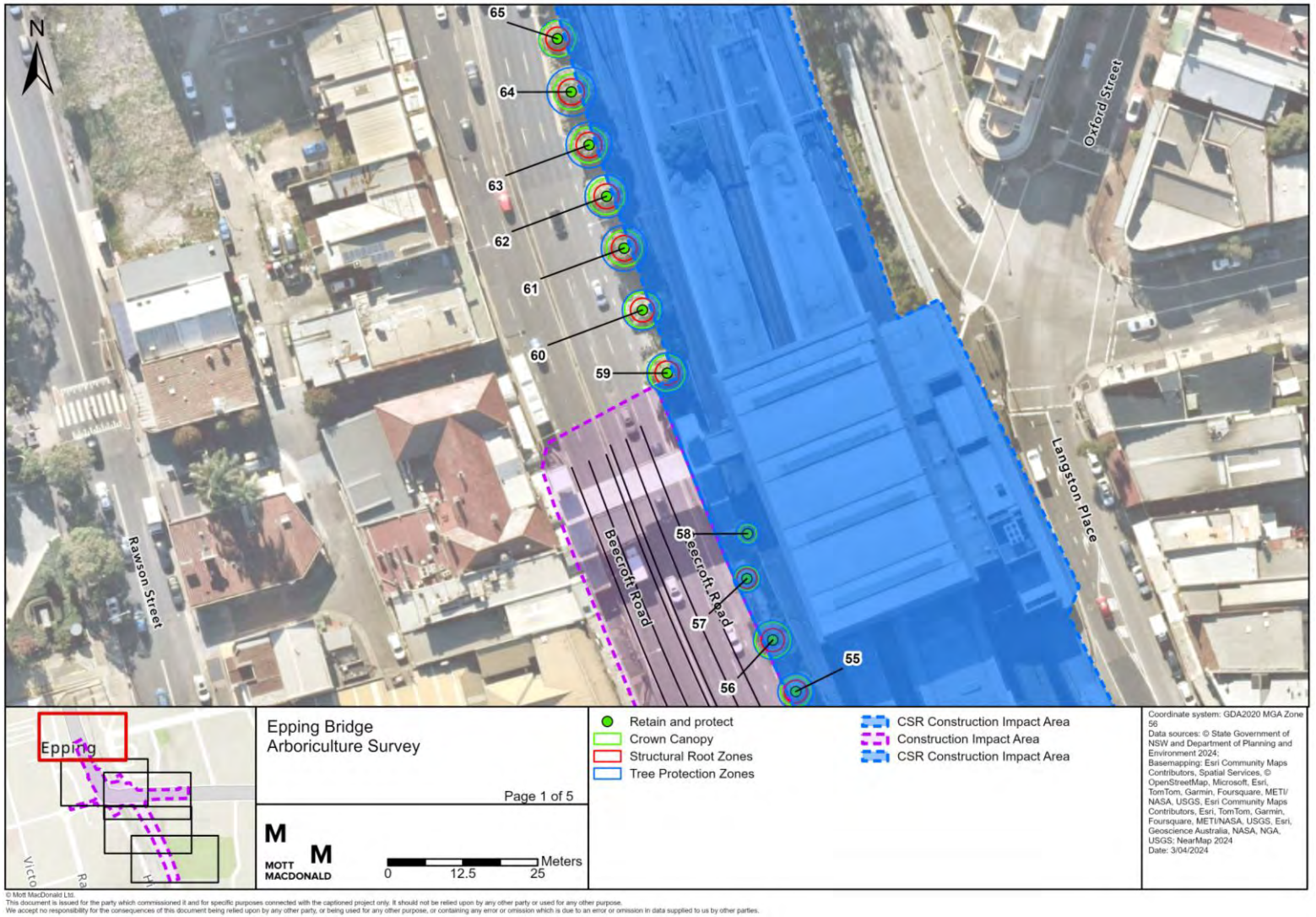

Figure 6-25 Tree locations along Beecroft Road within and in the vicinity of the construction impact area and CSR impact area

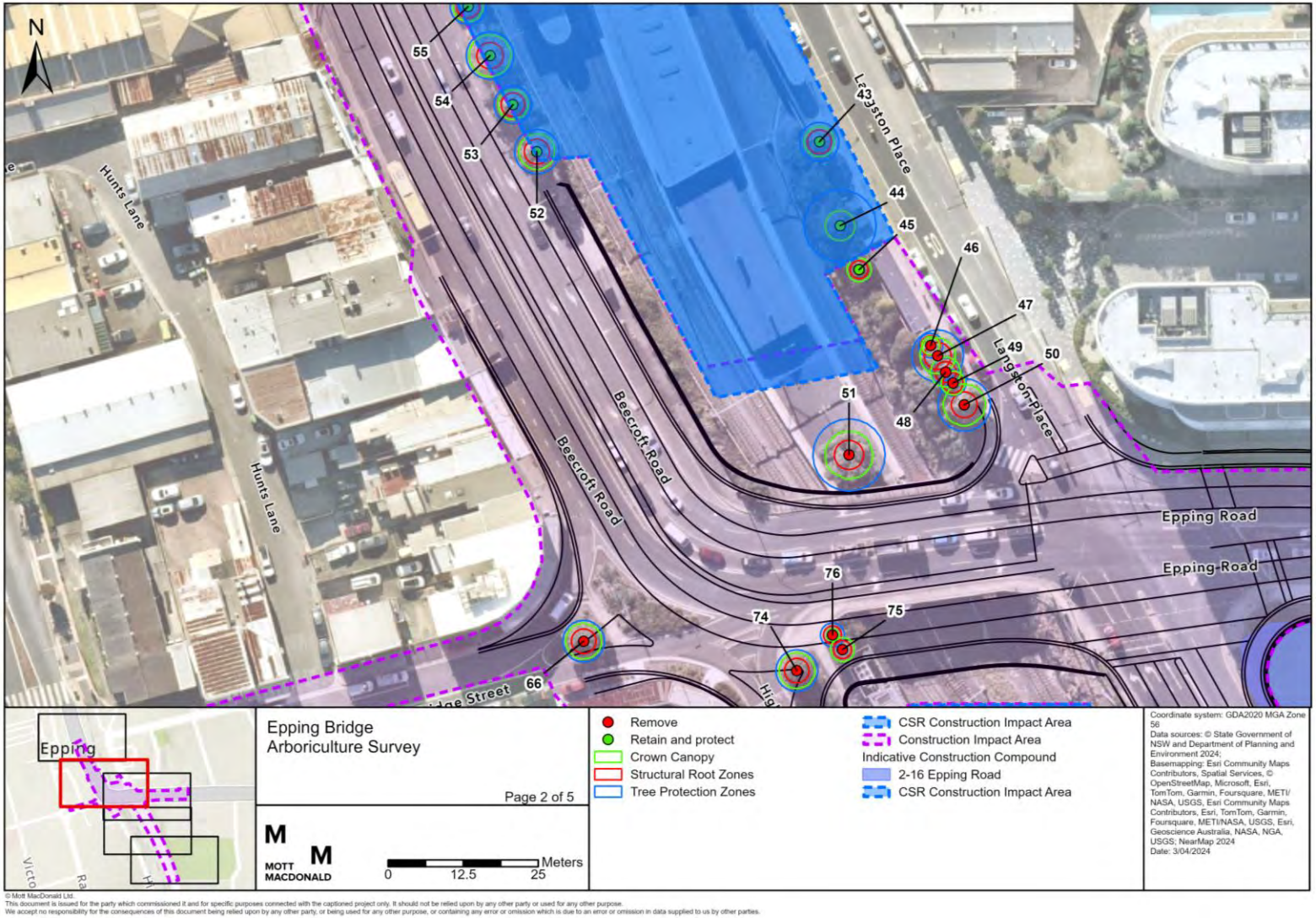

Figure 6-26 Tree locations along Langston Place, on the train station platform, Bridge Street, and High Street within and in the vicinity of the construction impact area and CSR impact area

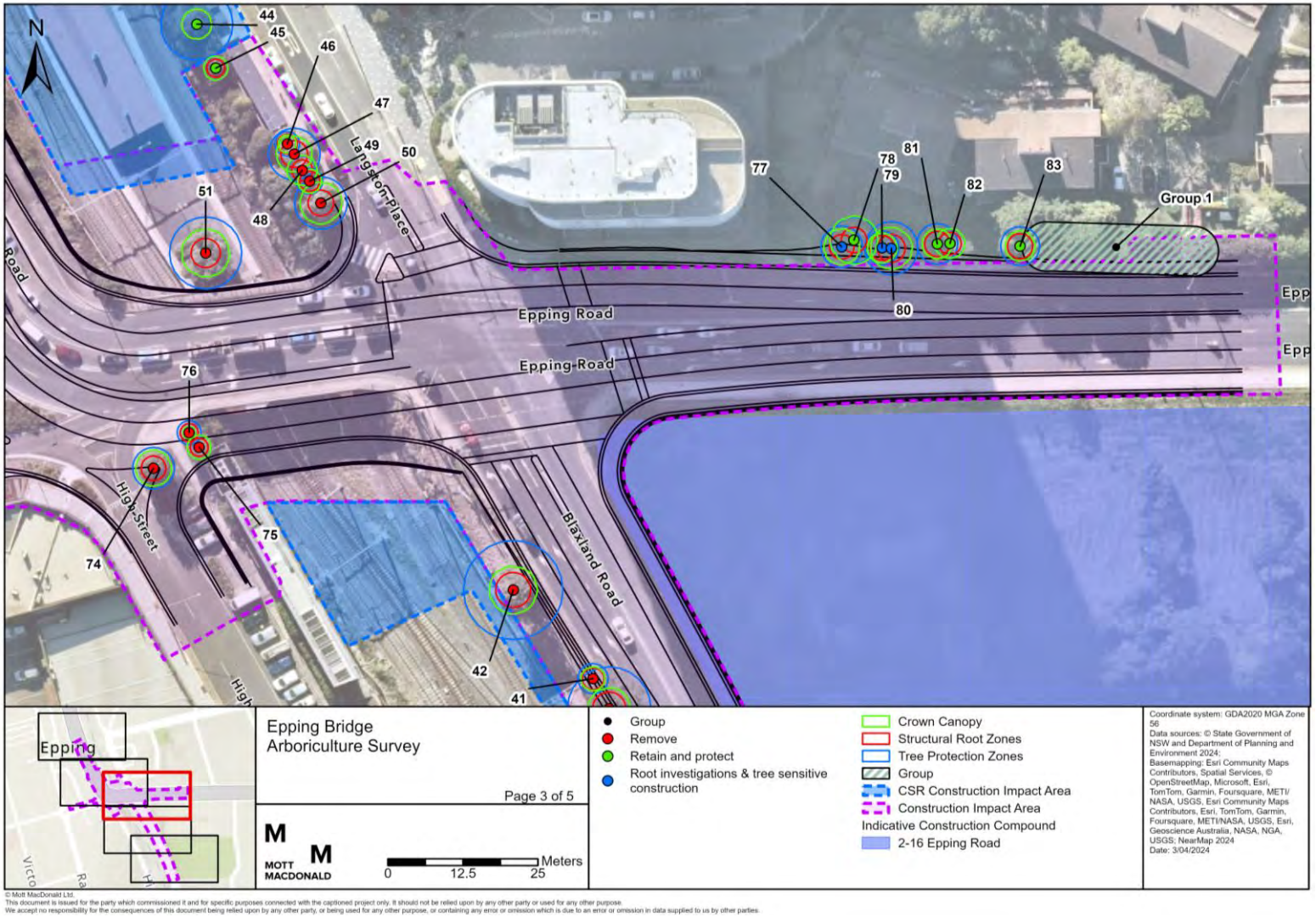

Figure 6-27 Tree locations along Blaxland Road, Langston Place, and Epping Road within and in the vicinity of the construction impact area and CSR impact area

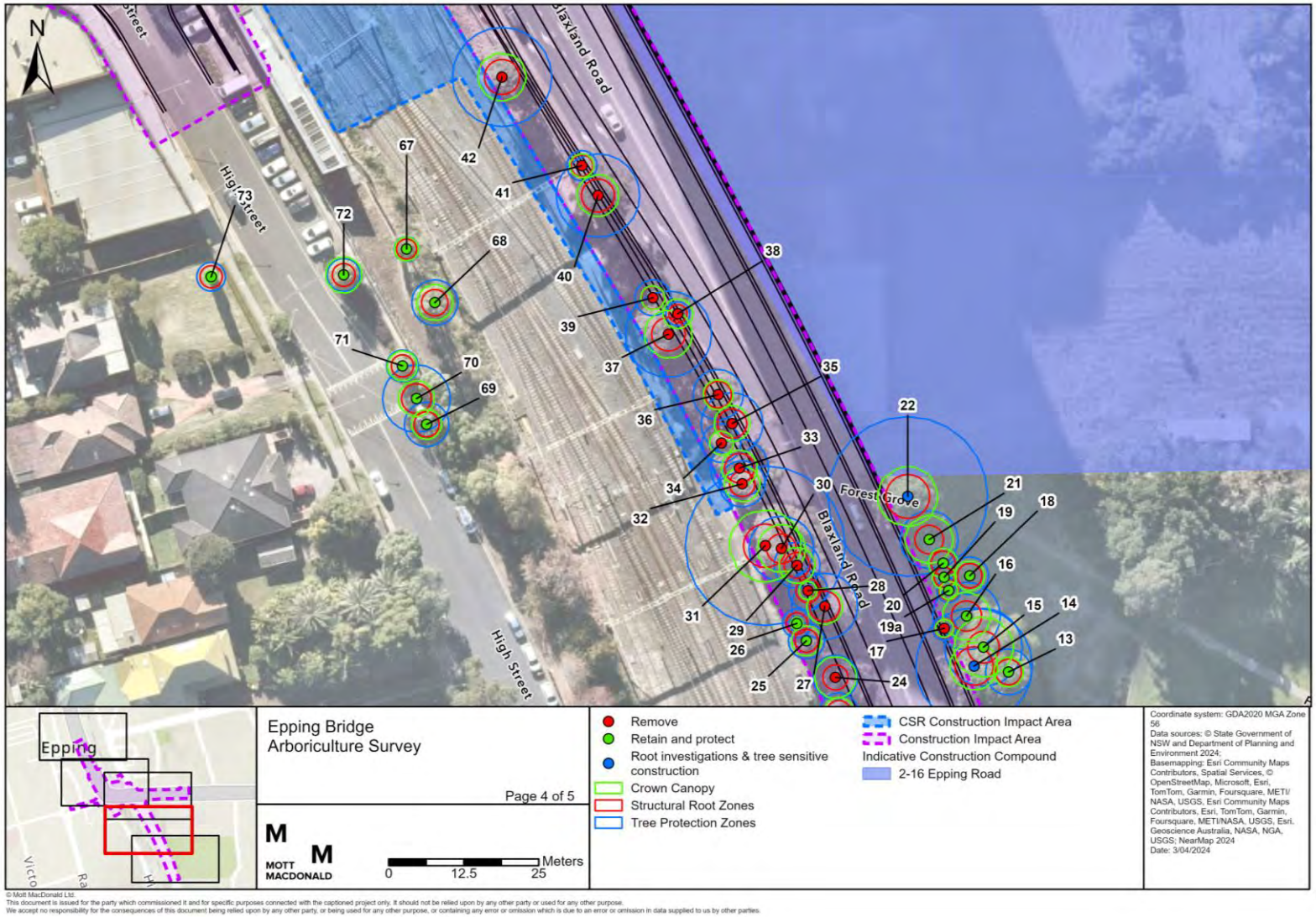

Figure 6-28 Tree locations along Blaxland Road, High Street, and Forest Park within and in the vicinity of the construction impact area and CSR impact area

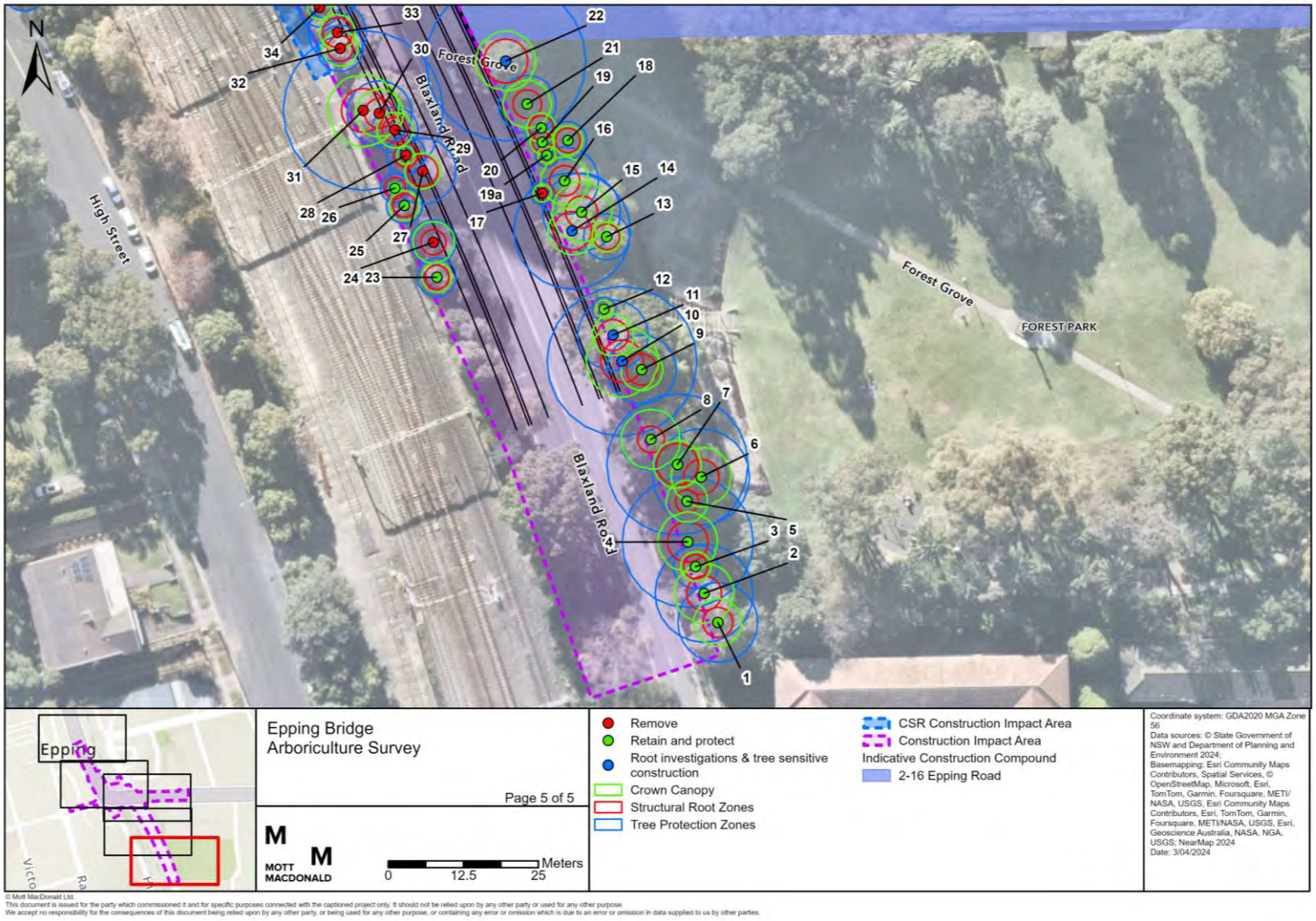

Figure 6-29 Tree locations along the southern extent of Blaxland Road and within Forest Park within and in the vicinity of the construction impact area and CSR impact area

Native plant community types

The State Vegetation Type Map (SVTM) does not identify any mapped remnant native plant community types (PCT) within the Proposal area, see Figure 6-30. This was verified on site.

The closest mapped remnant native PCT is located approximately 250 metres to the west of the Proposal within Boronia Park. This is mapped as PCT 3262 *Sydney Turpentine Ironbark Forest.* The next closest patch of remnant native PCT is located approximately 550 metres to the east, a finger of native vegetation that extends west from Dence Park. This is mapped as PCT 3262 *Sydney Turpentine Ironbark Forest* and PCT 3176 *Sydney Enrich Sandstone Moist Forest.*

As discussed above, there is potential for BGHF to be present within the indicative rail corridor access and construction compound location. Further investigation of BGHF in this location would occur before establishment of the in-corridor compound.

Threatened ecological communities

A search of the NSW BioNet Records and the Protected Matters Search Tool identified potential for nine threatened ecological communities listed under the *Biodiversity Conservation Act 2016* (BC Act) and/or the Australian Government *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to occur within the Proposal area. PCTs that have potential to conform to the listed entities are located throughout the wider locality, however none have been mapped within the Proposal area or identified during the field surveys.

As such no Endangered Ecological Communities (EECs) or Critically Endangered Ecological Communities (CEECs) are present within the Proposal area, nor would be impacted indirectly by the proposed works.

Threatened flora species

The NSW BioNet Records identified 18 threatened flora species listed under the BC Act as previously recorded or predicted to occur within five kilometres of the locality. Due to the Proposal being located in a highly modified urban/suburban environment it is considered to lack suitable habitat for threatened flora to occur within the Proposal area. There are no previous records of threatened flora species within the Proposal area (BioNet, 2023) and no threatened flora species were observed during field surveys.

Ground water dependent ecosystems

The Atlas of Groundwater Dependant Ecosystems (BoM, 2023) shows no information within the Proposal area and Epping. This indicates that there is low potential for groundwater dependant ecosystems to be present within the study area.

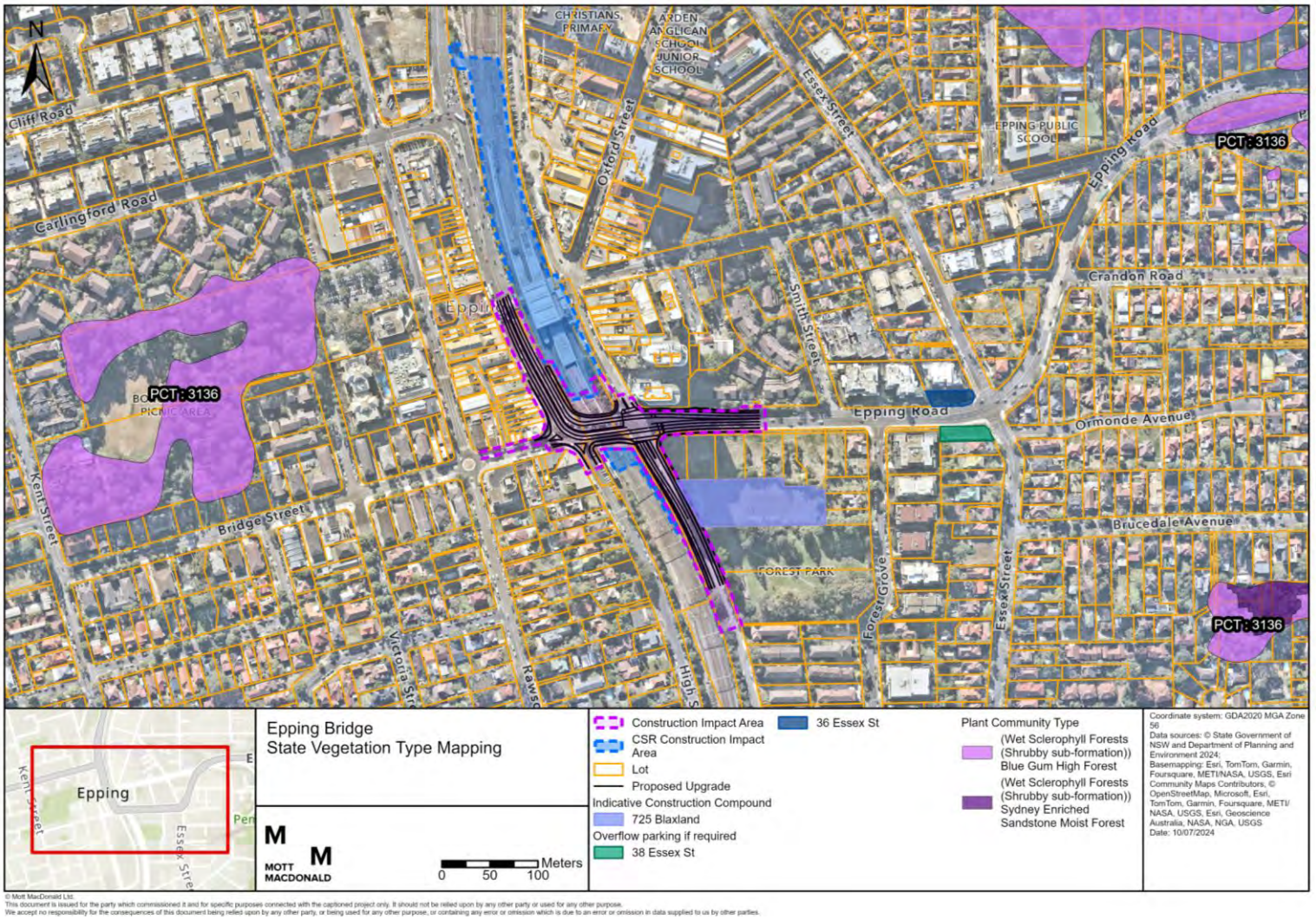

Figure 6-30 State vegetation type mapping

Threatened fauna species

The NSW BioNet Records identified 28 threatened fauna species listed under the BC Act and/or EPBC Act as previously recorded or predicted to occur within 5 kilometres of the locality (BioNet, 2023). The highly modified urban/suburban environment of the Proposal area is considered to limit suitable habitat for threatened fauna to occur within the Proposal area, except for the existing bridge that has potential threatened microbat habitat features such as:

- crevices, crack and holes
- concrete or metal cavities
- grab holes in culverts and bridge decking and girders
- expansion joints
- concrete abutments
- roughened exposed areas and uneven surfaces including closure pours and the space between concrete girders and diaphragms under bridges.

Database searches found records of the following species within the locality:

- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle)
- *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat)
- Miniopterus orianae oceanensis (Large Bent-winged Bat)
- *Miniopterus australis* (Little Bent-winged Bat)
- *Myotis macropus* (Southern Myotis).

It should be noted that there was one record for *Miniopterus orianae oceanensis* (Large Bent-winged Bat) 2015 at Epping Station, directly adjacent to the Proposal.

Microbat Habitat Assessment

Due to the potential for habitat features, a *Microbat Habitat Assessment* (Narla, 2023) was prepared in accordance with Transport's Microbat Management Guidelines (Transport, 2023e).

A roost survey was undertaken on 5 August 2023. The site was surveyed for potential habitat features and any identified features were subject to a thorough inspection. The ecologist summarised that the bridge does not present cracks and crevices that were deep enough or suitable for microbat use. Potential roost locations were identified within the bridge, primarily located where pipes or utilities entered into the bridge via holes in the concrete. No evidence of microbats was observed within potential roosting habitat. As such, no further assessment of microbats should be required as threatened microbat species are considered unlikely to utilise the Proposal area for habitat (Narla Environmental, 2023).

Weeds

Twelve weed species were identified within the Proposal area, with three of those identified as Weeds of National Significance (WoNS). These species require specific objectives for their management and removal in accordance with their biosecurity duty. Table 6-35 presents these species and their status under the NSW *Biosecurity Act 2015.*

Table 6-35 Priority weeds and WoNS within the Proposal area

Family	Scientific Name	Common Name	Biosecurity Act Status	WoNS
Asparagaceae	*Asparagus aethiopicus*	Asparagus Fern	SP	Yes
Asteraceae	*Senecio madagascariensis*	Fireweed	SP	Yes
Crassulaceae	*Bryophyllum delagoense*	Mother of Millions	OWRC	No
Lauraceae	*Cinnamomum camphora*	Camphor Laurel	OWRC	No
Malaceae	*Cotoneaster glaucophyllus*	Cotoneaster	OWRC	No
Ochnaceae	*Ochna serrulata*	Mickey Mouse Plant	OWRC	No
Oleaceae	*Ligustrum lucidum*	Large-leaved Privet	OWRC	No
Oleaceae	*Olea europaea subsp. Cuspidata*	African Olive	RP	No
Poaceae	*Eragrostis curvula*	African Lovegrass	OWRC	No
Ulmaceae	*Ulmus parvifolia*	Chinese Elm	OWRC	No
Ulmaceae	*Celtis sinensis*	Chinese Celtis	OWRC	No
Verbenaceae	*Lantana camara*	Lantana	SP	Yes

Note: OWRC = Other Weeds of Regional Concern, SP = State Priority, RP = Regional Priority

6.7.3 Potential impacts

Construction

Native vegetation removal

The Proposal would not have a significant impact upon biodiversity values of the Proposal area and surrounding locality as impacts are affecting small, fragmented areas of planted native/exotic vegetation that do not have high habitat value. No native PCTs (and as such no EECs and/or CEECs) are present within the construction impact area or the proposed construction compounds. Work within these areas would require removal of some planted native/exotic vegetation to enable construction within the rail corridor, on the station platform, along the rail corridor side of Blaxland Road, Langston Place, and High Street. This removal includes native trees identified for removal in the AIA and is discussed below. In addition, work within these areas is unlikely to impact endemic species in the soil seedbank within the area. Given the extensive agricultural, suburban and urban development in the locality over the past century, endemic species seed are expected to be depleted or have limited germination ability.

However, the location of the indicative rail corridor access and construction compound has potential to contain native PCTs that correspond with the BGHF CEEC. Further investigation of BGHF in this location would occur before establishment of the in-corridor compound. The establishment of the compound would avoid any impacts to identified BGHF. Therefore, no remnant native vegetation would be impacted by the Proposal.

Tree impacts

Transport would avoid tree removal wherever possible. Trees that would require removal are located within areas where construction is proposed. In some circumstances, there is a potential that tree roots may be substantially impacted by the encroachment of construction work into Tree Protection Zones (TPZ). This could impact the long-term stability and condition of the tree, which may lead to tree removal. Further information in relation to trees, including the species, their importance and any anticipated impact, is available in the AIA.

There are 28 trees within the Proposal area that would require removal as the work would result in a major encroachment into their TPZ, with likely long-term impacts to the tree's health, or in some circumstances their existing poor condition causes sensitivity to minor encroachment.

Sixty trees within or in the vicinity of the Proposal area are identified for retention and would not be impacted by the Proposal. Of the sixty trees, seven that are located within Forest Park, adjacent to the eastern edge of Blaxland Road would require root investigations and tree sensitive construction during the detail design process to ensure their retention. These trees are considered important to the visual and heritage character of the park. The information from the root investigation would be utilised to design tree sensitive retaining wall footings for the replacement wall on Blaxland Road. The design of Blaxland Road should minimise level changes in proximity to Forest Park to retain the canopy of significant heritage plantings (mitigation measure 58).

Of the sixty trees to be retained, there is a group of approximately four trees identified on the north-eastern extent of the construction impact area on Epping Road (see Figure 6-27) that were identified to be of mixed species and were not surveyed individually due to inaccessibility. These trees are anticipated to be able to be retained and this would be confirmed through non-destructive root investigation undertaken as part of detailed design.

All trees removed as part of the Proposal would be offset in accordance with Transport's *Tree and Hollow Replacement Guidelines* (Transport, 2023h).

Table 6-36 presents a summary of all trees to be impacted and retained by the Proposal.

Table 6-36 Trees to be impacted and retained by the Proposal

Impact	Reason	Total	Impacted Species
Trees identified for removal	Impacted by work and/or in close proximity to work, or trees in poor condition.	**28 Trees** Category AA: 1 Category A: 15 Category Z: 12	*Acacia implexa, Acacia parramattensis, Casuarina cunninghamiana, Celtis sinensis, Cinnamomum camphora, Elaeocarpus reticulatus, Eucalyptus sideroxylon, Grevillea robusta, Jacaranda mimosifolia, Ligustrum lucidum, Lophostemon confertus*

Impact	Reason	Total	Impacted Species
Trees requiring non-destructive root investigations and tree sensitive construction – to be retained	Excavations and retaining wall construction may impact the viability of the trees.	**7 trees and 1 group**[4] Category AA: 2 Category A: 5 trees, 1 group Category Z: 0	*Araucaria bidwillii, Araucaria cunninghamii, Brachychiton acerifolius, Grevillea robusta, Waterhousea floribunda,* Mixed species group (*Pittosporum tenuifolium, Murraya paniculata, Castanospermum australe and Syzygium paniculatum*)
Trees to be retained	Limited construction activities occurring in proximity to the trees which would not impact the viability of the trees.	**49 trees** Category AA: 2 Category A: 36 Category Z: 11	*Acmena smithii, Araucaria bidwillii, Banksia integrifolia, Brachychiton acerifolius, Callistemon citrinus, Cinnamomum camphora, Cupressus sempervirens, Ficus rubiginosa, Grevillea robusta, Jacaranda mimosifolia, Lophostemon confertus, Melia azedarach, Pittosporum undulatum, Stenocarpus sinuatus, Syzygium paniculatum, Ulmus parvifolia, Waterhousea floribunda*

Note: AA = Large and exceptional trees, A = Important tree suitable for retention, Z = unimportant trees not worthy of being a material constraint (Tree AZ Categories).

Mitigation measures have been provided within Section 6.7.4 to ensure the retention of trees during construction.

Habitat removal and fragmentation

The Proposal is located in an ecologically degraded urban environment, surrounded by fragmented habitat throughout the wider locality.

The Proposal would result in the removal of some native and exotic vegetation which has minimal potential to be utilised as foraging habitat by threatened fauna species. Additionally, no tree hollows, drays or nests that would indicate that the Proposal area is suitable roosting or breeding habitat were identified.

Fauna

Construction activities have potential to impact fauna that may be using shrubbery or other non-native habitat features within the Proposal area. Species most likely to be affected are small reptiles. These species are widespread and

[4] A group of approximately four trees were identified on the north-eastern extent of the construction impact area on Epping Road, see Figure 6-27. The trees were identified to be of mixed species and were not surveyed individually due to inaccessibility and the protection of landscaped gardens on private property. These trees are anticipated to be able to be retained however during detailed design it should be confirmed that trees can be retained.

abundant and therefore any potential losses of individuals are unlikely to impact upon any ecologically significant local populations.

Highly mobile fauna, such as common native birds species, are unlikely to be affected by construction activities as noise impacts would divert the birds to other foraging habitat in the locality at Forest Park, Boronia Park or Dence Park.

Mitigation measures are provided in Section 6.7.4 to further reduce the potential impacts on native fauna during construction.

Introduction and spread of weeds

Construction activities have the potential to bring new weed species and pathogens onto site through the use of dirty plant and tools. Cleared areas and exposed soils are vulnerable to early colonisation of weeds. It should be noted that the Proposal is unlikely to result in the introduction or spread of weeds given the highly modified urban context of the locality, the absence of intact native vegetation and the existing levels of infestation by exotic species.

Due to the weedy nature of the Proposal area there is potential that construction activities could transport weeds from the site to other locations. Mitigation measures are provided in Section 6.7.4 to manage the potential for weeds to be transported to and from the site.

Operation

The Proposal is located within a highly modified urban context and provides very limited habitat value. The operation of the proposal would be similar to the existing environment and would not significantly change the potential for collisions between vehicles and fauna to occur.

Landscaping would be implemented after construction which has potential to provide marginal foraging habitat for threatened species and common native species. Details of this is provided in Section 6.2.4 of this REF.

Conclusion on significance of impacts

Due to no remnant native vegetation occurring within the Proposal area and the microbat habitat assessment finding no evidence of threatened microbat species, it is considered that the Proposal does not provide habitat for threatened species listed under the BC Act and EPBC Act (Narla Environmental, 2023). Therefore, no test of significance, in accordance with Section 7.3 of the BC Act has been undertaken and no assessments of significance under the EPBC Act is required (DCCEEW, 2023).

6.7.4 Mitigation measures

Although there is limited biodiversity value within the Proposal area and the surrounding locality a range of mitigation measures are to be implemented during construction.

Recommended site-specific mitigation measures for vegetation clearing and potential impacts to trees are presented in Table 6-37.

Table 6-37 Site specific biodiversity impact mitigation measures

No.	Mitigation measure	Responsibility	Timing
78	Non-destructive root investigations would be undertaken to determine the impact of the proposed works to the root systems of the seven (7) trees and one (1) group of trees namely: 10, 11, 14, 22, 77, 79, 80 and G1. Tree sensitive construction methods may be required pending on the findings of the root investigations. See the AIA for information regarding	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
	root system works and tree sensitive construction techniques.		
79	A detailed tree management plan (TMP) is to be prepared in accordance with AS4970-2009 and developed in combination with the overall construction management plan for the site. The TMP should be prepared by a consulting Arborist with a minimum Australian Qualifications Framework (AQF) level 5 qualification.	Contractor	Detailed design
80	Prior to any works commencing at the site a Project Arborist should be appointed. The Project Arborist should be qualified to a minimum AQF level 5 and/or equivalent qualifications and experience and should assist with any development issues relating to trees that may arise. If at any time it is not feasible to undertake works in accordance with this, an alternative must be agreed in writing with the Project Arborist.	Contractor	Pre-construction
81	All tree work should be carried out by a qualified and experienced Arborist with a minimum of AQF level 3 in arboriculture, in accordance with NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and AS4373 Pruning of amenity trees (2007).	Contractor	Construction
82	Work undertaken within a tree protection zone is to be supervised by a qualified and experienced Arborist with a minimum of Australian Qualifications Framework (AQF) level 3 in arboriculture..	Contractor	Construction
83	In accordance with AS4970-2009, the Project Arborist would carry out regular site inspections to ensure works are carried out in accordance with this document throughout the development process. Site inspections are recommended on a monthly frequency throughout the development.	Contractor	Construction
84	Where possible, underground services would be located outside the TPZ of retained trees via sensitive techniques in accordance with recommendations from AS4970-2009.	Contractor	Detailed design / Construction
85	In the event that any microbats are observed during construction, an Unexpected Threatened Species Finds Procedure would be followed. Subsequently, a Microbat Management Plan (MMP) would be prepared.	Contractor	Construction
86	If a habitat feature, such as a nest, is identified during clearing, works would stop in the vicinity and an ecologist would be called to safely remove and relocate the fauna.	Contractor	Construction
87	An ecology assessment must be undertaken of the indicative area proposed to be used for rail corridor access and an in-corridor construction compound. The assessment must identify all ecology values within this area including BGHF. Materials storage/laydown activities shall not occur within BGHF or impact any ecology values, as identified within the ecology report. Exclusion areas must be established and maintained to	Transport/Contractor	Pre and during construction

No.	Mitigation measure	Responsibility	Timing
	protect BGHF and any other ecological values. Recommendations of the ecology report are to be implemented and incorporated within the CEMP.		

For a full list of mitigation measures, refer to Section 7.2.

To offset the 28 trees proposed to be impacted by the works, a minimum of 128 trees would need to be planted. This replacement value was calculated in accordance with the *Transport's Tree and hollow replacement guidelines* (Transport, 2023h). Other standard mitigation measures to address biodiversity impacts are identified in section 7.2.

6.8 Landform, geology and soils

6.8.1 Existing environment

The bridge is located on a high point in a locality that has a gently undulating topography. The Proposal area is located at approximately 100 metres above sea level and has a slight slope down to the northwest and southeast. The rail corridor at the bridge location is within a cutting and walls rise on either side to High Street to the west of the rail corridor and Blaxland Road to the east.

A desktop review of the *Soils Landscapes of Sydney 1:100,000 Sheet* (DPE, 2020b) indicates that the Proposal area is located on the Glenorie soil landscape. The geology of the Glenorie soil landscape is characterised by undulating to rolling low hills on Wianamatta Group shales. This group contains the Bringelly shale, the Minchinbury sandstone, and Ashfield shale.

The Glenorie soil landscape is characterised as shallow to moderately deep red with brown podzolic soils on crests; moderately deep red and brown podzolic soils on upper slopes; deep yellow podzolic soils on lower slopes and gleyed podzolic soils along drainage lines. Soil is limited by low wetting strength, very strong acidity and high aluminium toxicity and makes the overall landscape limited by high erosion hazard, local seasonal water logging and a moderate surface swelling potential (DPE, 2020b).

Geotechnical investigations were undertaken during the concept design. Investigations found geological variability across the site, and specifically variable rock mass quality with potential impacts on excavatibility and constructed pile lengths (Mott MacDonald, 2024). Further investigations are recommended to support the development of the detailed design.

A Preliminary Site Investigation (PSI) and Detailed Site Investigation (DSI) contamination assessments, were undertaken in the preparation of this REF. More detail in relation to this is provided in Section 6.9.

6.8.2 Potential impacts

Construction

The Proposal is located within the existing road and rail corridor and would increase the height of the bridge between one metre to two metres with the road level being built up by approximately one metre to meet the required grade in accordance with relevant standards. This would require earthworks to construct new retaining walls, including:

- one wall on the southside of Epping Road approaching the bridge for approximately 40 metres
- walls on both the eastern and western side of Blaxland Road approaching the bridge for approximately 50 metres
- walls on both the eastern and western side of Beecroft Road approaching the bridge for approximately 30 metres.

The construction of the above retaining walls would temporarily alter the topography during construction. On completion, the retaining walls would support a similar topography to the existing environment, with the only noticeable change being the increased high point in relation to the bridge.

Minor earthworks would be required for the regrading of roads, footpaths, bridge structures, piling and fences.

Drainage details are discussed in further detail in Section 6.10.

Construction of the Proposal would have potential to cause erosion and sediment impacts to the surrounding environment, including temporary:

- impacts to water quality in the local stormwater network and receiving watercourses
- blockages of stormwater inlets and drains
- tracking of dirt and mud on local road networks
- dust generation in windy dry weather
- destabilisation of surrounding infrastructure, cuttings and embankments.

In addition, if chemical spills during the refuelling of plant, leaks from poorly maintained plant and storage of chemicals were to occur during construction, this would have the potential to cause the contamination of soil within the Proposal area. Mitigation measures provided in Section 6.8.3 would manage and mitigate potential impacts associated to soil, erosion and sedimentation to an appropriate level.

Operation

At the completion of the Proposal, disturbed areas of the site would be landscaped and stabilised and therefore the operation of the Proposal would be unlikely to result in any direct impacts on soils, landscape and geology.

The increased height of the bridge between one metre to two metres requires the road level to be built up by approximately one metre to meet the required grade in accordance with relevant standards. This increase in height would alter the local topography, however this change is considered minor as it is an increase of the existing high point.

6.8.3 Mitigation measures

The mitigation measures that would be implemented during construction of the Proposal to mitigate and manage potential soil and erosion impacts are presented in Table 6-38.

Table 6-38 Site specific landform, geology, and soil impact mitigation measures

No.	Mitigation measure	Responsibility	Timing
94	The existing drainage systems would remain operational throughout construction and the erosion and sediment control plan (ESCP) would take this into consideration during the design and implementation of control measures.	Contractor	Construction
95	Exposed soils would be stabilised, surfaces reinstated and landscaping completed as soon as practicable after construction. Temporary erosion and sediment control shall remain in place until permanent stabilisation methods are implemented.	Contractor	Post-construction

Standard mitigation measures would also be implemented during construction of the Proposal and would include measures to mitigate and manage potential chemical spills. Refer to Section 7.2 for a full list of proposed mitigation measures for chemical spills and soil and erosion impacts.

6.9 Contamination

6.9.1 Methodology

A preliminary site investigation (PSI) contamination assessment was prepared by Nation Partners (Nation Partners, 2023) to identify potential sources of contamination as a result of current or historical activities, and to inform the scope of further contamination investigations. The assessment identified potential for contamination to occur, as such Transport elected to undertake a detailed site investigation (DSI).

A DSI contamination assessment (JK Environments, 2024) was prepared to make an assessment of site contamination in relation to the Proposal. The following tasks were undertaken:

- review of site information, including background and site history information
- preparation of a conceptual site model
- design and implementation of a sampling, analysis and quality plan
- interpretation of the analytical results against the adopted Site Assessment Criteria (SAC)
- data quality assessment.

In addition, the findings of a DSI for a residential development at 2-16 Epping Road by JK Environments (JK Environments, 2020) have also been utilised to inform this chapter to the extent that they are relevant to inform the likely contamination risks for the land acquisition area required as part of the Proposal.

For the purposes of this chapter the DSI for Epping Bridge will be called DSI 1 and the DSI for 2-16 Epping Road will be called DSI 2.

6.9.2 Existing environment

Site history

A review of historical aerial photographs indicated that the general land use has been unchanged since early 1930s, comprising low to medium residential lots and commercial storefronts and shops surrounding road and rail infrastructure. The location of the rail corridor and the roads have not been altered since the start of the aerial photograph review. The train station and the platform have been upgraded, and the platform locations slightly altered on a few occasions, roughly within the same area. No major land use changes were identified surrounding the site.

A review of historical aerial photographs for the construction compounds showed low density residential buildings at all three compounds between 1943 and 2016. The residential dwellings were demolished and removed between 2016 and 2018, with the lots at 36 and 38 Essex Street remaining vacant and undeveloped since 2018. The residential and commercial buildings that were located on the partial acquisition area at 2-16 Epping Road were removed in 2018, leaving undeveloped and vacant lots. The Bowling Greens at 725 Blaxland Road were used as a construction compound area in 2014 until October 2016. Afterwards, the site was not restored for original use and remains undeveloped.

A review of historical business directories identified 13 premises within 200 metres of the site with one or more registered businesses with an activity known to cause or be associated with contamination. This included motor garages, service stations, engineers, dry cleaners and pressers. Three businesses were identified as operating within the Proposal area, including a petrol station and mechanical repairer at 2 Epping Road.

Site investigation results Epping Bridge (DSI 1)

DSI 1 identified soil and groundwater contamination at concentrations above the assessment criteria within specific testing locations along Beecroft Road on the western side of the bridge. These locations would be within the construction area.

A monitoring well near the corner of the bridge and High Street identified groundwater contamination. The results indicate that the levels do not exceed the human health assessment criteria however exceedances of the ecological criteria were reported. The contamination was of a level that would be unlikely to pose an unacceptable risk to on-site workers and the community.

Soil samples of fill from beneath the road surface at Beecroft Road in proximity to the bridge identified contaminants, including polycyclic aromatic hydrocarbons (PAHs) and total recoverable hydrocarbons (TRH), at concentrations exceeding the human health and ecological assessment criteria in two discrete locations.

These contaminants are likely associated with previous road construction activities and were identified underneath sealed pavement areas. The contaminants in these locations do not pose an immediate risk and the potential for community exposure to these contaminants is considered to be very low. Areas of contamination that would be exposed during construction would be remediated in accordance with an appropriate remediation strategy that would be identified in the Environmental (Contamination) Management Plan or Remediation Action Plan, this may include the excavation of contaminated soils and offsite disposal at a licensed facility.

Site investigation results 2-16 Epping Road (DSI 2)

DSI 2 is a report that was undertaken to assess the residential use of the land at 2-16 Epping Road as part of a private residential development proposal. The findings have been considered to determine the potential for risk from road work within the acquisition area required as part of the Proposal.

DSI 2 identified surface asbestos and contaminated soils within 2-16 Epping Road near the western boundary, in proximity to the area of land identified for acquisition. This report also identified groundwater contamination but to a degree that was not considered to pose an unacceptable risk in a residential context. An unacceptable risk to construction workers is not anticipated with the implementation of the Environmental (Contamination) Management Plan.

Asbestos in fibre cement fragments were found in the western area of the site. Given the presence of other fibre cement fragments identified at the surface of the northern and eastern areas of the site, it is considered likely that the asbestos represents a site-wide impact within 2-16 Epping Road. The site would not be accessible to the community during construction. Any areas of the site required for pedestrian diversions near the boundary of 2-16 Epping Road would be remediated in a manner suitable for the intended purpose. The potential for community exposure to these contaminants is considered to be very low. On the basis of the assumed likely presence of asbestos, the site would be remediated and managed to minimise contamination risk to an acceptable level for the intended use, construction compound. Risk controls would be identified within an Environmental (Contamination) Management Plan or Remediation Action Plan.

Decommissioned underground storage tanks (USTs) have been identified on the site. Soil sampling within the northwest portion of the site found TRH in fill soils in concentrations exceeding the human health and ecological assessment criteria. The existing concrete ground surface restricts access to contaminated soil, and therefore the TRH do not pose an immediate risk to health. Storage tanks found within the proposed area of acquisition would be removed and areas of contamination that would be exposed during construction would be remediated in accordance with an appropriate remediation strategy contained within the Environmental (Contamination) Management Plan or Remediation Action Plan.

Acid sulfate soils

A review of the Australian Soil Resource Information System (ASRIS) on 4 October 2023 indicates that the Proposal area has a low to extremely low probability of containing acid sulfate soils (ASS).

6.9.3 Potential impacts

Construction

Contaminated soils have been identified within Beecroft Road and the proposed acquisition area at 2-16 Epping Road. In addition, field survey identified asbestos in fibre concrete fragments (FCF) on the surface of 2-16 Epping Road.

Contaminated soils and asbestos have potential to adversely impact humans, animals and plants through exposure to harmful toxic chemicals and airborne fibres during construction activities. In addition, contaminated soils can leach toxic chemicals into nearby ground or surface water.

Potential human and environmental receptors to contamination include:

- construction workers undertaking the Proposal
- the general public accessing the surrounding area, including local residents.

Given the extensive urban setting, absence of flora and fauna identified during the site inspection, and the distance from the nearest surface water body, no potential environmental receptors were identified.

The Epping Bridge DSI 1 includes recommendations to make the site suitable for the construction of the Proposal. The recommendations are captured in Section 6.9.4 and would be complied with prior to and during construction of the Proposal to ensure the safety of the community and to avoid and mitigate potential impacts associated with the identified sources of contamination.

In addition, specific mitigation measures have been prepared utilising the findings of DSI 2 to ensure areas within 2-16 Epping Road are suitable to be safely utilised for the construction of the Proposal. This includes the removal of surface FCF prior to use, investigation and removal of the USTs, and remediation of contaminated soils in accordance with a remediation strategy contained within the Environmental (Contamination) Management Plan or Remediation Action Plan for the area identified for land acquisition.

Operation

The operational phase of the proposal is not considered to have any contamination impacts.

6.9.4 Mitigation measures

Recommendations from the DSIs undertaken for the Proposal and the partial acquisition of lots at 2-16 Epping Road must be incorporated into the detailed design and construction stages of the Proposal in order to manage contamination impacts during construction. Site-specific mitigation measures are provided in Table 6-39.

Table 6-39 Site-specific contamination mitigation measures

No.	Mitigation measure	Responsibility	Timing
102	A remediation strategy to be prepared for the project to be detailed in an Environmental (Contamination) Management Plan and would include a Remediation Action Plan for the area identified for land acquisition within 2-16 Epping Road.	Contractor	Pre-construction
103	The investigation of the location and condition of underground storage tanks within 2-16 Epping Road would be undertaken, and the findings incorporated	Contractor	Pre-construction

No.	Mitigation measure	Responsibility	Timing
	into the Remediation Action Plan for the area identified for land acquisition within 2-16 Epping Road.		
104	The recommendations from Section 10 of the Epping Bridge Detailed Site Investigation (JK Environments, 2024) would be implemented. This would include the preparation and implementation of a Remediation Action Plan (RAP) and site validation.	Contractor	Pre-construction / Construction
105	A suitably qualified/licensed contractor is to remove all visible FCF from the areas of the site within exposed soils. A surface clearance certificate is then to be issued by a Licensed Asbestos Assessor prior to use of 2-16 Epping Road. Any other measures from the Environmental (Contamination) Management Plan relevant to the set up and operation of the construction compound must be implemented.	Contractor	Pre-construction
106	Any required removal of storage tanks and remediation of contaminated soils in accordance with a remediation strategy contained within the Environmental (Contamination) Management Plan or Remediation Action Plan for the area identified for land acquisition within 2-16 Epping Road.	Contractor	Construction
107	The remediation of contaminated soils in accordance with a remediation strategy for the area identified for land acquisition within 2-16 Epping Road.	Contractor	Construction

Refer to Section 7.2 for a full list of proposed mitigation measures.

6.10 Hydrology and flooding

6.10.1 Existing environment

Surface water

The Proposal is located within the Lane Cove River Catchment. The catchment is mostly urbanised in the upper reaches and contains many impervious surfaces such as concrete pavements and sealed roads. Lower reaches of the catchment contain pockets of native vegetation creating small buffer areas prior to stormwater entering the receiving waters.

The Proposal is located on a local topographic high, approximately 100 metres AHD, with gentle slopes to the northwest on the west side of the rail corridor, and to the southeast on the east side of the corridor. Rainfall in the area surrounding the Proposal would be captured by council's stormwater system along Beecroft Road, Blaxland Road and Epping Road. Council's stormwater system would eventually discharge stormwater into surrounding watercourses. The closest watercourse is Terrys Creek, a second order stream approximately 800 metres to the south, and Devlins Creek, a second order stream, approximately one kilometre to the north of the Proposal. Both are tributaries of the Lane Cove River. No drainage system currently exists on the bridge except for the kerbs and gutters on either side of the carriageway.

A review of the Environmental Planning Instrument – Flood Map, found the Proposal area to not be flood affected (DPIE, 2019). Epping is not included in the City of Parramatta Council online flood maps viewer, the site states there is no data available for the Epping area. Due to the lack of flood mapping for the area and the Proposal being located on a high

elevation and the nearest water courses being located approximately one kilometre away it is considered unlikely that the Proposal would be impacted by flooding.

Groundwater

A search of registered groundwater bores held by the Bureau of Meteorology identified 13 groundwater bores within 300 metres of the Proposal area, all of which were registered monitoring bores. No registered bores were found onsite or within the proposed construction compounds. The closest registered groundwater bore is located 204 metres northwest of the Proposal area. Standing water levels reported for registered monitoring bores within 250 metres of the site were between one and 2.5 metres below ground level (mbgl). A groundwater monitoring well installed, for a previous contamination assessment (at the property on the southeast corner of Epping Road and Blaxland Road) recorded a standing water level of 1.4mbgl (GHD, 2015).

The Lotsearch Report, prepared to support the PSI, indicated hydrogeology at the Proposal area is characterised by porous, extensive aquifers of low to moderate productivity.

6.10.2 Potential impacts

Construction

Surface water

Construction activities have potential to result in impacts to the water quality of Terrys and Devlins Creeks. Potential impacts include:

- contaminants could enter the local stormwater system and be transported to nearby watercourses from spills of fuels, oils and other chemicals associated with construction plant
- concrete work and washout areas could release alkaline runoff to the local stormwater system and nearby watercourses
- erosion and transportation of sediments during earthworks, piling, construction of bridge abutments, construction of embankments on Blaxland Road, stockpiling and trenching for utilities. This can result in sedimentation of local watercourses through stormwater runoff transporting soils and sediments offsite to receiving watercourses.

Potential impacts on water quality during construction would be managed and mitigated through implementation of mitigation measures detailed in Section 6.10.3.

Localised flooding has potential to occur within the Proposal area during construction due to minor changes to overland flow regimes and the temporary obstruction of drainage inlets during construction activities. This has potential to exacerbate water quality impacts, cause damage to construction equipment and potentially private property. Mitigation measures are provided in Section 6.10.3 to minimise the potential for localised flooding impacts during construction.

Groundwater

Piling activities for construction of the bridge abutments have the potential to encounter groundwater.

Operation

The Proposal would result in a small increase in impermeable area and therefore result in minor increases in surface runoff quantities. Flow calculations indicate bridge drainage is required to reduce the risk of aquaplaning at the intersection between the bridge, Epping Road, Blaxland Road and Langston Place. In addition, this would manage the flow width within the central median, protect the bridge joins and avoid run-off falling onto the train line below.

The proposed drainage system comprises of a below ground pit and pipe network, which collects stormwater runoff from the proposed road alignment to control nuisance flooding and enable effective stormwater management for the proposed road alignment. Pit spacing has been provided to manage the flow width requirements and pipes have been sized to convey the 10 percent annual exceedance period (AEP) storm event. Surface drains along the westbound median of the bridge are proposed to collect surface water flows.

The Proposal would adjust the topography of the road where it meets the bridge. This is not anticipated to adjust the flood regime in the area, as the Proposal is not located in a mapped flood prone area. The proposed drainage design is anticipated to manage stormwater flows in accordance with relevant guidelines. Therefore, the operation of the Proposal would not have any adverse impacts on drainage or hydrology.

6.10.3 Mitigation measures

Section 6.8.3 provides mitigation measures in relation to the controls of erosion, sedimentation and soils. These measures also apply to reducing impacts to water quality throughout construction and should be referred to. In addition, the standard mitigation measures outlined in Section 7.2 would be implemented to reduce risks to water quality in the locality.

Refer to 7.2 for a full list of proposed mitigation measures.

6.11 Air quality

6.11.1 Existing environment

The town centre and the Proposal area's air quality is characteristic of an urban environment, with some transport emission influences. Daily air quality monitoring across NSW is undertaken by Environment and Heritage NSW, a section of the Department of Climate Change, Energy, the Environment and Water (DCCEEW). Macquarie Park is the closest air quality monitoring station to the Proposal, operating approximately 3.3 kilometres northeast of Epping Station since 2017. A review of the Macquarie Park daily air quality concentration data on 16 August 2023 showed that the site experienced 'Good' air quality values.

6.11.2 Potential impacts

Construction

During construction, air quality impacts would be generated by the following activities:

- emissions from machinery and construction vehicles
- excavation works
- demolition of the existing bridge
- construction of the Proposal.

Dust

Construction works have potential to generate dust. Construction dust has potential to impact the respiratory and cardiovascular system and aggravation of asthma of workers and the community nearby. Elderly people and children are the most sensitive groups to these impacts. Table 6-40 presents locations where these sensitive groups congregate, these locations are identified as sensitive receptors of airborne dust impacts. Mitigation measures are presented in Section 6.11.3 to manage dust generation and minimise the potential of airborne dust to impact sensitive receptors.

Table 6-40 Sensitive receptors

Type of Receptor	Receptor	Address	Approximate Distance from the Proposal
Church	Epping Presbyterian	9 Bridge Street	75 m
Library	Epping Library	10 Pembroke Street	100 m
Medical Centre	Carlingford Epping Surgery	42 Rawson Street	150 m
Church	St Alban's Anglican Church	3 Pembroke Street	175 m
Church	Epping Church of Christ	31 Bridge Street	275 m
Community Service Centre	Chinese Christian Community Service Centre	41 Essex Street	325 m
Church	Our Lady Help of Christians Catholic Parish Church	29 Oxford Street	325 m
School	Our Lady Help of Christians Primary School	8 Cambridge Street	350 m
Church	Baptist Church	1-5 Ray Road	375 m
School	Arden Anglican School	6B Essex Street	375 m

Type of Receptor	Receptor	Address	Approximate Distance from the Proposal
Retirement	Uniting Coombah Epping	43 Oxford Street	450 m
School	Epping Public School	27-33 Pembroke Street	490 m

Other potential affected receivers within the vicinity of the Proposal include:

- local residences
- public recreation areas
- users of the adjacent commercial areas
- users of the Epping bus stops on Beecroft Road.

Emissions

Emissions related to construction vehicles and machinery would also be generated during the construction phase. These emission impacts would be short-term and minor given the relatively small construction footprint. The air quality impacts due to the construction of the Proposal are expected to be minor. Potential air quality impacts would be further minimised following the implementation of appropriate mitigation measures listed in Section 6.11.3.

Odour

Construction activities have potential to produce odours during paving of roads and painting of road markings. The period of these construction activities is short term, and it is not anticipated to cause nuisance to receivers within the vicinity of the Proposal.

Operation

Overall, the operational impacts to air quality are equivalent to the existing environment.

6.11.3 Mitigation measures

Mitigation measures would be implemented to manage potential impacts associated with air quality. Relevant site-specific measures are presented in Table 6-41.

Table 6-41 Site specific air quality impacts mitigation measures

No.	Mitigation measure	Responsibility	Timing
110	Construction manager to monitor weather forecast and where necessary, modify or suspend dust generating activities, such as excavations and heavy truck movements during dry and high wind speed conditions.	Contractor	Construction

Refer to Section 7.2 for a full list of proposed mitigation measures.

6.12 Waste

6.12.1 Potential impacts

The Proposal would generate waste both in quantity and type typical for construction projects. During construction of the Proposal, the following waste materials would be generated:

- green waste from vegetation removal

- components of the demolished bridge
    - this component includes the potential for Asbestos Containing Material and other hydrocarbon waste to be encountered
- excavated soil, sediment and rock
    - this component includes contaminated soils and the potential to encounter other materials, such as asbestos and hydrocarbon wastes
- packaging materials from items delivered to site such as pallets, crates, cartons, plastics and wrapping materials
- general waste generated from construction workers such as food, glass, plastic and paper.

Once in operation the Proposal is not expected to result in any changes to waste.

6.12.2 Mitigation measures

To minimise the potential impacts of waste from the Proposal, mitigation measures presented in Table 6-42 would be implemented.

Table 6-42 Site specific waste mitigation measures

No.	Mitigation measure	Responsibility	Timing
117	Waste management would be undertaken in accordance with the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act). Waste management targets for reuse and recycling have been taken from the baseline sustainability requirements for the Proposal: • 100% clean ballast reused, recycled or repurposed • 94% of inert and non-hazardous waste generated during demolition and construction reused, recycled or repurposed • 100% of useable spoil is reused, recycled or repurposed • 100% clean concrete is reused, recycled, or repurposed • 100% clean asphalt pavement is reclaimed • 40% of waste generated from office activities diverted from landfill.	Contractor	Construction / Post-construction

Standard mitigation measures regarding waste, outlined in Section 7.2, would be implemented to minimise potential impacts.

Refer to Section 7.2 for a full list of proposed mitigation measures.

6.13 Sustainability

The design of the Proposal would be based on Transport's commitment to delivering a sustainable transport system for NSW, including the application of Transport's Environmental Management System, which includes the use of the benchmarking tool, Transport Climate Change Risk Assessment Guidelines (Transport, 2021g), Transport Sustainable Design Guidelines Version 4.0 (Transport, 2019c) and the Carbon Tool (Transport, 2024a).

A minimum of 94 per cent of construction waste and demolition waste (by weight) would aim to be diverted from landfill. All usable spoil would be beneficially reused on site where possible. Water consumption during construction would be monitored and reported on and consumption of potable water would be reduced where practicable.

Materials to be used in the construction of the bridge would be selected carefully. Consideration would be given to life cycle impacts which are calculated by assessing the environmental impacts of materials from the point of extraction, through to transportation, use, operation and end of life.

Standard mitigation measures that would be implemented to reduce potential impacts on sustainability are detailed in Section 7.2.

6.14 Climate change

The dynamic nature of our climate system indicates a need to focus attention on how to adapt to the changes in climate and understand the limitation of adaptation. The effects of climate on the Sydney region can be assessed in terms of weather changes, storm intensity, flooding and increased risk of fire.

A detailed Climate Risk Assessment (CRA) Pre-Screening of location specific climate projections and relevant asset risk was undertaken in accordance with the CRA guidelines (Transport, 2021) which identified the following key risks:

- increased frequency, severity and duration of extreme temperatures leading to extreme heat related impacts on materials such as cracking of road surfaces, pavements and support structures reducing asset life, increasing maintenance costs and the impacts of urban heat island effects
- high temperatures greater than 35 degrees Celcius and greater than 40 degrees Celcius leading to urban heat island effect and expanding joints in structures, potential burns, low hanging overhead cables, thermal comfort issues
- long periods of drought leading to cracks in foundations and flora die back
- increased frequency and severity of extreme rainfall events leading to flooding of infrastructure (bridge, local roads) causing safety issues such as aquaplaning or visibility disruption, structural damage to retaining wall and slips
- increased intensity and frequency of bushfire events resulting in deterioration of visibility for asset users.

A detailed CRA would be completed at detailed design in consultation with asset stakeholders to determine further mitigation measures to be implemented.

Mitigation measures developed to minimise the potential for climate change impacts as a result of the Proposal are detailed in Table 6-43.

Table 6-43 Site specific climate change impacts mitigation measures

No.	Mitigation measure	Responsibility	Timing
122	The detailed design process would undertake a climate change impact assessment with reference to the *Transport Climate Change Risk Assessment Guidelines* (Transport, 2021g) to determine the hazards/risks associated with future climatic conditions.	Contractor	Detailed design
123	Detailed design would consider inclusions to minimise impacts of extreme heat, including:	Contractor	Detailed design

No.	Mitigation measure	Responsibility	Timing
	• selection of materials for durability in extreme conditions that minimise heat retention • urban design elements that provide lighter coloured surfaces and adequate shade, that minimise water use and provide drainage sized for future rainfall predictions. Relevant wind codes, surface water modelling would also be considered during detailed design. Some climate change risks in construction and operation would be managed through management plans and procedures.		

A detailed Climate Risk Assessment (CRA) would be completed at detailed design in consultation with asset stakeholders to determine the mitigation measures to be implemented.

6.15 Greenhouse gas

The detailed design process would undertake a compliant carbon footprinting exercise in accordance with Transport's *Carbon Tool* (Transport, 2024a) or other approved modelling tools. The carbon footprint would be used to inform decision making in design and construction.. Materials used in construction of the Proposal would be selected on the basis of sustainability principles, in particular low embodied carbon and use of recycled materials to minimise generation of greenhouse gases. During detailed design, the design, materials, fixtures and fittings would be selected to optimise the operational energy efficiency of the Proposal to reduce the projects lifecycle carbon impacts.

An increase in greenhouse gas emissions, primarily carbon dioxide, would be expected during construction of the Proposal due to exhaust emissions from construction machinery and vehicles transporting materials and personnel to and from site. All diesel construction plant and equipment would be required to comply with the Government Resource Efficiency Policy (GREP) requirements. During the development of the concept design a sustainability workshop was undertaken and opportunities to procure electric or fossil fuel free plant identified. These would be investigated further in detailed design.

Due to the small scale of the Proposal and the temporary nature of the individual construction work, it is considered that greenhouse gas emissions resulting from the construction of the Proposal would be minimal. Greenhouse gas emissions generated during construction would be kept to a minimum through the implementation of the standard mitigation measures detailed in Section 7.2.

Improvements to active transport through upgrades to the bridge's shared path may increase the number of pedestrians and cyclists through to the town centre and subsequently reduce the amount of fuel consumed by private motor vehicles, with a corresponding relative reduction in associated greenhouse gas emissions in the local area.

Once operational, the Proposal would produce minimal carbon emissions from traffic and street lighting.

7. Environmental management

This chapter identifies how the environmental impacts of the Proposal would be managed through environmental management plans and mitigation measures. Section 7.2 lists the proposed mitigation measures for the Proposal to minimise the impacts of the Proposal identified in Chapter 6.

7.1 Environmental management plans

A Construction Environment Management Plan (CEMP) for the construction phase of the Proposal would be prepared in accordance with the requirements of Transport's Environmental Management System (EMS). The CEMP would provide a centralised mechanism through which all potential environmental impacts relevant to the Proposal would be managed and would outline a framework of procedures and controls for managing environmental impacts during construction.

The CEMP would incorporate, as a minimum, all environmental mitigation measures identified below in Section 7.2, any conditions from licences or approvals required by legislation, and a process for demonstrating compliance with such mitigation measures and conditions.

7.2 List of mitigation measures

Mitigation measures for the Proposal are listed below in Table 7-1. These proposed measures would minimise the potential adverse impacts of the Proposal identified in Chapter 6 should the Proposal proceed.

Table 7-1 Proposed mitigation measures

No.	Mitigation measure	Responsibility	Timing
	General		
1.	**Construction Environmental Management Plan** A Construction Environmental Management Plan (CEMP) shall be prepared and implemented prior to the commencement of construction which addresses the following matters, as a minimum: a) project risk assessment including environmental aspects and impacts b) traffic and pedestrian management (a separate Traffic Management Plan (TMP) is required) c) urban design, landscape character and visual amenity d) noise and vibration management, including traffic noise generated by the Proposal e) water and soil management f) air quality management (including dust suppression) g) Aboriginal and non-Aboriginal heritage management h) biodiversity management i) storage and use of hazardous materials j) contaminated land management (including acid sulphate soils) k) weed management l) waste management m) bushfire risk n) environmental incident reporting and management procedures o) non-compliance and corrective/preventative action procedures	Contractor	Pre-construction

No.	Mitigation measure	Responsibility	Timing
	p) details of approvals, licences and permits required to be obtained under any other legislation for the Proposal. The CEMP shall: i. detail how the Contractor shall comply with the Conditions of Approval, Mitigation Measures, conditions of any licences, permits or other approvals issued by government authorities for the Proposal, all relevant legislation and regulations, and accepted best practice management ii. comply with the relevant requirements of Environmental Management Plan Guideline – Guideline for Infrastructure Projects (NSW Department of Planning Industry and Environment, 2020) iii. include an environmental compliance matrix for the Proposal (or such stages of the Proposal as approved by the Transport Environment and Sustainability Representative (TESR)) that details compliance with all relevant conditions and mitigation measures iv. include an Environmental Policy. The CEMP shall be reviewed and updated at six monthly intervals (unless otherwise approved with the TESR) and in response to any actions identified as part of the TESR's review of the document or in response to scope changes or modifications. Updates to the CEMP shall be made within 7 days of the completion of the review or receipt of actions identified in the Transport review of the document. The CEMP must be approved by the DES or delegate prior to the commencement of construction and following review, and be implemented for the construction.		
2.	**Environmental Controls Map** An Environmental Controls Map (ECM) shall be prepared in accordance with Transport's Environmental controls map guideline (Transport, 2023j) prior to the commencement of construction for implementation for the construction. The ECM is to be approved by the TESR and may be prepared in stages, as set out in the CEMP. A copy of the ECM shall be submitted to the TESR for review and written approval in accordance with Mitigation Measure 4. The ECM shall be prepared as a map – suitably enlarged in both A0 and A3 sizes and mounted on the wall of a site office and included in site inductions, supported by relevant written information. Updates to the ECM shall be made within 7 days of the completion of the review or receipt of actions identified by any TESR audit of the document and submitted to the TESR for written approval.	Contractor	Pre-construction
3.	**Site Induction** Prior to the commencement of construction, all contractors would be inducted on the key project environmental and sustainability risks, procedures, mitigation measures and conditions of approval. The induction shall be given by the Environmental Personnel and as a minimum would include: • details of the approved ECM as required by Mitigation Measure 2 and where the ECM is located on site, and a briefing on the CEMP as required by Mitigation Measure 1 • information on the protection measures to be implemented to protect vegetation, penalties for breaches and location of areas of sensitivity • preliminary identification of Aboriginal cultural heritage material. This training would include information such as the importance of Aboriginal cultural heritage material and places to the Aboriginal	Contractor	Pre-construction

No.	Mitigation measure	Responsibility	Timing
	community, as well as the legal implications of removal, disturbance and damage to any Aboriginal cultural heritage material and sites. A heritage induction informing them of the location of known heritage items and guidelines to follow if unanticipated heritage items or deposits are located during construction.		
4.	**Transport Environmental Management Approvals** Requirements for documents, plans or programs which must be reviewed and approved by the TESR (including the CEMP) are outlined in the Mitigation Measures. All reviews and approvals associated with these Mitigation Measures shall meet the following requirements (unless otherwise approved by the TESR or DES or if specifically noted in a Mitigation Measure): a) completed consultation with government agencies and relevant service/utility providers and evidence of consultation submitted with the plan b) a copy of the plan submitted to the TESR for review at least 21 days prior to commencement of Construction or the related works being commenced c) any comments made by the TESR in accordance with b) must be adequately addressed prior to submission for approval d) a copy of the plan submitted to the TESR to obtain written approval from the DES at least 5 days prior e) periodic review and update of the plan submitted to the TESR for written approval Construction must not commence until the DES has provided written approval of the plan/s.	Contractor	Pre-construction
5.	**Environment Personnel** Suitably qualified and experienced environmental management personnel shall be available and be responsible for implementing the environmental objectives for the Proposal, including undertaking regular site inspections, preparation and implementation of environmental documentation and ensuring the Proposal meets the requirements of the Environmental Management System (EMS). Details of the environmental personnel, including relevant experience, defined responsibilities and resource allocation throughout the Proposal (including time to be spent on-site/off-site) are to be submitted for the written approval of the DES, at least 21 days prior to commencement of construction of the Proposal (or such time as otherwise approved by the DES). Any adjustments to environmental resource allocations (on-site or off-site) are to be approved by the DES.	Contractor	Pre-construction and construction
6.	**Service Relocation** Service relocation would be undertaken in consultation with the relevant authority. Existing services and exclusion zones shall be identified on the ECM and on site to avoid direct impacts during construction.	Contractor	Pre-construction and construction
7.	**Detailed Design Validation** A detailed design validation report (DDVR) for the Proposal shall be prepared and submitted at each design stage to detail how compliance is achieved against: • the final Proposal description • all design mitigation measures detailed in the REF • any conditions of approval in the determination report for the Proposal. A final DDVR would accompany the Approval for Construction (or equivalent) submission.	Contractor	Pre-construction and following each design phase

No.	Mitigation measure	Responsibility	Timing
	The Proponent shall: a) submit a copy of the DDVR to the TESR for review b) update and submit a DDVR revision at each design stage or as required, including as the design progresses c) the TESR is to be given a minimum period of 7 days to review and provide any comments to the Proponent in relation to the DDVR. Upon completion of the final TESR review period a copy of the DDVR will be submitted to the DES (or nominated delegate) for written approval. The DDVR will be submitted to Transport for review and Confirmation that the design achieves compliance.		
8.	**Environmental Incident Procedure** Where non-compliances or incidents arise, an event report must be completed in the Transport incident management system and returned to the Principal's Representative in accordance with 'EMF-EM-PR-0001 Environmental Incident Procedure'.	Contractor	Construction
9.	**Proposal Modifications** Any modifications to the Proposal (as defined in this REF and/or future Determination Report), requiring an amendment REF (as determined by the TESR), would be subject to further assessment and approval by Transport. This assessment would need to demonstrate that any environmental impacts resulting from the modifications have been mitigated. The further assessment must be submitted and approved prior to commencement of works relating to the modification.	Contractor	As required
10.	**Proposal Changes** Any modifications to the Proposal (as defined in this REF and/or future Determination Report), which may be amended by a consistency assessment (as determined by the TESR), if approved, would be subject to further assessment and approval by Transport. This assessment would need to demonstrate that any environmental impacts resulting from the change have been minimised. The further assessment must be submitted to Transport 6 weeks prior to commencement of works relating to the modification.	Contractor	As required
11.	**Modification/Change Register** A project modification/change register shall be created and maintained throughout the project to identify project changes or modifications. The register will be updated and submitted at each design stage or as required, including as the design progresses. The register will be submitted to TESR for review of changes and direction on the approval pathway these changes or modifications should apply.	Contractor	As required
	Traffic and site access		
12.	**Road Condition Reports** Prior to construction commencement, road condition surveys and reports on the condition of roads and footpaths to be affected by construction shall be prepared and provided to Transport for information. Any damage resulting from the construction of the Proposal, aside from that resulting from normal wear and tear, shall be repaired at the Contractor's expense.	Contractor	Pre-construction and post-construction
13.	**Traffic Management Plan** Prior to the commencement of construction, a Traffic Management Plan (TMP) would be prepared and would include at a minimum: • ensuring adequate road signage at construction work sites to inform motorists and pedestrians of the work site ahead to ensure that the risk of road accidents and disruption to surrounding land uses is minimised • maximising safety and accessibility for pedestrians and cyclists	Contractor	Pre-construction

No.	Mitigation measure	Responsibility	Timing
	• ensuring adequate sight lines to allow for safe entry and exit from the site • ensuring access to railway stations, businesses, entertainment premises and residential properties (unless affected property owners have been consulted and appropriate alternative arrangements made) • managing impacts and changes to on and off street parking and requirements for any temporary replacement provision • parking locations for construction workers away from stations and busy residential areas and details of how this would be monitored for compliance • routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses • details for relocating kiss and ride, taxi ranks and rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus/taxi operators. Particular provisions would also be considered for the accessibility impaired • measures to manage traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the TMP. Consultation with the relevant roads authorities would be undertaken during preparation of the construction TMP. The performance of all project traffic arrangements must be monitored during construction.		
14.	**Community notification** Communication would be provided to the community and local residents to inform them of changes to parking, pedestrian access and/or traffic conditions including vehicle movements and anticipated effects on the local road network relating to site work.	Contractor	Construction
15.	**Road Occupancy Licences** Road Occupancy Licences for temporary road closures would be obtained, where required.	Contractor	Construction
16.	**Construction vehicle routes** Where feasible, vehicles performing construction deliveries or haulage should utilise the predetermined routes for the relevant construction area or compound to minimise impacts on the wider road network and residents.	Contractor	Construction
17.	**Opal bike shed, Langston Place** During construction, partial use of the Opal bike shed on Langston Place is to be maintained. The existing bike shed is to be reinstated as early as possible.	Contractor	Detailed design / Construction
18.	**Pedestrian access** Pedestrian access across the bridge must be maintained at all times during construction, excluding demolition. This includes the provision of temporary pedestrian paths when footpaths are obscured and no convenient and/or safe diversions are available.	Contractor	Construction
19.	**Road safety audit** A Road Safety Audit would be undertaken as part of detailed design and upon completion of construction, and design amendments made as required.	Contractor	Detailed design / Construction
20.	**Access to private properties** Access to private properties is to be maintained throughout construction.	Contractor	Construction
21.	**Safe access assessment**	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
	Prior to the use of overflow carparking at 36 and 38 Essex Street, a safe access assessment must be undertaken to ensure safety of workers, pedestrians and other road users.		
22.	**Use of two-way radios to avoid queuing** Queuing on public roads would be avoided by the use of two-way radios to call up haulage trucks from layover areas on a 'just in time' basis.	Contractor	Construction
23.	**Access to bus stops** Access to bus stops would be maintained during construction in consultation with the bus operators where feasible and reasonable, relocations would be managed in accordance with the TMP.	Contractor	Construction
24.	**Construction deliveries and haulage** Construction deliveries and haulage would be timed to occur outside peak traffic times where feasible and reasonable to minimise impacts on the road network	Contractor	Construction
25.	**Sydney Metro approval** Sydney Metro would need to approve proposed works within the second reserve. An engineering assessment of the Proposal demonstrating that induced effects on the underground rail infrastructure are acceptable to Sydney Metro, in accordance with the performance requirements outlined in Section 9 of *Sydney Metro Underground Corridor Protection Technical Guideline* must be prepared and submitted during detailed design.	Contractor	Detailed design
26.	**Revised rail replacement bus operations strategy** Transport would work with stakeholders during Detailed Design to develop a revised rail replacement bus operations strategy to complement the Proposal.	Transport and Contractor	Detailed design
27.	**Stakeholder consultation – refining traffic configuration** Further consultation with stakeholders would be undertaken during the Detailed Design phase to refine the traffic configuration with the aim of retaining the location of the existing bus stands, where feasible.	Transport and Contractor	Detailed design
	Urban design, landscape and visual amenity		
28.	Urban Design and Landscape Plan An Urban Design and Landscape Plan (UDLP) would be prepared by the Contractor, in consultation with Council and other asset/land owners, and submitted to Transport for written approval by the Urban Design Public Transport and Precincts team, prior to finalisation of the detailed design. The UDLP shall: a) demonstrate a robust understanding of the precinct through a comprehensive site analysis, including connectivity with street networks, mode change locations, active transport, and pedestrian movement b) identify opportunities and constraints c) establish precinct specific principles to guide and test design options d) consider Crime Prevention Through Environmental Design (CPTED) principles, including night-time safety of customers and the community. e) consider opportunities for: o Connecting with Country o community engagement o integrated heritage interpretation and adaptive reuse o public art f) address Transport Sustainable Design Guideline evidence requirements	Contractor	Prior to design finalisation

No.	Mitigation measure	Responsibility	Timing
	g) be prepared by a suitably qualified and experienced urban design professional The UDLP is to include a Public Domain Plan for the preferred design option and will provide analysis of the: i. landscape design approach including design of pedestrian and bicycle pathways, street furniture, interchange facilities, new planting and integration of any artwork ii. Materials Schedule including materials and finishes for proposed built works, colour schemes, paving and lighting types for public domain, fencing and landscaping iii. an Artist's Impression or Photomontage to communicate the proposed changes to the precinct The following design guidelines are available to assist and inform the UDLP: • TAP Urban Design Plan, Guidelines, Transport for NSW, Draft 2018 • Around the Tracks - urban design for heavy and light rail, Transport for NSW, Interim Issue December 2016Managing Heritage Issues in Rail Projects Guidelines, Transport for NSW, Interim 2016 • Creativity Guidelines for Transport Systems, Transport for NSW, Interim 2016 • Water Sensitive Urban Design Guidelines for Transport for NSW Projects, 2023.		
29.	**Transport's Design Review Panel** At 30% design stage, the design would be presented to Transport's Design Review Panel. Transport's Design Review Panel is an independent, multi-disciplinary panel of eminent experts who provide impartial design review and recommendations. This will contribute to achieving design excellence in respect to place making, built form, urban and landscape design and Connecting with County aspects of the project.	Contractor	Prior to design finalisation
30.	**Lighting Scheme** A lighting scheme for the construction and operation of the Proposal is to be developed by a suitably qualified lighting designer and prepared in accordance with relevant standards. The lighting scheme shall address the following as relevant, but not limited to: a) consideration of lighting demands of different areas b) strategic placement of lighting fixtures to maximise ground coverage c) use of LED lighting d) demonstrate that light spill and glare has been minimised to sensitive receivers e) control systems for lighting that dim or switch-off lights settings according to the amount of daylight the zone is receiving f) motion sensors to control low traffic areas g) ensuring security and warning lighting is not directed at neighbouring properties. The proposed lighting scheme is to be submitted to Transport's technical team for acceptance prior to design finalisation.	Contractor	Prior to design finalisation
31.	**Worksite Compounds and Hoardings** Worksite compounds would be screened for the construction with shade cloth (or similar material, where necessary and safe to do so), with Transport for NSW branding unless approved otherwise by the Transport Community and Stakeholder Engagement Manager, to minimise visual impacts from key	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
	viewing locations. Temporary hoardings, barriers, traffic management and signage would be removed as soon as safety requirements allow. This material should comply with The Infrastructure Project Style Guide November 2022 (Transport, 2022c). Work would be conducted behind temporary hoardings/screens wherever practicable. The installation of construction hoarding would take into consideration the location of residential receivers to ensure that 'line of sight' is broken, where feasible.		
32.	**Graffiti and Advertising** Hoardings, site sheds, fencing, acoustic walls around the perimeter of the site, and any structures built as part of the Proposal shall be maintained free of graffiti, or any advertising not authorised by Transport, during the construction period. Graffiti and unauthorised advertising shall be removed or covered within the following timeframes unless otherwise approved with Transport: a) offensive graffiti will be removed or concealed within 24 hours b) highly visible (yet inoffensive) graffiti will be removed or concealed within a week c) graffiti that is neither offensive or highly visible will be removed or concealed within a month d) any unauthorised advertising material will be removed or concealed within 24 hours.	Contractor	Construction
33.	**Design principles** Where feasible and reasonable, the design principles identified in the LCVIA would be incorporated into the detailed design of the Proposal.	Contractor	Detailed design
34.	**Replacement of the tree on Epping Station platform** The existing tree on Epping Station platform is to be replaced to respect and retain the existing character of the station.	Contractor	Detailed design
35.	**Lighting** Lights must be provided to luminate areas under the temporary bridge construction structure to ensure safety of passengers on Epping Station platform.	Contractor	During construction
	Noise and vibration		
36.	**Construction Noise and Vibration** Prior to commencement of construction, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the EPA's Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009), Transport's Construction noise and vibration guideline (roads) (Transport for NSW, 2023b) and the Noise and Vibration Impact Assessment for the Proposal (Mott MacDonald, 2024a). The CNVMP shall include, but not be limited to: a) details of construction activities and an indicative schedule for construction b) identification of construction activities that have the potential to generate noise and/or vibration impacts on surrounding land uses, particularly sensitive noise receivers c) detail what reasonable and feasible actions and measures shall be implemented to minimise noise impacts (including those identified in the REF) d) procedures for notifying sensitive receivers of construction activities that are likely to affect their noise and vibration amenity, as well as procedures for dealing with and responding to noise and vibration complaints	Contractor	Pre-construction

No.	Mitigation measure	Responsibility	Timing
	e) an Out of Hours Work Protocol (OOHWP) for the assessment, management and approval of works outside the standard construction hours identified in Mitigation Measure 38 of this approval, including a risk assessment process which deems the out of hours activities to be of low, medium or high environmental risk, is to be developed. All out of hours works are subject to written approval by the DES or as approved by EPA (where relevant to the issuing of an EPL). The OOHWP should be consistent with the Transport Construction noise and vibration guideline (roads) (Transport for NSW, 2023b) f) a description of how the effectiveness of actions and measures shall be monitored during the proposed works, identification of the frequency of monitoring, the locations at which monitoring shall take place, recording and reporting of monitoring results and if any exceedance is detected, the manner in which any non-compliance shall be rectified The CNVMP shall consider and outline measures to reduce the noise and vibration impacts from construction activities. Where practicable at source measures including by construction planning/staging and equipment selection shall be prioritised over at receiver measures. Reasonable and feasible mitigation measures include: • regularly training workers and contractors (such as at the site induction and toolbox talks) on the importance of minimising emissions and how to use equipment in ways to minimise noise and vibration • avoiding any unnecessary emissions when carrying out manual operations and when operating plant • ensuring spoil is placed and not dropped into awaiting trucks or other plant/vehicles • avoiding/limiting simultaneous operation of noisy or vibratory plant and equipment within discernible range of a sensitive receiver where practicable • switching off any equipment not in use for extended periods e.g. heavy vehicles engines would be switched off whilst being unloaded • avoiding deliveries at night/evenings or other sensitive times wherever practicable • no idling of delivery trucks • ensuring truck drivers are informed of designated vehicle routes, parking locations and acceptable delivery hours for the site • minimising talking loudly; no swearing or unnecessary shouting, or loud stereos/radios onsite; no dropping of materials from height where practicable, no throwing of metal items and slamming of doors • maximising the offset distance between noisy or vibratory plant and sensitive receivers and maintaining safe working distances for workers • directing noise-emitting plant away from sensitive receivers • regularly inspecting and maintaining plant to avoid increased noise levels from rattling hatches, loose fittings etc • use of quieter and less vibration emitting construction methods where feasible and reasonable • non-tonal movement alarms (or an equivalent mechanism) fitted and used on all construction vehicles and mobile plant regularly		

No.	Mitigation measure	Responsibility	Timing
	used on-site (i.e. greater than one day) and for any out of hours work.		
37.	**Property Condition Surveys** Subject to landowner agreement, property condition surveys shall be completed prior to piling, excavation or bulk fill or any vibratory impact works including jack hammering and compaction (Designated Works) in the vicinity of the following buildings/structures: i. all buildings/structures/roads within a distance of 50 m from the edge of the Designated Works (measured in a straight line) ii. all heritage listed buildings and other sensitive structures within 150 m from the edge of the Designated Works. iii. all locations that would be used for construction compounds Property condition surveys need not be undertaken if a risk assessment indicates that selected buildings/structures/roads identified in (a) and (b) will not be affected as determined by a qualified geotechnical and construction engineering expert with appropriate registration on the National Professional Engineers Register prior to commencement of Designated Works and provided to Transport. Selected potentially sensitive buildings and/or structures shall first be surveyed prior to the commencement of the Designated Works and again immediately upon completion of the Designated Works. Construction compound locations are to include an assessment of any pre-existing contamination. All owners of assets to be surveyed, as defined above, are to be advised (at least 14 days prior to the first survey) of the scope and methodology of the survey, and the process for making a claim regarding property damage. A copy of the survey(s) shall be given to each affected owner and Transport. A register of all properties surveyed shall be maintained. Any damage to buildings, structures, lawns, trees, sheds, gardens, etc. as a result of construction activity direct and indirect (i.e. including vibration and groundwater changes) shall be rectified at no cost to the owner(s).	Contractor	Pre-construction
38.	**Standard Construction Hours** Construction activities shall be restricted to the hours of 7:00 am to 6:00 pm (Monday to Friday); 8:00 am to 1:00 pm (Saturday) and at no time on Sundays and public holidays except for the following works which are permitted outside these standard hours: a) any works which do not cause noise emissions to be more than 5dBA higher than the rating background level (RBL) at any nearby residential property and/or other noise sensitive receivers b) out of hours work identified and assessed in the REF or the approved OOHWP c) the delivery of plant, equipment and materials which is required outside these hours as requested by police or other authorities for safety reasons and with suitable notification to the community as approved by the DES d) Emergency Work to avoid the loss of lives, property and/or to prevent environmental harm e) any other work as approved by the DES and considered essential to the Proposal, or as approved by EPA (where an EPL is in effect).	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
39.	**Special Audible Characteristics Activities** As per the *Construction noise and vibration guideline (public transport infrastructure)* (Transport for NSW, 2023c), construction activities with special audible characteristics would be limited to standard hours, and start no earlier than 8am unless otherwise approved by the DES in accordance with the CNVS. Rock breaking or hammering, jack hammering, pile driving, vibratory rolling, cutting of pavement, concrete or steel and any other activities which result in impulsive or tonal noise generation shall not be undertaken for more than three continuous hours, followed by a minimum one hour respite period, unless otherwise approved to by the DES, or as approved by EPA (where relevant to the issuing of an EPL). Note. *Special audible characteristics* refers to noise with characteristics that can cause annoyance and disturbance, containing noticeable factors such as tonality, low frequency noise, impulsive or intermittent noise events. These characteristics may not be considered noisy in a quantitative sense.	Contractor	Construction
40.	**Vibration Criteria** To avoid structural impacts as a result of vibration or direct contact with structures, the proposed work would be undertaken in accordance with the safe work distances outlined in the Noise and Vibration Impact Assessment (Mott MacDonald, 2024a). Where these distances cannot be met vibration trials and attended vibration monitoring of the trials would be undertaken in order to assess and mitigate vibration impacts. Vibration resulting from construction and received at any structure outside of the Proposal shall be limited to: a) for structural damage vibration –British Standard BS 7385-2:1993 Evaluation and measurement for vibration in buildings Part 2 and/or German Standard DIN 4150:Part 3 – 1999: Structural Vibration in Buildings: Effects on Structures b) for human exposure to vibration – the acceptable vibration values set out in the Environmental Noise Management Assessing Vibration: A Technical Guideline (Department of Environment and Conservation, 2006) which includes British Standard BS 6472-2:1992 Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz). These limits apply unless otherwise approved by the DES through the CEMP.	Contractor	Construction
41.	**Piling** Wherever practical, piling activities shall be completed using non-percussive piles. If percussive piles are proposed to be used, written approval of the DES shall be obtained prior to commencement of piling activities.	Contractor	Construction
42.	**Vibration Impacts to Heritage Structures** To effectively mitigate potential impacts of vibration on heritage structures within the station, activities that cause vibration would be managed in accordance with British Standard BS 7385-2:1993. If a heritage building or structure is found to be structurally unsound (following inspection) a more conservative cosmetic damage objective of 2.5mm/s peak component particle velocity (from DIN 4150) would be considered. Real time vibration monitoring would be conducted at commencement of relevant work to confirm compliance with the adopted standard. If vibration levels approach the determined trigger level, then the construction activity would cease and the heritage structure would be assessed and alternative construction methodologies developed, where practicable, before construction.	Contractor	Construction
43.	**Construction method revision**	Contractor	Detailed design

No.	Mitigation measure	Responsibility	Timing
	Construction method revision would be undertaken to include lower source vibration level plant where feasible and reasonable		
44.	**Attended vibration verification monitoring** Attended vibration verification monitoring would be undertaken at affected receivers at the commencement of works to confirm site-specific safe working distance	Contractor	Pre-construction / construction
45.	**Permanent vibration monitors** Permanent vibration monitors with an alarm system (flashing light, audible alarm, SMS etc) to warn relevant parties when approaching vibration limits would be installed at affected receivers.	Contractor	Pre-construction
46.	**Noise barriers** Noise barriers would be used around loud equipment such as hydraulic hammer, jackhammer and concrete saw cutting.	Contractor	Construction
47.	**Natural respite** Natural respite would be incorporated during operation of demolition equipment such as hydraulic hammers and jackhammer.	Contractor	Construction
48.	**Noise reducing shrouds** Noise reducing shrouds on hydraulic hammer would be used during operation.	Contractor	Construction
49.	**Hydraulic hammer** Hydraulic hammer contact with reinforcing bar within concrete structures would be minimised.	Contractor	Construction
	Heritage management		
50.	**Heritage Induction** As part of the site induction in accordance with Mitigation Measure 3, a heritage induction would be provided to workers prior to construction, informing them of the location of known heritage items and guidelines to follow if unexpected heritage items or deposits are located during construction. All construction staff would undergo an induction in the preliminary identification of Aboriginal cultural heritage material. This training would include information such as the importance of Aboriginal cultural heritage material and places to the Aboriginal community, as well as the legal implications of removal, disturbance and damage to any Aboriginal cultural heritage material and sites.	Contractor	Pre-construction
51.	**Unexpected Heritage Finds** If previously unidentified or unexpected Aboriginal objects or non-Aboriginal heritage/archaeological items are uncovered during construction, the procedures contained in Transport's *Unexpected Heritage Finds Guideline* (Transport for NSW, 2021f) would be followed, and work within the vicinity of the find would cease immediately. The TESR shall be immediately notified to co-ordinate a response, which may include direction to seek appropriate advice from a suitably qualified and experienced Heritage Advisor (in consultation with Heritage NSW). Works in the vicinity of the find shall not re-commence until written approval to recommence has been received from the DES. The event must be reported in Transport incident management system as a report only event in accordance with the Transport Environmental Incident Guideline. If human remains are found, work shall cease in the vicinity of the find, the site must be secured and the NSW Police and/or Heritage NSW notified. Where required, approvals for archaeological investigations, which may include an Aboriginal Heritage Impact Permit, would be obtained prior to work recommencing at the location. A discovery of suspected human remains	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
	greater than 100 years old is an archaeological case and is not subject to the requirements of NSW Coroners Act 2009.		
52.	**Protection of heritage items listed on the TAHE Section 170 Conservation Register** Design and construction of the Proposal within the curtilage of the Section 170 listed 'Epping Rail Station Group' must be undertaken in accordance with the recommendations made in the Statement of Heritage Impact (Mott MacDonald, 2023). In accordance with Section 170a of the Heritage Act, if the Proposal includes demolition of significant fabric, TAHE must provide notification of the work to Heritage NSW 14 days (or 40 days if the item is identified as being of State significance, but is not listed on the NSW State Heritage Register) prior to the commencement of the work	Contractor	Detailed design and construction
53.	**Council Notification** As Forest Park is listed on the heritage schedule of the Parramatta LEP 2023, Parramatta Council would be notified of the proposed work.	Transport	Pre-construction
54.	**Protection from Damage** During construction, suitable measures would be put in place to ensure the retained heritage elements are protected from damage. Measures may include hoardings, use of spotters during the movement of equipment and other measures as necessary.	Contractor	Construction
55.	**Heritage curtilages** The location of heritage curtilages would be clearly shown on Environmental Control Maps (ECMs).	Contractor	Pre-construction
56.	**Stacking and storage around heritage structures** Stacking and storage would not take place on or against or within any heritage structures on both the Epping Railway Station Group and Forest Park. The movement of plant should be planned in accordance with Transport's Temporary Works and Protection at heritage sites during construction Fact sheet (EMF-HE-FS-0166). Appropriate fencing or barriers should be installed around (but not fixed to) heritage elements where construction processes come within close proximity to heritage elements.	Contractor	Pre-construction / construction
57.	**Unexpected damage to heritage elements** Any unexpected damage to any heritage elements associated with the Epping Railway Station Group or Forest Park Heritage Items would be reported to Transport's Project Manager. This reported unexpected damage would be documented and disclosed to Transport's Environment and Sustainability Representative.	Contractor / Transport Project Manager	Construction
58.	**Retaining walls** To avoid damage to significant heritage plantings, the proposed retaining walls in proximity to Forest Park should adopt a design that is sensitive to surrounding tree roots as per the recommendations of the *Arboricultural Impact Assessment* Report 2023 prepared by Urban Arbor. The design of Blaxland Road should minimise level changes in proximity to Forest Park to retain the canopy of significant heritage plantings.	Contractor	Detailed design
59.	**Heritage interpretation** Heritage Interpretation would be provided on construction hoarding and signage of the construction areas in proximity to heritage items. This is in order to mitigate temporary visual impacts to the Epping Railway Station Group and other items and should include the temporary bridge construction platform.	Contractor	Detailed design

No.	Mitigation measure	Responsibility	Timing
	Specialist Heritage Advice would be sought for heritage interpretation solutions on the hoarding, and integration with Transport's Community Engagement Plan for these works.		
60.	**Structural assessments** Prior to works commencing, the construction contractor would undertake structural assessments of the station building and brick retaining wall on the western side of the rail corridor (Part of Station Building Listing) in order to determine the integrity and condition of these structures. Findings of these assessments must be used to determine safe working distances between plant and the structures, and this information would be incorporated into the noise and vibration management plan for the works. The vibration limits used to determine safe working distances would be based on the British Standard BS 7385:1993 for all structures which are considered sound by the inspection. Should the assessment find a structure to be of greater vulnerability to the impacts of construction vibration, due it's structural integrity,, the German Standard DIN 4150 - Part 3 (2016) 'Vibration in buildings - Effects on Structures' (DIN 41503:2016) vibration limit of 2.5mm/s peak component particle velocity must be used to set the vibration limit for these structures. Ways to mitigate vibration impacts should be considered, such as: • choosing alternative, lower impact equipment or methods where possible (bored piling, grip jacking or the use of a hammer cushion if impact piling is unavoidable) • scheduling the use of multiple vibration-causing activities so that they do not occur at the same time • isolating the equipment causing the vibration on resilient dampening mounts where possible.	Contractor	Pre-construction
61.	**Vibration testing and monitoring** The construction contractor must conduct vibration testing and monitoring, as per the Vibration Management Plan, both prior to and during vibration-generating activities occurring during the construction process, to ensure that vibration limits set for each structure are not exceeded. The construction contractor must seek the advice of a heritage specialist on methods and locations for installing equipment used for vibration, movement and noise monitoring of heritage listed structures. In the event that the vibration testing and monitoring shows that the preferred values for vibration are likely to be exceeded, the construction contractor must review the construction methodology and where feasible and reasonable, implement additional mitigation measures. Should the screening vibration limits be exceeded during works, those works would cease and visual inspection to check for potential damage would be conducted. The contractor must then follow the steps above to review and implement additional mitigation measures. Further mitigation measures would be discussed with a heritage specialist and their effects observed.	Contractor	Pre-construction
62.	**Urban Design and Landscaping** The finishes of the bridge abutments and tie-in structures shall be detailed in the urban design and landscape plan (UDLP) to ensure that the new work is aesthetically appropriate for the nineteenth century railway setting	Contractor	Pre-construction
	Socio-economic		
63.	**Local Goods and Services**	Contractor	Pre-construction

No.	Mitigation measure	Responsibility	Timing
	Sustainability criteria for the Proposal would be established to encourage the Contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal.		
64.	**Public Feedback** Feedback through the public display process would be used to facilitate opportunities for the community and stakeholders to have input into the Proposal, where practicable.	Transport	Pre-construction
65.	**Website** Project information shall be made available to members of the public, either on dedicated pages on the Transport/Project website or details provided as to where/if hard copies of this information may be accessed. Project information to be provided includes: a) a copy of the documents referred to under Condition 1 of any future approval b) 24 hour contact telephone number for information and complaints. All documents uploaded to the website must be compliant with the Web Content Accessibility Guidelines Version 2.2.	Transport	Pre-construction
66.	**Community Liaison Management Plan** A Community Liaison Management Plan (CLMP) shall be prepared and implemented to engage with government agencies, relevant Councils, landowners, community members and other relevant stakeholders (such as utility and service providers, bus companies, Taxi Council and businesses). The CLMP shall comply with the obligations of these conditions and should include, but not necessarily be limited to: a) a comprehensive, project-specific analysis of stakeholders, issues and proposed strategies to manage issues through the duration of the Proposal b) details of the communication tools (traditional and digital) and activities that will be used to inform and engage with the community and stakeholders c) a program for the implementation of community liaison activities relating to key construction tasks and milestones with strategies for minimising impacts and informing the community d) policies and procedures for handling community complaints and enquiries, including the Contractor's nominated 24 hour contact for management of complaints and enquiries e) analysis of other major projects/influences in the area with the potential to result in cumulative impacts to the community and strategies for managing these. The CLMP shall be prepared to the satisfaction of the relevant Community and Place Director (or nominated delegate) prior to the commencement of construction and implemented, reviewed and revised 6-monthly during the construction of the Proposal.	Contractor	Pre-construction and construction
67.	**Community Notification and Liaison** The local community shall be advised of any activities related to the Proposal with the potential to impact upon them. Prior to any site activities commencing and throughout the Proposal duration, the community is to be notified of works to be undertaken, the estimated hours of construction and details of how further information can be obtained (i.e. contact telephone number/email, website, newsletters etc.) including the 24 hour Construction Response Line number. Construction-specific impacts including information on traffic changes, parking changes, access changes, detours, services disruptions, public transport changes, high noise generating work activities and work required	Contractor	Pre-construction and construction

No.	Mitigation measure	Responsibility	Timing
	outside the nominated working hours shall be advised to the local community at least 7 days prior to such works being undertaken or other period as approved to by the relevant Community and Place Director.		
68.	**Complaints Management** A 24 hour construction response line number shall be established and maintained for the construction. Details of all complaints received during construction, including complaints received in person and via email, are to be recorded on a complaints register. A verbal response to phone enquiries on what action is proposed to be undertaken is to be provided to the complainant within two hours during all times construction is being undertaken and within 24 hours during non-construction times (unless the complainant agrees otherwise). A verbal response to written complaints (email/letter) should be provided within 48 hours of receipt of the communication. A detailed written response is to be provided to the complainant within 7 calendar days for verbal and/or written complaints. Information on all complaints received during the previous 24 hours shall be forwarded to the TESR each working day.	Contractor	Construction
69.	**Property adjustment plans** Property adjustment plans would be developed in consultation with the affected property owners	Transport	Pre-construction
70.	**Land acquisitions** All land acquisitions would be conducted in accordance with Transport's Land Acquisition Policy and compensation would be based on the requirements of the *Land Acquisition (Just Terms) Compensation Act 1991*	Transport	Pre-construction
71.	**Connecting to Country consultation report** The recommendations of the connecting to Country consultation report would be incorporated into the detailed design for the Proposal wherever it is reasonable and feasible to do so. This would include incorporation of connecting with Country elements into the Urban Design and Landscape Plan.	Contractor	Detailed design
	Biodiversity		
72.	**Removal of Trees or Vegetation** The Proposal would be designed and constructed to retain as much existing vegetation as possible and disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal. Trees and vegetation nominated to be removed in the Arboricultural Impact Assessment (Urban Arbor, 2023) would be clearly demarcated onsite prior to construction, to avoid unnecessary vegetation removal. Landowners consent would be obtained prior to vegetation removal, should TAHE not be the landowner. Trees and vegetation to be retained would be protected through temporary protection measures discussed in Mitigation Measures below. Separate approval, in accordance with Transport's EMF-EM-TT-0144 *Removal or trimming of vegetation application*, is required for the trimming, cutting, pruning or removal of all trees or vegetation where the impact has not already been identified in the REF or Determination Report for the proposal. The trimming, cutting, pruning or removal of trees or vegetation shall be undertaken in accordance with the Mitigation Measures.	Contractor	Design and Construction
73.	**Biodiversity Management** Construction of the Proposal must be undertaken in accordance with Transport's *Biodiversity Policy* (Transport, 2022d), including the Transport's *Biodiversity Assessment Guideline* (Transport, 2022e), Transport's *No net loss guidelines* (Transport, 2022f) and Transport's *Tree and hollow replacement guidelines* (Transport, 2023h).	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
74.	**Tree Protection Zones** Tree Protection Zones (TPZs) would be established around trees to be retained, as nominated in the Arboricultural Impact Assessment (Urban Arbor, 2023) or as required to protect vegetation. Tree protection would be undertaken in accordance with *AS 4970-2009 Protection of Trees on Development Sites* and would include exclusion fencing of TPZs. The tree dripline may be used as a guide for protecting trees where an exclusion zone is not established by an arborist/ecologist. Should the approved development be altered by a post-approval assessment, consideration of any additional TPZs beyond those identified in the Arboricultural Impact Assessment (Urban Arbor, 2023) would be required and may need to be supported by additional or addendum arboricultural advice.	Contractor	Construction
75.	**Tree and Vegetation Damage** In the event of any tree or vegetation to be retained becoming damaged during construction, the Contractor would immediately notify the Transport Project Manager and TESR to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible. Where arborist advice indicates that a tree or vegetation may be at risk of failure due to project works the priority should be to retain and protect the tree or vegetation. Following completion of construction the arborist should reassess the tree and their advice followed. Where tree or vegetation removal is required, replacement must be in accordance with the Transport's Biodiversity Policy (Transport, 2022d).	Contractor	Construction
76.	**Weed Control** Weed control measures, consistent with Transport's *Biodiversity Policy* (Transport, 2022d) *and the* Pesticides Regulation 2017, would be developed and implemented as part of the CEMP to manage the potential dispersal and establishment of weeds during the construction phase of the Proposal. This would include the management and disposal of weeds in accordance with the *Biosecurity Act 2015.*	Contractor	Construction
77.	**Replanting Program** Any vegetation removal shall be offset in accordance with Transport's *Biodiversity Policy* (Transport, 2022d). All vegetation planted on-site is to consist of locally native species, unless otherwise approved by the DES, following consultation with the relevant Council, where relevant, and/or the owner of the land upon which the vegetation is to be planted. A replanting strategy and maintenance schedule of offsetting on and offsite is to be provided to the TESR for review and approval at least 4 weeks prior to the commencement of replanting. All vegetation would be maintained for at least 12 months following completion of construction or following planting (whichever ends last) (unless approved by the TESR).	Contractor	Construction and operation
78.	**Non-destructive root investigations** Non-destructive root investigations would be undertaken to determine the impact of the proposed works to the root systems of the Seven (7) trees and one (1) group of trees namely: 10, 11, 14, 22, 77, 79, 80 and G1. Tree sensitive construction methods may be required pending on the findings of the root investigations. See the AIA for information regarding root system works and tree sensitive construction techniques	Contractor	Construction
79.	**Detailed Tree Management Plan** A detailed tree management plan (TMP) is to be prepared in accordance with AS4970-2009 and developed in combination with the overall construction	Contractor	Detailed design

No.	Mitigation measure	Responsibility	Timing
	management plan for the site. The TMP should be prepared by a consulting Arborist with a minimum AQF level 5 qualification.		
80.	**Project Arborist** Prior to any works commencing at the site a Project Arborist should be appointed. The Project Arborist should be qualified to a minimum AQF level 5 and/or equivalent qualifications and experience and should assist with any development issues relating to trees that may arise. If at any time it is not feasible to undertake works in accordance with this, an alternative must be agreed in writing with the Project Arborist.	Contractor	Pre-construction
81.	**Qualified Arborist** All tree work should be carried out by a qualified and experienced Arborist with a minimum of Australian Qualifications Framework (AQF) level 3 in arboriculture, in accordance with NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and AS4373 Pruning of amenity trees (2007).	Contractor	Construction
82.	**Tree protection zones** Work undertaken within a tree protection zone is to be supervised by a qualified and experienced Arborist with a minimum of Australian Qualifications Framework (AQF) level 3 in arboriculture.	Contractor	Construction
83.	**Project Arborist site inspections** In accordance with AS4970-2009, the Project Arborist would carry out regular site inspections to ensure works are carried out in accordance with this document throughout the development process. Site inspections are recommended on a monthly frequency throughout the development.	Contractor	Construction
84.	**Underground services outside of the TPZ** Where possible, underground services would be located outside the TPZ of retained trees via sensitive techniques in accordance with recommendations from AS4970-2009.	Contractor	Detailed design / Construction
85.	**Microbats** In the event that any microbats are observed during construction, an Unexpected Threatened Species Finds Procedure would be followed. Subsequently, a Microbat Management Plan (MMP) would be prepared.	Contractor	Construction
86.	**Habitat feature** If a habitat feature, such as a nest, is identified during clearing, works would stop in the vicinity and an ecologist would be called to safely remove and relocate the fauna.	Contractor	Construction
87.	**BGHF in the rail corridor** An ecology assessment must be undertaken of the indicative area proposed to be used for rail corridor access and an in-corridor construction compound. The assessment must identify all ecology values within this area including BGHF. Materials storage/laydown activities shall not occur within BGHF or impact any ecology values, as identified within the ecology report. Exclusion areas must be established and maintained to protect BGHF an any ither ecological values. Recommendations of the ecology report are to be implemented and incorporated within the CEMP.	Transport/Contractor	Pre and during construction
88.	**Mulch and landscaping** 1. Mulch used in landscaping must, to the extent possible, be derived from trees, shrubs and any other vegetative material that is approved by the Principal for use as mulch, removed during the clearing and grubbing works on the Site. If the mulch produced in this way is insufficient or not available, make up the shortfall by using imported hardwood chip that complies with Australian Standard AS 4454, the EPA Mulch Order 2016 and Mulch Exemption	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
	2016. Imported hardwood chip must also comply with the following requirements: a) Hardwood chip must only be derived from waste hardwood timber. Woodchip derived from trees which have been specifically harvested for that purpose will not be accepted under any circumstances b) The material must comprise hardwood chips with not more than 5% fines by volume, and must not contain any bark c) The average size of the woodchip must be approximately 30 mm x 20 mm x 5 mm and the maximum length of chip must not exceed 50 mm d) Hardwood chip must be free of soil, weeds, stones, vermin, insects or other foreign material. 2. Prior to procuring, the Contractor must provide in writing to the Principal the source of mulch, as well as a sample of mulch and product documentation demonstrating compliance, for approval or for other quality assurance diligence and surveillance purposes. 3. Prior to importing, the Contractor must ensure all imported mulch is visually inspected at the supplier's premises, with samples collected and tested in accordance with AS 4454. The Contractor must track batches of mulch to ensure the same mulch inspected and tested is delivered to site. 4. During unloading and land application, the Contractor must ensure that a suitably qualified expert visually inspects each load of mulch for compliance. All visual inspections of mulch must be documented and include as a minimum: a) location, date, and time of inspection b) name of inspector c) product name, supplier name, volume of material d) photographs of material inspected **e)** sample collection details (when applicable).		
	Soils and water		
89.	**Storage and Use of Hazardous Materials** Construction hazard and risk issues associated with the use and storage of hazardous materials shall be addressed through risk management measures, which shall be developed prior to construction as part of the overall CEMP, in accordance with relevant EPA guidelines, Transport's Chemical storage and spill response guidelines (Transport, 2023k) and Australian and ISO standards. These measures shall include: a) the storage of hazardous materials, and refuelling/maintenance of construction plant and equipment are to be undertaken in clearly marked designated areas designed to contain spills and leaks b) spill kits, appropriate for the type and volume of hazardous materials stored or in use, to be readily available and accessible to construction workers. Kits are to be kept at hazardous materials storage locations, in site compounds and on specific construction vehicles. Where a spill to a watercourse is identified as a risk, spill kits are to be kept in close proximity to potential discharge points in support of preventative controls c) all hazardous materials spills and leaks to be reported to site managers and actions to be immediately taken to remedy spills and leaks	Contractor	Pre-construction

No.	Mitigation measure	Responsibility	Timing
	d) training in the use of spill kits to be given to all personnel involved in the storage, distribution or use of hazardous materials.		
90.	**Erosion and Sediment Control** Soil and water management measures shall be prepared, implemented and maintained for the mitigation of water quality impacts during construction of the Proposal in accordance with Managing Urban Stormwater: Soils and Construction Volume 14th Edition (Landcom, 2004). The following are required, based on the amount of disturbance proposed: • soil and water management measures included on the ECM and in the CEMP for less than 250m2 of disturbance • erosion and sediment control plan (ESCP) for between 250-2,500m2 of disturbance • soil and water management plan (SWMP) for over 2,500m2 of disturbance Management measures would be established prior to any clearing, grubbing or site establishment activities and would be maintained and regularly inspected (particularly following rainfall events) to ensure their ongoing functionality. At a minimum inspection would occur monthly and would be reported in the inspection report. Management measures would be maintained until the work is complete and areas are stabilised. The management measures shall be reviewed and updated throughout construction so they remain relevant to the activities being undertaken.	Contractor	Pre-construction and construction
91.	**Vehicle Maintenance** Vehicles and machinery would be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment would also be refuelled offsite, or in a designated refuelling area.	Contractor	Construction
92.	**Pollution Incident** In the event of a pollution incident, work would cease in the immediate vicinity and the Contractor would immediately notify the Transport Project Manager and TESR in accordance with the Transport Environmental Incident Procedure (EMF-EM-PR-0010. The EPA would be notified, in accordance with Part 5.7 of the POEO Act.	Contractor	Construction
93.	**Groundwater** Should groundwater be encountered during excavation work, groundwater would be managed in accordance with the requirements of the Waste Classification Guidelines (EPA, 2014) and Transport's Water Discharge and Reuse Guideline (Transport for NSW, 2019e).	Contractor	Construction
94.	**Existing drainage systems** The existing drainage systems would remain operational throughout construction and the erosion and sediment control plan (ESCP) would take this into consideration during the design and implementation of control measures.	Contractor	Construction
95.	**Stabilise exposed soils** Exposed soils would be stabilised, surfaces reinstated and landscaping completed as soon as practicable after construction. Temporary erosion and sediment control shall remain in place until permanent stabilisation methods are implemented.	Contractor	Post-construction
	Contamination		
96.	**Waste Management Plan** The CEMP (or separate Waste Management Plan, if necessary) must address waste management and would at a minimum:	Contractor	Pre-construction

No.	Mitigation measure	Responsibility	Timing
	• identify all potential waste streams associated with the work and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities • apply the waste hierarchy to resource output streams and justification provided • detail other onsite management practices such as keeping areas free of rubbish • specify controls and containment procedures for hazardous waste and asbestos waste • outline the reporting regime for collating construction waste data		
97.	**Unidentified Contamination (Other Than Asbestos)** If previously unidentified contamination (excluding asbestos) is discovered during construction, work in the affected area must cease immediately, and an investigation must be undertaken and report prepared to determine the nature, extent and degree of any contamination. The level of reporting must be appropriate for the identified contamination in accordance with relevant EPA guidelines, including the *Guidelines for Consultants Reporting on Contaminated Sites* (Office of Environment and Heritage, 2011). The event must be reported in Transport incident management system as a report only event in accordance with the Transport Environmental Incident Procedure. A copy of any contamination report shall be submitted to the TESR for review in accordance with Mitigation Measure 4. The DES shall determine whether consultation with the relevant Council and/or EPA is required prior to continuation of construction within the affected area.	Contractor	Construction
98.	**Asbestos Management** If previously unidentified asbestos contamination is discovered during construction, work in the affected area must cease immediately, and an investigation must be undertaken and a report prepared to determine the nature, extent and degree of the asbestos contamination. The level of reporting must be appropriate for the identified contamination in accordance with relevant EPA, Safe Work Australia and SafeWork NSW guidelines and include the proposed methodology for the remediation of the asbestos contamination. Remediation activities must not take place until receipt of the investigation report. The event must be reported in Transport incident management system as a report only event in accordance with the Transport Environmental Incident Procedure. Works may only recommence upon receipt of a validation report from a suitably qualified contamination specialist that the remediation activities have been undertaken in accordance with the investigation report and remediation methodology. *Note: In circumstances where both previously unidentified asbestos contamination and other contamination are discovered within a common area, nothing in these conditions shall prevent the preparation of a single investigation report to satisfy the requirements of both Mitigation Measure 93 and Mitigation Measure 94.*	Contractor	Construction
99.	**Spoil Reuse, Removal and Classification** All excavated spoil suitable for reuse would be reused on site and distributed as approved by the TESR. The quantity and locations for reuse of excavated material would be further reviewed and confirmed with the TESR during construction. All spoil to be removed from site would be tested to confirm the presence of any contamination. Any contaminated spoil would be disposed of at an appropriately licensed facility.	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
	All spoil and waste must be classified in accordance with the *Waste Classification Guidelines Part 1: Classifying waste (*EPA, 2014) prior to disposal.		
100.	**Hazardous Materials Survey** A Hazardous Materials Survey in accordance with AS 2601 (2001) *Demolition of Structures* shall be undertaken by an appropriately qualified environmental scientist prior to the demolition of bridge and support structures. Subsequent removal of any hazardous material is to be undertaken in accordance with applicable EPA, SafeWork NSW and Safe Work Australia guidelines.	Contractor	Pre-construction
101.	**Concrete Washout** Any concrete washout would be established and maintained in accordance with Transport's EMF-EM-GD-0145 *Concrete washout guideline* (Transport for NSW, 2023a) with details included in the CEMP and location marked on the ECM.	Contractor	Construction
102.	**Remediation** A remediation strategy to be prepared for the project to be detailed in an Environmental (Contamination) Management Plan and would include a Remediation Action Plan for the area identified for land acquisition within 2-16 Epping Road.	Contractor	Pre-construction
103.	**Underground storage tank locations** The investigation of the location and condition of underground storage tanks within 2-16 Epping Road would be undertaken, and the findings incorporated into the Remediation Action Plan for the area identified for land acquisition within 2-16 Epping Road.	Contractor	Pre-construction
104.	**Epping Bridge Detailed Site Investigation** The recommendations from Section 10 of the Epping Bridge Detailed Site Investigation (JK Environments, 2024) would be implemented. This would include the preparation and implementation of a Remediation Action Plan (RAP) and site validation.	Contractor	Pre-construction / Construction
105.	**Removing FCF and surface clearance certificate** A suitably qualified/licensed contractor is to remove all visible FCF from the areas of the site with exposed soils. A surface clearance certificate is then to be issued by a Licensed Asbestos Assessor prior to use of 2-16 Epping Road. Any other measures from the Environmental (Contamination) Management Plan relevant to the set up and operation of the construction compound must be implemented.	Contractor	Pre-construction
106.	**Removal of Underground storage tanks** Any required removal of storage tanks and remediation of contaminated soils in accordance with a remediation strategy contained within the Environmental (Contamination) Management Plan or Remediation Action Plan for the area identified for land acquisition within 2-16 Epping Road.	Contractor	Construction
107.	**Remediation of contaminated soils at 2-16 Epping Road** The remediation of contaminated soils in accordance with a remediation strategy for the area identified for land acquisition within 2-16 Epping Road.	Contractor	Construction
	Air quality		
108.	**Minimising Impacts to Air Quality** To minimise air quality impacts and the generation of dust from construction activities, the following measures would be implemented: • plant and machinery would be switched off when not in use, and not left idling	Contractor	Pre-construction and construction

No.	Mitigation measure	Responsibility	Timing
	• vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable • apply water (or alternate measures) to exposed surfaces (e.g. unpaved roads, stockpiles, hardstand areas and other exposed surfaces) • cover stockpiles when not in use • appropriately cover loads on trucks transporting material to and from the construction site and securely fix tailgates of road transport trucks prior to loading and immediately after unloading • prevent mud and dirt being tracked onto sealed road surfaces • details on how methods for management of emissions would be incorporated into project inductions, training and pre-start/toolbox talks • details for procedure to ensure plant and machinery are regularly checked and maintained in a proper and efficient condition These methods are to be identified in the CEMP.		
109.	**Air quality management and monitoring** Air quality management and monitoring for the Proposal would be undertaken in accordance with Transport for NSW's *Air Quality Management Guideline* (Transport for NSW, 2021a).	Contractor	Pre-construction and construction
110.	**Weather forecast monitoring** Construction manager to monitor weather forecast and where necessary, modify or suspend dust generating activities, such as excavations and heavy truck movements during dry and high wind speed conditions.	Contractor	Construction
	Waste		
111.	**Waste Management Plan** The Waste Management Plan must be prepared and address waste management and would at a minimum: • identify all potential waste streams associated with the work and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities • detail other onsite management practices such as keeping areas free of rubbish • specify controls and containment procedures for hazardous waste and asbestos waste • outline the reporting regime for collating construction waste data.	Contractor	Pre-construction
112.	**Unexpected Finds Protocol** An appropriate Unexpected Finds Protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. Procedures for handling asbestos containing materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal to be undertaken in accordance with WorkCover requirements.	Contractor	Pre-construction
113.	**Reuse of excavated spoil** All excavated spoil suitable for reuse would be reused on site and distributed as agreed with Transport for NSW and the Contractor. The reuse of excavated material would be further reviewed and confirmed during construction.	Contractor	Construction
114.	**Testing of removed spoil** All spoil to be removed from site would be tested to confirm the presence of any contamination. Any contaminated spoil would be disposed of at an appropriately licensed facility.	Contractor	Construction

No.	Mitigation measure	Responsibility	Timing
115.	**Classification of spoil and waste** All spoil and waste must be classified in accordance with the Waste Classification Guidelines Part 1: Classifying waste (EPA, 2014) prior to disposal at an appropriately licensed facility.	Contractor	Construction
116.	**Concrete washout** Any concrete washout would be established and maintained in accordance with Transport for NSW's Concrete Washout Guideline (Transport for NSW, 2023a) with details included in the CEMP and location marked on the ECM.	Contractor	Construction
117.	**Waste management** Waste management would be undertaken in accordance with the Waste Avoidance and Resource Recovery Act 2001 (WARR Act). Waste management targets for reuse and recycling have been taken from the baseline sustainability requirements for the Proposal: • 100% clean ballast reused, recycled or repurposed • 94% of inert and non-hazardous waste generated during demolition and construction reused, recycled or repurposed • 100% of useable spoil is reused, recycled or repurposed • 100% clean concrete is reused, recycled, or repurposed • 100% clean asphalt pavement is reclaimed • 40% of waste generated from office activities diverted from landfill.	Contractor	Construction / Post-construction
	Sustainability, climate change and greenhouse gases		
118.	**Sustainable Design Guidelines** Detailed design of the Proposal would be undertaken in accordance with the NSW Sustainable Design Guidelines – Version 4.0 (Transport NSW, 2019c) achieve a minimum silver rating.	Contractor	During design
119.	**Carbon Footprint Exercise** The detailed design process would undertake a compliant carbon footprinting exercise in accordance with Transport's Carbon Tool (Transport, 2024a) or other approved modelling tools. The carbon footprint would to be used to inform decision making in design and construction.	Contractor	During design
120.	**Sustainability Officer** A suitably qualified and experienced Sustainability Officer shall be appointed who is responsible for implementing the sustainability objectives for the Proposal, in line with the Proposal's overarching Project Sustainability Plan. Details of the Sustainability Officer including defined responsibilities, duration and resource allocation throughout the appointment are to be submitted to the satisfaction of the Director of Sustainability prior to the preparation of the Sustainability Management Plan.	Contractor	Pre-construction
121.	**Sustainability Management Plan** A Sustainability Management Plan (SMP) which details the approach to managing sustainability requirements and opportunities during design and construction shall be prepared. The SMP shall include the following as a minimum: a) a completed electronic checklist demonstrating compliance with the Transport Sustainable Design Guidelines Version 4.0 (ST-114) b) a statement outlining the Construction Contactor's own corporate sustainability policies, obligations, goals, targets and commitments c) a description of the processes and methodologies for encouraging and identifying innovative sustainability outcomes on the Proposal, and the areas targeted for innovative sustainable solutions to be explored and/or implemented on the Proposal.	Contractor	Pre-construction

No.	Mitigation measure	Responsibility	Timing
	d) the approach to the identification of opportunities to reduce carbon emissions, energy use and embodied lifecycle impacts of the Proposal. This should include a summary of initiatives proposed for implementation to meet energy and carbon management objectives and targets e) the approach to sustainable procurement including how procurement processes have taken in to account the principles of ISO 20400: 2017 – Sustainable Procurement in the selection of all materials, products and services f) a description of the processes, standards and procedures for undertaking climate change risk assessments and strategies for mitigation of risks associated with climate change and extreme weather events. A copy of the SMP shall be submitted to the Director of Sustainability at least 30 days prior to the commencement of construction, for written approval (or such time as is otherwise approved by the Director).		
122.	**Climate change impact assessment** The detailed design process would undertake a climate change impact assessment with reference to the Transport Climate Change Risk Assessment Guidelines (Transport, 2021g) to determine the hazards/risks associated with future climatic conditions.	Contractor	Detailed design
123.	**Minimise impacts of extreme heat** Detailed design would consider inclusions to minimise impacts of extreme heat, including: • selection of materials for durability in extreme conditions that minimise heat retention • urban design elements that provide lighter coloured surfaces and adequate shade, that minimise water use and provide drainage sized for future rainfall predictions. Relevant wind codes, surface water modelling would also be considered during detailed design. Some climate change risks in construction and operation would be managed through management plans and procedures.	Contractor	Detailed design
	Cumulative impacts		
124.	**Ongoing Cumulative Impacts** The potential cumulative impacts associated with the Proposal would be further considered as the design develops and as further information regarding the location and timing of potential developments is released. Environmental management measures would be developed in the CEMP, and implemented as appropriate.	Contractor	Pre-construction

7.3 Cumulative impacts

Cumulative impacts occur when two or more proposals are carried out concurrently and in close proximity to one another. The impacts may be caused by both construction and operational activities and can result in a greater impact to the surrounding area than would be expected if each proposal was undertaken in isolation. Multiple proposals undertaken at a similar time/similar location may also lead to construction fatigue, particularly around noise, traffic and air quality impacts, if not appropriately managed.

A search of the Department of Planning and Environment's Major Proposals Register, Sydney Central Planning Panel Development and Planning Register, and City of Parramatta Council Development Application Register was undertaken in October 2023. Table 7-2 presents major proposals within Epping or small proposals within 500 metres of the Proposal, with recent approvals or under assessment.

Table 7-2 Major proposals within Epping or smaller proposals within 500 metres of the Proposal, with recent approvals or under assessment.

Application number	Address	Proposal description	Distance from Proposal	Status
DA/397/2020	2-16 Epping Road, 2-4 Forest Grove, Epping	Construction of 5 x 5-8 storey residential flat buildings comprising 321 apartments; construction of 2 x 2-3 level basement car parks comprising 266 car parking spaces	Within	Approved
SSD-31576972	242-244 Beecroft Road, Epping	Mixed use development	235 m	Approved
SSD-9250948	96-104 Carlingford Road, Epping	Redevelopment of Epping West public school	1,300 m	Approved
SSD-8873789	86 Chelmsford Avenue, Epping	New Epping South Primary School	1,300 m	Approved
DA/598/2023	2 Cambridge Street, Epping	Stratum subdivision of the building into two lots. One commercial lot and one residential lot	200 m	Under assessment
DA/410/2023	15 High Street, Epping	Demolition of existing structures and construction of a two storey 75 place childcare centre with 19 basement parking spaces	250 m	Approved
NA	High Street, Epping	Upgrade of Langston Place pavement, kerb and channel	25 m	CPC capital works program

During construction, work would be coordinated with other construction activities in the area, including those listed within Table 7-2. Consultation and liaison would occur with City of Parramatta Council, TAHE/Sydney Trains, and any other developers identified, to minimise cumulative construction impacts such as traffic and noise.

Traffic generated by the bridge construction is not anticipated to have a significant impact on the surrounding road network. However, lane closures and construction zone speed limits are anticipated to increase the delay of trips through the road network. Coordination with other projects in the area would look to divert other construction project haulage traffic away from the bridge to reduce impacts on road users in the locality.

Operational traffic and transport impacts would have a minimal impact on the performance of the surrounding road network.

Based on this assessment, it is anticipated that the cumulative impacts would be minor/negligible, provided that consultation with relevant stakeholders and mitigation measures in Chapter 7 are implemented.

The potential cumulative impacts associated with the Proposal would be further considered as the design develops and as further information regarding the location and timing of potential developments is released. Environmental management measures would be developed and implemented as appropriate.

8. Conclusion

This REF has been prepared in accordance with the provisions of Section 5.5 of the EP&A Act, considering to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The Proposal would provide the following benefits:

- improved safety and reduced traffic congestion across the Epping Bridge
- improved pedestrian and cyclist safety
- improved access to the town centre for the local community, road users and businesses
- increased westbound lane capacity through the town centre
- provision of infrastructure for future bike and pedestrian movement through the town centre.

The likely key impacts of the Proposal are as follows:

- impacts to the local community associated with construction of the Proposal. Impacts would be intermittent and are anticipated to include:
    - temporary noise and vibration impacts to adjacent residential and business areas during construction, including periods of weekend works
    - temporary rail and road closures during construction
    - temporary reduction in road capacity and increased traffic queuing during construction
    - temporary impacts on local traffic flow associated with construction traffic
    - temporary disruption to pedestrian and shared path access during construction
    - temporary changes to bus stop locations
    - temporary adverse impacts to visual amenity of the local environment due to the construction works associated with the Proposal
    - temporary loss of up to 21 car parking spaces with impacts occurring at High Street and Beecroft Road
- minor impacts to the visual environment from the introduction of new elements, such as safety screens and retaining walls, and from the removal of 28 existing planted native and exotic trees.

This REF has considered and assessed these impacts in accordance with section 171 of the EP&A Regulation and the requirements of the EPBC Act (refer to Chapter 4 and 6). Based on the assessment contained in this REF, it is considered that the Proposal is not likely to have a significant impact upon the environment or any threatened species, populations or communities. Accordingly, an Environmental Impact Statement (EIS) is not required, nor is the approval of the Minister for Planning and Public Spaces.

The Proposal would also take into account the principles of ESD and sustainability (refer to Section 3.3.3 and Section 4.4). These would be considered during the detailed design, construction and operational phases of the Proposal. This would ensure the Proposal is delivered to maximum benefit to the community, is cost effective and minimises any adverse impacts on the environment.

9. Certification

Drafting guidance:

The certification should be signed by the primary author of the REF and accepted by the project manager.

The certification must not be signed by the project manager until the review process described in the ***Project REF procedure (EMF-PA-GD-0070)*** has been completed and the REF is of adequate quality and is ready to be finalised. If in doubt, seek advice from the TE&SR.

I certify that I have reviewed and endorsed the contents of this REF and, to the best of my knowledge, it is in accordance with the EP&A Act, the EP&A Regulation and the Guidelines approved under Section 170 of the EP&A Regulation, and the information is neither false nor misleading. I accept it on behalf of Transport for NSW.

Name:	Geraint Breese
Position:	Senior Environmental Consultant
Company name:	Mott MacDonald
Date:	August 2024

I have reviewed and accept the contents of this REF and that it is a true account of the proposal.

Name:	Colin Muir
Position:	Project Manager
Transport region/program:	Transport for NSW
Date:	August 2024

10. EP&A Regulation publication requirement

Drafting guidance:

This section is to be completed by either the Environment and Sustainability Officer or Senior Manager Environment and Sustainability. Complete the REF publication decision checklist located within the document control pages of this template.

Table 10-1 EP&A Regulation publication requirement

Requirement	Yes/No
Does this REF need to be published under section 171(4) of the EP&A Regulation?	

11. References

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Terms and acronyms used in this REF

Term	Meaning
ABS	*Australian Bureau of Statistics*
AEP	*Annual Exceedance Probability*
AGIC	*Australia Green Infrastructure Council*
AGRD	*Austroads Guide to Road Design*
AHD	*Australian Height Datum*
AHIMS	*Aboriginal Heritage Information Management System*
AIA	*Arboricultural Impact Assessment*
AMB	*Asset Management Branch (refer to Definitions)*
AP	*Aboriginal Place*
APS	*Access to Premises (Disability Standards)*
AQF	*Australian Qualifications Framework*
ARI	*Average Recurrence Interval*
ASRIS	*Australian Soil Resource Information System*
ASS	*Acid Sulfate Soils*
BCA	*Building Code of Australia*
BC Act	*Biodiversity Conservation Act 2016 (NSW)*
BS	*British Standard*
CBD	*Central Business District*
CCTV	*Closed Circuit TV*
CEEC	*Critically Endangered Ecological Communities*
CEMP	*Construction Environmental Management Plan*
CLM Act	*Contaminated Land Management Act 1997 (NSW)*
CNVG-R	*Construction Noise and Vibration Guidelines (Roads)*
CNVIA	*Construction Noise and Vibration Impact Assessment*
CNVMP	*Construction Noise and Vibration Management Plan*
CPTED	*Crime Prevention Through Environmental Design*
CRA	*Climate Risk Assessment*
CSR	*Combined Services Route*
CTMP	*Construction Traffic Management Plan*
DAWE	*Department of Agriculture, Water and the Environment (Aust)*
DBH	*Diameter at Breast Height*
DBYD	*Dial Before You Dig*
D&C	*Design & Construct*
DCCEEW	*NSW Department of Climate Change, Energy, the Environment and Water*
DDA	*Disability Discrimination Act 1992 (Cwlth)*
DECC	*Department of Energy and Climate Change*
DES	*Director Environment and Sustainability (or nominated delegate)*
DPE	*NSW Department of Planning and Environment*
DPHI	*NSW Department of Planning, Housing and Infrastructure*
DPI	*NSW Department of Planning and Industry*
DPIE	*NSW Department of Planning, Infrastructure and Environment*
DSAPT	*Disability Standards for Accessible Public Transport (2002)*

Term	Meaning
DSI	*Detailed Site Investigation (Phase II Contamination Investigation)*
ECM	*Environmental Controls Map*
EEC	*Endangered Ecological Communities*
EES	*NSW Environment, Energy and Science (Division of Department of Planning and Environment)*
EIS	*Environmental Impact Statement*
EMS	*Environmental Management System*
EPA	*Environment Protection Authority*
EP&A Act	*Environmental Planning and Assessment Act 1979 (NSW)*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2021 (NSW)*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)*
EPI	*Environmental Planning Instrument*
EPL	*Environment Protection Licence*
ESCP	*Erosion and Sediment Control Plan*
ESD	*Ecologically Sustainable Development (refer to Definitions)*
FCF	*Fibre Concrete Fragments*
FM Act	*Fisheries Management Act 1994 (NSW)*
FSAM	*Free Standing Anchor Mast*
GDE	*Groundwater Dependent Ecosystem*
GREP	*NSW Government Resource Efficiency Policy*
GSG	*Great Soil Group*
GST	*Galvanised Steel Troughing*
HAF	*Housing Acceleration Fund*
Heritage Act	*Heritage Act 1977 (NSW)*
HIP	*Heritage Interpretation Plan*
HV	*High Voltage*
ICNG	*Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009)*
ICOMAS	*International Council on Monuments and Sites*
.ID	*Informed Decisions*
I&P	*Infrastructure & Place*
IS Council	*Infrastructure Sustainability Council*
LCVIA	*Landscape Character and Visual Impact Assessment*
LEP	*Local Environmental Plan*
LGA	*Local Government Area*
LoR	*Limit of Reporting*
LoS	*Level of Service*
LSPS	*Local Strategic Planning Statements*
LV	*Low Voltage*
MCA	*Multi Criteria analysis*
MMP	*Microbat Management Plan*
MTS	*Metro Trains Sydney*
NBN	*National Broadband Network*
NCA	*Noise Catchment Area*
NEPM	*National Environmental Protection Measures*
NES	*National Environmental Significance*

Term	Meaning
NML	*Noise Management Level*
NPW Act	*National Parks and Wildlife Act 1974 (NSW)*
NSW	*New South Wales*
NVIA	*Noise Vibration Impact Assessment*
OEH	*Formerly NSW Office of the Environment and Heritage*
OHWS	*Overhead Wire Structure*
OOHW	*Out of hours work*
OWRC	*Other weeds of regional concern*
PA system	*Public Address system*
PAH	*Polycyclic Aromatic Hydrocarbons*
PC	*Pavement core*
PCT	*Plant Community Type*
PMST	*Protected Matters Search Tool*
PoEO Act	*Protection of the Environment Operations Act 1997 (NSW)*
PSI	*Preliminary Site Investigation (Phase I Contamination Investigation)*
RailCorp	*(former) Rail Corporation of NSW*
RAP	*Remediation Action Plan*
RBL	*Rating Background Level*
REF	*Review of Environmental Factors (this document)*
RMS	*Roads and Maritime Services*
RNP	*NSW Road Noise Policy (Department of Environment, Climate Change and Water, 2011)*
Roads Act	*Roads Act 1993 (NSW)*
Roads and Maritime	*NSW Roads and Maritime Services (formerly Roads and Traffic Authority)*
RP	*Regional priority*
RTA	*Roads and Traffic Authority*
SAC	*Site Assessment Criteria*
SDG	*Transport for NSW Sustainability Design Guidelines v.4.0*
SEPP	*State Environmental Planning Policy*
SER	*Safety, Environment and Regulation*
SES	*State Emergency Services*
SH	*Standard Hours*
SHR	*State Heritage Register*
SoHI	*Statement of Heritage Impact*
SP	*State Priority*
SVTM	*State Vegetation Type Map*
TAHE	*Transport Asset Holding Entity*
TCP	*Traffic Control Plan*
TESR	Transport Environment and Sustainability Representative
Transport	*Transport for NSW*
TGSI	*Tactile Ground Surface Indicators (“tactiles”)*
TMP	*Traffic Management Plan*
TRH	*Total Recoverable Hydrocarbons*
TPZ	*Tree Protection Zone*
TVM	*Ticket Vending Machine*
UDLP	*Urban Design and Landscape Plan*
UG	*Underground*

Term	Meaning
UMP	*Utilities Management Plan*
UST	*Underground Storage Tanks*
VP	*Viewpoint*
WARR Act	*Waste Avoidance and Resource Recovery Act 2001 (NSW)*
WM Act	*Water Management Act 2000 (NSW)*
WoNS	*Weeds of National Significance*

Term	Meaning
Average Recurrence Interval	The likelihood of occurrence, expressed in terms of the long-term average number of years, between flood events as large as or larger than the design flood event. For example, floods with a discharge as large as or larger than the 100-year ARI flood will occur on average once every 100-years.
Asset Management Branch	The Asset Management Branch (formerly Asset Standards Authority) is a part of Transport for NSW responsible for engineering governance, assurance of design safety, and ensuring the integrity of transport and infrastructure assets. Within the rail environment, Design Authority functions formerly performed by Asset Standards Authority are now exercised by the Asset Management Branch.
Concept design	The concept design is the preliminary design presented in this REF, which would be refined by the Contractor (should the Proposal proceed) to a design suitable for construction (subject to Transport for NSW acceptance).
Design and Construct Contract	A method to deliver a proposal in which the design and construction services are contracted by a single entity known as the Contractor. The Contractor completes the Proposal by refining the concept design presented in the REF and completing the detailed design so that it is suitable for construction (subject to Transport for NSW acceptance). The Contractor is therefore responsible for all work on the Proposal, both design and construction.
Detailed design	Detailed design broadly refers to the process that the Contractor undertakes (should the Proposal proceed) to refine the concept design to a design suitable for construction (subject to Transport for NSW acceptance).
Disability Standards for Accessible Public Transport	The Commonwealth *Disability Standards for Accessible Public Transport 2002* ("Transport Standards") (as amended) are a set of legally enforceable standards, authorised under the Commonwealth *Disability Discrimination Act 1992* (DDA) for the purpose of removing discrimination 'as far as possible' against people with disabilities. The Transport Standards cover premises, infrastructure and conveyances, and apply to public transport operators and premises providers.
Ecologically Sustainable Development	As defined by section 193 of the EP&A Regulation. Development that uses, conserves and enhances the resources of the community so that ecological processes on which life depends are maintained, and the total quality of life, now and in the future, can be increased.
Feasible	A work practice or abatement measure is feasible if it is capable of being put into practice or of being engineered and is practical to build given proposal constraints such as safety and maintenance requirements.
Noise sensitive receiver	In addition to residential dwellings, noise sensitive receivers include, but are not limited to, hotels, entertainment venues, pre-schools and day care facilities, educational institutions (eg schools, TAFE colleges), health care facilities (eg nursing homes, hospitals), recording studios and places of worship/religious facilities (eg churches).
NSW Trains	From 1 July 2013, NSW Trains became the new rail provider of services for regional rail customers.
Out of hours work	Defined as work *outside* standard construction hours (ie outside of 7am to 6pm Monday to Friday, 8am to 1pm Saturday and no work on Sundays/public holidays).
Proponent	A person or body proposing to carry out an activity under Division 5.1 of the EP&A Act - in this instance, Transport for NSW.
Rail possession / shutdown	Shutdown is the term used by railway building/maintenance contractors to indicate that they have taken possession of the track (usually a block of track) for a specified period, so that no trains operate for a specified time. This is necessary to ensure the safety of workers and rail users.
Reasonable	Selecting reasonable measures from those that are feasible involves making a judgment to determine whether the overall benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the measure.
Sensitive receivers	Land uses which are sensitive to potential noise, air and visual impacts, such as residential dwellings, schools and hospitals.
Sydney Trains	From 1 July 2013, Sydney Trains replaced CityRail as the provider of metropolitan train services for Sydney.

Term	Meaning
Tactiles	Tactile tiles or Tactile Ground Surface Indicators (TGSIs) are textured ground surface indicators to assist pedestrians who are blind or visually impaired. They are found on many footpaths, stairs and train station platforms.
Transport Asset Holding Entity of New South Wales	The statutory State owned corporation and owner of rail property assets, rolling stock and rail infrastructure in the Sydney metropolitan area and limited country locations in New South Wales.
The Proposal	The construction and operation of the upgraded Epping Bridge.
The Proposal area	The land to be impacted during the construction of the Proposal.
Tree and Hollow Replacement Guidelines	The Transport for NSW guide that applies where there is vegetation clearing proposed, and where the impact of the proposed clearing is not deemed 'significant' for the purposes of section 5.5 of the EP&A Act. The Guide provides for planting of a minimum of eight trees for each large tree with a diameter at breast height (DBH) of between 50cm and 100cm, four trees where the DBH is 20-50cm, or two trees where DBH is 5-20cm.

Appendix A - Consideration of section 171(2) factors, section 171A factors and matters of national environmental significance and Commonwealth land

Consideration of section 171(2) factors

In addition to the requirements of the Guideline for Division 5.1 assessments (DPE 2022) as detailed in the REF, the following factors, listed in section 171(2) of the Environmental Planning and Assessment Regulation 2021, have also been considered to assess the likely impacts of the proposal on the natural and built environment.

Factor	Description of impact	Duration and extent
a) Environmental impact on the community.	The construction of the Proposal is anticipated to impact the community. Impacts would be temporary are associated to construction noise, reduced traffic capacity and reduced visual amenity in the locality. on the community in the locality. Mitigation measures outlined in Section 7.2, would be implemented to manage and minimise negative impacts during construction. The operation of the Proposal would result in an increase in the road capacity, improved safety and reduced congestion through the town centre.	Short-term, moderate, negative impact Long-term, positive impact
b) The transformation of the locality.	The Proposal would replace the existing Epping Bridge and upgrade approaches to the bridge. The works are located within existing road and rail corridors, in an urban environment. New visible elements would be added to the bridge including additional lanes and safety screens. The appearance of new elements would cause minor visual changes to the surrounding area. The detailed design phase of the Proposal would minimise the changes to the surrounding area by ensuring design is consistent with existing station elements and area and specific urban design principles. The Proposal also requires the removal of 28 trees which currently screen visual elements in the area. Visual impacts of the Proposal on the locality would be reduced through the implementation of mitigation measures outlined in Section 7.2. There would be some residual impact associated on the removal of trees along the rail corridor.	Long-term, moderate, negative impact
c) Any environmental impact on the ecosystems of the locality.	The Proposal would remove 28 trees of planted native and exotic varieties. The locality is a highly modified, urban environment with limited fauna habitat values. Environmental impacts are anticipated to be minor and would not be expected to result in adverse impacts to the ecosystems of the locality. The implementation of mitigation measures outlined in Section 7.2 would minimise impacts, including following the tree replacement ratios outlined in the Tree and Hollow Replacement Guidelines (Transport, for NSW, 2023h).	Nil
d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality.	During construction, the Proposal would result in a temporary reduction in the aesthetic quality of the locality as a result of noisy construction activities, loss of visual amenity, reconfigured traffic movements and control measures. Permanent changes to the landscape character during operation that would result from removal of the 28 trees within and surrounding the Proposal area, would reduce the aesthetic qualities and values of the area.	Short-term, moderate, negative

Factor	Description of impact	Duration and extent
	The installation of safety screens and new retaining features is also expected to reduce the aesthetic quality for some viewpoints. Impacts to qualities of the area surrounding the Proposal would be minimised through the he implementation of mitigation measures outlined in Section 7.2. This would include following the tree replacement ratios outlined in the Tree and Hollow Replacement Guidelines (Transport, for NSW, 2023h).	Long-term, moderate, negative
e) Any effect on any locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations.	The station is listed on TAHE's Section 170 Heritage and Conservation Register. The Proposal would result in some minor impacts to some parts of the station that are heritage listed including minor visual impacts. Mitigation measures require root investigations and tree sensitive construction methods to retain trees within the heritage listed Forest Park. The assessment determined that there is low potential for the Proposal to impact on any archaeological remains or items of Aboriginal heritage. Impacts to heritage would be minimised through the implementation of the mitigation measures provided Section 7.2.	Long-term, minor, negative Nil Nil
f) Any impact on the habitat of protected fauna (within the meaning of the *Biodiversity and Conservation Act 2016*).	The Proposal is unlikely to impact on the habitat of protected fauna as none has been identified as existing within the Proposal area. There is limited habitat value within the Proposal area.	Nil
g) Any endangering of a species of animal, plant or other form of life, whether living on land, in water or in the air.	The Proposal is unlikely to endanger any species of animal, plant or other form of life living on land, in water or in the air. There is limited habitat value within the Proposal area and vegetation to be removed is planted native or exotic species	Nil
h) Any long-term effects on the environment	The Proposal would have positive long-term effects by improving road safety and connectivity and contributing to the urban renewal and realisation of the Epping Activation Program. 28 trees are required to be removed to enable construction of the Proposal. The implementation of mitigation measures outlined in Section 7.2 would minimise impacts, including following the tree replacement ratios outlined in the Tree and hollow replacement guidelines (Transport, for NSW, 2023h).	Positive Moderate negative
i) Any degradation of the quality of the environment.	The construction of the Proposal is anticipated to impact the quality of the environment. Impacts would be temporary and are associated with construction noise, reduced traffic capacity and reduced visual amenity on the community in the locality. Mitigation measures outlined in Section 7.2, would be implemented to manage and minimise negative impacts during construction.	Short term, moderate negative

Factor	Description of impact	Duration and extent
	28 trees are required to be removed to enable construction of the Proposal. The implementation of mitigation measures outlined in Section 7.2 would minimise impacts, including following the tree replacement ratios outlined in the Tree and hollow replacement guidelines (Transport, for NSW, 2023h).	Long term, moderate negative
j) Any risk to the safety of the environment.	During construction pollution of the environment could occur from sedimentation of watercourses through transported sediment, exposure of contaminated soils, plant emissions, waste, spilt fuels and chemicals. Mitigation measures are outlined in Section 7.2 to minimise impacts. Operation of the Proposal would improve safety for road users and active transport users.	Short-term, minor, negative Long-term, positive
k) Any reduction in the range of beneficial uses of the environment.	The Proposal is not anticipated to result in any reduction in the range of beneficial uses of the environment.	Nil
l) Any pollution of the environment.	During construction pollution of the environment could occur from sedimentation of watercourses through transported sediment, exposure of contaminated soils, plant emissions, waste, spilt fuels and chemical. Mitigation measures are outlined in Section 7.2 to minimise impacts.	Short term, minor, negative
m) Any environmental problems associated with the disposal of waste	The Proposal is unlikely to result in environmental problems associated with the disposal of waste. All waste would be managed and disposed of in accordance with a site specific Waste Management Plan that would be prepared as part of the Construction Environmental Management Plan. Mitigation measures in section 7.2 would be implemented to ensure waste is reduced, reused or recycled where possible.	Nil
n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply.	Resources needed for the Proposal are readily available and are not in short supply.	Nil
o) The cumulative environmental effect with other existing or likely future activities.	Cumulative impacts are discussed in Section 7. A range of proposals have been identified within Epping which could create a cumulative environmental impact on traffic, noise and visual amenity. Mitigation measures must be implemented to manage potential cumulative impacts.	Short term, moderate, negative
p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions.	As the Proposal is not located within a coastal area, it would not impact on coastal process and/or coastal hazards, including projected climate change conditions.	Nil
q) Applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1	The Proposal would support the ongoing redevelopment of Epping in accordance with the Epping Activation Program. The Proposal aligns with a range of the Greater Sydney Region Plan, primarily: • Objective 1. Infrastructure that supports the three cities	Nil

Factor	Description of impact	Duration and extent
	• Objective 3. Infrastructure adapts to meet future needs • Objective 6. Services and infrastructure meet communities' changing needs. Epping is a metropolitan centre within the Central River City as such the *Central City District Plan* applies to the Proposal. The Proposal aligns with following objectives: • Planning Priority C1. Planning for a city supported by infrastructure • Planning Priority C3. Providing services and social infrastructure to meet people's changing needs.	
r) Other relevant environmental factors	In considering the potential impacts of the Proposal all relevant environmental factors have been considered, refer to Chapter 6 of this assessment.	Nil

Matters of National Environmental Significance and Commonwealth land

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

Factor		Impact
a	Any impact on a World Heritage property?	Nil
b	Any impact on a National Heritage place?	Nil
c	Any impact on a wetland of international importance?	Nil
d	Any impact on a listed threatened species or communities?	Nil
e	Any impacts on listed migratory species?	Nil
f	Any impact on a Commonwealth marine area? [State whether the proposal would impact on a Commonwealth marine area. If impacts are likely, describe the nature and extent of the impacts.]	Nil
g	Does the proposal involve a nuclear action (including uranium mining)?	Nil
h	Additionally, any impact (direct or indirect) on the environment of Commonwealth land?	Nil