BRIDGE ROAD OVERBRIDGE RENEWAL

REVIEW OF ENVIRONMENTAL FACTORS

Document History

Title	*Bridge Road Overbridge, Westmead – Bridge Renewal* Review of Environmental Factors
Number	1.0

Version	**Issued**	**Description**
Draft	11/05/2021	Draft REF for Bridge Road Overbridge, Westmead – Bridge Renewal
Final Draft	20/11/2023	Final Draft REF for Bridge Road Overbridge, Westmead – Bridge Renewal
Final	18/12/2023	Final REF for Bridge Road Overbridge, Westmead – Bridge Renewal

Executive Summary

Sydney Trains, in conjunction with City of Parramatta and Cumberland City Council, proposes to undertake the Bridge Road overbridge renewal project (the project).

The Bridge Road overbridge is a rail overpass across the Main Western Line located in Westmead. Originally constructed in 1949 and later rebuilt in 1977 (with subsequent repairs in 2005 and 2009), recent assessments have shown signs of structural deficiency. The bridge is of an outdated design and its height needs to be adjusted to allow vertical clearance under the bridge consistent with current standards.

The project includes:

- demolition of the existing bridge
- construction of a new bridge at the same location as the existing bridge. The new bridge design will incorporate widening the bridge and raising its vertical clearance
- regrading of roads at tie-ins and pavement works
- relocation of overhead wiring
- relocation of utilities.

GHD has prepared this Review of Environmental Factors (REF) on behalf of Sydney Trains to assess the environmental impacts associated with the construction and operation of the project under the provisions of Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The REF has been prepared in accordance with section 171 of the Environment Planning and Assessment Regulation 2000.

During construction, the main potential environmental impacts include traffic and noise, vibration and non-Aboriginal heritage. The assessment shows that potential adverse construction impacts would be appropriately managed in accordance with the mitigation measures outlined in this REF and subsequently the project will not have a significant impact on the environment.

Once operational, the project will have a beneficial impact towards improving connectivity and easing congestion in the Westmead area.

Terms and Definitions

Terms	
BC Act	*Biodiversity Conservation Act 2016* (NSW)
CEMP	Construction Environmental Management Plan
CLM Act	*Contaminated Land Management Act 1997* (NSW)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EP&A Regulation	Environmental Planning and Assessment Regulation 2000 (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EPA	NSW Environment Protection Authority
EPL	Environmental Protection Licence
Transport and Infrastructure SEPP	State Environmental Planning Policy (Transport and Infrastructure) 2021
LEP	Local Environmental Plan
NML	Noise Management Level
OEH	NSW Office of Environment and Heritage
PoEO Act	*Protection of the Environment Operations Act 1997* (NSW)
REF	Review of Environmental Factors
s170 Register	Heritage and Conservation Register, a list of heritage items made under s170 of the *Heritage Act 1977*
SEPP	State Environmental Planning Policy
SHR	NSW State Heritage Register
soffit	the bottom surface of a bridge
SoHI	Statement of Heritage Impact

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1 Introduction

Sydney Trains, in conjunction with City of Parramatta and Cumberland City Council, proposes to undertake the Bridge Road overbridge renewal project. The existing Bridge Road overbridge is a rail overpass across the Main Western Line located in Westmead consisting of a three-span steel girder and slab carrying two lanes of traffic (single carriageway with one lane for each direction). The bridge was originally constructed in 1949 and was later rebuilt in 1977 with subsequent repairs in 2005 and 2009. The bridge is of an outdated design and shows signs of structural deficiency, raising concerns over its long-term load carrying capacity.

The Bridge Road overbridge renewal project ("the project") will replace the existing bridge with a three-lane traffic bridge and include subsequent road upgrades at the tie-ins to local roads. The project will also increase the current height of the bridge by one metre, allowing a 5.3 metre vertical clearance under the bridge.

The project is subject to assessment and determination under Division 5.1 of the NSW *Environmental Planning and Assessment Act 1979* (the EP&A Act). An environmental impact assessment in the form of a review of environmental factors (REF) is required to satisfy Sydney Trains' obligations under Section 5.5 of the EP&A Act.

This Review of Environmental Factors (REF) has been prepared by GHD on behalf of Sydney Trains to assess the potential environmental impacts associated with the construction and operation of the project. The REF is based on the 70 per cent detailed design prepared by GHD and issued to Sydney Trains in June 2021 (GHD, 2021) and the agreed abutment amendment from piles and wall to contiguous pile and headstock. Additionally, the REF has drawn from both desktop assessment and site inspection. As bridges and overpasses can potentially provide habitat for microbats as roost sites, a biodiversity survey incorporating assessment for threatened bat species has been included as part of the REF.

1.1 Project location

The project is located in the suburb of Westmead across two local government areas (LGAs): City of Parramatta and the Cumberland City Council, with the centre of the railway line as the boundary between the two LGAs. Figure 1.1 shows the location of the site, land use zoning and key community and educational facilities.

The Bridge Road overbridge is owned by RailCorp and is situated on RailCorp owned land. The road reserve is owned by the Cumberland Council.

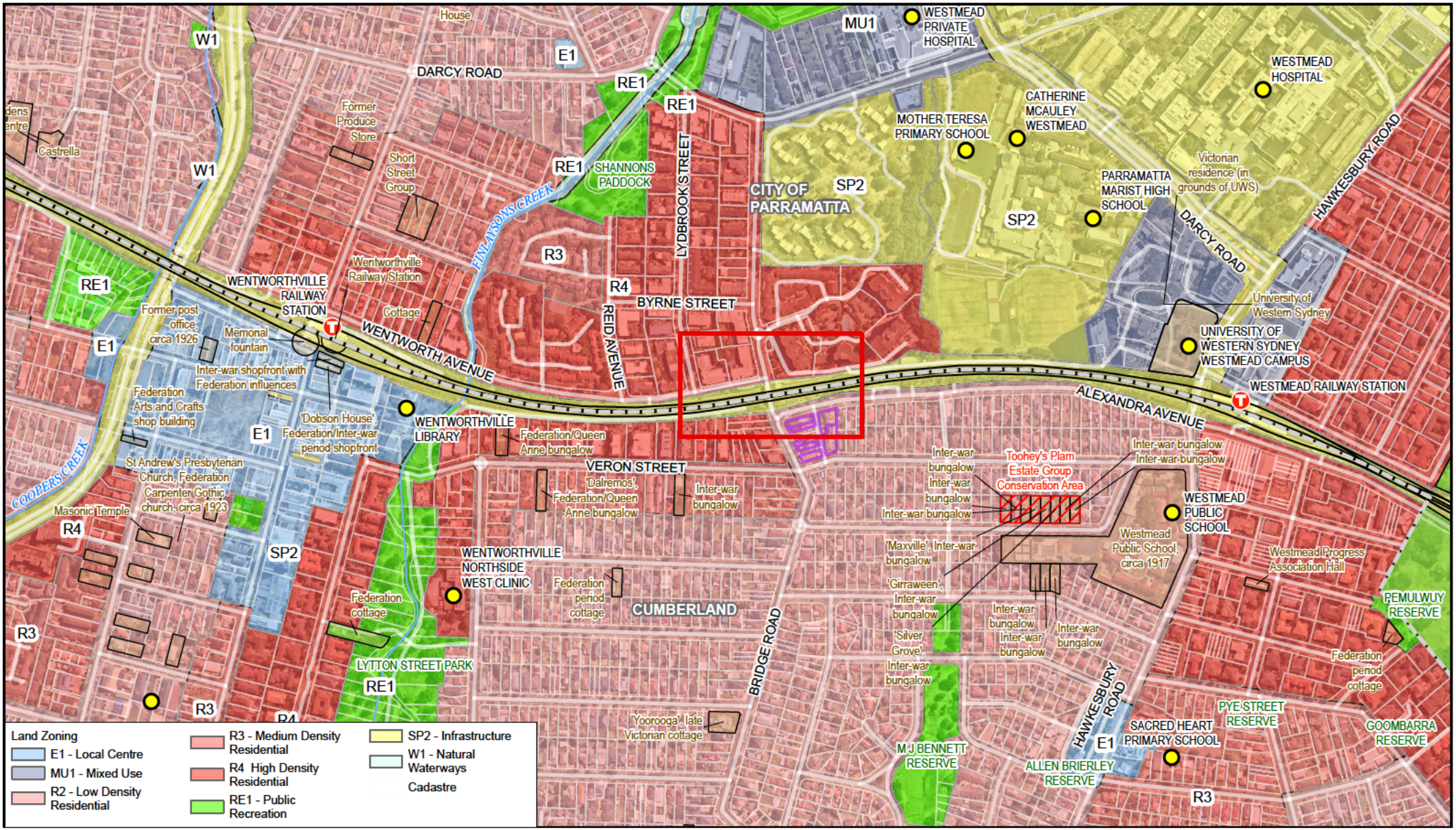
Land uses in the immediate vicinity of the site are as follows (from the centre of the site):

- to the east is the rail corridor, with Westmead Railway Station and the Hawkesbury Road rail overpass located about 500 metres east of the project site
- to the west is the rail corridor, with Wentworthville Railway Station located about 300 metres west of the project site

- to the north is a high-density residential area characterised by single-level houses, townhouses and apartments as well as multi-level apartment building. The largest of these is the Monarco Estate located at the corner of Bridge Road and Wentworth Avenue which consists of 98 units across eight floors. Bus stops are located on both sides of Bridge Road 10 to 20 metres north of the bridge
- to the south is a range of residential areas with medium and high-density residential to the southwest and low-density residential areas to the southeast.

Community and educational facilities in the project locality are mostly located east/north east of the project site. These include Western Sydney University's Westmead Campus, Parramatta Marist High School and Mother Teresa Primary School. Westmead Hospital is about 500 metres north of the project site.

Major roads surrounding the project site include the M4 Western Motorway to the south, Cumberland Highway to the west, Hawkesbury Road to the east and Darcy Road to the north.



Legend

- Project location
- Railway station
- Community and educational facilities
- Railway
- Watercourse
- Local Government Area
- Heritage
- Conservation Area - General
- Item - General
- Parramatta Archaeological Management Unit

Paper Size ISO A4

0 50 100 150 200

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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GHD

Sydney Trains
Westmead, Bridge Rd Overbridge - Bridge Renewal
Review of Environmental Factors

Project No. **12515755**
Revision No. **0**
Date **29/11/2023**

Project location

FIGURE 1.1

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Data source: LPI: DCDB/DCTB, 2017; DPE: Heritage, 2019;Imagery: Nearmap WMS Server: . Created by: rvillalon

1.2 Purpose of REF

The purpose of the REF is to:

- describe the project
- document, examine and take into account to the fullest extent possible the likely impacts of the project on the environment
- detail mitigation measures to be implemented
- determine whether an Environmental Impact Statement or Species Impact Statement is required in relation to the project
- determine whether the project can proceed.

For the purposes of these works, Sydney Trains is both the proponent and the determining authority for this REF under, Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The proposed works and associated environmental impacts have been described in the context of section 171 of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation), the *Biodiversity Conservation Act 2016* (BC Act), the *Fisheries Management Act 1994* (FM Act), other relevant NSW legislation and the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). In doing so the REF helps to fulfil the requirements of Section 5.5 of the EP&A Act, for Sydney Trains to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF will be considered when assessing:

- whether the project is likely to have a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning and Infrastructure under Division 5.2 of the EP&A Act
- the significance of any impact on threatened species as defined by the BC Act and/or FM Act and therefore the requirement for a Species Impact Statement, and
- the potential for the project to significantly impact a matter of national environmental significance or Commonwealth land and the need to make a referral to the Australian Government Department of Climate Change, Energy, the Environment and Water for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.

2 The Project

2.1 Need and Objectives of the Project

The need of the project is driven by a larger plan to increase connectivity in the Westmead area, the development of other transport projects particularly the Sydney Metro Rail, and recent assessment identifying structural defects of the bridge.

The City of Parramatta and the Cumberland Council recognise the growth in health and education sectors in Westmead. A media statement released in December 2018 confirms the councils' support for the project. The project, which will widen the existing bridge, will help unlock pinch points in the existing road network and ease congestion in the area.

The objective of the project is to replace the existing Bridge Road overbridge with a three-lanes bridge at the same location, with load rating that meets impact load as required by *Australian Standard for Bridge Design – Design load AS 5100.2:2017* and increased vertical clearance to comply with the *Transport Engineering Standard ESC 215 Transit Space*. The design and construction of the project is aimed to be undertaken in a way that minimises disruption for the local community and the environment.

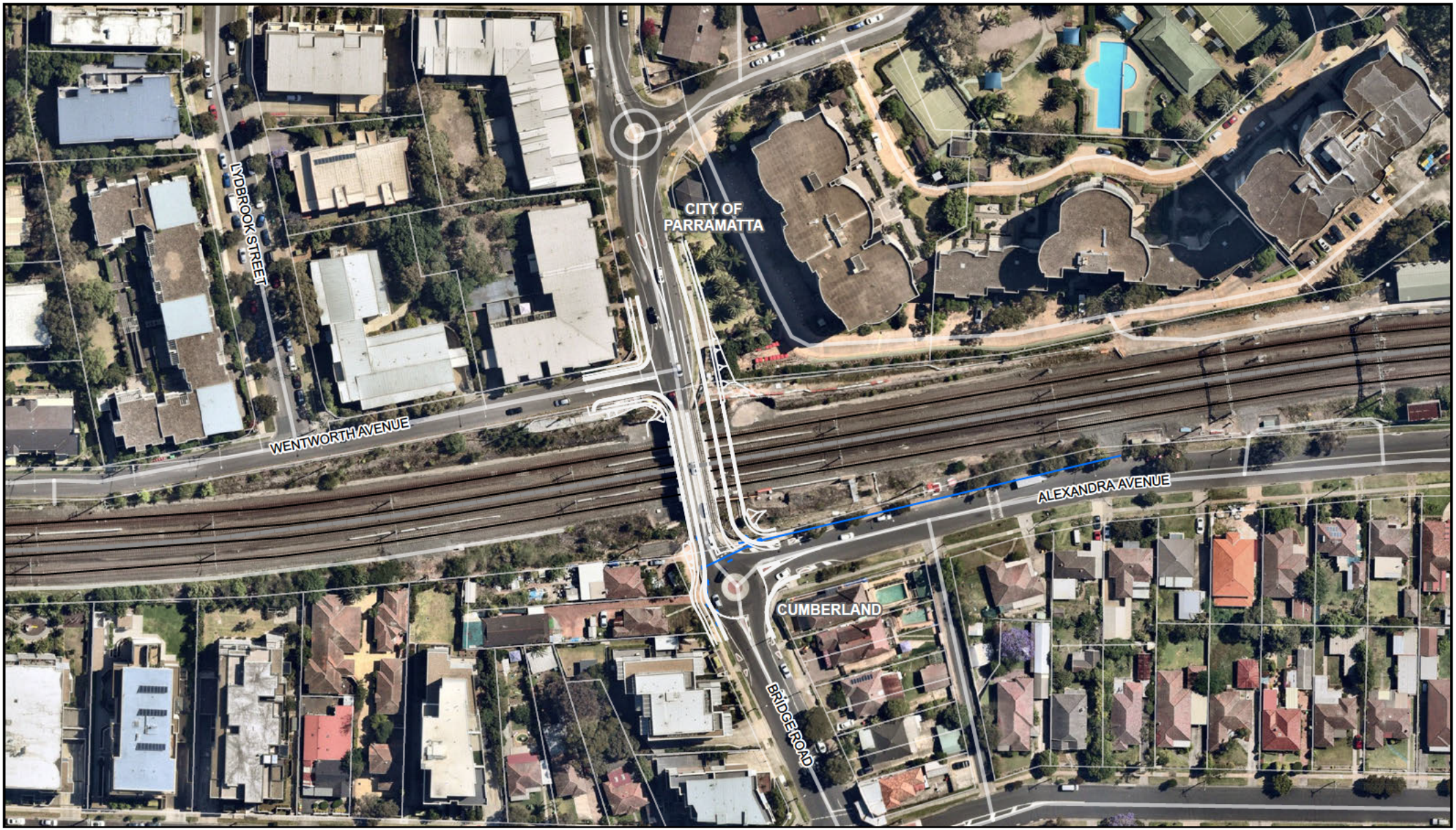
2.2 Description of Project

The 70 per cent concept design of the project was completed by GHD in June 2021 (GHD, 2021). Civil engineering drawings are provided in Appendix B.

The project includes:

- demolition of the existing bridge
- construction of a new bridge at the same location as the existing bridge
- regrading of roads at tie-ins and pavement works
- relocation of overhead wiring
- relocation of utilities.

The project design layout is shown in Figure 2.1



Legend

- Design
- Drainage
- Railway
- Cadastre
- Local Government Area

Paper Size ISO A4

0 10 20 30 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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GHD

Sydney Trains
Westmead, Bridge Rd Overbridge - Bridge Renewal
Review of Environmental Factors

The project

Project No. **12515755**
Revision No. **0**
Date **29/11/2023**

FIGURE 2.1

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2.2.1 *Bridge design*

The key features of the new bridge design are:

- three lane, single span bridge structure of 26.7 metres length in the general alignment of the existing bridge, with 6 metre approach spans at each end
- substructure and abutment consisting of a reinforced concrete contiguous pile wall comprising shotcrete/ concrete infill and headstock to support the superstructure
- superstructure consisting of 24 voided precast, prestressed concrete girders of 710 millimetres wide and 750 millimetres deep underlain with 200 millimetres thick reinforced concrete deck slab
- overall deck width of 19.26 metres, consisting of three 3.2 metre wide traffic lanes, a 3.5 metre wide shared path, a 1.89 metre wide footpath and a services beam located on the east side of the bridge
- height of 5.3 metres from the top of rail to the soffit of the bridge
- footpaths separated from traffic by an “SA kerb” (designed for heavy vehicles)
- medium performance level traffic barriers on each side of the bridge (suitable for heavy mass vehicles) together with a combined safety screen and an anti-throw (protection) screen partially lined with steel sheeting to protect bridge users from overhead wires.

2.2.2 *Road design*

Modifications to existing roads are required at the tie-ins to the new bridge. Key features of the road design are:

- widening of Bridge Road to accommodate an additional left turn lane
- adjustment to the vertical alignment of Wentworth Avenue and Alexandra Avenue at the tie-ins to Bridge Road.

To cater for the changes in road alignment, modification to road stormwater drainage will also be required.

The proposed drainage network seeks to replace the existing drainage network on a like for like basis through the following:

- realignment of the trunk drainage line in Bridge Road impacted by the project renewal of Bridge Road
- adjustments to Wentworth Avenue and Alexandra Avenue tie-ins and connections to existing drainage lines from Alexandra Avenue
- removal of three existing gully pits (located at the centre of the roundabout connecting Bridge Road and Alexandra Avenue)
- modification of existing inlet pit to inspection pit at the corner of Bridge Road and Alexandra Avenue, and construction of junction pit over existing pipe at this location (refer Appendix D).

2.2.3 *Overhead wiring*

Overhead wiring (OHW) is currently attached to the existing bridge and therefore will need to be adjusted as part of the project. The following works will be undertaken:

- detachment of existing OHW
- installation of two new OHW portals, one at either side of the new bridge. These new portals will cover four electrified western mainline tracks underneath.

It is understood that existing OHW will be detached from the existing bridge and transferred to new support structures prior to the demolition of the existing bridge.

2.2.4 *Utilities*

Existing utilities requiring relocation include combined services routes, high voltage power lines and Sydney Trains communication lines.

Combined services routes

Combines services routes run parallel to both abutments of the existing bridge and carry critical infrastructure to the rail corridor. Utilities of concern which are located under the existing bridge footpath are a 210 kPA Jemena gas main, 400 mm DICL Sydney Water pipe and three Telstra conduit cables.

All utilities will be moved into a new service girder north of the bridge and relocated prior to demolition of the existing bridge.

High voltage power lines

There are 33 kV and 11 kV high voltage power lines located at the northern end of the bridge near Wentworth Avenue. These lines are likely to be a hazard during construction lifting operations and will need to be relocated either temporary or permanently.

During development of the concept design, it was considered whether the high voltage lines could be permanently placed underground and connected to the substation located approximately 200 metres east of the bridge.

Sydney Trains communication lines

There are cable ducts incorporated in the existing bridge containing Sydney Trains communications lines including the Optus fibre network and TPG fibre network, which will need to be relocated. The relocation options are either the front face of the new bridge abutment or underground behind the new abutment. Associated signal pits will also need to be relocated.

2.3 Construction Methodology

2.3.1 *Overview*

Details of construction methodology are discussed below.

For the purposes of the impact assessment, the REF has assessed the works within the rail corridor and outside the rail corridor as occurring concurrently.

2.3.2 *Works within the rail corridor*

Works within the rail corridor will include:

- construction of a temporary post and panel wall to allow installation of contiguous pile abutment from headstock soffit level
- construction of the bridge substructure and abutment consisting of a reinforced concrete contiguous pile wall comprising shotcrete/ concrete infill and headstock to support the deck
- removal of the existing bridge sub and superstructure
- construction of the bridge superstructure consisting of single span, pre-stressed concrete plank in place of the existing bridge
- relocation of overhead wiring
- relocation of utilities located within the rail corridor.

The works within the rail corridor will need to be coordinated with Sydney Trains and are subject to Sydney Trains' safety requirements related to working around live rail, which will need to be under the continuous control of Protection Officers. The details of timing will be determined by the construction contractor, particularly where works are required to be undertaken during a track possession period.

It is considered possible for the contractor to establish a work zone within the rail corridor and separate the abutment/pier and foundation works from the rail corridor "danger zone" – a minimum 3 metres from the rail centreline. The work zone will be fenced off and, once established, will allow works to continue under live rail traffic without needing to limit works to track possession periods.

The bridge deck girders will need to be installed during rail shut down periods or track possession periods. The contractor will ensure a safe working area is established over the rail line, including working at height and prevention of objects falling onto live rail.

It is assumed that works within the rail corridor will require clearing of vegetation situated adjacent to rail tracks. The potential impact of vegetation clearing is assessed in section 5.2.

2.3.3 *Works outside the rail corridor*

The following scope of works will be undertaken outside the rail corridor. This includes:

- road construction to raise the road level to match the new bridge
- relocation of roadside services including road drainage.

During construction, one traffic lane in each direction will be maintained on Bridge Road during peak periods. A 0.5 metre wide shoulder and pedestrian access will also be maintained along Bridge Road during construction.

It is assumed that works outside the rail corridor will involve removal of street trees in the immediate vicinity of the works.

2.3.4 *Construction staging*

Construction will be undertaken in stages. The construction staging diagrams are shown in Appendix C and summarised below. Traffic impact considerations are discussed in further detail in Section 5.5.

Table 2.1: Construction staging

Construction stage	*Detail*
Stage 1	Construction of temporary retaining structures adjacent to Bridge Road Overbridge (both sides of the bridge) Construction of new abutments to the east of the existing bridge and temporary retaining wall Bridge Road and surrounds remain open
Stage 2	Construction access on Bridge Road north and south of the bridge, including connection to Alexandra Avenue south of the bridge Construction of a portion of the new bridge consisting one lane each way with one pedestrian walkway on the eastern side (“bridge 1”) Bridge Road remains open with the exception of full closure of the bridge during one weekend rail possession when “bridge 1” is lifted into place Partial closure of Alexandra Avenue
Stage 3	Bridge Road south of the bridge (between Alexandra Avenue and Grand Avenue) is closed except for resident access Partial closures of Bridge Road, Wentworth Avenue and Alexandra Avenue Opening of “bridge 1” to traffic (one lane each way)
Stage 4	Demolition of existing bridge Full closure of the bridge during one weekend posssession. Partial closures of Wentworth Avenue and Alexandra Avenue
Stage 5	Construction of new abutments to the west of “bridge 1” Construction of road approaches to the new bridge
Stage 6	Construction of the remaining portion of the new bridge (“bridge 2”) to the west of “bridge 1” Full closure of the bridge during one weekend rail possession when “bridge 2” is lifted into place Partial closures of Wentworth Avenue and Alexandra Avenue
Stage 7	Construction of Wentworth Avenue to design levels, including tie-in to Bridge Road Partial closures of Bridge Road, Wentworth Avenue and Alexandra Avenue
Stage 8	Construction of Alexandra Avenue to design levels, including tie-in to Bridge Road Removal of temporary retaining structures on both sides of the bridge

Construction stage	Detail
	Partial closures of Bridge Road, Wentworth Avenue and Alexandra Avenue
Stage 9	Finishing works to "bridge 2" Partial closures of Bridge Road and Alexandra Avenue Reopening of Wentworth Avenue
Stage 10	Opening of the new Bridge Road Overbridge to all traffic

2.3.5 *Workforce and construction vehicle parking*

Construction stage planning is still in its infancy, with detailed personnel allocations not yet known. Through conversation with Sydney Trains, it is understood that the construction of the project will typically involve an average workforce of approximately 10 to 20 site personnel during standard construction hours. For some limited items of work, an additional short-term workforce may be required, e.g. possession weekends for the bridge deck lifts.

For works undertaken during routine track possessions (Saturday and Sunday, daytime, evening and night), a workforce of about 15 or more people will be required. The final number of site personnel will be determined by the appointed contractor.

Heavy vehicle parking will be limited for the purpose of delivery and loading of material only. Deliveries will be staggered to minimise queuing of vehicles and a call up system in place to advise the site prior to arrival to site. Heavy vehicles will not queue within the public road area to avoid obstruction to traffic.

Light vehicle parking will be planned and managed prior to construction work and ensure minimal impact to parking within the surrounding network.

Unrestricted on-street parking is available at the following side streets:

- to the south of the bridge: on Alexandra Avenue, eastbound
- to the north of the bridge: on Wentworth Avenue between Reid Avenue and Railway Street, on both sides of the road.

It should be noted that the assumptions in this section are commensurate to the level of understanding of the construction sequence by the Sydney Trains.

2.3.6 *Plant and equipment*

The following plant and equipment are likely to be used for the project:

- excavators
- rigid and articulated trucks
- drilling rigs and boring machines
- cranes
- concrete trucks and pumps
- generators
- welding equipment
- trucks and trailers
- compactors
- graders
- paving machines
- vibrating rollers
- water carts
- road marking machine.

2.3.7 *Materials*

The following materials are to be imported to site:

- ready mix concrete
- reinforcement cages
- pre-fabricated bridge planks
- pre-cast concrete units
- conduits/ pipes
- fill material (abutments/ roads)
- OHW steel structural frames/ members
- miscellaneous: kerbs, manhole covers, pits.

The following waste materials will likely be generated during the project:

- material waste from redundant structures (concrete, reinforcement, cables, pipes)
- spoil from excavation (roads, abutments)
- green waste (vegetation clearing adjacent to existing abutments)
- general waste
- packaging material comprising cardboard and plastic.

2.3.8 *Ancillary facilities*

The contractor will be required to identify a suitable area to store plant, tools and materials in consultation with Sydney Trains.

Construction will require some elements to be constructed in place (for example, abutment and piers) while prefabricated structures will be used for the bridge where possible.

The location of ancillary facilities will be determined by the construction contractor and generally will:

- avoid proximity to sensitive receivers
- aim to avoid disruption to property access where possible
- be placed to avoid impact to known items of non-Aboriginal and Aboriginal heritage

- use existing cleared areas
- ensure no impacts to remnant native vegetation or key habitat features
- potential environmental impacts can be managed using the safeguards in this REF
- be rehabilitated at the end of construction.

The requirement for ancillary facilities will be confirmed by the appointed contractor.

2.3.9 *Traffic and access*

Construction access will use existing roads, however access routes for heavy vehicles will require consideration of restrictions within the road network. Limitations include:

- vehicles more than 4.6 metres high are not permitted on local roads in the vicinity of the project site
- a load limit of 3 tonne is imposed on Alexandra Avenue
- a load limit of 24 tonne is imposed on Bridge Road overbridge.

The approved route for 4.6-metre high vehicles is shown in Figure 2.2.

The potential impact of construction on traffic and access is discussed in further detail in section 5.5 of this REF.

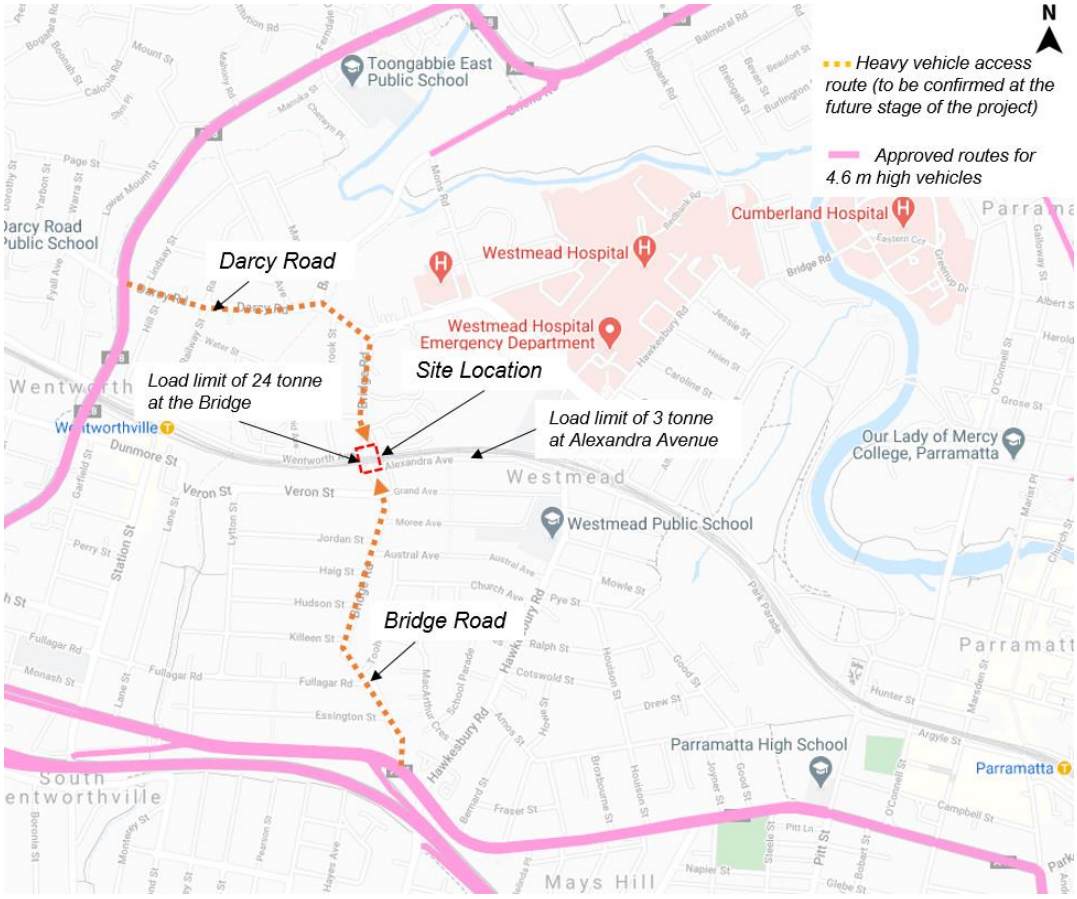


Figure 2.2: Construction vehicle access route

2.4 Timing and Costing

The project is expected to commence in 2024 and would take about two years to construct.

In the interest of safety and minimising disruption to peak periods, it would be necessary to undertake the majority of the proposed works during track possession or other periods outside of standard working hours. In order to complete the nominated works during the scheduled possessions, the proposed works would require 24-hour working hours and/or night shifts. In accordance with Section O13.4 of the Sydney Trains EPL 12208, any work undertaken outside of standard maintenance hours would require notification to noise affected sensitive receivers no less than five days prior to work commencing. The standard hours in accordance with the Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009) are:

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

Appropriate mitigation measures will be implemented to minimise noise impacts (refer Section 5.3.6).

The total cost of the project is about $19.5 million (Cumberland City Council, 2018). This is being achieved through funding from NSW Government Stronger Communities Fund allocations provided by the Parramatta ($600,000) and Cumberland ($500,000) Councils, with the remainder coming from Sydney Trains.

2.5 Alternatives Considered

The alternatives considered for the project include the ‘do-nothing’ option, modification of the existing bridge and undertaking a bridge renewal project.

The ‘do-nothing’ option would involve the continuing use of the existing Bridge Road Overbridge and would not meet the objectives of the project. Modification of the existing bridge is not feasible as the design of the bridge needs to be updated and would also not meet the objectives of the project. Therefore, these are not considered further.

Undertaking a bridge renewal project involves investigating a few different design options. The design options for bridge renewal have been assessed in *Westmead, Bridge Road Overbridge – Bridge Renewal Volume 1: Options Study* (GHD, 2020a). A range of factors and constraints have been considered, including:

- Utility relocations and design – with consideration given to the gas main and water main crossing the bridge
- Span arrangement – three different span configurations were explored, with the single clear span preferred.
- Bridge design – bridge superstructure and substructure options were evaluated with respect to five key criteria: constructability, maintainability, durability, road/rail clearance and cost.
- Road alignment options were considered for three different vertical clearance requirements, including the existing clearance of 5.1 metres, 5.9 metres and 6.5 metres.

2.6 Justification of Preferred Option

The preferred option consists of:

- Replacing the existing bridge with a new 3-lane bridge. The bridge is designed to be single span, thus eliminating central supports in the rail corridor.
- The bridge design comprises prestressed concrete planks with full height retaining abutments supported on piles (substructure) and a design life of 120 years.
- Vertical clearance of 5.3-metre from the top of rail to the soffit of the bridge deck. This allows for the detachment of OHW below the bridge.
- The construction methodology developed to allow existing traffic flows through the construction phase (anticipated two years).

The proposed 5.3-metre clearance is the minimum vertical clearance to avoid the need for OHW to be attached to the bridge. This clearance considers the project location and width of the bridge. The 5.3-metre clearance, rather than any higher, was chosen to minimise the extent of road modifications.

The preferred option will meet the objective of the project to replace the existing Bridge Road overbridge with a new bridge which complies with current design requirements.

The preferred option will also contribute to improving connectivity and easing congestion in the Westmead area. The preferred option is of appropriate scale and is not expected to result in significant environmental impacts.

3 Statutory Requirements

3.1 State Environmental Planning Policies

3.1.1 *State Environmental Planning Policy (Transport and Infrastructure) 2021*

The Chapter 2 of the State Environmental Planning Policy (Transport and Infrastructure) 2021 (Transport and Infrastructure SEPP) aims to assist in the effective delivery of public infrastructure across the State by improving certainty and regulatory efficiency through a consistent planning assessment and approvals regime for public infrastructure and services and through the clear definition of environmental assessment and approval processes for public infrastructure and services facilities.

The following clauses of the Infrastructure SEPP are relevant for the project:

- Section 2.93 permits development for the purpose of a railway or rail infrastructure facilities to be carried out by or on behalf of a public authority without consent on any land.
- 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 project is for a road infrastructure within railway infrastructure corridor and is to be carried out by or on behalf of Sydney Trains, it can be assessed under Division 5.1 of the EP&A Act and development consent from council is not required.

Sections 2.10 to 2.15 of the Transport and Infrastructure SEPP contain provision for public authorities to consult with local councils and other agencies prior to the commencement of development, as described in Section 4.

The project is not located on land reserved under the *National Parks and Wildlife Act 1974* (NPW Act) and does not affect land or development regulated by under State Environmental Planning Policy (Resilience and Hazards) 2021 (SEPP (Resilience and Hazards)) or the State Environmental Planning Policy (Planning Systems) 2021 (SEPP (Planning Systems).

3.2 Local Environmental Plans

Two local environmental plans apply to the project. The northern half of the project site is situated within the City of Parramatta and would be subject to the planning controls of the Parramatta Council. The southern half of the project site is situated within the Cumberland Council, which is a newly formed council resulting from major reorganisation of the area previously covered by Auburn, Holroyd and Parramatta Councils. As the project is within the former Holroyd Council, planning controls of the former Holroyd Council would apply.

However, as the project is being undertaken under Division 5.1 of the EP&A Act, the relevant provisions of the Transport and Infrastructure SEPP prevail over all other environmental planning instruments (such as LEPs) except where there is an inconsistency with State Environmental Planning Policy (State Significant Precincts) 2005.or certain provisions of the State Environmental Planning Policy (Coastal Management) 2018..

3.2.1 *Parramatta Local Environmental Plan 2023*

The site is located within land zoned SP2 Infrastructure. The land immediately adjacent to the site on the northern side of the rail corridor is zoned R4 High Density Residential under the Parramatta LEP 2023.

The objectives of the SP2 Infrastructure zone are:

- to enable land to be used for public open space or recreational purposes
- to provide a range of recreational settings and activities and compatible land uses
- to protect and enhance the natural environmental for recreational purposes
- to conserve, enhance and promote the natural assets and cultural heritage significance of Parramatta Park
- to create a riverfront recreational opportunity that enables a high quality relationship between the built and natural environment.

The objectives of the R4 High Density Residential zone are:

- to provide for the housing needs of the community within a high density residential environment
- to provide a variety of housing types within a high density residential environment
- to enable other land uses that provide facilities or services to meet the day to day needs of residents
- to provide opportunity for high density residential development close to major transport nodes, services and employment opportunities
- to provide opportunities for people to carry out a reasonable range of activities from their homes if such activities will not adversely affect the amenity of the neighbourhood.

Development of roads are permitted with consent within the above-mentioned zones under the Parramatta LEP.

3.2.2 *Cumberland Local Environmental Plan 2023*

The site is located within land zoned SP2 Infrastructure. The land immediately adjacent to the site on the southern side of the rail corridor is zoned R4 High Density Residential and R2 Low Density Residential under the Cumberland LEP 2011.

The objectives of the SP2 Infrastructure zone are:

- to provide for infrastructure and related uses
- to prevent development that is not compatible with or that may detract from the provision of infrastructure.

The objectives of the R2 Low Density Residential zone are:

- to provide for the housing needs of the community within a low density residential environment
- to enable other land uses that provide facilities or services to meet the day to day needs of residents
- to encourage residential development that maintains the amenity of the surrounding area
- to ensure that non-residential land uses are located in a setting that minimises impacts on the amenity of a low-density residential environment.

The objectives of the R4 High Density Residential zone are:

- to provide for the housing needs of the community within a high density residential environment
- to provide a variety of housing types within a high density residential environment
- to enable other land uses that provide facilities or services to meet the day to day needs of residents
- to ensure that non-residential land uses are located in a setting that minimises impacts on the amenity of a high density residential environment
- to encourage residential development that maintains the amenity of the surrounding area.

The project is consistent with the above objectives as upgrading the bridge to three lanes will provide infrastructure that is still compatible with the surrounds of the site area.

Development of roads are permitted with consent within the above-mentioned zones under the Cumberland LEP.

3.3 NSW State legislation

3.3.1 *Environment Planning and Assessment Act 1979*

In NSW, the EP&A Act and the EP&A Regulation regulate the majority of planning and environmental impact assessment requirements. Under Section 5.5 of the EP&A Act, Sydney Trains is required to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of its activities.

Section 171 of the EP&A Regulation identifies factors to be considered by Sydney Trains to assess the likely impacts of the project on the natural and built environment in producing the REF. The Section 171 factors are considered in Section 6.

3.3.2 *Roads Act 1993*

The *Roads Act 1993* (Roads Act) provides for the operation, maintenance and use of roadways in NSW including managing authorities, rites of passage and classification of roads.

Section 138(1) of the Roads Act requires that a person must not carry out work in, on or over a public road or dig up or disturb the surface of a public road without the prior consent of the appropriate road's authority. However, in accordance with clause 5 of Schedule 2, a public authority is not required to obtain a roads authority's consent to exercise the public authority's functions in, on or over an unclassified road other than a Crown road.

The project will involve works on Bridge Road, Wentworth Avenue and Alexandra Avenue, which are local roads managed by Parramatta and Cumberland City Councils. While approval from Council is not required to undertake the works on the roads, a road excavation permit will be required in accordance with Section 138(1) of the Roads Act. Sydney Trains has and will continue to consult with the Councils in relation to the permit.

3.3.3 *Heritage Act 1977*

The *Heritage Act 1977 (*Heritage Act) provides for the protection and conservation of non-Aboriginal cultural heritage items such as buildings, works, relics and other places of historic, cultural, social, archaeological, architectural, natural and aesthetic significance. Sydney Trains must seek the approval under Section 60 of the Heritage Act if it is likely to impact an item of heritage significance listed on the State Heritage Register (SHR). Certain rail-specific activities are exempt from obtaining external approval under the Heritage Act.

Sydney Trains also has important obligations which include the requirement to maintain a Section 170 heritage and conservation register of heritage assets it owns, occupies, controls, manages or is under its care. Sydney Trains is also obliged to protect and maintain these heritage items to minimum standards of maintenance and repair.

A search was undertaken of relevant NSW and Commonwealth databases for items within the suburb of Westmead. The nearest item of state significance listed in the SHR is the Parramatta Park and Old Government House (listing number 00596), located about 1.1 kilometres west of the site. This item is also listed in the National Heritage List as Old Government House and Government Domain, Parramatta. The project site is not included in the RailCorp's section 170 heritage and conservation register. The closest item in the RailCorp's section 170 register is the Wentworthville Railway Station Group (item #4801040), located about 300 metres west of the project site. Given the distance to this site, these items would not be impacted by the proposed works. There are a number of heritage items of local significance within close proximity to the project site. Potential impacts on heritage are discussed in section 5.4.

3.3.4 *Contaminated Land Management Act 1997*

The *Contaminated Land Management Act 1997* (CLM Act) establishes a process for investigating and remediating land where contamination presents a "significant risk of harm" to human health or the environment. It applies to contamination which occurred before or after its commencement.

Sydney Trains must consider contamination caused by past activities (including rail activities) and potential contamination from spills and leaks in developing and managing land.

Section 60 of the CLM Act imposes a duty on landowners to notify the Department of Planning and Environment, and potentially investigate and remediate the land if contamination is above NSW Environment Protection Authority (EPA) guidelines.

A search of the NSW EPA Contaminated Land Record website was undertaken on 3 March 2021 for the suburb of Westmead. The results of the search indicated that there are currently no notices issued for sites within one kilometre of the site under the CLM Act.A search of the List of NSW Contaminated Sites Notified to EPA indicated there is no record of any sites located within 300 metres of the site which have been notified to the EPA. As the project involves some sub-surface excavation, there is the potential to encounter soils contaminated by the adjacent rail activities during works. Potential impacts associated with encountering potentially contaminated soil during excavation will be managed through the implementation of standard control measures provided in Section 7.

3.3.5 *National Parks and Wildlife Act 1974*

Under the *National Parks and Wildlife Act 1974* (NPW Act), all Aboriginal objects and places are protected, irrespective of their level of significance or matters of land tenure. The Act sets up 'strict liability' offences for harming or desecrating Aboriginal objects and Aboriginal places (this type of offence may apply even if a person is unaware that they are harming an Aboriginal object). All persons are therefore responsible for taking reasonable precautions and exercising their due diligence to ensure that their actions will not harm Aboriginal objects.

A search of the Aboriginal Heritage Information System (AHIMS) was conducted on 3 March 2021. The searches showed there are no recorded Aboriginal sites located within 200 metres of the project site. Therefore, potential impacts to Aboriginal artefacts or sites will be managed through the implementation of standard control measures provided in Section 7.

3.3.6 *Biodiversity Conservation Act 2016*

The *Biodiversity Conservation Act 2016* (BC Act) seeks to conserve biological diversity at bioregional and State scales; to maintain the diversity and quality of ecosystems and enhance their capacity to adapt to change and provide for the needs of future generations; to assess the extinction risk of species and ecological communities and identify key threatening processes through an independent and rigorous scientific process; and to establish a framework to avoid, minimise and offset the impacts of proposed development and land use change on biodiversity.

The BC Act lists species, populations and ecological communities to be considered in deciding whether there is likely to be a significant impact on threatened biota, or their habitats. If any of these could be impacted by the project, an assessment of significance that addresses the requirements of Section 7.3 of the BC Act must be completed to determine the significance of the impact.

The project site is located within an urban area that has undergone extensive development. The area under the bridge is considered to provide potential roosting habitat for microbat species. A biodiversity assessment including site walk and Anabat survey (for detection of bat species) was undertaken on 27 March 2021. The results of this assessment are provided in Section 5.2.

3.4 Commonwealth Legislation

3.4.1 *Environment Protection and Biodiversity Conservation Act 1999*

Matters of National Environmental Significance (MNES) are protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Sydney Trains must not take an action that has, will have or is likely to have a significant impact on any MNES without approval from the Commonwealth Minister for the Environment. An action is a project, a development, an undertaking, an activity or a series of activities, or an alteration of any of these things. The northern end of the project area which is situated within the Parramatta LGA is included in a site that has been nominated to be listed in the National Heritage List: the 'Sydney Cultural Crescent Rock Art' Aboriginal site. This site covers an area of about 2 million hectares of eastern NSW where rock art might be present and is currently undergoing assessment by the Australian Heritage Council with an estimated assessment completion date of June 2025. The boundary of the prospective heritage listing is through the middle of the bridge, following the same boundary lines of the Parramatta and Cumberland LGAs.

The project is situated within a highly modified urban area incorporating transport corridors and away from areas regarded as containing archaeological potential, such as waterways. Given this, the potential for rock art sites to occur within the project site is considered low.

The closest item listed on the National Heritage List is the Old Government House and Government Domain, Parramatta, located about 1.1 kilometres east of the project site.

MNES are considered further in Section 6.

The assessment found that there is unlikely to be a significant impact on relevant MNES. Accordingly, the project has not been referred to the Australian Government Department of Agriculture, Water and the Environment.

3.5 Ecologically Sustainable Development

Ecologically sustainable development entails using, conserving and enhancing the community's environmental resources in a manner that sustains and improves ecological processes, and hence the quality of life, for present and future generations.

Section 36A(2)(c) of the *Transport Administration Act 1988* (TA Act) states that an objective of Sydney Trains is that where its activities affect the environment, it must conduct its operations in compliance with the principles of ecologically sustainable development contained in section 6(2) of the *Protection of the Environment Administration Act 1991* (POEA Act).

Section 6(2) of the POEA Act requires compliance with the following four principles of ecologically sustainable development, where an activity affects the environment.

1. **The precautionary principle:** For example, if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
2. **Inter-generational 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.
3. **Conservation of biological diversity and ecological integrity** should be a fundamental consideration of the decision to undertake the activity.
4. **Improved valuation, pricing and incentive mechanisms:** For example, the users of goods and services should pay prices that include the use of natural resources and assets and the ultimate disposal of any waste generated by the provision of that good or service, and that environmental goals, having been established, should be pursued in the most cost-effective way.

Sydney Trains is committed to ensuring that its projects are consistent with the principles of ecologically sustainable development. The principles of ecologically sustainable development have therefore been an integral consideration in the project. Table 3.1 outlines the how the principles of ecologically sustainable development have been applied to the project.

Table 3.1: The principles of ecologically sustainable development applied to the project

ESD Principle	*Application to the Project*
Precautionary principle	The project does not pose a risk of serious or irreversible environmental damage. Adverse impacts associated with the project would be minor. Measures to reduce adverse impacts as far as practicable have also been identified within this REF.
Intergenerational equity	The project is expected to contribute towards regional strategic benefits for future generations by contributing to management of traffic congestion resulting in a positive benefit for all road users.
Conservation of biological diversity and ecological integrity	This REF includes an assessment of the section 171 EP&A Regulation factors that broadly consider biological diversity and ecological integrity of the project area. The project area is located in a highly developed urban area and would not result in any loss of biodiversity or ecological integrity.

ESD Principle	Application to the Project
Improved valuation and pricing of environmental resources	Sydney Trains recognises the value of environmental resources and aims to minimise the impacts of its activities by ensuring that appropriate mitigation measures are implemented for all aspects of the project.

3.6 Licences, Approvals and Permits

Sydney Trains currently holds a Railway Systems Activities EPL 12208 under the *Protection of the Environment Operations Act 1997* (POEO Act). This licence authorises the carrying out of Railway Systems Activities at the NSW Rail Network as defined in the TA Act. EPL 12208 covers operation of the NSW Metropolitan Network. The key objective of the EPL is to minimise offensive noise and pollution from the NSW Metropolitan Network.The proposed works meet the definition of 'railway activities' as defined in Schedule 1 of the POEO Act, which include bridges and over track structures (Schedule 1(33)(4). The project will be undertaken in accordance with Sydney Trains' existing EPL (EPL no. 12208).

As stated in section 3.3.2, Council permits from Parramatta and Cumberland Councils are required in accordance with section 138 of the Roads Act.

3.7 Summary of Statutory Requirements

The project does not require development consent, is not State significant development or State significant infrastructure and is subject to environmental impact assessment under Division 5.5 of the EP&A Act.

Council permits from Parramatta and Cumberland Councils are required in accordance with section 138 of the Roads Act.

4 Consultation

4.1.1 *Transport and Infrastructure SEPP Consultation*

The Transport and Infrastructure SEPP contains provisions for public authorities such as Sydney Trains to consult with local councils and other public authorities prior to the commencement of certain types of development. Sydney Trains must take consideration of any responses received within 21 days after notification.

A summary of the Transport and Infrastructure SEPP consultation requirements is detailed below in Table 4.1.

Table 4.1: Summary of Transport and Infrastructure SEPP consultation

Is consultation with council or other agencies required under sections 2.10 to 2.15 of the Transport and Infrastructure SEPP?	
Are the works likely to have a substantial impact on the stormwater management services which are provided by council? Agency – City of Parramatta Council and Cumberland City Council	No
Are the works likely to generate traffic to an extent that will strain the existing road system in a local government area? Agency – City of Parramatta Council and Cumberland City Council	The project will generate constuction traffic that may have the potential to temporarily affect local roads during construction.
Will the works involve connection to a council owned sewerage system? If so, will this connection have a substantial impact on the capacity of the system? Agency – City of Parramatta Council and Cumberland City Council	No
Will the works involve connection to a council owned water supply system? If so, will this require the use of a substantial volume of water? Agency – City of Parramatta Council and Cumberland City Council	No
Will the works involve the installation of a temporary structure on, or the enclosing of, a public place which is under local council management or control? If so, will this cause more than a minor or inconsequential disruption to pedestrian or vehicular flow? Agency – City of Parramatta Council and Cumberland City Council	No
Will the works involve more than a minor or inconsequential excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance? Agency – City of Parramatta Council and Cumberland City Council	The project will involve excavation of a road or footpath for which council is a roads authority, including Bridge Road and Alexandra. Consultation with Councils is required.

Is consultation with council or other agencies required under sections 2.10 to 2.15 of the Transport and Infrastructure SEPP?	
Are the works located on flood liable land? If so, will the works change flooding patterns to a more than minor extent? Agency – City of Parramatta Council and Cumberland City Council	No
Is there a local heritage item (that is not also a state heritage item) or a heritage conservation area in the study area for the works? If yes, does a heritage assessment indicate that the potential impacts to the item/area are more than minor or inconsequential? Agency – City of Parramatta Council and Cumberland City Council	Local heritage items (part of Parramatta Archaeological Management Unit 2981) are located adjacent to the project area within the Cumberland LGA. Impacts to these items which are more than minor or inconsequential are unlikely, (refer Section 5.4) however consultation with the Cumberland Council will be undertaken to clarify requirements.
Are the works adjacent to a national park, nature reserve or other area reserved under the *National Parks and Wildlife Act 1974?* Agency – Office of Environment and Heritage	No
Are the works adjacent to an aquatic reserve declared under the *Fisheries Management Act 1994*? Agency – Department of Environment and Climate Change	No
Are the works in the Sydney Harbour Foreshore Area as defined by the *Sydney Harbour Foreshore Authority Act 1998?* Agency – Sydney Harbour Foreshore Authority	No
Do the works involve the development of a fixed or floating structure in or over navigable waters? Agency – NSW Maritime	No
Are the works for the purpose of residential development, as educational establishment, a health services facility, a correctional facility or group home in an area that is bush fire prone land? Agency – Rural Fire Services	No

Consultation with City of Parramatta and Cumberland Councils is required under Section 2.10(1)(f) due to the proposal involving excavation in roads, road verges and footpaths for which the council is the roads authority.

Consultation with Cumberland Council is required under Section 2.14 of the Transport and Infrastructure SEPP due to the presence of items listed in the local heritage listing associated with the Parramatta Archaeological Management Unit 2981.

4.1.2 *Other Agency and Community Consultation*

The following agencies have been identified as potential stakeholders for the project during the development of concept design:

- Transport for NSW – due to current construction activities associated with Parramatta Light Rail which have the potential to increase traffic volume on Bridge Road
- bus operators – Transit Systems and Hills Bus
- Westmead Hospital and NSW Ambulance
- Western Sydney University
- local schools
- businesses located on Briens Road about 500 metres north of the project location, including Coca Cola Amatil.

Sydney Trains' would continue to consult with Councils, community, agency and private landowners. Feedback would be taken into consideration and addressed during construction planning.

5 Environmental Impact Assessment

5.1 Assessment of Applicable Environmental Factors

A scoping exercise has been completed for the project. The scoping exercise has considered the potential environmental impacts of the project to identify those environmental factors requiring environmental impact assessment within this REF. The environmental factors relevant to the project are summarised in Table 5-1. For environmental factors that do not require further environmental assessment standard control measures are identified in Section 7.

Table 5.1: Applicable Environmental Factors

Environmental Factors	*Comments*	*Detailed discussion in REF?*		*Where?*
Landforms, geology and soils	A search of the Australian Soil Resource Information System (ASRIS) identified that the site is located in an area of low probability for Acid Sulfate Soils (ASS) to occur. The project would require minor excavation and any potential impact would be managed through the implementation of standard erosion and sediment controls.	Yes No	☐ ☒	Standard control measures to be implemented in Section 7.1.
Water quality and hydrology	No waterways are located in proximity to the site. The nearest water source is Finlayson Creek, about 450 metres to the west. The site is not located on flood prone land. mpacts to water quality and hydrology would be minimal and will be mitigated through the implementation of standard construction control measures.	Yes No	☐ ☒	Standard control measures to be implemented in Section 7.1.
Air quality	Construction activities have the potential to impact on air quality due to dust resulting from works. This will be managed through the implementation of standard control measures.	Yes No	☐ ☒	Standard control measures to be implemented in Section 7.1.

Environmental Factors	*Comments*	*Detailed discussion in REF?*		*Where?*
Biodiversity	Limited biodiversity values are present within the site area and surrounds. No native vegetation is proposed to be removed for the project. The bridge may be potential roosting habitat for threatened microbat species. A biodiversity impact assessment was undertaken to assess vegetation near the bridge, inspect the underbridge for signs of roosting bats, and conduct anabat surveys at dusk to monitor for any emerging bats. The biodiversity impact assessment is provided in Section 5.2.	Yes No	☒ ☐	Refer to Section 5.2.
Noise and vibration	Construction of the project has the potential to cause noise impacts to residential properties in the vicinity of the the project. Some works will be required to be undertaken during rail possession periods, resulting in potential out of hours works. The operation of the project also has the potential for increased traffic noise due to the additional lane on Bridge Road Overbridge. A construction and operational noise and vibration impact assessment has been undertaken and the results are discussed in Section 5.3.	Yes No	☒ ☐	Refer to Section 5.3.
Aboriginal and Non Aboriginal heritage	The results of an AHIMS search undertaken on 2 March 2021 found there are no registered Aboriginal items or sites within 200 metres of the site. Therefore, the management of Aboriginal heritage would be through the implementation of standard control measures including unexpected findings procedure. The results of non-Aboriginal heritage searches found no heritage item of National, State or local significance within the project location. A number of heritage items of local significance are located adjacent to the site, with the nearest being about 30 metres to the south east of the site. Further detail of non-Aboriginal heritage is discussed in Section 5.4.	Yes No	☒ ☐	See Section 5.4.
		Yes	☐	

Environmental Factors	*Comments*	*Detailed discussion in REF?*		*Where?*
Waste management	Waste streams that will potentially be generated during the project are detailed in Section 7.1. Any potential impacts due to waste management will be mitigated through the implementation of standard control measures.	No	☒	Standard control measures to be implemented in Section 7.1.
Contaminated land and hazardous materials	No contaminated sites are currently identifed within the project site area. The impacts due to potentially encountering contaminated soils are considered minimal and will be mitigated through the implementation of standard control measures.	Yes	☐	Standard control measures to be implemented in Section 7.1.
		No	☒	
Visual aesthetics and urban design	Visual aesthetic impacts will be minimal and will be mitigated through the implementation of standard control measures.	Yes	☐	Standard control measures to be implemented in Section 7.1.
		No	☒	
Socio-economic effects	This REF has assessed a number of environmental impacts of the project that have the potential to impact on the social and economic considerations as outlined above. In addition, the project will have a beneficial socio-economic impact for the wider community as it will improve traffic flow, access and reduce impact on the network capacity.	Yes	☐	Standard control measures to be implemented in Section 7.1.
		No	☒	
Traffic and access	Construction of the project will result in the reduced capacity of traffic across the bridge for the duration of construction and temporary closure of nearby roads. Traffic volumes generated by the project during construction may also impact on the surrounding road network. A Construction Traffic Impact Assessment was undertaken to assess the impact construction works will have on the flow of traffic within surrounding road network and provides control measures to minimise these impacts. This is summarised in Section 5.5. Once operational, the project will have a beneficial impact to traffic flow across the Bridge Road Overbridge as it will provide increased traffic capacity resulting from the bridge widening from two lane to three lanes.	Yes	☒	See Section 5.5.
		No	☐	
		Yes	☐	

Environmental Factors	*Comments*	*Detailed discussion in REF?*		*Where?*
Demand on resources	The project is not expected to diminish local supplies due to the limited materials that will be used and the size of the project.	No	☒	Standard control measures to be implemented in Section 7.1.
Cumulative environmental effects	The project will not cause any cumulative environmental effects. This is discussed further in Section 5.6.	Yes	☒	See Section 5.6.
		No	☐	

5.2 Biodiversity

5.2.1 *Methodology*

A biodiversity impact assessment has been undertaken to address the assessment requirements of the EP&A Act, BC Act and the EPBC Act. The assessment includes a desktop review of threatened species databases and existing vegetation mapping, as well as a field survey to assess vegetation and inspect the underbridge for signs of roosting bats. An anabat survey and observations of the underbridge at dusk were undertaken to search for emerging bats.

Desktop review

A desktop review of existing information was undertaken prior to the site inspection to identify biodiversity values that may be of relevance to the project. A search of relevant databases was completed to obtain records of threatened and migratory species, populations and ecological communities within the locality (defined as a ten-kilometre radius of the project site). The search included all species, populations and ecological communities listed under the NSW BC Act and/or Commonwealth EPBC Act with the potential to occur in the locality. The assessment included a review of the following:

- the NSW Department of Planning, Industry and Environment (DPIE) BioNet Atlas for records of threatened species listed under the BC Act and EPBC Act which have been recorded within the locality (DPIE 2021a, report generated 26 March 2021 included in Appendix D)
- the Australian Government Department of Agriculture, Water and Environment (DAWE) Protected Matters Search Tool for MNES listed under the EPBC Act which may occur in the study area (DAWE 2021a, 2021a, report created 26 March 2021 included in Appendix D)
- The NSW threatened biodiversity data collection (DPIE 2021b) and Commonwealth Species Profile and Threats Database (DAWE 2021b) for descriptions of the ecology, distribution and habitat requirements of threatened biota
- the NSW BioNet Vegetation Classification (VIS 2.1) – Community Identification (DPIE 2021c) to identify candidate plant community types (PCTs) in the study area

- existing vegetation mapping of the locality: The Native Vegetation of the Sydney Metropolitan Area (DPIE 2016)
- historical aerial photographs of the study area accessed via SIXmaps (NSW Government, 2021)
- priority weed declarations for the City of Parramatta and the Cumberland City Council (DPI 2021)
- aerial photography of the study area.

Field survey

Two GHD ecologists conducted a field survey on 27 March 2021 to describe biodiversity values and identify the presence of flora, fauna, or habitat features of relevance to threatened biota in the study area (marked in Figure 5.1).

Microbat ultrasonic echolocation call recordings (Anabat surveys) were undertaken using one Anabat unit for one night in the study area. One Anabat unit was fixed to a steel girder under the Bridge Road overpass (see Figure 5.1).

The Bridge Road overpass was visually inspected for evidence of use by microbats, such as the presence of guano (bat droppings) and for roosting microbats. The Bridge Road overpass was also monitored for the presence of emerging roosting microbats with a spotlight prior to and after dusk.

Calls recorded on the Anabats were identified using zero-crossing analysis and Analook software (version 4.1t, Chris Corben 2015). The *Bat calls of NSW: Region based guide to the echolocation calls of microchiropteran bats* (Pennay et al., 2004) was used to assist call analysis. Call identification was assisted by consulting records from BioNet (OEH 2021a).

5.2.2 *Existing Environment*

Overview

The project will be constructed between Wentworthville Station and Westmead Station at the Bridge Road overpass. The rail corridor at this location, and adjacent roads including Bridge Road, Wentworth Avenue and Alexandra Avenue all form the project area.

The study area is highly modified. Land uses adjoining the study area consist primarily of urban streetscapes and residential and industrial developments, interspersed with urban parklands.

The project occurs within the Blacktown soil landscape (OEH 2021d) and is underlain by the Wianamatta Group Ashfield Shale and Bringelly Shale formations which comprises laminite and dark grey siltstone, shale, with occasional calcareous claystone, laminite and coal. These natural shale layers were evident along the embankment within the rail corridor. Clay and dumped fill occur above these weathered shale layers. There are substantial volumes of fill materials within the study area, including gravel, and ballast in the rail corridor.

Existing vegetation consists of a combination of exotic shrub and forest, growing in association with self-recruited native species in the rail corridor. Urban plantings occur on the

road verges. Canopy vegetation in the study area is isolated and occurs in a small patch in the rail corridor and along street verges. The study area is not connected to any areas of intact native vegetation in the locality. The study area does not comprise a connecting link between any areas of habitat.

Vegetation

Existing vegetation mapping did not identify any vegetation units within the study area (DPIE 2016), however vegetation units mapped as Urban/Exotic/Native occur in close proximity within the rail corridor to the west of the study area.

There are no native PCTs (OEH 2021c) within the study area. There are two non-native vegetation map units: exotic scrub and forest, and urban plantings (see Figure 5.1, Table 5.2, Table 5.3). These map units were not assigned a PCT because of the low cover and species richness of indigenous native plants and/or because they occur on highly modified soils and landforms.

Table 5.2: Vegetation type – Urban plantings

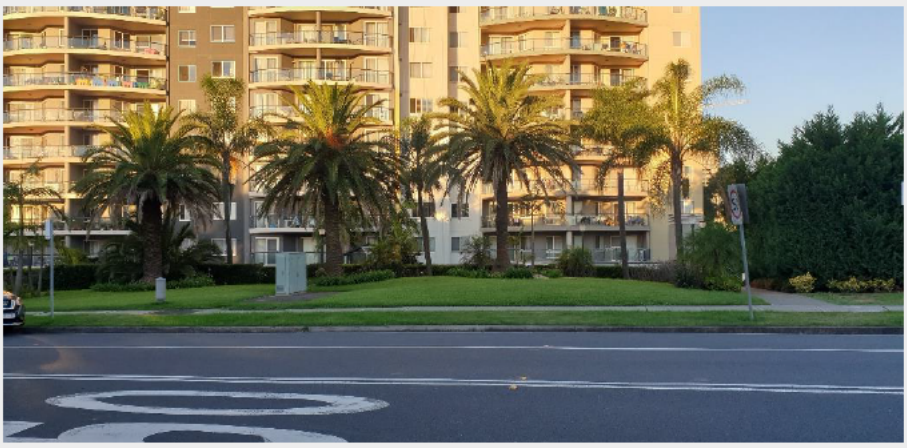
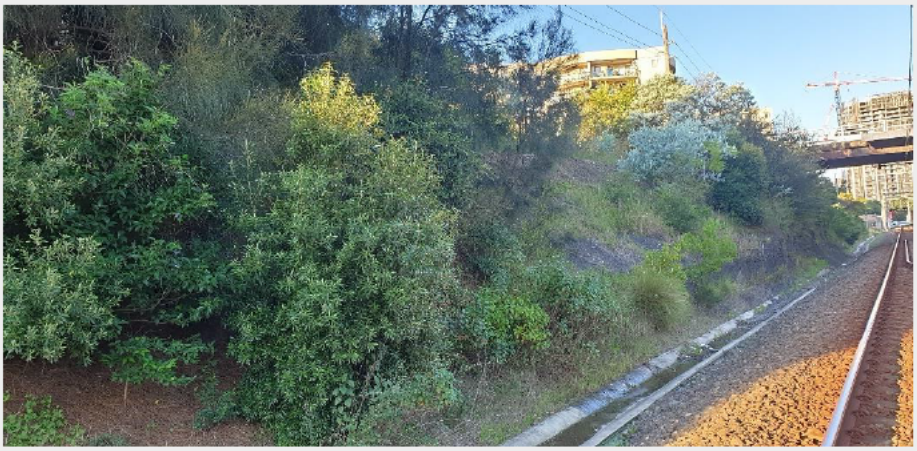
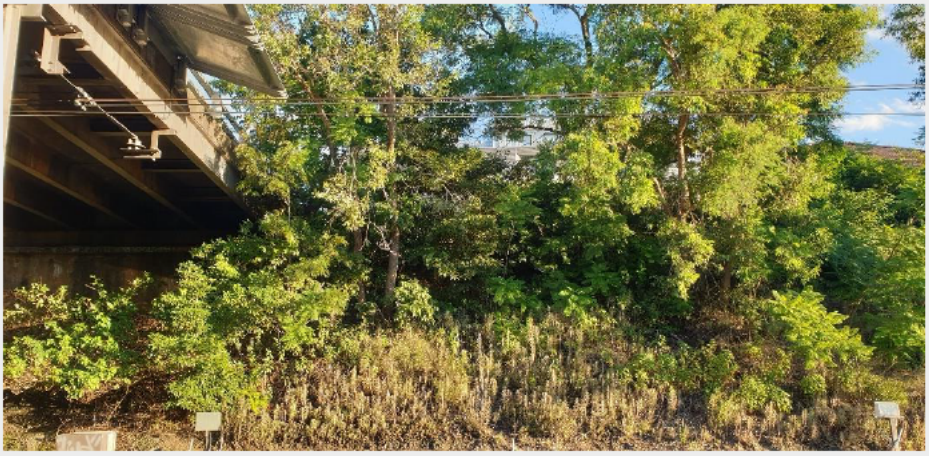
Vegetation type	Urban plantings
Photo 1 Planted *Phoenix canariensis* and *Syagrus romanzoffianum* off Bridge Road. Note the mown understorey	
Extent and distribution	This vegetation type occurs within the road verge of the Bridge Road intersection with Wentworth Avenue and Alexandra Avenue.
Structure and composition	Urban plantings comprise both planted exotic and native species, usually on mown road verges and gardens. Regularly mown Grassland to 0.2m; Foliage Projective Cover (FPC) present is >80%. Trees from 4 to 15m; total FPC is mostly <10%. There is a small park containing planted palm species at the intersection of Bridge Road and Wentworth Road in the front of apartment buildings at 91D Bridge Road. Palm species include Canary Island Date Palm (*Phoenix canariensis*), Dwarf Date Palm (*Phoenix roebelenii*), Cocos Palm (*Syagrus romanzoffianum*), Bangalow Palm (*Archontophoenix cunninghamiana*) and Alexandra Palm (*Archontophoenix alexandrae*). At the southern end of the parkland is a dense hedge of Leyland Cypress (*Cupressus x leylandii*). Several street trees occur along the footpath adjacent to Alexandra Avenue near the intersection with Bridge Road. Three mature *Callistemon* 'Kings Park Special' appear on the southern side of Alexandra Avenue and have been regularly lopped beneath over-head wires. On the northern side, mature specimens of Brush Box (*Lophostemon confertus*), Prickly-leaved Paperbark (*Melaleuca styphelioides*) and Bottlebrush Cultivar (*Callistemo n* 'Hannah Ray') occur. Grasses which occur on the mown verge include Carpet Grass (*Axonopus fissifolius*), Paspalum (*Paspalum dilatatum*) and Kikuyu Grass (*Cenchrus clandestinus*).
Threatened biota	This vegetation type does not comprise an occurrence of a threatened ecological community (TEC). No threatened flora species were recorded in this vegetation type in the construction footprint. Mowing of ground cover and trimming of canopies are likely to inhibit growth and development of indigenous forbs and grasses.

Table 5.3: Vegetation type – Exotic scrub and forest

Vegetation type	Exotic scrub and forest
Photo 2 Steep section of northern batter, to the west of bridge	
Photo 3 Planted rough-barked Apple growing on southern batter, to the west of bridge. Note the invasive weeds in the foreground	
Extent and distribution	This vegetation type occurs as continuous narrow bands within the rail corridor to the east and west of the bridge.
Structure and composition	This vegetation type contains a high cover and abundance of exotic species with occasional planted natives. Woodland to open-forest and shrubland to grassland, varying in height from 22 to 1m. Total FPC varies from 30% to 10%, depending on structure and species composition. Planted native canopy trees in the study area include occasional Blue Box (*Eucalyptus baueriana*) and Rough-barked Apple (*Angophora floribunda*). A line of planted Swamp Oak (*Casuarina glauca*) occurs in the mid storey within the northern batter. Brush Daphne (*Pittosporum undulatum*) and Blackthorn (*Bursaria spinosa* subsp. *spinosa*) are the only native shrub species to have self-recruited in the study area. Self-recruited exotic tree species include Jacaranda (*Jacaranda mimosifolia*), Peppercorn (*Schinus molle* var. *areira*), Silky Oak (*Grevillea robusta*). Camphor Laurel (Cinnamomum camphora), Chinese Elm (*Ulmus parvifolia*), Pistacchio (*Pistacia chinensis*) and Mulberry (*Morus alba*). Self-recruited exotic shrubs include Privet (*Ligustrum lucidum* and *Ligustrum sinense*), Cotoneaster (*Cotoneaster pannosus* and *Cotoneaster glaucophyllus*), Lantana (*Lantana camara*), African Olive (*Olea europaea* subsp. *cuspidata*), Yellow Bignonia (*Tecoma stans*) and Mickey Mouse Plant (*Ochna serrulata*). Self-recruited exotic climbing species include Moth Vine (*Araujia sericifera*), Madeira Vine (*Anredera cordifolia*), Japanese Honeysuckle (*Lonicera*

Vegetation type	Exotic scrub and forest
	japonica), Morning Glory (*Ipomoea indica*) and Bindweed (*Convolvulus arvensis)*. Exotic grass species include Red Natal Grass (*Melinis repens*), Whisky Grass (*Andropogon virginicus*), Soft Lovegrass (*Eragrostis pilosa*), Rhodes Grass (*Chloris gayana*) and Fountain Grass (*Cenchrus setaceus*). Mother of Millions (*Bryophyllum delagoense*), an invasive succulent species, was recorded throughout the rail corridor.
Threatened biota	This vegetation type does not comprise an occurrence of a TEC. No threatened flora species were recorded in this vegetation type in the construction footprint. Mowing of ground cover and trimming of canopies are likely to inhibit growth and development of indigenous forbs and grasses.

Priority weeds

Priority weeds are those plants with restrictions on their trade and movement and that harm the NSW environment, economy and community under the Biosecurity Act 2015.

The study area contains eight species declared as priority weeds in the City of Parramatta and the Cumberland City Council LGA (part of the Greater Sydney control area) as shown in Table 5.4. These priority species occur within the areas described, are highly prevalent within the rail corridor and would reduce overall biodiversity value in the study area.

Table 5.4: Priority weeds recorded within the site

Common name	Scientific name	Location
Climbing Asparagus Fern and Ground Asparagus	Asparagus plumosus Asparagus aethiopicus	Within the rail corridor
Green Cestrum	Cestrum parqui	
Madeira vine	Anredera cordifolia	
African Olive	Olea europaea subsp. cuspidata	
Lantana	Lantana camara	
Fireweed	Senecio madagascariensis	
Pampas Grass	Cortaderia selloana	

Legend

- Study area
- Construction footprint
- Design
- Anabat detector and roost watch
- Grey-headed Flying-fox (Vulnerable- BC and EPBC Act)

Paper Size ISO A4

0 10 20 30 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Sydney Trains
Westmead, Bridge Rd Overbridge - Bridge Renewal
Review of Environmental Factors

Vegetation, survey effort and threatened biota

Project No. **12515755**
Revision No. **0**
Date **29/11/2023**

FIGURE 5.1

N:\AU\Sydney\Projects\21\12515755\GIS\Maps\12515755_Westmead_BridgeRd_Overbridge_BridgeRenewal\12515755_REF_A.aprx
Print date: 29 Nov 2023 - 10:20

Data source: GHD: Vegetation, 2021; LPI: DCDB/DCTB, 2017; Imagery: Nearmap WMS Server: . Created by: rvillalon

Fauna and fauna habitats

A low diversity of fauna species were recorded during the field survey, typical of a highly modified urban environment. A total of nine species of fauna were recorded in the study area of which six were native and three exotic (see Appendix E). The fauna observed were all common and widespread species. The study area is only likely to contain these and similar species capable of persisting in highly urbanised habitats such as those within the study area. Native bird species frequently observed in the study area include the Noisy Miner (*Manorina melanocephala*) and Long-billed Corella (*Cacatua tenuirostris*). The exotic feral Rock Dove (*Columbia livia*) were regularly recorded throughout the survey. The one reptile recorded was the Eastern Blue Tongue Lizard (*Tiliqua scincoides scincoides*), observed on ballast substrate in the rail corridor.

Fauna habitat resources include:

- exotic scrub and forest
- landscaped plantings on road verges
- the Bridge Road overpass structure.

Exotic scrub and forest within the rail corridor provides shelter and foraging resources for a range of birds and mammals including the Rainbow Lorikeet (*Trichoglossus molucannus*), Red Wattlebird (*Anthochaera carunculata*) and Superb Fairywren (*Malurus cyaneus*). The dense midstorey of exotic scrub and forest would provide den habitat for the Common Ringtail Possum (*Pseudocheirus peregrinus*), although no nest of squirrels (dreys) were recorded during the survey. Exotic scrub and forest would also provide habitat for exotic fauna such as the Black Rat (*Rattus rattus*).

There are very few crevices or cracks that would provide potential sheltering habitat for native reptiles. Common and widespread reptiles such as skinks may bask on the top of the ballast and/or batter on occasion. There is no leaf litter within the road verge itself, and areas of modified vegetation within the rail corridor contain low amounts of leaf litter or foraging substrate. A small concrete drain below the northern batter was wet at the time of survey and would provide water and possible foraging habitat for local avifauna. Numerous bird footprints were recorded within muddy sections of this drain likely to be from urban species including Rock Dove and Crested Pigeon (*Ocyphaps lophotes*). There is very limited habitat suitable for common frogs in this drain as there is no emergent reed or sedge habitat present and it is isolated from better quality wetland habitat.

Photo 4: Small concrete drain on the up-side of the rail corridor

Landscaped plantings on road verges have limited structural complexity most often occurring as a line of trees above a mown understorey. The fruits of Cocos Palms in the north of the study area would provide foraging resources for fruit-eating birds and the Grey-headed Flying-fox (*Pteropus poliocephalus*).

Occasional grasses and herbs would support invertebrates which would in turn provide foraging resources for relatively mobile and opportunistic native fauna, including birds such as the Australian Magpie (*Cracticus tibicen*), Magpie-lark (*Grallina cyanoleuca*) and Laughing Kookaburra (*Dacelo novaeguineae*).

Bridges and overpasses may, in general, have particular value for microbats as roost sites if the structure contains suitably deep and sheltered refuge. The Bridge Road overpass is constructed from steel girders and sheets. The bridge did not appear to contain any fissures, cracks or crevices which could be used for roosting by microbat species. No evidence of roosting bats or bat droppings was detected at this bridge despite purposeful inspection during the field surveys. No microbats were observed exiting roosts in the bridge during dedicated observation periods at dusk. Only one bat; Gould's Wattled Bat (*Chalinolobus gouldii*), was recorded on the Anabat recorder targeting potential roost anchor points under this bridge (see Appendix F). This bat is not known to roost under bridges or other man-made structures and would have been foraging when recorded by the Anabat detector. These results do not suggest that bats were roosting under the Bridge Road overpass or that habitat in the study area is of particular value to microbat species.

Photo 5: Bridge Road overpass

There are no hollow-bearing trees within the study area.

Threatened and migratory biota

There are no threatened ecological communities (TECs) within the study area.

The study area contains broadly suitable habitat for a number of threatened plants and threatened populations that are known or predicted to occur in the locality based on the desktop assessment (see Appendix D). The following threatened flora have been recorded in similar habitat within the Parramatta area:

- *Epacris purpurascens* var. *purpurascens*, which is listed as a vulnerable species under the BC Act. It has been recorded in a range of habitats, including sclerophyll forest, scrubs and swamps, most of which have a strong shale soil influence.
- *Acacia pubescens,* which is listed as a vulnerable species under the BC and EPBC Acts. It occurs in parts of western Sydney on clay soils. This species is often recorded "…. in roadside and railside bushland remnants" (National Herbarium of NSW 2021).
- *Grevillea juniperina* subsp. *juniperina* is listed as a vulnerable species under the BC Act. It "….grows in open dry sclerophyll (eucalypt-dominated) forest or woodland, at altitudes of less than about 50 metres, in sandy to clay-loam soils and red pseudolateritic gravels" (National Herbarium of NSW 2021).
- *Marsdenia viridiflora* subsp. *Viridiflora* is listed as an endangered population within the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local governments areas. It is a climber which naturally occurs in vine thickets and open shale woodland but may occasionally be seen growing on fences.

  There is a small area of poor quality potential habitat for each of these species within the rail corridor. Urban plantings outside the rail corridor do not comprise habitat for these species.

No individuals or populations of any of the listed species were recorded during the survey nor are any likely to occur within the study area given the absence of native vegetation and intact soil profiles and distance from any areas of intact native vegetation.

The study area contains limited habitat for threatened fauna. Most of the threatened fauna recorded in the locality would not occur given their specific habitat requirements, preference for larger tracts of native vegetation and a general absence of important habitat resources within the study area.

The Grey-headed Flying-fox (*Pteropus policephalus*), which is listed as a vulnerable species under the BC Act and EPBC Act, was opportunistically recorded approximately 30 metres away to the north of the study area during surveys. There are a large number of records of the species in the locality (OEH 2021a). The Grey-headed Flying-fox would forage in planted street trees and parklands within the study area when food trees are flowering or fruiting. The study area does not contain any of the significant food plants for Grey-headed Flying -fox (Eby and Law 2008). A small number of plants in the study area including the Cocos Palm (*Syagrus romanzoffiana*), Canary Island Date Palm (*Phoenix canariensis*), Sweet Pittosporum (*Pittosporum undulatum*), Silky Oak (*Grevillea robusta*) and Rough-barked Apple (*Angophora floribunda*) would provide foraging habitat on occasion. Only the Rough-barked Apple would be removed for construction of the project.

No breeding camps of the Grey-headed Flying-fox occur in the study area. The closest camp is located about 1.5 kilometres away to the east at Parramatta Park (DEE 2021c) and is a nationally important Grey-headed Flying-fox camp. Potential roosting habitat is restricted to riparian vegetation within the Parramatta River and tributaries within the locality.

Threatened microbats previously recorded in the locality include the Southern Myotis (*Myotis macropus*), Little Bent-winged Bat (*Miniopterus australis*), Large Bent-winged Bat *(Miniopterus orianae oceanensis*) and Eastern Freetail Bat (*Micronomus norfolkensis*). The study area does not contain suitable habitat for the Southern Myotis which forages over waterbodies and roosts in close proximity to water. The Eastern Freetail Bat rarely occurs in developed areas and the urban plants and exotic scrub and forest within the study area are unlikely to provide habitat of importance for this species. The Bridge Road overpass would not provide roosting habitat for the Little or Large Bent-winged Bat which roost in large caves. There were no hollow-bearing trees in the study area that provide roost sites for tree-roosting microbats.

The Powerful Owl (*Ninox strenua*) has been regularly recorded in the locality, however the study area does not provide foraging habitat for the species. The study area also does not provide breeding habitat for the species and is unlikely to roost in this highly modified location.

5.2.3 *Potential Impacts*

Direct impacts

The project would replace the existing two traffic lane steel bridge with a single span, three traffic lane pre-stressed concrete bridge between Westmead and Wentworthville Station. The

project is located within highly modified lands within and around the rail corridor at Bridge Road and no intact stands of naturally occurring native vegetation would be disturbed by the proposed works. Works will be completed entirely within the road reserve and adjoining road corridor which will not require the clearing of native vegetation or the removal of habitat of value for native fauna.

The project will result in the removal of 0.17 hectares of exotic scrub and forest as well as 0.03 hectares of urban plantings. The removal of vegetation outside the road corridor will be restricted to patches of mown lawn only, with all midstorey and canopy plantings to be retained. The construction footprint has limited habitat value for native plants. Any vegetation clearing required in these areas will principally remove exotic grasses, exotic shrubs, planted non-threatened native plants and environmental weeds.

Environmental safeguards to minimise the clearing of planted native vegetation and protect retained vegetation are presented in sections 5.4.3 and 7 of this REF and will be included in a Construction Environment Management Plan (CEMP).

The rail corridor and surrounds contain primarily exotic scrub and forest and planted native species which generally have low biodiversity value. The project will not remove any hollow-bearing trees, nests or dreys. Given the absence of intact stands of native vegetation, waterbodies or any other habitat resources, impacts on local populations of fauna species are likely to be low. All midstorey and canopy trees within the road verge will be retained, and will continue to provide foraging resources for common birds. The removal of some maintained understorey vegetation on the road verge is likely to comprise only a small portion of potential habitat for local fauna species. The vegetation to be removed will not provide critical or important habitat for any local populations of native fauna.

Recommendations have been made in Table 5.5 to minimise the risk of impacts on fauna species during the proposed works.

Indirect impacts

There is very limited potential for any indirect impacts as a result of the proposed works, given the existing disturbed and modified nature of the construction footprint and surrounding area, as well as the proposed mitigation measures.

A summary of potential indirect impacts associated with the works is provided below:

- The project will not result in the creation of any new edge zones or habitats, nor will it exacerbate any existing edge effects that may be in operation. Given the existing degree of modification within the study area, the project is unlikely to result in an increase to pest species in the area.
- The adjacent residential area and roads provides a substantial barrier to movement for any native fauna species that may use vegetation in the construction footprint, and there are no large tracts of native vegetation that will be impacted by the project. The project is unlikely to contribute to any additional fragmentation or isolation of habitat.
- Disturbance associated with minor vegetation clearing and construction work associated with the project will increase the potential for the introduction, establishment

and spread of new weed species, and diseases and pathogens. Diseases and pathogens can, in general, be introduced or spread to site via dirt or organic material attached to machinery, vehicles, equipment and employees. The potential for significant or new impacts associated with these pathogens is relatively low, given the existing modification, urbanisation and extent of human visitation across the site and surrounding study area.

- The proposed works will be undertaken during standard, daytime construction hours. There is existing disturbance associated with background noise throughout the study area, and any fauna species present are already likely to be habituated to noise and activity. There will be an increase above existing background levels during construction works. Any such increase will be temporary in nature and is unlikely to result in a significant impact on any fauna species that could occur in or adjacent to the project site. Areas subject to construction noise will be temporarily disturbed, and some fauna may vacate areas in proximity to the project site during construction. No additional permanent impacts associated with noise are expected on site as a result of the project.

Impacts on threatened biota

There are no TECs within the project site, nor is there any habitat for any threatened flora species. The study area provides some limited potential foraging habitat for the Grey-headed Flying-fox and several threatened microbats. The small number of trees to be removed in the rail corridor will not provide important foraging habitat for these species. There is no roosting or breeding habitat for these species in the study area and the study area does not contain habitat important for the lifecycle or persistence of any local population.

Based on the consideration of impacts outlined above, the project will not result in a significant impact on any threatened or migratory biota listed under the BC Act or EPBC Act. Given the limited likelihood, extent and magnitude of impacts on threatened or migratory biota, no individual tests of significance pursuant to Section 7.3 of the BC Act (5-part test), or the MNES Significant Impact Guidelines have been prepared.

5.2.4 *Control Measures*

The environmental safeguards outlined in Table 5.5 will be implemented to address the potential impacts of the project on biodiversity values. A CEMP will be prepared, that will identify the specific measures to be implemented during the 'Pre-construction' and 'Construction' stages of the project.

Table 5.5: Environmental safeguards

Issues	*Safeguard*	*Timing*	*Responsibility*
Environmental management	A CEMP will be prepared, including the specific mitigation/management measures and sub-plans listed below along with work methods, contingencies, roles and responsibilities.	Pre-construction	Construction contractor

Issues	Safeguard	Timing	Responsibility
	The mitigation/management measures included in the CEMP and sub-plans will be implemented during pre-construction and construction stages.		
Worker inductions	Ensure all workers are provided with an environmental induction prior to starting construction activities on site. This will include information on protection measures to be implemented to protect biodiversity during construction.	Pre-construction	Construction contractor
Fauna management	A pre-inspection survey of the construction footprint will be undertaken by the contractor to check for sheltering resident native fauna. If native fauna is detected, then fauna management protocols will be implemented by a suitably qualified wildlife handler.	Pre-construction/ construction	Construction contractor
Weeds	Weed management and control will be undertaken and will include: Removal and control of noxious weed species. Appropriate disposal of weeds and weed-infested soils. Stabilisation of disturbed areas following clearing to prevent weed establishment and spread.	Pre-construction/ construction	Construction contractor
Site re-establishment	Bush revegetation using locally native species and targeted weed removal in the disturbed area should occur for a two year period following construction as per the Sydney Trains Biodiversity System Procedure.	Post-construction	Sydney Trains

5.2.5 *Biodiversity offset requirements*

The Sydney Trains Biodiversity Organisational Procedure (EMS-06-OR-1006 Version 1) and Biodiversity Offsets Calculator (EMS-06-WI-0177 Version 3) has been used to assist Sydney Trains to consider the provision of offsets for tree removal that fall outside statutory requirements.

The project will remove non-locally native trees, locally native trees and exotic trees and will exceed the clearance requirements for operations outlined in Appendix 1 of the Biodiversity Organisational Procedure. Recommended offset obligations are shown in Table 5.6 below.

Table 5.6 summarises the potential offset requirements, based on the offset guides 'minor' offsets option for the clearing of trees. The project is below the threshold for moderate offset options due to the low impact of the project on modified vegetation. The total recommended

offset provision for the project of $9,450 payable to the biodiversity offset fund (BOF) administered by Sydney Trains and used for revegetation works.

Table 5.6: Recommended offset requirements

Ecological loss	*Vegetation to be removed*	*Offset option*	*Offset multiplier*	*Offset provision*
Locally native trees	19 trees	Minor	$300 to the BOF for each locally native tree removed	$5,700
Non-locally native or exotic trees	25 trees	Minor	$150 to the BOF for each non-local tree removed	$3,750
Areas of vegetation that are exotic vegetation and weeds	0.17 hectares	Minor	No offset necessary	
Total			$9,450	

5.3 Noise and Vibration

5.3.1 *Existing Environment*

The site is located on Bridge Road about 650 metres to the east of Wentworthville Station. Existing noise around the site is dominated by road and rail traffic.

Sensitive noise receivers in the vicinity of the project site include residential, commercial and industrial properties, and educational facilities, with the nearest residential properties located at about 10 metres distance from site.

Residential land uses have been identified in close proximity to the site along Bridge Road, Wentworth Avenue, Alexandra Avenue and Version Street. The surrounding residences are located in R2 Low Density Residential, R3 Medium Density Residential and R4 High Density Residential land zones. The closest residential receivers to the works are:

- 136 Bridge Road, Westmead: 3 storey residential apartment block located 10 metres north of the overbridge
- 91D Bridge Road, Westmead: 8 storey residential apartment block located 30 metres north-east of the overbridge
- 100 to 112 Bridge Road, Westmead: single standing and residential apartment blocks located about 10 metres to 80 metres south of the overbridge. The nearest residence (112 Bridge Road) is adjacent to the overbridge
- 79 to 87 Bridge Road, Westmead: single standing residential premises located 25 metres to 85 metres south of the overbridge.

5.3.2 *Construction hours*

Works will be scheduled during the recommended standard construction hours provided in the *Interim Construction Noise Guideline* (ICNG) (DECC, 2009) where possible. The ICNG standard hours are as follows:

- Monday to Friday: 7 am to 6 pm
- Saturday: 8 am to 1 pm
- No works on Sundays or public holidays.

Works outside standard construction hours may be required during a rail possession so as not to affect Sydney Trains' ability to provide safe and reliable rail services or a safe working environment. Works outside standard hours are categorised into 'shoulder hours' and 'night hours' and are defined as follows:

- Shoulder hours: 6 pm to 10 pm (Monday to Friday), 1 pm to 10 pm (Saturday), 8 am to 10 pm (Sunday / public holidays)
- Night: 10 pm to 7 am (Monday to Friday), 10 pm to 8 am (Saturday, Sunday, public holidays).

5.3.3 *Assessment criteria*

Background noise levels were adopted from AS1055 for a suburban/urban area to determine the construction noise management levels (NMLs) for the project. The NMLs used for this assessment are provided in Table 5.7.

Table 5.7: Construction noise management levels

Standard hours	*Outside standard hours*		
	Day	*Evening*	*Night*
55	50	45	40

5.3.4 *Potential Construction Noise Impacts*

Potential construction noise impacts are determined based on the predicted exceedance above the construction noise management level (NML). The NML is based on the land use of the surrounding environment and the period where construction works are required (eg standard hours, shoulder hours or night hours).

The perceived level of impact has been based on the perception categories defined in the *Construction Noise and Vibration Strategy* (TfNSW, 2018). These perception categories are based on the level of exceedance above the rating background levels and used to determine the community consultation and additional mitigation requirements for TfNSW projects.

Table 5.8: The level of risk during each construction stage

Work phase	Most sensitive time of day noisiest plant will be operating	Noise management level (NML)	Predicted noise level at nearest receiver	Level of risk
Site establishment and vegetation clearing	Standard hours	55	71	Medium Risk
Construction of temporary retaining structures	Shoulder hours	50	75	High Risk
Abutment construction	Shoulder hours	50	76	High Risk
Earthworks for access approach construction	Shoulder hours	50	77	High Risk
Asphalting works for access approach construction	Shoulder hours	50	80	High Risk
Bridge construction works	Shoulder hours	50	73	High Risk
Demolition of the existing bridge	Shoulder hours	50	78	High Risk
Overhead wiring construction	Night	40	70	High Risk

Construction noise impacts during standard hours and shoulder hours

Plant and equipment that will operate during construction are outlined in section 2.3.6. The loudest equipment that will operate include vibratory rollers, concrete trucks and pumps, slip-forming machines, graders and equipment required for bridge demolition works.

Residences located along Bridge Road adjacent to the overbridge will receive the highest impacts during construction. The noise impacts during standard and shoulder hours at the most impacted receiver are expected to be:

- Standard hours: up to 16 dBA above the NML which represents a medium risk. Residences located within 100 metres of the construction works are predicted to experience moderately intrusive noise levels (exceedances greater than 10 dBA above the NML).
- Shoulder hours: up to 30 dBA above the NML which represents a high risk. Residences located within 150 metres of the construction works are predicted to experience clearly audible noise levels (exceedances greater than 5 dBA above the NML).

Noise levels have the potential to exceed the highly affected level of 75 dBA at the nearest sensitive receivers for brief periods during construction during abutment construction, access approach construction and bridge demolition works.

Construction noise impacts during night hours

The operation of intensive noise generating plant will not be required during night hours. Overhead wiring works may be required during the night-time period where exceedances up

to 30 dBA are predicted which represents a high level of risk. Residences located within 500 metres of the construction works are predicted to experience noticeable noise levels (exceedances above the NML).

Discussion of impacts

Due to the nature of construction works, impacts due to noise and vibration will not permanently affect the community and surrounding environment. These impacts will be limited to the construction period and will occur over short durations when the construction equipment is operational. Elevated levels of noise due to construction related activities will occur and noise management controls will be implemented to reduce impacts as far as reasonably practicable.

Standard noise mitigation measures and controls should be applied to receivers where feasible and reasonable. Construction noise levels and impacts will be minimised with these noise control measures. Suitable mitigation measures for construction noise are discussed in section 5.4.3.

5.3.5 *Potential Construction Traffic Noise Impacts*

Construction will generate light and heavy vehicle movements associated with worker movements, the transportation of construction machinery, equipment and materials to the site. The *Road Noise Policy* (DECCW, 2011) recommends that "any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'without construction' scenario. The existing traffic will need to increase by about 58 per cent in order for noise levels to increase by more than 2 dBA.

Existing peak hour traffic volumes on the Bridge Road overbridge are provided in the traffic impact assessment and summarised in Table 5.9.

Table 5.9: Existing peak hour traffic volumes

Location	Direction	AM Peak Hour (veh/h)	PM Peak Hour (veh/h)	Saturday Peak Hour (veh/h)
Bridge Road overbridge	Northbound	580	542	469
	Southbound	748	816	503

The construction site will be accessed via Darcy Road and Bridge Road via Cumberland Highway. The construction volume generated is unknown at this stage, but estimated to be small (refer section 2.3.5). Construction traffic noise impacts are considered unlikely as the existing peak hour traffic volumes will not increase by more than 58 per cent.

Partial road closures will be required during bridge construction works which will redirect traffic across the existing road traffic network. Existing traffic will be diverted to Darcy Road, Grand Avenue, Railway Street, Veron Street and Grand Avenue. The traffic diversions will be temporary and road closures will be dependent on the construction stage. Traffic noise impacts due to diversions will be minimal as all traffic will be diverted onto roads with high traffic volumes during peak hours.

5.3.6 *Control Measures*

Reasonable and feasible work practices to minimise noise impacts in the form of control measures have been determined based on Sydney Trains *EMS-10-FM-0166 Maintenance Quantitative Noise and Vibration Assessment*.

The following mitigation measures will be implemented to limit the impacts to the sensitive receivers during the project:

- All staff and contractors are to be advised of the requirements and responsibilities to manage noise in accordance with the ICNG including implementing reasonable and feasible noise mitigation and management measures to minimise noise impacts.
- Notify sensitive receivers at least five days prior to commencing work.
- Avoid the simultaneous operation of noisy plant items near sensitive residential receivers.
- Residences located within a minimum distance of 150 metres will be notified via letterbox drop of the proposed works prior to construction works including the expected periods of particular high noise to the community. Notification will be provided at least 5 days prior to commencement of the relevant works which are to occur outside the standard hours.
- Carry out loading and unloading away from sensitive residential receivers.
- Locate site access points as far as possible away from sensitive residential receivers.
- Plan for and conduct night time activities in ways that eliminate or minimise the need for audible warning alarms.
- Plant used intermittently will be throttled or shut down when not in use.
- Use quieter equipment where reasonable and feasible.

5.4 Aboriginal and Non-Aboriginal Heritage

5.4.1 *Existing Environment*

A search of the AHIMS database was undertaken on 2 March 2021, which indicated no sites or items of Aboriginal significance were recorded within 200 metres of the project area.

Searches of the following NSW and Commonwealth heritage databases were undertaken to identify whether any non-Aboriginal heritage listed items are located within the vicinity of the project site:

- Australian Heritage Database
- State Heritage Register
- RailCorp's Section 170 Heritage Register
- Parramatta LEP
- Holroyd LEP.

The project is not located within the heritage curtilage of any heritage item of National, State or local significance. The 'Sydney Cultural Crescent Rock Art', an area covering about 2 million hectares of land in eastern NSW, has been included in the Finalised Priority Assessment List as of 1 July 2020 which could have outstanding heritage value due to the density of rock art. The boundary of the listing is through the middle of the project site, however the likelihood of Indigenous rock art within the project area is considered low given the highly modified urban environment including existing transport infrastructure (road and rail corridors).

The nominated heritage site is currently under assessment to be included in the National Heritage List, with assessment completion date is scheduled for 30 June 2025, by which time the project will have already been completed.

A search of the NSW State Heritage Inventory within the Parramatta and Cumberland Councils indicated the presence of Parramatta Archaeological Management Units within the locality. In 2000, the Parramatta Historical Archaeological Landscape Management Study (PHALMS)(Godden Mackay Logan, 2000) was prepared to identify and provide a framework for the management of Parramatta's historical archaeological resources. The study area encompasses the land within the area covered by the Sydney Regional Environmental Plan No. 28 – Parramatta (now repealed). To facilitate the management of archaeological values, area of land with archaeological was divided into discrete unis called archaeological management units (AMUs).

The Parramatta AMUs 2981 and 2982 are located within the Cumberland LGA and the Parramatta AMUs 2917, 2926 and 2960 are located within the Parramatta LGA, Each of these AMUs contain a list of property identities (lots and DPs) which are considered to contain archaeological potential. Of these, seven individual properties listed within the Parramatta AMU 2981 are located within the project site at the corner of Alexandra Avenue and Bridge Road (see Figure 5.2). These properties have local heritage significance.

The Parramatta AMU 2981 consists of primarily single-storey houses on house-sized allotments, ranging in age from 1920s to 1970s. The area covered by the AMU has moderate to high potential to contain intact subsurface deposits related to the early Colonial period and the Government Domain (1810-1857). Archaeological evidence within the AMU area may include built landforms, open deposits and scatters and ecological samples which have the potential to yield information relating to historic agriculture, environment, government and administration, housing, land tenure and township themes. Archaeological evidence within the AMU is likely to be largely intact, though subject to minor disturbance in some areas due to the subdivision of land in 1871 and residential development. A comprehensive archaeological assessment of this AMU has not been undertaken at the time of writing of this REF.

Heritage items with local heritage significance (listed on the Parramatta LEP and Holroyd LEP) in the vicinity of the project area are shown in Figure 1.1.

5.4.2 *Potential Impacts*

Aboriginal heritage

The AHIMS database contains records of Aboriginal sites that have been officially recorded and included on the list. Large areas of NSW have not been subject to systematic archaeological survey, therefore AHIMS listings may reflect previous survey patterns and should not be considered a complete list of Aboriginal sites within a given area. Shallow excavation works with a limited extent are proposed within an area that has been previously disturbed. Therefore, the likelihood of encountering unidentified Aboriginal heritage items is considered low and the project is not anticipated to have any potential impacts on Aboriginal heritage.

Non-Aboriginal heritage

With regards to potential impacts on non-Aboriginal heritage items, the project is not anticipated to result in impact to items of National, State or local heritage significance. The following has been considered:

- There is potential for the project to impact on archaeological items listed under the Parramatta AMU 2981. Potential impact on these heritage items will avoided through the implementation of control measures provided in section 5.4.3.
- There is potential for minimal indirect impacts on heritage properties of local significance due to dust and migration of spoil and construction materials. These will be minimised through the implementation of management measures provided in Section 7.
- While the project is located within a prospective National Heritage Listing, the works will be unlikely to intercept with any cultural rock art sites due to the location of the works primarily being on areas previously disturbed for current infrastructure corridors. Potential impacts to cultural rock sites will be avoided through the implementation of unexpected finds procedures provided in section 5.4.3.
- The project area is disturbed, located within a built area and rail corridor, and unlikely to yield any archaeological material of significance.

5.4.3 *Control Measures*

The measures provided below will be implemented prior and during construction to minimise potential impacts to Aboriginal and non-Aboriginal heritage:

- Consultation with the Cumberland Council will be undertaken regarding potential impacts on items listed in the Parramatta AMU 2981 prior to works being undertaken.
- Consultation with NSW Heritage may be required if impacts to archaeological values are anticipated. Any further approval will be sought and obtained prior to works commencing.
- The project team including contractors will be briefed on the presence of archaeological potential within the Parramatta AMU 2981 adjacent to the project site.
- No materials are to be stockpiled or stored within heritage areas of archaeological potential, in particular near the properties associated with the Parramatta AMU 2981 heritage area.

- Any accidental damage to a heritage item is to be treated as an environmental incident, with appropriate recording and notification.
- If deeper excavations beyond those proposed in this REF are required, the Sydney Trains Project Manager and Environment Division must be notified to confirm no additional assessment or approval is required.
- Should an unexpected historic relic or Aboriginal object be identified during construction, work in the immediate vicinity of the find is to stop and the area must be fenced off with suitable markers (star pickets, flagging or barrier mesh). The Sydney Trains Project Manager and Environment Division are to be notified. Engage an archaeologist to determine the significance of the find, and if required, determine the notification, consultation, and approval requirements. Works must not recommence until Sydney Trains has provided written approval to do so.

Legend

- Design
- Railway
- Drainage
- Local Government Area
- Parramatta Archaeological Management Unit

Paper Size ISO A4

0 10 20 30 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Sydney Trains
Westmead, Bridge Rd Overbridge - Bridge Renewal
Review of Environmental Factors

Project No. **12515755**
Revision No. **0**
Date **29/11/2023**

Heritage

FIGURE 5.2

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Print date: 29 Nov 2023 - 10:07

Data source: LPI: DCDB/DCTB, 2017; Imagery: Nearmap WMS Server: . Created by: rvillalon

5.5 Traffic and Access

5.5.1 *Existing Environment*

Roads within the project site

Road located within the project site are:

- Bridge Road – a local road, oriented north-south connecting Great Western Highway to the south and Darcy Road to the north. Bridge Road crosses the Main Western Line at Westmead (the Bridge Road overbridge).
- Wentworth Avenue – a local road, oriented east-west parallel to the railway, connecting Bridge Road to the east and Wentworthville Station to the west.
- Alexandra Avenue is a local road, oriented east-west connecting Bridge Road to the west to Hawkesbury Road to the east.

All three roads are two-way undivided local roads with one traffic lane in each direction and are signposted at 50 kilometres per hour.

North of the bridge, Bridge Road connects with the Monarco Estate access (unnamed road) with a single lane roundabout (approximately 70 metres north of the overbridge) and Wentworth Avenue priority-control with a Stop sign immediately north of the overbridge.

South of the overbridge, Bridge Road intersects with Alexandra Avenue with a single lane roundabout.

Bus services

Bus services within the project site are described in Table 5.10. Bus stops located within the site and a suitable (250 metres) walking distance from site are shown in Figure 5.3.

Table 5.10: Bus services

Route	Frequency	Route Description
705	Weekday: One service nominally 30-minute intervals Weekend: One service Nominally 30-60 minute intervals	Parramatta to Blacktown via Seven Hills
705	Weekday: One nominally 30-minute intervals Weekend: One nominally 60-120 minute intervals	Blacktown to Parramatta via Seven Hills
708	Weekday: One service Weekend: No service	Constitution Hill to Parramatta via Pendle Hill
708	Weekday: One service Weekend: No service	Constitution Hill to Parramatta via Pendle Hill
818	Weekday: one service per 60-minute intervals Weekend: No service	Merrylands to Westmead Hospitals
818	Weekday: one service per 60-minute intervals Weekend: No service	Westmead Hospitals to Merrylands

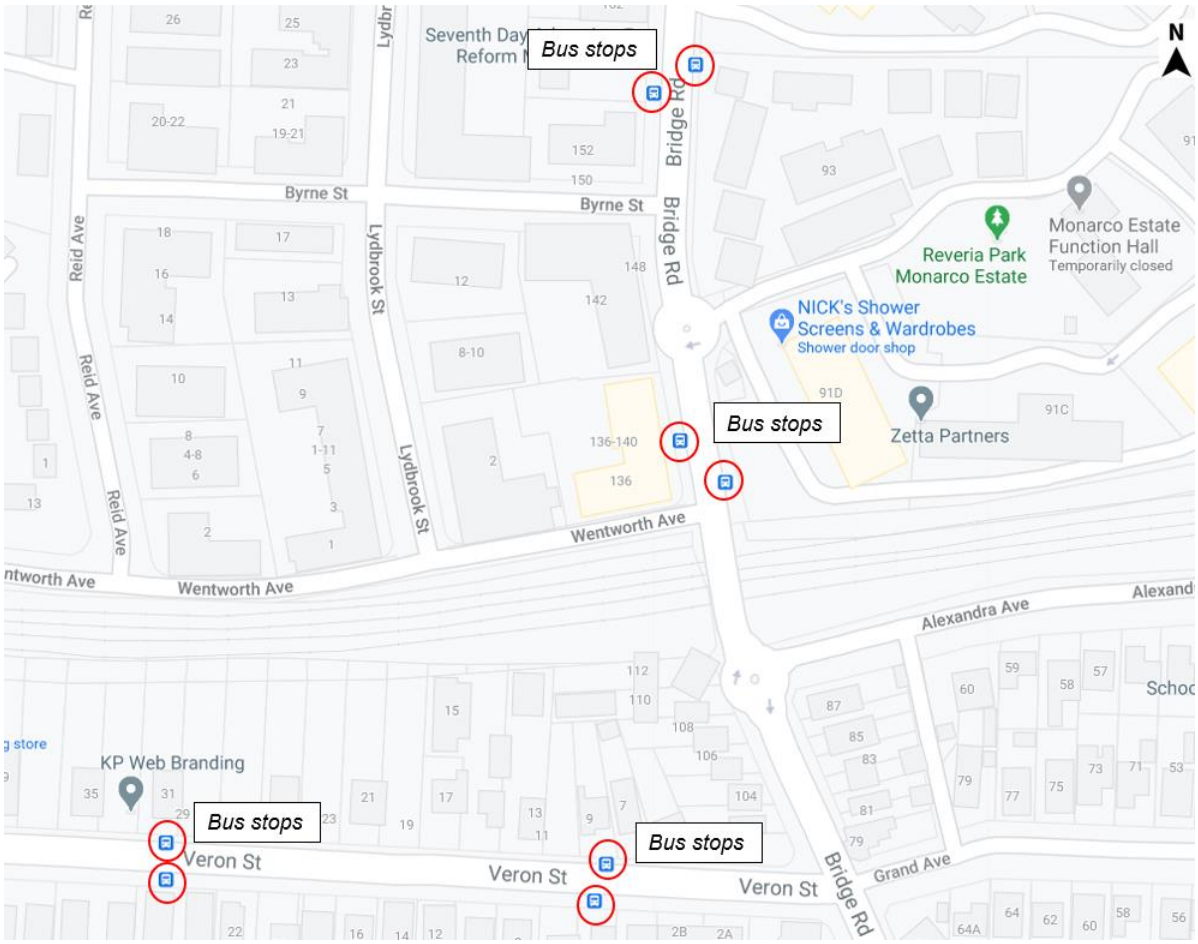

Figure 5.3: Bus stops within and near the project site

Train services

The project site is located between two railway stations: Westmead station about 800 metres to the east and Wentworthville station about 850 metres to the west.

Wentworthville Station is served by the following Lines:

- T1 North Shore and Western Line
- T5 Cumberland Line.

Westmead Station is served by the following lines:

- T1 North Shore and Western Line
- T5 Cumberland Line
- BMT Intercity Blue Mountains Line.

Bicycle and pedestrian access

The Roads and Maritime Cycleway Finder website identified there are currently off-road bicycle routes within proximity to the site along Hawkesbury Road and Darcy Road (refer

Figure 5.4). An on-road cycle path is located along Wentworth Avenue. Secured bike lockers are provided at Wentworthville and Westmead Stations.

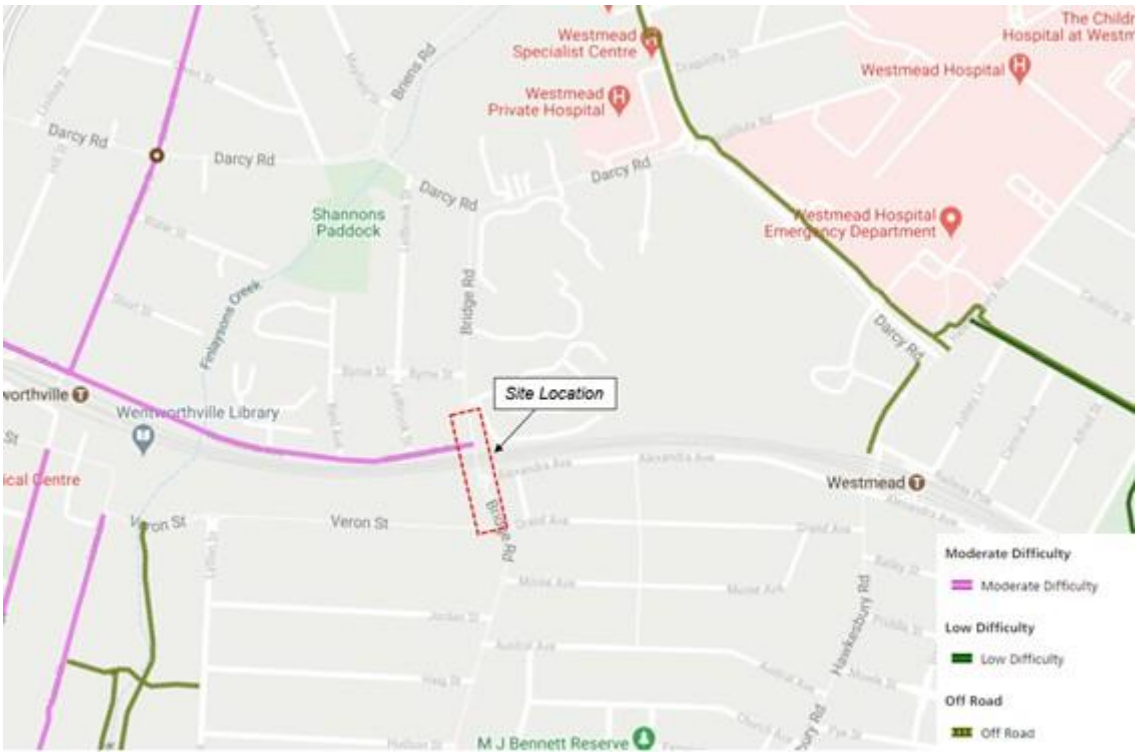

Figure 5.4: Existing bicycle network

The pedestrian network is reasonably well developed, with footpaths provided along all roads within the vicinity of the project site. Pedestrian footpaths are provided on both the eastern and western kerb of Bridge Road, and a single footpath is provided along the eastern side across the overbridge. A signalised pedestrian crossing facility is provided at the intersection of Bridge Road and Grand Avenue.

5.5.2 *Potential Impacts*

Construction impacts

As mentioned in section 2.3.4, construction will be undertaken in stages. Table 5.11 shows the road closures expected to occur during each of the construction stages.

Table 5.11: Road closures during construction

Construction stage	*Roads impacted*	*Detail*
Stage 1	None	All roads will continue to remain open to operate as per existing road conditions and no road closure is expected to occur during this stage The construction of "bridge 1" post and panel temporary retaining wall, backfill and "bridge 1" abutments and approach will occur during this stage. It is also expected that utility upgrades behind "bridge 1" retaining wall will commence. This work will take place within the rail corridor with minimal impact on the road network.
Stage 2	Alexandra Avenue – partial closure Bridge Road – full closure during one weekend rail possession	Alexandra Avenue will be partially closed during this stage. The existing bridge and Wentworth Avenue are expected to remain open. The construction and installation of "bridge 1" comprising one lane in each direction and pedestrian walkway is expected to be available during this stage. During this stage, utility upgrades across Alexandra Avenue will take place to ensure that utilities crossing the bridge can be switched over to the new route once "bridge 1" is in position. Full closure of Bridge Road will be required when bridge 1 is lifted into place. This will take place during a single weekend rail possession. "Bridge 1" finishes will be completed for temporary stage configuration.
Stage 3	Bridge Road – partial closure Wentworth Avenue – partial closure Alexandra Avenue – partial closure	Bridge Road will be partially closed for road upgrade works to be compelted north and south of the bridge. Wentworth Avenue will be partially closed in both directions for road upgrade works to be completed, tying into the new alignment of Bridge Road. Only residents will be allowed to access the driveways within these areas during the partial closure. The traffic along the existing bridge will be diverted to "bridge 1" and allowed to access from the north of Bridge Road to the bridge and along Alexandra Avenue.
Stage 4	Bridge Road – partial closure, with full closure of the bridge	Stage 3 road closures will remain during Stage 4.

Construction stage	Roads impacted	Detail
	required during one weekend rail possession. Wentworth Avenue – partial closure Alexandra Avenue– partial closure	Continued road upgrades to Bridge Road, Wentworth Avenue and utilities. Road operations to continue across the new "bridge 1" link from north Bridge Road on to Alexandra Avenue. Full closure of Bridge Road will be required during a single weekend rail possession when the exisitng bridge is demolished.
Stage 5	Bridge Road – partial closure Wentworth Avenue – partial closure Alexandra Avenue– partial closure	Stage 3 road closures will remain during Stage 5. Continued road upgrades to Bridge Road, Wentworth Avenue and utilities. Road operations to continue across the new "bridge 1" link from north Bridge Road on to Alexandra Avenue. The construction of the "bridge 2" post and panel temporary retaining wall, backfill and "bridge 2" abutments will occur during this stage. It is also expected that utility upgrades behind the "bridge 2" retaining wall will commence.
Stage 6	Bridge Road – partial closure, with full closure of the bridge occurring during one weekend rail possession Wentworth Avenue – partial closure Alexandra Avenue– partial closure	Stage 3 road closures will remain during Stage 6. Continued road upgrades to Bridge Road, Wentworth Avenue and utilities. Full closure of Bridge Road overbridge will be needed when "bridge 2" is lifted into place. This will take place during one weekend rail possession.
Stage 7	Bridge Road – partial closure Wentworth Avenue – partial closure Alexandra Avenue– partial closure	Stage 3 road closures will remain during Stage 7. Continued road upgrades to Bridge Road, Wentworth Avenue and utilities. "Bridge 2" finishes will be completed for temporary stage configuration.
Stage 8	Bridge Road – partial closure Wentworth Avenue – partial closure Alexandra Avenue– partial closure	Stage 3 road closures will remain during Stage 8. Final configuration of "bridge 2" and completion of road construction will occur during this stage.

Construction stage	Roads impacted	Detail
Stage 9	Bridge Road – partial closure Alexandra Avenue– partial closure	"Bridge 2" and Wentworthville Avenue construction will be opened for traffic. "Bridge 1" to be closed. Final configuration layout to be constructed and bridge 1" tied into "bridge 2". Alexandra Avenue will be closed to finish the works on "bridge 2" and ensure all tie-ins are completed for the final configuration.
Stage 10	No road closure.	The construction work will be completed and all roads will be opened for traffic.

Road closures outlined in Table 5.11 would necessitate traffic diversions. Possible traffic diversion routes during partial and full road closures are provided in Figure 5.5 and Figure 5.6, respectively.

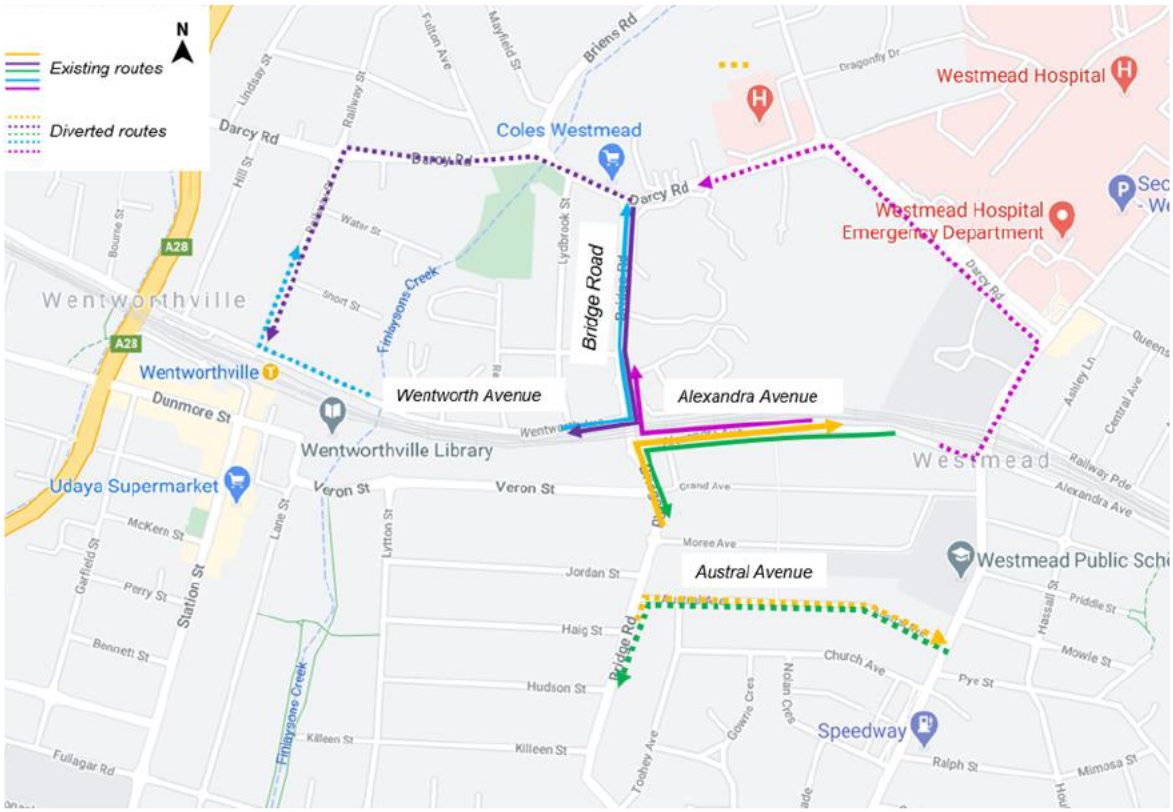

Figure 5.5: Traffic diversion routes during construction – partial closure of the bridge and/or surrounding roads

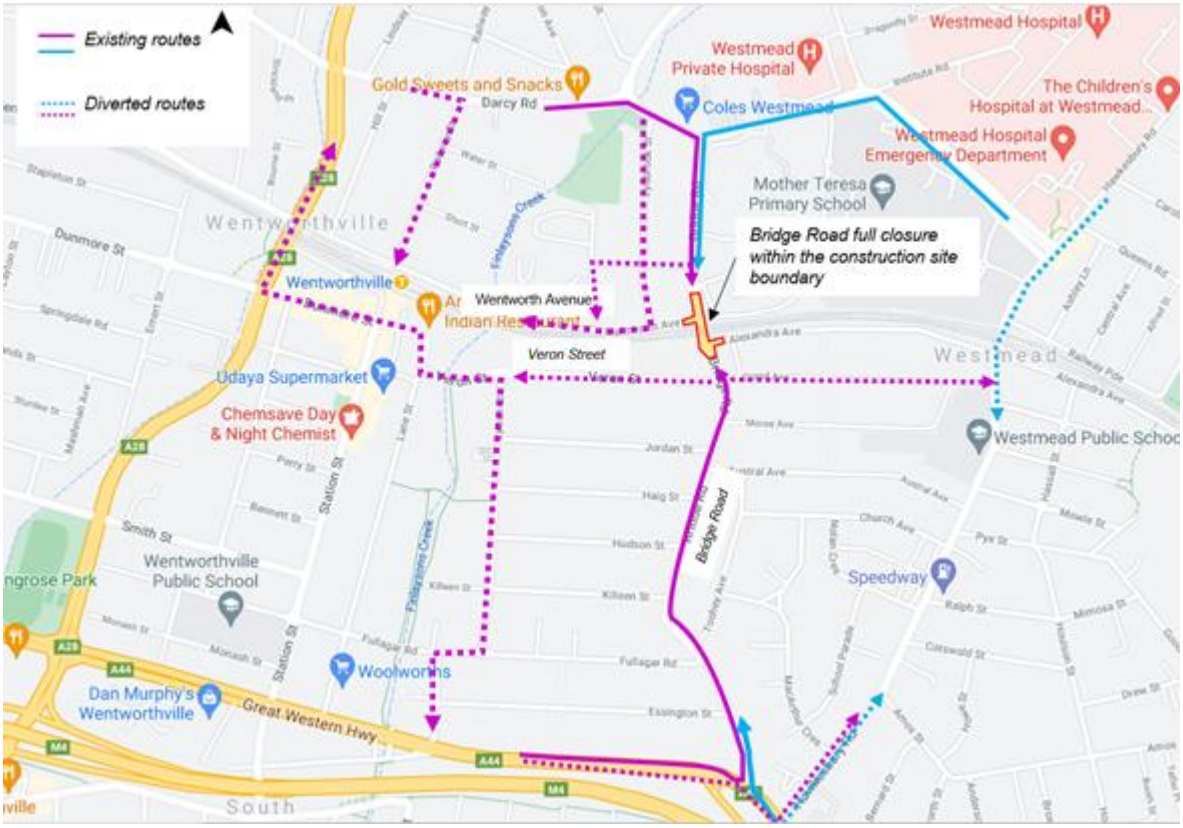

Figure 5.6: Traffic diversion routes during construction – full closure of the bridge

Construction traffic is not anticipated to result in a significant impact to traffic on State and regional roads but has a high potential to temporarily impact on local roads. Traffic disruptions for the local community will be minimised through the implementation of control measures provided in section 5.5.3.

Construction impacts – parking

Construction of the project will have short-term localised impacts on on-street parking, as there will be partial road closures for the works and the presence of construction vehicles. The duration of road closures is currently unknown.

Construction impacts – public transport

Construction of the project is not expected to impact on trains services providing that construction and demolition works will be undertaken during scheduled rail possession periods. During rail possession periods, train services will be replaced by buses. Details regarding construction scheduling is not yet available at the time of writing this REF. It is assumed that works within and above the rail corridor can be undertaken within a rail possession window without needing Sydney Trains to schedule additional rail possession time.

Construction of the project will have a temporary impact on access to bus stops, particularly on Bridge Road near Wentworth Avenue. The following bus stops will be impacted and may require temporary relocation (refer Figure 5.7):

- Bus stop ID 2145542 Bridge Rd opposite Wentworth Avenue

- Bus stop ID 2145548 Bridge Rd after Wentworth Avenue.

Bus routes that will be impacted during construction include bus routes 705, 708, 818 and 824.

Figure 5.7: Bus routes and stops impacted during construction

Control measures will include consultation with bus operators to ensure impact to services are minimised.

Construction impacts – pedestrians and cyclists

Construction is expected to have a temporary impact on pedestrians and cyclists with potential risk to safety due to the presence and/or movements of construction vehicles' in the project area. Impacts to pedestrians and cyclists will be minimised through the implementation of control measures provided in section 5.5.3.

Operational impacts

Once operational, the project will be beneficial to the community by reducing traffic congestion for motorists travelling along Bridge Road and supporting rail services travelling underneath.

5.5.3 *Control Measures*

- A Construction Traffic Management Plan (CTMP) will be prepared prior to the commencement of works with site induction for construction personnel being undertaken to outline the requirements of the CTMP. The CTMP will be developed in consultation with Parramatta City Council, Cumberland Council and Transport for NSW and include such items as:
    - Vehicle approach routes
    - Traffic management and traffic control plans
    - Pedestrian / cycle manage management
    - Oversize vehicle permit requirements
    - Road hazards (including fog, wet weather, frost, wildlife etc.)
    - Conditions as provided by the stakeholders including Transport for NSW Traffic Management Centre and local councils
    - Incident management plan, outlining the procedures to be undertaken should incidents occur, and relevant contact details.
- A communications plan will be developed prepared prior to the commencement of works to outline methods of communicating changes during the works and advise motorists of potential delays, as well as traffic diversion routes.
- Signage and traffic control devices will be installed to alert motorists and pedestrians to changes to local traffic conditions during the construction period.
- Bus operators, transport management centre, emergency services and any other key stakeholders will be notified of the project and timing of work.
- Traffic flow, parking and loading/unloading areas will be planned not to obstruct the traffic on Bridge Road, Alexandra Avenue, Wentworth Avenue or any of the surrounding road network.
- Vehicles, plant and equipment must use designated routes.

5.6 Cumulative Environmental Impacts

In accordance with section 171 of the EP&A Regulation, any cumulative environmental effects of the project associated with other existing and likely future activities must be taken into account in determining the potential impacts of the project on the environment.

The cumulative environmental effect is a combination of the direct impacts that would occur as a result of the construction and operation of the project, along with any direct impacts of the current operation taking place at the site or from other projects within the general area.

The potential impacts of the project are envisaged to be medium and localised. It is not expected that the project would make a significant contribution to any cumulative environmental impact on either a local or regional scale, provided that the measures identified in this REF are implemented. Rather, by contributing to an improvement of the existing infrastructure, the project will improve road user experience and reduce the potential for cumulative impacts associated with other developments.

The project will bring about a temporary moderate impact in local traffic, minor noise impacts during construction and on-going operational noise impacts associated with increased traffic over the new bridge crossing. The project will bring a cumulative beneficial effect to motorists by easing congestion and contributing to travel time saving on Bridge Road.

6 Consideration of State and Commonwealth Environmental Factors

6.1 Section 171 Factors

The factors listed in section 171 of the EP&A Regulation are required to be considered to assess the likely impacts of the project on the natural and built environment. The impacts on these factors from the project are summarised in Table 6.1 and are based on the environmental impact assessments in Section 5.

Table 6.1: Section 171 Factors

Section 171 Factors		*Impact*
(a)	Any environmental impact on a Community? The project will cause temporary amenity and traffic impacts during construction due to noise and partial or full road closures. During operation, there will be a small increase in traffic noise, however this is offset by the overall community benefit of improved traffic access.	Short term: Moderate Long term: Positive
(b)	Any transformation of a locality? Short term transformation of locality will occur during the project construction works. In the long term, the locality is transformed through the presence of a new bridge which meets current design requirements.	Short-term: Minor Long-term: Positive
(c)	Any environmental impact on the ecosystems of the locality? The project will result in some vegetation clearing within the rail corridor, with minor impact to ecosystems of the locality. The vegetation comprises primarily of exotic species and will not disturb adjoining intact native vegetation The impact on ecosystem of the locality is considered minor and short term.	Short-term: Minor Long-term: Nil
(d)	Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? No	Nil
(e)	Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations? Items with local heritage significance are present within proximity to the project site associated with the Parramatta Archaeological Management Units (refer details in section 5.4). Impacts to these items should be able to be avoided through the implementation of control measures provided in section 5.4.3.	Nil

Section 171 Factors		Impact
(f)	Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act* 1974)? The biodiversity assessment undertaken as part of the REF indicated that the project will not result in any impact on the habitat of protected fauna. Refer to section 5.2 .	Nil
(g)	Any endangering of any species of animal, plant or other form of life whether living on land, in water or in the air? The project will not result in the endangering any species of animal, plant or other form of life whether living on land, in water or in the air. Refer to section 5.2	Nil
(h)	Any long term effects on the environment? Long term positive impacts include improved travel times for road users across Bridge Road and improved visual amenity.	Long term: Positive
(i)	Any degradation of the quality of the environment? The project will have short-term minor negative impacts on the local environment as a result of construction works, such as noise and air emissions. In the long term, the project will not result in minor negative impact in noise and air emissions due to the increased traffic associated with the additional lane across the new bridge.	Nil
(j)	Any risk to the safety of the environment? No	Nil
(k)	Any reduction in the range of beneficial uses of the environment? No	Nil
(l)	Any pollution of the environment? Noise impacts and dust from construction equipment will occur during the construction phase of the project. These will be minimal in nature and impacts will be mitigated through implementation of standard controls and measures (refer Table 7.1).	Short term: minor
(m)	Any environmental problems associated with the disposal of waste? Waste will be generated during the project works from the demolition of the existing road bridge and other construction works associated with the construction of the new bridge. Waste will be disposed of appropriately and opportunities for recycling of waste incorporated where possible.	Nil.
(n)	Any increased demands on resources (natural or otherwise) that are or are likely to become in short supply? No	Nil.
(o)	Any cumulative environmental effect with other existing or likely future activities? No. Refer to section 5.6.	Nil.

Section 171 Factors		Impact
(p)	Any impact on coastal processes and coastal hazards, including those under projected climate change conditions? No. The project is not located in a coastal area.	Nil.
(q)	Any applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1 No strategic planning statements, regional or district plans are applicable to this project.	Nil
(r)	Any other relevant environmental factors Environmental factors impacted by the proposal are discussed in section 5 of this REF. With the implementation of the safeguards given in section 7 of this REF, no additional impacts would be generated by the project.	Short term: minor

6.2 Matters of National Environmental Significance Factors

Under the environmental assessment provisions of the EPBC Act, the following MNES and impacts on Commonwealth land are required to be considered to assist in determining whether the project should be referred to the Australian Government Department of the Environment. Table 6.2 addresses the MNES for the project.

Table 6.2: MNES

MNES	Impact
Any environmental impact on a World Heritage property? The project will not have an impact on any World Heritage property.	Nil.
Any environmental impact on National heritage places? The project will not have an impact on any currently listed National heritage place.	The 'Sydney Cultural Crescent Rock Art', an area covering about 2 million hectares of land in eastern NSW has been included in the Finalised Priority Assessment List as of 1 July 2020 which could have outstanding heritage value due to the density of rock art. The boundary of the listing is through the middle of the project site, however the likelihood of Indigenous rock art within the project area is considered low given the highly modified urban environment including existing transport infrastructure (road and rail corridors). The nominated heritage site is currently under assessment to be included in the National Heritage List, with assessment completion date is scheduled for 30 June 2025, by which time the project will have already been completed. The nearest item on National Heritage List is the Old Government House and Government Domain, Parramatta, located about 1.1 kilometres east of the site and will not be affected by the project.

MNES	Impact
Any environmental impact on RAMSAR wetlands? The project will not have an impact on any RAMSAR wetlands.	Nil.
Any environmental impact on Commonwealth listed threatened species or ecological communities? There are no listed threatened species or ecological communities within the project site.	Nil. The EPBC protected matters search of identified six threatened ecological communities and 33 threatened species that may occur within one kilometre of the project locality. The biodiversity assessment undertaken as part of the REF (section 5.2) confirmed that the project will not require the clearing of native vegetation or the removal of habitat of value for native fauna.
Any environmental impact on Commonwealth listed migratory species? Migratory species are unlikely to occur within the project site. The project area does not contain 'important habitat' for migratory species as defined in the MNES significant impact guidelines.	Nil. The EPBC protected matters search identified 15 migratory species within one kilometre of the project locality, however the project is not likely to impact on these species due to lack of suitable habitat.
Does any part of the project involve nuclear action? No.	Nil
Any environmental impact on a Commonwealth marine area?	Nil
Any impact on Commonwealth land?	Nil

There are no MNES that will be affected as a result of this project. No Commonwealth land will be affected, either directly or indirectly, as a result of this project.

As the project will not impact on any of these matters, a referral to the Commonwealth Minister for the Environment is not required.

7 Environmental Management Measures

7.1 Summary of Control Measures

The following control measures have either been identified through the assessment undertaken through this REF or are standard best practice environmental management controls. They will be incorporated into the detailed design phase of the project and during construction and operation of the project, should it proceed. These control measures will minimise any potential adverse environmental impacts arising from the project. The controls measures are summarised in Table 7.1.

Table 7.1: Summary of Site Specific Control Measures

Aspect	Potential Impact	Control measures
Landforms, Geology and Soils	☒ Soil Erosion / Stability ☒ Site Rehabilitation ☐ Acid Sulphate Soils	Effective erosion and sediment control measures will be established for any works resulting in land disturbance in accordance with The Blue Book 'Managing Urban Stormwater: Soils and Construction – Volume 1, 4th Edition (Landcom, 2004). These control measures will be documented in an Erosion and Sedimentation Control Plan for the works, which will be prepared in accordance with Sydney Trains procedure EMS-09-PR-0012 and include as a minimum the following actions: • Diverting surface runoff around the works area, where necessary. • Placing sediment barriers around any stormwater drains/pits. • Undertaking regular inspections of all sediment and control structures. • Immediately adjusting or reinstating any structure found to be ineffective. The following soil erosion control measures must also be implemented: • Disturbed surfaces must be stabilised as soon as possible. • Stockpiles must be located in designated areas, away from drainage lines, and covered to prevent dust generation. • Dry street sweepers or hand-held brooms must be used to clean the pedestrian footpath and Douglas Street, in the case of tracked sediment. • Standard dust-control measures must be implemented for both open excavations and stockpiles, including the use of a water cart and/or water spray equipment.

		• Excavation must be avoided when heavy rain is forecast. • Construction plant and vehicle access to unsealed areas must be limited during and immediately following wet weather. • Unsurfaced entry points must be stabilised using aggregate underlain with geotextile fabric.
Water Quality and Hydrology	☐ Pollution ☒ Sedimentation ☒ Oil Spills	• The disturbance area must be minimised, where possible, by limiting the width and depth of the excavation required for the concrete abutments. • Spills or leaks are to be reported to the Sydney Trains Project Manager/Officer on site and clean up measures commenced immediately. • Pollution incidents or spills that cause or may cause material harm to the environment are to be reported to the EPA, in consultation with Sydney Trains. • Chemicals must be appropriately stored and handled in accordance with relevant Safety Data Sheets (SDS). • Construction personnel must be trained in spill containment and response procedures. • All required chemicals and fuels must be located within an appropriately bundled enclosure as required by relevant legislation and standards (e.g., AS1940: Australian standard for the storage and handling of flammable and combustible liquids) and located away from stormwater drains. • Spill kits appropriate to products used on site must be readily available. • Plant and equipment must be regularly inspected to check for oil leaks. • Refuelling of vehicles or machinery is to occur within a containment or hardstand area designed to prevent the escape of spilled substances to the surrounding environment • Wash down of concrete mixers, concreting equipment and trucks must take place in an appropriate area away from drainage lines and stormwater drains. • Wash down areas must be appropriately constructed, and the collected material disposed of off-site. • An Erosion and Sedimentation Control Plan must be prepared by suitable qualified persons as per EMS-14-PR-0012 *Erosion and Sediment Control* and is to be fully implemented and managed through all stages of the project.

Air Quality	☒ Dust ☒ Odour & Fumes ☒ Greenhouse Gases	• At the conclusion of the demolition works of the existing bridge, the project site must be examined visually for any evidence of paint chips or debris resulting from the demolition activities. All debris must be removed. • Emission of dust from unsealed roads and other exposed surfaces such as unprotected earth or soil stockpiles must be controlled by use of surface sealants and/or water spray carts or other appropriate cover material. • Disturbed areas must be rehabilitated upon completion of demolition works by provision of protective ground cover such as mulches, vegetation, organic binders or dust retardants. • Stockpiles must be appropriately maintained and contained which could include covering or regular watering to minimise dust. • Traffic movements on any disturbed areas must be limited. • Work must be minimised during high wind periods. • Plant and equipment must be operated in a proper and efficient manner and switched off when not in use. • Plant and equipment must be maintained in accordance with manufacturer's specifications to ensure that it is in a proper and efficient condition. • Plant and equipment must be regularly inspected to ascertain that fitted emission controls are operating efficiently.

Biodiversity	☒ Trimming and removal of trees
	☒ Noxious weeds
	☐ Native vegetation
	☐ Habitat
	☐ Threatened species
	☐ Sensitive areas
		• A CEMP will be prepared, including the specific mitigation/management measures and sub-plans listed below along with work methods, contingencies, roles and responsibilities. The mitigation/management measures included in the CEMP and sub-plans will be implemented during pre-construction and construction stages.
		• Ensure all workers are provided with an environmental induction prior to starting construction activities on site. This will include information on protection measures to be implemented to protect biodiversity during construction.
		• A pre-inspection survey of the construction footprint will be undertaken by the contractor to check for sheltering resident native fauna. If native fauna is detected, then fauna management protocols will be implemented by a suitably qualified wildlife handler.
		• Weed management and control will be undertaken and would include:
		  o Removal and control of noxious weed species.
		  o Appropriate disposal of weeds and weed-infested soils.
		  o Stabilisation of disturbed areas following clearing to prevent weed establishment and spread.
		• Bush revegetation using locally native species and targeted weed removal in the disturbed area should occur for a two-year period following construction as per the Sydney Trains Biodiversity System Procedure.

Noise and Vibration	☒ Noise ☒ Vibration ☒ Adjoining landowners	• All staff and contractors are to be advised of the requirements and responsibilities to manage noise in accordance with the ICNG including implementing reasonable and feasible noise mitigation and management measures to minimise noise impacts • Notify noise sensitive receivers at least five days prior to commencement of work • Avoid the simultaneous operation of noisy plant items near sensitive residential receivers • Residences located within a minimum distance of 150 metres will be notified via letterbox drop of the proposed works prior to construction works including the expected periods of particular high noise to the community. Notification will be provided at least 5 days prior to commencement of the relevant works which are to occur outside the standard hours. • Carry out loading and unloading away from sensitive residential receivers • Locate site access points as far as possible away from sensitive residential receivers • Plan for and conduct night-time activities in ways that eliminate or minimise the need for audible warning alarms • Plant used intermittently will be throttled or shut down when not in use • Use quieter equipment where reasonable and feasible.
Heritage	☐ Aboriginal Heritage ☐ Non Aboriginal Heritage ☐ Conservation area ☒ Archaeological potential	• Consultation with the Cumberland Council will be undertaken regarding potential impacts on items listed in the Parramatta AMU 2981 prior to works being undertaken. • Consultation with NSW Heritage may be required if impacts to archaeological values are anticipated. Any further approval will be sought and obtained prior to works commencing. • The project team including contractors will be briefed on the presence of potential archaeological potential within the Parramatta AMU 2981 adjacent to the project site. • No materials are to be stockpiled or stored within heritage areas of archaeological potential, in particular near the properties associated with the Parramatta AMU 2981 heritage area. • Any accidental damage to a heritage item is to be treated as an environmental incident, with appropriate recording and notification. • If deeper excavations beyond those proposed in this REF are required, the Sydney Trains Project Manager and Environment Division must be notified to confirm no additional assessment or approval is required. • Should an unexpected historic relic or Aboriginal object be identified during construction, work in the immediate vicinity of the find is to stop and the area must be fenced off with suitable markers (star pickets, flagging or barrier mesh). The Sydney Trains Project Manager and Environment Division are to be notified. Engage an archaeologist to determine the significance of the find, and if required, determine the notification, consultation,

		and approval requirements. Works must not recommence until Sydney Trains has provided written approval to do so.
Waste Management	☒ Spoil ☒ Litter ☐ Chemicals ☐ Hazardous, Liquid or Special Waste ☐ Solid waste	• Resource management options for the project must be considered against a hierarchy of the following order embodied in the *Waste Avoidance and Resource Recovery Act 2001*: 1. Avoid unnecessary resource consumption. 2. Recover resources (including reuse, reprocessing, recycling and energy recovery). 3. Dispose (as a last resort). • All wastes must be classified in accordance with the *Waste Classification Guidelines* (DECC, 2009) prior to disposal and transported to a licensed waste disposal facility. • Prior to construction, site personnel must be trained in the principals of avoid, reuse, recycle and the appropriate disposal of domestic and industrial waste, responding to spills on site and the storage and locations and disposal of different types of waste. • Excavated material must be temporarily stored in a bunded area or with appropriate environmental controls in place to prevent run-off of contaminants entering the stormwater system. • Any spoil or waste material tracked onto paved areas such as roads and car parks must be immediately swept up. No water is to be used to wash any such material tracked onto roads into stormwater drains. • Any concrete aggregate from concrete washdown areas must be disposed off-site either to a recycling facility or a licensed waste disposal facility. • An adequate number of bins must be placed at the site for workers and all litter will be placed in these bins. Work areas of the project site would be kept clean and free of litter, including cigarette butts, at all times. • All waste must be removed from the site on completion of the works.
Contaminated Land and Hazardous Materials	☒ Soil Contamination ☒ Hazardous spills	• All excavated material must be analysed prior to transportation and disposal in accordance with NSW *Waste Classification Guidelines* (DECC, 2009). • Where material (sand or aggregate) is required backfilling and levelling of the site, prior to the acceptance of any soil onsite (regardless of volume), the following actions must be taken to reduce the risk of receiving contaminated material. o The only fill that may be imported to the site is virgin excavated natural material (VENM) within the meaning of the POEO Act and/or any other waste-derived material subject of a resource recovery exemption under clause 51A of the POEO Act (Waste) Regulation 2005 that is permitted to be used as fill material. Any fill received at the site must be accompanied by documentation providing its waste classification or the material's compliance with the exemption conditions.

		○ Request the supplier provides formal certification that the fill material is VENM. ○ Request the supplier provide information on what activities previously occurred onsite where there fill was sourced. ○ Check for signs of contamination, such as odours (chemical/petrol), staining from chemicals, and rubbish such as bricks, timber, Masonite, etc. ○ Supervise the delivery of the material to ensure the material received matches the material ordered. ○ Maintain all documents and records. • Hazardous materials must be transported, stored and used in accordance with the corresponding Material Safety Data Sheets (MSDS). • If unexpected contamination is encountered during excavation the contaminated material will be stockpiled separately and the Sydney Trains Project Manager will be notified. Unexpected contamination could include odours (chemical/petrol), staining from chemicals or rubbish such as bricks, timber, and masonite. • Fuels, lubricants and chemicals must be stored and, where practicable, used within containment/hardstand areas designed to prevent the escape of spilt substances to the surrounding environment, as required by relevant legislation and standards (eg, AS1940: Australian Standard for the storage and handling of flammable and combustible liquids). • Adequate spill prevention and containment measures (eg drip trays) must be used when refuelling equipment on site. • All storage and handling equipment on site must be maintained properly. • Construction personnel to be trained in spill containment and response procedures. • Appropriate spill response material to be kept on site. • Spills or leaks to be reported to the senior officer on site and clean up measures commenced immediately. • Spills to be reported in accordance with legislative and licensing requirements. • Where possible, spilt material and contaminated soils to be treated on site. If this is not possible, the material or soils to be removed off-site for disposal at an appropriately licensed facility, • All spills that cause or may cause material harm to the environment to be reported to the NSW EPA.
Visual Aesthetics and Urban Design	☒ Visual ☐ Views and vistas	• A high level of housekeeping must be maintained by ensuring that the work site is kept in a clean and tidy condition, with appropriate areas identified for waste materials. • Waste materials must be removed from site regularly.

	☐ Overshadowing ☐ Light spill	• Any disturbed areas of the site must be revegetated using locally indigenous species in accordance with EMS-06-GD-0074 *Revegetation Guide* and EMS-06-TP-0066 *Revegetation Technical Specification Template*.
Socio-Economic Effects	☐ Land Use ☐ Property Effects ☐ Economic Effects ☒ Other community impacts	• Control measures identified to minimise noise and vibration, air quality, traffic and access and visual aesthetics must be implemented to minimise potential socio-economic impacts.

Transport	☒ Traffic and access ☒ Transport	• A Construction Traffic Management Plan (CTMP) would be prepared prior to the commencement of works with site induction for construction personnel being undertaken to outline the requirements of the CTMP. The CTMP would be developed in consultation with Parramatta City Council and Transport for NSW and include such items as: o Vehicle approach routes o Traffic management and traffic control plans o Pedestrian / cycle manage management o Oversize vehicle permit requirements o Road hazards (including fog, wet weather, frost, wildlife etc.) o conditions as provided by the stakeholders including Transport for NSW Traffic Management Centre. • A communications plan would be developed prepared prior to the commencement of works to outline methods of communicating changes during the works and advise motorists of potential delays, as well as traffic diversion routes. • Signage and traffic control devices would be installed to alert motorists and pedestrians to changes to local traffic conditions during the construction period. • Bus operators, transport management centre, emergency services and any other key stakeholders would be notified of the project and timing of work. • Traffic flow, parking and loading/unloading areas would be planned not to obstruct the traffic on Bridge Road, Alexandra Avenue, Wentworth Avenue or any of the surrounding road network. • Vehicles, plant and equipment must use designated routes.

7.2 Implementation Process

The environmental management measures contained in this REF (as outlined in section 7.1) would be implemented to ensure that the environment is adequately protected and that adverse impacts are avoided or otherwise substantially ameliorated.

The construction contractor would be required to prepare a specific Construction Environmental Management Plan (CEMP) incorporating the mitigation measures specified in this REF. A copy of this REF and the CEMP is to be retained on the work site and produced upon request. The CEMP is to be reviewed by a Sydney Trains Environmental Professional, where required and endorsed by the Project Manager prior to works commencing on site. The CEMP is to include the following:

- identification of the environmental issues and risks of the project
- details of environmental controls to be implemented including location and timing
- details of statutory requirements including those of any approvals and licences
- assignment of responsibility for implementation and monitoring of environmental controls
- reporting, incident notification and emergency procedures
- contact details for all site personnel and agency contacts
- corrective action requirements and their verification.

8 Finalisation

8.1 Justification and conclusion

The project, as demonstrated within this REF, would have some minor short-term environmental impacts. The implementation of control measures provided within this REF would ensure the significance of any potential environmental impacts during construction are minimised.

8.2 REF Determination

8.2.1 *Author Declaration*

I declare that:

- This REF has been prepared in accordance with the following plans and supporting information (insert table of plans or specific assessments, where relevant).
- This REF addresses the requirements of Section 5.5 of the EP&A Act.
- An examination and assessment of the activity has been undertaken to take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of that activity, as addressed in this REF.
- The likely significance of the environmental impacts of the activity has been assessed in accordance with Section 171 of the EP&A Regulation.
- An assessment of the impacts of the activity on critical habitat and on threatened species, populations or ecological communities or their habitats, for both terrestrial and aquatic species has been undertaken. The activity described in the REF will not significantly affect threatened species, populations or ecological communities or their habitats. Therefore, no Species Impact Statement is required.
- The assessment has addressed the potential impacts of the activity on matters of national environmental significance and any impacts on Commonwealth land and concluded that there will be no significant impacts. Therefore there is no need for a referral to be made to the Australian Government Department of the Environment for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.
- The environmental impacts of the proposal are not likely to be significant and therefore it is not necessary for an environmental impact statement to be prepared and approval to be sought from the Minister of Planning under Division 5.2 of the EP&A Act.
- This REF provides a true and fair review of the activity in relation to the likely impacts of the proposed activity on the environment, and details the control measures to be implemented to minimise the potential impact on the environment.
- I have complied with the Sydney Trains EMS-03-WI-0124 *Part 5 Review of Environmental Factors Process*.

Author:

Name:	[redacted]
Position:	
Signature	

8.2.2 *Assessor Declaration*

I declare that:

- I have independently reviewed this REF.
- It is my judgement that the declaration made by the Author is correct and not false or misleading in a material respect.
- I have complied with the Sydney Trains EMS-03-WI-0124 *Part 5 Review of Environmental Factors Process.*
- It is recommended that the project proceed subject to the implementation of all mitigation measures identified in this REF and compliance with all other relevant statutory approvals, licences, permits and authorisations.

Reviewed by:	
Name:	[redacted]
Position:	
Signature	

8.2.3 *Certifier Declaration*

I declare that:

- The description of the project in this REF thoroughly and accurately represents the proposed activities associated with the project.
- The REF provides a true and fair review of the activity in relation to the likely impacts of the proposed works on the environment and details the control measures to be implemented to minimise the potential impact on the environment.
- I have reviewed the Assessment and Evaluation requirements of the EMS-09-WI-0124 *Part 5 Review of Environmental Factors Process* and am satisfied these have been adequately completed.
- I accept the REF on behalf of Sydney Trains.
- A copy of this REF will be retained onsite and produced upon request.
- All mitigation measures described in this REF (or an agreed equivalent) will be implemented.
- Personnel will be briefed during site induction on the location of sensitive areas and control measures identified in this REF.
- Control measures will be regularly monitored and maintained to ensure effectiveness.

- Any additional approvals, licences or permits required under relevant environmental legislation will be obtained and the conditions therein diligently implemented.
- I have complied with the Sydney Trains EMS-09-WI-0124 *Part 5 Review of Environmental Factors Process.*
- I acknowledge that I will be held accountable for implementing all of the activities listed under the Certifier Declaration.

Certified by:	
Name:	[redacted]
Position:	
Signature:	

8.2.4 *Determiner's Declaration*

I declare that:

- Having considered the scope of the project, the impacts and controls identified in the REF, I approve the undertaking of the project as described by the REF with the conditions as recommended by Assessor and/or Certifier.
- This project determination will remain current for a maximum of five years until at which time it shall lapse if works have not been physically commenced.
- I have complied with the EMS-09-WI-0124 Part 5 Review of Environmental Factors Process.

Determiner's Declaration and Approval:	
Name:	[redacted]
Position:	
Signature:	

9 References

DECC, 2009, Interim Construction Noise Guideline.

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Godden Mackay Logan, 2000, Parramatta Historical Archaeological Landscape Management Study (PHALMS)

Landcom, 2004, Managing Urban Stormwater: Soils and Construction – Volume 1, 4th Edition (The Blue Book).

National Herbarium of NSW, 2016, PlantNET accessed at Nationalplantnet.rbg.syd.nsw.gov.au

Pennay, M., Law, B. and Reinhold, L., 2004, *Bat calls of NSW: Region based guide to the echolocation calls of microchiropteran bats*.

Appendix A – Site Photographs

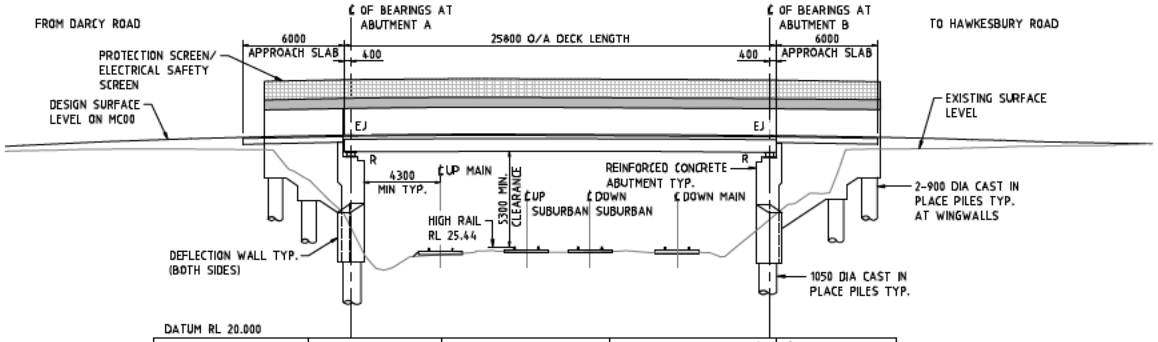
Photograph 1: Bridge Road Overbridge (as seen from Alexandra Avenue)

Photograph 2: Bridge Road Overbridge (as seen from Wentworth Avenue)

Photograph 3: Wentworth Avenue, showing access gate to the rail corridor

Photograph 4: Monarco Estate Apartment Building, Bridge Road immediately north of the bridge

Appendix B – Civil Engineering Drawing

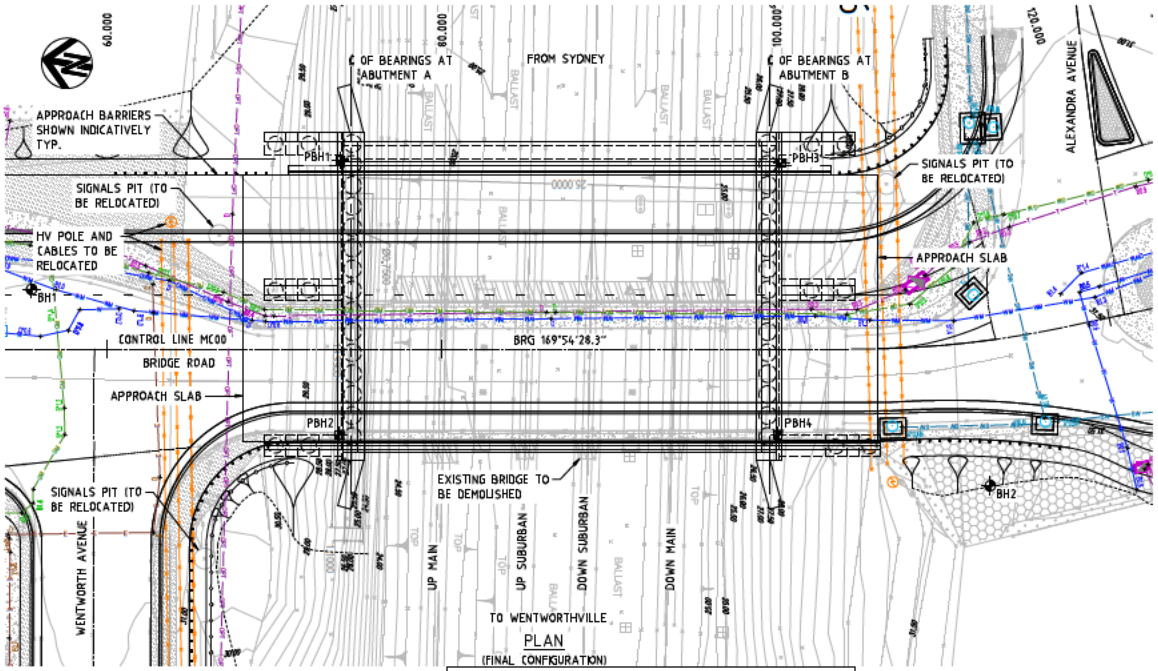


DATUM RL 20.000

DESIGN SURFACE LEVEL ON CONTROL LINE MC00	32.126	32.179	32.153	32.097	32.094
EXISTING SURFACE LEVEL ON CONTROL LINE MC00	26.614	24.988	25.172	27.065	27.439
CHAINAGE ON CONTROL LINE MC00	74.550	80.000	90.000	99.550	100.000

ELEVATION

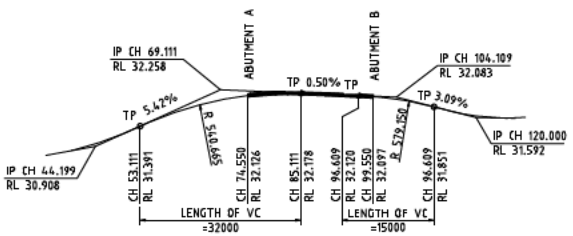
EXISTING BRIDGE NOT SHOWN FOR CLARITY



PLAN

(FINAL CONFIGURATION)

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR



VERTICAL ALIGNMENT DIAGRAM (MC00)

NOT TO SCALE

GENERAL NOTES

SCALE 0 2 4 6 8 10m (2 1) OR AS SHOWN

1. DIMENSIONS ARE IN MILLIMETRES.
2. DIMENSIONS ARE NOT TO BE SCALED FROM THE DRAWINGS.
3. CHAINAGES AND REDUCED LEVELS ARE IN METRES.
4. REDUCED LEVELS ARE RELATED TO AUSTRALIAN HEIGHT DATUM (AHD)
5. R DENOTES RESTRAINED BEARING
   EJ DENOTES EXPANSION JOINT
6. LOCATION OF ALL EXISTING SERVICES TO BE CONFIRMED ON SITE PRIOR TO CONSTRUCTION AND RELOCATED IF REQUIRED.
7. CONCRETE BRIDGE DECK WATERPROOFING MEMBRANE SHALL CONFORM TO RMS SPECIFICATION B344 TYPE 1. WATERPROOFING MEMBRANE SHALL BE OVERLAID WITH 75mm THICK ASPHALT.

DESIGN LOADING

1. TRAFFIC – SM1600 (FINAL CONFIGURATION)
   T44 (TEMPORARY CONFIGURATION)
   FOOTWAY – 5kPa
2. TRAFFIC BARRIER: MEDIUM PERFORMANCE LEVEL TO AS 5100.2
3. DESIGNED IN ACCORDANCE WITH AS 5100 AND ESC 320
4. DESIGN TRAFFIC SPEED: 50km/h
5. EARTHQUAKE ZONE: BEDC–3
6. BRIDGE TYPE: PSC PLANK
7. WIND SPEED:
   – SERVICEABILITY 37m/s
   – ULTIMATE 48m/s
8. SERVICES – 2kN/m

EXISTING BOREHOLES

ADDITIONAL BOREHOLES (PBH) TO BE UNDERTAKEN

SERVICES NOTE

SERVICES ON EXISTING BRIDGE TO RELOCATE:
- TELSTRA CABLES, 100mm PVC PIPE
- JEMENA GAS, 6" PIPE
- SYDNEY WATER, 400mm SCL

SERVICES OFF BRIDGE TO RELOCATE:
- HV POLE (WENTWORTH AVE END)
- SIGNAL PITS
- SYDNEY TRAINS FIBRE DUCT
- ENDEAVOUR ENERGY LIGHT POLE

EXISTING SERVICES LEGEND

- EXISTING HV ELECTRICITY (OH)
- EXISTING STORMWATER PIPE (UG)
- EXISTING ELECTRICITY DISTRIBUTION CABLE (UG)
- EXISTING LOW PRESSURE GAS MAIN (UG)
- EXISTING TELSTRA CABLE (UG)
- EXISTING OPTUS CABLE (UG)
- EXISTING WATER PIPE LOCAL (UG)
- EXISTING WATER MAIN DISUSED (UG)
- EXISTING WATER MAIN POTABLE (UG)

NOT FOR CONSTRUCTION

AMD	DESCRIPTION	DESIGNER SIGN/DATE	VERIFIED SIGN/DATE	APPROVED SIGN/DATE
0	ISSUED FOR CONCEPT	LJW/7.07.20	AJM/7.07.20	AJM/7.07.20

CO-ORDINATE SYSTEM: MGA Zone 56 | HEIGHT DATUM: AHD | SCALE: AS SHOWN

Transport for NSW

Transport Sydney Trains

GHD

DRAWN K. BRADLEY
DESIGNED L. WEATHERSTONE
DRG CHECK S. KOKLAS
DESIGN CHECK L. JAYAWARDENA
APPROVED J. NICHOLLS

WESTMEAD

MAIN WEST LINE 25.937 km

BRIDGE ROAD OVERBRIDGE REPLACEMENT

GENERAL ARRANGEMENT PLAN AND ELEVATION

FILE No. 12515755 | SHEET: 1 OF 4 | A1

STATUS: CONCEPT DESIGN

DRG No. 21-12515755-BR-1001 | 0 | EDMS No.

LEGEND

1000 CONTROL ALIGNMENT CHAINAGES

T50 SURVEY CONTROL MARKER LOCATION WITH IDENTIFIER

FROM SYDNEY

ALEXANDRA AVENUE

BRIDGE ROAD

WENTWORTH AVENUE

TO WENTWORTHVILLE

MC00

MC10

MC20

PBT 0

PAT 20

PC 104.706

PT 117.267

PAT 155.949

PBT 0

PAT 27.488

PAT 46.544

PT 34.138

B=169 54 28.3
L=104.706m

B=260 05 43.2
L=27.488m

B=157 54 48.9
L=38.683m

4.00
3.20
3.20
3.20
2.30

FOR BRIDGE DESIGN INCLUDING CONNECTIONS TO SAFETY BARRIERS, REFER TO STRUCTURAL BRIDGE DRAWINGS.

CONTROL MC00 - BRIDGE ROAD					
	STATION	EASTING	NORTHING	BEARING	RADIUS
START	0	298018.875	1257747.161	169°54'28.3"	
TP	104.706	298037.223	1257644.075	169°54'28.3"	
CENTRE		298096.295	1257654.589		-60
TP	117.267	298040.698	1257632.029	157°54'48.9"	
END	155.949	298055.243	1257596.185	157°54'48.9"	
CONTROL MC10 - WENTWORTH AVE					
	STATION	EASTING	NORTHING	BEARING	RADIUS
START	0	298029.256	1257688.839	260°05'43.2"	
END	27.488	298002.178	1257684.111	260°05'43.2"	
CONTROL MC20 - ALEXANDRA AVE					
	STATION	EASTING	NORTHING	BEARING	RADIUS
TP	0	298042.074	1257628.639	68°36'42.4"	
CENTRE		298121.757	1257425.187		218
TP	34.138	298074.702	1257638.56	77°33'49.2"	
END	46.544	298086.817	1257641.232	77°33'49.2"	

SETOUT TABLE

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

PLAN
1:200

0 4 8 12 20
METRES 1 TO 200

AMD	DESCRIPTION	DESIGNER SIGN./DATE	VERIFIED SIGN./DATE	APPROVED SIGN./DATE
0	ISSUED FOR CONCEPT	M.G/26.06.20	G.P/26.06.20	J.N/26.06.20

CO-ORDINATE SYSTEM: ISG | HEIGHT DATUM: A.H.D | SCALE: 1:200

NSW GOVERNMENT Transport for NSW

NSW Transport Sydney Trains

GHD INFRASTRUCTURE

DRAWN	J.HARRIS	26.06.20
DESIGNED	M.NGO	26.06.20
DRG CHECK	A.HARROP	26.06.20
DESIGN CHECK	A.HARROP	26.06.20
APPROVED	J.NICHOLLS	26.06.20

WESTMEAD

MAIN WEST LINE 25.937 km

WESTMEAD BRIDGE ROAD RENEWAL ROAD REALIGNMENT

GENERAL ARRANGEMENT

FILE No. GHD 21 12515755 | SHEET: 1 OF 1 | A1

STATUS: CONCEPT DESIGN ©

DRG No. 21-12515755-CD-1011 | 0 | EDMS No.

DF 801*554

File Plotted G:\21\12515755\CADD\Drawings\21-12515755-CD-1011.dwg

Plot Date & Time 7/7/2020 6:16 PM

Plotted by FUAHURA

LEGEND

- CONTROL ALIGNMENT CHAINAGES
- FINAL SURFACE MAJOR CONTOURS
- FINAL SURFACE MINOR CONTOURS
- ø375 DRAINAGE PIPE WITH SIZE & FLOW DIRECTION
- ø375 EXISTING DRAINAGE PIPE TO BE RETAINED WITH SIZE AND FLOW DIRECTION
- EXISTING DRAINAGE TO BE DECOMMISSIONED
- SA PIT
- INSPECTION PIT
- HEADWALL

PIT ID	PIT TYPE	PIT SURFACE LEVEL (m)	PIT DEPTH (m)	EASTING	NORTHING	D/S PIPE DIA (mm)	D/S PIPE LENGTH (m)	D/S PIPE CLASS
1-1	SA1	31.84	1.10	298034.063	1257641.005	375	8.69	RCP 4
2-1	SA1	31.41	0.66	298039.304	1257616.163	375	6.14	RCP 4
2-2	SA2 SAG	31.33	0.64	298036.625	1257621.691	375	10.80	RCP 4
3-1	SA1	31.35	1.10	298047.709	1257640.668	375	2.44	EXISTING
EX 3-1	SA1	31.57	1.15	298049.058	1257638.633	375	15.04	EXISTING
EX 3-2	IP	31.26	0.94	298035.367	1257632.415	375	2.91	RCP 4
EX 3-3	EX PIT	31.17	1.15	298049.058	1257638.633	375	107.17	EXISTING
EX 3-4	EX HW	25.56	1.14	298051.732	1257639.784			

PIT SCHEDULE

PLAN
1:200

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

AMD	DESCRIPTION	DESIGNER SIGN./DATE	VERIFIED SIGN./DATE	APPROVED SIGN./DATE
0	ISSUED FOR CONCEPT	F.J/26.06.20	G.P/26.06.20	J.N/26.06.20

CO-ORDINATE SYSTEM: ISG | HEIGHT DATUM: A.H.D | SCALE: 1:200

NSW GOVERNMENT Transport for NSW
NSW Transport Sydney Trains

GHD INFRASTRUCTURE

DRAWN J.HARRIS 26.06.20
DESIGNED F.JAHURA 26.06.20
DRG CHECK A.HARROP 26.06.20
DESIGN CHECK A.HARROP 26.06.20
APPROVED J.NICHOLLS 26.06.20

WESTMEAD
MAIN WEST LINE 25.937 km
WESTMEAD BRIDGE ROAD RENEWAL
ROAD REALIGNMENT
DRAINAGE PLAN

FILE No. GHD 21 12515755 | SHEET: 1 OF 1 | A1
STATUS: CONCEPT DESIGN
DRG No. 21-12515755-CD-2011 | 0 | EDMS No.

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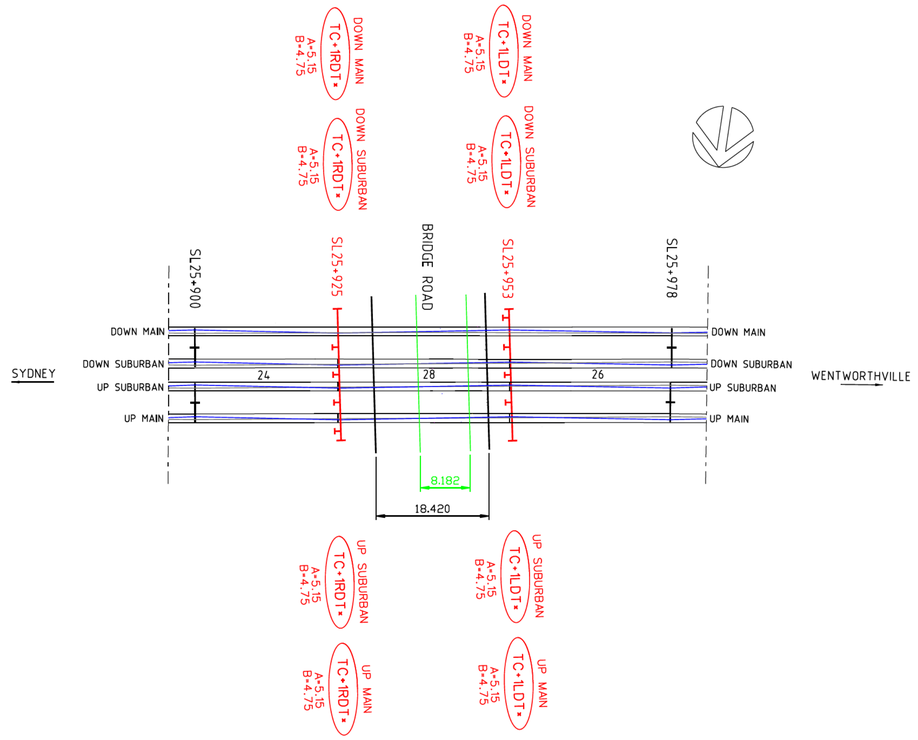
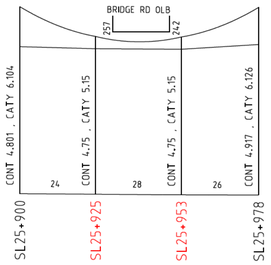
Plotted by FTJAHURA

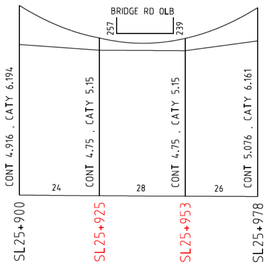
DF 801*554



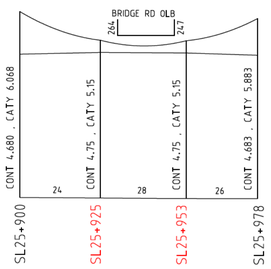
PLEASE REFER TO OHW LAYOUT EL0001207 FOR EXISTING DETAIL.



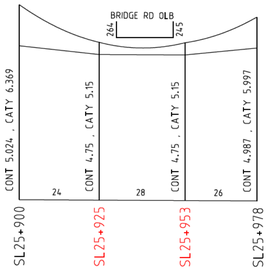
WIRE PROFILES DOWN MAIN
(SYSTEM 2)
VERTICAL: 1:100, HORIZONTAL: 1:1000



WIRE PROFILES DOWN SUBURBAN
(SYSTEM 2)
VERTICAL: 1:100, HORIZONTAL: 1:1000



WIRE PROFILES UP SUBURBAN
(SYSTEM 9)
VERTICAL: 1:100, HORIZONTAL: 1:1000



WIRE PROFILES UP MAIN
(SYSTEM 9)
VERTICAL: 1:100, HORIZONTAL: 1:1000

LEGEND:

- NEW BAY LENGTH
- 67 — BAY LENGTH WITH EXISTING DROPPERS (IF BLACK)
- NEW /MODIFIED OHW WIRE (IF BLUE)
- EXISTING OHW (IF GREY)
- OHW TO BE REMOVED (IF GREEN)
- NEW STRUCTURE (IF RED)
- EXISTING STRUCTURE (IF BLACK)
- STRUCTURE TO BE REMOVED (IF GREEN)
- EXISTING/DESIGN TRACK
- NEW CANTILEVER CODING (IF RED)
- EXISTING CANTILEVER CODING (IF BLACK)
- CANTILEVER TO BE REMOVED (IF GREEN)
- DESIGN VALUE
- "*" DENOTES THE SURVEYED VALUE (IN BLACK)
- DENOTES MODIFIED VALUE

A=CATENARY
B=CONTACT*
C=REGISTRATION ARM
D=HEEL HEIGHT
E=STAGGER *
F=SPECIAL DESIGN
Z=SPECIAL STRUCTURE

0 1 2 3 4 5 METRES 1 TO 50

0 1 5 10 METRES 1 TO 100

0 10 50 100 METRES 1 TO 1000

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH GHD CONCEPT DESIGN REPORT 12515755-RPT-CONCEPT_DESIGN.
2. THE INTENT OF THIS DESIGN IS TO REMOVE THE EXISTING OHW SUPPORTS FROM UNDERNEATH THE BRIDGE ROAD OLB AND TRANSFER THE WIRES ONTO NEW OHW SUPPORTS WITHOUT ANY ATTACHMENT TO PROPOSED BRIDGE.

CONSTRUCTION STAGING

3. OHW WORKS ARE CONSIDERED EARLY WORKS, THAT IS OHW WILL BE REMOVED FROM THE EXISTING BRIDGE AND TRANSFERRED ONTO THE NEW SUPPORT STRUCTURES BEFORE DEMOLISHING AND ERECTING THE PROPOSED BRIDGE.

REFERENCES

1. OHW SURVEY - SK101_B_200.dgn
2. OHW LAYOUTS - EL0001206_D0c & EL0001207_D0c.
3. OLB DESIGN MODEL - 12515755-BR-GA_2013

NOT FOR CONSTRUCTION

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

AMD	DESCRIPTION	DESIGNER SIGN./DATE	VERIFIED SIGN./DATE	APPROVED SIGN./DATE
0	ISSUED FOR CONCEPT	BH/RB 07.07.20	N/A	JN 07.07.20

CO-ORDINATE SYSTEM: MGA ZONE 56 | HEIGHT DATUM: A.H.D | SCALE: 1:500

NSW GOVERNMENT Transport for NSW

GHD

GHD
EL

DRAWN	BRODIE HAYTER	07.07.2020
DESIGNED	BRODIE HAYTER U/S RUEVERN BARRITT	07.07.2020
DRG CHECK	AKHILESH SINGH	07.07.2020
DESIGN CHECK	AKHILESH SINGH	07.07.2020
APPROVED	JOHN NICHOLLS	07.07.2020

WESTMEAD

MAIN WESTERN LINE - 25.700 km TO 26.100km

RAILWAYS OVERHEAD WIRING BRIDGE ROAD OLB REPLACEMENT

LAYOUT

FILE No. 12515755 - OHW.dwg | SHEET: 1 OF 1 | A1

STATUS: CONCEPT DESIGN ©

DRG No. 12515755 - OHW | 0 | EDMS No.

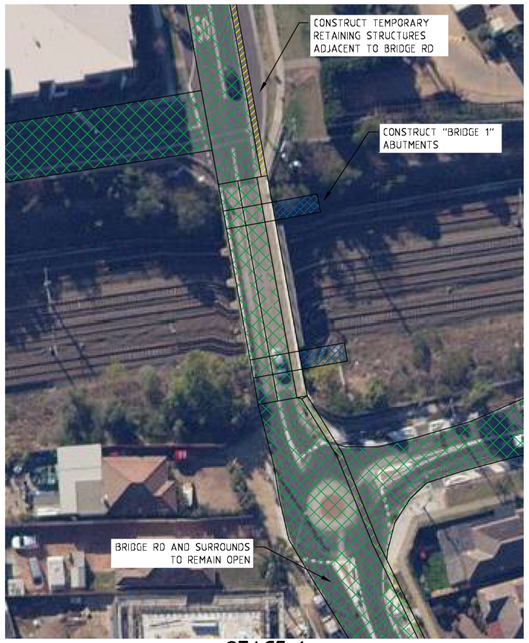
DF 801*554

File Plotted N:\AU\Sydney\Projects\21\12515755\CADD\Drawings\OHW\12515755 - OHW.dgn

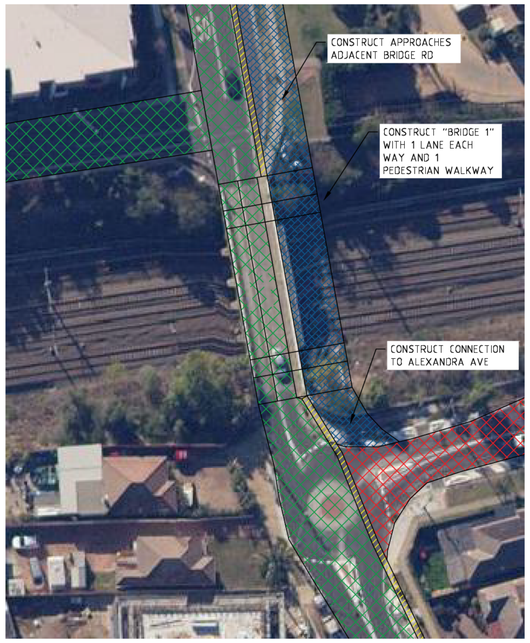
Plot Date & Time 7/07/2020

Plotted by bhayter

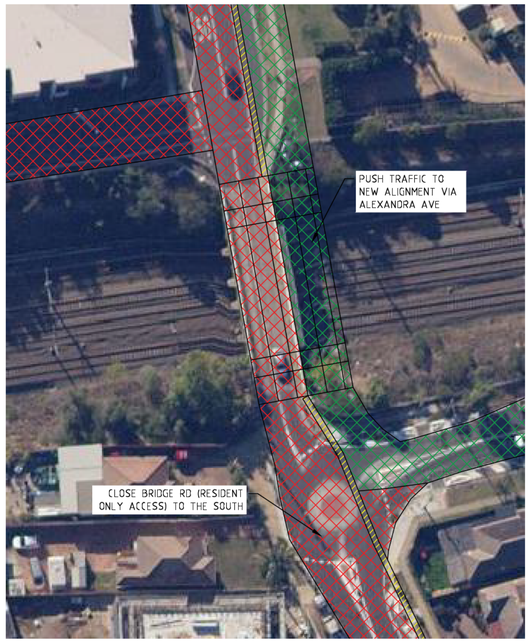
Appendix C – Construction Staging



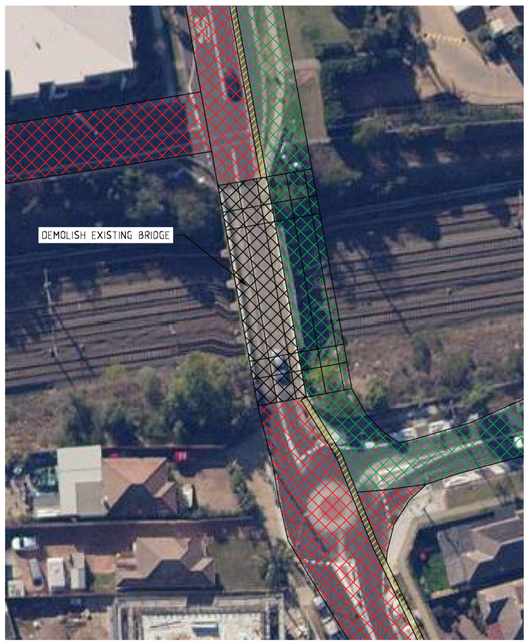
STAGE 1
CONSTRUCT "BRIDGE 1" ABUTMENTS AND NORTHERN APPROACH



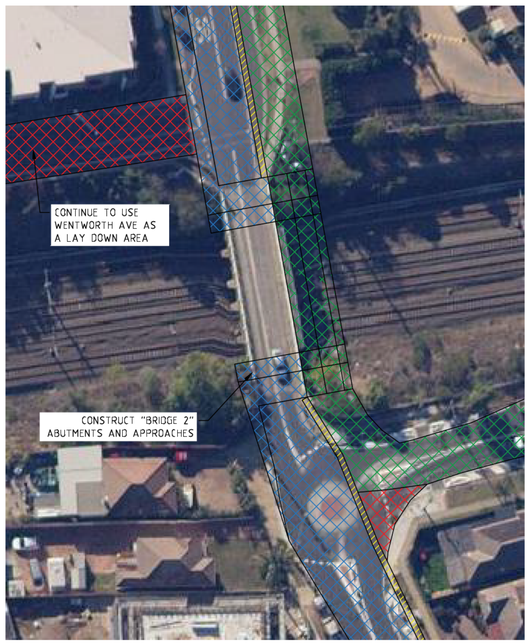
STAGE 2
CONSTRUCT "BRIDGE 1" AND CLOSE ALEXANDRA AVE



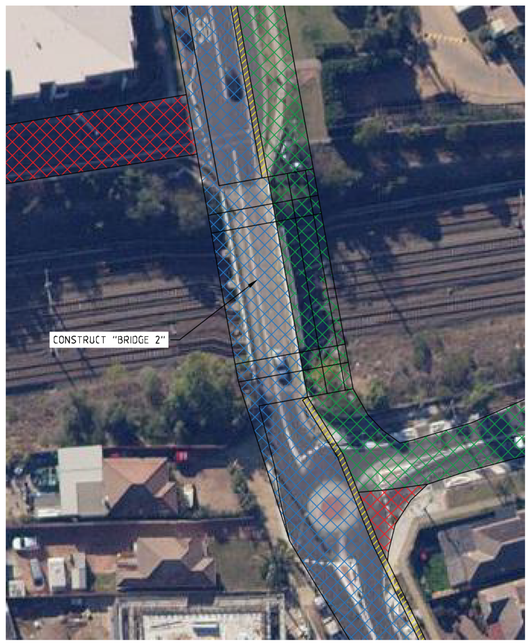
STAGE 3
CLOSE BRIDGE RD AND OPEN "BRIDGE 1" TO TRAFFIC



STAGE 4
DEMOLISH EXISTING BRIDGE



STAGE 5
CONSTRUCT "BRIDGE 2" ABUTMENTS AND APPROACHES



STAGE 6
CONSTRUCT "BRIDGE 2"

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FOR INFORMATION

A	ISSUE FOR INFORMATION	LW / 06.02.20	LJ / 06.02.20	
AMD	DESCRIPTION	DESIGNER SIGN./DATE	VERIFIED SIGN./DATE	APPROVED SIGN./DATE

CO-ORDINATE SYSTEM: MGA Zone 56 | HEIGHT DATUM: AHD | SCALE: NTS

NSW GOVERNMENT Transport for NSW

NSW Transport Sydney Trains

GHD

DRAWN	L. WEATHERSTONE	06.02.2020
DESIGNED	L. WEATHERSTONE	06.02.2020
DRG CHECK		
DESIGN CHECK	L. JAYAWARDENA	06.02.2020
APPROVED		

WORK IN PROGRESS

MAIN WEST SUBURBAN LINE

BRIDGE ROAD OVERBRIDGE REPLACEMENT
CONSTRUCTION STAGING
SINGLE SPAN
AERIAL VIEW STAGING

FILE No. 12515755 | SHEET: 1 OF 2 | A1
STATUS: FOR INFORMATION
DRG No. 12515755-SK007 | A | EDMS No.

DF 801*554

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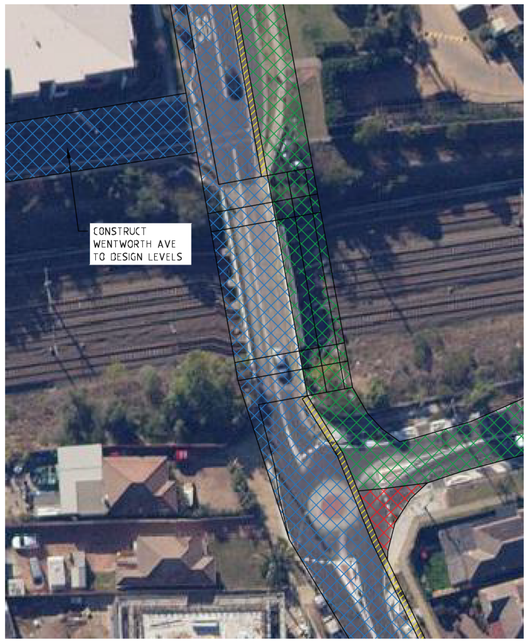
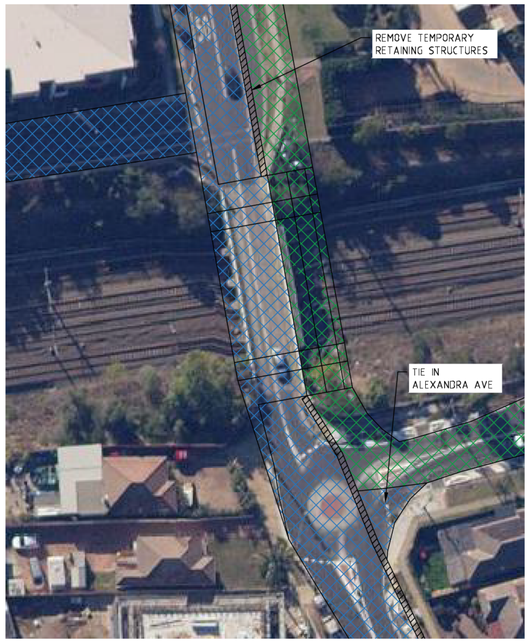
Plotted by:LWEATHERSTONE

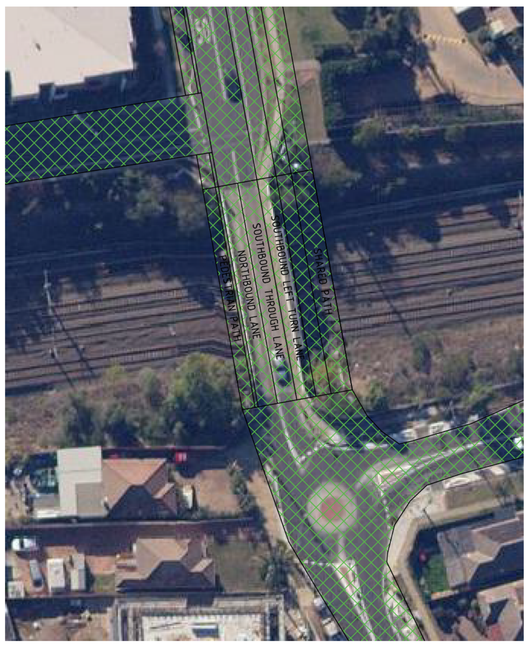


STAGE 7
CONSTRUCT WENTWORTH AVE



STAGE 8
CONNECTIONS TO BRIDGE RD

STAGE 9
FINISHING WORKS TO "BRIDGE 1"



STAGE 10
OPEN ALL ROADS FOR TRAFFIC

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR INFORMATION

AMD	DESCRIPTION	DESIGNER SIGN./DATE	VERIFIED SIGN./DATE	APPROVED SIGN./DATE
A	ISSUE FOR INFORMATION	LW / 06.02.20	LJ / 06.02.20	

CO-ORDINATE SYSTEM: MGA Zone 56 | HEIGHT DATUM: AHD | SCALE: NTS

NSW GOVERNMENT Transport for NSW

NSW Transport Sydney Trains

GHD

DRAWN	L. WEATHERSTONE	06.02.2020
DESIGNED	L. WEATHERSTONE	06.02.2020
DRG CHECK		
DESIGN CHECK	L. JAYAWARDENA	06.02.2020
APPROVED		

WORK IN PROGRESS

MAIN WEST SUBURBAN LINE

BRIDGE ROAD OVERBRIDGE REPLACEMENT
CONSTRUCTION STAGING
SINGLE SPAN
AERIAL VIEW STAGING

FILE No. 12515755 | SHEET: 2 OF 2 | A1
STATUS: FOR INFORMATION ©
DRG No. 12515755-SK008 | A | EDMS No.

DF 801*554

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Plotted by:LWEATHERSTONE

Appendix D – Biodiversity threatened species database searches

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Licensed Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed Entities in selected area [North: -33.70 West: 150.86 East: 151.09 South: -33.91] recorded since 26 Mar 2001 until 26 Mar 2021 returned a total of 22,151 records of 87 species.
Report generated on 26/03/2021 2:19 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Amphibia	Myobatrachidae	3116	*Pseudophryne australis*		Red-crowned Toadlet	V,P		12	
Animalia	Amphibia	Hylidae	3166	*Litoria aurea*		Green and Golden Bell Frog	E1,P	V	12148	
Animalia	Amphibia	Limnodynastidae	3042	*Heleioporus australiacus*		Giant Burrowing Frog	V,P	V	1	
Animalia	Aves	Apodidae	0334	*Hirundapus caudacutus*		White-throated Needletail	P	V,C,J,K	29	
Animalia	Aves	Ardeidae	0197	*Botaurus poiciloptilus*		Australasian Bittern	E1,P	E	7	
Animalia	Aves	Ardeidae	0196	*Ixobrychus flavicollis*		Black Bittern	V,P		3	
Animalia	Aves	Accipitridae	0218	*Circus assimilis*		Spotted Harrier	V,P		4	
Animalia	Aves	Accipitridae	0226	*Haliaeetus leucogaster*		White-bellied Sea-Eagle	V,P		308	
Animalia	Aves	Accipitridae	0225	*Hieraaetus morphnoides*		Little Eagle	V,P		23	
Animalia	Aves	Accipitridae	0230	*Lophoictinia isura*		Square-tailed Kite	V,P,3		5	
Animalia	Aves	Accipitridae	8739	*Pandion cristatus*		Eastern Osprey	V,P,3		3	
Animalia	Aves	Rostratulidae	0170	*Rostratula australis*		Australian Painted Snipe	E1,P	E	3	
Animalia	Aves	Scolopacidae	0164	*Calidris canutus*		Red Knot	P	E,C,J,K	13	
Animalia	Aves	Scolopacidae	0161	*Calidris ferruginea*		Curlew Sandpiper	E1,P	CE,C,J,K	239	
Animalia	Aves	Scolopacidae	0165	*Calidris tenuirostris*		Great Knot	V,P	CE,C,J,K	1	
Animalia	Aves	Scolopacidae	0167	*Limicola falcinellus*		Broad-billed Sandpiper	V,P	C,J,K	1	
Animalia	Aves	Scolopacidae	0152	*Limosa limosa*		Black-tailed Godwit	V,P	C,J,K	1	
Animalia	Aves	Scolopacidae	0149	*Numenius madagascariensis*		Eastern Curlew	P	CE,C,J,K	10	
Animalia	Aves	Scolopacidae	0160	*Xenus cinereus*		Terek Sandpiper	V,P	C,J,K	1	
Animalia	Aves	Laridae	0117	*Sternula albifrons*		Little Tern	E1,P	C,J,K	3	
Animalia	Aves	Cacatuidae	0268	*Callocephalon fimbriatum*		Gang-gang Cockatoo	V,P,3		15	
Animalia	Aves	Cacatuidae	0268	*Callocephalon fimbriatum*		Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai Local Government Areas	E2,V,P,3		11	
Animalia	Aves	Cacatuidae	0265	^^*Calyptorhynchus lathami*		Glossy Black-Cockatoo	V,P,2		4	
Animalia	Aves	Psittacidae	0260	*Glossopsitta pusilla*		Little Lorikeet	V,P		24	
Animalia	Aves	Psittacidae	0309	*Lathamus discolor*		Swift Parrot	E1,P,3	CE	31	
Animalia	Aves	Psittacidae	0302	*Neophema pulchella*		Turquoise Parrot	V,P,3		4	
Animalia	Aves	Strigidae	0246	*Ninox connivens*		Barking Owl	V,P,3		4	
Animalia	Aves	Strigidae	0248	*Ninox strenua*		Powerful Owl	V,P,3		437	
Animalia	Aves	Tytonidae	0252	*Tyto longimembris*		Eastern Grass Owl	V,P,3		1	
Animalia	Aves	Tytonidae	0250	*Tyto novaehollandiae*		Masked Owl	V,P,3		6	
Animalia	Aves	Tytonidae	9924	*Tyto tenebricosa*		Sooty Owl	V,P,3		1	
Animalia	Aves	Acanthizidae	0504	*Chthonicola sagittata*		Speckled Warbler	V,P		1	
Animalia	Aves	Meliphagidae	0603	*Anthochaera phrygia*		Regent Honeyeater	E4A,P	CE	11	
Animalia	Aves	Meliphagidae	0448	*Epthianura albifrons*		White-fronted Chat	V,P		208	
Animalia	Aves	Meliphagidae	0448	*Epthianura albifrons*		White-fronted Chat population in the Sydney Metropolitan Catchment Management Area	E2,V,P		208	
Animalia	Aves	Neosittidae	0549	*Daphoenositta chrysoptera*		Varied Sittella	V,P		7	
Animalia	Aves	Artamidae	8519	*Artamus cyanopterus cyanopterus*		Dusky Woodswallow	V,P		23	
Animalia	Aves	Petroicidae	0380	*Petroica boodang*		Scarlet Robin	V,P		4	
Animalia	Aves	Petroicidae	0382	*Petroica phoenicea*		Flame Robin	V,P		2	
Animalia	Mammalia	Dasyuridae	1008	*Dasyurus maculatus*		Spotted-tailed Quoll	V,P	E	10	
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*		Koala	V,P	V	10	
Animalia	Mammalia	Petauridae	1137	*Petaurus norfolcensis*		Squirrel Glider	V,P		2	
Animalia	Mammalia	Pseudocheiridae	1133	*Petauroides volans*		Greater Glider	P	V	2	
Animalia	Mammalia	Pteropodidae	1280	*Pteropus poliocephalus*		Grey-headed Flying-fox	V,P	V	1648	
Animalia	Mammalia	Emballonuridae	1321	*Saccolaimus flaviventris*		Yellow-bellied Sheathtail-bat	V,P		30	
Animalia	Mammalia	Molossidae	1329	*Micronomus norfolkensis*		Eastern Coastal Free-tailed Bat	V,P		72	
Animalia	Mammalia	Vespertilionidae	1353	*Chalinolobus dwyeri*		Large-eared Pied Bat	V,P	V	4	
Animalia	Mammalia	Vespertilionidae	1372	*Falsistrellus tasmaniensis*		Eastern False Pipistrelle	V,P		37	

Animalia	Mammalia	Vespertilionidae	1357	*Myotis macropus*	Southern Myotis	V,P		68
Animalia	Mammalia	Vespertilionidae	1361	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P		37
Animalia	Mammalia	Miniopteridae	1346	*Miniopterus australis*	Little Bent-winged Bat	V,P		21
Animalia	Mammalia	Miniopteridae	3330	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V,P		235
Animalia	Gastropoda	Camaenidae	I006	*Meridolum corneovirens*	Cumberland Plain Land Snail	E1		110
Animalia	Gastropoda	Camaenidae	I130	*Pommerhelix duralensis*	Dural Land Snail	E1	E	79
Plantae	Flora	Apocynaceae	10896	*Marsdenia viridiflora subsp. viridiflora*	Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	E2		488
Plantae	Flora	Campanulaceae	1937	*Wahlenbergia multicaulis*	Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	E2		107
Plantae	Flora	Convolvulaceae	2234	*Wilsonia backhousei*	Narrow-leafed Wilsonia	V		104
Plantae	Flora	Dilleniaceae	14733	^^*Hibbertia spanantha*	Julian's Hibbertia	E4A,2	CE	1
Plantae	Flora	Dilleniaceae	11250	*Hibbertia superans*		E1		78
Plantae	Flora	Elaeocarpaceae	6205	*Tetratheca glandulosa*		V		48
Plantae	Flora	Ericaceae	7752	*Epacris purpurascens var. purpurascens*		V		147
Plantae	Flora	Fabaceae (Faboideae)	2853	*Dillwynia tenuifolia*		V		3
Plantae	Flora	Fabaceae (Faboideae)	2853	*Dillwynia tenuifolia*	Dillwynia tenuifolia Sieber ex D.C. in the Baulkham Hills local government area	E2,V		1
Plantae	Flora	Fabaceae (Faboideae)	3007	*Pultenaea parviflora*		E1	V	25
Plantae	Flora	Fabaceae (Faboideae)	3008	*Pultenaea pedunculata*	Matted Bush-pea	E1		4
Plantae	Flora	Fabaceae (Mimosoideae)	3741	*Acacia clunies-rossiae*	Kanangra Wattle	V		1
Plantae	Flora	Fabaceae (Mimosoideae)	3860	*Acacia pubescens*	Downy Wattle	V	V	4508
Plantae	Flora	Grammitidaceae	9471	*Grammitis stenophylla*	Narrow-leaf Finger Fern	E1,3		2
Plantae	Flora	Malvaceae	6140	*Lasiopetalum joyceae*		V	V	2
Plantae	Flora	Myrtaceae	4007	*Callistemon linearifolius*	Netted Bottle Brush	V,3		3
Plantae	Flora	Myrtaceae	4024	*Darwinia biflora*		V	V	23
Plantae	Flora	Myrtaceae	4134	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	V	V	8
Plantae	Flora	Myrtaceae	8907	*Eucalyptus scoparia*	Wallangarra White Gum	E1	V	2
Plantae	Flora	Myrtaceae	11892	*Eucalyptus sp. Cattai*		E4A	CE	5
Plantae	Flora	Myrtaceae	4283	*Rhodamnia rubescens*	Scrub Turpentine	E4A		3
Plantae	Flora	Myrtaceae	4293	*Syzygium paniculatum*	Magenta Lilly Pilly	E1	V	29
Plantae	Flora	Orchidaceae	9615	^^*Pterostylis saxicola*	Sydney Plains Greenhood	E1,P,2	E	2
Plantae	Flora	Proteaceae	8293	*Grevillea beadleana*	Beadle's Grevillea	E1,3	E	1
Plantae	Flora	Proteaceae	10917	*Grevillea juniperina subsp. juniperina*	Juniper-leaved Grevillea	V		28
Plantae	Flora	Proteaceae	9680	*Macadamia integrifolia*	Macadamia Nut		V	14
Plantae	Flora	Proteaceae	5458	*Persoonia hirsuta*	Hairy Geebung	E1,P,3	E	8
Plantae	Flora	Rhamnaceae	5573	*Pomaderris brunnea*	Brown Pomaderris	E1	V	5
Plantae	Flora	Rhamnaceae	5591	*Pomaderris prunifolia*	P. prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	E2		18
Plantae	Flora	Rubiaceae	5680	*Galium australe*	Tangled Bedstraw	E1		2
Plantae	Flora	Thymelaeaceae	6965	*Pimelea curviflora var. curviflora*		V	V	8
Plantae	Flora	Thymelaeaceae	6190	*Pimelea spicata*	Spiked Rice-flower	E1	E	285
Plantae	Flora	Zannichelliaceae	6339	*Zannichellia palustris*		E1		6

Australian Government

Department of Agriculture, Water and the Environment

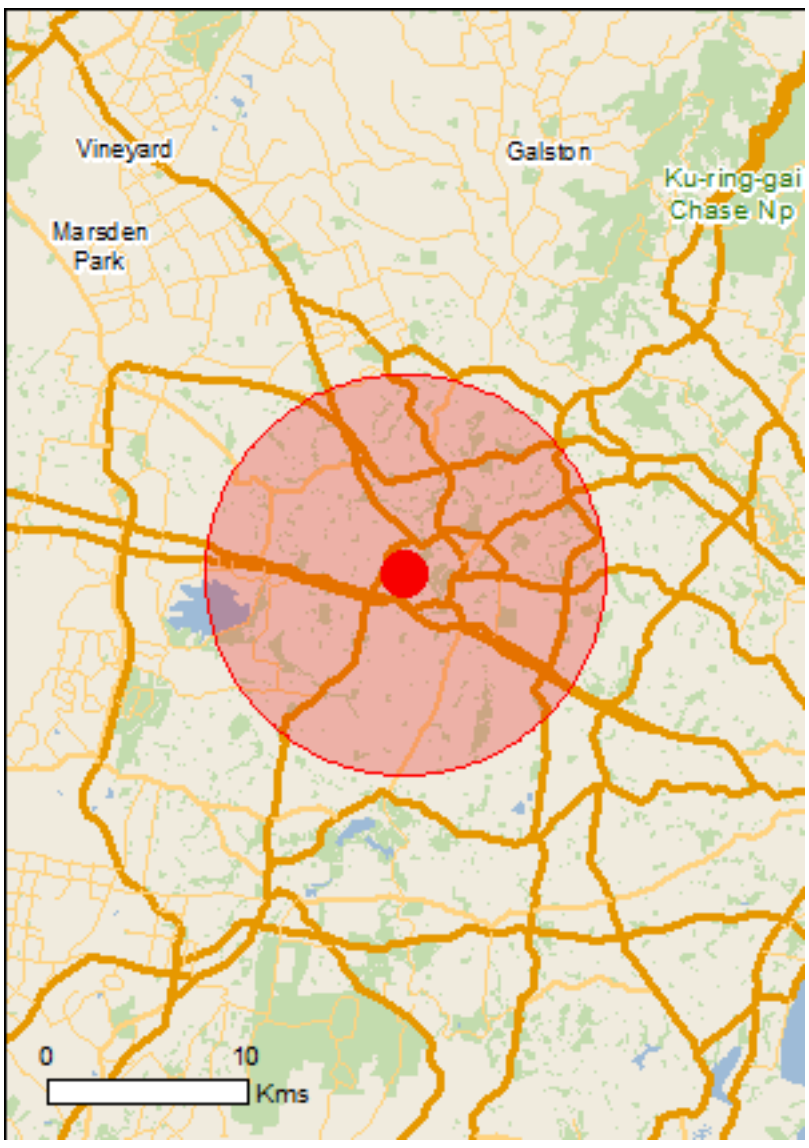
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 26/03/21 14:26:03



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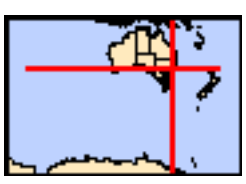

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	2
National Heritage Places:	2
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	11
Listed Threatened Species:	83
Listed Migratory Species:	52

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	27
Commonwealth Heritage Places:	3
Listed Marine Species:	62
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	2
Regional Forest Agreements:	None
Invasive Species:	53
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

World Heritage Properties		[Resource Information]
Name	State	Status
Australian Convict Sites (Old Government House and Domain Buffer Zone)	NSW	Buffer zone
Australian Convict Sites (Old Government House and Domain)	NSW	Declared property

National Heritage Properties		[Resource Information]
Name	State	Status
Historic		
Old Government House and the Government Domain	NSW	Listed place
Parramatta Female Factory and Institutions Precinct	NSW	Listed place

Listed Threatened Ecological Communities		[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Blue Gum High Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	Endangered	Community may occur within area
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Coastal Upland Swamps in the Sydney Basin Bioregion	Endangered	Community may occur within area
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically Endangered	Community likely to occur within area
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community likely to occur within area
Shale Sandstone Transition Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area
Turpentine-Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically Endangered	Community likely to occur within area

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species

Name	Status	Type of Presence
		habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within

Name	Status	Type of Presence
		area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis cucullatus cucullatus Hooded Plover (eastern), Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat may occur within area
Fish		
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area
Frogs		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat may occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Isoodon obesulus obesulus		
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat likely to occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Other		
Pommerhelix duralensis		
Dural Land Snail [85268]	Endangered	Species or species habitat known to occur within area
Plants		
Acacia bynoeana		
Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat known to occur within area
Acacia pubescens		
Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat known to occur within area
Allocasuarina glareicola		
[21932]	Endangered	Species or species habitat may occur within area
Asterolasia elegans		
[56780]	Endangered	Species or species habitat may occur within area
Caladenia tessellata		
Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area
Cryptostylis hunteriana		
Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area
Cynanchum elegans		
White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Darwinia biflora		
[14619]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus camfieldii		
Camfield's Stringybark [15460]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Eucalyptus sp. Cattai (Gregson s.n., 28 Aug 1954) [89499]	Critically Endangered	Species or species habitat known to occur within area
Genoplesium baueri Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid [7528]	Endangered	Species or species habitat known to occur within area
Haloragodendron lucasii Hal [6480]	Endangered	Species or species habitat may occur within area
Lasiopetalum joyceae [20311]	Vulnerable	Species or species habitat may occur within area
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat likely to occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat known to occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat known to occur within area
Persoonia nutans Nodding Geebung [18119]	Endangered	Species or species habitat likely to occur within area
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat known to occur within area
Pimelea spicata Spiked Rice-flower [20834]	Endangered	Species or species habitat known to occur within area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area
Pterostylis saxicola Sydney Plains Greenhood [64537]	Endangered	Species or species habitat likely to occur within area
Pultenaea parviflora [19380]	Vulnerable	Species or species habitat may occur within area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat known to occur within area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat may occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Thesium australe		
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Zieria involucrata		
[3087]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata		
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Hoplocephalus bungaroides		
Broad-headed Snake [1182]	Vulnerable	Species or species habitat may occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna grisea		
Sooty Shearwater [82651]		Species or species habitat likely to occur within area
Calonectris leucomelas		
Streaked Shearwater [1077]		Species or species habitat known to occur within area
Diomedea antipodensis		
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora		
Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans		
Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi		
Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus		
Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli		
Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species

Name	Threatened	Type of Presence
		habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species

Name	Threatened	Type of Presence
		habitat known to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -
Commonwealth Land - Australian & Overseas Telecommunications Corporation
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Postal Corporation
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Australian Telecommunications Corporation
Commonwealth Land - Australian Wool Testing Authority Limited
Commonwealth Land - Commonwealth Bank of Australia
Commonwealth Land - Commonwealth Scientific & Industrial Research Organisation
Commonwealth Land - Commonwealth Trading Bank of Australia
Commonwealth Land - Defence Housing Authority
Commonwealth Land - Defence Service Homes Corporation
Commonwealth Land - Director of Defence Service Homes
Commonwealth Land - Director of War Service Homes
Commonwealth Land - Reserve Bank of Australia
Commonwealth Land - Telstra Corporation Limited
Commonwealth Land - War Service Homes Commissioner
Defence - 1/15 RNSWL - LANCER BARRACKS - PARRAMATTA
Defence - ADFRU PARRAMATTA
Defence - BLACKTOWN TRAINING DEPOT
Defence - CHESTER HILL (NO 2 STORE DPT)
Defence - LIDCOMBE MULTI-USER DEPOT
Defence - MERRYLANDS
Defence - NEWINGTON
Defence - RAAF STORES DEPOT REGENTS PARK
Defence - TIMOR BARRACKS - DUNDAS
Defence - VILLAWOOD - MOTOR REPAIR W/SHP (VILLAWOOD GEMS BASE)

Commonwealth Heritage Places [Resource Information]

Name	State	Status

Name	State	Status
Historic		
Lancer Barracks	NSW	Listed place
Lancer Barracks Precinct	NSW	Listed place
Villawood Immigration Centre	NSW	Listed place

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur

Name	Threatened	Type of Presence
		within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Species or species habitat known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area
Puffinus griseus Sooty Shearwater [1024]		Species or species habitat likely to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat known to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Thalassarche sp. nov.		
Pacific Albatross [66511]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis rubricollis		
Hooded Plover (eastern) [66726]	Vulnerable*	Species or species habitat may occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis		
Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area
Reptiles		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata		
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Newington	NSW
Prospect	NSW

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis		
Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris European Greenfinch [404]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Asparagus scandens Asparagus Fern, Climbing Asparagus Fern [23255]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Newington Wetlands	NSW

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-33.80808 150.97993

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Appendix E – Biodiversity species list

Fauna species recorded in the study area

Class	Common name	Scientific name	Observation Type
Birds	Common Myna	*Sturnus tristis	O,W
	Long-billed Corella	Cacatua tenuirostris	O,W
	Noisy Miner	Manorina melanocephala	O,W
	Rainbow Lorikeet	Trichoglossus haematodus	O,W
	Rock Dove	*Columba livia	O,W
	Spotted Turtle-Dove	*Streptopelia chinensis	O,W
Mammals	Grey-headed Flying-fox	Pteropus poliocephalus	W
	Goulds' Wattled Bat	Chalinolobus gouldii	U
Reptiles	Eastern Blue-tongue	Tiliqua scincoides	O

Notes: O= observed/seen, W= heard, U= ultrasonic call detection, * =exotic

Flora species recorded in the study area

Scientific name	Common name
Cupressaceae	
*Cupressus x leylandii	Leyland Cypress
*Juniperus conferta	Japanese Shore Juniper
Acanthaceae	
Pseuderanthemum variabile	Pastel Flower
Adoxaceae	
*Viburnum odoratissimum	Sweet Viburnum
Amaranthaceae	
Alternanthera denticulata	Lesser Joyweed
Anacardiaceae	
*Pistacia chinensis	Chinese Pistachio
*Schinus areira var. molle	Pepper Tree
Apiaceae	
Centella asiatica	Gotu Kola
*Foeniculum vulgare	Fennel
Apocynaceae	
*Araujia sericifera	Moth Vine
*Gomphocarpus fruticosus	Narrow-leaved cotton bush
Araliaceae	
Hydrocotyle acutiloba	-
Asteraceae	
*Ageratina adenophora	Crofton Weed

Scientific name	Common name
*Aster subulatus	Bushy Starwort
C Bidens pilosa	Pitchforks
*Cirsium vulgare	Thistle
*Conyza sumatrensis	Tall fleabane
*Hypochaeris radicata	Cat's Ear
*Senecio madagascariensis	Fireweed
Sigesbeckia orientalis subsp. orientalis	Indian-weed
*Sonchus oleraceus	Common Sowthistle
*Taraxacum officinale	Dandelion
Basellaceae	
*Anredera cordifolia	Madeira Vine
Bignoniaceae	
*Jacaranda mimosifolia	Jacaranda
*Tecoma stans	Yellow Bignonia
Brassicaceae	
*Hirschfeldia incana	Buchan Weed
Cannabaceae	
*Celtis sinensis	Hackberry
Caprifoliaceae	
*Lonicera japonica	Japanese Honeysuckle
Caryophyllaceae	
*Cerastium fontanum	Mouse-ear Chickweed
Casuarinaceae	
Casuarina glauca	Swamp Oak
Convolvulaceae	
*Convolvulus arvensis	-
Convolvulus erubescens	Blushing Bindweed
Dichondra repens	Kidney Weed
*Ipomoea indica	Morning Glory
Crassulaceae	
*Crassula delagoense	Mother of Millions
Fabaceae (Faboideae)	
*Trifolium fragiferum	Strawberry Clover
Fabaceae (Mimosoideae)	
Acacia decurrens	Sydney Green Wattle
Acacia longifolia subsp. longifolia	Sydney Golden Wattle
*Acacia podalyriifolia	Queensland Silver Wattle

Scientific name	Common name
C Vachellia farnesiana	Mimosa Bush
Gentianaceae	
*Centaurium erythraea	Pink Stars
Hypericaceae	
Hypericum gramineum	Small St John's Wort
Lauraceae	
*Cinnamomum camphora	Camphor Laurel
Malvaceae sens lat.	
*Malva parviflora	Mallow
*Sida rhombifolia	Paddy's Lucerne
Meliaceae	
Melia azedarach	White Cedar
Moraceae	
*Morus alba	Mulberry
Myrtaceae	
Angophora floribunda	Rough-barked Apple
^Callistemon 'Harkness'	Bottlebrush
^Callistemon 'Kings Park Special'	Bottlebrush
Callistemon salignus	Pink Tips
^Callistemon viminalis	River Bottlebrush
Eucalyptus baueriana	Blue Box
^Lophostemon confertus	Brushbox
Melaleuca linariifolia	Snow in Summer
Melaleuca styphelioides	Prickly-leaved Paperbark
^Syzygium australe	Brush Cherry
Tristaniopsis laurina	Water Gum
Ochnaceae	
*Ochna serrulata	Mickey Mouse Plant
Oleaceae	
*Ligustrum lucidum	Large-leaved Privet
*Ligustrum sinense	Small-leaved Privet
*Olea europaea subsp. cuspidata	African olive
Phyllanthaceae	
Breynia oblongifolia	Coffee Bush
Pittosporaceae	
Bursaria spinosa subsp. spinosa	Blackthorn
Pittosporum undulatum	Brush Daphne

Scientific name	Common name
Plantaginaceae	
Plantago debilis	Slender Plantain
*Plantago lanceolata	Plantain
Polygonaceae	
*Rumex sagittata	Turkey Rhubarb
Proteaceae	
^Grevillea robusta	Silky Oak
Rosaceae	
*Cotoneaster glaucophyllus	Glaucous Cotoneaster
*Cotoneaster pannosus	Silverleaf Cotoneaster
Sapindaceae	
Dodonaea triquetra	Large-leaf Hop-bush
Solanaceae	
*Cestrum parqui	Green Cestrum
*Solanum nigrum	Nightshade
Ulmaceae	
*Ulmus parvifolius	Chinese Elm
Verbenaceae	
*Lantana camara	Lantana
Liliidae	
Amaryllidaceae	
*Clivia miniata	Kaffir Lily
Arecaceae	
^Archontophoenix alexandrae	Alexandra Palm
^Archontophoenix cunninghamiana	Bangalay Palm
*Howea forsteriana	Kentia Palm
*Phoenix canariensis	Canary Island Date Palm
*Phoenix roebelenii	Dwarf Date Palm
*Syagrus romanzoffiana	Cocos Palm
Asphodelaceae	
Dianella caerulea var. caerulea	Blue Flax lily
Asparagaceae	
*Asparagus aethiopicus	Asparagus fern
*Asparagus plumosus	Climbing Asparagus
Cannaceae	
*Canna x generalis	Canna lily
Commelinaceae	

Scientific name	Common name
Commelina cyanea	Scurvy Weed
*Tradescantia fluminensis	Wandering Jew
Cyperaceae	
*Cyperus brevifolius	Mullumbimby Couch
*Cyperus eragrostis	-
Iridaceae	
*Romulea rosea var. australis	Onion Grass
Juncaceae	
Juncus continuus	-
Juncus usitatus	-
Lomandraceae	
Lomandra longifolia	Spiny-headed Mat-rush
Poaceae	
*Andropogon virginicus	Whisky Grass
Anisopogon avenaceus	Oat Speargrass
*Axonopus fissifolius	Carpet Grass
Bothriochloa macra	Redleg Grass
*Cenchrus clandestinus	Kikuyu
*Cenchrus setaceus	Fountain Grass
*Chloris gayana	Rhodes Grass
*Cortaderia selloana	Pampas Grass
Cynodon dactylon	Couch
*Digitaria ciliaris	Summer Grass
Entolasia stricta	Wiry Panic
*Ehrharta erecta	Panic Veldtgrass
*Eragrostis pilosa	Soft Lovegrass
Imperata cylindrica	Blady Grass
*Melinis repens	Red Natal Grass
Microlaena stipoides var. stipoides	Weeping Grass
Panicum effusum	Hairy Panic
*Paspalum dilatatum	Paspalum
*Setaria gracilis	Slender Pigeon Grass
*Stenotaphrum secundatum	Buffalo

Notes: *not indigenous to Australia, ^ Australian species, not indigenous to Parramatta (see James *et al*. 1999).

Appendix F – Biodiversity Anabat detector survey results

Anabat analysis – 12515755

Analysis method

Bat calls were recorded during field surveys using an Anabat Express Zero Crossing detector (Titley Scientific).

The full night zero crossing analysis file (zca file) recorded using the detector was converted to zc sequence files using Anabat Insight (version 1.9.3) for analysis and in order to add metadata (e.g. species label etc). During the conversion process a filter was applied to identify bat sequences and remove noise files. Noise files were moved to a separate folder for later checking.

The *Bat calls of NSW: Region based guide to the echolocation calls of microchiropteran bats* (Pennay et al. 2004) was used to assist call analysis. Call identification was also assisted by consulting distribution information for potential species (Pennay et al 2011; Churchill 2008; Van Dyck et al. 2013) and records from BioNet (May 2020). No reference calls were collected during the survey.

Summary of results and survey effort

Anabat detector surveys were completed within the study area between 6:10 - 8:54 PM on the 27/03/2021 under the Bridge Road over-bridge at Westmead. Approximately 38 zc files were recorded and analysed. Three files contained signals of interest (ie bat calls), however two of these files were unable to distinguished to genus/species. A partial call of one microbat, Gould's Wattled Bat (*Chalinolobus gouldii*) was recorded during surveys.

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