

Transport for NSW

Riverwood Commuter Car Park

Review of Environmental Factors



Artist's impression of the proposed Riverwood Commuter Car Park, subject to change during detailed design

Riverwood Commuter Car Park Review of Environmental Factors

**Commuter Car Park Program
Ref – 6595976**

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Document author: Morgan Cardiff, Jarryd Barton

Document reviewers: Vivian Tse, Andrew To, Alice Paul, Chris Richards, Ashe Earl-Peacock, Bec Krieger, Louise Bieler, Megan Bridge, Glenn Spark, Ben Groth, Sally Durham, Alice Paul, Jarryd Barton, Paul Greenhalgh

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Abbreviations

Term	Meaning
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
ARI	Average Recurrence Interval
ASS	Acid Sulfate Soils
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
CBD	Central Business District
CCTV	Closed Circuit TV
CEMP	Construction Environmental Management Plan
CLM Act	<i>Contaminated Land Management Act 1997 (NSW)</i>
CNVMP	Construction Noise and Vibration Management Plan
CPTED	Crime Prevention Through Environmental Design
DAWE	Department of Agriculture, Water and the Environment (Cwlth)
DBH	Diameter Breast Height
DBYD	Dial Before You Dig
DDA	<i>Disability Discrimination Act 1992 (Cwlth)</i>
DoE	Commonwealth Department of the Environment
DPIE	NSW Department of Planning, Industry and Environment
DSI	Detailed Site Investigation (Phase II Contamination Investigation)
ECM	Environmental Controls Map
EES	NSW Environment, Energy and Science (Division of Department of Planning Industry and Environment) (formerly OEH)
EMS	Environmental Management System
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000 (NSW)</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)</i>
EPI	Environmental Planning Instrument

Term	Meaning
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development (refer to Definitions)
FM Act	<i>Fisheries Management Act 1994 (NSW)</i>
Heritage Act	<i>Heritage Act 1977 (NSW)</i>
ICNG	<i>Interim Construction Noise Guideline (Department of Environment and Climate Change, 2000)</i>
Infrastructure SEPP	<i>State Environmental Planning Policy (Infrastructure) 2007 (NSW)</i>
LEP	Local Environmental Plan
LGA	Local Government Area
LoS	Level of Service
NES	National Environmental Significance
NPW Act	<i>National Parks and Wildlife Act 1974 (NSW)</i>
NSW	New South Wales
OEH	Formerly NSW Office of the Environment and Heritage
OHWS	Overhead Wiring Structure
OOHW	Out of hours works
PDP	Public Domain Plan
POEO Act	<i>Protection of the Environment Operations Act 1997 (NSW)</i>
RailCorp	(former) Rail Corporation of NSW
RAP	Remediation Action Plan
RBL	Rating Background Level
REF	Review of Environmental Factors (this document)
Roads Act	<i>Roads Act 1993 (NSW)</i>
Roads and Maritime	NSW Roads and Maritime Services (formerly Roads and Traffic Authority)
SEPP	State Environmental Planning Policy
SHR	State Heritage Register
SoHI	Statement of Heritage Impact
TAHE	Transport Asset Holding Entity (a NSW Government State Owned Corporation)

Term	Meaning
TCP	Traffic Control Plan
Transport for NSW	Transport for NSW
TMP	Traffic Management Plan
TPZ	Tree Protection Zone
UDP	Urban Design Plan
WARR Act	<i>Waste Avoidance and Resource Recovery Act 2001 (NSW)</i>
WM Act	<i>Water Management Act 2000 (NSW)</i>

Definitions

Term	Meaning
Average Recurrence Interval	The likelihood of occurrence, expressed in terms of the long-term average number of years, between flood events as large as or larger than the design flood event. For example, floods with a discharge as large as or larger than the 100-year ARI flood will occur on average once every 100-years.
Concept design	The concept design is the preliminary design presented in this REF, which would be refined by the Contractor (should the Proposal proceed) to a design suitable for construction (subject to Transport for NSW acceptance).
Design and Construct Contract	A method to deliver a project in which the design and construction services are contracted by a single entity known as the Contractor. The Contractor completes the project by refining the concept design presented in the REF and completing the detailed design so that it is suitable for construction (subject to Transport for NSW acceptance). The Contractor is therefore responsible for all work on the project, both design and construction.
Detailed design	Detailed design broadly refers to the process that the Contractor undertakes (should the Proposal proceed) to refine the concept design to a design suitable for construction (subject to Transport for NSW acceptance).
Disability Standards for Accessible Public Transport	The Commonwealth <i>Disability Standards for Accessible Public Transport 2002</i> (“Transport Standards”) (as amended) are a set of legally enforceable standards, authorised under the Commonwealth <i>Disability Discrimination Act 1992</i> (DDA) for the purpose of removing discrimination ‘as far as possible’ against people with disabilities. The Transport Standards cover premises, infrastructure and conveyances, and apply to public transport operators and premises providers.
Ecologically Sustainable Development	As defined by clause 7(4) Schedule 2 of the EP&A Regulation. Development that uses, conserves and enhances the resources of the community so that ecological processes on which life depends are maintained, and the total quality of life, now and in the future, can be increased.
Feasible	A work practice or abatement measure is feasible if it is capable of being put into practice or of being engineered and is practical to build given project constraints such as safety and maintenance requirements.
Interchange	Transport interchange refers to the area/s where passengers transit between vehicles or between transport modes. It includes the pedestrian pathways and cycle facilities in and around an interchange.
Noise sensitive receiver	In addition to residential dwellings, noise sensitive receivers include, but are not limited to, hotels, entertainment venues, pre-schools and day care facilities, educational institutions (e.g. schools, TAFE colleges), health care facilities (e.g. nursing homes, hospitals), recording studios and places of worship/religious facilities (e.g. churches).
Opal card	The integrated ticketing smartcard being introduced by Transport for NSW.
Out of hours works	Defined as works <i>outside</i> standard construction hours (i.e. outside of 7am to 6pm Monday to Friday, 8am to 1pm Saturday and no work on Sundays/public holidays).

Term	Meaning
Proponent	A person or body proposing to carry out an activity under Division 5.1 of the EP&A Act - in this instance, Transport for NSW.
Reasonable	Selecting reasonable measures from those that are feasible involves making a judgment to determine whether the overall benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the measure.
Sensitive receivers	Land uses which are sensitive to potential noise, air and visual impacts, such as residential dwellings, schools and hospitals.
The Proposal	The construction and operation of the Riverwood Commuter Car Park.
Vegetation Offset Guide	<p>The Transport for NSW guide that applies where there is vegetation clearing proposed, and where the impact of the proposed clearing is not deemed 'significant' for the purposes of section 5.5 of the EP&A Act.</p> <p>The Guide provides for planting of a minimum of eight trees for each large tree with a diameter at breast height (DBH) of more than 60cm, four trees where the DBH is 15-60cm, or two trees where DBH is less than 15cm.</p>

Executive summary

Overview

Transport for NSW is proposing to construct the Riverwood Commuter Car Park (the Proposal) to improve customer experience at this location and in surrounding localities through the provision of additional parking spaces for commuters. Transport for NSW is the government agency responsible for the delivery of major transport infrastructure projects in NSW and is the proponent for the Proposal.

The Proposal forms part of the Commuter Car Park Program. The NSW Government is committed to delivering accessible public transport infrastructure, which is why Transport for NSW is providing more commuter car parks where they are needed. The delivery of commuter car parks at key transport interchanges will provide a range of benefits, including:

- improved customer access to the public transport network
- encouraging mode shift away from private vehicles
- improving the flexibility and reliability of customer's 'first and last mile' of their journey
- contributing to reducing congestion on our road network.

The Proposal includes:

- removal of the existing at-grade car park and demolition of existing structures
- construction and operation of a multi-storey car park (MSCP) comprised of a ground level plus two additional levels (including rooftop) of commuter car park, which would include:
 - up to 140 commuter car parking spaces
 - a minimum of three accessible parking spaces
 - access to each level of the car park via one lift and two stair wells
 - internal vehicle circulation ramps connecting each level of the car park
 - provision for future electric vehicle charging stations (at least 15 per cent of car spaces)
 - Transport Park&Ride infrastructure (Opal card operated boom gates)
- vehicle access and egress direct from Webb Street
- separation of vehicles access points and pedestrian access paths to the car park
- installation of rooftop solar panels
- ancillary works including services diversion and/or relocation, drainage works, an on-site storage detention tank, and landscaping
- installation of closed-circuit television (CCTV), lighting and wayfinding signage for safety and security.

Subject to approval, construction is expected to commence in late 2021 and take around 12 months to complete. A detailed description of the Proposal is provided in Chapter 3 of this Review of Environmental Factors (REF). An overview of the Proposal is shown in Figure ES-1 and Figure ES-2.

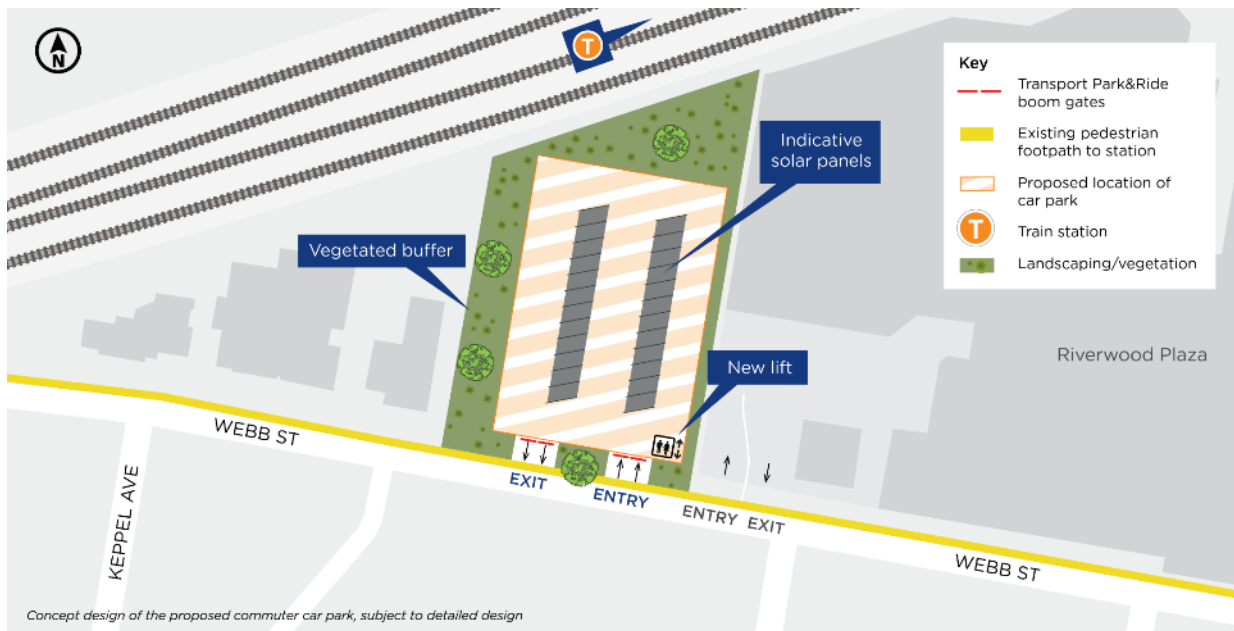


Figure ES-1 Key features and location of the Proposal



Indicative only, subject to detailed design

Figure ES-2 Photomontage of the Proposal looking north east from Keppel Avenue Reserve

Need for the Proposal

Transport for NSW recognises the critical role commuter car parks play in improving the quality of access to public transport in the customer's first and last mile, particularly in middle and outer metropolitan areas.

Approximately 73 per cent of workers from the middle and outer urban sectors of Sydney predominantly drive the whole distance to work, with around 46 per cent of those workers commuting 20 kilometres to 60 kilometres daily (Australian Bureau of Statistics, 2016).

The Proposal is designed to drive a stronger customer experience outcome, to deliver improved travel to and between modes, encourage greater public transport use and better integrate interchanges with the role and function of town centres. The Proposal would also assist in responding to forecasted growth in the region and as such would support growth in commercial and residential development.

Transport for NSW is committed to improving the customer experience on the public transport network across NSW. Commuter car parks are important gateways to the transport system and as such play a critical role in shaping the customer experience and perception of public transport.

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

The Proposal fulfils the program objectives by proposing to provide:

- improved customer access to the public transport network
- mode shift away from private vehicles
- reduced congestion on our road network.

Community and stakeholder consultation

In accordance with the requirements of the *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP), consultation is required with local councils and/or public authorities in certain circumstances, including where council managed infrastructure is affected. Consultation on the Proposal has commenced with Georges River Council, private property owners that will be acquired to deliver the project and other nearby stakeholders (Riverwood Plaza). Consultation with these stakeholders will continue through the detailed design and construction of the Proposal.

Community consultation activities for the Proposal would be undertaken during the public display period of this REF with the public invited to submit feedback to help Transport for NSW understand what is important to customers and the community. The REF would be displayed for a period of two weeks. Further information about these specific consultation activities is included in Chapter 5 of this REF.

A Project Infoline (1800 684 490) and email address (projects@transport.nsw.gov.au) have been established to provide members of the public with the tools to make enquiries and submit comments.

Feedback can be sent to:

- projects@transport.nsw.gov.au
- Commuter Car Park Program – Riverwood Commuter Car Park
Associate Director Environmental Impact Assessment
Transport for NSW
Locked Bag 6501
St Leonards NSW 2065

Or submitted:

- via www.transport.nsw.gov.au/riverwood

Transport for NSW would review and assess all feedback received during the public display period, prior to determining whether or not to proceed with the Proposal.

Should the Proposal proceed to construction, the community would be kept informed throughout the duration of the construction period. Figure ES-3 shows the planning approval and consultation process for the Proposal.

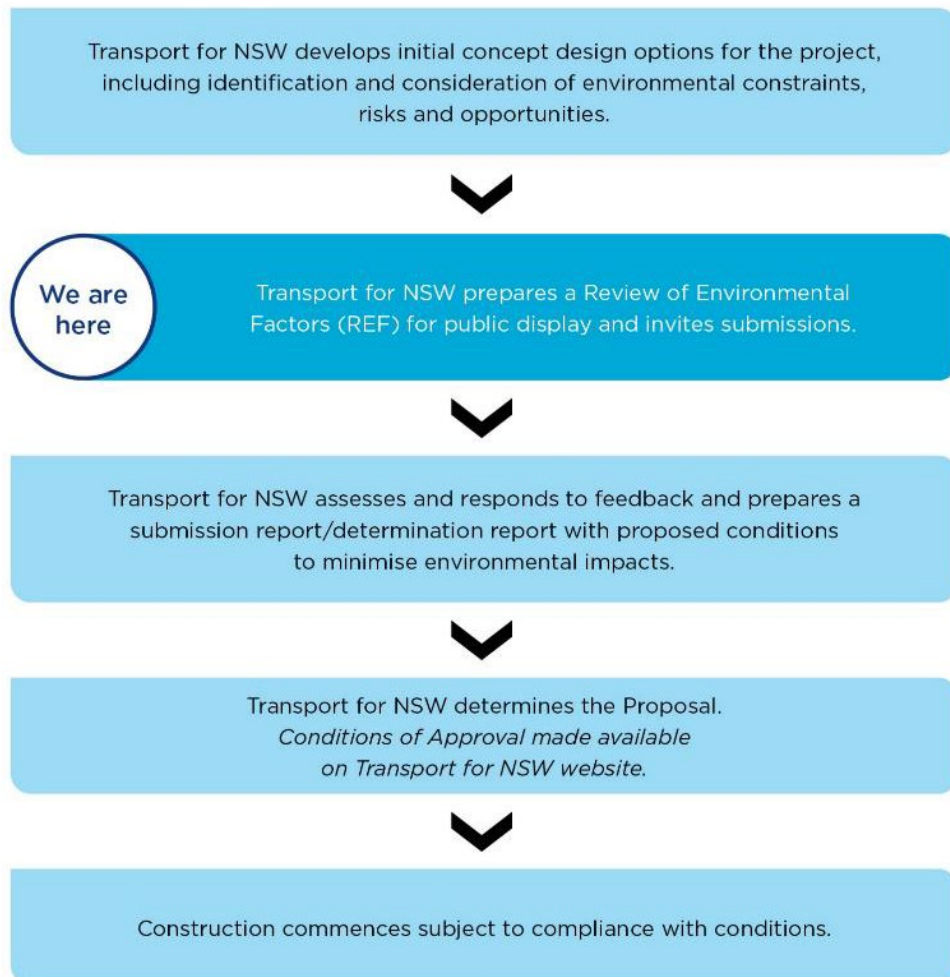


Figure ES-3 Planning approval and consultation process for the Proposal

Environmental impact assessment

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

The Proposal would provide the following benefits:

- provision of additional commuter parking in close proximity to Riverwood Station, encouraging improved opportunities to change modes of transport, thereby encouraging increased passenger rail mode share
- an increase in the accessibility and convenience to and from Riverwood Station by providing additional commuter parking, potentially increasing the use of public transport
- improvement of the customer experience by providing modern car parking facilities with weather protection and security features including lighting and CCTV cameras
- reduction in the need for commuters to park in local streets, potentially improving traffic and road safety due to an increase in available car parking.

The following key impacts have been identified should the Proposal proceed:

- acquisition and removal of three existing residential dwellings
- minor increases in local traffic movements during operation of the proposed car park
- during construction, a loss of parking capacity within the existing car park, changes to access arrangements (including pedestrian diversions) and minor delays on the adjacent road network during construction
- temporary visual, noise and vibration and other amenity-related impacts during the construction period, along with a permanent change to the visual characteristics of the area during operation
- removal of some existing trees which would be replaced in accordance with the *Transport for NSW Vegetation Offset Guide* (Transport for NSW, 2019a).

Further information regarding these impacts and proposed mitigation measures are provided in Chapter 6 and Chapter 7 of this REF.

Conclusion

This REF has been prepared having regard to sections 5.5 and 5.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), and clause 228 of the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation), to ensure that Transport for NSW takes into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposal.

The detailed design of the Proposal would also be designed in accordance with the *NSW Sustainable Design Guidelines – Version 4.0* (Transport for NSW, 2017) taking into account the principles of ecologically sustainable development (ESD).

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

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

1 Introduction

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

1.1 Overview of the Proposal

1.1.1 The need for the Proposal

Transport for NSW recognises the critical role commuter car parks play in improving the quality of access to public transport in the customer's first and last mile, particularly in middle and outer metropolitan areas. Transport for NSW is committed to delivering accessible public transport infrastructure, which is why Transport for NSW is providing more commuter car parks through the Commuter Car Park Program. The Commuter Car Park Program is a NSW Government initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure.

1.1.2 Key features of the Proposal

The Proposal includes:

- removal of the existing at-grade car park and demolition of existing structures
- construction and operation of a multi-storey car park (MSCP) comprised of a ground level plus two additional levels (including rooftop) of commuter car park, which would include:
 - up to 140 commuter car parking spaces
 - a minimum of three accessible parking spaces
 - access to each level of the car park via one lift and two stair wells
 - internal vehicle circulation ramps connecting each level of the car park
 - provision for future electric vehicle charging stations (at least 15 per cent of spaces)
 - Transport Park&Ride infrastructure (Opal card operated boom gates)
- vehicle access and egress direct from Webb Street
- separation of vehicles access points and pedestrian access paths to the car park
- installation of rooftop solar panels
- ancillary works including services diversion and/or relocation, drainage works, an on-site storage detention tank, landscaping and potential installation of rainwater tanks (subject to detailed design)
- installation of closed-circuit television (CCTV), lighting and wayfinding signage for safety and security.

Subject to planning approval, construction is expected to commence in late 2021 and take around 12 months to complete. A detailed description of the Proposal is provided in Chapter 3 of this Review of Environmental Factors (REF).

A summary of the key features of the Proposal are provided in Figure 3-1.

1.2 Location of the Proposal

The Proposal is in the suburb of Riverwood, in the Georges River Local Government Area (LGA), about 16 kilometres south west of Sydney's central business district.

The Proposal is located about 220 metres to the south west of Riverwood Station on Webb Street. Riverwood Station is on the Airport and South Line and is serviced by T8 Line services.

The Proposal is immediately to the west of the Riverwood Plaza, around 130 metres from the main commercial centre of the suburb of Riverwood, and at the transition of the commercial and residential areas to the south.

The location of the Proposal in the regional context is shown on Figure 1-1 and the site location is shown in Figure 1-2 and Figure 1-3 (including the typical walkable radius from the Proposal site).

The Proposal site would extend across four properties as follows:

- Lot 100 DP 832293
- Lot 5 DP23676
- Lot 6 DP23676
- Lot 7 DP23676.

1.3 Existing infrastructure and land uses

The Proposal site consists of an existing at-grade car park, and three single storey detached residential properties on Webb Street. Residential properties are located along the western boundary of the Proposal, and to the south beyond Webb Street. The T8 rail corridor is located immediately to the north.

The existing at-grade car park consists of 50 car parking spaces and contains a number of mature trees in the central portion of the car park, and a row of mature trees along the northern boundary adjacent to the rail corridor.

The existing car park is accessed via the main entry to the Riverwood Plaza shopping centre on Webb Street. Pedestrian access to the car park is via the Riverwood Plaza. There is currently no formal pedestrian access to Webb Street, with pedestrians currently using the vehicle entry to access Webb Street, or accessing the Riverwood Station via the rear of the Riverwood Plaza (through the existing loading dock area).

The Proposal site is relatively flat, with some landscaping present around the edges of the car park. Brick walls are present between the car park and residential properties located to the south and west.

The southern portion of the Proposal site contains three single storey residential properties.

Photographs of the Proposal site are provided in Figure 1-4 to Figure 1-6.

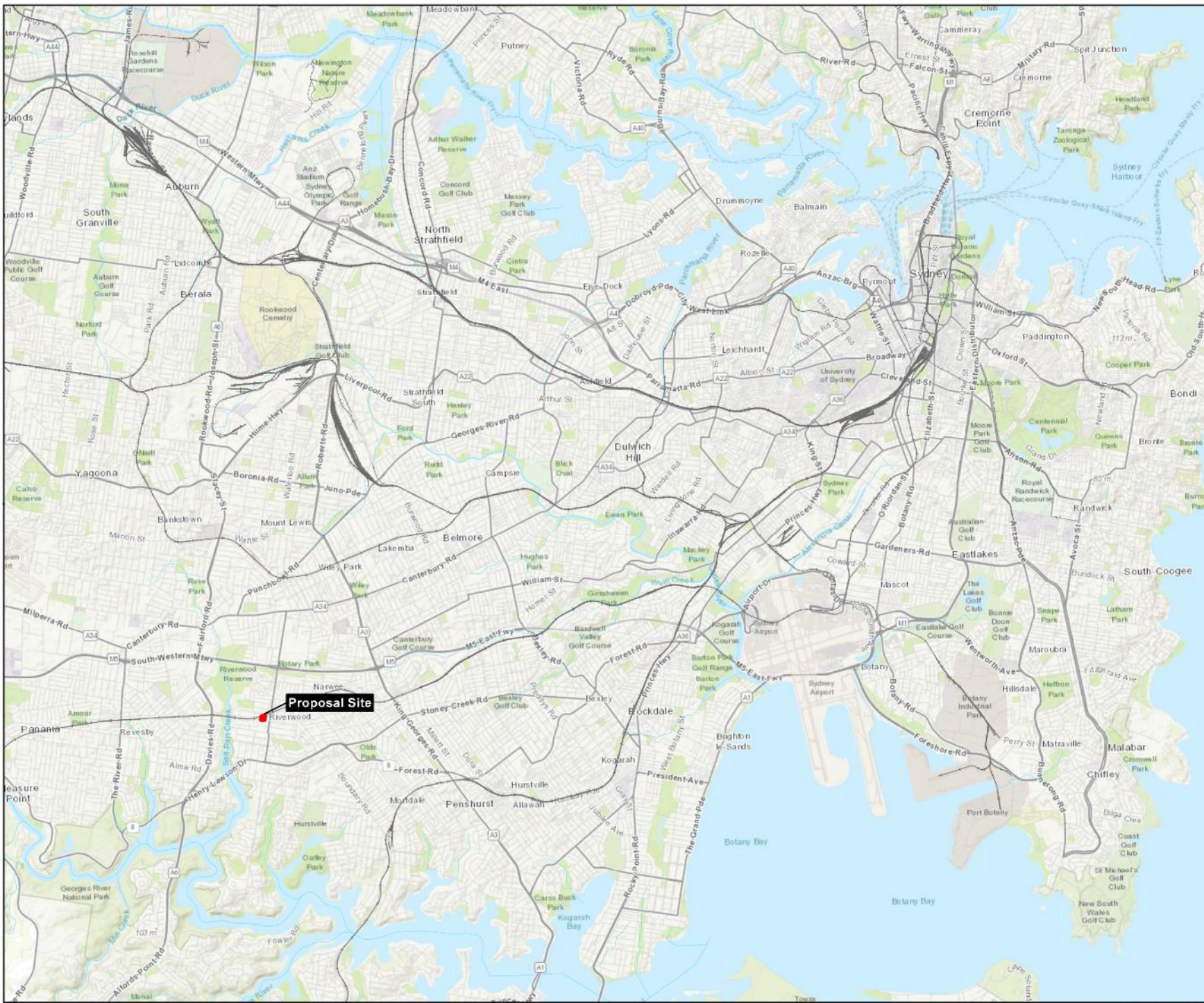


Riverwood Commuter Car Park

Figure 1-1
Regional Context

Legend

- Roads
- Watercourses
- Railway
- Proposal Site



0 1 2 km

Coordinate system: GDA2020 MGA Zone 56

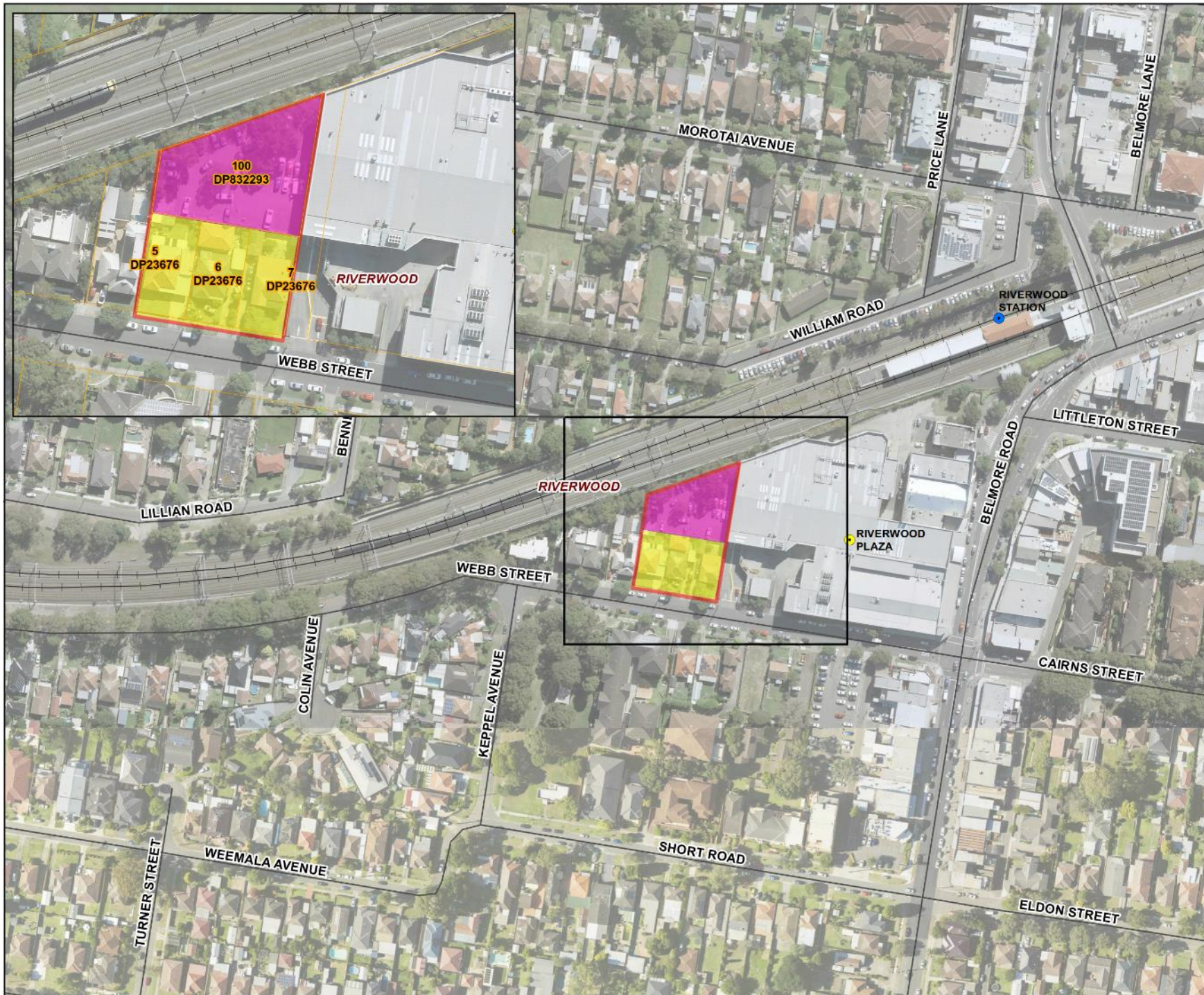


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Legend

- Railway Station
- Roads
- +— Railway
- Cadastre (Lot/DP)
- Proposal Site
- Existing at-grade car park
- Existing residential properties



Coordinate system: GDA2020 MGA Zone 56
 Scale ratio correct when printed at A3
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Legend

- Railway Station
- Roads
- Railway
- Watercourses
- Proposal Site
- Existing at-grade car park
- Existing residential properties

Walking Distance Radius

- 400m
- 800m



0 50 100 m

Coordinate system: GDA2020 MGA Zone 56
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Figure 1-4 Existing car park located on the Proposal site looking north



Figure 1-5 Existing car park located on the Proposal site looking south



Figure 1-6 View of residential properties currently located on the Proposal site

1.4 Purpose of this Review of Environmental Factors

This REF has been prepared by WSP on behalf of Transport for NSW to assess the potential impacts of the Riverwood Commuter Car Park. For the purposes of these works, Transport for NSW is the proponent and the determining authority under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The purpose of this REF is to describe the Proposal, to assess the likely impacts of the Proposal having regard to the provisions of Section 5.5 and 5.7 of the EP&A Act, and to identify mitigation measures to reduce the likely impacts of the Proposal. This REF has been prepared in accordance with clause 228 of the *Environment Planning and Assessment Regulation 2000* (EP&A Regulation).

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

Having regard to the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), this REF considers the potential for the Proposal to have a significant impact on matters of National Environmental Significance (NES) or Commonwealth land, and the need to make a referral to the Commonwealth Department of the Environment and Energy for any necessary approvals under the EPBC Act. Refer to Chapter 4 for more information on statutory considerations.

2 Need for the Proposal

Chapter 2 discusses the need and objectives of the Proposal, having regard to the objectives of the Commuter Car Park Program and the specific objectives of the Proposal. This chapter also provides a summary of the options that have been considered during development of the Proposal and why the preferred option has been chosen.

2.1 Strategic justification

Improving transport customer experience is the focus of the NSW Government's transport initiatives. Transport interchanges and train stations are the important gateways to the transport system and as such play a critical role in shaping the customer's experience and perception of public transport.

The proposed Riverwood Commuter Car Park, the subject of this REF, forms part of the Commuter Car Park Program. This program is designed to improve customer access to the public transport network, encourage a mode shift away from private vehicles, and reduce congestion on our road network.

In September 2015, the NSW Government announced a series of State Priorities as part of *NSW: Making It Happen* (NSW Government, 2015). The State Priorities are intended to guide the ongoing actions of the NSW Government across the State, and guide resource allocation and investment in conjunction with the NSW Budget. *NSW: Making it Happen* focuses on 12 key 'priorities' to achieve the NSW Government's commitments. These priorities range across a number of issues including infrastructure, the environment, education, health, wellbeing and safety in addition to Government services.

One of the 12 priorities relate to investment in building infrastructure. The ongoing development and investment in transport infrastructure is identified as part of the wider building infrastructure priority. The Proposal assists in meeting the priority by improving accessibility to public transport and encouraging greater use of public transport.

The NSW Government has developed *Future Transport Strategy 2056* (Transport for NSW, 2018a). This plan provides a comprehensive strategy for all modes of transport across NSW over the next 40 years, while also delivering on current commitments.

Public transport is viewed as critical to urban productivity, expanding employment opportunities by connecting people to jobs, reducing congestion, and supporting delivery of urban renewal.

Table 2-1 provides an overview of NSW Government policies and strategies relevant to the Proposal.

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

Policy / Strategy	Overview	How the Proposal aligns
<p><i>Future Transport Strategy 2056</i> (Transport for NSW, 2018a)</p>	<p><i>Future Transport 2056</i> is an update of NSW's <i>Long-Term Transport Master Plan</i>. It is a suite of strategies and plans for transport to provide an integrated vision for the state.</p> <p><i>Future Transport 2056</i> identifies 12 customer outcomes to guide transport investment in Greater Sydney.</p> <p>These outcomes include transport providing convenient access, supporting attractive places and providing 30-minute access for customers to their nearest centre by public transport.</p>	<p>The Proposal would deliver on the customer focus, accessible services, and sustainability outcomes of the <i>Future Transport Strategy 2056</i>.</p> <p>The Proposal would deliver on the customer focus and support accessible services (outcome 5) by improving accessibility to public transport and creating travel options for more customers. The Proposal would also support the sustainability objective (outcome 6) by encouraging the use of public transport and helping to reduce the number of cars on the roads, resulting in (net) less emissions.</p> <p>The Proposal would also include the provision of infrastructure for electric vehicle charging stations to support the uptake of electric vehicles on the road network in the future. This would further support the sustainability strategy.</p>
<p><i>Future Transport 2056, NSW Electric and Hybrid vehicle plan</i> (Transport for NSW, 2019n)</p>	<p>The <i>NSW Electric and Hybrid vehicle plan</i> aims to maximise the benefits of a transition to more electric and hybrid vehicles for NSW, and it reflects the NSW governments focus on future mobility and technology innovations to modernise the transport network. Specifically, the Plan outlines new actions around the co-investing charging points in commuter car parks.</p>	<p>The proposal would be consistent with the objectives and key actions of the <i>NSW Electric and Hybrid vehicle plan</i>. The proposal would provide an allowance of at least 15 per cent of parking spaces to be dedicated to electric vehicles and hybrids and provide conduits for charging points.</p>
<p><i>Disability Inclusion Action Plan (2018-2022)</i> (Transport for NSW, 2017a)</p>	<p>The <i>Disability Inclusion Action Plan 2018-2022</i> was developed by Transport for NSW in consultation with the Accessible Transport Advisory Committee, which consists of representatives from peak disability and ageing organisations within NSW.</p> <p>The Disability Plan identifies the challenges, the achievements to date, the considerable undertaking that is required to finish the job and provides a solid and practical foundation for future progress over the next five years.</p>	<p>The Proposal would be consistent with the objectives of the <i>Disability Inclusion Action Plan</i>. The Proposal would include a minimum of three accessible car spaces, lift access, and safe pedestrian access.</p>

Policy / Strategy	Overview	How the Proposal aligns
<p><i>A Metropolis of Three Cities - Greater Sydney Region Plan</i> (Greater Sydney Commission, 2018)</p>	<p>The <i>Greater Sydney Region Plan</i> is the NSW Government's 40-year land use plan for Sydney. It establishes a vision for a metropolis of three cities – the Eastern Harbour City, Central River City and Western Parkland City. The plan includes a number of objectives related to transport networks including:</p> <ul style="list-style-type: none"> • provision of transport infrastructure to support future growth • optimising existing infrastructure where possible. 	<p>The Proposal would particularly support Direction 6 of the Plan, which is to create 'a well-connected city' by ensuring services and infrastructure meet communities' changing needs. The Proposal would be consistent with this direction by providing additional infrastructure to support future growth to transport services for commuters and improved connectivity to Riverwood Station and public transport opportunities for surrounding suburbs.</p>
<p><i>South District Plan</i> (Greater Sydney Commission, 2018)</p>	<p>The South District Plan applies to the Georges River local government area. The plan described the planning priorities and actions to improve liveability and achieve a productive and sustainable future for the district.</p>	<p>The Proposal would support the planned urban renewal of the Riverwood precinct by investing in infrastructure which supports public transport access to and from the precinct. This includes both the commuter car park and additional bicycle storage proposed for Riverwood Station.</p>
<p><i>Building Momentum – State Infrastructure Strategy 2018-2038</i> (Infrastructure NSW, 2018)</p>	<p>The <i>State Infrastructure Strategy 2018-2038</i> makes recommendations for each of NSW's key infrastructure sectors including transport. The strategy sets out the Government's priorities for the next 20 years, and combined with the <i>Future Transport Strategy 2056</i>, the <i>Greater Sydney Region Plan</i> and the <i>Regional Development Framework</i>, brings together infrastructure investment and land-use planning for our cities and regions.</p>	<p>The Proposal would support this plan in the key areas of 'integrate transport with land use', 'manage travel demand' and 'capitalise on new technology'.</p> <p>The Proposal would take advantage of the existing land use of a parking lot to provide additional commuter parking spaces close to Riverwood Station.</p> <p>The Proposal would also support ongoing investment in rail infrastructure and would align with the need to continue to provide public transport to support Sydney's increasing population.</p>
<p><i>NSW: Premier Priorities</i> (NSW Government, 2019) https://www.nsw.gov.au/improving-nsw/premiers-priorities/</p>	<p>In June 2019, 14 new Premier's Priorities were announced that would allow the Government to measure and deliver in areas where NSW can do better. The key policy priorities, include the following:</p> <ul style="list-style-type: none"> • a strong economy • highest quality education • well-connected communities with quality local environments • breaking the cycle of disadvantage 	<p>The Proposal would assist in meeting the key priority to develop well connected communities with quality local environments by investing in transport infrastructure, improving access to public transport and encouraging greater use of public transport.</p>

Policy / Strategy	Overview	How the Proposal aligns
<i>Georges River 2050: Leading for change (Georges River Council, 2020)</i>	<p>The <i>Georges River 2050: Leading for Change</i> provides a commitment to building a better future with a focus on key aspirations of</p> <ul style="list-style-type: none"> improving accessibility for people and businesses improving sustainability and green outcomes celebrating social and cultural diversity building a strong innovative economy. 	<p>The Proposal would support the Georges River 2050 strategy by improving the accessibility and connectivity of Riverwood and the surrounding suburbs with greater Sydney, thus contributing to the 30-minute city vision. The Proposal would also support the sustainable development of the region by improving public transport links and thus encouraging greater use and support the development of electric vehicle charging infrastructure in the region.</p>

2.2 Objectives of the Commuter Car Park Program

Transport for NSW is committed to delivering accessible public transport infrastructure, which is why Transport for NSW is providing more commuter car parks through the Commuter Car Park Program. The Commuter Car Park Program is a NSW Government initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure.

The objective of the Commuter Car Park Program is to extend the reach of the public transport network in middle and outer metropolitan Sydney by intercepting customers earlier in their journey. The delivery of commuter car parks at key transport interchanges aims to provide a range of benefits as outlined in Table 2-2.

Table 2-2 Objectives of the Commuter Car Park Program

Category	Objectives
Accessible services	<ul style="list-style-type: none"> increase access to public transport for customers in their 'first and last mile' journey.
Successful places	<ul style="list-style-type: none"> complement and integrate with existing and future communities and support economic and place-making objectives in centres.
Efficient connectivity for passengers	<ul style="list-style-type: none"> develop efficient transport interchanges to enable people to reach more destinations within and between cities and centres by enabling the 30-minute city through comparative or improved travel time with private vehicle travel replace car trips to destinations and centres with alternative public and active transport modes.
Safety and performance	<ul style="list-style-type: none"> provide a safe multi-modal transport journey by design Improve the effectiveness of interchanging.
Adaptability	<ul style="list-style-type: none"> support the future needs of customers and consider emerging transport trends, growth and technologies plan and design infrastructure that is resilient and able to adapt to future alternative uses and scenarios.

Category	Objectives
Sustainability	<ul style="list-style-type: none"> to deliver whole of life value for money limit environmental impacts and contribute to the NSW Government's aspirational target to achieve net-zero emissions by 2050 maximise the construction phase benefits to the local economy by utilising local businesses and engaging a workforce that reflects the local social demographic of the area.

2.3 Objectives of the Proposal

The specific objectives of the Riverwood Commuter Car Park are to:

- provide additional commuter parking close to Riverwood Station to service increasing demand
- provide improved accessibility to transport linkages for employment and recreation
- improve integration with the surrounding precinct
- improve customer safety
- improve customer amenity
- maintain pedestrian links to Riverwood Station.

Demand for parking at Riverwood Station was modelled with consideration to the current and future public transport network, future land use (including population, workforce and employment), population growth and known travel patterns. Inputs to modelling also included on-street parking availability and surveys of similar car parks. Modelling concluded a shortfall in commuter car parking in Riverwood in both 2026 and 2036 if more commuter car parking is not provided.

2.4 Alternative options considered

The aim of the Proposal is to provide additional parking spaces in the vicinity of Riverwood Station to help cater for future rail commuter demand. Three options, including a 'do-nothing' option, were considered as part of the development of the Proposal. Criteria such as distance from Riverwood Station, alignment to the Program objectives and environmental and social impacts were considered during the development of the Proposal.

The options comprised:

- re-development of the existing car park on the southern side of Webb Street, opposite the Riverwood Plaza shopping centre
- re-development of the existing car park and adjacent residential properties on the northern side of Webb Street, to the west of the Riverwood Plaza shopping centre car park
- do-nothing, maintaining the existing level of parking available.

Consideration of each of these options is provided in the following sections.

2.4.1 The ‘do-nothing’ option

Under a ‘do-nothing’ option, existing access to the car park would remain the same and there would be no changes to the way the car park currently operates. The ‘do nothing’ option would not address the future demand for commuter car parking in the area, potentially limiting the use and investment in public transport and adding to vehicular kilometres travelled by increased car trips for commuter journeys.

The ‘do nothing’ option was not considered a feasible option as it would be inconsistent with NSW Government objectives and would not assist in encouraging the use of public transport, and would not meet the immediate needs of the local community.

2.4.2 Redevelopment south of Webb Street

The option of redevelopment south of Webb Street would require the acquisition of retail parking and apartments on Webb Street. The car park would likely overshadow properties to the south, as well as having potential privacy and noise impacts. There would also be short term parking impacts during construction at this location, as the existing car park services businesses fronting Belmore Road.

2.4.3 Redevelopment north of Webb Street

The option of redevelopment north of Webb Street provides customers with consolidated and convenient commuter parking within walking distance to the station. This option also however requires acquisition of three residential properties. Potential privacy and noise impacts were also considered for this option due to the proximity to neighbouring residential properties.

2.5 Justification for the preferred option

The option north of Webb Street was identified as the preferred location for the Proposal.

Both sites would align with the program objectives of providing accessible services, improving liveability through provision of successful places, integrating with the Riverwood town centre masterplan and improving choice to public transport in the first and last kilometre of the customer’s journey.

The option north of Webb Street would be situated between Riverwood Plaza to the east and an existing residential property to the west. The development of this site is unlikely to substantially overshadow adjacent properties. The option south of Webb Street is located between a laneway to the east, servicing businesses fronting Belmore Road and existing housing to the west. Both options would require management of potential privacy and noise impacts through façade design, and noise treatment during design and construction.

Both sites would use Webb Street for access to the proposed car park, which would result in additional vehicle movement on the street and through the Webb Street/Belmore Road signalised intersection.

The distance from both car parks to Riverwood Station is around 300 metres, and pedestrian movement would typically occur via Webb Street and Belmore Road from both sites. There is, however, opportunity for the site north of Webb Street to have connection to Riverwood Station through Riverwood Plaza (subject to detailed design) which would be a better customer outcome than walking on Webb Street, where pedestrians would be required to navigate crossings for the car park entry/exit and Riverwood Plaza vehicle entry/exit.

The option south of Webb Street is likely to result in increased overshadowing of the existing housing to the west and south. The existing short-term parking spaces may need to be offset during construction. In addition, the acquisition of apartments and an existing council car park which services several retail outlets was considered to result in increased impacts to the wider community than the option north of Webb Street.

Overall, the option north of Webb Street is the preferred location as it is considered to have reduced impact to the community, including less overshadowing and fewer residents impacted by property acquisition.

3 Proposal description

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

3.1 Scope of work

As described in Section 1.1, the Proposal involves the construction and operation of a MSCP in the suburb of Riverwood. The Proposal is part of the Commuter Car Park Program, which would improve accessibility and amenity for customers at Riverwood Station.

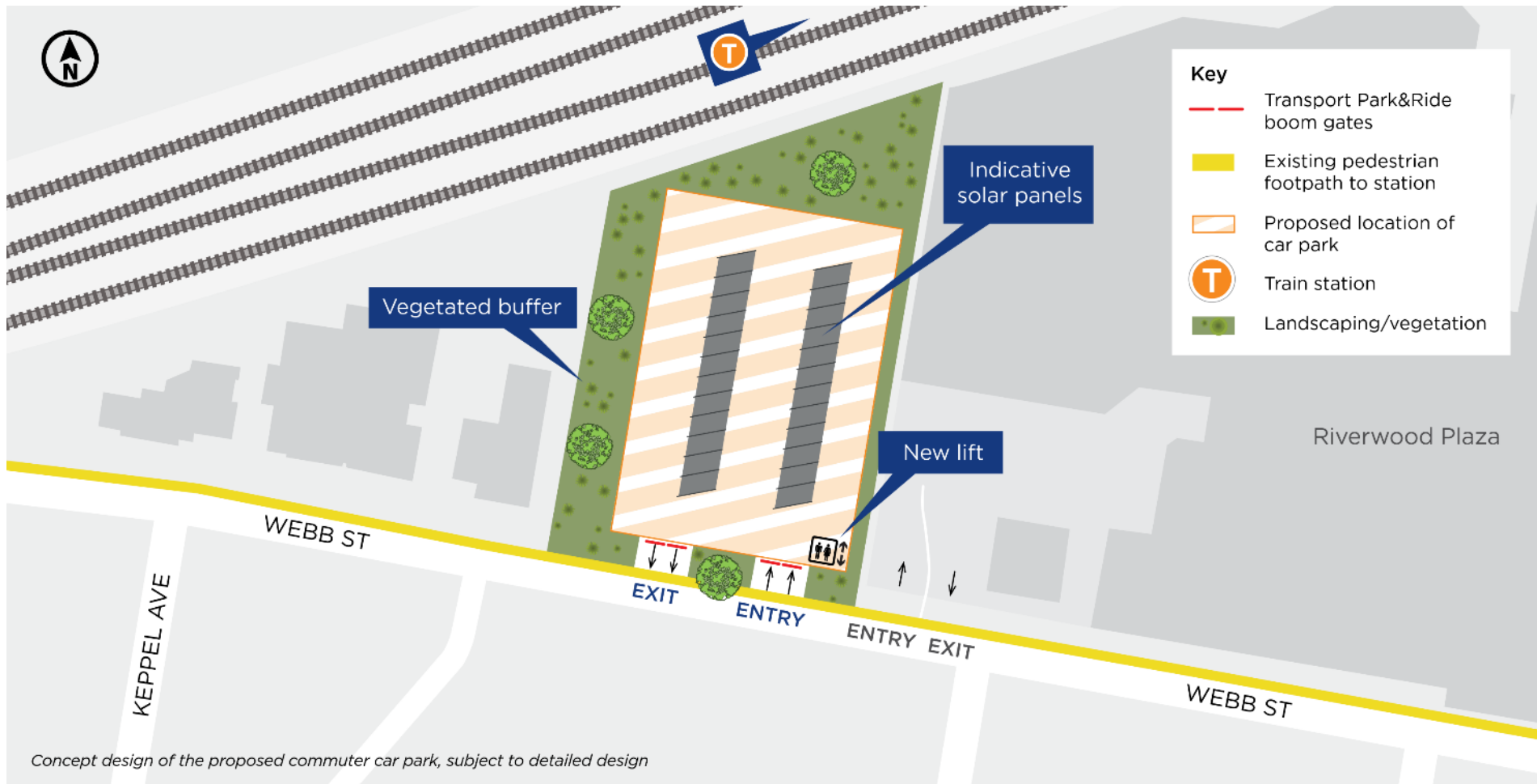
The Proposal is located adjacent to the Riverwood Plaza, and replaces the existing ground level parking at 10A Webb Street which is owned by TfNSW.

The Proposal would provide up to 140 commuter car parking spaces and provide an integration with the existing road and pedestrian network.

The Proposal includes:

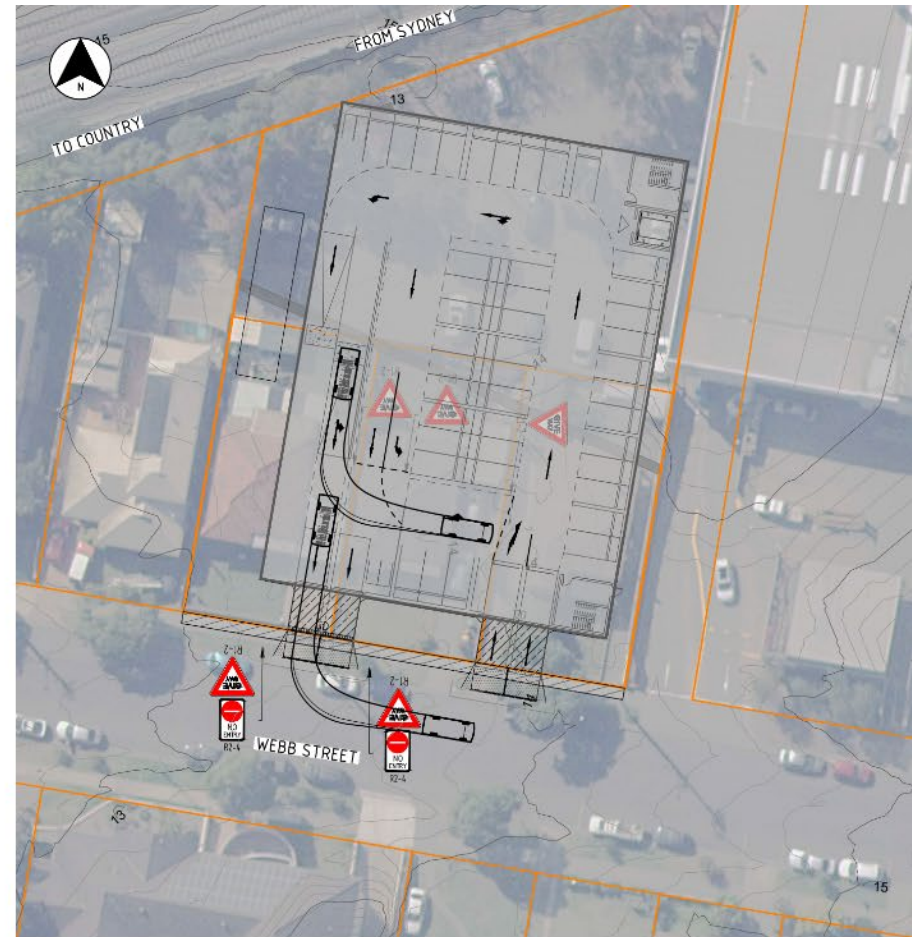
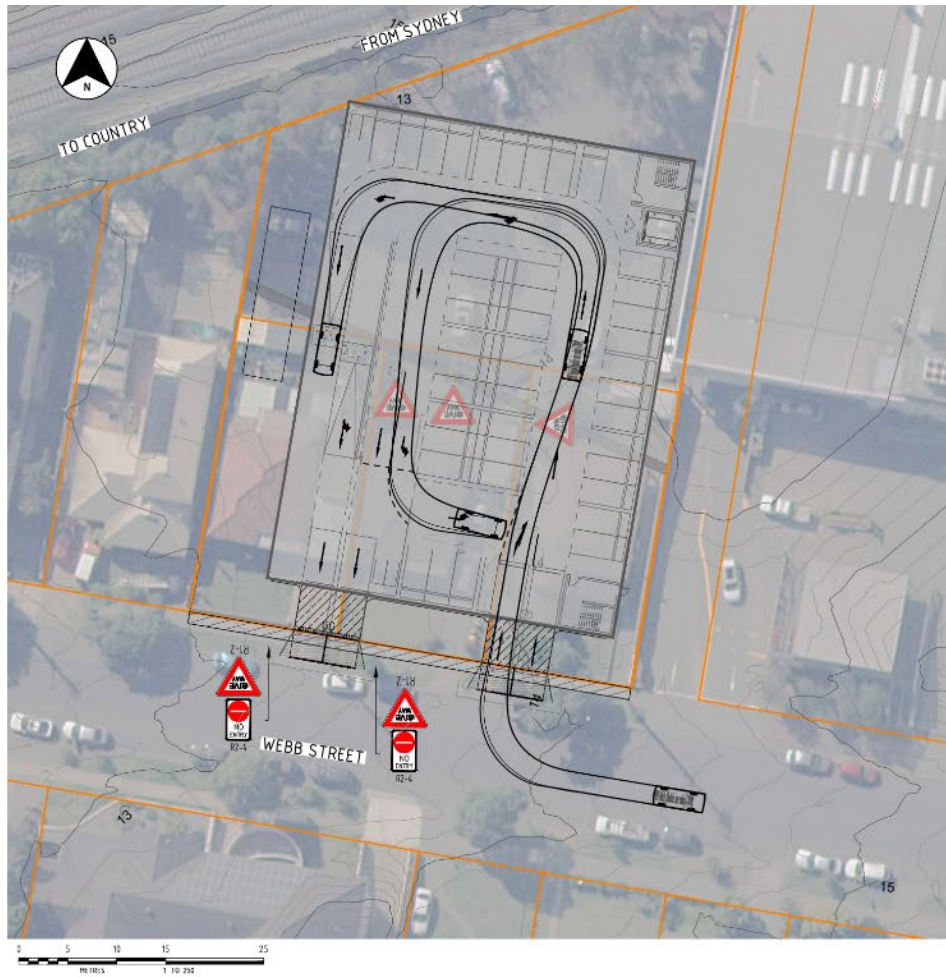
- removal of the existing at-grade car park and demolition of existing structures
- construction and operation of a MSCP comprised of a ground level plus two additional levels (including rooftop) of commuter car park, which would include:
 - up to 140 commuter car parking spaces
 - a minimum of three accessible parking spaces
 - access to each level of the car park via one lift and two stair wells
 - internal vehicle circulation ramps connecting each level of the car park
 - provision for future electric vehicle charging stations (at least 15 per cent of spaces)
 - Transport Park&Ride infrastructure (Opal card operated boom gates)
- vehicle access and egress direct from Webb Street
- separation of vehicles access points and pedestrian access paths
- installation of roof top solar panels
- ancillary works including services diversion and/or relocation, drainage works, an on-site storage detention tank, landscaping and potential installation of rainwater tanks (subject to detailed design)
- installation of CCTV, lighting and wayfinding signage for safety and security.

Figure 3-1 and Figure 3-2 shows the general layout of key elements for the Proposal.



Indicative only, subject to detailed design

Figure 3-1 Overview of the Proposal



Indicative only, subject to detailed design

Figure 3-2 Indicative parking layout of the Proposal showing vehicle circulation and entry (left) and exit (right) points

3.1.1 Materials and finishes

Materials and finishes for the Proposal have been selected based on the criteria of durability, low maintenance and cost effectiveness, to minimise visual impacts, and to be aesthetically pleasing.

Availability and constructability are also important criteria to ensure that materials are readily available, and the structure can be built with ease and efficiently. Materials are also selected for their application based on their suitability for meeting design requirements.

The Proposal would be constructed from a range of different materials, with a different palette for each architectural element. Subject to detailed design, the Proposal would include the following:

- durability, low maintenance and cost effectiveness (including the use of anti-graffiti paint or coatings)
- colour options are most likely to use a natural design scheme – neutral tones to blend the car park with natural elements of the neighbourhood, and to create a less obtrusive façade
- identify appropriate screening treatments which could be applied to maintain optimum ventilation to comply with the requirements of an open-deck car park
- materials are to be selected on the basis of sustainability principles, in particular lower carbon content, use of recycled materials and properties assist with the reduction of the urban heat island effect. Such materials may include recycled crushed glass, lower carbon content concrete and permeable paving availability and constructability criteria to ensure resources are readily available, and for the structure to be constructed with ease and proficiency.

The design would be submitted to Transport for NSW's Design Review Panel for comment before being accepted by Transport for NSW. An Urban Design and Landscape Plan (UDLP) would also be prepared by the Contractor, for endorsement by Transport for NSW.

3.2 Design development

3.2.1 Engineering constraints

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

Existing structures: the Proposal would require the removal of the existing at-grade car park located at 10A Webb Street. The Proposal would also require the acquisition (and removal of existing structures) of three residential properties which front Webb Street.

Utilities: A Dial Before You Dig (DBYD) search has identified a number of utilities in the vicinity of the proposed works including:

- water and sewer mains
- aerial electrical and street lighting
- telecommunications
- high pressure gas main.

Other considerations:

- minimising impacts to vegetation on site
- minimising the impacts to the existing parking and commercial uses during construction
- minimising disruption (amenity impacts) to residents adjacent to the site.

3.2.2 Design standards

The Proposal would be designed having regard all relevant design standards, including but not limited to the following:

- *Disability Standards for Accessible Public Transport 2002* (issued under the *Commonwealth Disability Discrimination Act 1992*)
- *Transport for NSW Wayfinding Planning Guide, Car Parks* (December 2018)
- *Transport for NSW Commuter Car Parks Urban Design Guidelines*
- Building Code of Australia
- relevant Australian Standards
- Asset Standards Authority standards
- Sydney Trains standards
- *NSW Sustainable Design Guidelines – Version 4.0* (Transport for NSW, 2017)
- *Guidelines for the Development of Public Transport Interchange Facilities* (Ministry of Transport, 2008)
- Crime Prevention Through Environmental Design (CPTED) principles
- other Transport for NSW policies and guidelines
- Georges River Council standards, where relevant.

3.2.3 Sustainability in design

The development of the concept design for the Proposal has been undertaken in accordance with the project targets identified in Transport for NSW's Environmental Management System (EMS) and the *NSW Sustainable Design Guidelines – Version 4.0* (Transport for NSW, 2019b) which groups sustainability into seven themes:

- energy and greenhouse gases
- climate resilience
- materials and waste
- biodiversity and heritage
- water
- pollution control
- community benefit.

There are 14 compulsory requirements and two sub requirements that project teams are required to implement when there is confirmation that these individual initiatives are applicable to the project. Each compulsory requirement has an associated list of supporting initiatives.

3.3 Construction activities

3.3.1 Work methodology

Subject to approval, construction is expected to commence in late 2021 and take around 12 months to complete. The construction methodology would be further developed during the detailed design of the Proposal by the nominated construction contractor under contract to Transport for NSW.

The proposed construction activities for the Proposal are identified in Table 3-1. This staging is indicative and is based on the current concept design and may change once the detailed design methodology is finalised. The staging is also dependent on the construction contractor's preferred methodology, program and sequencing of work.

Table 3-1 Indicative construction staging for key activities

Stage	Activities
Site preparation	<ul style="list-style-type: none">• identify, locate, and disconnect utilities• secure the boundary site with temporary fencing and hoarding• install traffic and pedestrian controls in the vicinity of Webb Street and close the existing car park• undertake survey to identify site boundaries and mark out proposed car park foundations.
Demolition / site clearing works	<ul style="list-style-type: none">• undertake demolition works of existing structures• clear site of any existing vegetation not being retained and demolish obsolete kerbs and landscaping in existing car park.
Site establishment / utilities	<ul style="list-style-type: none">• establish site office, amenities, and plant/material storage areas• establish other environmental controls, such as erosion and sediment controls• relocate or cap local utilities clear of building footprint• provide necessary services to various points within the car parking footprint.
Building and structural works	<ul style="list-style-type: none">• prepare the site for the construction of foundations• construct piled foundations, footing beams and pile caps over new piles• form and pour ground flood slabs• construct suspended levels, including stairs, walls and columns one level at a time• construct blockwork on each level• make good at-grade car park where surface has been disturbed for installation of services or construction of new foundations• install new lifts• install electrical, hydraulic, and mechanical services infrastructure.

Stage	Activities
Architectural features / finishing	<ul style="list-style-type: none"> • install protective screens around building perimeter • install vehicle crash barriers, balustrades, new cladding • landscape area at ground level • painting of car park concrete elements • marking of car park lines, direction arrows and installation of way finding signage • construct new footpaths, kerbs and access within the Proposal site to link adjacent infrastructure • installation of ancillary features including fire protection, CCTV, electrical elements and other Transport Park&Ride infrastructure (boom gates etc).
Precinct works (external to the car park)	<ul style="list-style-type: none"> • road modifications such as the finishing of surfacing works and line marking between the Proposal and Webb Street (as required) • installation of new wayfinding signage, as required • completion of landscaping (subject to detailed design).
Testing and commissioning	<ul style="list-style-type: none"> • completion of activities to test and commission power supply, lifts, lighting boom gates etc.
Decommissioning of temporary facilities and site demobilisation	<ul style="list-style-type: none"> • remove temporary site facilities • removal of footpath/pedestrian management and traffic controls • removal of environmental controls • completion of site clean-up and tidying works.

3.3.2 Plant and equipment

The plant and equipment likely to be used during construction would include, but not be limited to:

- tower and mobile cranes
- water truck
- street sweeper
- road saw
- vibratory rollers
- trench compactors
- concrete pump
- semi-trailers
- spoil trucks
- welding equipment
- air compressors
- concrete saws
- generators
- concrete vibrators
- jack hammers
- demolition saw
- excavators
- elevated work platforms
- paving machine
- lighting towers
- various hand tools.

3.3.3 Working hours

Most works required for the Proposal would be undertaken during standard (NSW) Environment Protection Authority (EPA) construction hours, which are as follows:

- 7.00am to 6.00pm Monday to Friday
- 8.00am to 1.00pm Saturdays
- no work on Sundays or public holidays.

Certain works may need to occur outside standard hours and would include night works and works during routine rail possessions which are scheduled closures that would occur regardless of the Proposal when part of the rail network is temporarily closed and trains are not operating.

Out of hours works may be required in some cases to minimise disruptions to customers, pedestrians, motorists, and nearby sensitive receivers; and to ensure the safety of railway workers and operational assets.

Approval from Transport for NSW would be required for any out of hours work and the affected community would be notified as outlined in Transport for NSW's *Construction Noise and Vibration Strategy* (Transport for NSW, 2019c) (refer to Section 6.3 for further details).

3.3.4 Extended working hours during COVID-19

The Minister for Planning and Public Spaces has made a number of Orders under Section 10.17 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) in response to the COVID-19 pandemic. This includes the *Environmental Planning and Assessment (COVID-19 Development – Infrastructure Construction Work Days No. 2) Order 2020* (the 'Order'), which commenced on 24 December 2020, and is applicable to construction activities for projects which have been subject to an assessment under Division 5.1, or approval under Division 5.2 of the EP&A Act. The Order extends the standard construction hours to allow infrastructure construction work on Saturday, Sunday and Public holidays (7.00am to 6.00pm), without the need for any approval (excluding high noise generating works such as rock breaking or pile driving and the like).

These extended working hours were due to expire on 25 March 2021. However, on Wednesday 24 March 2021, the NSW Government introduced the *COVID-19 Legislation Amendment (Emergency Measures) Bill 2020*, which was subsequently passed by parliament, and came into effect on 25 March 2021. A section of the Bill enabled the extension of the extended working hours until 31 March 2022.

Whilst no further assessment of the environmental impacts are required for these extended working hours, in the event that Transport for NSW would seek to utilise the extended working hours permitted by the Order, advance notification would be provided to the community.

3.3.5 Earthworks

Excavations and earthworks would be minimal as works would be undertaken on a relatively flat, and newly demolished lot. The site may be regraded in some areas with minor levelling to allow for column placement and foundation construction.

Excavations and earthworks would generally be required for footings, and foundations of the car park, lift shafts, drainage/stormwater works and trenching activities for adjustments and relocations.

Excavated material would be reused onsite where possible or disposed of in accordance with relevant legislative requirements.

3.3.6 Source and quantity of materials

The source and quantity of materials would be determined during the detailed design phase of the Proposal and would consider the requirements of the *NSW Sustainable Design Guidelines – Version 4.0* (Transport for NSW, 2019b).

Materials would be sourced from local suppliers where practicable. Reuse of existing and recycled materials would be undertaken where practicable. Consideration would also be given to life cycle impacts of each material chosen which would be calculated by assessing the environmental impacts of materials from the point of extraction, through to transportation, use, operation and end of life.

3.3.7 Traffic access and vehicle movements

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

- temporary loss of existing parking in the Proposal site during construction
- construction vehicle movements and access arrangements which may interrupt traffic flow on the local road network
- restricted parking on Webb Street would result in temporary loss of street parking.

Further discussion of potential traffic access and vehicle impacts is provided in Section 6.1.

Parking

The Proposal site would be accessed by construction traffic via Webb Street though the signalised intersection with Belmore Road. Existing parking on Webb Street would need to be restricted at the frontage of the Proposal site to allow for heavy vehicles and machinery access.

Parking for workers driving to the site would be assigned on Webb Street, west of Keppel Avenue and adjacent to the rail corridor, as depicted in Figure 3-3. This area is currently an observed overspill zone for commuter parking.



Indicative only, subject to detailed design

Figure 3-3 Proposed construction parking

Construction haulage routes

Haulage routes are proposed along Belmore Road between the M5 Motorway and Riverwood Station. Vehicles coming to and leaving from the proposed site would use the same route travelling along Belmore Road and turn onto (or out of if exiting the area) Webb Street via the signalised intersection as in Figure 3-4.



Indicative only, subject to detailed design

Figure 3-4 Indicative haulage routes

3.3.8 Ancillary facilities

Temporary construction compound areas would be required to accommodate a site office, amenities, laydown, and storage area for materials. These areas would be confined to the Proposal site as follows:

- worker amenities would be located along the southern boundary of the site (fronting onto Webb Street)
- a material handling area would be established at the rear and western side of the proposed car park, covering an area of around 875 square metres.

These areas combined would contain worker amenities such as toilets, change rooms, meal rooms, shower facilities, first aid, site offices, on-site fabrication workshops, materials handling and storage areas, dangerous goods storage, and site security.

Impacts associated with utilising this area have been considered in the environmental impact assessment including requirements for rehabilitation.

An overview of the proposed site compounds and ancillary facility locations is shown on Figure 3-5.

3.3.9 Public utility adjustments

The Proposal has been designed to avoid relocation of services where feasible, however further investigation may be required. It is likely some services may require relocation, including:

- the existing sewer main
- lighting and associated electrical cables
- telecommunications.

Such relocation is unlikely to occur outside of the footprint of the works assessed in this REF. In the event that works would be required outside of this footprint, further assessment would be undertaken.

Relocation or other work that may affect services would be undertaken in consultation with the respective utility authorities.

3.4 Property acquisition

The Proposal would require the permanent acquisition of three existing residential properties to accommodate the proposed car park. The properties that would require acquisition are:

- 12 Webb Street (Lot 7 DP23676)
- 14 Webb Street (Lot 6 DP23676)
- 16 Webb Street (Lot 5 DP23676).

The location of the proposed properties that would require acquisition are shown in Figure 3-6. The remainder of the Proposal is located on land currently owned by Georges River Council.

3.5 Operation and maintenance

The Proposal would operate 24 hours, 7 days a week, and would have an Opal card operated boom gate system.

The future operation and maintenance of the car park is subject to further discussions with Sydney Trains, Transport for NSW, and Georges River Council. Structures constructed under this Proposal would be maintained by Sydney Trains. However, it is expected that adjacent garden/landscape areas would continue to be maintained by Georges River Council.



Legend

- Railway Station
- Roads
- +— Railway
- Proposal Site
- Materials Handling Areas
- Worker Amenity



0 10 20 m

Coordinate system: GDA2020 MGA Zone 56
 Scale ratio correct when printed at A3
 1:1,000 Date: 17-Jun-21

Data Sources: Imagery © Metromap 2020

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Legend

- Railway Station
- Roads
- + Railway
- ▭ Cadastre (Lot/DP)
- ▭ Proposal Site
- ▭ Existing at-grade car park
- ▭ Residential properties proposed to be acquired



Coordinate system: GDA2020 MGA Zone 56



Scale ratio correct when printed at A3

1:2,000

Date: 17-Jun-21

Data Sources: Imagery © Metromap 2020

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4 Statutory considerations

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

4.1 Commonwealth legislation

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The (Commonwealth) EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, and heritage places – defined in the EPBC Act as ‘matters of National Environmental Significance (NES)’.

The EPBC Act requires the assessment of whether the Proposal is likely to significantly impact on matters of NES or Commonwealth land. These matters are considered in full in Appendix A.

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

4.1.2 Other Commonwealth legislation

Other Commonwealth legislation applicable to the Proposal is discussed in Table 4-1.

Table 4-1 Other Commonwealth legislation applicable to the Proposal

Applicable legislation	Considerations
<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i>	<p>There is an obligation on a person who discovers anything which he or she has reasonable grounds to suspect are Aboriginal remains to report that discovery to the Minister, giving particulars of the remains and their location.</p> <p>The Proposal does not include any previously identified Aboriginal sites and/or places (refer Section 6.4); however, considerations for unexpected finds further detailed in mitigation measures and applies to this Act.</p>
<i>Disability Discrimination Act 1992 (DDA)</i>	<p>This Act aims to eliminate as far as possible, discrimination against persons on the ground of disability in areas including access to premises and the provision of facilities, services and land.</p> <p>The Proposal would be designed having regard to the requirements of this Act. The Proposal would include three accessible or DDA compliant parking spaces which would be consistent with the overall intention of this Act.</p>

4.2 NSW legislation and regulations

4.2.1 Transport Administration Act 1988

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

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

2A Objects of Act

...

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

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

...

- (a) **Environmental sustainability**
To promote the delivery of transport services in an environmentally sustainable manner.
- (b) **Social benefits**
To contribute to the delivery of social benefits for customers, including greater inclusiveness, accessibility and quality of life.

4.2.2 Environmental Planning and Assessment Act 1979

The EP&A Act establishes the system of environmental planning and assessment in NSW. This Proposal is subject to the environmental impact assessment and planning approval requirements of Division 5.1 of the EP&A Act.

Division 5.1 of the EP&A Act specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as Transport for NSW, which do not require development consent under Part 4 of the Act.

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

Clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) defines the factors which must be considered when determining if an activity assessed under Division 5.1 of the EP&A Act has or is likely to have a significant impact on the environment. Chapter 6 of the REF provides an environmental impact assessment of the Proposal in accordance with clause 228 and Appendix B specifically responds to the factors for consideration under clause 228.

4.2.3 Other NSW legislation and regulations

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

Table 4-2 Other legislation applicable to the Proposal

Applicable legislation	Considerations
<i>Biodiversity Conservation Act 2016</i> (BC Act) (NSW)	<p>The site has generally been developed previously for use as both residential properties and an existing surface car park.</p> <p>The site has not been identified as containing suitable habitat for any listed threatened species or community and is unlikely to have a significant impact on any threatened species or community (refer Section 6.7).</p>
<i>Biosecurity Act 2015</i> (NSW)	<p>Clause 22 of the <i>Biosecurity Act 2015</i> requires any person who deals with a biosecurity matter has a duty to ensure that in so far as is reasonably practicable, the potential biosecurity risk is prevented, eliminated, or minimised.</p> <p>Appropriate management methods would be implemented during construction if declared noxious weeds in the Georges River LGA are identified (refer to Section 6.7).</p>
<i>Contaminated Land Management Act 1997</i> (CLM Act) (NSW)	<p>Section 60 of the CLM Act imposes a duty on landowners to notify the NSW Department of Planning, Industry and Environment (formerly Office of Environment and Heritage (OEH)), and potentially investigate and remediate land if contamination is above EPA guideline levels.</p> <p>The site has not been declared under the CLM Act as being significantly contaminated (refer Section 6.8).</p>
<i>Crown Lands Act 1987</i> (NSW)	<p>The Proposal does not involve works on any Crown land.</p>
<i>Heritage Act 1977</i> (Heritage Act) (NSW)	<p>The <i>Heritage Act 1977</i> provides for a number of provisions applicable for consideration for the proposal. These include:</p> <ul style="list-style-type: none"> • Sections 57 and 60 require approval for works where items listed on the State Heritage Register are to be impacted • Sections 139 and 140 similarly required an approval/permit to be obtained where relics are likely to be exposed or disturbed • For any works which may have an impact upon items listed on a Section 170 heritage and conservation register maintained by a government agency, notification to Heritage NSW may be required. <p>The Proposal site has not been identified as being heritage listed.</p> <p>The Proposal is located within 100 metres of the Riverwood Railway Station which is listed on Transport Asset Holding Entity's Section 170 heritage register. As the Proposal is located outside the rail corridor, and there is no direct access between the Proposal and the station, the Proposal is unlikely to impact the heritage item (refer section 6.5)</p>
<i>Land Acquisition (Just Terms Compensation) Act</i> (LA Act) (NSW)	<p>The Proposal would require the permanent acquisition of three existing residential properties to accommodate the proposed car park. All acquisitions of privately-owned land would be undertaken in consultation with landowners and in accordance with the LA Act.</p>

Applicable legislation	Considerations
<i>National Parks and Wildlife Act 1974</i> (NPW Act) (NSW)	<p>Sections 86, 87 and 90 of the NPW Act require consent from NSW Department of Planning, Industry and Environment (formerly OEH) for the destruction or damage of Indigenous objects. The Proposal is unlikely to disturb any Indigenous objects (refer Section 6.4).</p> <p>However, if unexpected archaeological items or items of Indigenous heritage significance are discovered during the construction of the Proposal, all works would cease, and appropriate advice sought.</p>
<i>Protection of the Environment Operations Act 1997</i> (PoEO Act) (NSW)	<p>The Proposal does not involve a 'scheduled activity' under Schedule 1 of the PoEO Act. Accordingly, an Environment Protection Licence (EPL) is not required for the Proposal.</p> <p>However, in accordance with Part 5.7 of the PoEO Act, Transport for NSW would notify the EPA of any pollution incidents that occur onsite. This would be managed in the Construction Environmental Management Plan to be prepared and implemented by the Contractor.</p>
<i>Roads Act 1993</i> (Roads Act) (NSW)	<p>Section 138 of the Roads Act requires consent from the relevant road authority for the carrying out of work in, on or over a public road. However, clause 5(1) in Schedule 2 of the Roads Act states that public authorities do not require consent for works on unclassified roads.</p> <p>The Proposal would likely require temporary adjustment of traffic conditions on Webb Street during construction of the Proposal site. Georges River Council would be the relevant roads authority and would be consulted during detailed design (refer to Section 6.1).</p> <p>However, should the detailed construction methodology for the Proposal identify the need for activities such as temporary road or lane closures, this would be undertaken in consultation with the Georges River Council including obtaining Road Occupancy Licence(s) as required.</p>
<i>Waste Avoidance and Resource Recovery Act 2001</i> (WARR Act) (NSW)	<p>Transport for NSW would carry out the Proposal having regard to the requirements of the WARR Act.</p> <p>A site-specific Waste Management Plan would be prepared.</p>
<i>Water Management Act 2000</i> (WM Act) (NSW)	<p>Approval under the WM Act is required for certain types of developments and activities that are carried out in or near a river, lake or estuary. Under section 91E of the WM Act, it is an offence to carry out a controlled activity in, on or under waterfront land unless a controlled activity approval has been issued.</p> <p>The proposal would not be undertaken in or near a river, lake or estuary. Additionally, the Proposal would not involve any water use (from a natural source e.g. aquifer, river – only from the network), water management works, drainage or flood works, controlled activities or aquifer interference.</p>

4.2.4 State Environmental Planning Policies

State Environmental Planning Policy (Infrastructure) 2007

The Infrastructure SEPP is the key environmental planning instrument which determines the permissibility of a Proposal and under which part of the EP&A Act an activity or development may be assessed.

Division 15, Clause 79 of the Infrastructure SEPP allows for certain types of development to be carried out by or on behalf of a public authority without consent on any land (i.e. assessable under Division 5.1 of the EP&A Act). Specifically, Clause 79(1) of the Infrastructure SEPP states that:

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

Clause 78 defines 'rail infrastructure facilities' as including elements such as:

- (a) *'railway tracks, associated track structures, cuttings, drainage systems, fences, tunnels, ventilation shafts, emergency accessways, bridges, embankments, level crossings and roads, pedestrian and cycleway facilities.'*
- (d) *'railway stations, station platforms and areas in a station complex that commuters use to get access to the platforms'*
- (e) *public amenities for commuters*
- (f) *associated public transport facilities for railway stations...'*

'Associated public transport facilities' is further defined in Clause 5 to include 'car parks intended for use by commuters'.

Consequently, development consent is not required for the Proposal, which is classified as a rail infrastructure facility, however the environmental impacts of the Proposal have been assessed under the provisions of Division 5.1 of the EP&A Act.

Part 2 of the Infrastructure SEPP contains provisions for public authorities to consult with local councils and other agencies prior to the commencement of certain types of development. Section 5.2 of this REF discusses the consultation undertaken under the requirements of the Infrastructure SEPP.

The Infrastructure SEPP prevails over all other environmental planning instruments except where there is an inconsistency with *State Environmental Planning Policy (State Significant Precincts) 2005* or certain provisions of *State Environmental Planning Policy (Coastal Management) 2018*. The Proposal does not require consideration under these SEPPs and therefore do not require further consideration as part of this REF.

State Environmental Planning Policy 55 – Remediation of Land

State Environmental Planning Policy No.55 — Remediation of Land (SEPP 55) provides a State-wide approach to the remediation of contaminated land for the purpose of minimising the risk of harm to the health of humans and the environment. While consent for the Proposal is not required, the provisions of SEPP 55 have still been considered in the preparation of this REF.

Section 6.8 of this REF contains an assessment of the potential contamination impacts of the Proposal. It is not expected that any large-scale remediation (Category 1) work would be required as part of the Proposal. The proposed land use would not differ to the existing use and is, therefore, would unlikely to be affected by any potential contaminants that exist within the rail corridor.

Impacts of contaminated lands and potential remediation are in Section 6.8.

Greater Metropolitan Regional Environmental Plan No 2 – Georges River Catchment

The aim of this plan is to protect the environment of the Georges River Catchment by ensuring that the impacts of future land uses are considered. The Proposal is located within a part of the Georges River LGA managed by the Greater Metropolitan Regional Environmental Plan. The impact of the Proposal on receiving waters including the impacts of stormwater runoff, is considered in Section 6.9.

4.2.5 Hurstville Local Environmental Plan 2012

The Proposal is located within the Georges River LGA, which was formed in 2016 with the merger of Kogarah City Council and Hurstville City Council. As a result of the merger, the *Hurstville Local Environment Plan 2012* (Hurstville LEP 2012) is still the applicable LEP to the Proposal. It should be noted the *Draft Georges River LEP 2020* is currently being developed by Georges River Council, however this has not been finalised.

The Infrastructure SEPP prevails 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 *State Environmental Planning Policy (Coastal Management) 2018*. During the preparation of this REF, the provisions of *Hurstville Local Environment Plan 2012* were considered (refer Table 4-3).

Table 4-3 Relevant provisions of the Hurstville LEP 2012

Provision description	Relevance to the Proposal
<p>Clause 2.3 – Zone objectives and Land Use Table</p>	<p>Applicable land zones</p> <p>Under the Hurstville LEP 2012, the Proposal is located in areas zoned as:</p> <ul style="list-style-type: none"> • R3 Medium Density Residential • B2 Local Centre. <p>Zone objectives</p> <p>The objectives of the applicable land zones are as follows:</p> <ul style="list-style-type: none"> • R3 Medium Density Residential – to provide for the housing needs of the community within a medium density residential environment, to enable other land uses that provide facilities or services to meet the day to day needs of residents • B2 Local Centre – to enable a range of retail, business, entertainment and community uses that serve the needs of people who live in, work in and visit the local area, encourage employment opportunities in accessible locations and to maximise public transport patronage and encourage walking and cycling. <p>Permissible development within land zones</p> <p>Development for the purposes of a car park is permissible with consent under the R3 Medium Density Residential. Car parks are not identified as either permitted or prohibited within the B2 Local Centre zone, although the Proposal is consistent with the objective of the zone to maximise public transport patronage and encourage walking and cycling.</p> <p>Notwithstanding the objectives and permissibility of the proposed works within each of the identified zones, the provisions of the Infrastructure SEPP prevail over the Hurstville LEP 2012. Development consent from Georges River Council is not required.</p>

Provision description	Relevance to the Proposal
Clause 4.3 – Height of building	<p>The purpose of this clause is to ensure that developments are compatible with the height, bulk and scale of the existing and desired future character of the locality and minimise visual impact, disruption of views, loss of privacy and loss of solar access to existing development.</p> <p>The height of the Proposal would be around 10 metres and would not exceed the maximum height of 12 metres and 13 metres identified for the street frontage and rear portions of the site respectively.</p>
Clause 6.1 – Acid sulfate soils	The Proposal is not on land mapped as containing Acid Sulfate Soils.
Clause 6.6 – Active street frontages	<p>The Proposal is not on land mapped as being identified as an active street frontage under Clause 6.6.</p> <p>Notwithstanding, subject to detailed design, some landscaping would be provided along Webb Street to provide an appropriate street frontage for the Proposal.</p>

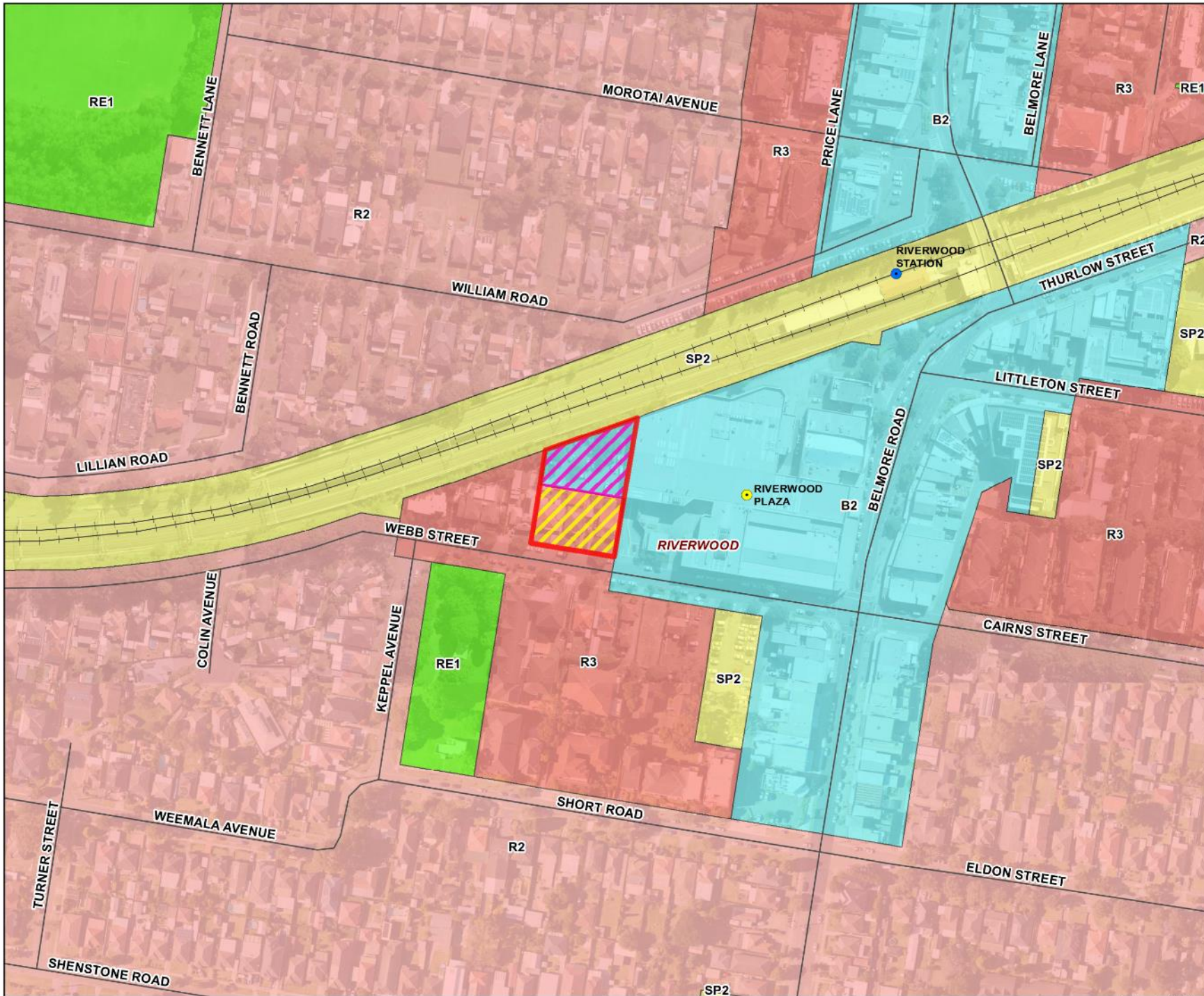
Figure 4-1 shows the relevant section of the zoning map from the Hurstville LEP 2012, with the indicative location of the Proposal.

4.3 Ecologically sustainable development

Transport for NSW is committed to ensuring that its projects are implemented in a manner that is consistent with the principles of ecologically sustainable development (ESD). The principles of ESD are generally defined under the provisions of clause 7(4) of Schedule 2 to the EP&A Regulation as:

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

The principles of ESD have been adopted by Transport for NSW throughout the development and assessment of the Riverwood Commuter Car Park. Section 3.2.3 summarises how ESD would be incorporated in the design development of the Proposal. Section 6.13 includes an assessment of the Proposal on climate change and sustainability, and Section 7.2 lists mitigation measures to ensure ESD principles are incorporated during the construction phase of the Proposal.



Legend

- Railway Station
- Roads
- Railway
- Proposal Site
- Existing residential properties

Land Zoning

- B2 Local Centre
- R2 Low Density Residential
- R3 Medium Density Residential
- RE1 Public Recreation
- SP2 Infrastructure



0 10 20 30 m

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A3

1:2,000 Date: 31-May-21

Data Sources: Imagery © Mapbox 2020

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5 Community and stakeholder consultation

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

5.1 Stakeholder consultation during concept design

The Proposal was announced to the public in February 2021 to coincide with the commencement of the private property acquisitions.

At this time, Transport for NSW issued a project newsletter to nearby properties and Georges River Council explaining the Proposal. Contact details were provided to allow for enquiries or questions from interested stakeholders.

Ongoing engagement with the owners/tenants of the properties that need to be acquired to deliver the Proposal has been continuing during the development of the concept design. Engagement has also occurred with adjacent property owners including the owners of Riverwood Plaza, 18 Webb Street, 15 Webb Street and the business located at 13 Webb Street.

5.2 Consultation requirements under the Infrastructure SEPP

Part 2, Division 1 of the Infrastructure SEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. Clauses 13, 14, 15 and 16 of the Infrastructure SEPP require that public authorities undertake consultation with councils and other agencies, when proposing to carry out development without consent.

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

Table 5-1 Infrastructure SEPP consultation requirements

Clause	Clause particulars	Relevance to the Proposal
Clause 13 Consultation with Councils – development with impacts on council related infrastructure and services	<p>Consultation is required where the Proposal would result in:</p> <ul style="list-style-type: none"> substantial impact on stormwater management services generating traffic that would place a local road system under strain involve connection to or impact on a council owned sewerage system involve connection to and substantial use of council owned water supply significantly disrupt pedestrian or vehicle movement involve significant excavation to a road surface or footpath for which Council has responsibility. 	<p>The Proposal would include works that would:</p> <ul style="list-style-type: none"> disrupt pedestrian and vehicle movements impact on road pavements under Council's care and control impact on Council-operated footpaths. <p>Initial consultation with Georges River Council has been undertaken and would continue throughout the detailed design and construction phases. Refer to Section 6.1.</p>

Clause	Clause particulars	Relevance to the Proposal
<p>Clause 14 Consultation with Councils – development with impacts on local heritage</p>	<p>Where railway station works:</p> <ul style="list-style-type: none"> substantially impact on local heritage item (if not also a State heritage item) substantially impact on a heritage conservation area. 	<p>There is no proposed impact to local heritage/heritage conservation area. Accordingly, consultation with Council is not required.</p> <p>Accordingly, consultation with Georges River Council is not considered to be required under this clause.</p> <p>Refer to Section 6.5.</p>
<p>Clause 15 Consultation with Councils – development with impacts on flood liable land</p>	<p>Where railway station works:</p> <ul style="list-style-type: none"> impact on land that is susceptible to flooding – reference would be made to <i>Floodplain Development Manual: the management of flood liable land</i>. 	<p>The Proposal is not located on land that is susceptible to flooding as outlined in the <i>Hurstville Local Environment Plan 2012</i>, however the Proposal site has been identified as within the Probable Maximum Flood Event, 100-year flood level by the Georges River Flood Study (Georges River Council, 2016).</p> <p>Accordingly, consultation with Georges River Council is required in regard to this aspect.</p> <p>Refer to Section 6.9.</p>
<p>Clause 15A Consultation with Councils – development with impacts on certain land within the coastal zone</p>	<p>Where railway station works:</p> <ul style="list-style-type: none"> impact on land within a coastal vulnerability area and is inconsistent with certified coastal management program that applies to that land. 	<p>The Proposal is not located on land within a coastal vulnerability area.</p> <p>Accordingly, consultation with Georges River Council is not required in regard to this aspect.</p>
<p>Clause 15AA Consultation with State Emergency Service – development with impacts on flood liable land</p>	<p>Where railway station works:</p> <ul style="list-style-type: none"> impact on flood liable land – written notice must be given (together with a scope of works) to the State Emergency Services and taken into consideration any response to the notice received from the State Emergency Service within 21 days after the notice is given. 	<p>The Proposal is not located on flood liable land with reference to the <i>Hurstville Local Environment Plan 2012</i>, however, the Proposal site has been identified as within the Probable Maximum Flood Event, 100-year flood level by the Georges River Flood Study (Georges River Council, 2016).</p> <p>Accordingly, consultation with the State Emergency Services is required in regard to this aspect.</p> <p>Refer to Section 6.9.</p>

Clause	Clause particulars	Relevance to the Proposal
Clause 16 Consultation with public authorities other than Councils	For <i>specified development</i> which includes consultation with the NSW Department of Planning, Industry and Environment (formerly OEH) for development that is undertaken adjacent to land reserved under the <i>National Parks and Wildlife Act 1974</i> , and other agencies specified by the Infrastructure SEPP where relevant. Although not a specific Infrastructure SEPP requirement, other agencies Transport for NSW would consult with other relevant agencies (as necessary) including Sydney Trains.	The Proposal is not located adjacent to land reserved under the <i>National Parks and Wildlife Act 1974</i> . Accordingly, consultation with the OEH now the Environment, Energy and Science (EES) Group part of the Department of Planning, Industry and Environment (DPIE) on this matter is not required.

5.3 Consultation strategy

The consultation strategy for the Proposal was developed to encourage stakeholder and community involvement and foster interaction between stakeholders, the community and the project team.

The consultation strategy that has been developed, having regard to the requirements of the planning process ensures that stakeholders, customers and the community would be informed of the Proposal and have the opportunity to provide input.

The objectives of the consultation strategy are to:

- provide accurate and timely information about the Proposal and REF process to relevant stakeholders and the community
- raise awareness of the various components of the Proposal and the specialist environmental investigations
- ensure that the directly impacted community are aware of the REF and consulted where appropriate
- provide opportunities for stakeholders and the community to express their view about the Proposal
- understand and access valuable local knowledge from the community and stakeholders
- record the details and input from community engagement activities
- build positive relations with identified community stakeholders
- ensure a comprehensive and transparent approach
- established communication channels to enable stakeholders to be kept informed throughout the Proposal
- inform stakeholders above design changes, if required, and how input as a result of the consultation has influenced Proposal outcomes.

5.4 Public display

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

- installation of signage around the station informing commuters of the Proposal, contact information to provide feedback and a QR code taking customers to the project webpage
- a dedicated project webpage on Transport for NSW website that includes a summary of the Proposal and information on how to provide feedback
- public display of the REF on the project webpage
- distribution of a project update to local community, outlining the Proposal and inviting feedback on the REF
- a geographically targeted social media post to Riverwood and surrounding suburbs to inform social media users of the Proposal and link to view the plans
- consultation with Georges River Council, Sydney Trains, and other non-community stakeholders.

Community consultation activities for the Proposal would be undertaken during the public display of this REF. The display period of the REF would be advertised in the week that the public display commences. The REF would be displayed for a period of approximately two weeks. Due to the evolving Covid-19 situation in Greater Sydney, community engagement to support the public display of the REF will be undertaken remotely.

The REF would be available for the community to view on the [Transport for NSW website¹](#). Information on the Proposal would be available through the Project Infoline (1800 684 490) or by [email²](#).

Feedback can be sent to:

- projects@transport.nsw.gov.au
- Commuter Car Park Program – Riverwood Commuter Car Park
Associate Director Environmental Impact Assessment
Transport for NSW
Locked Bag 6501
St Leonards NSW 2065

Or submitted:

- via www.transport.nsw.gov.au/riverwood

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

¹ <https://www.transport.nsw.gov.au/projects/current-projects>

² projects@transport.nsw.gov.au

5.5 Aboriginal community involvement

An Aboriginal Heritage Information Management System (AHIMS) search was undertaken for the area covered by the Proposal (the area around the site) plus a 200-metre radius, on 14 April 2021. No Aboriginal sites were identified within a 200-metre radius of the site, and therefore the given the size and extent of the Proposal, it would not be expected to impact any Aboriginal site(s).

The extensive landscape modification that has occurred across the Proposal area suggests that intact evidence of Aboriginal land use is unlikely to occur within the boundaries of the Proposal area. Similarly, the high level of disturbance would suggest that the archaeological potential of the area is low. Therefore, it was not considered necessary to undertake specific Aboriginal consultation.

5.6 Ongoing consultation

At the conclusion of the public display period for this REF, Transport for NSW would acknowledge receipt of feedback from each respondent. The issues raised by the respondents would be considered by Transport for NSW before determining whether to proceed with the Proposal (refer Figure ES-3).

Should Transport for NSW determine to proceed with the Proposal, the Determination Report would be made available on the Transport for NSW website and would summarise the key impacts identified in this REF, demonstrate how Transport for NSW considered issues raised during the public display period, and include a summary of mitigation measures proposed to minimise the impacts of the Proposal.

Should Transport for NSW determine to proceed with the Proposal, the project team would keep the community, Councils and other key stakeholders informed of the process, identify any further issues as they arise, and develop additional mitigation measures to minimise the impacts of the Proposal. The interaction with the community would be undertaken in accordance with a Community Liaison Plan to be developed prior to the commencement of construction.

6 Environmental impact assessment

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

This environmental impact assessment has been undertaken in accordance with clause 228 of the EP&A Regulation. A checklist of clause 228 factors and how they have been specifically addressed in this REF is included at Appendix B.

6.1 Traffic and transport

A *Traffic and Transport Impact Assessment* (TTIA), which assessed the existing environment and impacts of the Proposal on the surrounding road, pedestrian and public transport network was prepared by WSP in May 2021. This section provides a summary of the TTIA report.

6.1.1 Existing environment

Riverwood Station

Riverwood Station is serviced by the T8 Airport & South Line, linking Riverwood to the Southern Highlands, Airport and Sydney CBD. The station has one island platform with two sets of tracks on either side.

Station patronage

Station patronage Opal card data was assessed for the pre-COVID-19 conditions to provide an indication of the typical travel patterns of Riverwood Station. The number of commuters boarding at Riverwood Station is summarised in Table 6-1 showing peak and daily demand profiles.

Table 6-1 AM peak hour station entries – 2020

Hour commencing	Average station entries	AM peak demand profile	Daily demand profile
5am	229	8%	5%
6am	406	17%	10%
7am	981	41%	23%
8am	801	33%	19%
AM Peak Total	2,414	100%	57%
Daily Total	4,234		100%

Source: Opal data, January 2020 – FutureRail

Station access and facilities

Riverwood Station provides interchange facilities including bus stops, taxi ranks, kiss and ride area, and bicycle parking. The station is also staffed 24 hours a day, seven days a week and provides bicycle parking. The platform is also sheltered and provides access for mobility impaired users. Details of these facilities are discussed in the following sections.

Bus services

The following bus routes service the Riverwood Station precinct on weekdays:

- 940 Bankstown to Hurstville via Riverwood, Hurstville to Bankstown via Riverwood
- 942 Campsie to Lugarno, Lugarno to Campsie
- 944 Mortdale to Bankstown via Peakhurst Heights, Bankstown to Mortdale via Peakhurst Heights
- 945 Bankstown to Hurstville via Mortdale, Hurstville to Bankstown via Mortdale
- N20 Riverwood to City Town Hall via Airport.

Current bus facilities are in close proximity to the Riverwood Station precinct, providing a convenient connectivity to the station via bus services. Bus shelters are typically provided for customers waiting to board bus services unless an awning is available.

Taxi facilities

A small, taxi rank loop on the south side of the station off Belmore Road exists with space to comfortably fit three vehicles. Raised marked pedestrian (zebra) crossings facilitate pedestrian movement and prevent disruption of the footpaths.

Kiss and ride facilities

There are no existing/formal kiss and ride facilities at Riverwood Station. During the site visit, informal kiss and ride vehicle movements were observed at the north-west end of the station along William Road.

Existing parking conditions

Georges River Council developed a car parking strategy in July 2018 which included capacity and occupancy assessments of the on-street and off-street parking facilities of its town centres, including Riverwood. The study found that:

- 80 per cent of surveyed spaces were on-street; 71 per cent of which were unrestricted at all times
- 85 per cent of the off-street spaces surveyed were 3P parking
- peak occupancy of all supply was around 68 per cent (weekday) and 59 per cent (weekend)
- the off-street car parking facilities to the north of the rail line were well utilised whilst the car parks south of the rail line have lower utilisation rate
- the Webb Street car park (north) site (i.e. development site) were surveyed with a capacity of 50 car parking spaces (3 hour time limited spaces), weekday occupancy of 62 per cent (Wednesday at 11.00am), and weekend occupancy of 78 per cent (Saturday at 11.00am)
- there is lower demand for all day parking (greater than seven hours) on the weekend compared to the weekday, confirming use of these spaces by commuters or local workers.

Existing commuter parking facilities were also considered during the initial design development phase of the Project by Futurerail in 2020, which identified a total of 109 spaces across three locations near Riverwood Station (Figure 6-1). The largest facility is located north west of Riverwood Station on William Road, comprising 65 spaces. Two smaller commuter parking

facilities are located east of Riverwood Station on Morotai Avenue (23 spaces) and Thurlow Street (21 spaces).

A site visit was undertaken in February 2020 to observe parking and traffic conditions near the station (Futurerail, 2020). The site visit observed all three commuter parking facilities at full capacity. The utilisation of on street unrestricted car parking was also observed at on Thurlow Street, Erskine Street, Littleton Street, Webb Street, Keppel Avenue, Short Avenue, William Road and Morotai Avenue (Figure 6-1). Approximately 180 to 210 cars were observed at overflow parking locations during the site visit.

Further details on existing parking conditions are provided in Section 3.4 of the TTIA.

Pedestrian network

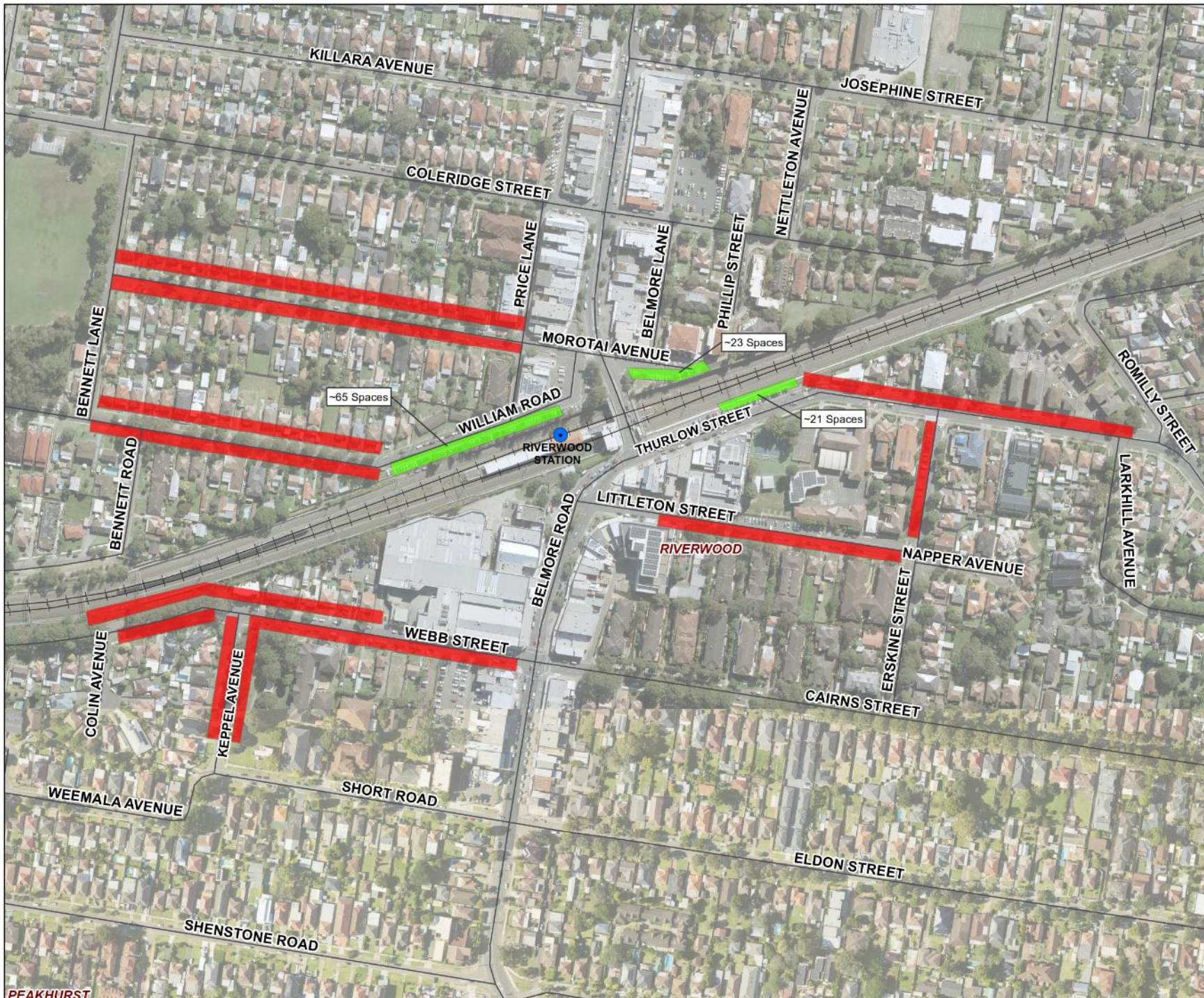
Being located within the vicinity of a town centre, the footpath network around Riverwood Station and at the proposed site is generally well established and available on both sides of the road. Footpaths within the town centre, including at the immediate boundaries of Riverwood Plaza are typically wide and paved from the boundary (building line) to the road kerb. Other locations, including on Webb Street, have narrow (typically 1.2 metres) footpaths throughout.

Currently, the site is also informally accessible via Riverwood Plaza via its main entry on Belmore Road, north of Webb Street and the loading dock access road which runs parallel with the rail line.

Bicycle network

There are currently no dedicated cycleways to access the bicycle parking at Riverwood Station, with a dedicated cycleway available on Webb Street only, between Salt Pan Creek and Turner Street. Access to the Riverwood town centre and station for cyclists would be on-road. Cycling in the study area generally appears to occur along Webb Street between Salt Pan Creek to Belmore Road and in north-south direction on Belmore Road.

Uncovered bicycle hoops were observed immediately north of Riverwood Station on William Street, and at the north-eastern corner of Thurlow Street/Belmore Road.



Legend

- Railway Station
- Roads
- Railway
- Observed overflow parking
- Current Commuter parking arrangements



0 40 80 m

Coordinate system: GDA2020 MGA Zone 56
 Scale ratio correct when printed at A3
 1:3,000 Date: 06-Jul-21

Data Sources: Imagery © Mapbox 2020

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6.1.2 Potential impacts

Traffic modelling scenarios

The following modelling scenarios have been included in the assessment to investigate the impacts of the Proposal during construction and operation.

1. Base 2021 (existing) – includes 2021 traffic counts to understand existing performance of the road networks. The intersections are modelled based on the existing 2021 layout.
2. Construction 2022 – includes background traffic growth and addition of construction vehicles to road network to understand impact of construction vehicles on the road network. The intersections are modelled based on the existing 2021 layout.
3. Future 2023 Base – includes background traffic growth with no changes to road network (i.e. no new commuter car parks) to understand impact of future traffic volumes. The intersections are modelled based on the existing 2021 layout.
4. Future 2023 Operational – includes background traffic growth and proposed traffic generated by commuter car parks to consider worst case option and understand impact of additional commuter traffic. The intersections are modelled based on the preferred design option.
5. Future 2033 Operational – adds 10 years of background traffic growth to Future 2023 Operational scenario to understand impact to network in 10 years. The intersections are modelled based on the preferred design option.

Construction impacts

Traffic impacts

Construction of the Proposal would cause a temporary increase in the number of vehicles travelling north-south along Belmore Road. Intersection modelling identified that the performance during AM and PM peaks would experience greater delays during construction compared to existing traffic performance. While the assessed intersections would not be at a failure point, they would likely experience greater delays, with predictions of up to 11 and 14 seconds in the AM and PM peaks, and increased queue lengths of up to an additional 80 metres, particularly at the Belmore Road/Thurlow Street intersection.

Construction traffic entering Webb Street from Belmore Road from the north approach right turn would also impact performance at this location during the AM peak. While the intersection would maintain an adequate performance through this scenario, there would be a temporary decline in performance during construction. Average delay would increase from 12 seconds to 27 seconds for the affected approaches with the existing Level of Service A becoming a Level of Service B during construction. Introducing construction traffic to this right turn is expected to create additional delays, although the overall performance is still considered to be acceptable.

During the PM peak, construction traffic exiting Webb Street via the left turn would impact the performance of the western leg of the intersection, with the remaining legs maintaining reasonable performance. Average delays for these movements would increase from 35 seconds to 42 seconds with the existing Level of Service C becoming a Level of Service D during construction.

Detailed intersection performance can be found in Appendix B of the TTIA.

Additional traffic impacts may occur as heavy vehicles would use Belmore Road as a haulage route from the M5 Motorway. Belmore Road is typically limited to light vehicles, buses and delivery/loading vehicles. Heavy vehicles may also occasionally use Henry Lawson Drive to the south however this would be limited and therefore have negligible traffic impacts.

A Construction Traffic Management Plan (CTMP) would be developed as part of the detailed design of the Proposal and would include haulage routes.

Train services

For most part, the construction activities of the car park would generally be contained within the site boundaries and the immediate vicinity of the site. As such, the construction of the Proposal would not have any impacts on trains services.

However, given that the site abuts the rail corridor, minor works (e.g. stormwater connection) may be required to be done within the rail corridor (subject to detailed design). Should they be required, these works would likely need to occur outside standard hours. Works would be undertaken at night or during routine rail possessions which are scheduled closures that would occur regardless of the Proposal when part of the rail network is temporarily closed, and trains are not operating.

Approval from Transport for NSW would be required for any out of hours work and the affected community would be notified accordingly prior to the undertaking of works.

Bus services

Bus services currently operate on Belmore Road and would unlikely be affected by the construction of the Proposal. For the worst-case scenario modelled, buses may experience some delays associated with construction traffic during the peak hours. These delays would likely not have a noticeable impact to the overall service performance, particularly outside of the peak hour, and with the north-south flow maintaining priority bus movements.

Taxi

The taxi rank on Belmore Road is not located near the Proposal site. As such, these facilities would not be impacted by the Proposal.

Parking impacts

During construction, temporary parking restrictions would be required at the frontage of the Proposal site for plant, equipment and construction vehicle access. This may impact up to around six existing on street parking spaces.

Parking for workers driving to the site would be assigned on Webb Street, west of Keppel Avenue and adjacent to the rail corridor, as depicted in Chapter 3. Construction workers would also be encouraged to take public transport to the site, where practicable.

Based on the site visit and car park occupancy survey undertaken for the Georges River Council car parking strategy, the proposed area assigned for construction workers parking currently has a moderate occupancy rate. Parking for construction workers would be temporary and is considered to result in a minor impact to existing parking requirements.

The CTMP would include management of construction worker parking and access during the construction period.

Pedestrian network impacts

Construction activities would generally be contained within the Proposal site. However, the footpath network would be subjected to minor impacts, particularly on Webb Street where vehicles would access the Proposal site for deliveries, and the driveways would be constructed.

The CTMP would consider movements and safety of pedestrians on Webb Street during and outside of the construction hours.

An accredited Traffic Controller would be present at the site access gate during work hours to manage pedestrian movements and site access.

Bicycle network impacts

As described previously, while Webb Street currently does not have a dedicated cycleway, it is used regularly by cyclists between Salt Pan Creek and Belmore Road.

The CTMP would include measures to ensure safe cycling. With the development of the CTMP, the impact of construction works to cycling activities is considered minor.

Road safety impacts

Heavy vehicles delivering plant and materials to the site would be within the current access regulation on Belmore Road and Webb Street, that allows General Access Vehicles up to 19 metres long. However, the haulage route would be through Riverwood town centre where pedestrian activity is high. To minimise the risk to pedestrians associated with heavy vehicle movements, a Vehicle Movement Plan (VMP) would be developed as part of the CTMP. This would inform drivers of the designated route, risks along the travel route and restricted time periods of travel through the town centre.

Delivery of large machinery would be undertaken outside of the peak periods of the existing road network and town centre to further minimise potential impacts to pedestrians, motorists, and nearby sensitive receivers.

Operational impacts

The following section describes the anticipated traffic impacts of the Proposal on the surrounding road network during operation. The traffic generation, distribution and performance of the assessed intersections are further discussed below. The adopted AM peak (7:30am–8:30am) aligns with Opal data (entries and exits) presented in Table 6-1 which shows that most entries occur between 7:00am–9:00am. We have assumed that the same is true for the PM, where the adopted 4:30pm–5:30pm peak matches station exits for the purposes of this assessment.

Traffic impacts

Traffic generation

The Proposal would provide approximately 140 car spaces. The total trip generation for the AM (assumed 40 per cent) and PM (assumed 30 per cent) peaks would be around 56 and 42 vehicles respectively. As identified in Section 3.2.3 of the TTIA, the total traffic generation for the existing at-grade car park and residential dwellings during the peak AM and PM hours is approximately 13 and 11 light vehicles respectively. These trips were removed from the Proposal trip generation to understand the net increase in overall trip generation for the site.

The total trip generation for the site would therefore be 43 light vehicles in the AM peak and 31 vehicles in the PM peak.

Intersection performance

Intersection performance for each of the future scenarios is detailed in Table 5.1 of the TTIA (WSP, 2021) with the Base 2021 scenario provided for comparison. AM and PM queue lengths along the western approach at the intersection of Belmore Road and Webb Street are up to around 25 metres and 95 metres respectively in these scenarios. Queueing is not predicted to impact access to the proposed car park which is around 120 metres west of the intersection, or access to the Riverwood Plaza car park, which is around 100 metres west of the intersection.

In summary, the key findings for each of the key intersections assessed are as follows:

- Thurlow Street/Belmore Road intersection:
 - there may be a reduction in the Level of Service experienced at this intersection due to the predicted background growth alone (background growth is traffic generated by increased population and/or density only). Based on average delay, performance of the intersection decreases from Level of Service D to Level of Service E in the AM peak and Level of Service E to Level of Service F during the PM peak
 - no clear difference between future 2023 Base and Operational scenarios indicating poor performance in Future 2023 Operational scenario is due to population growth, rather than traffic generated by the Proposal
 - the western approach performance would also worsen due to an increase in traffic travelling north-south on Belmore Road - preventing traffic on the western approach having sufficient green light periods. The intersection would most likely continue to operate near and eventually at capacity during both peaks until the Future Operational 2033 stage, at which point the increase in traffic due to population growth alone would cause major delays during the PM peak, projected to be up to 93 seconds.
- Belmore Road/Webb Street/Cairns Street intersection
 - no substantial changes in performance until the Future 2033 Operational scenario, supporting the finding that traffic growth impacts the network to a greater extent than traffic generated by the Proposal
 - good performance through all scenarios during both peaks
 - modelling shows that PM peak queue lengths of between 70 and 100 metres along Webb Street. Site observations support this with queue lengths not reaching the Proposal site, which is approximately 120 metres from the intersection.
- Belmore Road/Short Road/Eldon Street intersection
 - this intersection was observed to have poor performance. As observed on site, this intersection's proximity to the Belmore Road/Webb Street/Cairns Street signalised intersection enables east-west vehicles to take advantage of gaps in north-south traffic flow. Drivers along Belmore Road also tend to provide appropriate space for the incoming traffic to merge
 - performance at this intersection is anticipated to worsen across each scenario and peak.

Overall, the impacts to traffic due to the operation of the Proposal are considered to be minimal. The scenario modelling indicates that there would be negligible difference between the Future 2023 Base and Operational scenarios, indicating that there would be little impact on the existing traffic network from the 30 to 50 vehicles introduced by the Proposal during peak periods. A more notable impact would be that of the background traffic growth, assumed for the purposes of this modelling as 0.5 per cent per annum. By 2033, the general traffic growth would have reached a point where the network is likely to operate at capacity, requiring investigations into additional upgrades or improving overall efficiency.

The modelling and intersection performance indicates that traffic generated by the Proposal is not likely to be the primary reason for declining intersection performance across the assessed scenarios. Vehicles entering Webb Street from Belmore Road during the AM peak, as well as vehicles exiting Webb Street to Belmore Road during the PM peak, do not appear to impact performance significantly. Each of these movements' performance remains steady and reasonable. It appears that the future background growth would likely be the reason for declining intersection performance.

Public transport impacts

Bus services

The current bus operations and access arrangements are not proposed to change due to the Proposal. Bus services may experience increased traffic delays over time however these are mainly due to background traffic growth.

Taxi

The Proposal would not impact the taxi services as no changes are proposed to the operation or location of the tax rank.

Parking impacts

The Proposal would increase the existing car parking facilities by up to 140 spaces. This car park is expected to reduce on-street parking demand by commuters, which would relieve capacity for other uses, such as residential developments and activities in the Riverwood town centre. The 3-hour parking spaces which are present in the existing car park would not be reinstated as part of the Proposal.

Pedestrian network impacts

The walking route from Riverwood Station to the Proposal site is likely to be via Belmore Road (western footpath) and Webb Street (northern footpath). This is around 300 metres long on existing footpaths, which is wide and sheltered for most of the route (i.e. around Riverwood Plaza). Direct access between the Proposal and Riverwood Station behind Riverwood Plaza is not possible due to the use of the rear of the Riverwood Plaza as a loading dock.

Although not a formalised pedestrian route, customers travelling between the proposed car park and Riverwood Station could also walk through Riverwood Plaza, which would increase the pedestrian traffic for local businesses.

Customers walking between the Proposal site and Riverwood Station would have a positive impact in increasing pedestrian activities on Webb Street (improving passive surveillance) and for businesses along the route. The Proposal would also improve the footpath conditions immediately outside of the Proposal site.

Wayfinding signage would guide customers between the station and the Proposal site, as it is not visible from the station.

Bicycle network impacts

Cyclists on Webb Street may experience minor traffic impacts due to traffic generated by the Proposal, with the addition of a greater number of vehicles entering and exiting the proposed car park.

Road safety impacts

The Proposal would generate additional traffic with more cars entering and exiting Belmore Road and Webb Street to access the car park. This increase however is considered minor and with the unchanged configuration of the road network, is not envisaged to worsen the existing road safety issues in the area.

6.1.3 Mitigation measures

The following mitigation measures relating to traffic and transport impacts would be implemented.

- Prior to the commencement of construction, a Construction Traffic Management Plan (CTMP) would be prepared as part of the Construction Environmental Management Plan and would include at a minimum:
 - ensuring adequate road signage at construction work sites to inform motorists and pedestrians of the work site ahead to ensure that the risk of road accidents and disruption to surrounding land uses is minimised
 - maximising safety and accessibility for pedestrians and cyclists
 - ensuring adequate sight lines to allow for safe entry and exit from the site
 - ensuring access to railway stations, businesses, entertainment premises and residential properties (unless affected property owners have been consulted and appropriate alternative arrangements made)
 - managing impacts and changes to on and off-street parking and requirements for any temporary replacement provision
 - parking locations for construction workers away from stations and busy residential areas and details of how this will be monitored for compliance
 - routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses
 - details for relocating kiss and ride
 - taxi ranks and rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus/taxi operators. Particular provisions would also be considered for the accessibility impaired
 - measures to manage traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the TMP
 - preparing heavy vehicle access plans.
- Communication would be provided to the community and residents to inform them of changes to parking, pedestrian or cyclist access and/or traffic conditions including vehicle movements and anticipated effects on the local road network relating to site works.
- Road Occupancy Licences for temporary road closures would be obtained, where required.
- A Traffic Guidance Scheme (TGS), formerly Traffic Control Plan (TCP), is to be developed for construction vehicle access off Webb Street. TCP implementation will ensure adequate warning and guidance is provided to road users, thus minimising road related traffic impacts.

- A drive-through assessment or swept path analysis would be considered during detailed design to ensure that sufficient manoeuvring space is provided for the largest design vehicle along the proposed haulage routes.
- Suitable vehicle, pedestrian and cyclist paths would be maintained throughout the construction of the proposed upgrade to ensure safe and easy access throughout the interchange outside of the scheduled track possession periods.
- Suitable pedestrian provisions would be made to ensure that pedestrian connectivity between bus stops is not impacted as a part of the works and that suitable and safe paths are provided.
- Fencing and barriers would be installed between construction site and outside construction zone to ensure safe and easy navigation of pedestrians and cyclists.
- Staging any new DDA compliant ramps, lifts and stairs (including demolishing existing non-complaint path) would be undertaken to minimise the impacts to pedestrians and cyclists accessing the station from the proposed works.
- Detailed design would investigate locations to provide additional bicycle storage closer to the station entrance. Consultation with the relevant land owner would be undertaken to determine the final location (where feasible and reasonable).

Refer to Table 7-1 in Section 7.2 for a full list of proposed mitigation measures.

6.2 Urban design, landscape and visual amenity

A *Landscape Character and Visual Impact Assessment (LCVIA)* was undertaken by Iris Visual planning and design (Iris) for the Proposal (Iris, 2020). The findings of this assessment are summarised in this section. A site visit was carried out on 7 April 2021 to gain an understanding of the existing visual environment within the Proposal site and surrounds.

6.2.1 Existing environment

The Proposal site includes an existing at-grade car park, and three single storey detached residential properties on Webb Street. There is a residential property adjoining the western boundary of the Proposal site, which includes a two storey detached dwelling. There are three storey apartment buildings to the west of this property and also to the south of the site on Webb Street. Surrounding this to the south are predominantly low rise residential dwellings.

To the south west of the site the Keppel Avenue Reserve is located on Webb Street and extends south along Keppel Avenue. This park includes open lawn areas, mature trees, footpaths and a small playground.

The Riverwood Plaza shopping centre is located to the east of the Proposal site and extends to Belmore Road, the local commercial centre and main street of Riverwood. The shopping centre has a car park service entry facing Webb Street. This building has a bulky built form and presents a blank façade to Webb Street and the Proposal site.

The T8 rail corridor is located immediately to the north of the site, with Riverwood Station located to the north east of the site. The station is accessed via the Belmore Street overbridge. The station is serviced by three small linear commuter car parks, including two to the north of the rail corridor, along William Road and Morotai Avenue, and one to the south east of the station, along Thurlow Street.

A bus stop and taxi zone are located along Belmore Road, south of the station (refer to Figure 6-2). There are no existing/formal kiss and ride facilities at Riverwood Station. During the site visit, informal kiss and ride vehicle movements were observed to the north of the station on William Road.

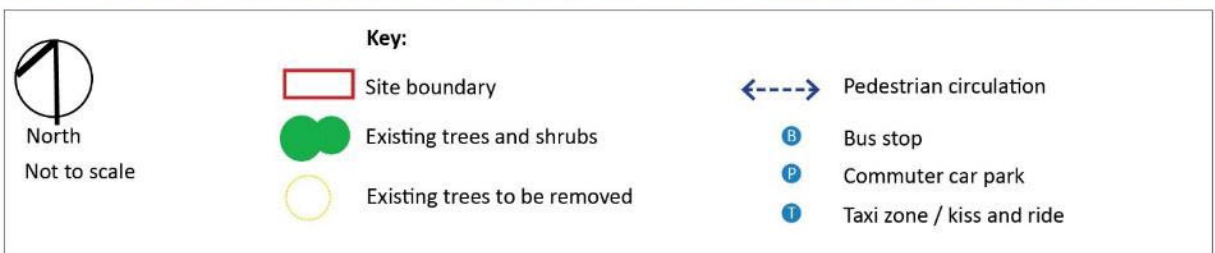


Figure 6-2 Landscape and visual features of the site

6.2.2 Potential impacts

The following viewpoints were selected to represent the range of views to the site and the Proposal:

- Viewpoint 1: View north west from Webb Street
- Viewpoint 2: View north east from Keppel Avenue Reserve
- Viewpoint 3: View east from corner of Webb Street and Keppel Avenue
- Viewpoint 4: View south west from William Road
- Viewpoint 5: View south west from Belmore Road overbridge.

The location of these viewpoints is shown on Figure 6-3, and an assessment of each viewpoint is summarised in the following sections.

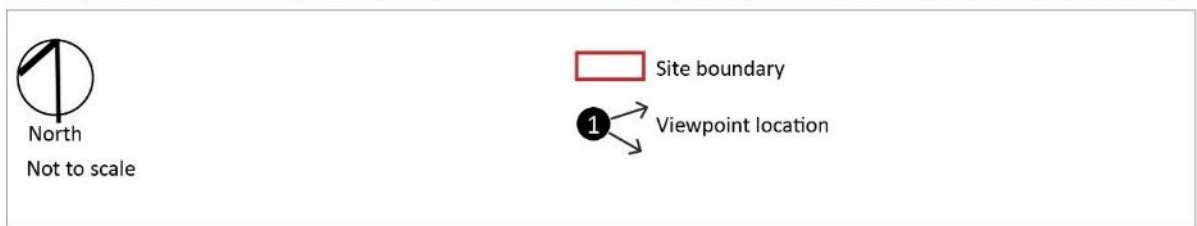


Figure 6-3 Viewpoint location plan

Construction phase

Views during the daytime

Table 6-2 summarises the daytime construction impacts assessed at each of the representative viewpoint locations.

Table 6-2 Assessment of visual impacts during construction of the Proposal

Viewpoint	Assessment of visual impact	Impact rating
Viewpoint 1 – View north west from Webb Street	<p>A construction site would be established on the site, in the middle ground of the view, beyond the Riverwood Plaza building. Three houses along Webb Street located within the site (centre of view) would be demolished to accommodate the Proposal. The site would be secured by temporary fencing, with hoarding erected along the fence line. Construction of the car parking structure would be visible rising above the site and construction vehicles would be seen accessing the site via Webb Street.</p> <p>The concrete walls of Riverwood Plaza would partially block views to the northern areas site. The two street trees beside the site along Webb Street are proposed be retained and would provide some screening and visual softening of the construction site.</p> <p>Overall, while the scale and intensity of construction would contrast with the leafy suburban character of the background of this view, it would have less contrast with the back of house areas of the Riverwood Plaza and not be substantially larger than what would be expected with the construction of medium density residential development for example.</p> <p>This would result in a moderate magnitude of change and a minor adverse visual impact to this view during construction. This impact would be for a short duration and temporary (up to 12 months during construction).</p>	Minor adverse
Viewpoint 2 – View north east from Keppel Avenue Reserve	<p>Three houses located in the middle ground of this view (centre of view) would be demolished and a construction site would be established in the centre of the view on the northern side of Webb Street, adjacent to the Riverwood Plaza building. The site would be secured by temporary fencing, with hoarding erected along the fence line. Construction of the upper levels of the car park would be visible above the fence line (and vehicles on Webb Street). Construction vehicles would also be seen accessing the site from the west via Webb Street. The two street trees beside the site (centre of view) along Webb Street would be retained and provide some screening of the construction site.</p> <p>Overall, while the scale and intensity of construction would contrast with the suburban character of the existing site in this view, it would have less contrast due to the existing back of house areas of the Riverwood Plaza and would not be substantially larger than what would be expected with the construction of medium density residential development in this location.</p> <p>This would result in a moderate magnitude of change and a minor adverse visual impact during construction. This impact would be for a short duration and temporary (up to 12 months during construction).</p>	Minor adverse

Viewpoint	Assessment of visual impact	Impact rating
Viewpoint 3 – View east from corner of Webb Street and Keppel Avenue	<p>A construction site would be established in the background of the view, in front of the Riverwood Plaza building, and would be partly screened by the existing street trees. The works would include the demolition of three houses along the north side of Webb Street which would be able to be glimpsed between the trees in this view.</p> <p>There would be site fencing and hoarding erected along the site boundary and construction vehicles would be seen accessing the site via the western end of Webb Street. Construction of the upper levels of the car park would be visible above the street trees.</p> <p>Overall, the existing vegetation would partially block views to the site. The works would be in the middle to background of the view and seen in the context of the rear of the existing shopping centre. This construction activity would not be substantially larger than what would be expected with the construction of medium density residential development in this location.</p> <p>This would result in a low magnitude of change and a negligible visual impact during construction. This impact would be for a short duration and temporary (up to 12 months during construction).</p>	Negligible
Viewpoint 4 – View south west from William Road	<p>The construction site would be established in the background of the view, to the west of the Riverwood Plaza building (right of view). From this location, the rail corridor embankment and trees along the rail corridor would partially block views to the site, particularly the ground level construction activity.</p> <p>Several trees within the site would be removed, including two mature Brush box (<i>Lophostemon confertus</i>) trees and several semi-mature Casuarina trees along the northern (centre of view) and eastern boundary of the site. Construction of the upper levels of the car park would be visible, rising above the hoarding.</p> <p>Overall, the construction works would not be prominent in this view as it would be partly obstructed by the intervening landform and filtered by the existing vegetation along the rail corridor. The works would be in the background of the view and seen in the context of the rear of the existing shopping centre. This would result in a low magnitude of change and a negligible visual impact during construction. This impact would be for a short duration and temporary (up to 12 months during construction).</p>	Negligible
Viewpoint 5 – View south west from Belmore Road overbridge	<p>The car park construction site would be set back from the rail corridor boundary fence, and mostly screened by the existing shopping centre building. Existing vegetation along the northern site boundary, including several Gum trees and Casuarina trees, would be retained and filter views to the northern areas of the construction site.</p> <p>The construction of the upper levels of the car park would be partly visible above the rail corridor, seen through this vegetation, fences, overhead wires and associated equipment, light posts, and in the context of trains approaching and departing the station.</p> <p>The openness of this view would be retained and foreground views to the heritage listed train station would remain. Overall, there would be a low magnitude of change and a negligible visual impact during construction.</p>	Negligible

Views at night

During construction, the Proposal site would be lit for security. However, it is unlikely that the site would be used on an ongoing basis for construction activity during evening hours.

Generally, the character of the construction works at night would be visually absorbed into the surrounding brightly lit environment.

This would result in a negligible magnitude of change and a negligible visual impact during construction.

Urban design and landscape impacts

The demolition of three dwellings and a car park would introduce intense construction activity and contrast with the leafy suburban character of the site and adjacent residential area of Riverwood. Several existing trees within the site would be removed during construction, reducing the leafy character of the site somewhat. However, the street trees would be retained, maintaining streetscape of Webb Street. Elsewhere, where possible, trees which overhang the site would be retained with some minor trimming if required.

The construction of the Proposal would require excavations. However, this landform modification would not appreciably impact upon the character of the adjacent streetscape.

Access to the existing car park would be removed. Temporary pedestrian access arrangements and footpath diversions would potentially reduce the legibility and accessibility along Webb Street, adjacent to the site. There would also be reduced amenity and comfort for pedestrians approaching Belmore Road from the east, particularly during demolition, earthworks and installation of concrete slabs, due to the use of large-scale machinery.

Overall, there would be a moderate magnitude of change to the landscape and urban design functionality of the Proposal site. This would result in a minor adverse landscape impact during construction. This would be a short term and temporary impact.

Operational phase

Views during the daytime

Table 6-3 summarises the daytime operational impacts assessed at each of the representative viewpoint locations.

Table 6-3 Assessment of visual impacts during operation of the Proposal

Viewpoint	Assessment of visual impact	Impact rating
Viewpoint 1 – View north west from Webb Street	<p>The new multi-level car park structure would be visible in the middle ground of this view, rising to around three storeys. The eastern end of the structure would be set down below street level, about two metres lower than the adjacent Riverwood Plaza building. The car park structure would replace views to the three detached dwellings fronting Webb Street. The mass and scale of the car park would provide a visual transition between the shopping centre and residential and unit development further west on Webb Street.</p> <p>The southern façade of the car park would be prominent in this view. Articulation of the façade would be achieved by a vertical louvre system or similar architectural screening device, using varying colours. This would reduce the visual bulk of the structure and provide some screening of the vehicles located within the structure.</p>	Minor adverse

Viewpoint	Assessment of visual impact	Impact rating
	<p>The vehicle access and egress locations would be seen in the centre of the view, offset from the existing trees. There would be garden areas (subject to detailed design) along Webb Street, softening views to the base of the structure.</p> <p>Overall, the building would be of a larger massing and scale than the existing residential buildings but provide a visual transition in built form along Webb Street. The height and scale of this development would also be consistent with the zoning and building height allowed in the draft Georges River LEP 2020 (R4 High Density Residential development up to 12 metres). The design of the building, including vertical louvres and landscaping, would somewhat reduce the visual bulk of the new parking structure. This would result in a moderate magnitude of change and a minor adverse visual impact.</p> <p>An artist impression of the Proposal during operation is provided in Figure 6-4.</p>	
<p>Viewpoint 2 – View north east from Keppel Avenue Reserve</p>	<p>The new car park structure would be visible in the middle ground of this view, rising to three storeys and mostly obstructing the view to the rear of the shopping centre. The car park structure would contrast in scale and height to the adjacent two storey detached dwelling at 18 Webb Street. While the structure would extend about 40 metres along Webb Street, creating a continuous architectural treatment with limited articulation, the façade treatment would incorporate vertical aluminium louvres in different colours to reduce the visual scale of the structure. This form would be seen adjacent to and replace the view to the visually bulky shopping centre, and several three storey residential apartments.</p> <p>The building would be partly screened by the existing street trees and trees located along the western side of the site. However, the southern façade would be prominent in this view with a simple form and continuous architectural treatment. Additional vehicles would be seen on Webb Street and accessing the proposed car park structure, adding additional movement and activity to this view.</p> <p>The building would have a scale and height that is consistent with the zoning and building height nominated in the draft Georges River LEP 2020 (currently zoned R3, however proposed to change to R4 High Density Residential development up to 12 metres high under draft Georges River LEP).</p> <p>Overall, while the architectural screening would assist in providing some visual interest and screen the vehicles within the parking structure, the length of the car park would increase the prominence of this structure. Due to the context of the existing shopping centre and medium density residential apartments, there would be a moderate magnitude of change and a minor adverse visual impact.</p> <p>A photomontage showing the Proposal during operation is provided in Figure 6-5.</p>	<p>Minor adverse</p>

Viewpoint	Assessment of visual impact	Impact rating
Viewpoint 3 – View east from corner of Webb Street and Keppel Avenue	<p>A construction site would be established in the background of the view, in front of the Riverwood Plaza building, and would be partly screened by the existing street trees. The works would include the demolition of three houses along the north side of Webb Street which would be able to be glimpsed between the trees in this view.</p> <p>There would be site fencing and hoarding erected along the site boundary and construction vehicles would be seen accessing the site via the western end of Webb Street. Construction of the upper levels of the car park would be visible above the street trees.</p> <p>Overall, the existing vegetation would partially block views to the site. The works would be in the middle to background of the view and seen in the context of the rear of the existing shopping centre. This construction activity would not be substantially larger than what would be expected with the construction of medium density residential development in this location.</p> <p>This would result in a low magnitude of change and a negligible visual impact during construction. This impact would be for a short duration and temporary (up to 12 months during construction).</p>	Negligible
Viewpoint 4 – View south west from William Road	<p>From this angle, the northern façade of the car park would be a large, architecturally screened structure, with only the upper levels visible.</p> <p>The building would not rise above the tree line and would be partly filtered and screened by the existing vegetation proposed to be retained.</p> <p>This structure would be seen at a distance of about 80 metres, in the context of the existing shopping centre, and with the rail corridor and trains seen in the foreground of view.</p> <p>Overall, the building would introduce additional built form element to this view, which would be lower in height than the existing shopping centre, set back from the rail corridor and be filtered by retained existing vegetation along the northern boundary of the site. The design of the building, including vertical louvres, and potential additional landscaping along the northern site boundary, would further reduce the visual scale of the car parking structure. There would be a low magnitude of change and a negligible visual impact.</p>	Negligible
Viewpoint 5 – View south west from Belmore Road overbridge	<p>The car park construction site would be set back from the rail corridor boundary fence, and mostly screened by the existing shopping centre building. Existing vegetation along the northern site boundary, including several Gum trees and Casuarina trees, would be retained and filter views to the northern areas of the construction site.</p> <p>The construction of the upper levels of the car park would be partly visible above the rail corridor, seen through this vegetation, fences, overhead wires and associated equipment, light posts, and in the context of trains approaching and departing the station.</p> <p>The openness of this view would be retained and foreground views to the heritage listed train station would remain. Overall, there would be a low magnitude of change and a negligible visual impact during construction.</p>	Negligible



Figure 6-4 Artist impression of Viewpoint 1 during operation



Figure 6-5 Photomontage of Viewpoint 2 during operation

Views at night

During operation, the multi-storey car park would have motion sensor lighting for use at night as required. The new structure would be seen within the context of the existing lighting at Riverview Plaza shopping centre, including the ground level car park, and streetlights along Webb Street. However, it would extend this brightly lit character closer to the residential areas to the west and south of the site.

It is likely that there would be some additional skyglow seen above the site and a direct view to additional light sources from the residential buildings to the north, west and south of the site. The car park would increase the height and intensity of the light along Webb Street, where there would currently be views to relatively low-level lighting from the single storey detached dwellings.

The lighting for the Proposal would use technologies to minimise light spill and skyglow (to be confirmed during detailed design). The design of barriers and louvres within the structure and on the façade, would also be designed to block vehicle headlights from within the structure.

Generally, the character of the proposed multi-storey car park at night would result in a moderate magnitude of change at night, resulting in a minor adverse visual impact at night during operation.

Urban design and landscape impacts

During operation, pedestrian access along Webb Street would be reinstated and there would be improvements to accessibility of the station precinct with the increased availability of commuter car parking. The trees and gardens removed during construction would be replaced with new landscaping where possible, (subject to detailed design).

Overall, during operation there would be a low magnitude of change to the landscape and urban design functionality of the Proposal site. This would result in a minor beneficial landscape impact during operation.

Potential for overshadowing

Tall structures have the potential to overshadow neighbouring properties and impact solar access, particularly in the winter months.

There is no specific guideline for solar access in the construction of car parks, so general reference has been made to the *Apartment Design Guide* that includes a minimum of two of hours of direct sunlight between 9am and 3pm in mid-winter for living rooms and private open space.

There is potential for the Proposal to overshadow the property located at 18 Webb Street. Overshadowing from the Proposal would occur during the winter months due to the car park structure and close proximity to the dwellings.

A summary of the potential impacts for the adjacent properties is provided below:

- properties to the west of the site
 - the new car parking structure would overshadow the dwelling at 18 Webb Street between 9.00am and 10.00am on the 21st of June, when the sun is at its lowest point in the sky. The property would however still achieve three hours of sunlight to the entire property between 9.00am and 3.00pm in mid-winter. There would not be a material overshadowing impact on the property at 18 Webb Street
- properties to the south of the site
 - the analysis shows that the shadow from the Proposal would not extend to the residences to the south of Webb Street. Therefore, there would be no overshadowing impact expected to the on the properties at 7-21, 15 and 13 Webb Street.

Shadow diagrams for mid-winter at hourly intervals from 9:00am to 3:00pm have been prepared for the Proposal and are shown in Figure 6-6.



21 June - 9am



21 June - 10am



21 June - 11am



21 June - 12 noon



21 June - 1pm



21 June - 2pm



21 June - 3pm

Figure 6-6 Overshadowing diagrams during winter, June 21, 9AM – 3PM

6.2.3 Mitigation measures

The following mitigation measures are recommended to be implemented to reduce the visual impacts of the Proposal:

- An Urban Design Plan and Landscaping Plan is to be submitted to TfNSW and endorsed by the Precincts and Urban Design team. The Urban Design Plan is to address the fundamental design principles as outlined in 'Around the Tracks' – urban design for heavy and light rail, TfNSW, Interim 2016. The Urban Design Plan and Landscaping Plan shall:
 - a) demonstrate a robust understanding of the site through a comprehensive site analysis to inform the design direction, demonstrate connectivity with street networks, transport modes, active transport options, and pedestrian distances
 - b) identify opportunities and challenges
 - c) establish site specific principles to guide and test design options
 - d) demonstrate how the preferred design option responds to the design principles established in 'Around the Tracks', including consideration of Crime Prevention through Environmental Design Principles

The Urban Design Plan and Landscaping Plan is to include the Public Domain Plan for the chosen option and will provide analysis of the:

- a) landscape design approach including design of pedestrian and bicycle pathways, street furniture, interchange facilities, new planting and opportunities for public art
- b) materials Schedule including materials and finishes for proposed built works, colour schemes, paving and lighting types for public domain, fencing and landscaping
- c) an Artist's Impression or Photomontage to communicate the proposed changes to the precinct

The following design guidelines are available to assist and inform the Urban Design Plan and Landscaping Plan for the Proposal:

- a) *TAP Urban Design Plan, Guidelines*, TfNSW, Draft 2018
- b) *Commuter Car Parks, urban design guidelines*, TfNSW, Interim 2017
- c) *Managing Heritage Issues in Rail Projects Guidelines*, TfNSW, Interim 2016
- d) *Creativity Guidelines for Transport Systems*, TfNSW, Interim 2016
- e) *Water Sensitive Urban Design Guidelines* for TfNSW Projects, 2016

Endorsement of the Urban Design Plan and Landscaping Plan will demonstrate compliance with the Conditions of Approval in the Review of Environmental Factors (REF) Determination Report.

The Urban Design Plan and Landscaping Plan shall be:

- i. prepared prior to concept design and finalised
- ii. Prepared in consultation with Local Council and relevant stakeholders
- iii. Prepared by a registered Architect and/or Landscape Architect.

- All permanent lighting would be designed and installed in accordance with the requirements of standards relevant to *AS4282 Control of the obtrusive effects of outdoor lighting* (2019).
- The detailed design of the Proposal would comply with Crime Prevention Through Environmental Design principles.
- Worksite compounds would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations.
- Temporary hoardings, barriers, traffic management and signage would be removed when no longer required.
- During construction, graffiti would be removed in accordance with TfNSW's Standard Requirements.
- Light spill from the construction area into adjacent visually sensitive properties would be minimised by directing construction lighting into the construction areas and ensuring the site is not over-lit. This includes the sensitive placement and specification of lighting to minimise any potential increase in light pollution.
- Finishes and materials for the car park would be complementary to the existing locality and landscape and reflective surfaces would be minimised with a preferred use of muted colours.
- The design of the car park would incorporate screening at each level to contain the break out of headlights to surrounding properties.
- Locate site equipment visual and facilities away from adjacent residential properties to minimise potential impact.
- Consult with Council for planting areas along the pathway between Belmore Road and the site to be refreshed and additional street trees to improve level of shade, streetscape amenity and comfort for pedestrians.
- A vegetated buffer would be planted on the western façade of the Proposed car parking structure to reduce visual impact (and radiant heat effects) on nearby residences.
- Liaise with neighbours to the west (18 Webb Street) to confirm landscape treatment within the garden area to the west of the site.
- Select a neutral colour scheme and finishes for the southern façade of light tones to reflect the natural light and be visually recessive when viewed against the sky.
- The louvres or architectural screen along the western and southern façade should be designed to screen cars and limit headlights from nearby residential properties, as well as provide texture and shadow to reduce the visual scale of the structure.

Refer to Table 7-1 in Section 7.2 for a full list of proposed mitigation measures.

6.3 Noise and vibration

A *Noise and Vibration Impact Assessment (NVIA)* report by WSP was prepared in June 2021, with results summarised below.

6.3.1 Existing environment

The area surrounding the Proposal is predominantly residential, except for the Riverwood Plaza shopping centre and associated facilities and Webb Reserve. The existing T8 rail corridor is also located directly to the north of the Proposal site. Residential receivers are located to the north (opposite the rail corridor), west and south of the Proposal.

Noise sensitive receivers surrounding the Proposal site are shown in Figure 6-7 and are identified as follows:

- R for residential
- P for passive recreation.

Receivers have been categorised into the Noise Catchment Areas (NCAs) shown in Figure 6-7 for the purposes of assessment.

Background and ambient noise levels were measured at representative receiver locations near the Proposal site to characterise the existing noise environment. Noise levels were measured using both attended and unattended noise monitoring surveys in accordance with the *Australian Standard 1055-1997- Acoustics-Description and Measurement of Environmental Noise (AS 1055)* and the *NSW Noise Policy for Industry (EPA, 2017)*. Noise monitoring locations are outlined in Table 6-4 and shown in Figure 6-7.

Table 6-4 Noise monitoring locations

Noise logger location identification	Address	Survey method	Date of survey
L1	3 Keppel Avenue	Attended monitoring	21 April 2021
		Unattended monitoring	21 to 30 April 2021
L2	13 Webb Street	Attended monitoring	21 April 2021
		Unattended monitoring	21 to 30 April 2021



Figure 6-7 Noise sensitive receivers, noise catchment areas and noise monitoring locations

An overview of unattended and attended noise monitoring results is provided in Table 6-5 and Table 6-6 respectively. Background levels at both locations were consistent and characterised by urban noise sources. Ambient noise levels were influenced by vehicle movements, airplane flyovers, train and truck movements, loading and unloading activities and birds.

Table 6-5 Unattended noise monitoring results

Location	Rating Background Level (RBL) dBA ¹			Ambient noise level L _{eq} dBA ²		
	Day ³	Evening ³	Night ³	Day ³	Evening ³	Night ³
L1	40	40	33	53	49	43
L2	50	44	38	57	54	49

¹ Rating Background Level (RBL), the 10th percentile min L_{A90} noise level recorded over all day, evening and night-time monitoring periods

² Ambient noise levels: the overall noise level over each assessment period (daytime/evening/night-time) as defined in the Noise Policy for Industry and Interim Construction Noise Guideline

³ Time periods defined as – Day: 7.00 am to 6.00 pm Monday to Saturday, 8am to 6pm Sunday; Evening: 6.00 pm to 10.00 pm; Night: 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday

Table 6-6 Attended noise monitoring results

Location	Monitoring start time	L _{eq} 15 min dBA ¹	L ₉₀ , 15 min dBA ²	L _{MAX} dBA ³
L1	12:24pm	48	38	71
L2	12:55pm	55	45	81

6.3.2 Potential impacts

Construction phase

Construction noise

The assessment and management of noise from construction works was completed using the NSW Interim Construction Noise Guideline (ICNG) (Department of Environment and Climate Change, 2000). The ICNG provided a framework to consider the impacts of construction noise on residences and other sensitive land uses and the recommended Noise Management Levels (NMLs) for construction. The application of the ICNG criteria to the Proposal is outlined in Table 6-7.

Table 6-7 ICNG recommended NMLs

Time of day	NML (L _{eq} , 15 minutes)	Application
Recommended standard hours: Monday to Friday 7:00am to 6:00pm Saturday 8:00am to 1:00pm	Noise affected RBL + 10dB	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured L _{Aeq,15min} is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to minimise noise. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.

Time of day	NML ($L_{eq, 15 \text{ minutes}}$)	Application
No work on Sundays or public holidays	Highly noise affected 75dBA	<p>The highly noise affected level represents the point above which there may be strong community reaction to noise.</p> <p>Where noise is above this level, the proponent should consider very carefully if there is any other feasible and reasonable way to reduce noise to below this level.</p> <p>If no quieter work method is feasible and reasonable, and the works proceed, the proponent should communicate with the impacted residents by clearly explaining the duration and noise level of the works, and by describing any respite periods that would be provided.</p>
Outside recommended standard hours	Noise affected RBL + 5dB	<p>A strong justification would typically be required for works outside the recommended standard hours.</p> <p>The proponent should apply all feasible and reasonable work practices to meet the noise affected level.</p> <p>Where all feasible and reasonable practices have been applied and noise is more than 5dBA above the noise affected level, the proponent should consult with the community.</p>

NMLs for construction activities were developed for the NCAs shown in Figure 6-7. The NMLs are informed by the ICNG recommendations in Table 6-7 and the Proposal-specific Rating Background Levels (RBLs) in Table 6-5. Separate NMLs were developed for residential and non-residential receivers during standard construction hours and out of hours periods. Out of hours periods were divided into the following categories:

- Period 1 (OOHW1): evening and/or low risk periods
 - Monday to Friday – 6.00pm to 10.00pm,
 - Saturday – 7:00am to 8:00am and 1:00pm to 10:00pm
 - Sunday and public holidays – 8:00am to 6:00pm.
- Period 2 (OOHW2): night and/or medium to high risk periods
 - Monday to Saturday – 10:00pm to 7:00am
 - Sunday and public holidays – 7:00am to 8:00am and 6:00pm to 7:00am.

Site-specific NMLs were developed to consider sleep disturbance impacts on residential receivers.

The NMLs for the Proposal are summarised in Table 6-8.

Table 6-8 NMLS for residential receivers

Receiver type	NML dBA $L_{eq,15MIN}$				Sleep disturbance criteria $L_{A1,1MIN}$ dBA RBL
	Standard hours	OOHW1	OOHW2	Highly noise affected	
Residential NCA1	60	50	43	75	47
Residential NCA2	50	45	38	75	40
Residential NCA3	60	50	43	75	47
Passive recreation	60 (external noise level) ¹				N/A
Commercial	70 (external noise level) ¹				N/A

Note 1 For non-residential receiver types, the NMLs only apply when the receiver is being used.

Construction noise impacts from the Proposal were assessed using computer modelling and considered factors including noise sources, receiver locations and the effect of local topography, atmosphere and built environment. The model assessed the following eight construction scenarios which correspond with the stages of construction for the Proposal:

- site preparation (S01)
- demolition / site clearing works (S02)
- site establishment / utilities works (S03)
- building and structural works (S04)
- architectural features/finishes (S05).
- precinct works (external to the bar park) (S06)
- testing and commissioning (S07)
- decommissioning (SC08).

Details of specific activities proposed at each construction scenario is included in Table 4.1 of the NVIA. The predicted maximum noise levels for each scenario and receiver are presented in Table 6-9.

Table 6-9 Maximum predicted construction noise levels and indicative exceedances per scenario

Receiver ID	NCA	Receiver type	Modelled maximum noise level per scenario at closest point to receiver, dBA $L_{eq,15min}$							
			S01	S02	S03	S04	S05	S06	S07	S08
R1	1	Residential	81	90 (84)	82	87	85	90 (84)	68	82
R2	1	Residential	71	80 (74)	72	77	75	80 (74)	58	72
R3	1	Residential	57	66 (60)	58	63	61	66 (60)	44	58
R4	1	Residential	73	82 (76)	74	79	77	82 (76)	60	74
R5	1	Residential	70	79 (73)	71	76	74	79 (73)	57	71
R6	1	Commercial	81	90 (84)	82	87	85	90 (84)	68	82
R7	2	Residential	58	67 (61)	59	64	62	67 (61)	45	59
R8	3	Residential	62	71 (65)	63	68	66	71 (65)	49	63
R9	3	Residential	62	71 (65)	63	68	66	71 (65)	49	63
R10	3	Residential	61	70 (64)	62	67	65	70 (64)	48	62
R11	3	Residential	61	70 (64)	62	67	65	70 (64)	48	62
R12	3	Residential	56	65 (59)	57	62	60	65 (59)	43	57

The orange shaded cells show exceedances of the standard-hours day period.

The cells with red text show exceedances of highly noise affected noise management levels.

Standard construction hours

The assessment indicates that noise levels are predicted to exceed relevant NMLs during at the nearest sensitive receivers in NCA1, NCA2 and NCA3 during all activities, with scenarios S02 (demolitions/site clearing works) and S06 (Precinct works – external to the car park) presenting the greatest impact to sensitive receivers.

Noise levels are predicted to result in exceedances of relevant criteria by up to 30dBA during scenarios S01 and S06, and 27dBA during scenario S04 (building and structural works). The closest residences to the construction works in NCA1 (R1, R2, R4 and R5) are predicted to be highly noise affected when works are at their closest during most scenarios.

For the nearest commercial receivers, noise levels are predicted to exceed relevant criteria in for all scenarios. Exceedances up to 20dBA are predicted in Scenarios S02 and S06, with up to 17dBA predicted during Scenario S04. However, it is noted that the substantial western façade and relatively insensitive land uses facing the Proposal (car park, loading docks) would reduce the impact of these predicted levels

Based on the assessment, noise impacts would be intrusive during standard hours at the nearest receivers to the works areas. It is noted that activities such as Scenarios SC01 (site preparation), SC02 (demolition/site cleaning works), SC03 (site establishment/utilities), SC06 (precinct works), SC07 (testing and commissioning) and SC08 (decommissioning of temporary facilities and site demobilisation) would be of relatively short duration (between one and 2 weeks).

Impacts from Scenario SC04 (Building and structural works) would occur over a period of around three months and are expected to result in noticeable noise impacts at the nearest sensitive receivers.

The assessment is conservative and assumes all equipment would be operating simultaneously at any point in the construction footprint in a worst case 15-minute period. In reality, noise impacts are likely to be lower than predicted as plant items may not be operating simultaneously at all times and would likely be operating at further distance from some receivers. Works are expected to take place intermittently over any construction period, so these exceedances would not be expected to occur continuously over the duration of the Proposal.

Where exceedances of the NML are anticipated, a combination of mitigation, management and consultation with receivers would be implemented to manage and minimise impacts.

Out of hours construction

Certain works may need to occur outside standard hours to maintain a safe work environment or to minimise impacts to operational transport infrastructure and services. Works outside standard hours would require approval from Transport for NSW for such works, and further assessment would be required.

Construction road traffic

The *NSW Road Noise Policy* (RNP) (EPA, 2013) provides guidance on the assessment of noise impacts from road traffic noise on sensitive receivers. The RNP provides noise criteria to traffic generated by construction activities on various road types by light and heavy vehicles. Where road traffic noise levels increase by more than 2dBA as a result of proposed construction traffic and the relevant RNP criteria are exceeded, investigation of mitigation options would be required.

Noise levels generated by construction vehicles are anticipated to comply with relevant road noise criteria during standard construction hours, with notable impacts anticipated during any out of hours works (where required). The mitigation and management measures outlined in section 6.3.3 would be implemented to manage and minimise these impacts, including the restriction of heavy vehicle movements to and from the site to standard hours where feasible.

Vibration

Section 7 of the *Construction Noise and Vibration Guideline* (Roads and Maritime Services, 2016) recommends safe working distances for achieving human comfort and cosmetic building damage criteria for a range of different plant and equipment.

The major potential sources of vibration from the proposed construction activities would be associated with pile boring, jackhammering and smooth drum (vibratory) roller equipment during scenarios S01, S02 and S03.

The construction footprint is located adjacent the nearest residential receiver (R1) and commercial receivers (R6). Vibratory rolling works may be undertaken within the safe working distances for cosmetic damage and human response. The mitigation and management measures outlined in Section 6.3.3 would be implemented to manage and minimise these impacts, including the scheduling of high-vibration work during less sensitive time periods where possible.

Vibration impacts are anticipated to be minimal for all other receivers. Remaining receivers would be located outside the safe working distance limits for cosmetic damage and human response.

Operational phase

Car park noise

The potential noise impacts associated with operation of the Proposal considered mechanical plant noise (such as rooftop lift motors) and vehicle operation noise (such as car parking and deliveries).

High level desktop calculations were completed based on the nearest offset distances to receivers, building configuration, construction components and shielding impacts. Predicted mechanical plant noise levels are expected to comply with the operational *Noise Policy for Industry* (EPA, 2017) noise criteria at all sensitive receivers.

Internal vehicle movements would result in minor exceedances of operational *Noise Policy for Industry* noise criteria at four residential receiver locations (R1, R2, R4 and R5). Impacts would be generally limited to evening and night-time periods only, during which times traffic is likely to be reduced from the modelled peak hour movements. However, it is likely that noise would still exceed the relevant trigger levels for noise mitigation at the nearest residences.

It is important that transmission paths between internal areas of the car park and the surrounding residences are considered during detailed design. Further, any changes to the construction of the facades would require further investigation of noise impact.

Occasional events such as horns or aggressive driving around the site may generate higher noise levels than those outlined above, however these are expected to be very infrequent and as such not result in significant sleep disturbance impacts.

To reduce operational noise impacts associated with the new car park, reasonable and feasible mitigation options would be considered during detailed design. Measures would include, but would not be limited to, inclusion of absorptive internal linings, and ramps, concrete surface finishes to avoid wheel squeal in all areas trafficable by vehicles, acoustic louvres and increased barrier heights.

Road traffic

The Proposal would result in a minor increase to road traffic noise on local roads around the Proposal site. Impacts would be associated with the peak hour usage of the proposed multi-storey car park and as a result of the proposed new car park entry and exit point on Webb Street. Noise levels are predicted to comply with the RNP noise criteria.

6.3.3 Mitigation measures

During detailed design consideration would be given to ensuring the car park design, including materials and finishes mitigates the potential for wheel squeal generated during operation of the car park.

Prior to commencement of works, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the ICNG (Department of Environment and Climate Change, 2009) and the *Construction Noise and Vibration Strategy* (Transport for NSW, 2019c). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.

The CNVMP would outline measures to reduce the noise impact from construction activities. Reasonable and feasible noise mitigation measures which would be considered include:

- regularly training workers and contractors (such as at the site induction and toolbox talks) on the importance of minimising noise emissions and how to use equipment in ways to minimise noise
- avoiding any unnecessary noise when carrying out manual operations and when operating plant
- ensuring spoil is placed and not dropped into awaiting trucks
- avoiding/limiting simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver where practicable
- switching off any equipment not in use for extended periods e.g. heavy vehicles engines would be switched off whilst being unloaded
- avoiding deliveries at night/evenings wherever practicable
- no idling of delivery trucks
- keeping truck drivers informed of designated vehicle routes, parking locations and acceptable delivery hours for the site
- minimising talking loudly; no swearing or unnecessary shouting, or loud stereos/radios onsite; no dropping of materials from height where practicable, no throwing of metal items and slamming of doors.

The CNVMP would include measures to reduce the construction noise and vibration impacts from mechanical activities. Reasonable and feasible noise mitigation options which would be considered, include:

- maximising the offset distance between noisy plant and adjacent sensitive receivers and determining safe working distances
- using the most suitable equipment necessary for the construction works at any one time
- directing noise-emitting plant away from sensitive receivers
- regularly inspecting and maintaining plant to avoid increased noise levels from rattling hatches, loose fittings etc

- using non-tonal reversing/movement alarms such as broadband (non-tonal) alarms or ambient noise-sensing alarms for all plant used regularly onsite (greater than one day), and for any out of hours works
- use of quieter and less vibration emitting construction methods where feasible and reasonable.

Work would generally be carried out during standard construction hours (i.e. 7.00am to 6.00pm Monday to Friday; 8.00am to 1.00pm Saturdays). Any work outside these hours may be undertaken if approved by Transport for NSW or authorised under the *Environmental Planning and Assessment (COVID-19 Development – Infrastructure Construction Work Days No. 2) Order 2020* (whilst the Order is in effect), and the community is notified prior to this work commencing. An Out of Hours Work application form would need to be prepared by the Contractor and submitted to the Transport for NSW Environment and Planning Manager for any work outside normal hours.

As per the *Construction Noise and Vibration Strategy* (Transport for NSW, 2019c), construction activities with special audible characteristics (high noise impact, intensive vibration, impulsive or tonal noise emissions) would be limited to standard hours, starting no earlier than 8am; and to continuous blocks not exceeding three hours each with a minimum respite from those activities and works of not less than one hour between each block, unless otherwise approved by Transport for NSW.

Work would be conducted behind temporary hoardings/screens wherever practicable. The installation of construction hoarding would take into consideration the location of residential receivers to ensure that 'line of sight' is broken, where feasible.

To avoid structural impacts as a result of vibration or direct contact with structures, the proposed works would be undertaken in accordance with the safe work distances outlined in the Noise and Vibration Assessment (WSP, 2021) and attended vibration monitoring or vibration trials would be undertaken where these distances are required to be challenged.

Vibration (other than from blasting) resulting from construction and received at any structure outside of the project would be managed in accordance with:

- for structural damage vibration – British Standard BS 7385-2:1993 *Evaluation and measurement for vibration in buildings Part 2* and German Standard DIN 4150: Part 3 – 1999: *Structural Vibration in Buildings: Effects on Structures*
- for human exposure to vibration the acceptable vibration – values set out in the *Environmental Noise Management Assessing Vibration: A Technical Guideline* (Department of Environment and Conservation, 2006) which includes British Standard BS 6472-2:1992 *Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)*.

Property conditions surveys would be completed prior to piling, excavation of bulk fill or any vibratory works including jack hammering and compaction for all buildings/structures/roads with a plan distance of 50 metres from the works and all heritage listed buildings and other sensitive structures within 150 metres of the works (unless otherwise determined following additional assessment they are not likely to be adversely affected).

To reduce operational noise impacts associated with the new car park, reasonable and feasible mitigation options would be considered during detailed design. Measures would include, but would not be limited to, inclusion of absorptive internal linings, sealed facades and ramps, concrete surface finishes to avoid wheel squeal in all areas trafficable by vehicles, acoustic louvres and increased barrier heights. The effectiveness of any treatments would be validated following construction by testing of offsite noise levels to confirm the effectiveness of the measures. If exceedances of NMLs remain, at property treatment would be implemented where reasonable and feasible (where agreed by the property owner).

Refer to Table 7-1 for a list of proposed mitigation measures.

6.4 Indigenous heritage

6.4.1 Existing environment

A basic search of the Aboriginal Heritage Information System (AHIMS) database was undertaken on 14 April 2020. An area within a 200 metre buffer around the Proposal site was searched in order to gain information on the archaeological context of the area, and to ascertain whether there are any previously recorded Aboriginal sites.

No Aboriginal sites have been recorded within or in the vicinity of the Proposal site, and the site is not located within a landscape feature likely to indicate the presence of Aboriginal objects in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (OEH, 2010).

The Proposal is located in an area that has been highly modified for the construction of the existing at-grade car, as well as significant development on adjacent land (including the construction of residential properties, the Riverwood Plaza, and the rail corridor). It is therefore considered unlikely that any Indigenous heritage items would be located in or in the vicinity of the Proposal site, due to this past history of disturbance.

Overall, the high level of disturbance due to construction of the existing at-grade car, as well as significant development on adjacent land would suggest that the archaeological potential of the area is low.

6.4.2 Potential impacts

Construction phase

Construction of the Proposal would involve excavation and other ground disturbance activities which have the potential to impact Indigenous sites, if present. Ground disturbing activities have the potential to impact Indigenous sites, if present. However, as no known Indigenous heritage items are located in the vicinity of the Proposal and no significant excavations are proposed, no impacts on Indigenous heritage are expected due to construction of the Proposal.

Operational phase

It is not expected that there would be any risks to Indigenous heritage from the operation of the Proposal.

6.4.3 Mitigation measures

The following mitigation measures are proposed with respect to potential Aboriginal heritage impacts:

- All construction staff would undergo an induction in the recognition of Aboriginal cultural heritage material. This training would include information such as the importance of Aboriginal cultural heritage material and places to the Aboriginal community, as well as the legal implications of removal, disturbance and damage to any Aboriginal cultural heritage material and sites.
- If unforeseen Indigenous objects are uncovered during construction, the procedures contained in Transport for NSW's *Unexpected Heritage Finds Guideline* (Transport for NSW, 2019d) would be followed, and works within the vicinity of the find would cease immediately. The Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Environment and Planning Manager so they

can assist in co-ordinating next steps which are likely to involve consultation with an Aboriginal heritage consultant, Heritage NSW and the Local Aboriginal Land Council.

If human remains are found, work would cease, the site secured and the NSW Police and Heritage NSW notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained prior to works recommencing at the location.

If changes are made to the Proposal that may result in impacts to areas not covered by this assessment, further assessment would be required. Refer to Table 7-1 in Section 7.2 for a full list of proposed mitigation measures.

6.5 Non-Indigenous heritage

6.5.1 Existing environment

A search of the following heritage databases was undertaken for the Proposal site on 14 April 2020:

- Commonwealth and National Heritage lists
- NSW State Heritage Register
- Railcorp Section 170 Heritage and Conservation Register
- Hurstville LEP 2012.

The desktop search identified no items listed on the Commonwealth or National Heritage List within the Proposal site or immediate surrounds. Two locally listed heritage items were identified within one kilometre of the Proposal site.

- The Riverwood Railway station group which is listed on the Transport Asset Holding Entity's s170 Heritage and Conservation register is located around 100 metres to the north east of the Proposal site.

The Riverwood Station has historical importance as a major public work completed as an unemployment relief project during the Great Depression, as a major transport hub of for the suburb of Riverwood since 1931, and for its relationship with the development of the areas.

The station contains aesthetic significance relating to the 1930's.

- The Salt Pan Creek Sewage Aqueduct, which is listed on the Hurstville LEP, and is located around 800 metres to the south west of the Proposal site.

Heritage items in the vicinity of the Proposal are shown on Figure 6-8.

6.5.2 Potential impacts

Construction phase

There are no heritage listed items within the Proposal site. As such, it is unlikely that the Proposal would result in a direct impact to any heritage listed items.

The Proposal site is visible from the Section 170 listed Riverwood Station and has the potential to have a visual impact on this item. Visual impacts have been assessed in Section 6.2 and it was concluded that the visual impacts of the Proposal would be of a low magnitude of change and a negligible visual impact during both construction and operation.

Indirect impacts on heritage listed buildings within the vicinity of the Proposal such as vibration impacts have the potential to occur during vibration intensive activities. Vibration impacts and

safe working distances are discussed further in Section 6.3 with no heritage items identified as being with the recommended minimum working distances for vibration intensive plant.



Legend

- Railway Station
- Roads
- Railway
- Proposal Site
- Existing at-grade car park
- Existing residential properties
- S170 Heritage - Riverwood Railway Station Group



Coordinate system: GDA2020 MGA Zone 56
 Scale ratio correct when printed at A3
 1:2,000 Date: 06-Jul-21

Data Sources: Imagery © Metromap 2020

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Operational phase

The operation of the Proposal is not considered to present any risks to non-Indigenous heritage.

6.5.3 Mitigation measures

Potential impacts to non-indigenous heritage would be managed through the implementation of the Construction Environmental Management Plan (CEMP) prepared by the Contractor that would map and protect nearby non-Indigenous heritage items and prescribe management measures to ensure these items are not affected.

Any unexpected archaeological deposits would be managed in accordance with relevant legislation and stop-work procedures to be prepared by the Contractor. Further archaeological work and/or consents would be obtained for archaeological deposits prior to works recommencing at the location, where required.

Refer to Table 7-1 in Section 7.2 for a full list of proposed mitigation measures.

6.6 Socio-economic impacts

6.6.1 Existing environment

Demographics

Riverwood contains a generally linear, mixed used town centre which predominantly extends along Belmore Road (both to the north and south of Riverwood Station).

A review of the 2016 Australian Bureau of Statistics (ABS) Census data was undertaken for Riverwood. Key demographics for the suburb included:

- Riverwood had a population of 12,103 and with a medium age of 39 years
- children aged 0-14 years made up 15.8 per cent of the population with people aged over 65 made up 17 per cent of the population
- of those reported being in the labour force, aged 15 years and over, 85 per cent were employed (full time or part time) with car being the predominant method of travel to work (47 per cent), train only (25.1 per cent) and a train bus combination of 3.2 per cent
- the suburb has a large proportion of people born overseas with 18.6 per cent identifying China as their place of birth, and 70.6 per cent identifying both parents being born overseas
- the percentage of households speaking English only at home was 31.8 per cent, with 15.3 per cent and 12.5 per cent speaking Mandarin and Cantonese respectively. Arabic, Greek and Vietnamese were also identified as the top language spoken at home
- housing in the suburb was predominantly a flat or apartment (46 per cent), and separate housing (39.8 per cent) with 52 per cent renting.

Land uses

The land near the proposal includes:

- a large commercial precinct surrounded by residential areas to the south, and east
- the main retail centre of Riverwood on Belmore Road, which includes essential services such as pharmacies, medical centres, banks, and restaurants
- typically, one to three storey residential housing and high-density apartments blocks with some areas of parkland present
- the T8 Railway line runs in an east-west alignment through Riverwood, dividing residential and commercial areas to the north and south
- two schools and one early childhood centre is located in Riverwood, the closest to the site being St Joseph Catholic Primary School around 400 metres to the west of the Proposal site
- Riverwood Plaza which is located directly adjacent to the Proposal site (to the east).

6.6.2 Potential impacts

Construction phase

The Proposal has the potential to impact residents, businesses, and commuters near the Proposal during construction due to the following:

- temporary loss of existing car parking spaces
- increased heavy-vehicle movements on the surrounding road network
- visual, and, noise and vibration impacts
- acquisition and permanent removal of three residential dwellings on the site (acquisition and removal to be under during the construction phase).

Construction activities would be predominantly confined to the Proposal site, although some footpath and road work is anticipated to occur outside these boundaries.

Construction would require the temporary closure of the existing at-grade car park at the Proposal site, resulting in the temporary loss of existing parking spaces. The potential disruption to parking may have an impact on commuters, however any impact would be temporary and minor in nature. Construction workers would be encouraged to park within the Proposal site or the wider precinct to avoid impacting on remaining commuter parking spaces.

Residents, businesses, Georges River Council and other relevant stakeholders would be notified of the proposed work, and where practicable, consulted about construction timing, alternative parking arrangements and any traffic management arrangements including detours if required.

Operational phase

Overall, the Proposal is expected to benefit the wider community by improving accessibility and providing additional parking spaces. The car park would increase the existing number of spaces associated with the existing at-grade car park, resulting in a net increase of around 96 additional parking spaces for commuters.

The Proposal would assist in encouraging the use of public transport by increasing car spaces, improving parking security and commuter accessibility. The new parking facility is expected to encourage more people to use public transport. As a result, it is expected that the Proposal would have a positive impact on existing nearby businesses.

It is also anticipated that, once operational, the provision of additional parking spaces would increase the number of vehicles operating within the immediate vicinity of the Proposal. However longer trips to major employment areas such as the CBD may be reduced through increased uptake of public transport.

6.6.3 Mitigation measures

Mitigation and management measures would be implemented to avoid, minimise or manage potential socio-economic impacts. These mitigation and management measures have been identified in Chapter 7.

Specific measures to manage impacts associated with traffic, noise, air quality and visual amenity are outlined in the following Sections:

- Traffic and transport – Section 6.1
- Urban design, landscape, and Visual amenity – Section 6.2
- Noise and Vibration – Section 6.3
- Air quality – Section 6.10.

Sustainability criteria for the Proposal would be established to encourage the Construction Contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal.

Impacts on the community would be managed through the implementation of a Community Liaison Management Plan (CLMP) before, during and after construction. This plan would be developed by the Contractor and Transport for NSW to identify stakeholders and consult with them as appropriate.

Communities would continue to be engaged with throughout the Proposal to be kept up to date, and a 24-hour contact would be available to contact with any questions or concerns. Where possible, feedback and input of stakeholders would be implemented into the Proposal.

Refer to Table 7-1 in Section 7.2 for a full list of proposed mitigation measures.

6.7 Biodiversity

6.7.1 Existing environment

The Proposal site currently consists of an existing at-grade car park and three existing residential properties. The car park contains several trees including two Brush Box (*Lophostemon confertus*), and a row of mature trees along the northern boundary adjacent to the rail corridor including a large gum tree and several Casuarina trees. The existing residential properties also include generally limited vegetation with some gardens, grassed areas and small planted trees and shrubs at the front and rear of the residences.

Photos of the typical vegetation present in the car park is shown in Figure 6-9 and Figure 6-10.

A search of the EPBC Act Protected Matters Search Tool and the NSW Department of Planning, Industry and Environment BioNet Atlas was undertaken on 20 May 2021 for a 500 metre buffer of the Proposal site.

The EPBC Act Protected Matters Search Tool report identified the following within the search area:

- six threatened ecological communities
- 42 threatened species
- 16 migratory species.

The search of the NSW BioNet Atlas identified no records of threatened species within the Proposal site. The potential for this species to occur on site is unlikely, due to the lack of suitable habitat and disturbed nature of the site.

The habitat connectivity of the Proposal site is considered to be low given the typically low level of vegetation across the site. The Proposal site is unlikely to provide habitat for native species.



Figure 6-9 Existing trees along the northern site boundary adjacent to the rail corridor



Figure 6-10 Brush Box trees within the existing car park

6.7.2 Potential impacts

Construction phase

Direct biodiversity impacts of the Proposal are predicted to be minimal due to the disturbed nature of vegetation in the Proposal site. The Proposal would require the removal of the existing planted landscaping surrounding the existing car park including a majority of the trees and understorey vegetation. Subject to the development of the detailed construction methodology, some trees such as the existing gum tree would be retained, where possible.

No impacts to remnant native vegetation or high-quality fauna habitat are predicted. The final extent of vegetation trimming and removal would be determined during detailed design and construction planning stages and would be minimised as far as practicable (such as the existing gum tree). Any trees that are found to require removal would be subject to offsetting in accordance with *Transport for NSW's Vegetation Offset Guide* (Transport for NSW, 2019a).

Landscaping would be further developed during detailed design and would aim to plant the offset species within the Proposal site. Planted species would include those representative of the region.

Indirect impacts, including dust generation, noise and light disturbance are predicted to be minimal. Construction activities, including truck movements to and from the site, also have the potential to spread weeds or pathogens.

Mitigation measures described in section 6.7.3 and listed in Table 7-1 would be implemented to manage potential impacts.

Operational phase

No threatened species, nor habitat suitable for threatened fauna are likely to be located within the Proposal site. Operational activities are not proposed to increase the risk to existing biodiversity.

6.7.3 Mitigation measures

The following mitigation measures relating to biodiversity would be implemented:

- Prior to construction, during detailed design, an arborist assessment report would be undertaken to provide an assessment of vegetation to be impacted by the Proposal.
- Construction of the Proposal would be undertaken in accordance with the *Transport for NSW Vegetation Management (Protection and Removal) Guideline* (Transport for NSW, 2018) and *Transport for NSW Fauna Management Guideline* (Transport for NSW, 2019).
- All workers would be provided with an environmental induction prior to commencing work onsite. This induction would include information on the protection measures to be implemented to protect vegetation, penalties for breaches and locations of areas of sensitivity.
- Disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal. Trees nominated to be removed for the Proposal would be clearly demarcated onsite prior to construction, to avoid unnecessary vegetation removal. Trees to be retained would be protected through temporary protection measures discussed below.
- Tree Protection Zones (TPZs) would be established around trees to be retained. Tree protection would be undertaken in line with AS 4970-2009 *Protection of Trees on Development Sites* and would include exclusion fencing of TPZs.

- In the event of any tree to be retained becoming damaged during construction, the Construction Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Environment and Planning Manager to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible.
- Should the detailed design or onsite works determine the need to remove or trim any additional trees, which have not been identified in the REF, the Construction Contractor would be required to complete Transport for NSW's Tree Removal Application Form and submit it to Transport for NSW for approval.
- For new landscaping works, mulching and watering would be undertaken until plants are established.
- Weed control measures, consistent with Transport for NSW's *Weed Management and Disposal Guideline* (Transport for NSW, 2015), would be developed and implemented as part of the CEMP to manage the potential dispersal and establishment of weeds during the construction phase of the project. This would include the management and disposal of weeds in accordance with the Biosecurity Act 2015. Additionally, plant and equipment would be cleaned prior to accessing the Proposal site.

Refer to Table 7-1 in Section 7.2 for a full list of proposed mitigation measures.

6.8 Contamination, landform, geology and soils

6.8.1 Existing environment

Topography and hydrology

The Proposal site generally flat with an elevation of around 15 metres Australian Height Datum (AHD).

The surrounding area consists of gently undulating topography from the lower areas around Salt Pan Creek (south west) to the elevated areas to the east of the proposal site. Salt Pan Creek is local located around 720 metres to the south west. All surface drainage from the site and surrounding area would travel through local stormwater drainage to Salt Pan Creek. Salt Pan Creek is a tributary of the Georges River which discharges into Botany Bay.

Soils

Riverwood is underlain by the Blacktown soil unit. This landscape comprises of gently undulating rises on Wianamatta Group shales. Ground slopes are generally less than five degrees. Silts and clays are the predominant soils in the landscape unit.

Due to the existing development and disturbed nature of the Proposal, fill materials can be anticipated on the site though the existing parking area and residential properties. The type, thickness and extent of fill materials is currently unknown.

Soil erodibility is expected to be generally moderate, but where there are highly dispersible soils there is the potential for higher erodibility. Erosion from water is generally considered to be moderate to high under significant flows. Poor soil drainage can also be expected in low lying, constrained areas. Localised areas of high shrink-swell potential may also be prevalent which impact on shallow foundations for structures.

Site geology

The site is underlain by Ashfield Shale, which comprises black to dark-grey shale and laminitic (interbedded/interlaminated sandstone and siltstone).

Acid sulfate soil risk

Acid Sulfate risk makes were viewed online (26 April 2021). The NSW government eSPADE database indicates that the site is outside areas mapped as having potential acid sulfate soil occurrence.

Contamination

A review of the NSW EPA's Contaminated Land Public Record and the PoEO Public Register indicated that the site is not listed as a contaminated site and has not been subject to regulation under the *Contaminated Land Management Act 1997*.

The review also indicated there are no sites recorded on the EPA contaminated site list within a 500-metre radius of the site. The nearest listed properties are in Padstow around 1.5 kilometres to the north west, beyond Salt Pan Creek.

Due to the existing development, and historic use as a parking area and as residential dwellings, there may be the potential for localised contaminants associated with vehicle leaks (such as hydrocarbons and heavy metals). These contaminates would be expected to be localised and minor in nature.

6.8.2 Potential impacts

Construction phase

The proposal would require the excavation of work for the installation of foundations and footings for a lift shaft within the car park. Other trenching or excavation may be required for footpath and road works, relocation of services, drainage works and minor tree removals.

Soil disturbance

Excavation and other earthworks such as trenching and stockpiling activities, if not adequately managed, could result in the following impacts:

- erosion of exposed soils and stockpiled materials
- dust generation from excavations
- increase in sediment loads entering storm water system and/or local runoff.

Such impacts can be a nuisance to the community, and lead to impacts to water quality and biodiversity through the introduction of sediment into local waterways. These impacts are expected to be minor in nature due to the limited level of ground disturbance required for the Proposal and the relatively flat topography of the proposal site.

Erosion risks can be managed through the implementation of standard measures as outlined in the *Managing urban Stormwater: Soils and Construction guidelines* (Landcom, 2004) (the Blue Book)

Contamination

Excavation of surface materials has the potential to expose contaminated materials. Due to the historic land use of a portion of the proposal site, as an existing car park, there is the potential to encounter contaminants associated with the parking of vehicles such as hydrocarbons and heavy metals from leaks and spills.

While these contaminants are not expected to be found in significant volumes, there is the risk that if not managed correctly could present a risk to the health of construction workers or the community. The exposure of contaminates could also pose an environmental risk if they were to enter nearby waterways or through stormwater infrastructure.

The demolition of existing residential properties also has the potential to identify potential asbestos containing materials. The presence of this material would be determined prior to commencement of construction and appropriate management measures implemented by the Contractor.

Operational phase

The operation of the Proposal would have no material change to geology, soils, hazardous materials or contamination.

An increased number of cars would be using the site during operation and as described in Section 6.9 below, stormwater would collect contaminants such as heavy metals or fuel left by vehicles using the car park, which could potentially be conveyed to the stormwater drainage infrastructure and the soil of the site. A proposed measure to mitigate this impact would be to redirect the stormwater captured through a stormwater quality improvement system before discharging into the local stormwater system. Options to implement this would be identified during detailed design.

6.8.3 Mitigation measures

The following mitigation measures are proposed with respect to the potential soil and contamination impacts.

- Prior to commencement of works, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the '*Blue Book*' *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004) and updated throughout construction so it remains relevant to the activities. The Erosion and Sediment Control Plan measures would be implemented prior to commencement of works and maintained throughout construction.
- Erosion and sediment control measures would be established prior to any clearing, grubbing and site establishment activities and would be maintained and regularly inspected (particularly following rainfall events) to ensure their ongoing functionality. Erosion and sediment control measures would be maintained and left in place until the works are complete and areas are stabilised.
- Vehicles and machinery would be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment would also be refuelled offsite, or in a designated refuelling area.
- All fuels, chemicals and hazardous liquids would be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards, EPA Guidelines and the Transport for NSW Chemical Storage and Spill Response Guidelines (Transport for NSW, 2015g).
- Adequate water quality and hazardous materials procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implemented in accordance with relevant EPA guidelines and the Transport for NSW Chemical Storage and Spill Response Guidelines (Transport for NSW, 2015g) during the construction phase. All staff would be made aware of the location of the spill kits and be trained in how to use the kits in the case of a spill.
- In the event of a pollution incident, works would cease in the immediate vicinity and the Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Environment and Planning Manager. The EPA would be notified by Transport for NSW if required, in accordance with Part 5.7 of the POEO Act.

- The CEMP (or separate Waste Management Plan, if necessary) must address waste management and would at a minimum:
 - to identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities
 - detail other onsite management practices such as keeping areas free of rubbish or specify controls and containment procedures for hazardous waste and asbestos waste
 - specify controls and containment procedures for hazardous waste and asbestos waste.
- An appropriate unexpected contamination finds protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. Procedures for handling asbestos containing materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal to be undertaken in accordance with SafeWork NSW requirements.
- All spoil to be removed from site would be tested to confirm the presence of any contamination. Any contaminated spoil would be disposed of at an appropriately licensed facility.
- All spoil and waste must be classified in accordance with the *Waste Classification Guidelines Part 1: Classifying waste* (EPA, 2014) prior to disposal.
- Any concrete washout would be established and maintained in accordance with the *Transport for NSW Concrete Washout Guideline – draft* (Transport for NSW, 2015) with details included in the CEMP and location marked on the Environmental Controls Map (ECM).

Refer to Table 7-1 in Section 7.2 for a full list of proposed mitigation measures.

6.9 Hydrology and water quality

6.9.1 Existing environment

The proposal is located in the Salt Pan Creek catchment. A tributary of the Georges River.

The topography of the site is relatively flat. The nearest mapped waterway, Salt Pan Creek is a tidal urban water way around 720 metres to the south west of the site. The waterways and waterbodies near the proposal site are shown on Figure 6-11.

Drainage from the Proposal site is expected to collect in onsite stormwater drainage systems, and travel to the west along the rail corridor, or Webb Street towards Salt Pan Creek.

Groundwater

A search of the Australian Groundwater explorer database (BOM, 2021) identified six registered groundwater bores within a 500 metre radius of the site. All groundwater bores are monitoring bores associated with a service station on the corner of Belmore Road and Shenstone Road around 320 metres to the south of the Proposal site.

While there is no site-specific groundwater data, based on the topography and location of nearby Salt Pan Creek, the inferred groundwater flow direction is to the west.

Flooding

Flood prone land identified in the Hurstville LEP 2012 is located 700 metres to the north west of the Proposal. The LEP shows the areas of flood prone land do not impact any areas of the Proposal site.

A review of the *Georges River Council – Overland flood study (2016)* indicated that the site is however located within the 100-year flood level and probable maximum flood (PMF) event and has the potential would be inundated by up to 1.0 metre of water during these events. This flood risk is generally confined to the existing car parking area of the Proposal, as shown by the PMF extent in Figure 6-11 (Georges River Council, Flood mapping, 2016).

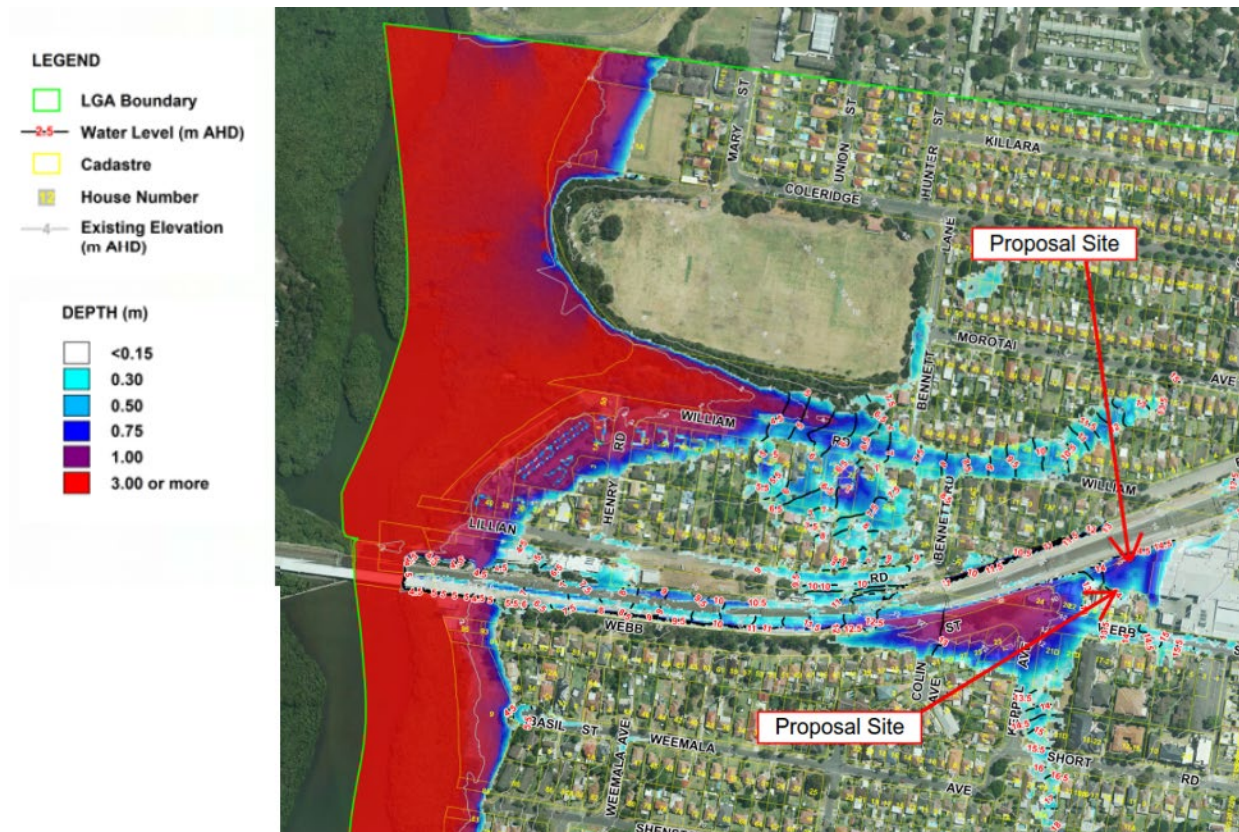


Figure 6-11 Probable maximum flood extent (Georges River Council, 2016)

6.9.2 Potential impacts

Construction phase

Without safeguards, pollution (fuels, chemical or wastewater from accidental spills, and sediment from excavations and stockpiles) could potentially enter stormwater drains and flow into nearby waterways. Activities that would disturb soil during construction work would have the potential to impact on local waterways as a result of erosion and sedimentation.

Additionally, while groundwater levels were not determined as part of this assessment, areas of excavation may need to be locally dewatered as a result of groundwater seepage or rainfall runoff. Incorrect dewatering may pose risks to nearby waterways where run-off travels from the site to these areas.

Operational phase

The Proposed multi-storey car park is anticipated to receive most of the rainfall on the top level. The capture of rainfall from the top level would be via downpipes discharging stormwater to the ground level of the site.

Stormwater and drainage infrastructure (including the on-site storage detention tank) would be designed in accordance with the relevant Transport for NSW and Sydney Water standards and requirements. Relevant standards and requirements from Georges River Council would also be considered. The implementation of these standards and recommendations is expected to ensure that the works do not adversely impact upon Council's drainage infrastructure.

The Proposal would result in a minor increase in impervious area on the site due to removal of small landscaped areas within the current at-grade park layout and the removal of existing landscaped or grassed areas in the existing residential properties along Webb Street. Therefore, the Proposal is unlikely to significantly impact upon Council's drainage infrastructure.

The stormwater from the Proposal would collect contaminants such as heavy metals or fuel left by vehicles using the car park, which could potentially be conveyed to nearby waterways. A proposed measure to mitigate this impact would be to redirect the stormwater captured through stormwater quality improvement systems before discharging into the local stormwater system.

The development is not required to comply with Georges River Council standards, however various water quality improvement devices and Water Sensitive Urban Design (WSUD) principles would be considered for the Proposal. Considerations include provision of gross pollutant traps for primary treatment of water and oil and sediment separating devices. The outcome of the integration of WSUD devices would be provided in the detailed design.

The potential operational flooding impacts would be further considered during the detailed design process. However, the design would ensure that existing flood levels for surrounding sensitive receivers for the 1 in 100 year average recurrence interval flood event would not increase (ie. zero afflux would result). Similarly, the final design would ensure that flood behaviour on adjacent sensitive receivers would not be adversely affected.

6.9.3 Mitigation measures

Mitigation measures for impact during construction such as erosion and sediment control and minimising potential spills are addressed in Section 6.8.

Mitigation measures with specific reference to hydrology and water quality not addressed in Section 6.8 include:

- A detailed flood impact assessment would be undertaken during detail design to confirm the potential changes to flooding risks of the area within the Proposal site, and surrounding properties which have the potential to be affected by changes in flood levels and behaviour as a result of the Proposal.
- Adequate measures are to be provided to ensure the proposal would any increase in existing flood impacts to surrounding areas/ residential properties, and minimise flood risks. The potential impacts of climate change on flooding shall be considered to ensure safe access and infrastructure is maintained.
- A process for preparing the site for flood events would be detailed in the CEMP and would be enacted if a flood warning is issued.
- Opportunities to employ WSUD principles would be investigated during development of detailed design of the Proposal, along with identification of options to reduce the runoff burden to the existing drainage system.

- The existing drainage system would remain operational though the construction phase.
- Should groundwater be encountered during excavation works, groundwater would be managed in accordance with the requirements of the *Waste Classification Guidelines* (EPA, 2014) and the *Transport for NSW Water Discharge and Reuse Guideline* (Transport for NSW, 2015b).

Refer to Table 7-1 in Section 7.2 for a full list of proposed mitigation measures.

6.10 Air quality

6.10.1 Existing environment

Regional air quality

The broader Sydney East monitoring region provides the most representative air quality monitoring results for Riverwood. The Sydney East region includes air quality monitoring sites at Macquarie Park, Chullora, Rozelle, Lindfield, Randwick and Earlwood. The closest monitoring sites to the Proposal site are Chullora and Earlwood however both of these sites are noted as non-conforming to the requirements of the Australian Standard AS/NZS 3580.

A search of the daily regional air quality index for the Sydney East region showed that the region generally experienced 'Good' air quality values with some outlying values of 'Poor' and 'Hazardous'. Poor and hazardous air quality was recorded in November 2019, December 2019 and parts of January 2020 due to smoke from widespread bushfires in NSW (DPIE, 2020).

A search of the National Pollutant Inventory (NPI) database 2019/20 data indicates there are a total of ten facilities reporting emissions within a 5-kilometre radius of the Proposal. Most of these sites are located to the north and north west of the proposal site adjacent and to the north of the South Western Motorway. The closest facility which has reported pollution is 1.5 kilometres away and is a chemical Manufacturing facility.

Based on a review of the existing land uses surrounding the Proposal, the existing air quality is characteristic of an urban environment, with notable construction and transport emission influences.

Air pollutant sources

Based on the land uses surrounding the Proposal, the existing air quality is likely to be characteristic of an urban environment. The predominant sources of localised air pollution are likely to be vehicle exhaust fumes and diesel locomotives.

Sensitive Receivers

Potentially affected receptors within the vicinity of the Proposal site include the following:

- users of the adjacent commercial and recreational areas
- residents
- pedestrians and commuter in the local area
- local workers at adjacent commercial areas.

6.10.2 Potential impacts

Construction phase

Potential air quality impacts during construction would be temporary and associated with dust particles and emissions of carbon monoxide, sulphur dioxide, particulate matter (PM₁₀), nitrous oxides, volatile organic compounds, and polycyclic aromatic hydrocarbons from the combustion of diesel fuel and petrol from construction plant and equipment.

Anticipated sources of dust and dust-generating activities include:

- demolition works associated with the existing residential buildings
- excavation for the new lift foundations
- other trenching or excavation for footpath and road works
- stockpiling activities
- dust generated from the loading and transfer of material from trucks
- other general construction works.

The Proposal would be likely to have minimal impact on air quality as it would not involve extensive excavation or other land disturbance with the potential to generate significant quantities of dust.

The operation of plant, machinery, and trucks, as well as construction traffic may also lead to increases in exhaust emissions in the local area however these impacts would be minor and generally short-term.

Operational phase

The increased capacity of the existing car park would increase the number of vehicles in the area, and local vehicle emissions are likely to increase. However, this increase in emissions is not likely to be noticeable and is not expected to have any major impacts on local air quality. The design of the Proposal would allow for ventilation and emissions are expected to disperse.

Overall, no major operational impacts related to air quality are anticipated as a result of the operation of the Proposal.

Additionally, as the Proposal would increase access to public transport, the use of public transport would be expected to increase and lead to a relative reduction in the amount of private vehicle related emissions in the long-term travelling within the wide region.

6.10.3 Mitigation measures

The following mitigation measure are proposed with respect to the potential air quality impacts.

- Air quality management and monitoring for the Proposal would be undertaken in accordance with *Transport for NSW Air Quality Management Guideline* (Transport for NSW, 2019).
- Methods for management of emissions would be incorporated into project inductions, training, and pre-start/toolbox talks.
- plant and machinery would be regularly checked and maintained in a proper and Efficient condition. Plant and machinery would be switched off when not in use, and not left idling.
- Vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable.

- To minimise the generation of dust from construction activities, the following measures would be implemented:
 - apply water (or alternate measures) to exposed surfaces (e.g. unpaved roads, stockpiles, hardstand areas and other exposed surfaces) cover stockpiles with geofabric or equivalent
 - cover stockpiles when not in use
 - appropriately cover loads on trucks transporting material to and from the proposal site and securely fix tailgates of road transport truck prior to loading and immediately after loading
 - prevent mud and dirt being tracked onto sealed road surfaces.

Refer to Table 7-1 in Section 7.2 for a full list of proposed mitigation measures.

6.11 Waste

Minimal waste is generated on the site as it is currently an at-grade car park. The waste generated includes personal waste from commuters using the car park.

During construction of the Proposal, the following waste materials would be generated:

- demolition waste from the removal of the exiting residential buildings (including potentially asbestos containing materials), footpath works, removal of brick fencing etc.
- asphalt and concrete
- surplus building materials
- excavated spoil
- building material waste (including metals, timber, plastic, packaging and fencing etc)
- electrical wiring and conduit
- hazardous chemical waste (i.e. fuels and oils)
- green waste
- general waste, including food scraps generated by construction workers.

Waste management would be undertaken in accordance with the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act). A Waste Management Plan would be prepared to identify all potential waste streams associated with the work and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities along with other onsite management practices such as keeping the area tidy and free of rubbish.

The handling, storage, transport and disposal of asbestos and hazardous waste (including any lead waste) would be in accordance with the requirements of relevant EPA and Safe Work NSW guidelines.

6.12 Sustainability

The design of the Proposal would be based on the principles of sustainability, including the incorporation of the *NSW Sustainable Design Guidelines – Version 4.0* (Transport for NSW, 2019b) and the Transport for NSW *Environmental Management System (EMS)*. These guidelines require a number of mandatory and discretionary initiatives to be applied (refer to Section 3.2.3 for more information regarding the application of these guidelines).

Further positive impacts in relation to climate change and sustainability associated with the Proposal include encouraging a reduction in private vehicle use and increase the accessibility of public transport services.

Refer to Table 7-1 in Section 7.2 for a full list of proposed mitigation measures.

6.13 Climate change

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

Climate change could lead to an increase in the intensity of rainfall events, whereby the expected rainfall 100-year average recurrence interval flood event can occur more frequently. Given the identification of the Proposal site within the 100-year flood level and PMF event, the detailed design of the Proposal would include consideration of potential mitigation strategies. The current design includes a proposed on-site storage detention tank which would be considered as part of this strategy.

Climate change could lead to an increase in frequency and severity in bushfires. The Proposal is not situated on land mapped as bush fire prone, but would be designed with appropriate fire protection measures.

The detailed design would consider the impacts of climate change on the Proposal through:

- a hydrological assessment would be undertaken to ensure that the proposed infrastructure would not increase the potential flooding within the Proposal site
- selection of materials for durability in extreme conditions and that minimise heat retention
- incorporate fire resistant/retarding materials wherever practicable
- incorporate engineering and design features to ensure structures are constructed to minimise direct impacts from severe storms and strong winds.

6.14 Greenhouse gas emissions

An increase in greenhouse gas emissions, primarily carbon dioxide, would be expected during construction of the Proposal due to exhaust emissions from construction machinery and vehicles transporting materials and personnel to and from site.

The detailed design process would undertake a compliant carbon foot printing exercise in accordance with Transport for NSW's *Carbon Estimate and Reporting Tool Manual* (Transport for NSW, 2019f) or other approved modelling tools. The carbon footprint would be used to inform decision making in design and construction.

Due to the small scale of the Proposal and the short-term temporary nature of the individual construction works, it is considered that greenhouse gas emissions resulting from the construction of the Proposal would be minimal. Furthermore, greenhouse gas emissions generated during construction would be kept to a minimum through the implementation of the standard mitigation measures detailed in Table 7-1.

It is anticipated that, once operational, the Proposal may result in an increase in use of public transport and a relative decrease in use of private motor vehicles by commuters to travel to and from Riverwood. A modal shift in transport usage may reduce the amount of fuel consumed by private motor vehicles with a corresponding relative reduction in associated greenhouse gas emissions in the local area.

Furthermore, solar panels would be incorporated into detailed design. By adopting solar panels, the operation of the car park would be less reliant on electricity from the existing electrical grid. This would therefore result in benefits including and not limited to:

- reducing the car park's demand for grid electricity during peak times and therefore result in reduced loads on the electricity network
- reducing the operations greenhouse gas emissions, consequently reducing the car park's carbon footprint and therefore contributing to the NSW's Governments net-zero emissions by 2050 target
- contributing to the decarbonisation of the electricity network as a result of any excess energy produced from solar being fed back into the local electricity grid
- reducing the heat load on the building's roof and in the building as a whole and contributing to lower summer temperatures at the car park, as a result of the shadowing from solar panels
- reducing the risk of exposure to escalating energy costs and carbon pricing in the future; as well as cost savings in grid electricity bills over the life of the car park.

The proposed solar panels may however have some visual impact to surrounding residents and other surrounding uses, however given the proposed height of the car park it is considered this would have a minimal impact and would be further considered through detailed design and the Urban Design Plan.

6.15 Cumulative impacts

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

The following searches were undertaken to assess the potential for cumulative impacts:

- A search of the DPIE Major Projects Register (5 May 2021) did not identify any projects with potential for cumulative impacts near the Proposal. The nearest proposed project was the Padstow Resource Recovery Facility (around 2.2 kilometres to the north west beyond the south Western Sydney Motorway). The project is for the development of a drilling mud processing plant with a capacity of 250,000 tonnes per annum at an existing resource recovery facility. Due to its location, and local characteristics, there is a low risk of any cumulative impacts with the Proposal.

- A review of the Sydney and Regional Joint Regional Planning Panel Development and Planning Register on 3 May 2021 did not identify any nearby projects in the Suburb of Riverwood.
- A review of the Georges River Council Development Application (DA) Register on 3 May 2021 identified the following DA's currently on display, recently submitted or which have been determined in the Riverwood suburb:
 - a dwelling construction around 1.1 kilometres to the east of the Proposal. The DA would not result in any cumulative impacts with the Proposal
 - development works at the Riverwood Glory football club including an amenities block, lighting amenities, kiosk, and the construction of a foreshore link at Salt Pan Creek. The DA is for the site around 440 metres to the north west of the proposal beyond the T8 Rail line and would not result in any cumulative impacts with the Proposal
 - a mixed-use development consisting of demolition of existing structures and construction of a mixed retail and residential development (including 66 parking spaces) at 279 Belmore Road Riverwood which was approved by the Land and Environment Court in April 2019.

During construction, consultation and liaison would occur with Georges River Council, RailCorp/Sydney Trains, Riverwood Development Company and any other developers identified, to minimise cumulative construction impacts such as traffic and noise.

Traffic associated with the construction Proposal is not anticipated to have a substantial impact on the operation of the existing road network. Operational traffic and transport impacts, associated with the Proposal, are not considered to have a substantial impact on the performance of the existing road network operation.

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

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

7 Environmental management

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

7.1 Environmental management plans

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

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

7.2 Mitigation measures

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

Table 7-1 Proposed mitigation measures

No.	Mitigation measure
General	
1.	A Construction Environmental Management Plan (CEMP) would be prepared by the Contractor in accordance with the relevant requirements of <i>Environmental Management Plan Guideline – Guideline for Infrastructure Projects</i> , NSW Department of Planning, Industry and Environment, 2020) for approval by Transport for NSW, prior to the commencement of construction and following any revisions made throughout construction.
2.	A project risk assessment including environmental aspects and impacts would be undertaken by the Contractor prior to the commencement of construction and documented as part of the CEMP.
3.	An Environmental Controls Map (ECM) would be developed by the Contractor in accordance with Transport for NSW's <i>Guide to Environmental Controls Map</i> (Transport for NSW, 2019g) for approval by Transport for NSW, prior to the commencement of construction and following any revisions made throughout construction.
4.	Prior to the commencement of construction, all contractors would be inducted on the key project environmental risks, procedures, mitigation measures and conditions of approval.
5.	Site inspections to monitor environmental compliance and performance would be undertaken during construction at appropriate intervals.
6.	Service relocation would be undertaken in consultation with the relevant authority. Contractors would mark existing services on the ECM to avoid direct impacts during construction.

No.	Mitigation measure
7.	Any modifications to the Proposal, if approved, would be subject to further assessment and approval by Transport for NSW. This assessment would need to demonstrate that any environmental impacts resulting from the modifications have been minimised.
Traffic and site access	
8.	<p>Prior to the commencement of construction, a Traffic Management Plan (TMP) would be prepared as part of the CEMP and would include at a minimum:</p> <ul style="list-style-type: none"> • ensuring adequate road signage at construction work sites to inform motorists and pedestrians of the work site ahead to ensure that the risk of road accidents and disruption to surrounding land uses is minimised • maximising safety and accessibility for pedestrians and cyclists • ensuring adequate sight lines to allow for safe entry and exit from the site • ensuring access to railway stations, businesses, entertainment premises and residential properties (unless affected property owners have been consulted and appropriate alternative arrangements made) • managing impacts and changes to on and off-street parking and requirements for any temporary replacement provision • parking locations for construction workers away from stations and busy residential areas and details of how this will be monitored for compliance • routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses • details for relocating kiss and ride • taxi ranks and rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus/taxi operators. Particular provisions would also be considered for the accessibility impaired • measures to manage traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the TMP • preparing heavy vehicle access plans. <p>Consultation with the relevant roads authorities would be undertaken during preparation of the construction TMP. The performance of all project traffic arrangements must be monitored during construction.</p>
9.	Communication would be provided to the community and local residents to inform them of changes to parking, pedestrian access and/or traffic conditions including vehicle movements and anticipated effects on the local road network relating to site works.
10.	Road Occupancy Licences for temporary road closures would be obtained, where required.
11.	A Traffic Guidance Scheme (TGS), formerly Traffic Control Plan (TCP), is to be developed for construction vehicle access off Webb Street. TCP implementation will ensure adequate warning and guidance is provided to road users, thus minimising road related traffic impacts.
12.	A drive-through assessment or swept path analysis would be considered during detailed design to ensure that sufficient manoeuvring space is provided for the largest design vehicle along the proposed haulage routes.
13.	Suitable vehicle, pedestrian and cyclist paths would be maintained throughout the construction of the proposed upgrade to ensure safe and easy access throughout the interchange outside of the scheduled track possession periods.

No.	Mitigation measure
14.	Suitable pedestrian provisions would be made to ensure that pedestrian connectivity between bus stops is not impacted as a part of the works and that suitable and safe paths are provided.
15.	Fencing and barriers would be installed between construction site and outside construction zone to ensure safe and easy navigation of pedestrians and cyclists.
16.	Staging any new DDA compliant ramps, lifts and stairs (including demolishing existing non-complaint path) would be undertaken to minimise the impacts to pedestrians and cyclists accessing the station from the proposed works.
17.	Detailed design would investigate locations to provide additional bicycle storage closer to the station entrance. Consultation with the relevant land owner would be undertaken to determine the final location (where feasible and reasonable).

Urban design, landscape and visual amenity

18. An Urban Design Plan and Landscaping Plan is to be submitted to TfNSW and endorsed by the Precincts and Urban Design team. The Urban Design Plan is to address the fundamental design principles as outlined in 'Around the Tracks' – urban design for heavy and light rail, TfNSW, Interim 2016. The Urban Design Plan and Landscaping Plan shall:

- a) Demonstrate a robust understanding of the site through a comprehensive site analysis to inform the design direction, demonstrate connectivity with street networks, transport modes, active transport options, and pedestrian distances
- b) Identify opportunities and challenges
- c) Establish site specific principles to guide and test design options
- d) Demonstrate how the preferred design option responds to the design principles established in 'Around the Tracks', including consideration of Crime Prevention through Environmental Design Principles

The Urban Design Plan and Landscaping Plan is to include the Public Domain Plan for the chosen option and will provide analysis of the:

- a) Landscape design approach including design of pedestrian and bicycle pathways, street furniture, interchange facilities, new planting and opportunities for public art
- b) Materials Schedule including materials and finishes for proposed built works, colour schemes, paving and lighting types for public domain, fencing and landscaping
- c) An Artist's Impression or Photomontage to communicate the proposed changes to the precinct

The following design guidelines are available to assist and inform the Urban Design Plan and Landscaping Plan for the Proposal:

- a) TAP Urban Design Plan, Guidelines, TfNSW, Draft 2018
- b) Commuter Car Parks, urban design guidelines, TfNSW, Interim 2017
- c) Managing Heritage Issues in Rail Projects Guidelines, TfNSW, Interim 2016
- d) Creativity Guidelines for Transport Systems, TfNSW, Interim 2016
- e) Water Sensitive Urban Design Guidelines for TfNSW Projects, 2016

Endorsement of the Urban Design Plan and Landscaping Plan will demonstrate compliance with the Conditions of Approval in the Review of Environmental Factors (REF) Determination Report

The Urban Design Plan and Landscaping Plan shall be:

- I. Prepared prior to concept design and finalised
- II. Prepared in consultation with Local Council and relevant stakeholders
- III. Prepared by a registered Architect and/or Landscape Architect

No.	Mitigation measure
19.	All permanent lighting would be designed and installed in accordance with the requirements of standards relevant to <i>AS 1158 Road Lighting</i> and <i>AS 4282 Controlling the Obtrusive Effects of Outdoor Lighting</i> .
20.	The detailed design of the Proposal would comply with Crime Prevention Through Environmental Design principles.
21.	Worksite compounds would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations.
22.	Temporary hoardings, barriers, traffic management and signage would be removed when no longer required.
23.	During construction, graffiti would be removed in accordance with Transport for NSW's Standard Requirements.
24.	Light spill from the construction area into adjacent visually sensitive properties would be minimised by directing construction lighting into the construction areas and ensuring the site is not over-lit. This includes the sensitive placement and specification of lighting to minimise any potential increase in light pollution.
25.	Finishes and materials for the car park would be complementary to the existing locality and landscape and reflective surfaces would be minimised with a preferred use of muted colours.
26.	The design of the car park would incorporate screening at each level to contain the break out of headlights to surrounding properties.
27.	Consult with Council for planting areas along the pathway between Belmore Road and the site to be refreshed and additional street trees to improve level of shade, streetscape amenity and comfort for pedestrians.
28.	A vegetated buffer would be planted on the western façade of the Proposed car parking structure to reduce visual impact (and radiant heat effects) on nearby residences.
29.	Liaise with neighbours to the west (18 Webb Street) to confirm landscape treatment within the garden area to the west of the site.
30.	Select a neutral colour scheme and finishes for the southern façade of light tones to reflect the natural light and be visually recessive when viewed against the sky.
31.	The louvres or architectural screen along the western and southern façade should be designed to screen cars and limit headlights from nearby residential properties, as well as provide texture and shadow to reduce the visual scale of the structure.
Noise and vibration	
32.	Prior to commencement of works, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the <i>Interim Construction Noise Guideline</i> (Department of Environment and Climate Change, 2009), <i>Construction Noise and Vibration Strategy</i> (Transport for NSW, 2019c) and the Noise and Vibration Impact Assessment for the Proposal (WSP, 2021). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.

No.	Mitigation measure
33.	<p>The CNVMP would outline measures to reduce the noise impact from construction activities. Reasonable and feasible noise mitigation measures which would be considered, include:</p> <ul style="list-style-type: none"> • regularly training workers and contractors (such as at the site induction and toolbox talks) on the importance of minimising noise emissions and how to use equipment in ways to minimise noise • avoiding any unnecessary noise when carrying out manual operations and when operating plant • ensuring spoil is placed and not dropped into awaiting trucks • avoiding/limiting simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver where practicable • switching off any equipment not in use for extended periods e.g. heavy vehicles engines would be switched off whilst being unloaded • avoiding deliveries at night/evenings wherever practicable • no idling of delivery trucks • keeping truck drivers informed of designated vehicle routes, parking locations and acceptable delivery hours for the site • minimising talking loudly; no swearing or unnecessary shouting, or loud stereos/radios onsite; no dropping of materials from height where practicable, no throwing of metal items and slamming of doors.
34.	<p>The CNVMP would include measures to reduce the construction noise and vibration impacts from mechanical activities. Reasonable and feasible noise mitigation options which would be considered, include:</p> <ul style="list-style-type: none"> • maximising the offset distance between noisy plant and adjacent sensitive receivers and determining safe working distances • using the most suitable equipment necessary for the construction works at any one time • directing noise-emitting plant away from sensitive receivers • regularly inspecting and maintaining plant to avoid increased noise levels from rattling hatches, loose fittings etc • using non-tonal reversing/movement alarms such as broadband (non-tonal) alarms or ambient noise-sensing alarms for all plant used regularly onsite (greater than one day), and for any out of hours works • use of quieter and less vibration emitting construction methods where feasible and reasonable.
35.	<p>Work would generally be carried out during standard construction hours (i.e. 7.00am to 6.00pm Monday to Friday; 8.00am to 1.00pm Saturdays). Any work outside these hours may be undertaken if approved by Transport for NSW or authorised under the <i>Environmental Planning and Assessment (COVID-19 Development – Infrastructure Construction Work Days No. 2) Order 2020</i> (whilst the Order is in effect), and the community is notified prior to this work commencing. An Out of Hours Work application form would need to be prepared by the Contractor and submitted to the Transport for NSW Environment and Planning Manager for any work outside normal hours.</p>
36.	<p>As per the <i>Construction Noise and Vibration Strategy</i> (Transport for NSW, 2019c), construction activities with special audible characteristics (high noise impact, intensive vibration, impulsive or tonal noise emissions) would be limited to standard hours, starting no earlier than 8am; and to continuous blocks not exceeding three hours each with a minimum respite from those activities and works of not less than one hour between each block, unless otherwise approved by Transport for NSW.</p>

No.	Mitigation measure
37.	Work would be conducted behind temporary hoardings/screens wherever practicable. The installation of construction hoarding would take into consideration the location of residential receivers to ensure that 'line of sight' is broken, where feasible.
38.	To avoid structural impacts as a result of vibration or direct contact with structures, the proposed works would be undertaken in accordance with the safe work distances outlined in the Noise and Vibration Assessment (WSP, 2021) and attended vibration monitoring or vibration trials would be undertaken where these distances are required to be challenged.
39.	<p>Vibration (other than from blasting) resulting from construction and received at any structure outside of the project would be managed in accordance with:</p> <ul style="list-style-type: none"> • for structural damage vibration –British Standard BS 7385-2:1993 Evaluation and measurement for vibration in buildings Part 2 and German Standard DIN 4150:Part 3 – 1999: Structural Vibration in Buildings: Effects on Structures • For human exposure to vibration the acceptable vibration – values set out in the <i>Environmental Noise Management Assessing Vibration: A Technical Guideline</i> (Department of Environment and Conservation, 2006) which includes British Standard BS 6472-2:1992 <i>Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)</i>.
40.	Property conditions surveys would be completed prior to piling, excavation of bulk fill or any vibratory works including jack hammering and compaction for all buildings/structures/roads with a plan distance of 50 metres from the works and all heritage listed buildings and other sensitive structures within 150 metres of the works (unless otherwise determined following additional assessment they are not likely to be adversely affected).
41.	To reduce operational noise impacts associated with the new car park, reasonable and feasible mitigation options would be considered during detailed design. Measures would include, but would not be limited to, inclusion of absorptive internal linings, sealed facades and ramps, concrete surface finishes to avoid wheel squeal in all areas trafficable by vehicles, acoustic louvres and increased barrier heights. The effectiveness of any treatments would be validated following construction by testing of offsite noise levels to confirm the effectiveness of the measures. If exceedances of NMLs remain, at property treatment would be implemented where reasonable and feasible (where agreed by the property owner).
Indigenous heritage	
42.	All construction staff would undergo an induction in the recognition of Indigenous cultural heritage material. This training would include information such as the importance of Indigenous cultural heritage material and places to the Indigenous community, as well as the legal implications of removal, disturbance and damage to any Indigenous cultural heritage material and sites.
43.	<p>If unforeseen Indigenous objects are uncovered during construction, the procedures contained in Transport for NSW's <i>Unexpected Heritage Finds Guideline</i> (Transport for NSW, 2019d) would be followed, and works within the vicinity of the find would cease immediately. The Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Environment and Planning Manager so they can assist in co-ordinating next steps which are likely to involve consultation with an Aboriginal heritage consultant, Heritage NSW and the Local Aboriginal Land Council.</p> <p>If human remains are found, work would cease, the site secured, and the NSW Police and Heritage NSW notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained prior to works recommencing at the location.</p>

No.	Mitigation measure
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Non-Indigenous heritage

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| 44. | A heritage induction would be provided to workers prior to construction, informing them of the location of known heritage items and guidelines to follow if unanticipated heritage items or deposits are located during construction. |
| 45. | In the event that any unanticipated archaeological deposits are identified within the project site during construction, the procedures contained in Transport for NSW's <i>Unexpected Heritage Finds Guideline</i> (Transport for NSW, 2019d) would be followed, and works within the vicinity of the find would cease immediately. The Contractor would immediately notify the Transport for NSW Project Manager and the Transport for NSW Environment and Planning Manager so they can assist in co-ordinating the next steps which are likely to involve consultation with an archaeologist and Heritage NSW. Where required, further archaeological work and/or consents would be obtained for any unanticipated archaeological deposits prior to works recommencing at the location. |

Socio-economic

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| 46. | Sustainability criteria for the Proposal would be established to encourage the Contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal. |
| 47. | Feedback through the submissions process would be encouraged to facilitate opportunities for the community and stakeholders to have input into the project, where practicable. |
| 48. | A Community Liaison Plan would be prepared prior to construction to identify all potential stakeholders and best practice methods for consultation with these groups during construction. The plan would also encourage feedback and facilitate opportunities for the community and stakeholders to have input into the project, where practicable. |
| 49. | Contact details for a 24-hour construction response line, Project Infoline and email address would be provided for ongoing stakeholder contact throughout the construction phase. |
| 50. | The community would be kept informed of construction progress, activities and impacts in accordance with the Community Liaison Plan to be developed prior to construction. |

Biodiversity

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| 51. | Prior to construction, during detailed design, an arborist assessment report would be undertaken to provide an assessment of vegetation to be impacted by the Proposal. |
| 52. | Construction of the Proposal must be undertaken in accordance with Transport for NSW's <i>Vegetation Management (Protection and Removal) Guideline</i> (Transport for NSW, 2019h) and Transport for NSW's <i>Fauna Management Guideline</i> (Transport for NSW, 2019i). |
| 53. | All workers would be provided with an environmental induction prior to commencing work onsite. This induction would include information on the protection measures to be implemented to protect vegetation, penalties for breaches and locations of areas of sensitivity. |
| 54. | Disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal. Trees nominated to be removed-would be clearly demarcated onsite prior to construction, to avoid unnecessary vegetation removal. Trees to be retained would be protected through temporary protection measures discussed below. |

No.	Mitigation measure
55.	Tree Protection Zones (TPZs) would be established around trees to be retained. Tree protection would be undertaken in line with AS 4970-2009 <i>Protection of Trees on Development Sites</i> and would include exclusion fencing of TPZs.
56.	In the event of any tree to be retained becoming damaged during construction, the Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Environment and Planning Manager to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible.
57.	Should the detailed design or onsite works determine the need to remove or trim any additional trees, which have not been identified in the REF, the Contractor would be required to complete Transport for NSW's Tree Removal Application Form and submit it to Transport for NSW for approval.
58.	For new landscaping works, mulching and watering would be undertaken until plants are established.
59.	Weed control measures, consistent with Transport for NSW's <i>Weed Management and Disposal Guideline</i> (Transport for NSW, 2019j), would be developed and implemented as part of the CEMP to manage the potential dispersal and establishment of weeds during the construction phase of the project. This would include the management and disposal of weeds in accordance with the <i>Biosecurity Act 2015</i> .
Soils and water	
60.	Prior to commencement of works, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the 'Blue Book' <i>Managing Urban Stormwater: Soils and Construction Guidelines</i> (Landcom, 2004) and updated throughout construction so it remains relevant to the activities. The Erosion and Sediment Control Plan measures would be implemented prior to commencement of works and maintained throughout construction.
61.	Erosion and sediment control measures would be established prior to any clearing, grubbing and site establishment activities and would be maintained and regularly inspected (particularly following rainfall events) to ensure their ongoing functionality. Erosion and sediment control measures would be maintained and left in place until the works are complete and areas are stabilised.
62.	Vehicles and machinery would be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment would also be refuelled offsite, or in a designated refuelling area.
63.	All fuels, chemicals and hazardous liquids would be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards, EPA Guidelines and Transport for NSW's <i>Chemical Storage and Spill Response Guidelines</i> (Transport for NSW, 2019k).
64.	Adequate water quality and hazardous materials procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implemented in accordance with relevant EPA guidelines and the Transport for NSW <i>Chemical Storage and Spill Response Guidelines</i> (Transport for NSW, 2019k) during the construction phase. All staff would be made aware of the location of the spill kits and be trained in how to use the kits in the case of a spill.

No.	Mitigation measure
65.	In the event of a pollution incident, works would cease in the immediate vicinity and the Contractor would immediately notify the Transport for NSW Project Manager and Transport for NSW Environment and Planning Manager. The EPA would be notified by Transport for NSW if required, in accordance with Part 5.7 of the POEO Act.
66.	The existing drainage systems would remain operational throughout the construction phase.
67.	Should groundwater be encountered during excavation works, groundwater would be managed in accordance with the requirements of the <i>Waste Classification Guidelines</i> (EPA, 2014) and Transport for NSW's <i>Water Discharge and Reuse Guideline</i> (Transport for NSW, 2019).
68.	A detailed flood impact assessment would be undertaken during detail design to confirm the potential changes to flooding risks of the area within the Proposal site, and surrounding properties which have the potential to be affected by changes in flood levels and behaviour as a result of the Proposal.
69.	Adequate measures are to be provided to ensure the proposal would any increase in existing flood impacts to surrounding areas / residential properties, and minimise flood risks. The potential impacts of climate change on flooding shall be considered to ensure safe access and infrastructure is maintained.
70.	A process for preparing the site for flood events would be detailed in the CEMP and would be enacted if a flood warning was issued.
71.	Opportunities to employ WSUD would be investigated during development of detailed design of the Proposal, along with identification of options to reduce the runoff burden to the existing drainage system.
72.	The existing drainage system would remain operational though the construction phase.
Air quality	
73.	Air quality management and monitoring for the Proposal would be undertaken in accordance with Transport for NSW's <i>Air Quality Management Guideline</i> (Transport for NSW, 2019e).
74.	Methods for management of emissions would be incorporated into project inductions, training and pre-start/toolbox talks.
75.	Plant and machinery would be regularly checked and maintained in a proper and efficient condition. Plant and machinery would be switched off when not in use, and not left idling.
76.	Vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable.
77.	<p>To minimise the generation of dust from construction activities, the following measures would be implemented:</p> <ul style="list-style-type: none"> • apply water (or alternate measures) to exposed surfaces (e.g. unpaved roads, stockpiles, hardstand areas and other exposed surfaces) • cover stockpiles when not in use • appropriately cover loads on trucks transporting material to and from the construction site and securely fix tailgates of road transport trucks prior to loading and immediately after unloading • prevent mud and dirt being tracked onto sealed road surfaces.

No.	Mitigation measure
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Waste and contamination

78. The CEMP (or separate Waste Management Plan, if necessary) must address waste management and would at a minimum:
- identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities
 - detail other onsite management practices such as keeping areas free of rubbish
 - specify controls and containment procedures for hazardous waste and asbestos waste
 - outline the reporting regime for collating construction waste data.

79. An appropriate Unexpected Finds Protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. Procedures for handling asbestos containing materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal to be undertaken in accordance with WorkCover requirements.

80. All spoil to be removed from site would be tested to confirm the presence of any contamination. Any contaminated spoil would be disposed of at an appropriately licensed facility.

81. All spoil and waste must be classified in accordance with the *Waste Classification Guidelines Part 1: Classifying waste* (EPA, 2014) prior to disposal.

82. Any concrete washout would be established and maintained in accordance with Transport for NSW's *Concrete Washout Guideline – draft* (Transport for NSW, 2019m) with details included in the CEMP and location marked on the ECM.

Sustainability, climate change and greenhouse gases

83. Detailed design of the Proposal would be undertaken in accordance with the *NSW Sustainable Design Guidelines – Version 4.0* (Transport for NSW, 2019b).

84. The detailed design process would undertake a compliant carbon footprinting exercise in accordance with Transport for NSW's *Carbon Estimate and Reporting Tool Manual* (Transport for NSW, 2019f) or other approved modelling tools. The carbon footprint would be used to inform decision making in design and construction.

85. The detailed design would consider the impacts of climate change on the Proposal through:
- a hydrological assessment would be undertaken to ensure that the proposed infrastructure would not increase the potential flooding within the Proposal site
 - selection of materials for durability in extreme conditions and that minimise heat retention
 - incorporate fire resistant/retarding materials wherever practicable
 - incorporate engineering and design features to ensure structures are constructed to minimise direct impacts from severe storms and strong winds.

Cumulative impacts

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

8 Conclusion

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

The Proposal would provide the following benefits:

- provision of additional commuter parking in close proximity to Riverwood Station encouraging improved opportunities to change modes of transport
- an increase in the accessibility and convenience to and from Riverwood Station, potentially increasing the use of public transport
- improvement of the customer experience by providing modern car parking facilities with weather protection and security features including lighting and CCTV cameras
- reduction in the need for commuters to park in local streets, potentially improving traffic and road safety.

The likely key impacts of the Proposal are as follows:

- acquisition and removal of three existing residential dwellings
- minor increases in local traffic movements during operation of the proposed car park
- temporary reduction in parking capacity within the existing car park, changes to access arrangements (including pedestrian diversions) and minor delays on the adjacent road network during construction
- temporary visual, noise and vibration and other amenity-related impacts during the construction period
- removal of some existing trees which would be replaced in accordance with the *Transport for NSW Vegetation Offset Guide* (Transport for NSW, 2019a).

This REF has considered and assessed these impacts in accordance with clause 228 of the EP&A Regulation and the requirements of the EPBC Act (refer to Chapter 6, Appendix A and Appendix B). Based on the assessment contained in this REF, it is considered that the Proposal is not likely to have a significant impact upon the environment or any threatened species, populations or communities. Accordingly, an EIS is not required, nor is the approval of the Minister for Planning and Public Spaces.

The Proposal would also take into account the principles of ESD and sustainability (refer to Section 3.2.3 and Section 4.3). These would be considered during the detailed design, construction and operational phases of the Proposal. This would ensure the Proposal is delivered to maximum benefit to the community, is cost effective and minimises any adverse impacts on the environment.

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Appendix A Consideration of matters of National Environmental Significance

The table below demonstrates Transport for NSW's consideration of the matters of NES under the EPBC Act to be considered in order to determine whether the Proposal should be referred to Commonwealth Department of the Environment.

Matters of NES	Impacts
<p>Any impact on a World Heritage property? The Proposal would not have an impact on any world heritage property.</p>	Nil
<p>Any impact on a National Heritage place? The Proposal would not have an impact on national heritage place.</p>	Nil
<p>Any impact on a wetland of international importance? The Proposal would not have an impact on any wetland of international importance.</p>	Nil
<p>Any impact on a listed threatened species or communities? It is unlikely that the development of the Proposal would significantly affect any listed threatened species or communities.</p>	Nil
<p>Any impacts on listed migratory species? It is unlikely that the development of the Proposal would significantly affect any listed migratory species.</p>	Nil
<p>Does the Proposal involve a nuclear action (including uranium mining)? The Proposal does not involve a nuclear action.</p>	Nil
<p>Any impact on a Commonwealth marine area? The proposal would not impact any commonwealth marine areas.</p>	Nil
<p>Does the Proposal involve development of coal seam gas and/or large coal mine that has the potential to impact on water resources? The Proposal does not involve the development of coal seam gas and or other large coal mine that has the potential to impact water resources.</p>	Nil
<p>Additionally, any impact (direct or indirect) on Commonwealth land? The Proposal is not located in or near any Commonwealth land.</p>	Nil

Appendix B Consideration of clause 228

The table below demonstrates Transport for NSW's consideration of the specific factors of clause 228 of the EP&A Regulation in determining whether the Proposal would have a significant impact on the environment.

Factor	Impacts
<p>(a) Any environmental impact on a community?</p> <p>There would be some temporary impacts to the community during construction, particularly in relation to noise, traffic, access and visual amenity. The temporary reduction of parking spaces at the existing car park would be an inconvenience to commuters. Mitigation measures outlined in Chapter 7 would be implemented to manage and minimise adverse impacts.</p>	Minor
<p>(b) Any transformation of a locality?</p> <p>The Proposal would change a new, dominant visible element within the immediate environment. However, given the existing surrounding development, in particular Riverwood Plaza, the changes is not anticipated to be substantial.</p> <p>The Proposal would have a positive contribution to the locality by helping to address the high demand for commuter car parking spaces. The Proposal also provides infrastructure that supports potential growth and provides improved public transport facilities.</p>	Minor
<p>(c) Any environmental impact on the ecosystem of the locality?</p> <p>Due to the removal of planted vegetation within the site, the Proposal would may a minor impact on the local ecosystem as discussed in Section 6.7. Vegetation removal would be subject to offsetting in accordance with the <i>Transport for NSW Vegetation Offset Guide</i> (Transport for NSW, 2019).</p>	Minor
<p>(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?</p> <p>Some short-term impacts during construction would be anticipated, particularly in relation to noise, traffic and access and visual amenity.</p> <p>There would be some minor to moderate impacts to visual amenity in particular for residents adjacent the Proposal site.</p> <p>The visual impacts from the Proposal are anticipated to generally be moderate for adjacent residents during operation. A landscape and visual impact assessment was completed and is summarised in Section 6.2.</p>	Minor to moderate
<p>(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?</p> <p>The Proposal site is not located in close proximity to any registered heritage items, and Aboriginal Heritage items are unlikely to be harmed by the Proposal. The visual impacts from the Proposal are anticipated to be minor to moderate.</p> <p>During operation the Proposal would have positive impacts to the community through providing a modern car park structure with improved access, lighting and safety measures (such as CCTV). The car park would be consistent with the form and scale of adjacent developments.</p>	Minor

Factor	Impacts
<p>(f) Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)?</p> <p>The impacts on the habitat of protected fauna is likely to be negligible (see Section 6.7). Vegetation removal would be required to facilitate the development of the Proposal and would be subject to offsetting in accordance with the <i>Transport for NSW Vegetation Offset Guide</i> (Transport for NSW, 2019).</p>	Negligible
<p>(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?</p> <p>The Proposal is unlikely to impact on or endanger existing species (see Section 6.7). Vegetation removal would be required to facilitate the development of the Proposal and would be subject to offsetting in accordance with the <i>Transport for NSW Vegetation Offset Guide</i> (Transport for NSW, 2019).</p>	Negligible
<p>(h) Any long-term effects on the environment?</p> <p>The Proposal is unlikely to have any long-term effects on the environment.</p>	Nil
<p>(i) Any degradation of the quality of the environment?</p> <p>The Proposal would result in the minor removal of vegetation. Impacts from the Proposal would be minimised by the implementation of the mitigation measures identified in Chapter 7.</p>	Negligible
<p>(j) Any risk to the safety of the environment?</p> <p>Construction of the Proposal would be managed in accordance with the mitigation measures outlined in this REF and a CEMP. The Proposal is unlikely to cause risks to the safety of the environment provided the recommended mitigation measures are implemented.</p>	Minor
<p>(k) Any reduction in the range of beneficial uses of the environment?</p> <p>The Proposal would remove the existing residential range of uses from the southern portion of the Proposal site. The impact on the range of uses on the northern portion would remain unchanged.</p>	Moderate
<p>(l) Any pollution of the environment?</p> <p>The Proposal is unlikely to cause any pollution to the environment provided the recommended mitigation measures are implemented.</p>	Minor
<p>(m) Any environmental problems associated with the disposal of waste?</p> <p>The Proposal is unlikely to cause any environmental problems associated with the disposal of waste. Subject to further investigation, the demolition of the existing residential dwellings on the site may include identification of asbestos containing materials.</p> <p>All waste would be managed and disposed of in accordance with the EPA <i>Waste Classification Guidelines</i> (EPA, 2014). Mitigation measures would be implemented to ensure waste is reduced, reused or recycled where practicable.</p>	Minor to (potential) moderate

Factor	Impacts
<p>(n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?</p> <p>The Proposal is unlikely increase demands on resources that are or are likely to become in short supply.</p>	Nil
<p>(o) Any cumulative environmental effect with other existing or likely future activities?</p> <p>The cumulative effects of the Proposal are described in Section 6.15. Where feasible, environmental management measures would be co-ordinated to reduce any cumulative construction impacts. The Proposal is unlikely to have any significant adverse long-term impacts.</p>	Negligible
<p>(p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?</p> <p>The Proposal is not located in the coastal zone and would not affect or be affected by any coastal processes or hazards.</p>	Nil