Transport for NSW

NSW GOVERNMENT

Supplementary Design Place and Movement Report

Parramatta Light Rail Stage 2

October 2023

PARRAMATTA LIGHT RAIL STAGE 2
DESIGN PLACE AND MOVEMENT SUPPLEMENTARY REPORT

TRANSPORT FOR NSW
SEPTEMBER 2023
FINAL

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ASPECT Studios

Welcome to Country

Welcome to galumban nura/gurad (sacred Country). This Country is where nattaigalo (fresh or sweet water) creeks flow into the tidal garigalo (saltwater) Country. Where these two diverse environments meet, the fertile wetlands and swamps of biddigalo (bitter or sour water) are created. This place is home to ancient, mangrove cathedrals, nestled in the safety of Dahl'wah (the casuarina) and the stories of our women.

For thousands of generations, this Country has been carefully protected in a reciprocal relationship with local Aboriginal peoples. In the spirit of connectedness that the Parramatta Light Rail embodies, we inclusively acknowledge all of the eora (local custodians) of this area including the D'harawal, Dharug, Eora, Gai-maragal, Gundungurra and Guri-Ngai peoples. We pay our respects to the Ancestors and Elders, past, present and emerging, and honour their unique Ancestral connections to Country, story and knowledge.

Country here has provided for these local communities in great abundance for countless generations. It will be through honouring the enduring spirit of Country as a provider, healer and vital connection to culture that we can create a future whereby many diverse communities can continue to prosper connected to, and united by, Country.

Ngeeyinee bulima nandiritah
(May you always see the beauty of this earth)

Shannon Foster

D'harawal eora Knowledge Keeper and
ORALA Registered Sydney Traditional Owner

Sun setting within the biddigalo (bitterwater) mangroves of the Parramatta River (credit: Bangawarra).

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List of acronyms and definitions

Acronym / Term	Meaning
ACHAR	Aboriginal Cultural Heritage Assessment Report
AHD	Australian Height Datum
ANZCTC	Australia-New Zealand Counter-Terrorism Committee
AS4970	Australian Standard 4970-2009 Protection of trees on development sites
BCA	Building Code of Australia
CBD	Central business district
CPTED	Crime Prevention Through Environmental Design
Definition Design	Design prepared for the EIS
DRP	Design Review Panel
DSAPT	Disability Standards for Accessible Public Transport
DPE	NSW Department of Planning and Environment
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EP&A Act	*Environmental Planning and Assessment Act 1979*
GANSW	Government Architect NSW
GPOP	Greater Parramatta to Olympic Peninsula
GSC	Greater Sydney Commission
HAT	Highest Astronomical Tide
IS	Infrastructure Sustainability
ISC	Infrastructure Sustainability Council
ISO	International Organization for Standardization
LAHD	Land and Housing Development
LCZ	Landscape character zone

Acronym / Term	Meaning
LRV	Light rail vehicle
NCC	National Construction Code
Scoping Design	Preliminary design for the project developed prior to the Definition Design
OHW	Overhead wires
ORALRA	Office of the Registrar Aboriginal Land Rights Act 1983
RAS	Royal Agricultural Society of NSW
SEARs	Secretary's Environmental Assessment Requirements
SDG	Sustainable Development Goals
SMW	Sydney Metro West
SOP	Sydney Olympic Park
SOPA	Sydney Olympic Park Authority
SPR	Strategic Planning and Review Department
The project	The Parramatta Light Rail Stage 2 Project
UHI	Urban heat island
UN	United Nations
Unforgetting	Unforgetting knowledges of Country are spatial and experiential ways of actively asserting the Ancestral and time immemorial knowledges of Country. Unforgetting is more than a process of remembering: where a feature of an individual or community's memory can be recalled, forgotten and later re-remembered. It is the process of revival and repetition, etching story and connection into physical reality and identity.
WSUD	Water sensitive urban design
WHO	World Health Organisation

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1.0 Introduction

1.1 Overview

1.1.1 Parramatta Light Rail

The NSW Government's Greater Sydney Region Plan *A Metropolis of Three Cities* (Greater Sydney Commission, 2018) outlines a vision for a three-city metropolis. The Central River City covers the four local government areas of the City of Parramatta, Blacktown City, Cumberland City and The Hills Shire. A Metropolis of Three Cities highlights Greater Parramatta as the focal point for the Central River City, with employment growth and public transport being of key importance.

The Greater Parramatta and the Olympic Peninsula area (GPOP), which extends from Westmead and Parramatta in the west to Sydney Olympic Park to the east, is fast emerging as the heart of Sydney's Central River City and is set to grow and change significantly over the next 20 years. Forecasts predict that GPOP will accommodate almost 170,000 new residents by 2041. Employment opportunities will also grow, with an additional 100,000 jobs predicted by 2041 (SGS, 2017).

Parramatta Light Rail will deliver an integrated light rail service that supports the population and employment growth expected throughout GPOP. It will integrate with existing and future modes of transport, including buses, trains, ferries and active transport (pedestrian and cycle networks), as well as Sydney Metro West services and the existing road network.

Parramatta Light Rail would be delivered in stages to keep pace with development:

- Stage 1 will connect Westmead to Carlingford via the Parramatta central business district (CBD) and Camellia. The construction and operation of Parramatta Light Rail Stage 1 was approved by the NSW Minister for Planning in May 2018. Major construction is underway with the track installation complete and light rail stop construction in progress. Stage 1 is expected to start operating in 2024. Further information on Stage 1 is available at Parramatta Light Rail.
- Transport for NSW is now proposing to construct and operate Stage 2 of Parramatta Light Rail ('the project'). Stage 2 would connect the Parramatta CBD and Stage 1 to Camellia, Rydalmere, Ermington, Melrose Park, Wentworth Point and Sydney Olympic Park.

Figure 1 provides an overview of Parramatta Light Rail showing both stages.

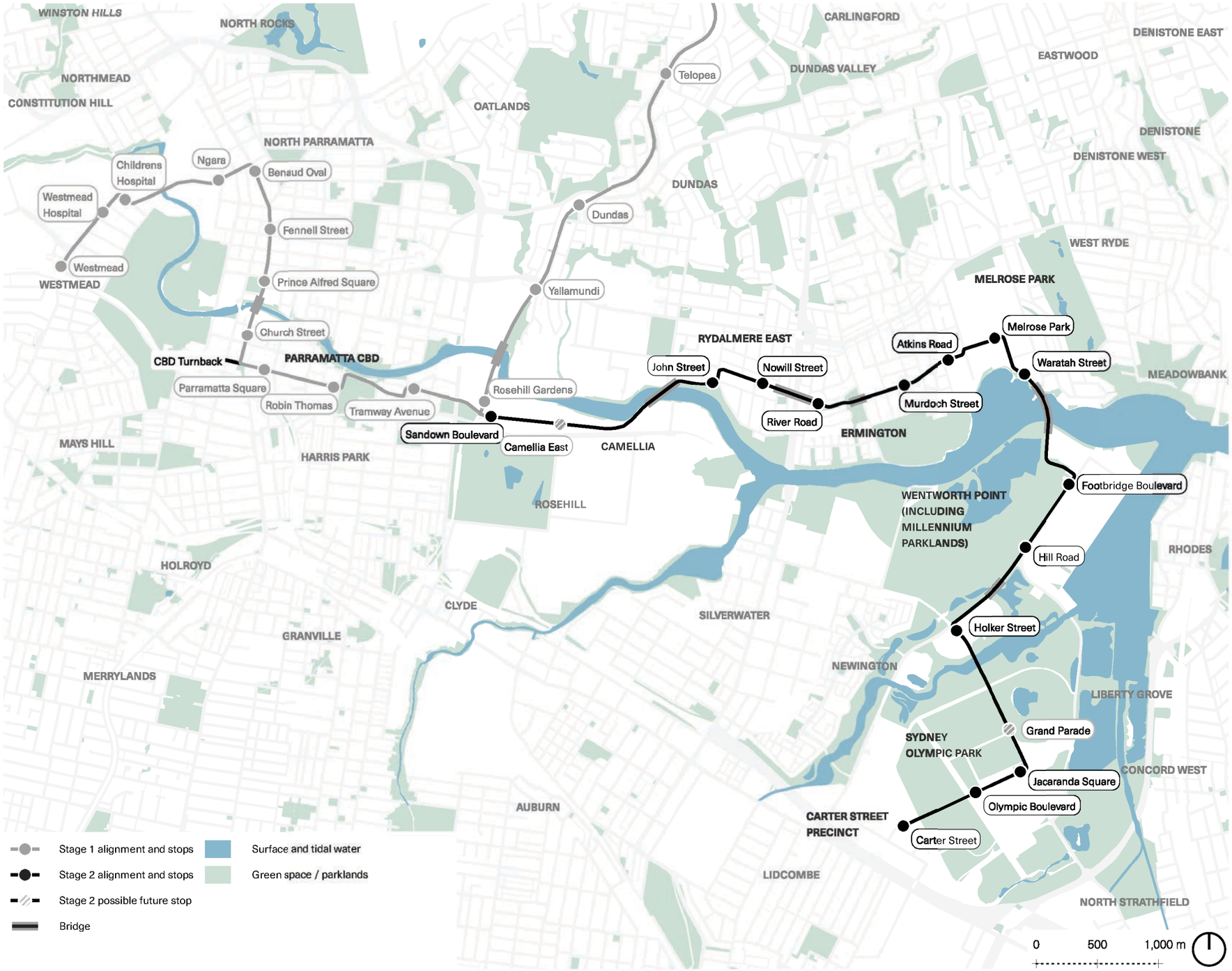

Figure 1: Parramatta Light Rail network.

1.2 Approval and assessment requirements

1.2.1 Approval requirements

The project is critical State significant infrastructure and is subject to approval by the NSW Minister for Planning under Part 5, Division 5.2 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act).

The project is also determined to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) and requires approval from the Australian Minister for the Environment and Water.

An environmental impact statement (EIS) was prepared to assess the potential impacts of the project, and to identify the management measures to address those impacts. The EIS was exhibited by the NSW Department of Planning and Environment from 9 November 2022 to 16 December 2022. The EIS was also prepared to support Transport for NSW's application for approval of the project under the EPBC Act.

The EIS was supported by a range of technical papers, which provided detailed assessments of the potential impacts of the project as they relate to the key environmental issues defined by the Secretary's environmental assessment requirements (SEARs). This included Technical Paper 1 (Design Place and Movement Report).

1.2.2 Responding to submissions and proposed amendments

During the exhibition period, stakeholders and members of the community were able to review the EIS, participate in consultation and engagement activities, and make a written submission to the Department of Planning and Environment for consideration in its assessment of the project.

Transport for NSW has prepared a submissions report to address the Planning Secretary's request to submit a response to the issues raised in submissions to the EIS during public exhibition and DPE's State Significant Infrastructure and State Significant Project Guidelines.

During and following public exhibition of the EIS, Transport for NSW has undertaken further investigations and is proposing a number of design amendments to the project. The aim of these amendments is to address issues raised during consultation and in submissions, and to minimise the potential impacts of the project.

A summary of the proposed amendments is provided in Table 1. Further information is provided in the amendment report.

In addition, refinements are proposed to the location of the substation at Atkins Road, and the cut and fill volumes generated during earthworks.

Table 1: Summary of amendments

Proposed amendment	Overview
1 Camellia foreshore to Rydalmere alignment and bridge	As described in section 5.4.2 and Appendix D of the EIS, investigation of an alternative alignment between Camellia and Rydalmere (the 'Camellia foreshore to Rydalmere option') was ongoing in parallel with development of the EIS. It is now proposed to amend the project to incorporate this alternative alignment of the light rail track, active transport link and bridge over the Parramatta River. The new alignment extends along the Sandown Line corridor in Camellia; however, instead of crossing south over to Grand Avenue, it continues along the Parramatta River foreshore in Camellia before extending across a new bridge structure and along the boundary of Eric Primrose Reserve in Rydalmere. The bridge design has been amended, and includes different pier arrangements in the river. It is also proposed to locate the light rail stop at John Street closer to Rydalmere Wharf.
2 Melrose Park to Wentworth Point bridge	The project as described in the EIS included a bridge located between the southern end of Wharf Road in Melrose Park and the northern end of Wentworth Point. It is proposed to amend the alignment and locate the bridge further to the west to avoid direct impacts to residential properties. The works would also include the removal of the high voltage transmission tower and relocation of wires with three new poles.
3 Bridge at Hill Road	The project as described in the EIS included retaining the Hill Road bridge in Sydney Olympic Park and providing a new bridge for light rail vehicles on the western side of the existing bridge. It is now proposed to remove the existing bridge at Hill Road and construct a new bridge, which would accommodate road traffic and light rail vehicles in an on-road (segregated) running corridor.

1.3 Project overview

The project comprises two main elements:

- construction of about 10 kilometres of light rail infrastructure between Camellia and the Carter Street precinct adjacent to Sydney Olympic Park
- operation of about 13 kilometres of light rail alignment between the Parramatta CBD and the Carter Street precinct, including a section of infrastructure constructed by Parramatta Light Rail Stage 1 between Camellia and the Parramatta CBD.

Further information on the location of the project, and a description of the project site for the purposes of this document, is provided in the amendment report.

1.3.1 Key features

The key features of the project (as amended), which are shown in Figure 2 include:

Light rail track and bridges

The project would deliver:

- a new 10 kilometre long dual light rail track, with 14 stops, between the Parramatta Light Rail Stage 1 line in Camellia and the Carter Street precinct adjacent to Sydney Olympic Park
- two bridges over the Parramatta River to allow the light rail line to cross between Camellia and Rydalmere, and between Melrose Park and Wentworth Point
- a bridge over Silverwater Road between Rydalmere and Ermington
- other bridge works in Ken Newman Park and Sydney Olympic Park.

Active and public transport integration

The project would also deliver:

- about 9.5 kilometres of new active transport links between Camellia and the Carter Street precinct, which would connect with the existing cycling and pedestrian network
- interchanges with other forms of public transport, including trains, ferries, buses and Sydney Metro West, with the main interchanges located in the Parramatta CBD, Rydalmere and Sydney Olympic Park
- a light rail and pedestrian zone (no through vehicle access) within Sydney Olympic Park along Dawn Fraser Avenue between Australia Avenue and Olympic Boulevard
- bus access over the proposed bridge between Melrose Park and Wentworth Point.

Other works

Works proposed to support the project's operation would include:

- turnback facilities, including along part of Macquarie Street in the Parramatta CBD and at the Atkins Road stop
- adjustments to the Parramatta Light Rail stabling and maintenance facility at Camellia
- five new traction power substations to convert electricity to a form suitable for use by light rail vehicles
- new and improved open spaces and recreation facilities at Eric Primrose Reserve, Ken Newman Park and the Atkins Road stop.

Further information on the project is provided in the updated project description chapters in Appendix A of the amendment report.

1.3.2 Operation

The project would operate between the Parramatta CBD and the Carter Street Precinct, using a section of the Parramatta Light Rail Stage 1 alignment and the alignment constructed as part of the project.

Between the Parramatta CBD and Camellia, the project would operate along about three kilometres of the Parramatta Light Rail Stage 1 alignment. Parramatta Light Rail Stage 2 services would terminate at the Stage 1 Parramatta Square stop to allow customers direct and convenient access to Parramatta's CBD, and interchange with Stage 1 light rail services, trains, buses and Sydney Metro West.

From Camellia, the project would operate along the light rail infrastructure proposed as part of Stage 2, terminating at the proposed Carter Street stop.

The project would operate as a turn-up-and-go light rail service from 5am to 1am, seven days a week, as for Parramatta Light Rail Stage 1. The project would have travel times of around 29 minutes from the Carter Street stop in Lidcombe to the proposed Sandown Boulevard stop in Camellia, and a further seven minutes from Camellia to the Parramatta Square stop in the Parramatta CBD.

Further information on the project's operation is provided in the amendment report.

1.3.3 Timing

It is anticipated that construction would start in 2025, subject to obtaining all necessary approvals, and the first passenger services are proposed to start from 2030/2031.

An indicative construction methodology is provided in the amendment report.

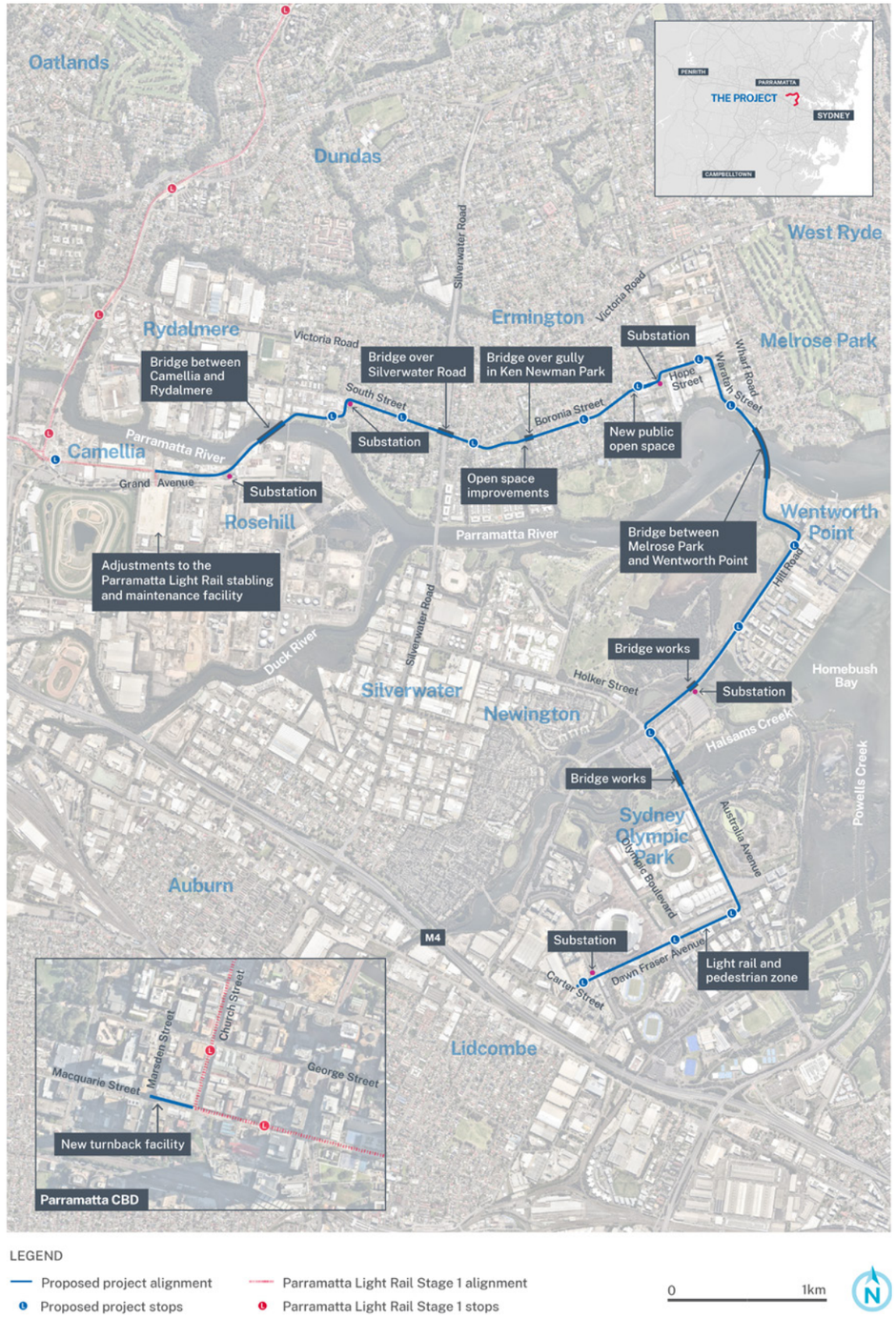

Figure 2: Parramatta Light Rail Stage 2 alignment and key features.

1.3.4 Purpose and scope of this report

Additional design development has been undertaken since exhibition of the EIS to further minimise impacts on the environment and community, to assist with responding to issues raised in submissions and during consultation, and to further progress commitments made in the EIS.

This report is a supplementary report to Technical Paper 1 (Design Place and Movement Report) that considers the following amendments and refinements, as they relate to design, place and movement:

- Camellia foreshore to Rydalmere alignment and bridge (amendment)
- Substation at Atkins Road stop (refinement)
- Melrose Park to Wentworth Point bridge (amendment)
- Bridge at Hill Road (amendment)

This report only addresses the above amendments and refinements. Other amendments and refinements to the project that have occurred since the EIS was exhibited would not change the design place and movement outcomes previously reported in Technical Paper 1 (Design Place and Movement).

This supplementary report should be read in conjunction with Technical Paper 1 (Design Place and Movement).

Table 2: Response to SEARs Key Issue 1

Requirement	Summary response	Reference within this report
2. Operational transport impacts, including:		
(e) the accessibility of each stop and the general vicinity of walking and cycling catchments	Accessibility to the John Street Stop has been updated in line with the Camellia foreshore to Rydalmere alignment and bridge amendment.	Section 3.1

Table 3: Response to SEARs Key Issue 2

Requirement	Summary response	Reference within this report
1. A design led process that is informed, collaborative and iterative, which:		
(a) utilises good design processes (such as Design Excellence and Design Review);	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-
(b) provides connectivity – active and public transport (at and to stops);	The responses provided within the EIS Technical paper 1 (Design Place and Movement Report) still apply to this requirement. The alignments of the bridges between Camellia and Rydalmere, and between Melrose Park and Wentworth Point and associated ATL's have been updated. Refer to Figure 16, Figure 17, and Figure 18.	Chapters 2-3
(c) retains and enhances existing and new views and vistas;	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-
(d) is designed with and connected to Country;	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-
(e) is designed with integration of cultural heritage, heritage interpretation and public art;	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-
(f) utilises design experts and multidisciplinary teams;	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-
(g) demonstrates how design integrity will be maintained in subsequent stages of the assessment process; and	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-
(h) involves the community, user groups and other stakeholders.	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-
2. Identify place principles that reflect the design objectives in Better Placed, including a focus on:		
(a) fit – contextually, culturally, local and of its place;	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-
(b) performance – sustainable, adaptable and durable;		
(c) community – inclusive, welcoming, connected, accessible and diverse;		
(d) people – safe, comfortable and liveable and healthy (such as crime prevention through environmental design);		
(e) working – functional, efficient and fit for purpose;		
(f) value – creating and adding value		
(g) look and feel – engaging, inviting and attractive.		

Requirement	Summary response	Reference within this report
3. Include and illustrate place designs, outcomes and actions that protect and facilitate improvements to the built environment and place, including in relation to:		
(a) built form (including key project elements and amenity impacts on the surrounding environment);	The response to this requirement provided within the EIS Technical Paper 1 (Design Place and Movement Report) still applies. However, the alignments of the bridge between Camellia and Rydalmere and bridge between Melrose Park and Wentworth Point have been amended.	Section 3.1.2 Section 3.4.1
(b) public space (including public open space, and how that space has been maximised and protected, access to and the quality of the space);	The response to this requirement provided within the EIS Technical Paper 1 (Design Place and Movement Report) still applies. However, the alignment between Camellia and Rydalmere now passes through Eric Primrose Reserve, enabling improvements to the existing open space and the creation of new open space areas in proximity to the John Street stop. The alignment of the bridge between Melrose Park and Wentworth Point has also been amended and the project's scope within Archer Park amended accordingly.	Chapter 2 Section 3.1.5 Section 3.1.6 Section 3.4.3
(c) residual land (where it is known that this will be returned as public open space and the reallocation of space);	The response to this requirement provided within the EIS Technical Paper 1 (Design Place and Movement Report) still applies. However, the alignment of the bridge between Camellia and Rydalmere and associated location of the John Street stop result in residual land being converted into permanent open space.	Chapter 2 Section 3.1.6
(d) stops as places;	The response to this requirement provided within the EIS Technical Paper 1 (Design Place and Movement Report) still applies. However, the alignment of the bridge between Camellia and Rydalmere now locates the John Street stop within the parkland setting of Eric Primrose Reserve.	Section 2.1 Section 2.3 Section 2.4 Section 2.5 Section 2.9 Section 3.1.2 Section 3.1.5 Section 3.1.6
(e) views and vistas (including an assessment of visual impact, and visual representations of the proposal from key locations to illustrate the proposal where visual impacts that are deemed greater than medium).	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-
This should also address maintenance of infrastructure, place, landscaping and residual land.	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-
4. Identify movement (accessibility and connectivity) principles, outcomes and actions that facilitate improvements to movement, including in relation to:		
(a) how the proposal considers the relationship between movement and place;	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-
(b) how the proposal contributes to more walking, cycling and public transport use (along the alignment and to and from stop(s)), including journey time comparisons for public and active transport for general traffic journey time improvements made, and the matters set out in the Healthy Urban Development Checklist TC1 and TC2 (NSW Health, 2009) (pages 76-78);	The response to this requirement provided within the EIS Technical Paper 1 (Design Place and Movement Report) still applies. However, the amended alignment between Camellia and Rydalmere results in shorter journey times for people travelling on light rail or active transport facilities in this section of the project.	Section 2.9 Section 3.1.2 Section 3.1.4 Section 3.1.6
(c) how any walking, cycling or public transport provided by the proposal integrates with wider active and public transport networks.	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-

Requirement	Summary response	Reference within this report
The EIS must demonstrate changes to:		
(a) access to public space;	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-
(b) access to community facilities or areas providing services to the community, such as local centres;	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-
(c) active transport and other forms of public transport, including local walking and cycling routes maintained or made more direct, safe and comfortable;	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report)	-
5. Identify green infrastructure design principles that are reflective of the principles in Greener Places and the Sydney Green Grid.		
	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-
6. Include and illustrate green infrastructure designs, actions and outcomes for the proposal including in relation to:		
(a) green infrastructure, including enhancement of open space that supports recreation, biodiversity and waterway health;	The response to this requirement provided within the EIS Technical Paper 1 (Design Place and Movement Report) still applies. However, the alignment between Camellia and Rydalmere would now pass through Eric Primrose Reserve, resulting in improvements to the existing open space and the creation of new open space areas in proximity to the John Street stop. The alignment of the bridge between Melrose Park and Wentworth Point has also been amended and the project's improvements to Archer Park amended accordingly.	Chapter 2 Section 3.1.6 Section 3.4.3
(b) how the proposal will achieve a net increase in tree numbers and canopy within proximity of the impacted area. (This relates to the number of trees to be cleared by the proposal (a tree is defined by Australian Standard 4970) that will not be covered by a biodiversity offset strategy).	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-
7. Identify how the proposal has been designed with and connected with Country, and reflects the findings of the Aboriginal Cultural Heritage Assessment Report (ACHAR).		
	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-
8. Outline the urban design response on the visual amenity and landscape impacts of construction across the alignment and for each precinct on:		
(a) views and vistas;	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-
(b) streetscapes, key sites and buildings (including existing landscape works, green space and tree canopy);	The response to this requirement provided within the EIS Technical Paper 1 (Design Place and Movement Report) still applies. However, the amended alignment between Camellia and Rydalmere means the project no longer provides an urban design response on Grand Avenue in Camellia, as the project site no longer impacts this area.	Chapter 2 Section 3.1.1 Section 3.1.6
(c) heritage items including Aboriginal places, environmental heritage and areas of heritage sensitivity	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-
(d) the local community.	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-
Visual representations of the proposal must be provided from key receiver locations to illustrate the proposal and its visual impacts and how the proposal has responded to the visual impact through urban design and landscaping.	No change to response - refer EIS Technical Paper 1 (Design Place and Movement Report).	-

1.4 Amendments and refinements

This report describes the design, place and movement requirements for the project amendments and refinements that have resulted from additional design development that has been undertaken since exhibition of the EIS.

Table 4 lists each section of the Design Place and Movement Report that was originally prepared to support the EIS and notes if there has been a change to the design, place and movement outcomes for the project. Cross references have been provided to where these can be found within this report.

Table 4: Schedule of changes.

Design Place and Movement Report section	Summary of Change	Reference within this report
Chapter 1 – Introduction		
1.1 Overview	Updated text describing the project.	Section 1.2 Section 1.3
1.2 Place and movement	No change.	-
1.3 The project	Updated text and figures to describe and illustrate the project.	Section 1.5
1.4 Report structure	No change.	-
Chapter 2 – Design Process		
Whole chapter	No change.	-
Chapter 3 – Design Place and Movement Framework		
Whole chapter	No change.	-
Chapter 4 – Project Overview		
4.1 Route alignment	Updated text and figure to describe and illustrate the alignment in Camellia and Rydalmere and the updated alignment of the bridge between Melrose Park and Wentworth Point.	Section 2.1
4.2 Stop locations	Updated illustration of stop locations resulting from the updated alignment in Camellia and Rydalmere.	Section 2.2
4.3 Contributing to place identity	Updated illustration of place identity resulting from the updated alignment in Camellia and Rydalmere.	Section 2.3
4.4 Stop accessibility	Updated illustration of stop accessibility resulting from the updated alignment in Camellia and Rydalmere and relocation of the John Street stop.	Section 2.4
4.5 Development interfaces	Updated illustration of development interfaces and stop catchments resulting from the updated alignment in Camellia and Rydalmere and the updated alignment of the bridge between Melrose Park and Wentworth Point.	Section 2.5
4.6 Ecology	Updated illustration of the project's interface with ecologically sensitive lands resulting from the updated alignment in Camellia and Rydalmere and the updated alignment of the bridge between Melrose Park and Wentworth Point. Updated illustration and description of the Hill Road bridge over Haslams Creek depicting a reduced footprint, and reduced environmental impact to environmentally sensitive lands.	Section 2.6
4.7 Remediated lands	Updated illustration of the project's interface with contaminated lands resulting from the updated alignment in Camellia and Rydalmere and the updated alignment of the bridge between Melrose Park and Wentworth Point.	Section 2.7
4.8 Integrated transport	Updated description and illustration of the project's integrated transport outcomes resulting from the updated alignment in Camellia and Rydalmere.	Section 2.8
4.9 Travel speeds	Updated description and illustration of the project's travel speed outcomes resulting from the updated alignment in Camellia and Rydalmere.	Section 2.9
4.10 Walking and cycling	Updated description and illustration of the project's walking and cycling outcomes resulting from the updated alignment in Camellia and Rydalmere and the updated alignment of the bridge between Melrose Park and Wentworth Point.	Section 2.10
4.11 Green infrastructure	No change.	-
4.12 Precincts	No change.	-

Design Place and Movement Report section	Summary of Change	Reference within this report
Chapter 5 – Parramatta CBD		
Whole chapter	No change to this precinct.	-
Chapter 6 – Camellia		
6.1 Overview	Updated description and illustration of the project's alignment, open space, and walking and cycling outcomes resulting from the updated alignment and bridge in Camellia and Rydalmere.	Section 3.1.1
6.2 Designing with Country	No change to Designing with Country approach within this precinct.	-
6.3 Vision and principles	No change to the vision and principles for this precinct.	-
6.4 Design place and movement outcomes	Updated description and illustration of the project's alignment, open space, and walking and cycling outcomes resulting from the updated alignment and bridge in Camellia and Rydalmere.	Section 3.1.2 Section 3.1.4
Chapter 7 – Rydalmere East		
7.1 Overview	Updated description and illustration of the project's alignment, open space, and walking and cycling outcomes resulting from the updated alignment and bridge in Camellia and Rydalmere.	Section 3.1.1
7.2 Designing with Country	No change to Designing with Country approach within this precinct.	-
7.3 Vision and principles	No change to the vision and principles for this precinct.	-
7.4 Design place and movement outcomes	Updated description and illustration of the project's alignment, open space, and walking and cycling outcomes resulting from the updated alignment and bridge in Camellia and Rydalmere.	Section 3.1.5
Chapter 8 – Ermington		
Whole chapter	No change to this precinct.	-
Chapter 9 – Melrose Park		
9.1 Overview	Updated description and illustration of the project's alignment resulting from the updated alignment and bridge between Melrose Park and Wentworth Point. Updated illustration and description of the refinement to the power traction substation location within the Atkins Road Stop precinct.	Section 3.2.1
9.2 Designing with Country	No change to Designing with Country approach within this precinct.	-
9.3 Vision and principles	No change to the vision and principles for this precinct.	-
9.4 Design place and movement outcomes	Updated description and illustration of the project's alignment, open space, and walking and cycling outcomes resulting from the updated alignment and bridge between Melrose Park and Wentworth Point.	Section 3.3 Section 3.4
Chapter 10 – Wentworth Point		
10.1 Overview	Updated description and illustration of the project's alignment.	Section 3.2.1
10.2 Designing with Country	No change to Designing with Country approach within this precinct.	-
10.3 Vision and principles	No change to the vision and principles for this precinct.	-
10.4 Design place and movement outcomes	Updated description and illustration of the project's alignment, open space, and walking and cycling outcomes resulting from the updated alignment and bridge between Melrose Park and Wentworth Point.	Section 3.5
Chapter 11 – Sydney Olympic Park		
Whole chapter	No change to this precinct.	-

Design Place and Movement Report section	Summary of Change	Reference within this report
Chapter 12 – Carter Street Precinct		
Whole chapter	No change to this precinct.	-
Chapter 13 – Bridges		
13.1 Overview	Updated text and figure to describe and illustrate the alignment in Camellia and Rydalmere and the updated alignment of the bridge between Melrose Park and Wentworth Point.	Chapter 3
13.2 Bridge design vision and principles	No change.	-
13.3 New bridge between Camellia and Rydalmere	Updated text and figure to describe and illustrate the alignment in Camellia and Rydalmere and the updated alignment of the bridge between Melrose Park and Wentworth Point.	Section 3.1.2
13.4 New bridge over Silverwater Road	No change.	-
13.5 New bridge in Ken Newman Park	No change.	-
13.6 New bridge between Melrose Park and Wentworth Point	Updated text and figure to describe and illustrate the alignment in Camellia and Rydalmere and the updated alignment of the bridge between Melrose Park and Wentworth Point.	Section 3.4
Chapter 14 – Design Elements		
Whole chapter	No change to the design elements previously described in Technical Paper 1.	-
Chapter 15 – Actions and Next Steps		
Whole chapter	Despite the amendments and refinements described within the supplementary report, there are no changes to the actions and next steps previously described in Technical Paper 1.	-
Chapter 16 – References		
Whole chapter	No change.	-

1.5 The project

1.5.1 Route overview

Much of the route remains unchanged from that previously described in Technical Paper 1. However, two of the amendments described in this report have resulted in changes to the route illustrated here. These include:

1. The alignment described in the EIS involved light rail running through the Camellia precinct via the Sandown Line corridor and along the northern side of Grand Avenue. The new alignment still runs along the Sandown Line corridor; however, instead of deviating south to run along Grand Avenue, it continues along the Parramatta River foreshore in Camellia before extending across a new bridge structure and along the boundary of Eric Primrose Reserve in Rydalmere.
2. The project as described in the EIS included a bridge located between the southern end of Wharf Road in Melrose Park and the northern end of Wentworth Point. The new alignment of this bridge locates it further to the west to avoid direct impacts to residential properties.
3. The project as described in the EIS included the retention of the existing Hill Road bridge, and providing a new bridge running parallel on the west, resulting in impacts to the Narawang Wetland. The new proposal is to replace the existing bridge with the construction of a new bridge with integrated light rail, reducing the overall footprint, and minimising impacts to the adjacent wetland.

These amendments are located in the context of the project's precincts in Figure 3.

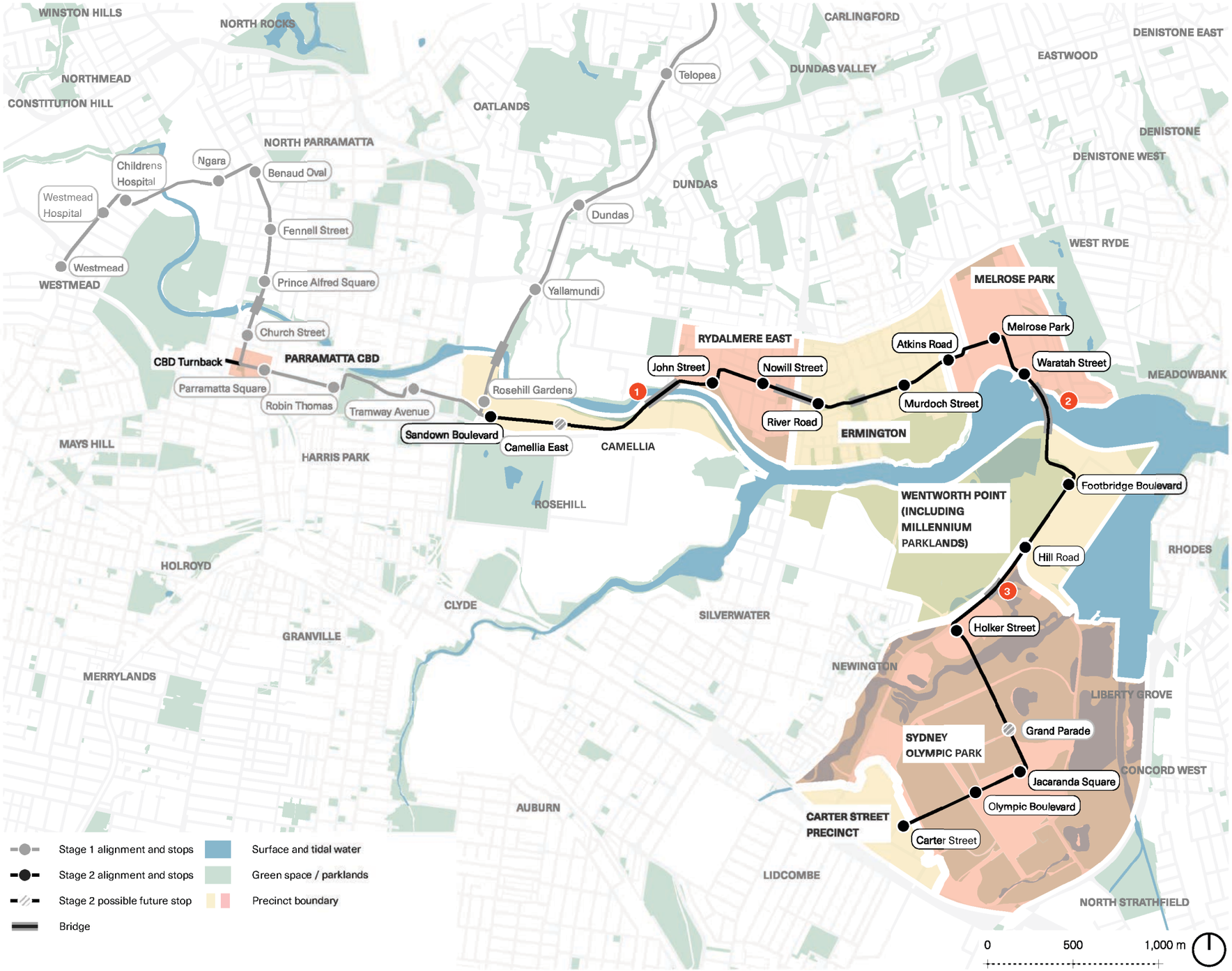

Figure 3: Stops and precincts along the alignment.

2.0 Update to Project Overview

2.1 Route alignment

2.1.1 Alignment overview

Design changes illustrated within this section of the report include:

1. Camellia foreshore to Rydalmere alignment and bridge – the updated alignment of the light rail track, active transport link and bridge over the Parramatta River.
2. Melrose Park to Wentworth Point bridge – the updated alignment of the light rail track, active transport link and bridge over the Parramatta River.
3. Hill Road bridge – no change to alignment.

Updates to the alignment can be seen in Figure 4. Refer to the Amendment Report for additional information.

2.1.2 Chapter overview

This chapter focuses on the changes to the alignment since the EIS, and highlights the subsequent impacts it has on the surrounding context.

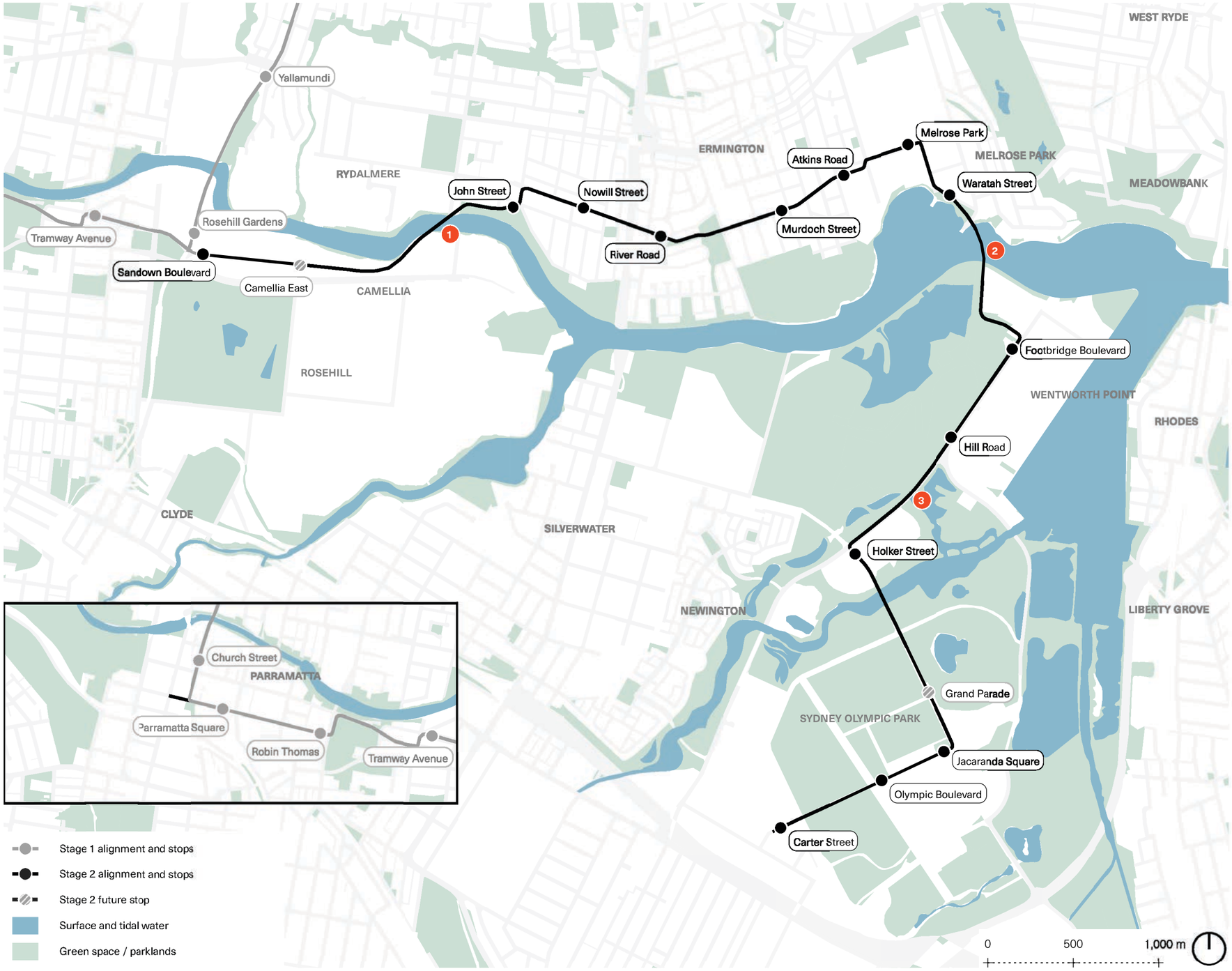

Figure 4: Route alignment.

2.2 Stop locations

2.2.1 Development of stop locations

The amendment to the Camellia foreshore to Rydalmere alignment and bridge (described in Chapter 3 – Alignment Changes) has resulted in a reduction in the total length of the alignment as well as a change to the John Street stop location.

This amendment is illustrated in Figure 5 below.

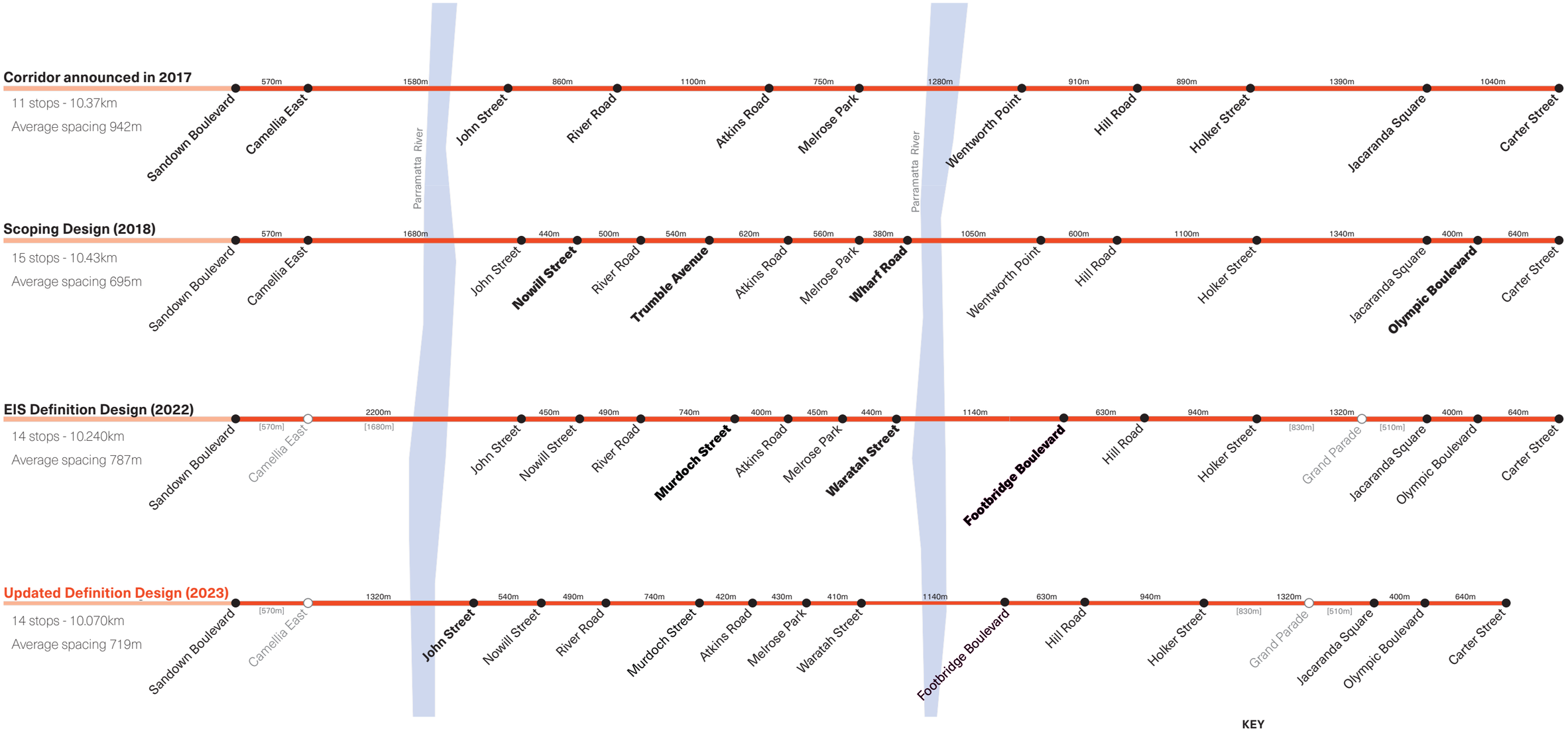

Figure 5: Development of stop locations.

2.2.2 Overview of proposed stops

Sandown Boulevard

No change.

Camellia East (potential future)

No change.

John Street

The John Street stop would be located within Eric Primrose Reserve and adjacent industrial properties to be acquired for the project. The stop would sit immediately north of the existing car parking area for the Rydalmere Ferry Wharf. The stop would provide catchment for residential and commercial development in Rydalmere, interchange with Rydalmere Ferry Wharf, and access to Eric Primrose Reserve on the river foreshore.

Nowill Street

No change.

River Road

No change.

Murdoch Street

No change.

Atkins Road

No change.

Melrose Park

No change.

Waratah Street

No change.

Footbridge Boulevard

No change.

Hill Road Stop

No change.

Holker Street

No change.

Grand Parade (potential future)

No change.

Jacaranda Square

No change.

Olympic Boulevard

No change.

Carter Street

No change.

2.3 Contributing to place identity

Design changes illustrated within this section of the report include:

1. Camellia foreshore to Rydalmere alignment and bridge – the updated alignment of the light rail track, active transport link and bridge over the Parramatta River would result in a change to Eric Primrose Reserve. Improved outcomes for parkland character would be achieved by running the alignment on the outskirts of the parkland, and no longer dissecting the park. Residual land not required by the project would be improved to provide new open space areas with recreation facilities.
2. Melrose Park to Wentworth Point bridge – the new alignment of the bridge would result in a change to the operation of the Ermington boat ramp, the design of Archer Park, and associated facilities. The amended bridge design would reduce its footprint on the southern foreshore of the Parramatta River and provide additional space for walking and cycling connections and public amenities.
3. Hill Road bridge – no change.

These updates to the alignment are reflected in Figure 6.

Figure 6: Contributing to place identity.

2.4 Stop accessibility

Design changes illustrated within this section of the report include:

1. Camellia foreshore to Rydalmere alignment and bridge – the updated alignment of the light rail track, active transport link and bridge over the Parramatta River would result in a change to the location of the John Street stop, including closer proximity to the Parramatta Valley Cycleway for customers accessing the stop via the foreshore parklands. The stop's new location is illustrated in Figure 7.
2. Melrose Park to Wentworth Point bridge – no change.
3. Hill Road bridge – no change.

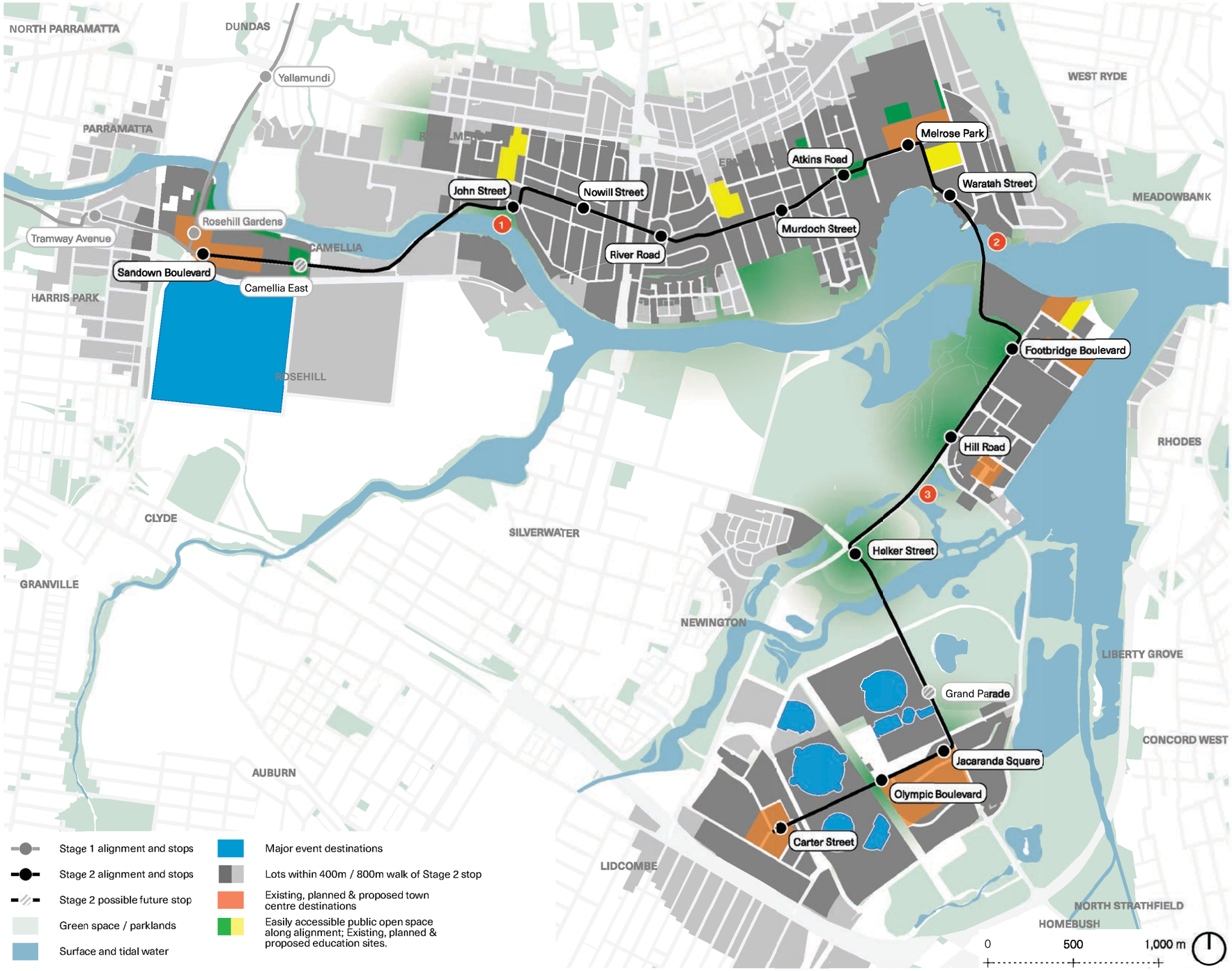

Figure 7: Stop accessibility.

2.5 Development interfaces

Design changes illustrated within this section of the report include:

1. Camellia foreshore to Rydalmere alignment and bridge – the updated alignment of the light rail track, active transport link and bridge over the Parramatta River would result in a change to the location of the John Street stop. The stop's new location is illustrated in Figure 8 together with minor adjustments to the stop's catchment.
2. Melrose Park to Wentworth Point bridge – no change.
3. Hill Road bridge – no change.

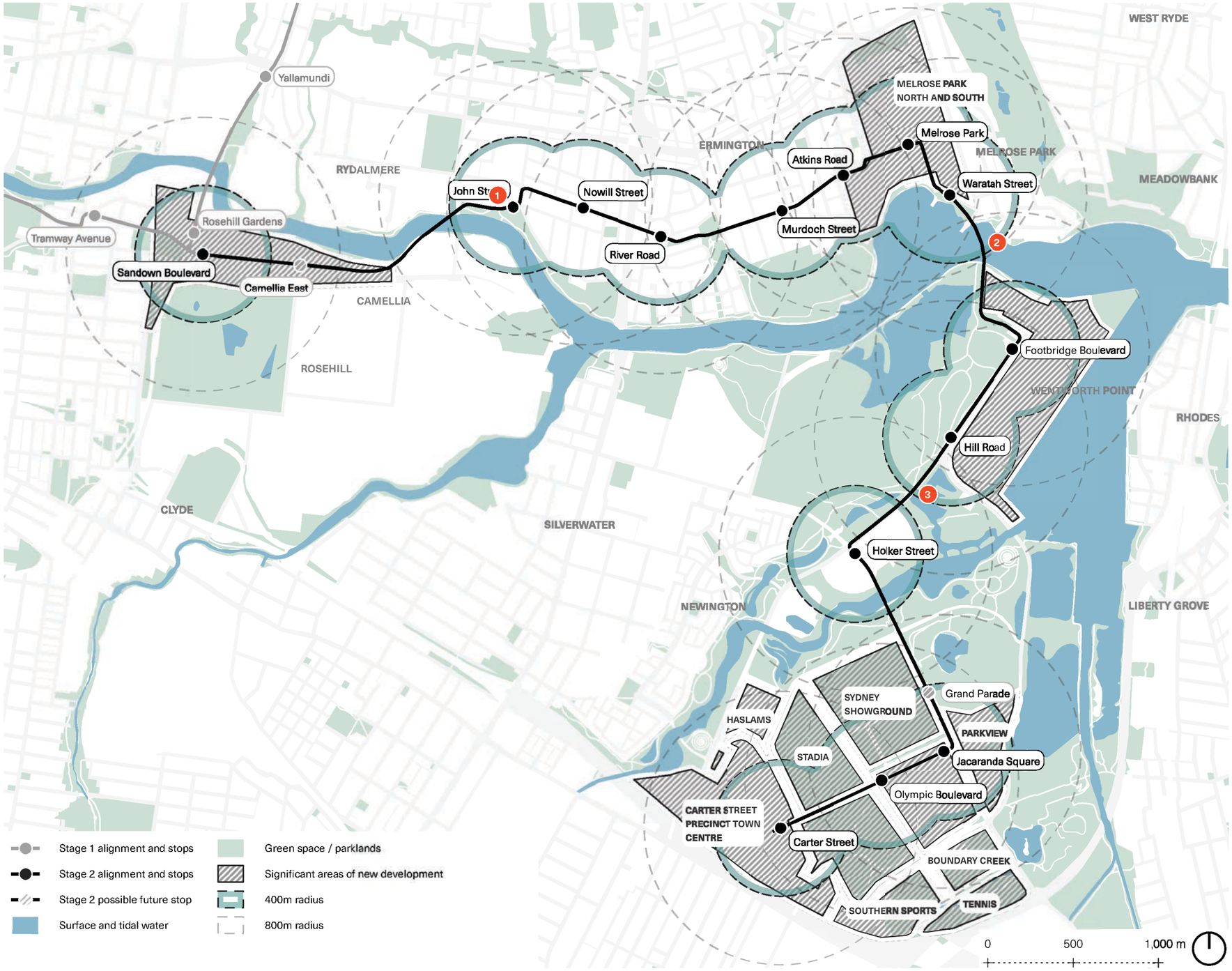

Figure 8: Development interfaces.

2.6 Ecology

Design changes illustrated within this section of the report include:

1. Camellia foreshore to Rydalmere alignment and bridge – the updated alignment of the light rail track, active transport link and bridge over the Parramatta River would result in a change to the biodiversity impact of this section of the project.
2. Melrose Park to Wentworth Point bridge – the updated alignment of the bridge would result in a change to the environmental impact of this section of the project.
3. Hill Road bridge – the updated bridge design would result in reduced impact on Narawang Wetland.

The updated alignment is illustrated in Figure 9, which shows indicative ecological constraints only. For detailed mapping refer to the updated Biodiversity Development Assessment Report.

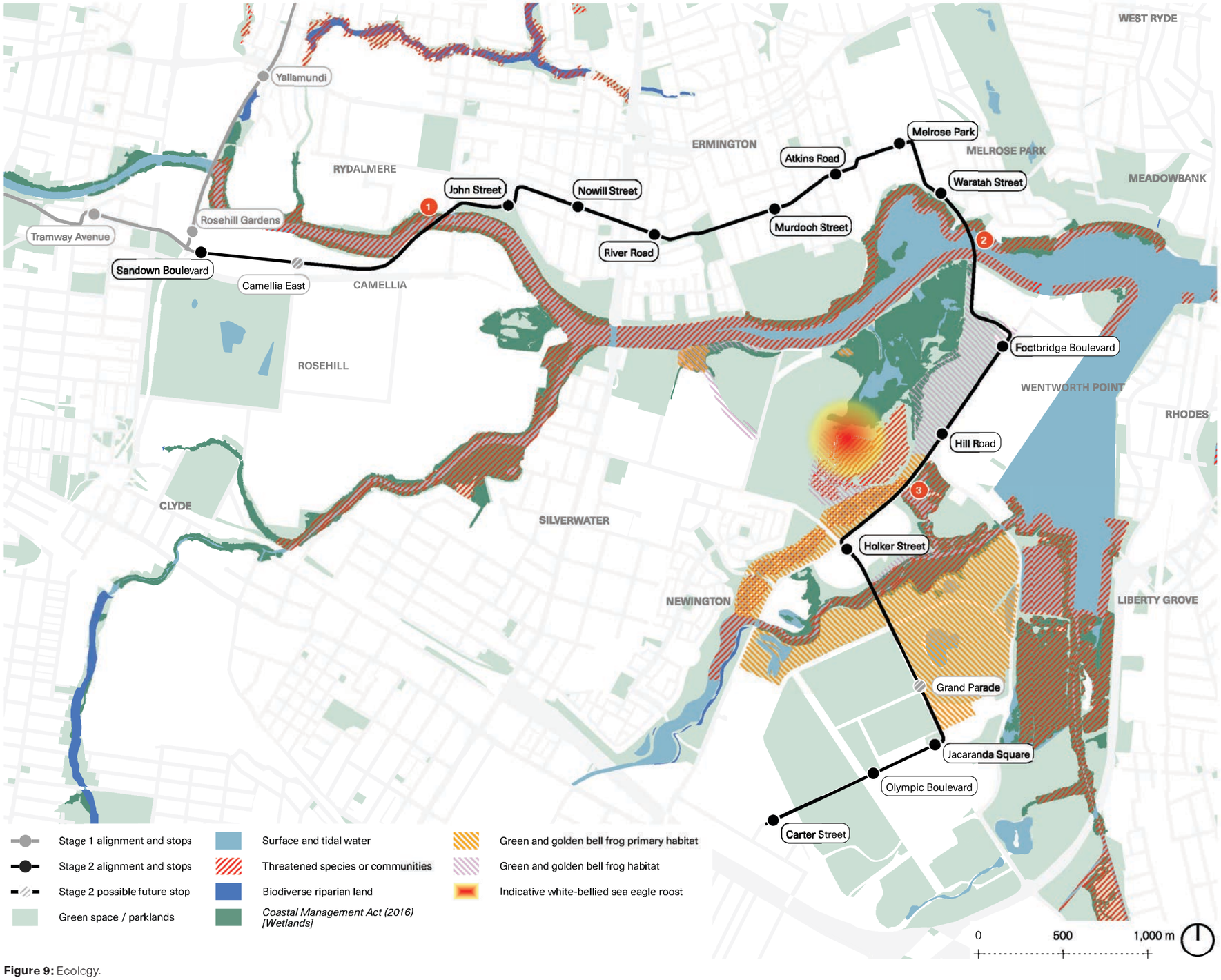

Figure 9: Ecolcgy.

2.7 Integrated transport

Design changes illustrated within this section of the report include:

1. Camellia foreshore to Rydalmere alignment and bridge – the updated alignment of the light rail track, active transport link and bridge over the Parramatta River would result in a change to the location of the John Street stop. The stop's new location would bring it slightly closer to the Rydalmere Ferry Wharf, reducing the interchange distance between stop and wharf. The updated alignment is illustrated in Figure 10 with minor changes to integrated transport corridor.
2. Melrose Park to Wentworth Point bridge – no change.
3. Hill Road bridge – no change.

These updates to the alignment are reflected in Figure 10.

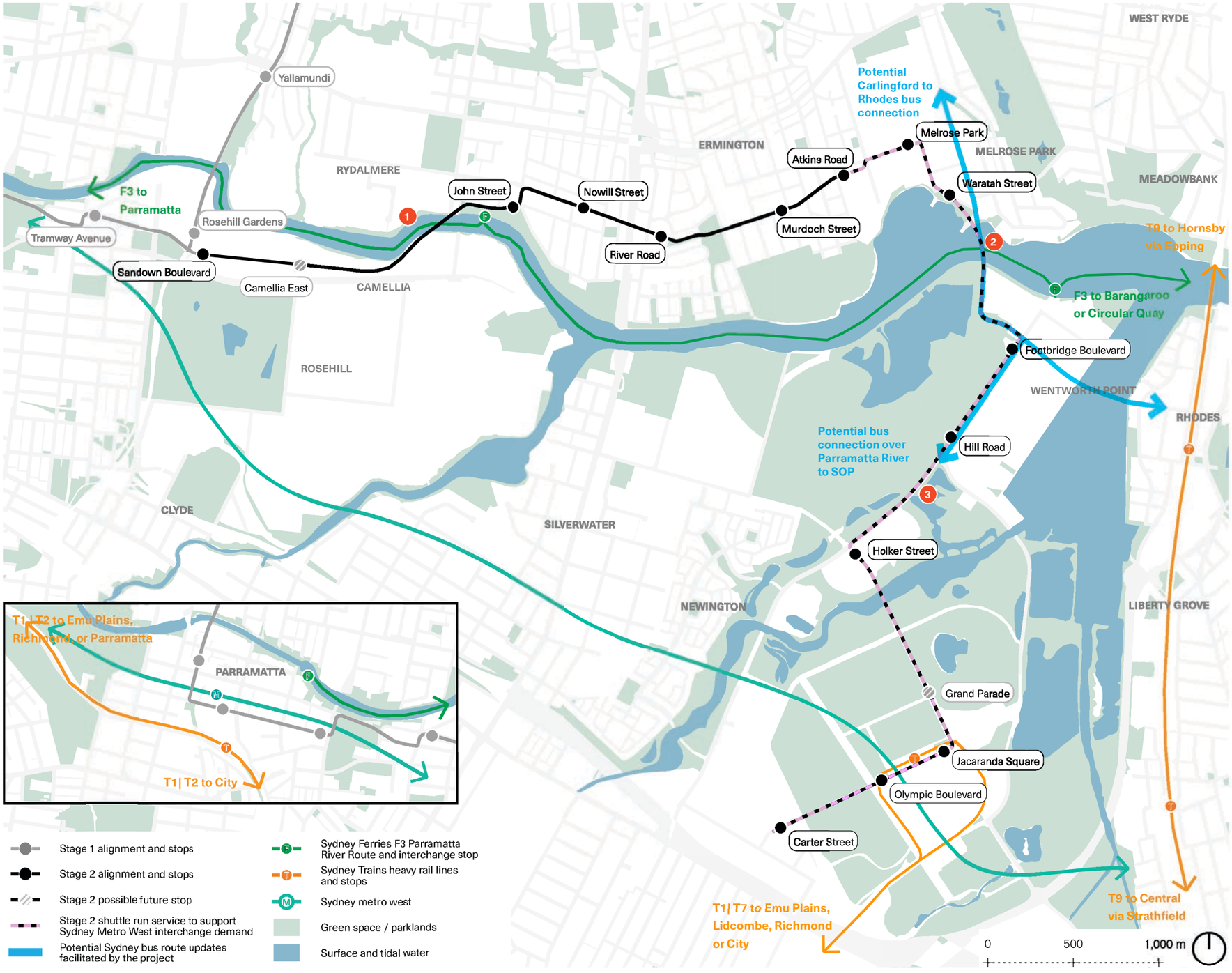

Figure 10: Integrated transport.

2.8 Travel speeds

Design changes illustrated within this section of the report include:

1. Camellia foreshore to Rydalmere alignment and bridge – the updated alignment of the light rail track, active transport link and bridge over the Parramatta River would result in changes to travel speeds in this area of the project. An indicative speed limit of 50km/hr is shown within Figure 11 for this area of the project.
2. Melrose Park to Wentworth Point bridge – the updated alignment of the light rail track, active transport link and bridge over the Parramatta River would result in changes to travel speeds in this area of the project. An indicative speed limit of 50km/hr is shown within Figure 11 for this area of the project.
3. Hill Road bridge – no change.

These updates to the alignment are reflected in Figure 11.

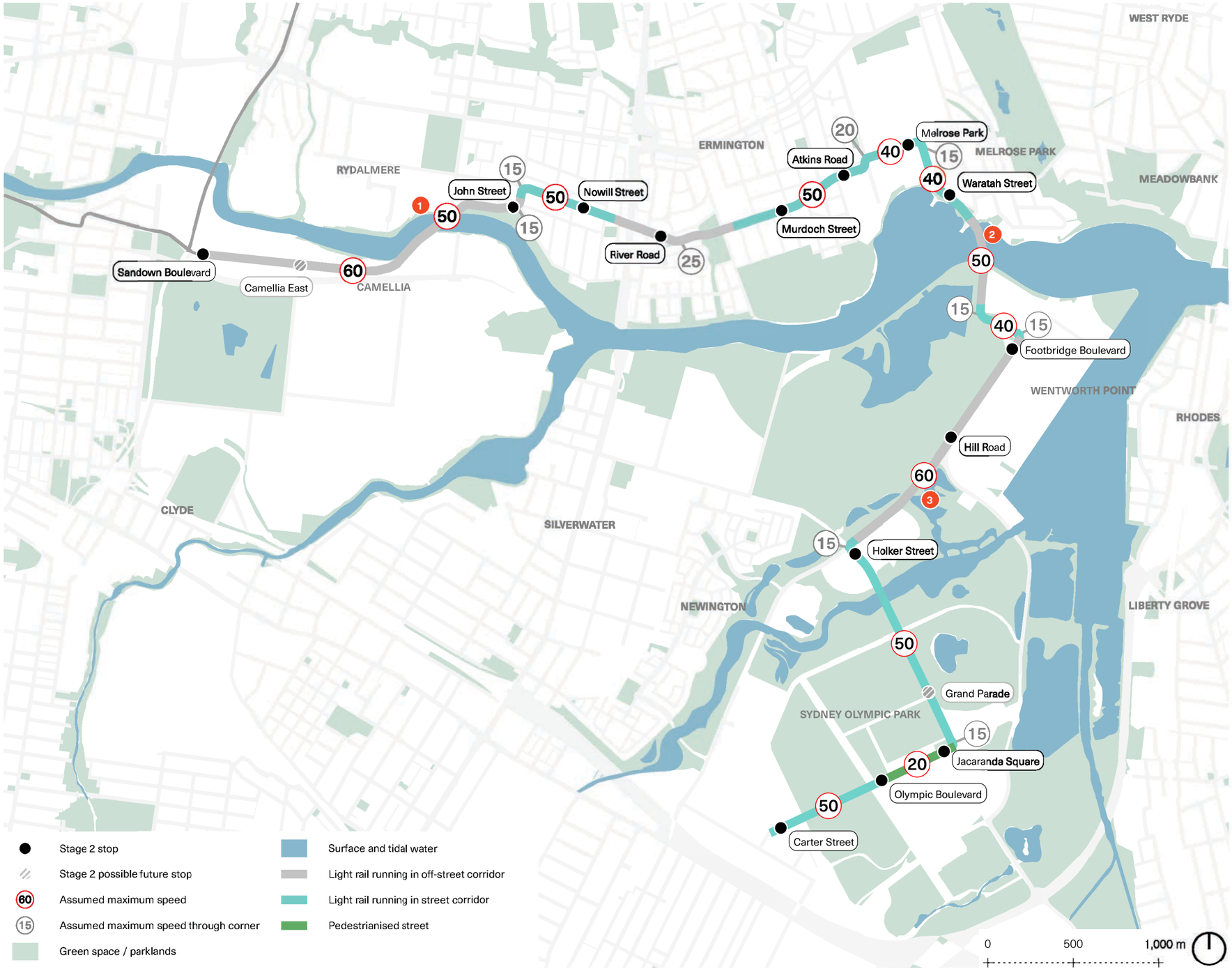

Figure 11: Light rail travel speeds.

2.9 Walking and cycling

2.9.1 Walking and cycling facilities

Design changes illustrated within this section of the report include:

1. Camellia foreshore to Rydalmere alignment and bridge – the updated alignment of the light rail track and bridge provides a walking and cycling connection along the foreshore of the Parramatta River rather than the heavy industrial environment of Grand Avenue. Adjustments to the bridge design would result in a shared path provided on one side of the bridge. Improvements to the Rydalmere Wharf precinct would include a separated footpath and two–way cycleway providing direct and convenient access along the foreshore and to the John Street stop.
2. Melrose Park to Wentworth Point bridge – the updated alignment and bridge design would result in a shared path provided on one side of the bridge with improved connections to the northern and southern foreshores.
3. Hill Road bridge – no change.

Indicative walking and cycling connections are shown in Figure 12.

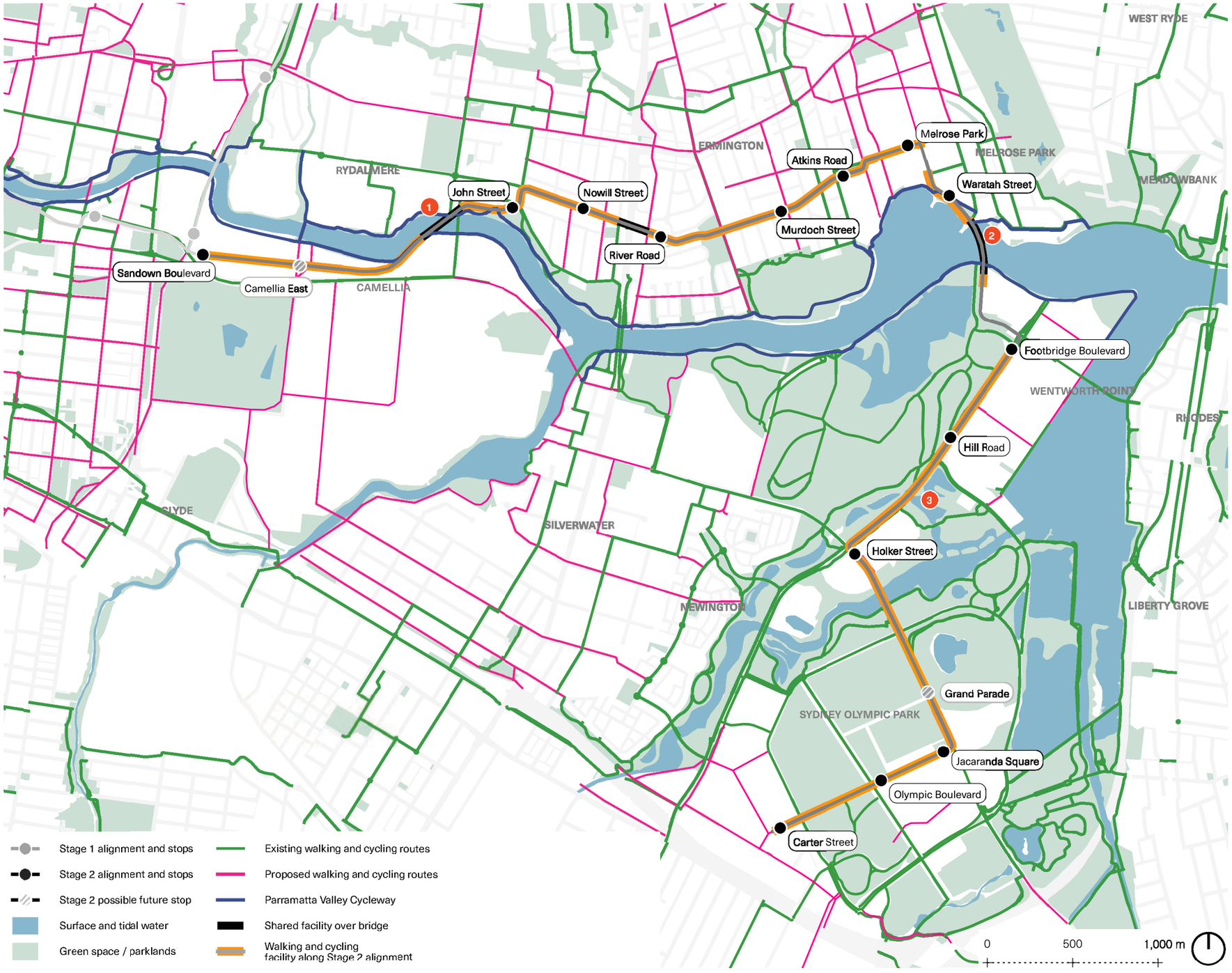

Figure 12: Walking and cycling facilities.

Walking and cycling on streets

No change – refer Technical Paper 1 (Design Place and Movement Report).

Walking and cycling within open spaces

Design changes illustrated within this section of the report include:

1. Camellia foreshore to Rydalmere alignment and bridge – the updated alignment of the light rail track, active transport link and bridge over the Parramatta River would result in a change to the alignment of walking and cycling along the Camellia foreshore and through Eric Primrose Reserve. This results in a reduction in distance and travel time for the Camellia Loop identified in Figure 13 below.
2. Melrose Park to Wentworth Point bridge – no change.
3. Hill Road bridge – no change.

An update to the indicative cycling routes created by the project can be seen in Figure 13.

2.9.2 Walking and cycling on bridges

No change – refer Technical Paper 1 (Design Place and Movement Report).

2.9.3 Implementation strategy

No change – refer Technical Paper 1 (Design Place and Movement Report).

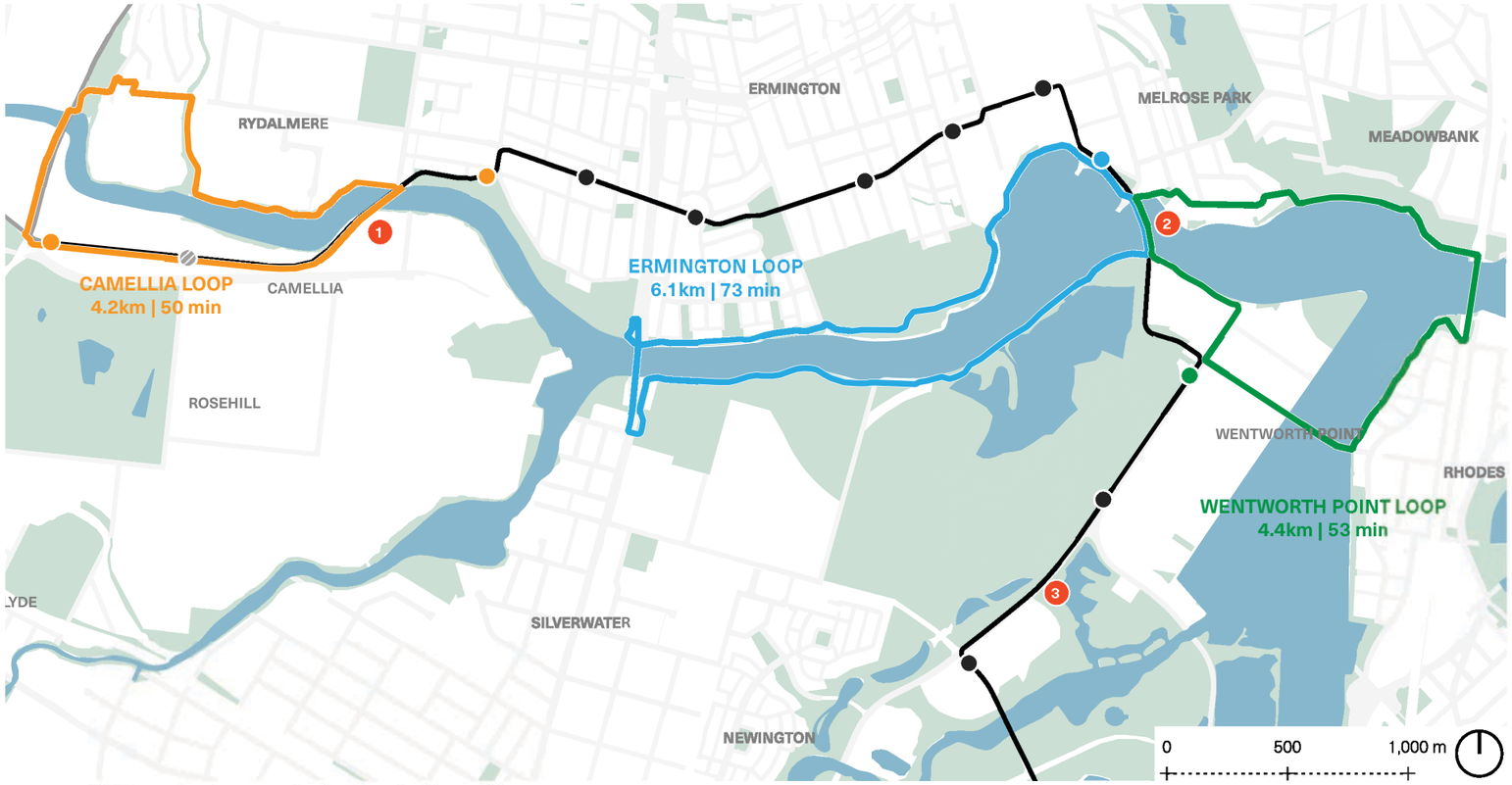

Figure 13: Walking and cycling recreation loops created by new Parramatta River crossings.

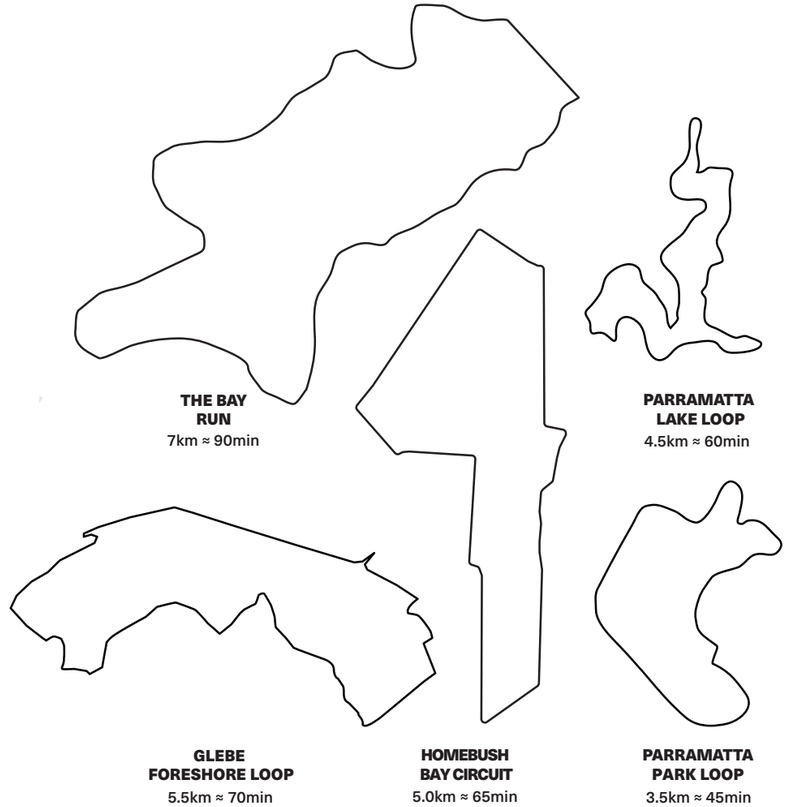

Figure 14: Comparable walking and cycling recreation loops in metropolitan Sydney.

3.0 Alignment Updates

3.1 Camellia foreshore to Rydalmere alignment and bridge

3.1.1 Alignment summary

The change presented within this section of the report illustrates an update to the alignment of the light rail track, active transport infrastructure, and bridge over the Parramatta River between Camellia and Rydalmere.

The new alignment extends along the Sandown Line corridor in Camellia; however, instead of crossing south over to Grand Avenue, it continues along the Parramatta River foreshore in Camellia before extending across a new bridge structure and along the boundary of Eric Primrose Reserve in Rydalmere.

A new shared path would run along the west of the Sandown Line within Camellia, and cross the Parramatta River on the new bridge before tying into the Parramatta Valley Cycleway. The bridge design has also been amended and includes improved pier arrangements in the river.

The new alignment in Eric Primrose Reserve results in a new location for John Street stop, integrating with Eric Primrose Reserve, and would be located closer to Rydalmere Ferry Wharf.

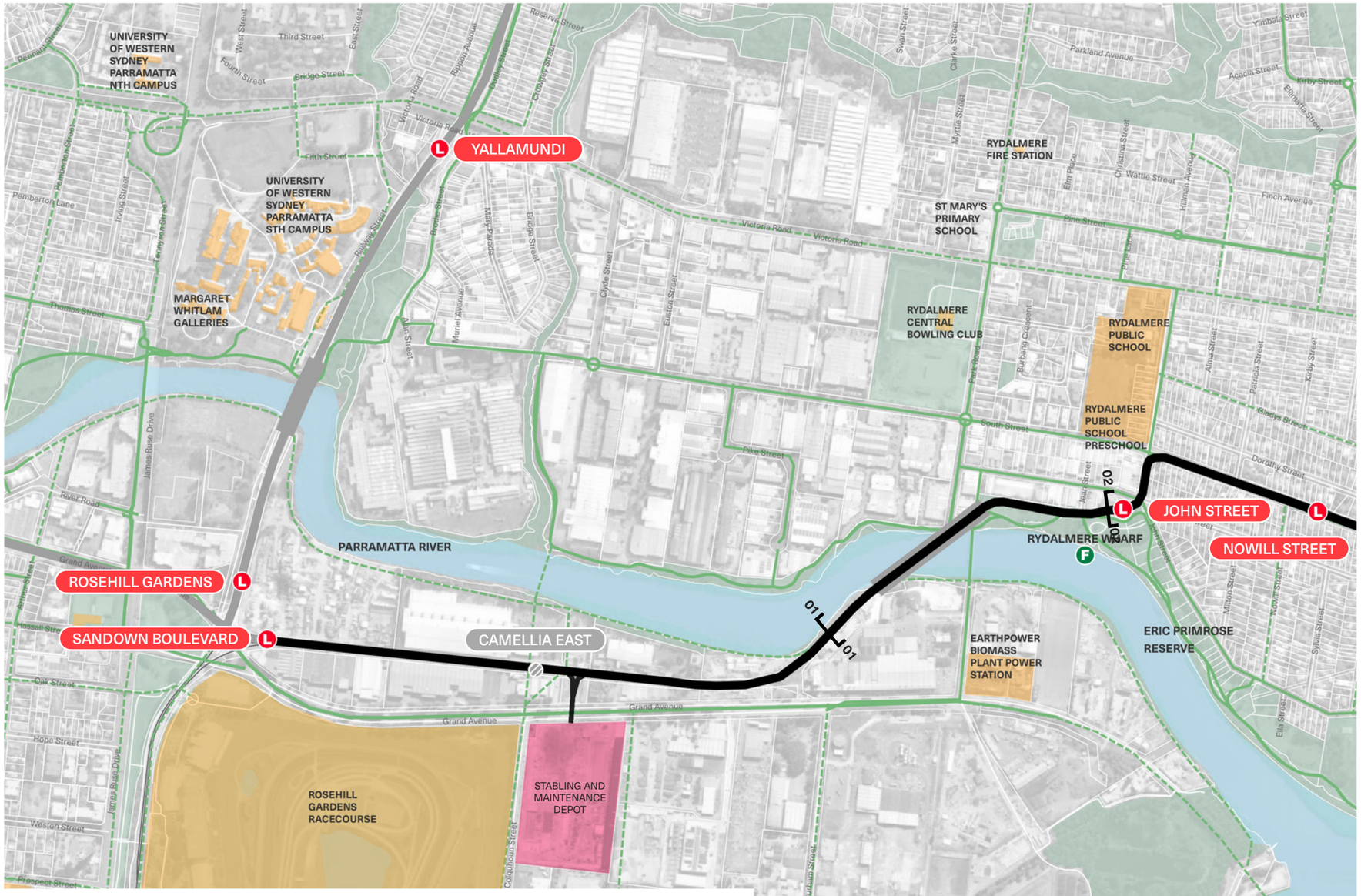

Figure 15: Overview map - Camellia.

3.1.2 Bridge overview

The new bridge between Camellia and Rydalmere would cross the Parramatta River between the Sandown Line on the southern foreshore and Eric Primrose Reserve on the northern foreshore.

A number of options for the alignment and bridge types were developed and tested. A preferred alignment was selected, running along the foreshore of the Sandown Line in Camellia, and crossing the Parramatta River landing in Rydalmere. This change minimises impacts to the existing mangroves, the car park at the Rydalmere Ferry Wharf, and eliminates impacts to the existing fig trees within Eric Primrose Reserve, and the reserve's amenity block.

This amended alignment also reduces impacts on the existing development and street network of Camellia and provides a more direct connection to Rydalmere for light rail customers as well as those using active transport facilities.

There is also an opportunity for open space improvements and increased landscape amenity along the Camellia foreshore, further supporting the recreational needs of Camellia as its masterplan is realised.

The new bridge would be about 260m long, of which about 120m of this spans over the Parramatta River. A number of bridge types were considered and tested to meet the site constraints, with a concrete box girder selected as the preferred option for the bridge design. The updated alignment and bridge design would result in a single sided shared path over the Parramatta River, with a minimum width of 5.5m, in line with stakeholders requirements.

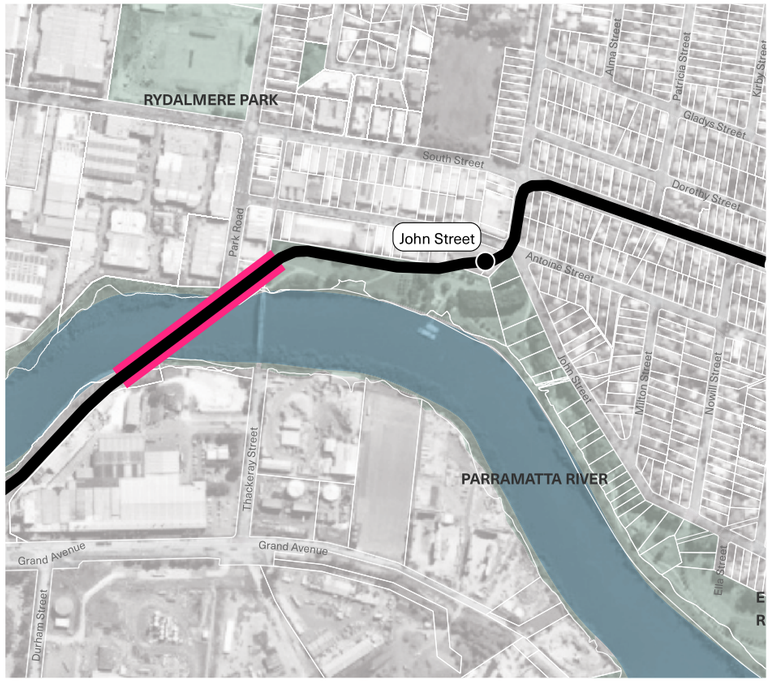

Figure 16: Overview map - New bridge between Camellia and Rydalmere.

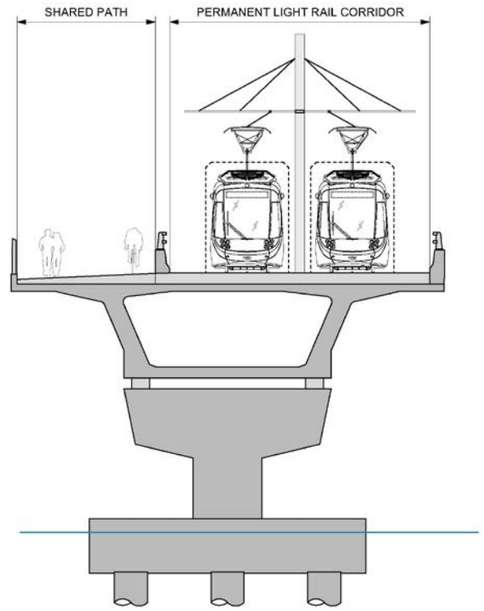

Figure 17: Typical cross section - New bridge between Camellia and Rydalmere at bridge pier (indicative only - subject to design development).

3.1.3 Bridge design requirements

Site-specific urban design requirements have been established for the new bridge between Camellia and Rydalmere in response to the project's bridge design principles and objectives as outlined in the adjacent table.

These remain largely consistent with the EIS Technical Paper 1 (Design Place and Movement Report), however minor refinements to the bridge's urban design requirements are presented in red text within Table 5.

Table 5: New bridge between Camellia and Rydalmere - principles, objectives, and design requirements

BRIDGE DESIGN PRINCIPLES + OBJECTIVES	CAMELLIA BRIDGE URBAN DESIGN REQUIREMENTS
Design quality **Objective: Designs are to achieve high quality outcomes and elegant proportions to reduce visual and physical impacts and create an asset to the adjacent neighbourhoods and region.**	• Responsive to landing in Eric Primrose Reserve, adjacent industrial properties along Park Road and ensuring access and function of Rydalmere Wharf. • Integration of the main span to supporting spans and all design elements - overhead wires, lighting, safety screens, balustrades, crash barriers and the like. • Bridge would provide views up and down the river and over adjacent foreshore areas. • Bridge viewed from the river and foreshore paths. Particular consideration of views from Eric Primrose Reserve and future foreshore reserves along Camellia. • First crossing of the Parramatta River for the project. Closest to Parramatta CBD. Consideration of existing and proposed bridges including Alfred Street footbridge.
Responsive to context **Objective: Designs are to respond sensitively to the landscape, its history, social rituals and cultural significance.**	• Minimise visual and environmental impact to Eric Primrose Reserve, minimise impacts to existing trees, particularly mangroves along the foreshore. • Minimise visual impact to residents along John Street. Provide buffers of additional planting to manage privacy and light pollution. • Consider, manage and reflect the river edge, foreshore and parkland landscape. • Provide legible intuitive active transport connections from the bridge to the existing and proposed foreshore paths.
Environmentally sensitive **Objective: Minimise impact to the environment through the placement of bridge elements and consideration of construction impacts.**	• Minimise impacts to the foreshore areas, mangroves, and wetland areas and carefully locating bridge piers and bridge abutments and considering the overall bridge design to minimise impacts both during and post construction. • Consider ways in which the pile cap design can enhance the ecology of the river. • Consider ways the bridge abutments can contribute to ecological and habitat creation outcomes. • Consider ways in which overshadowing, light pollution, and noise pollution can be minimised during construction and operation. • Bridge design to avoid creation of barriers or deterrents to wildlife movement along the river corridor (ie bats, migratory shorebirds) - this could be physical shape, reflectivity, lighting, overhead wires, collision risk, entanglement
User friendly **Objective: Provide equitable access, integrate pedestrian and bicycle facilities and connect to adjacent networks in a safe, legible and convenient way.**	• Resting points, shade structures and views to be considered in the design of the bridge. Active transport link widths to allow for resting points and passing places. • Safe access to the bridge, and connections to the foreshore. CPTED issues created by landing in Camellia to be carefully considered. • Ease of navigation along the river and below the bridge. Navigation by the pedestrian and cyclist on and off the bridge should be intuitive. • Provide a minimum 5.5m wide shared path on the western side of the bridge with direct access to the Parramatta Valley Cycleway and foreshore paths on both sides of the river.
Value **Objective: Provide value for money and an asset of lasting value to all, through good design, innovation and collaboration.**	• Consider the amenity of the Eric Primrose Reserve and future foreshore areas in Camellia. • Consideration of the use of common design elements between the bridges, establishing economies in design and construction. • Ensure the bridge design embeds safety-in-design outcomes for construction and operations. • Minimising maintenance from the river. • Seek innovation throughout the design and construction process to continually improve and add value. • Ongoing implementation of design excellence in the composition of the bridge. Maximise benefits of the bridge and outcomes for the context.

3.1.4 Sandown Line

Overview

To the east of the light rail track and depot turnout being constructed by Stage 1, the light rail alignment would proceed along the Sandown Line along the Parramatta River foreshore providing new pedestrian and cyclist foreshore amenity and function at the river's edge.

The new amenity would include a new shared path and landscaping, and would provide pedestrians and cyclists access to the new bridge between Camellia and Rydalmere.

Built form

Built form within this section of the project would be limited to the construction of the new bridge between Camellia and Rydalmere. This would include abutments on the southern and northern shores of the Parramatta River, with several bridge spans and piers within the river required.

Power supply would be provided via a traction power substation located within 27 Grand Avenue, the point at which the alignment turns north towards Rydalmere.

Public space

A new shared path would be delivered along the river's edge adjacent the light rail track zone. Tree and understorey planting would be provided to screen adjacent properties along the southern edge of the light rail track zone.

Residual land

There is no residual land associated with the updated alignment.

Stops as places

There are no stops proposed within this section of the project.

Transport integration

The shared path provided along the Parramatta River foreshore would deliver a regionally significant connection between the new bridge over the Parramatta River and the Parramatta CBD via the Sandown Line and bridge over James Ruse Drive.

Visual amenity

Updates to the visual amenity as a result of this proposed change are described in chapter 6 of the Amendment Report.

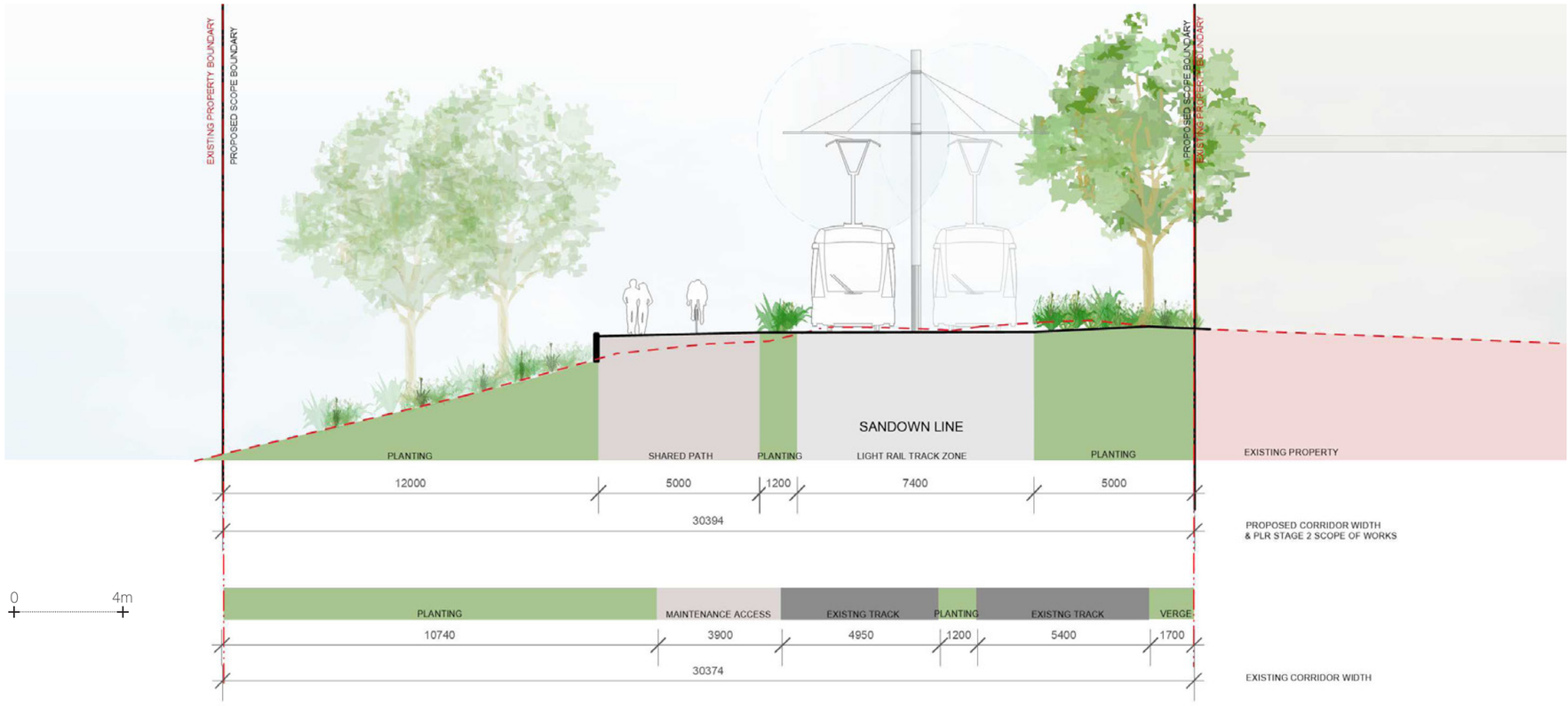

Figure 18: Cross section 01 - Sandown Line (indicative only - subject to design development).

Figure 19: Light rail track separated from road with buffer planting, Randwick, Australia (credit: ASPECT Studios).

Figure 20: Shared path with buffer planting adjacent light rail track, Randwick, Australia (credit: ASPECT Studios).

3.1.5 Eric Primrose Reserve & John Street stop

Overview

The amended alignment would land in the western portion of Eric Primrose Reserve on the northern shore of the Parramatta River. The alignment would enter the reserve via the new bridge between Camellia and Rydalmere over the Parrramatta River.

North of the bridge landing, the alignment would run east within Eric Primrose reserve along the northern edge of the parkland adjacent the industrial properties on Antoine Street. A stop would be provided within the parkland setting of Eric Primrose Reserve which would provide an opportunity to serve the industrial employment lands to the west, while supporting potential future renewal of low density housing stock in Rydalmere. Refer to Figure 21 for more information.

Built form

Built form within this area of the project would include the construction of the bridge abutment in the western portion of Eric Primrose Reserve. It would also include the stop platform with associated access infrastructure.

Power supply would be provided via a traction power substation located within land that would be acquired on John Street, with access to be determined during design development.

Public space

The amended alignment would involve upgrades to the existing Eric Primrose Reserve and construction of a new open space to the north of the John Street stop. This new public open space would include new active recreational facilities.

The project would also make provisions for continuous walking and cycling facilities throughout the reserve and stop environment. These would include separated walking and cycling facilities that would tie into the Parramatta Valley Cycleway. Refer to the following page for more information.

Residual land

At the John Street stop, residual land would be improved as public space with recreation facilities, as well as providing space within the stop environment for accessibility and passive surveillance.

Residual land on John Street would be improved with walking and cycling connections to/from South Street, and provide a location for a traction power substation.

Stops as places

The John Street stop would be located west of the existing John Street roadway within industrial land that would be acquired and converted into parkland, providing access to the stop from John Street, Eric Primrose Reserve, Antoine Street, and Jean Street.

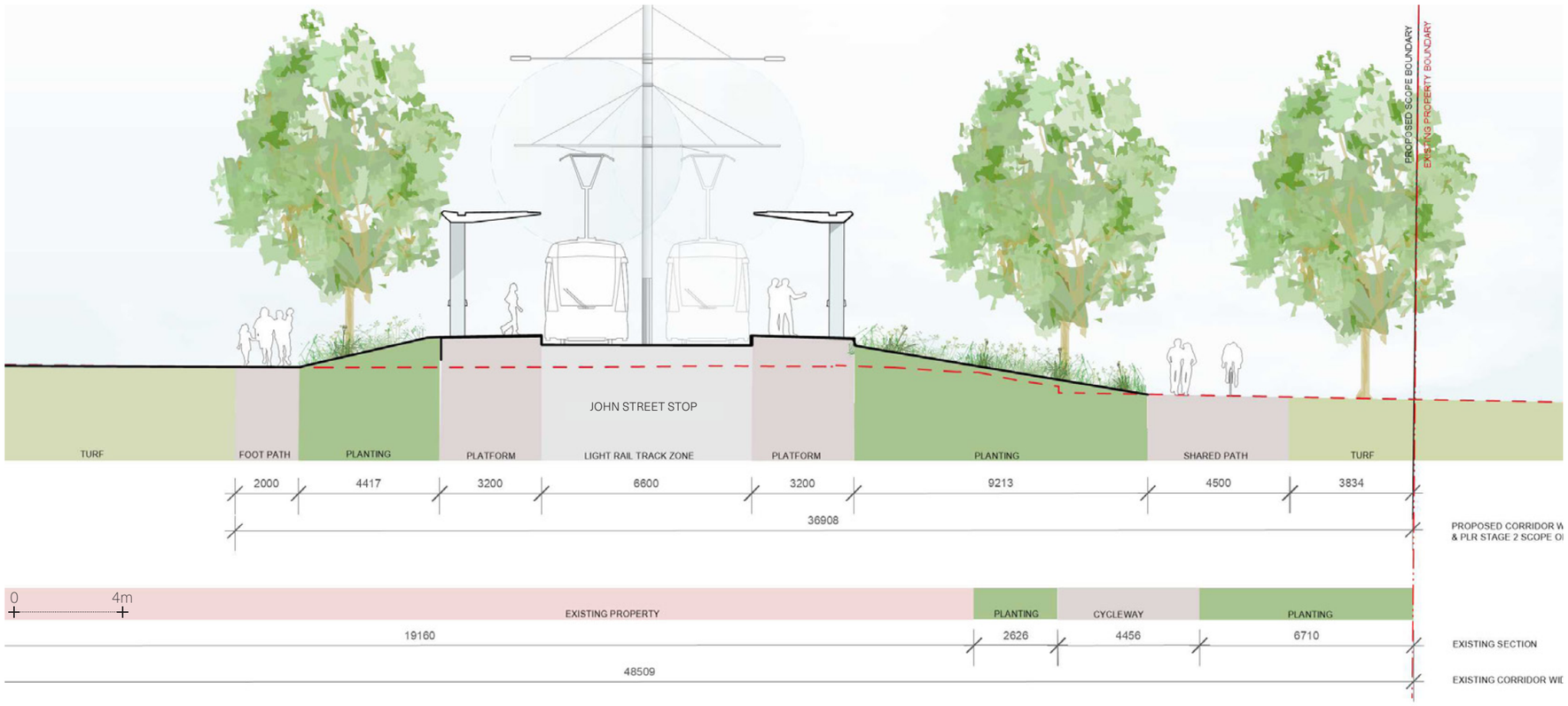

Figure 21: Cross section 02 - John Street Stop (indicative only - subject to design development).

Transport integration

The John Street stop would allow for interchange with Rydalmere Ferry Wharf via accessible and intuitive connections.

New signalised intersections at John Street, Antoine Street, and South Street would allow for the project to safely transition from the stop precinct to the connecting road network.

New walking and cycling connections would be provided between the new bridge over the Parramatta River, existing pathways within Eric Primrose Reserve, and new routes proposed as part of the project along South Street.

Walking and cycling connections through the John Street stop precinct would be provided via a shared path. Pedestrian access to the stop would be provided via footpaths, steps and ramps to both ends of the stop platforms. Bicycle parking would be integrated within the stop precinct in public spaces near the stop platforms.

Visual amenity

Updates to the visual amenity as a result of this proposed change are described in chapter 6 of the Amendment Report.

Figure 22: Row of street trees screening light rail from adjacent residential buildings, Paris, France (credit: Gordon Stewart).

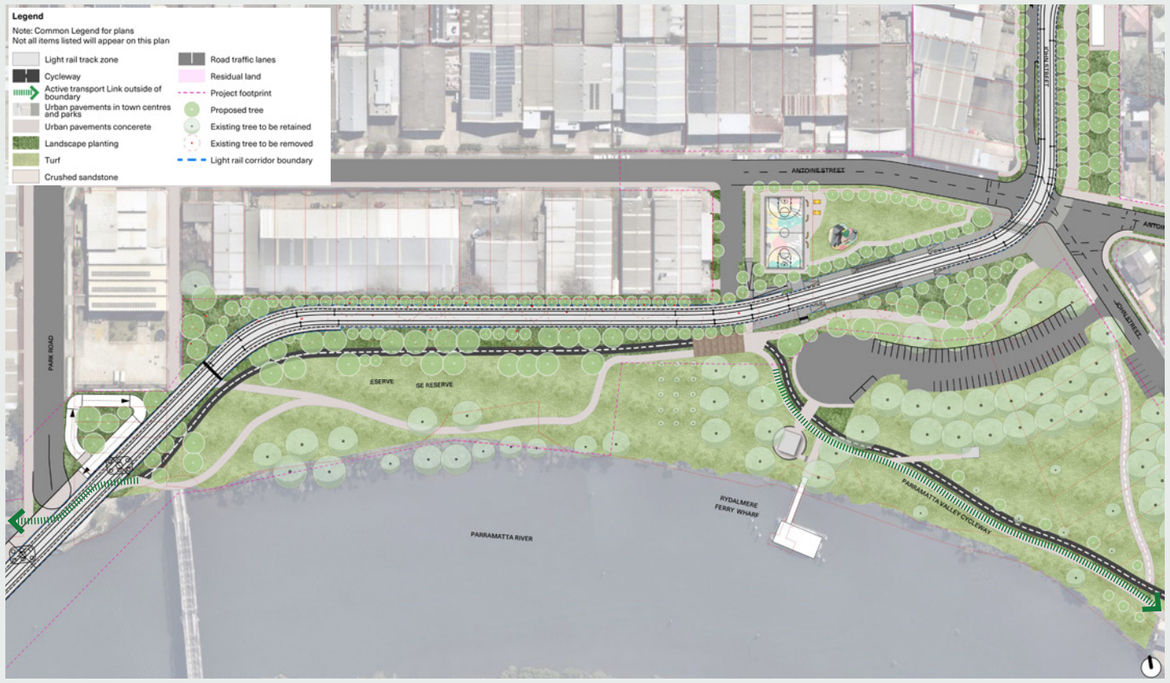

Figure 23: Eric Primrose Reserve concept plan.

3.1.6 Eric Primrose Reserve concept

The amended alignment and bridge between Camellia and Rydalmere would provide the project with an opportunity to improve existing open space in Eric Primrose Reserve. New open space would also be created surrounding to the light rail stop.

The amended alignment would relocate the John Street stop closer to Rydalmere Ferry Wharf. Parkland improvements would include the delivery of new recreation amenities and facilities, better walking and cycling connections through the stop and ferry wharf environment, and improvements to the Parramatta Valley Cycleway within the project footprint.

The concept materials presented in Figure 23 and Figure 24 illustrate potential park improvements that are subject to ongoing design development and consultation with stakeholders.

Concept design objectives

Light rail

- Safe and accessible stop platforms
- Continuous walking and cycling connections through the stop precinct
- Direct and accessible interchange to the ferry wharf

Circulation

- Improved alignment of Parramatta Valley Cycleway through the wharf precinct (by others)
- Integrating the Parramatta Valley Cycleway with the walking and cycling infrastructure with the Parramatta Light Rail active transport link

Parkland amenity

- Improved and safe alternative cycling routes through parkland
- Additional recreational amenity
- Reduced impact to parking
- Access to Parramatta River
- Resting points to support the Parramatta Valley Cycleway

Figure 24: Eric Primrose Reserve indicative concept precedent images.

3.2 Melrose Park to Wentworth Point bridge

3.2.1 Alignment summary

This section of the report describes and illustrates changes to the power traction substation within the Atkins Road precinct, and in the updated alignment for the bridge between Melrose Park and Wentworth Point, the subsequent impacts to the adjacent residential properties, the high voltage power lines, Ermington boat ramp, and associated open space.

The project as described in the EIS included a bridge located between the southern end of Wharf Road in Melrose Park and the northern end of Wentworth Point. It is proposed to amend the alignment and locate the bridge further to the west to avoid direct impacts to residential properties. The works would also include the removal of the high voltage power tower and relocation of wires with three new poles.

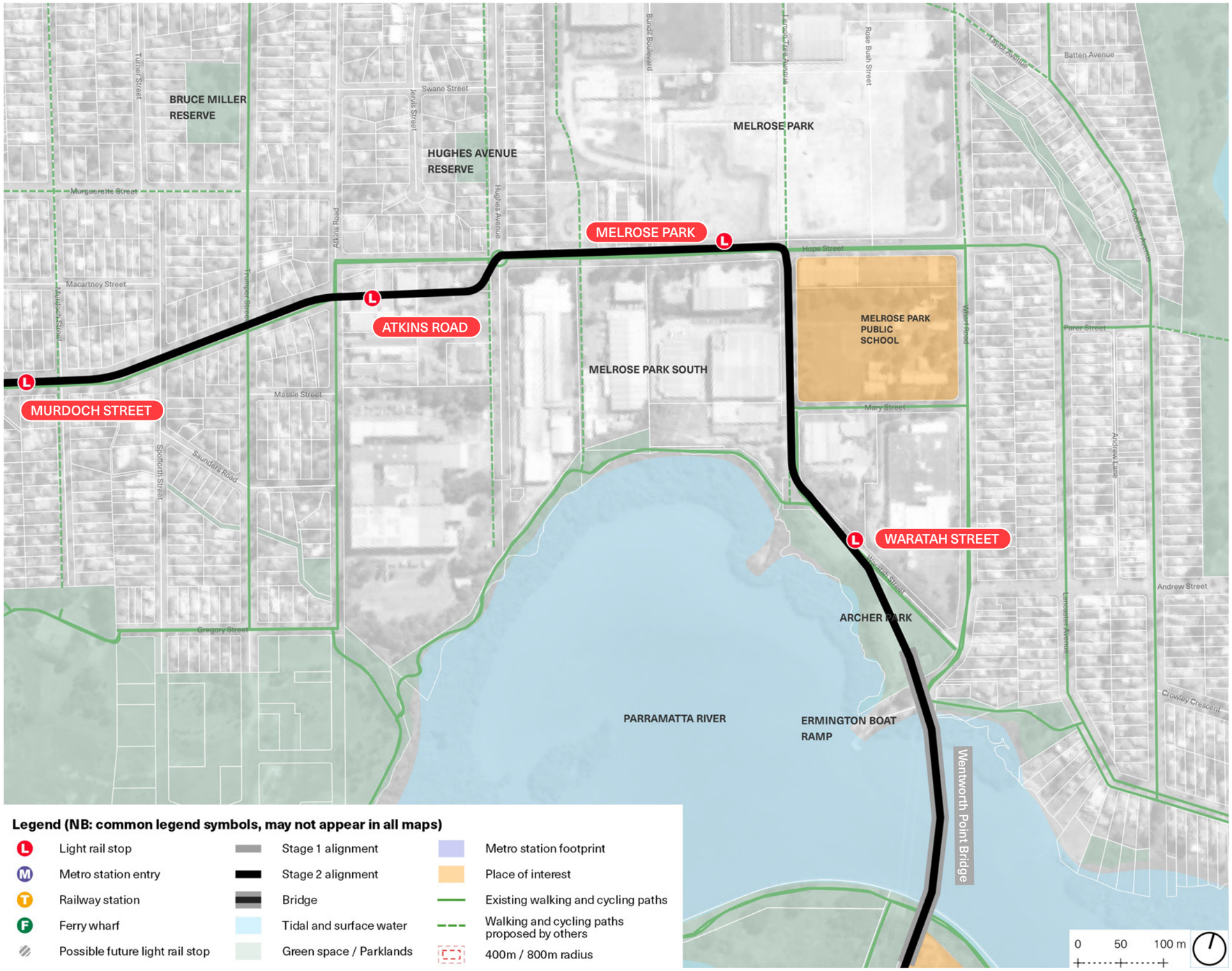

Figure 25: Overview map - Melrose Park.

3.3 Substation at Atkins Road stop

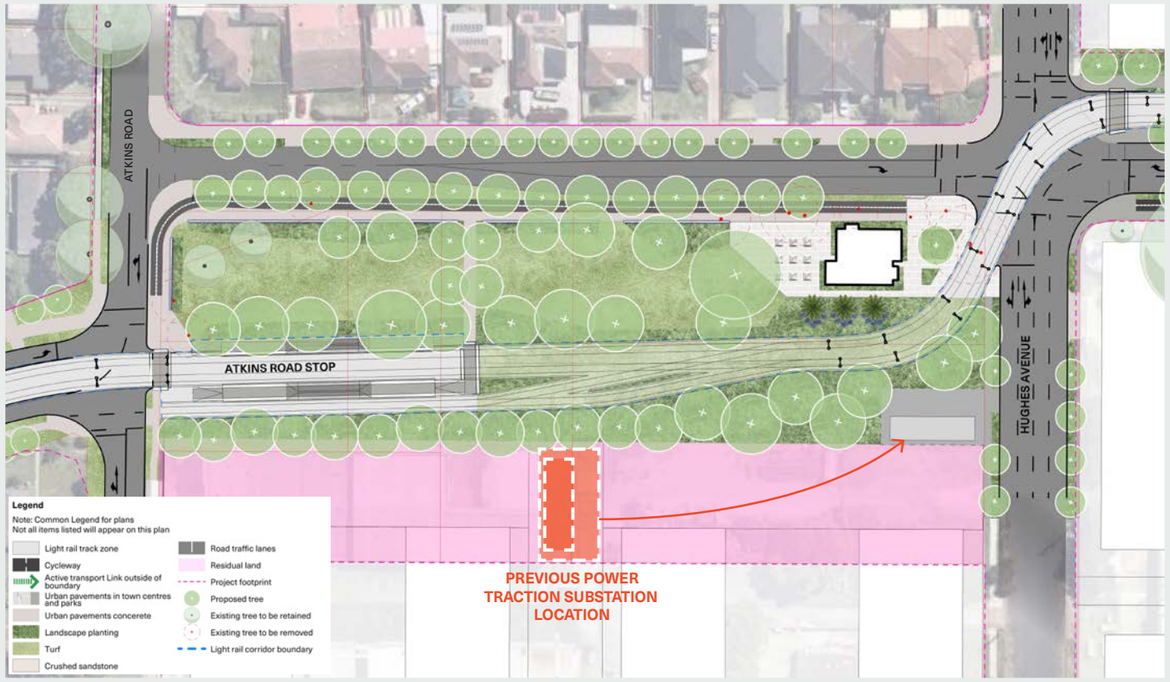

Figure 27: Atkins Road concept open space and power traction substation relocation.

3.3.1 Relocation overview

The location of the traction power substation within the Definition Design and EIS was the result of a prior version of the road design through the Atkins Road stop precinct, with maintenance and service access provided between the prior road design and the previous power traction substation location (shown red above).

The road design through Atkins Road stop precinct has since been updated. The previous power traction substation location would require an access road of about 180 metres, resulting in a reduced amount of landscape space delivered by the project, and an inefficient use of the open space.

The concept plan presented above proposes the power traction substation be relocated to the south eastern corner of the Atkins Road stop precinct fronting Hughes Avenue. This would allow for maintenance access to the facility via an existing public street, provides an overall increase in landscape space , and allows for the reduction in the project footprint.

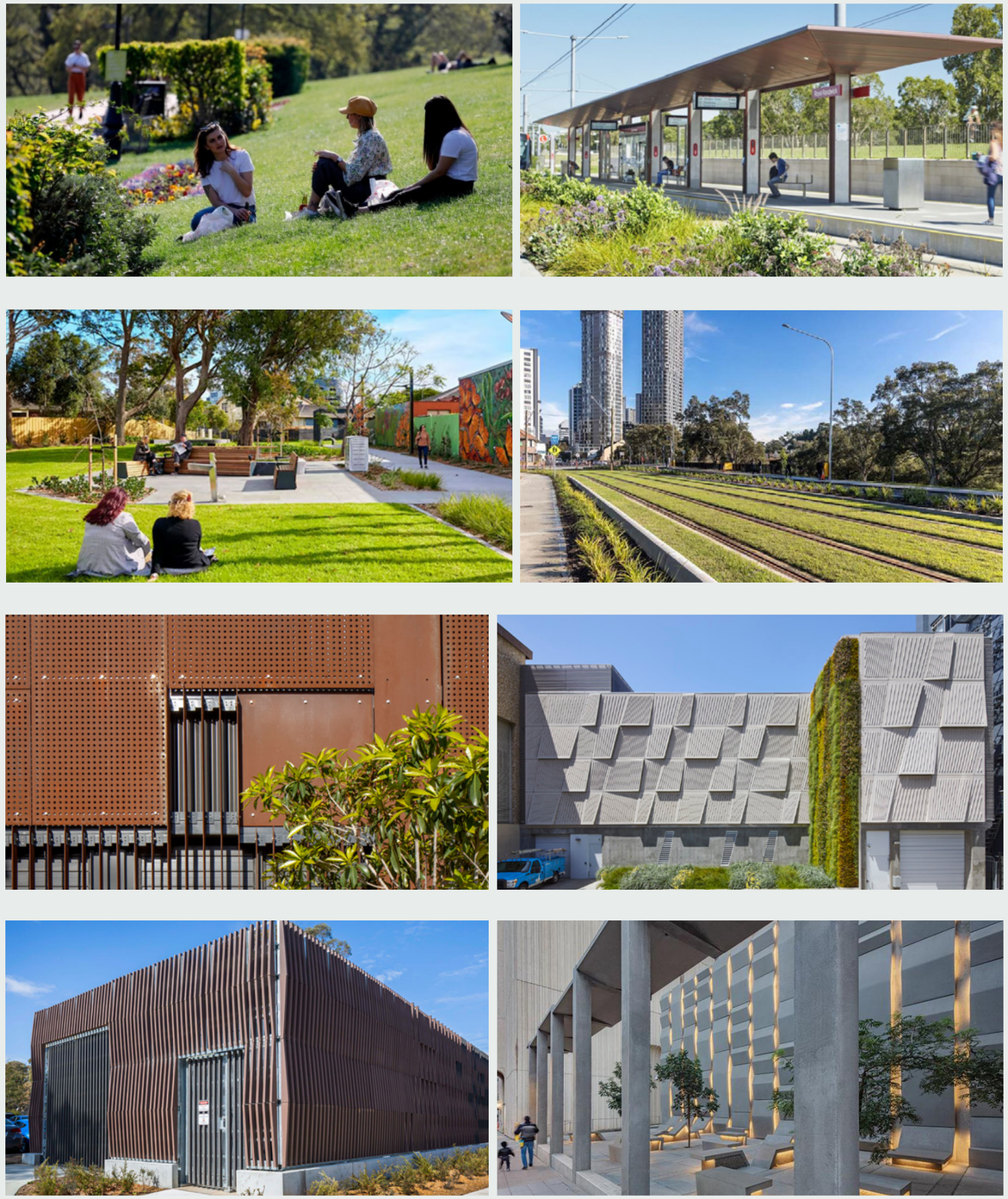

Figure 26: Atkins Road concept open space and substation precedent images.

3.4 New bridge between Melrose Park and Wentworth Point

3.4.1 Bridge overview

The amended bridge alignment and design results in the residential properties noted for acquisition in the EIS being retained. This change necessitates the removal and replacement of the existing high voltage transmission tower, and a redesign of Archer Park and access driveway to Ermington boat ramp.

The new curved alignment results in a bridge length of about 320m long between abutments and 350m between approaches, 230m of which occurs over the river. A number of options for bridge types were developed and tested for the river crossing. Following a multi-criteria analysis process a preferred type was selected, this being a concrete box girder balanced cantilever bridge.

This bridge would deliver three roughly equal spans within the river. The arrangement of walking and cycling facilities has been amended to a single sided 6m shared path on the eastern side of the bridge, allowing for improved tie-ins with the open spaces on both foreshores.

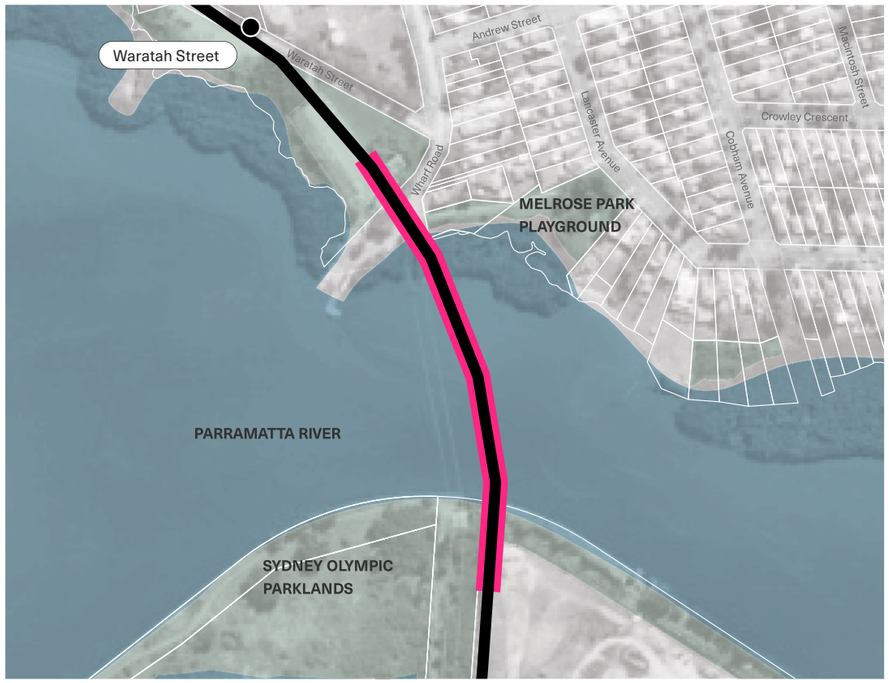

Figure 28: Overview map - New bridge between Melrose Park and Wentworth Point.

3.4.2 Bridge design requirements

Site-specific urban design requirements have been established for the new bridge between Melrose Park and Wentworth Point in response to the project's bridge design principles and objectives as outlined in the adjacent table.

These remain largely consistent with the EIS Technical Paper 1 (Design Place and Movement Report), however minor refinements to the bridge's urban design requirements are presented in red text within Table 6.

Table 6: New bridge between Melrose Park and Wentworth Point - principles, objectives and design requirements

BRIDGE DESIGN PRINCIPLES + OBJECTIVES	WENTWORTH POINT BRIDGE URBAN DESIGN REQUIREMENTS
Design quality **Objective: Designs are to achieve high quality outcomes and elegant proportions to reduce visual and physical impacts and create an asset to the adjacent neighbourhoods and region.**	• Responsive to landing in the parkland context of Ermington Boat ramp (in Melrose Park), the significant areas of mangroves that exist along the Parramatta River at this location; adjacent to residential properties along Wharf Road, and the access and function of Ermington Boat Ramp. • Integration of the main span to supporting spans and all design elements - overhead wires, lighting, balustrades, crash barriers and the like. • Bridge would provide views up and down the river and over adjacent foreshore areas. • Bridge viewed from the river and foreshore paths. Particular consideration of views from Melrose Park and foreshore reserves along Wentworth Point. • Consideration given to the bridge as a significant structure spanning the river and the first bridge for the project when traveling east to west.
Responsive to context **Objective: Designs are to respond sensitively to the landscape, its history, social rituals and cultural significance.**	• Minimise visual impact to existing and future development at Melrose Park and Wentworth Point, minimise impacts to existing vegetation, particularly the mangroves and significant trees. • Minimise visual impact to residents along Wharf Road. Provide buffers of additional planting to manage privacy and light pollution. • Consider, manage and reflect the river edge, foreshore and parkland landscape. And the integration of the bridge design with the future Hill Road development. • Provide legible intuitive active transport connections from the bridge to the existing and proposed foreshore paths. • Provide minimal lighting to the bridge structure, reducing the environmental impact to the river, and the sensitive parklands within Sydney Olympic Park.
Environmentally sensitive **Objective: Minimise impact to the environment through the placement of bridge elements and consideration of construction impacts.**	• Minimise impacts to the foreshore areas, mangroves, and wetland areas and carefully locating bridge piers and bridge abutments and considering the overall bridge design to minimise impacts both during and post construction. • Consider ways in which the pile cap design can enhance the ecology of the river. • Consider ways the bridge abutments can contribute to ecological and habitat creation outcomes. • Minimise impacts to remediated lands (e.g. Woo-la-ra) in Wentworth Point.
User friendly **Objective: Provide equitable access, integrate pedestrian and bicycle facilities and connect to adjacent networks in a safe, legible and convenient way.**	• Resting points, shade structures and views to be considered in the design of the bridge. Active transport link widths to allow for resting points and passing places. • Safe access to the bridge, and connections to the foreshore. CPTED issues created by bisecting the Melrose Park and landing in the Hill Road Development site to be carefully considered. • Ease of navigation along the river and below the bridge. Navigation by pedestrians and cyclists on and off the bridge should be intuitive. • Provide a 6m shared path on the eastern side of the bridge with direct access to the Parramatta Valley Cycleway and foreshore paths on both sides of the river.
Value **Objective: Provide value for money and an asset of lasting value to all, through good design, innovation, and collaboration.**	• Consider the amenity of the Ermington Boat ramp, the recreational uses on both sides of the river, and future foreshore areas in Wentworth Point. • Consider the use of common design elements, establishing economies of scale in design and construction. • Ensure the bridge design embeds safety-in-design outcomes for construction and operations. • Minimise maintenance from the river. • Seek innovation throughout the design and construction process to continually improve and add value. • Ensure ongoing implementation of design excellence in the composition of the bridge, maximising the benefits of the bridge and outcomes for the context.

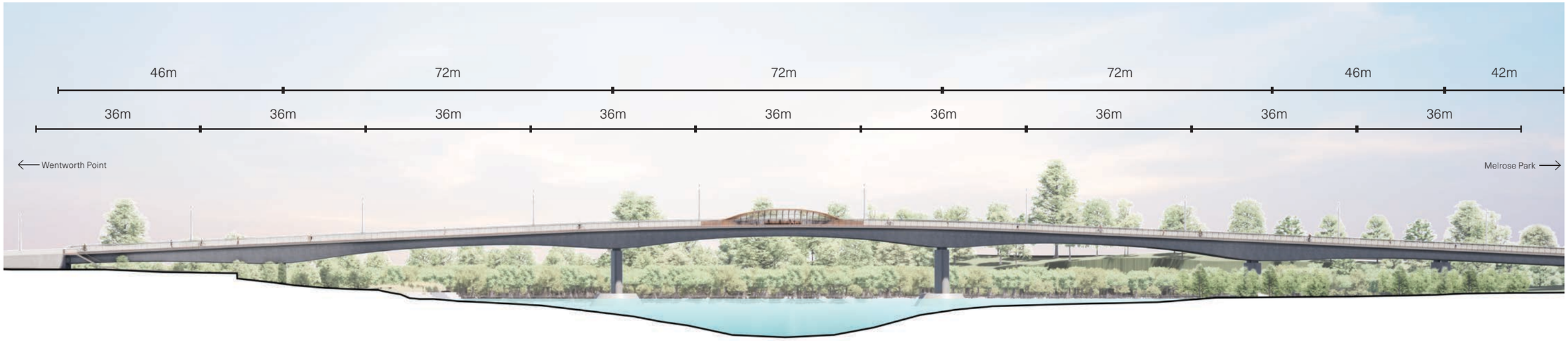

Figure 29: East elevation - New bridge between Melrose Park and Wentworth Point (indicative only - subject to design development).

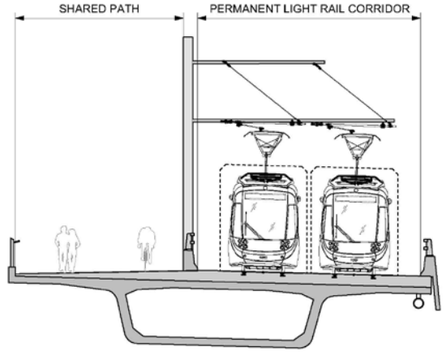

Figure 30: Typical cross section - New bridge between Melrose Park and Wentworth Point at mid-span (indicative only - subject to design development).

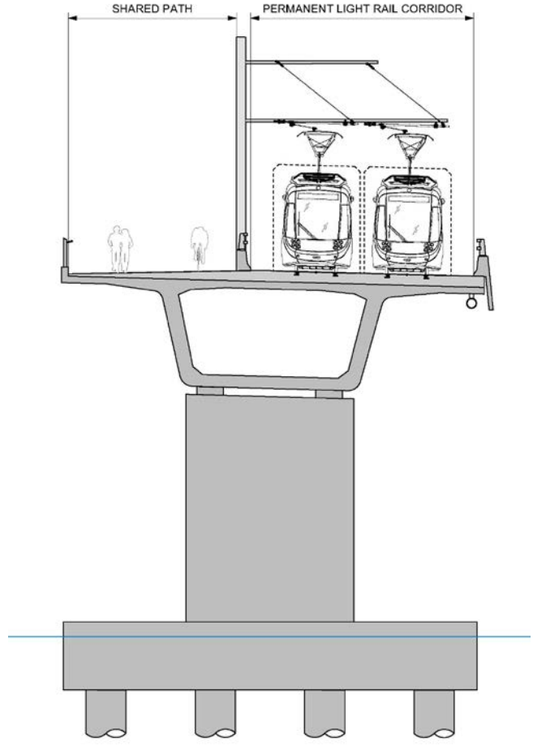

Figure 31: Typical cross section - New bridge between Melrose Park and Wentworth Point at bridge pier (indicative only - subject to design development).

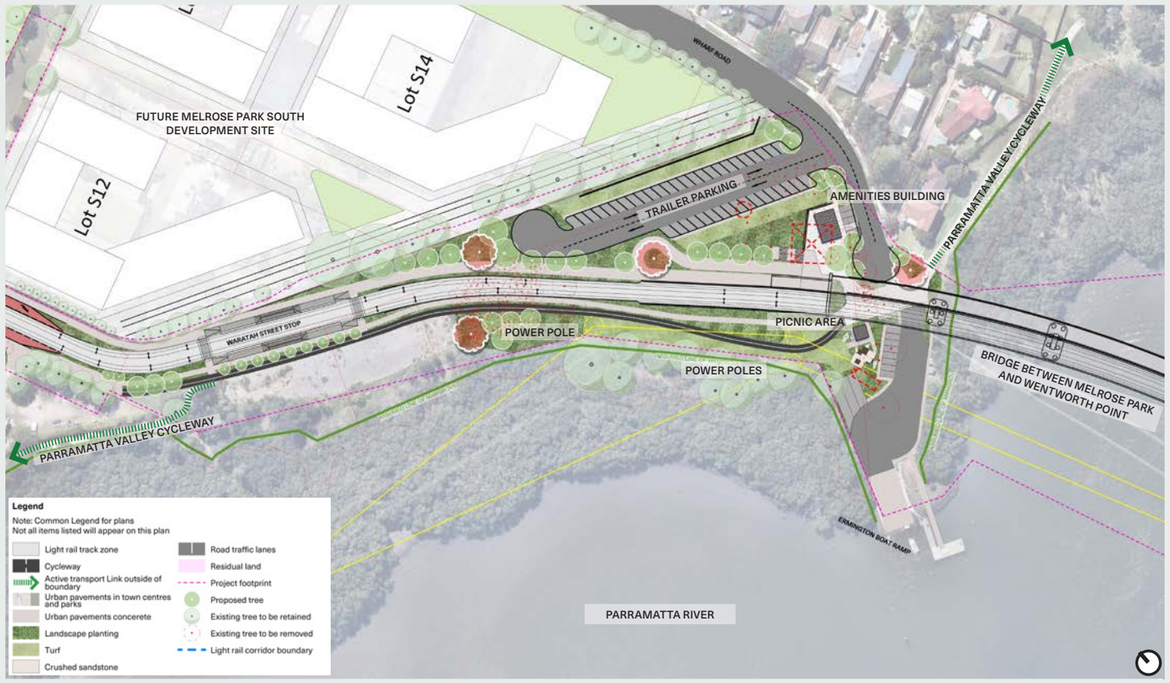

Figure 32: Archer Park indicative concept plan.

3.4.3 Archer Park and Ermington boat ramp

Changes to Archer Park are the result of the new bridge and track alignment, which would shift west further into Archer Park to eliminate impact to the adjacent residential properties on Wharf Road.

As a result of the alignment and bridge updates, the existing lattice high voltage transmission tower would require replacement with three new power poles (shown yellow in the plan above). Two of these poles would be located directly south west of the original tower in the turfed area currently used for boat and trailer parking, and one located further north. This update would necessitate a new Ausgrid easement to align with the new power pole locations.

The Ermington boat ramp and associated facilities, including the trailer parking area, would also be amended due to the updated alignment and bridge location. Access to the boat ramp would be facilitated via a two-way driveway. Boat and trailer parking would be located to the north east of the alignment with the same number of boat and trailer parking bays as in the EIS, as shown in the plan above.

A shared path is proposed on one side the bridge. This would turn around at the bridge landing and enter a pedestrian and cyclist shared plaza connecting to the Parramatta Valley Cycleway. This space would be a place to gather with seating walls and parkland amenities such as bike parking and drinking fountains.

The changes to the open space within Archer Park include adjustments to the location of parkland picnic facilities, including a shade structure, tables and benches, BBQ, and a new amenities building.

Due to the location of the new power poles and easement, the existing amenity block (shown in red in the plan above) would require demolition and replacement to the north east of the new bridge and accessed via the pedestrian and cyclist shared plaza.

Figure 33: Archer Park indicative concept precedent images.

3.5 Bridge at Hill Road

The project as described in the EIS included retaining the existing Hill Road bridge in Sydney Olympic Park and providing a new bridge for light rail vehicles on the western side of the existing bridge.

It is now proposed to remove the existing bridge at Hill Road and construct a new bridge, which would accommodate road traffic and light rail vehicles in an on-road (segregated) running corridor. The new bridge would include the light rail corridor along its north western edge, four lanes of traffic located centrally, and a 3.5m wide shared path on its southern edge.

The new bridge would be a single span, concrete structure, about 20m long and 38m wide. It would be of a similar height to the existing bridge.

The benefits of this new bridge include a single structure designed to current standards, compliance on flood immunity and performance, reduction of impact area in Narawang Wetland, and no widening to the western side and impact on the existing flood control weir.

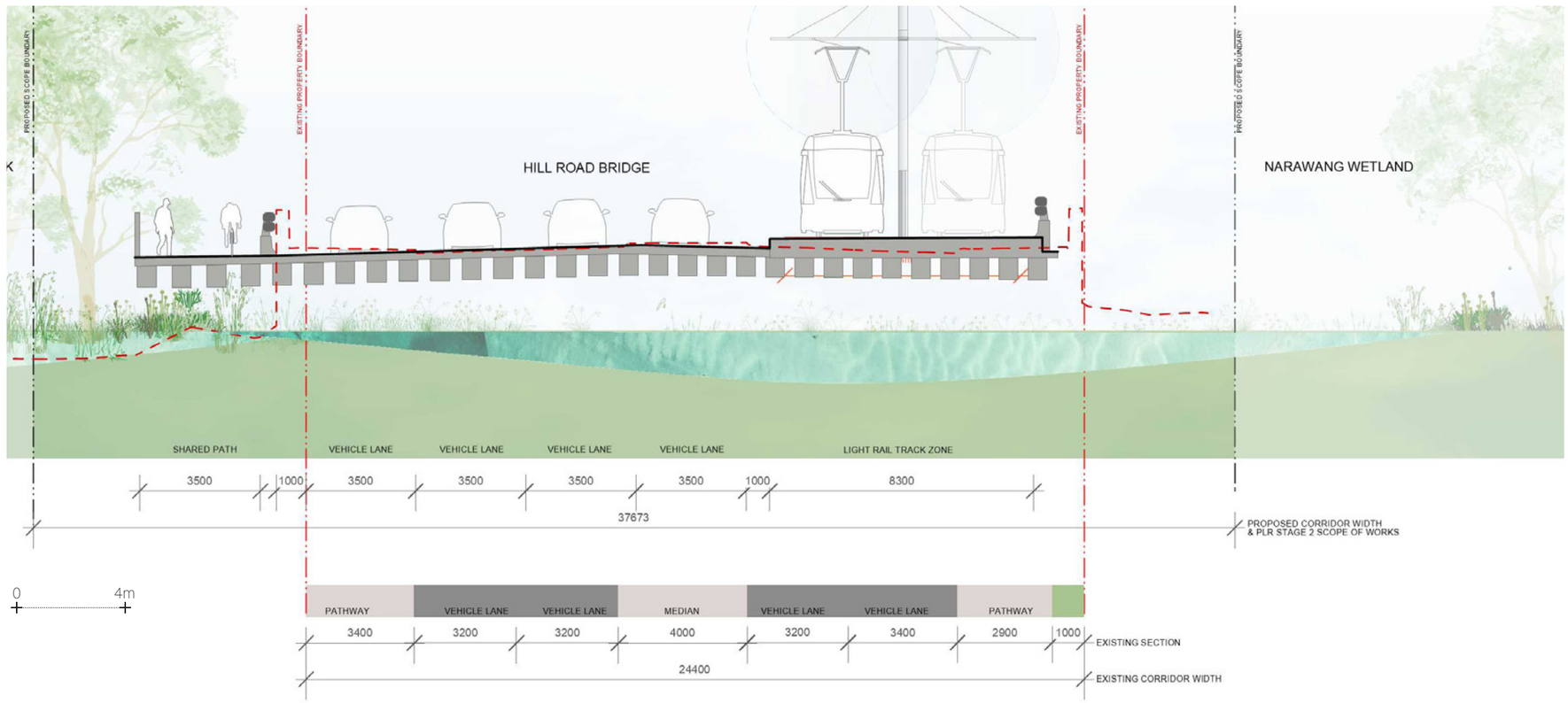

Figure 34: Cross section 20 - Hill Road bridge over Haslams Creek (indicative only - subject to design development).

Figure 35: Light rail located on dedicated bridge, Porto, Portugal (credit: Planode Metro).

Figure 36: Shared path along light rail interfacing with wetlands, Randwick, Australia (credit: ASPECT Studios).

Figure 37: Shared path along light rail with connection to stop, Randwick, Australia (credit: ASPECT Studios).