

### 3 Approval and assessment requirements

*This chapter provides a summary of the project's approval requirements under relevant legislation, and the application and assessment process for the project. The chapter also considers the consistency of the project with other relevant statutory requirements.*

#### 3.1 Summary of requirements

The project is State significant infrastructure in accordance with Division 5.2 of the EP&A Act, by operation of the State and Regional Development SEPP and the Infrastructure SEPP. As State significant infrastructure the project is permissible without development consent and is subject to assessment and approval by the NSW Minister for Planning and Public Spaces.

The key steps in the planning approval process for the project are shown in Figure 3.1. The assessment and approval requirements under the EP&A Act are described in section 3.2. Other approvals and permits are also required, as described in section 3.3.

#### 3.2 Approval and assessment requirements under the EP&A Act

The EP&A Act and the Regulation provide the framework for development assessment in NSW. The EP&A Act and the Regulation include provisions to ensure that the potential environmental impacts of a development are considered in the decision making process prior to proceeding to construction.

The key requirements of the EP&A Act in relation to the approval and assessment of the project are described below and shown in Figure 3.1. This is discussed further in Section 3.2.2.

Clause 79(1) of the Infrastructure SEPP permits development for the purpose of a railway or rail infrastructure facilities to be carried out by or on behalf of a public authority without consent on any land. As the project is characterised as development for the purpose of a railway or rail infrastructure facilities and ARTC is identified as a public authority for development connected with 'rail corridors or railway infrastructure facilities' under clause 5 of the SEPP, development consent under Part 4 of the EP&A Act is not required for the project.

Part 5 of the EP&A Act defines the assessment process for infrastructure activities that do not need development consent. In accordance with section 5.1(1), ARTC is the proponent and determining authority for the project.

Section 5.12(2) of the EP&A Act provides that a State environmental planning policy may declare any development, or any class or description of development, to be State significant infrastructure. Clause 14(1) of the State and Regional Development SEPP provides that development is State significant infrastructure if it is permissible without development consent by virtue of the operation of a State environmental planning policy, and it is specified in the categories of development in Schedule 3 of the State and Regional Development SEPP.

Schedule 3 (clause 3) of the State and Regional Development SEPP defines 'rail infrastructure' as '*Development for the purpose of rail infrastructure by or on behalf of the Australian Rail Track Corporation that has a capital investment value of more than \$50 million.*'

As the project is permissible without development consent, has a capital investment value of about \$120 million and it is being undertaken by ARTC, it meets the requirements of clause 14(1) of the State and Regional Development SEPP.

On this basis, the project is State significant infrastructure and the preparation of an EIS is required (section 5.17(1) of the EP&A Act).

ARTC is seeking the project to be declared by the Minister for Planning and Public Spaces as critical State significant infrastructure under section 5.13 of the EP&A Act.

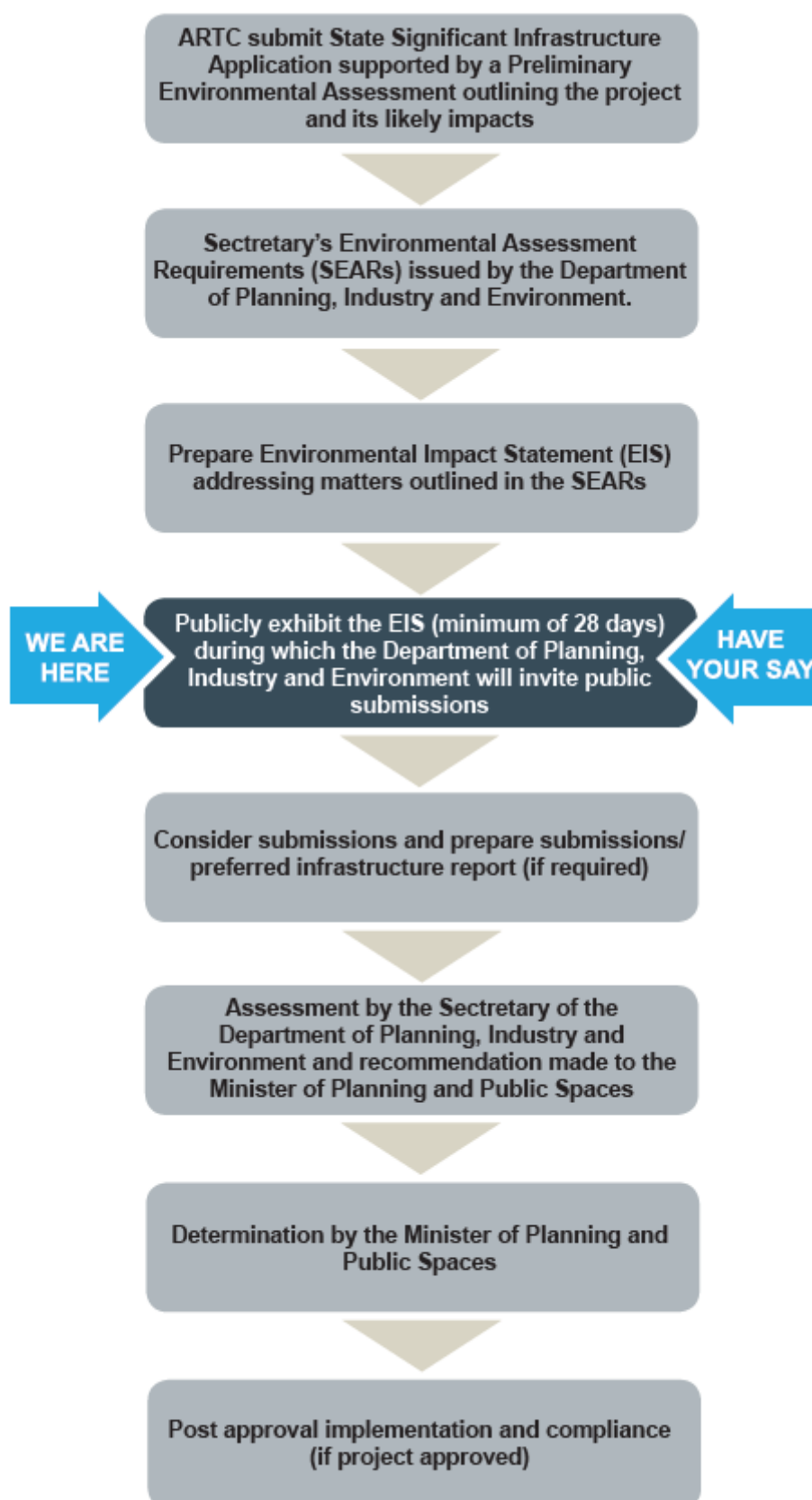


Figure 3.1 NSW planning approvals process for State significant infrastructure

### **3.2.1 Approval authority**

Division 5.2 of the EP&A Act defines the approval requirements for State significant infrastructure. Under section 5.14, the approval of the Minister for Planning and Public Spaces is required for State significant infrastructure.

### **3.2.2 Approval process under Division 5.2 of the EP&A Act**

#### **3.2.2.1 Environmental assessment requirements**

In accordance with section 5.15(2) of the EP&A Act, an application for State significant infrastructure needs to describe the infrastructure and contain any other matter required by the Planning Secretary. The SEARs for the project, issued on 17 May 2018, define the matters the Secretary requires the EIS to address (in accordance with section 5.17 of the EP&A Act). The requirements detailed in the SEARs, together with where they are addressed by this EIS, are provided in Appendix A.

The form and content requirements for the EIS are defined by Schedule 2 of the Regulation. These requirements, and how they are addressed by the EIS, are provided in Appendix B.

#### **3.2.2.2 Public exhibition and submissions**

The Department of Planning, Industry and Environment will place the EIS on public exhibition for a minimum of 28 days. During the exhibition period, interested parties can review the EIS and make a written submission to the Department of Planning, Industry and Environment for consideration during the assessment process.

At the completion of the public exhibition period, the Department of Planning, Industry and Environment will provide ARTC a copy of the submissions received. After reviewing the submissions, ARTC will prepare a submission report that responds to the relevant issues raised. If changes are required to the project to respond to the issues raised or to minimise environmental impacts, a preferred infrastructure report may also be required. The report will be made available to the public. Further information on the proposed approach to consultation during the exhibition period is provided in Chapter 4 (Consultation).

#### **3.2.2.3 Assessment and approval**

Following the exhibition period, the Department of Planning, Industry and Environment will prepare an assessment report, which is submitted to the Minister for Planning and Public Spaces for consideration.

Approval from the Minister for Planning and Public Spaces is required before ARTC can proceed with the project (pursuant to section 5.19 of the EP&A Act).

### **3.2.3 Land owner's consent/notification requirements**

Clause 193 of the Regulation provides the owner's consent and notification requirements for State significant infrastructure. In accordance with clause 193(1), as the project is State significant infrastructure being undertaken by a public authority and is for linear transport infrastructure, the consent of individual land owners is not required to make an application.

However, notice of the application needs to be given in accordance with the requirements of clause 193(4).

### **3.2.4 Application of relevant environmental planning instruments**

Section 5.22(2)(a) of the EP&A Act provides that environmental planning instruments (such as State environmental planning policies and local environmental plans) do not apply to or in respect of State significant infrastructure, except where *'they apply to the declaration of infrastructure as State significant infrastructure or as critical State significant infrastructure (and to the declaration of development that does not require consent)'*. The State environmental planning policies relevant to the declaration of the project as



State significant infrastructure and as development that does not require consent are considered in sections 3.2.1 and 3.2.2.

### 3.3 Other NSW legislative requirements

Sections 5.23 and 5.24 of the EP&A Act define the legislation that does not apply to State significant infrastructure, and the approvals that must be applied consistently. In accordance with these sections and relevant legislation, the other approvals that would be required are summarised in Table 3.1. Further information in relation to these requirements is provided in section 3.3.2.

**Table 3.1 Other approval requirements under NSW legislation**

Legislation	Requirement
<i>Protection of the Environment Operations Act 1997</i> (POEO Act)	Operation of the project would be a scheduled activity for the purposes of the POEO Act and would require an environment protection licence (EPL). The need to modify ARTC's existing EPL (EPL #3142) to include the project would be confirmed in consultation with the EPA.
<i>Water Act 1912</i>	A licence would be sought under Part 5 of the <i>Water Act 1912</i> due to the need to undertake dewatering during piling and utility relocation works.

#### 3.3.1 Legislation that does not apply or must be applied consistently

In accordance with section 5.23(1) of the EP&A Act, some legislation does not apply to State significant infrastructure or must be applied consistently. The relevant approvals not required, include:

- a permit under section 201, 205 or 219 of the *Fisheries Management Act 1994*
- an approval under Part 4, or an excavation permit under section 139 of the *Heritage Act 1977*
- an Aboriginal heritage impact permit under section 90 of the *National Parks and Wildlife Act 1974*
- a water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the *Water Management Act 2000*.

In addition, Division 8 of Part 6 of the *Heritage Act 1977* (relating to making heritage orders) does not apply to prevent or interfere with the carrying out of approved State significant infrastructure.

In accordance with section 5.24(1) of the EP&A Act, the following approvals that are potentially required cannot be refused:

- an environment protection licence under Chapter 3 of the POEO Act
- a consent under section 138 of the *Roads Act 1993*.

### 3.3.2 Consideration of requirements under relevant NSW Acts

NSW environmental planning related legislation relevant to the project is identified in Table 3.2.

**Table 3.2** Consideration of requirements under relevant NSW legislation

Legislation	Requirement
<i>Protection of the Environment Operations Act 1997 (POEO Act)</i>	<p>An EPL is required under Chapter 3 of the POEO Act to undertake a scheduled activity or scheduled development work (listed in Schedule 1). The project meets the definition of '33 Railway systems activities' in Schedule 1.</p> <p>Operation of the project would be a scheduled activity for the purposes of the POEO Act and would require an EPL. ARTC have an existing EPL (EPL #3142) that authorises rail system activities on the rail network. The need to modify ARTC's existing EPL to include the project would be confirmed in consultation with the EPA.</p>
<i>Roads Act 1993</i>	<p>Under section 138 of the <i>Roads Act 1993</i>, approval from the relevant roads authority is required to disturb, erect a structure, or carry out work in, on or over a public road. Clause 5(1) of Schedule 2 to the Roads Act exempts public authorities from this requirement, except in relation to works on or over classified and Crown roads.</p> <p>As discussed in section 3.2.1, ARTC is identified as a public authority for development connected with 'rail corridors or railway infrastructure facilities' under clause 5 of the Infrastructure SEPP. Additionally, the project does not include works to a classified public road. As such, approval is not required under the Roads Act 1993.</p>
<i>Water Management Act 2000 and Water Act 1912</i>	<p>The provisions of the <i>Water Management Act 2000</i> are being progressively implemented to replace the <i>Water Act 1912</i>. Since 1 July 2004 the new licensing and approvals system has generally been in effect in those areas of NSW covered by operational water sharing plans. The study area is covered by the Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2011.</p> <p>Temporary dewatering and construction activities that interfere with aquifers are generally identified as aquifer interference activities in accordance with the <i>Water Management Act 1912</i> and the <i>NSW Aquifer Interference Policy (DPI 2012)</i>. However, the aquifer interference approval provisions of the <i>Water Management Act 2000</i> have not commenced, and licensing of these activities is carried out under Part 5 of the <i>Water Act 1912</i>.</p> <p>Construction of the project would involve piling works for construction of the bridges and retaining walls, which is likely to intercept groundwater. A licence would be sought under Part 5 of the <i>Water Act 1912</i> if extraction of groundwater in the form of dewatering is required.</p>
<i>Contaminated Land Management Act 1997</i>	<p>Section 60 of the <i>Contaminated Land Management Act 1997</i> outlines the circumstances in which notification of the EPA is required in relation to the contamination of land.</p> <p>The EPA would be notified in writing of contamination identified within the project area, in accordance with the requirements of section 60 of the Act.</p>
<i>Fisheries Management Act 1994</i>	<p>Section 199 of the <i>Fisheries Management Act 1994</i> requires a public authority to notify the Minister prior to carrying out dredging or reclamation (defined by section 198A).</p> <p>The project would require works near Cabramatta Creek, which may trigger the notification requirements of the Act. Further information on the works required is provided in Chapters 6 and 7 (Project description – operation and construction). The</p>

Legislation	Requirement
	<p>potential impacts on the creek are considered in Chapter 13 (Hydrology, flooding and water quality).</p> <p>The Minister for Primary Industries would be notified in writing if dredging or reclamation work is required, in accordance with the requirements of section 199.</p>
<i>Heritage Act 1977</i>	<p>Section 146 of the <i>Heritage Act 1997</i> requires that the Heritage Council be notified if a relic is uncovered, where it is reasonable to believe that the Heritage Council is unaware of the location of the relic.</p> <p>The Heritage Council would be notified in writing of relics uncovered during construction, in accordance with the requirements of section 146.</p>
<i>Land Acquisition (Just Terms Compensation) Act 1991</i>	<p>The <i>Land Acquisition (Just Terms Compensation) Act 1991</i> specifies the procedures and requirements for the acquisition of land for a public purpose.</p> <p>Chapter 16 (Land use and property) provides information on the acquisition of private property required for the project. Acquisition would be undertaken in accordance with this Act.</p>
<i>Biosecurity Act 2015</i>	<p>The <i>Biosecurity Act 2015</i> provides for the prevention, elimination, minimisation and management of biosecurity risks. Landowners have a responsibility to control invasive weeds on their land, including public authorities.</p> <p>The approach to managing weeds during construction is provided in Chapter 11 (Biodiversity).</p>
<i>Waste Avoidance and Resource Recovery Act 2001</i>	<p>The <i>Waste Avoidance and Resource Recovery Act 2001</i> encourages the most efficient use of resources to reduce environmental harm.</p> <p>As described in Chapter 19 (Waste), waste resulting from the project would be managed in accordance with the requirements of this Act.</p>

### 3.4 Requirements under Commonwealth legislation

#### 3.4.1 Environment Protection and Biodiversity Conservation Act 1999

Under Part 3 the EPBC Act, approval from the Australian Government Minister for the Environment would be required for an action that:

- has, will have, or is likely to have a significant impact on a matter of national environmental significance
- is undertaken on Commonwealth land and has, will have, or is likely to have a significant impact on the environment
- is undertaken outside Commonwealth land and has, will have or is likely to have a significant impact on the environment of Commonwealth land
- is undertaken by the Commonwealth and has, will have or is likely to have a significant impact on the environment.

Matters of national environmental significance comprise:

- world heritage properties
- national heritage places
- wetlands of international importance
- Commonwealth-listed threatened species and ecological communities

- Commonwealth-listed migratory species
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mines)
- a water resource, in relation to coal seam gas development and large coal mining development.

An EPBC Act protected matters search was undertaken on 20 September 2018 for an area within a 10 kilometre radius of the project site. No world, national or Commonwealth heritage items have been identified within or adjacent to the project area.

The potential for impacts on ecological matters of national environmental significance are considered in Chapter 11 (Biodiversity). No potential significant impacts were identified.

The project would not impact on Commonwealth marine areas or the Great Barrier Reef Marine Park, and it does not involve a nuclear action or coal seam gas/coal mining.

As no significant impacts on matters of national environmental significance or Commonwealth land are predicted, and the project is not being undertaken by a Commonwealth agency, approval under the EPBC Act is not required.

#### **3.4.2 Native Title Act 1993**

The main objective of the *Native Title Act 1993* is to recognise and protect native title. Section 8 states that the *Native Title Act 1993* is not intended to affect the operation of any law of a State or a Territory that is capable of operating concurrently with the Act. Searches of the register maintained by the National Native Title Tribunal indicated that there are no native title claims registered with respect to land within the project area. The project also would not directly affect Crown land that is currently the subject of a native title claim.

## 4 Consultation

*This chapter describes the engagement and consultation undertaken for the project and the EIS to date, and proposed during EIS exhibition and construction. The key issues raised and relevant to the EIS are summarised below.*

### 4.1 Consultation approach and strategy

#### 4.1.1 Overall approach and objectives

ARTC is committed to active engagement with the community and key stakeholders in the projects it undertakes. ARTC's approach to consultation for this project aims to:

- build relationships with the community and key stakeholders
- ensure that the local community and key stakeholders are informed about the project and given the opportunity to provide feedback
- demonstrate an understanding of community concerns and values
- manage community and key stakeholder feedback and complaints in a timely, respectful way
- build community and stakeholder confidence in ARTC and the decisions it makes.

ARTC is implementing a comprehensive community and stakeholder consultation program to engage proactively with local communities and key stakeholders about the project. In addition to the local community, the key stakeholders for the project include:

- Fairfield and Liverpool councils
- local community groups
- representatives of community infrastructure and facilities in the vicinity of the project site
- rail commuters
- Aboriginal community groups
- elected representatives
- Transport for NSW
- Sydney Trains
- NSW Ports
- utility providers.

#### 4.1.2 Consultation plan

Community and stakeholder engagement for the project commenced in early 2018. A Stakeholder Engagement Strategy was developed to identify and guide the objectives and expected outcomes of consultation during each stage of the consultation process, including:

- prior to and during preparation of the EIS
- during exhibition of the EIS
- prior to construction.

A community and stakeholder engagement plan would be prepared prior to main construction works to guide the construction phase of works and would aim to detail the approach to communication between ARTC and

its Construction Contractor(s), and the community and government authorities. This is discussed further in section 22.1.2.

## **4.2 Consultation undertaken prior to and during preparation of the EIS**

### **4.2.1 Consultation activities**

The purpose of this stage of consultation was to introduce the project to the community and key stakeholders, and to seek input (in terms of issues and concerns) to inform the EIS preparation and design process. A summary of the consultation activities and tools that were utilised during this stage is provided in Table 4.1.

Given the cultural diversity within the LGAs (refer to section 2.2.2) guidance on how to access translation and interpretative services were provided on all flyers, fact sheets and on the project website, in English, Vietnamese, Mandarin and Arabic.

**Table 4.1 Consultation activities**

<b>Activity</b>	<b>Purpose/outcomes</b>	<b>Timing</b>
Community contact mechanisms: <ul style="list-style-type: none"> <li>• toll free community information line (1300 550 402)</li> <li>• project email (enviroline@artc.com.au)</li> </ul>	<ul style="list-style-type: none"> <li>• Obtain feedback, measure awareness and provide opportunities for input</li> <li>• To date one telephone enquiry has been received</li> </ul>	Established in November 2018
Project website ( <a href="https://www.artc.com.au/projects/cabramatta-loop-project/">https://www.artc.com.au/projects/cabramatta-loop-project/</a> )	<ul style="list-style-type: none"> <li>• Provide information and promote channels through which people can communicate their views, issues, and concerns</li> </ul>	Website went live in February 2019
Printed information: <ul style="list-style-type: none"> <li>• posters</li> <li>• notification letter</li> <li>• engagement strategy</li> </ul>	<ul style="list-style-type: none"> <li>• Raise awareness and understanding</li> <li>• Provide information on the community information session and contact mechanisms</li> <li>• Notification letters were sent to 2,770 addresses within the local area (within 250 metres of the project site) Print and electronic copies sent to Liverpool City Council and Fairfield City Council</li> <li>• Electronic copies were sent to the Principals or key contacts at 3 local schools, 2 local hospitals, and 13 social/recreational clubs (eg Southern Districts Softball Association, CORE Community Service Fairfield) for distribution to parents/members</li> <li>• All key stakeholders and community groups identified in the Stakeholder Engagement Strategy were emailed electronic copies of the notification letter, as were 6 persons who requested to be kept informed via responding on the ARTC website.</li> <li>• The notification letter was posted on the ARTC website.</li> </ul>	February to March 2019

Activity	Purpose/outcomes	Timing
	<ul style="list-style-type: none"> <li>Posters were displayed at Cabramatta and Warwick Farm stations sent to Fairfield City Council and Liverpool City Council</li> <li>Printed Stakeholder Engagement Strategy was available at the drop-in session and provided to councils. Electronic copy was available on the ARTC website.</li> </ul>	
Advertisements	<ul style="list-style-type: none"> <li>Raise awareness of the project</li> <li>Provide information about the community information session</li> <li>Advertisements were placed in local newspapers Fairfield City Champion and Liverpool City Champion</li> </ul>	20 February 2019
Community information session	<ul style="list-style-type: none"> <li>The session was held at Cabravale Community Centre in Cabramatta</li> <li>Five people attended</li> <li>Issues raised included: <ul style="list-style-type: none"> <li>construction approach and impacts</li> <li>impacts to parking</li> <li>noise impacts from freight trains</li> <li>environmental impacts, such as impacts on local wildlife.</li> </ul> </li> </ul>	13 March 2019
Stakeholder meetings and briefings	<ul style="list-style-type: none"> <li>A number of meetings have been held with Liverpool City Council and Fairfield City Council to describe and provide updates to the project as well as seek feedback on key issues and design development, refer below for further detail</li> <li>Discussion with the South District Softball Association on 31 January 2019 to discuss potential impacts the project may have on Jacqui Osmond Reserve</li> <li>Meeting with the principal of Lawrence Hargrave School on 19 March 2019 to provide a project briefing and discuss any concerns held by the school and its wider community</li> <li>Transport for NSW's Transport Management Centre on 17 July 2019 to provide a project briefing and discuss any potential project concerns</li> <li>A meeting was held on 24 May 2019 with private land owners who have the potential to be impacted by project, to provide a project briefing and to discuss site access for utility investigations, as well as property acquisition</li> </ul>	January 2018 to July 2019

#### **4.2.1.1 Consultation with councils**

Consultation with Liverpool City Council and Fairfield City Council was undertaken to provide key information relating to the design of the project, the approach to construction and management of key impacts. Information regarding key design elements was provided to the councils, and review of this information has allowed an understanding of the council's operational needs and asset maintenance requirements to be considered in the project design. This included the following considerations:

- a key area of design input for Fairfield City Council related to the alignment of Broomfield Street including the specifications to adopt for footpaths, lane widths and parking lane widths
- a key area of design input for Liverpool City Council related to the proposed design of the hybrid embankment and retaining wall within and adjacent to Jacquie Osmond Reserve, which has been designed to consider future operations and maintenance of the reserve.

A number of key issues associated with the design and construction of the project have been discussed across a range of meetings including, but not limited to:

- property access
- parking
- consultation, considering residential and business impacts as well as social infrastructure
- construction staging
- compounds
- landscaping.

The following meetings have been held with Liverpool City Council and Fairfield City Council to describe and provide updates to the project as well as seek feedback on key issues and design development:

- Liverpool City Council in January 2018
- Liverpool City Council in October 2018
- Liverpool City Council in December 2018
- Liverpool City Council in January 2019
- Liverpool City Council in February 2019 (two meetings)
- Fairfield City Council in February 2018
- Fairfield City Council in November 2018
- Fairfield City Council in December 2018
- Fairfield City Council in February 2019 (two meetings)
- Fairfield City Council in March 2019
- Fairfield City Council in August 2019

#### **4.2.1.2 Aboriginal Community**

Consultation with the Aboriginal community was undertaken as part of the Aboriginal heritage impact assessment, in accordance with the *Aboriginal cultural heritage consultation requirements for proponents* (DECCW, 2010). This included initial notification of the project to the below stakeholders in November 2018 as part of a request for a list of Aboriginal stakeholders who should be contacted regarding the project:



- Fairfield City Council
- Gandangara Local Aboriginal Land Council
- Greater Sydney Local Land Services
- Liverpool City Council
- National Native Title Tribunal
- NSW Native Title Services Corporation Limited
- Office of Environment and Heritage (OEH)
- Office of the Registrar, Aboriginal Land Rights Act 1983 of Aboriginal Owners.

Further information regarding this consultation process, including the outcomes of this consultation, is provided in Chapter 15 (Aboriginal heritage).

#### **4.2.2 Summary of issues raised**

A summary of the key issues raised during consultation relevant to the project and EIS, including the potential impacts to be considered and the information to be provided by the EIS, is provided in Table 4.2.

**Table 4.2**      **Summary of issues raised**

<b>Issue category</b>	<b>Issues raised</b>	<b>By whom</b>	<b>Where addressed in the EIS</b>
Traffic and transport	Traffic disturbance and management strategies	Councils, Transport for NSW, local residents, Southern Districts Softball Association	<p>Construction traffic impacts, including diversion and traffic management requirements during construction, are described in section 8.3.3. Mitigation measures to minimise these impacts are provided in section 8.5.2. This includes preparation of a construction traffic management plan which would will include measures to minimise the potential for impacts on the community and the operation of the surrounding road and transport environment, including those listed in this EIS.</p> <p>Further information is provided in Technical Report 1 – Traffic, transport and access impact assessment.</p>
	Loss of parking and relocation of on-street parking for local residents and commuters	Councils, local residents, wider community (commuters)	<p>An assessment of parking impacts due to loss of parking during construction and operation is provided in section 8.3.5 and section 8.4.2, respectively. Measures to mitigate impacts associated with loss of parking are provided in section 8.5.2 and includes the provision of temporary parking in the surrounding area to offset loss. The parking assessment concluded that that Broomfield Street has the capacity to absorb the loss of 11 parking spaces that would occur as a result of the project.</p> <p>Further information is provided in Technical Report 1 – Traffic, transport and parking impact assessment.</p>

Issue category	Issues raised	By whom	Where addressed in the EIS
Noise and vibration	Noise impacts during night works	Councils, local residents	<p>The construction noise impact assessment described in section 9.3 included an assessment of noise outside of standard hours, including the potential for sleep disturbance. As described in section 9.5.2 an out of hours protocol will be developed as part of the construction noise and vibration plan which will provide a process for the consideration of out of hours work and procedures to manage potential impacts.</p> <p>Further information is provided in Technical Report 2 – Noise and vibration impact assessment.</p>
	Noise generated by operation of the project	Councils, local residents, Lawrence Hargrave School	<p>An operational noise impact assessment was undertaken and is described in section 9.4. The assessment found that the predicted noise levels would be exceeded at one sensitive receiver. This receiver will be considered for potential noise mitigation as discussed in section 9.5.2.</p> <p>Further information is provided in Technical Report 2 – Noise and vibration impact assessment.</p>
	Noise generated by an increase in rail freight traffic in the early mornings and evenings	Councils, local residents	<p>An operational noise impact assessment was undertaken for the project and is discussed in section 9.4. This assessment considered the impacts associated with an increase in rail freight traffic at all times of the day. As noted above the predicted noise levels were only exceeded at one residence.</p> <p>Further information is provided in Technical Report 2 – Noise and vibration impact assessment.</p>

Issue category	Issues raised	By whom	Where addressed in the ES
Biodiversity	Potential impacts on the local flying fox population at Cabramatta Creek	Councils, local residents	<p>A biodiversity assessment was undertaken for the project and considered potential impacts to the Cabramatta Creek Grey-headed Flying-fox roost camp. This assessment is provided in section 11.3.2. The assessment concluded that given the distance of the Cabramatta Creek Grey-headed Flying-fox roost camp from the project site and the minor magnitude of noise and other residual impacts arising from the project no particular measures to further minimise impacts to the roost camp are required.</p> <p>Further information is provided in Technical Report 4 – Biodiversity development assessment report.</p>
Flooding	Exacerbation of flooding issues on Sussex Street	Fairfield City Council	<p>A flooding impact assessment which considers operation of the project including the realignment of Broomfield Street, was undertaken and is described in section 13.4.1. The assessment found that the project would have a minimal impact on the flooding of the majority of properties along Broomfield Street during the one per cent AEP flood event, due to proposed drainage changes along Broomfield Street. As described in section 13.5, further assessment and design refinement would be undertaken during detailed design to minimise the potential for flooding impacts.</p> <p>Further information is provided in Technical Report 5 – Hydrology and flooding impact assessment.</p>

Issue category	Issues raised	By whom	Where addressed in the EIS
Socio-economic (amenity) impacts	Proximity of Lawrence Hargrave School to the rail corridor, with the potential for impacts including noise and vibration, access impacts  Management of potential impacts at Lawrence Hargrave School	Lawrence Hargrave School	<p>The potential for access impacts to the school were assessed as part of the construction traffic impact assessment and are described in section 8.3.6. These impacts would be managed through implementation of a construction traffic management plan, described in section 8.5.</p> <p>Potential construction noise and vibration impacts to the school were considered as part of the noise and vibration assessment described in section 9.3. As described above, with the exception of one receiver, no operational noise impacts were predicted due to the project. However, consideration has been given to the school's needs and concerns (refer to Chapter 18 (Socio-economic impacts)), and consultation will be undertaken with Lawrence Hargrave School as committed to through mitigation measure D7.4.</p>
	Relocation of softball diamonds and associated costs	Liverpool City Council, Southern Districts Softball Association	<p>Relocation of the softball diamonds from a land use perspective and community impact perspective is discussed in sections 16.3 and 16.4 (land use) and sections 18.3 and 18.4 (social). As committed to through mitigation measure D7.3 consultation will be undertaken with Liverpool City Council and the Southern Districts Softball Association as part of design development to minimise impacts on the softball fields.</p> <p>Note that consideration of costs is beyond the scope of the EIS.</p>

Issue category	Issues raised	By whom	Where addressed in the ES
Landscaping and visual amenity	Request to reinstate shade and foliage along the rail corridor to replace that lost during construction of the Southern Sydney Freight Line	Liverpool City Council, Southern Districts Softball Association, local residents	The landscape and visual impact assessment considered the loss of trees within Jacquie Osmond Reserve. However, as described in section 17.3.3, the provision of trees or other plantings on the embankment would potentially cause safety issues (branches in the rail corridor and hard distances near the softball field) and/or require additional maintenance. As described in section 17.6.2 an urban design and landscape plan would be developed during detailed design with the aim of reducing impacts due to the loss of vegetation.  Further information is provided Technical Report 10 – Landscape and visual impact assessment.
	Potential for lighting impacts during night works	Councils, local residents	The potential for lighting impacts during construction has been considered as part of the landscape and visual impact assessment and is described in section 17.4.3. The potential for lighting impacts would be mitigated through the implementation of mitigation measure C10.2, which requires temporary lighting to be sited and designed to avoid light spill.

#### 4.2.3 Consultation undertaken as an input to the SEARs

A summary of issues raised by government agencies consulted by the Department of Planning, Industry and Environment during preparation of the SEARs is provided in Table A.3 in Appendix A, together with a reference to where they are addressed in the EIS.

Engagement with these government agencies since SEARs has been limited to engagement with OEH. Engagement with OEH during Aboriginal community engagement, is discussed in section 4.2.1.

#### 4.3 Consultation during exhibition of the EIS

The Department of Planning, Industry and Environment will place the EIS on exhibition for a minimum of 28 days. During that time, the consultation tools implemented during preparation of the EIS will continue to be used, where relevant. Consultation tools used during this period will include the following:

- advertisements will be placed in newspapers to advise of the exhibition period, how to view the EIS, and project team contact details to contact
- distribution of flyers and e-newsletters to the community
- community information session and briefings will be held during exhibition to enable community members and representatives to ask questions ahead of making a submission to the Department of Planning, Industry and Environment.

The EIS will be available for viewing at the following locations:

- Fairfield City Council Administration Centre, 86 Avoca Road, Wakeley
- Whitlam Library Cabramatta, 165 Railway Parade, Cabramatta
- Liverpool Council Administration Centre, 33 Moore Street, Liverpool.
- Liverpool Library, 170 George St, Liverpool.

The document can also be viewed at the Department's website (<https://www.planningportal.nsw.gov.au/major-projects>).

During the exhibition period, government agencies, project stakeholders and the community will be able to review the EIS and make a written submission to the Department of Planning, Industry and Environment for consideration in its assessment of the project.

A community information session will be held during the display to enable community members and representatives to ask questions and to provide feedback to ARTC project team members. In addition to the community information session a number of other activities will be undertaken to promote awareness of the EIS exhibition. These activities include:

- doorknocking of residents along Broomfield Street, residents along the haulage route around Station Street and commercial businesses located at the Warwick Farm Home Centre with an offer of face-to-face meetings with a translator as needed
- distribution of flyers at both Cabramatta and Warwick Farms stations, as well as a pop-up conversation booth at Cabramatta Station
- broadening the area for the letterbox distribution of flyers
- advertising the EIS exhibition in the local Vietnamese newspaper.

At the completion of the exhibition period the Department of Planning, Industry and Environment will provide ARTC with a copy of submissions received and a summary of issues raised. A submissions report will be prepared responding to the issues raised, and the report will be made available for viewing on the

Department of Planning, Industry and Environment's planning portal website. If changes to the project need to be made, a preferred project report will also be prepared.

## **4.4 Consultation during design and delivery of the project**

### **4.4.1 Consultation activities**

Consultation with the community and key stakeholders would continue in the lead up to and during construction. The aim of consultation during design and delivery of the project would be to ensure that:

- accurate and accessible information is available
- a timely response is given to issues and concerns raised by the community
- feedback from the community is encouraged
- opportunities for input are provided.

The community contact facilities would continue to be available during construction, together with a 24-hour complaints management mechanism (described in section 4.4.2). Targeted consultation methods, including notifications, signage and face-to-face communication, would continue to occur. ARTC's project website would also include updates on the progress of the project. These consultation methods would be detailed in a community and stakeholder engagement plan which would be prepared prior to the commencement of main construction works, and would detail the approach to communicate between ARTC and its Construction Contractor(s), and the community and government authorities. The community and stakeholder engagement plan is described further in section 22.2.3.

The consultation mechanisms that would be implemented during future stages of the project are summarised in Table 4.3.

**Table 4.3 Consultation tools and activities to be implemented during design and delivery**

<b>Activity</b>	<b>EIS exhibition</b>	<b>Timing</b>	
		<b>Design</b>	<b>Construction</b>
Project and EIS display	✓		
Community contact mechanisms (1300 telephone number and email)	✓	✓	✓
Meetings and discussions with key stakeholders, including project briefings	✓	✓	✓
Project website	✓	✓	✓
Social media	✓	✓	✓
Letters, notifications and project updates	✓	✓	✓
Face-to-face consultation	✓	✓	✓
Media engagement	✓		✓
Signage			✓



Activity	EIS exhibition	Timing	
		Design	Construction
Complaints management			✓

#### 4.4.2 Complaints management

The construction contractor would be required to implement a complaints management and handling procedure during construction. This procedure would be defined by the construction environmental management plan, which the contractor would be required to prepare and have approved by ARTC and the Department of Planning, Industry and Environment prior to construction commencing.

The complaints management procedure would include the following at a minimum:

- contact details for a 24-hour project response line and email address
- management of complaints in accordance with ARTC's management protocols, specifically:
- details of all complaints received will be recorded
- verbal and written responses will be provided within time limits.

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## 5 Project background, needs and options

*This chapter provides background information in relation to how the design of the project has developed. The strategic context to the project's development is described, including the key issues, demands and planning driving the need for the project. A summary of the need for the project is included.*

*The chapter also describes the alternatives to the project as a whole, the process of design development to date, and the options that were considered as part of the design process.*

### 5.1 Strategic context

#### 5.1.1 Existing situation and key issues

##### 5.1.1.1 The importance of the Sydney Metropolitan Freight Network

Transporting freight by rail is a key priority for the Australian and NSW Governments, ARTC and its customers. In October 2015 ARTC published the *2015-2024 Sydney Metropolitan Freight Strategy* following investigation of Sydney rail freight movements and forecasts. This identified that rail freight on this network is to increase over the next 15 years. Further, the *Transport for NSW Freight and Ports Plan 2018-2023* sets objectives to boost capacity and efficiency of the rail freight network. The project is one of several listed under the goal of building capacity of the freight network.

##### 5.1.1.2 Port Botany

Port Botany is one of Australia and NSW's most important infrastructure assets, as the second largest container port in Australia, and NSW's largest bulk liquid and gas port and only container port. Port Botany handles 99 per cent of NSW's container demand, moving more than 6,000 containers on average every day. The port also handles 98 per cent of NSW's consumption of liquid petroleum gas (LPG), 90 per cent of bulk chemical products, 30 per cent of refined petroleum fuels and 100 per cent of bitumen products (NSW Ports, 2015).

Together, the international gateways of Port Botany and the nearby Sydney Airport directly serve the Greater Sydney area, the largest city region economy in Australia, and wider areas of NSW. Combined, these gateways generate \$10.5 billion of economic activity and handle close to \$100 billion of freight. Efficient access to and from the port and airport is critical to the economy.

As described in Chapter 2 (Location and setting), the SSFL forms part of the MFN which transports freight to and from Port Botany. The role of the SSFL is to eliminate the transit time/availability impacts of Sydney Train's passenger peak prohibition on rail freight operations through southern Sydney's commuter rail network.

##### 5.1.1.3 Existing rail line constraints

The SSFL is predicted to be at capacity by 2023, limiting its ability to adequately service future demands for rail freight transport (described in section 5.1.2). The single track section of the SSFL between Cabramatta and Warwick Farm constrains the ability to increase the share of freight moved by rail on the line.

#### 5.1.2 Future demands

Over the next 20 years, container freight, air freight, air travel and general traffic in and around the Sydney area are expected to grow significantly. This will put more pressure on roads and other infrastructure and impact local communities. The key demands driving the need for the project are outlined below.

### **5.1.2.1 Freight growth**

By 2036, the amount of freight moved in NSW is projected to nearly double to 618 million tonnes (Transport for NSW, 2018d). The amount of container freight handled by Port Botany is predicted to significantly increase over the next 20 years – from 2.36 million twenty foot equivalent units (TEU) in 2016 to between 7.5 and 8.4 million TEU in 2045 (NSW Ports 2015, Infrastructure NSW 2018).

Providing for the forecast freight volumes at Port Botany will include:

- port infrastructure works – including works to improve the efficiency and use of existing operations and new port infrastructure to facilitate increases in throughput, as defined by the NSW Ports' 30 Year Master Plan (NSW Ports 2015)
- transport infrastructure works – including works to improve the efficiency and capacity of freight movement to and from the port.

In addition to the growth in container freight, air freight handled by Sydney Airport is predicted to increase by 64 per cent – from 615,378 tonnes in 2012 to 1,011,312 tonnes in 2033 (SACL, 2014a). Transporting this freight to and from the airport will also place additional demands on the road network in the study area.

### **5.1.2.2 Increasing demands for rail freight transport**

The Australian and NSW Governments have identified clear objectives to increase the share of freight moved by rail (Transport for NSW, 2018d, Infrastructure Australia 2016). NSW Ports recognises that maximising the capacity of Port Botany requires a combined investment in, and optimisation of, both road and rail networks, and that investment in just one mode will not suffice (NSW Ports, 2015).

NSW Ports has set a target of 40 per cent of total freight volumes to be transported by rail (NSW Ports, 2015). This represents a substantial increase compared with the current 14 per cent share of freight moved by rail.

Port Botany is the centre of operations for NSW's import/export container supply chain. As such, its efficient operation is critical to maintaining an efficient and effective supply chain. Transporting increased freight volumes to and from the port will place additional demands on the existing rail line, with freight that cannot be accommodated on rail placing additional demands on the surrounding congested road network.

The development of Moorebank Intermodal Terminal, which is currently under construction, will also place additional demands on the existing rail line. The terminal was proposed as part of a long-term strategy to increase the movement of freight by rail. At full operation, the terminal will have the capacity to shuttle more than one million TEUs annually between Port Botany and Moorebank by rail instead of road.

ARTC was requested by the Department of Infrastructure, Regional Development and Cities (DIRDC) to identify capacity enhancements required on the MFN and the SSFL to meet predicted demand to 2030, known as the "Capacity Project" (ARTC, 2015). The scoping phase of the capacity project was completed between July 2014 and September 2016.

Freight traffic to and from Port Botany from outer metropolitan Sydney runs via the MFN (North/West) and the SSFL (South). The SSFL is expected to reach its peak of 24 trains per day (in each direction) by 2023, which considers the predicted demand from Moorebank Intermodal Terminal. Demand is predicted to steadily increase from 2023, with up to 33 trains per day (in each direction) by 2030. The project would provide increased capacity, for up to 36 trains per day (in each direction), improving reliability for freight operators and thus supporting the targets to increase modal share.

### 5.1.3 Strategic planning and policy context

The strategic context for the project is influenced by strategic planning for transport, land use and freight undertaken at the national, state and regional/local levels. The project is consistent with the strategies outlined in Table 5.1. Further detail on the documents listed below is provided in Appendix C.

Table 5.1 Strategic context of the project

Strategy/plan / policy	Key policies and strategies relevant to project need
<b>National</b>	
<i>Inquiry into National Freight and Supply Chain Priorities</i> (Commonwealth of Australia, 2018)	The inquiry recognises the continuing growth of the Australian freight sector, and recommends priorities to guide investment, reform and governance for improved productivity and efficiency. Key to this is improving the efficiency and reliability of the freight rail network and its linkages to key ports such as Port Botany.
<i>Australian Infrastructure Plan and Infrastructure Priority List</i> (Infrastructure Australia, 2018)	Improving the efficiency of freight movements through major ports is a priority listed in the plan, to increase Australia's productivity and competitiveness and remove constraints and pinch-points. The Port Botany Freight Line duplication is listed as a High Priority Initiative of the Australian Infrastructure Priority List and the construction Cabramatta Loop project is noted to increase the benefits of the duplication.
<b>NSW</b>	
<i>Future Transport Strategy 2056</i> (Transport for NSW, 2018b)	The outcomes of this strategy related to the project include: <ul style="list-style-type: none"> <li>• efficient and reliable freight journeys supported by 24/7 rail access between key freight precincts with convenient access to centres</li> <li>• safely, efficiently and reliably moving people and goods.</li> </ul>
<i>State Infrastructure Strategy 2018-2038</i> (Infrastructure NSW, 2018)	The Strategy provides the NSW Government with advice about infrastructure policy and investment priorities. Recommendations of the strategy include: <ul style="list-style-type: none"> <li>• overcome local constraints on the regional road and rail networks that limit the use of high productivity freight vehicles and rail freight</li> <li>• further develop the Sydney rail network with new rail links and system-wide upgrades</li> <li>• develop and protect freight and service networks by improving road and rail access for goods and services to local, national and global markets, leverage the Commonwealth's Inland Rail investment and address existing inefficiencies and pinch points.</li> </ul>
NSW Freight and Ports Plan 2018-2038 (Transport for NSW, 2018d)	The Plan includes over 70 initiatives to be delivered by 2023 – ranging from infrastructure investment to trials of new technologies. The initiatives are focused on achieving five key objectives with supporting actions. Three of the objectives with actions of relevance to the project include: <ul style="list-style-type: none"> <li>• economic growth: productivity will be enhanced by investing in freight infrastructure and delivering and improving key freight programs and projects</li> <li>• efficiency, connectivity and access: the efficiency of the rail network and trade gateways will be boosted by facilitating new technology and improved coordination of Port Botany freight movements</li> <li>• capacity: capacity boosting investments in the rail freight network will be made by improving the capacity of east-west movements through targeted improvements to the NSW rail network.</li> </ul>

Strategy/plan / policy	Key policies and strategies relevant to project need
<b>Regional</b>	
<i>A Metropolis of Three Cities – the Greater Sydney Region</i> (Greater Sydney Commission, 2018a)	The Greater Sydney Commission's plan is that Sydney will grow as three cities - Western Parkland City, the Central River City and the Eastern Harbour City. Port Botany is located in the Eastern Harbour City and connects with the Western Parkland City via the SSFL. The plan states that the freight rail network is fundamental to the future transport of these three cities and that a growing Greater Sydney requires an efficient and effective road and rail freight network integrated with ports and airports.
<i>Western City District Plan – connecting communities</i> (Greater Sydney Commission, 2018)	<p>The Western City District Plan identifies the need to increase economic productivity and the critical role that new infrastructure plays in achieving this. It emphasises the importance of the trade gateways – such as Western Sydney Airport and Port Botany for the economic corridor of the Western region, as well as Greater Sydney and NSW.</p> <p>A key action for councils and government agencies is to support and facilitate internationally competitive freight and logistics sectors. Currently most of Greater Sydney's freight is moved on the road network. This dedicated freight rail connection from Port Botany in the Eastern Harbour City to the Western Parkland City will increase the proportion of freight moved by rail, and reduce the number of trucks on the roads. This should result in a more efficient road network by reducing congestion and delays in freight and logistics movements.</p> <p>The project will enable increased freight rail capacity, this may increase the economic potential of the industrial precincts in the area and enhance connections to the Western Sydney Employment Area.</p>
<i>Greater Sydney Services and Infrastructure Plan</i> (Transport for NSW, 2018c)	The Greater Sydney Services and Infrastructure Plan is the NSW Government's vision for transport in Greater Sydney for the next 40 years. Supporting the safe, efficient and reliable movement of goods around Greater Sydney will require a high capacity network for moving goods between trade gateways and freight precincts, and improved rail networks. By 2026, additional freight rail capacity is proposed to support growth in containerised movements. Additional investment is proposed between Port Botany connections, particularly between ports and warehouses.
<i>Sydney Metropolitan Freight Strategy</i> (ARTC, 2015)	The purpose of this Strategy is to document and discuss the challenges, opportunities and the most effective solutions to achieve rail freight growth in Sydney so as to help provide direction both within the ARTC business, and for the supply chain participants. As part of the staged upgrading program for the MFN and Port Botany rail link, a capacity study looking at potential future enhancements to the MFN, Port Botany line and SSFL to accommodate increased freight traffic to Port Botany to 2030 was completed as Stage 3 of the Port Botany Rail Link program. The project was identified as an option to provide capacity improvement.
<i>North-South Corridor Strategy</i> (ARTC 2005)	The construction of the SSFL was identified as a key project in this strategy to improve the performance of the Sydney-Brisbane rail link and to deliver substantial improvements in transit time, reliability, capacity and above and below rail yield.

## 5.2 Project need summary

The project is needed to address the issues identified in section 5.1.1 and respond to the demands listed in section 5.1.2.

Efficient access to and from Port Botany is critical to the economic growth and prosperity of Sydney. Over the next 20 years, container freight, air freight, air travel and general traffic in and around the Port Botany area are expected to grow significantly. This will put more pressure on roads and other infrastructure and

impact local communities. Without significant infrastructure investment, existing transport constraints and challenges will worsen.

The amount of container freight handled by Port Botany is predicted to significantly increase. The Australian and NSW Governments have identified clear objectives to increase the share of this freight that is moved by rail. Transporting more freight to and from Port Botany by rail will place additional demands on the existing rail line, with freight that cannot be accommodated on rail placing demands on the surrounding congested road network.

The SSFL is predicted to be at capacity by 2023, limiting its ability to adequately service future demands for rail freight transport. The single track section of the SSFL between Cabramatta and Warwick Farm constrains the ability to increase the share of freight moved by rail on the line. Additional demand arising from the predicted growth in container freight has the potential to exacerbate this situation, impacting on reliability and restricting the efficient movement of freight across the broader Sydney rail network.

### **5.3 Alternatives to the project as a whole**

This section describes potential alternatives to the project that have the potential to achieve the same project objectives.

#### **5.3.1 Alternative freight transport solutions**

Currently the majority of freight in NSW is transported by road. This is likely to be due in part to the historical inequity in the funding of road and rail infrastructure, but is also related to the superior efficiency and flexibility offered by road transport. Road transport of freight offers the following benefits:

- shorter door-to-door transit times than rail
- high reliability (on time), and high flexibility and availability to meet customer's preferred dispatch and receive times.

The NSW Government is currently delivering, or has delivered a number of road projects across Sydney, including WestConnex, NorthConnex, Western Harbour Tunnel, Beaches Link, the F6 Extension and major road projects to support the future Western Sydney Airport, and across regional NSW through the Bridges for the Bush Program, Fixing Country Roads Program, the Regional Road Freight Corridor Fund and the Pacific, Newell and Great Western highways upgrades. However, while investment in road projects forms part of the solution to Sydney's and the state's freight network needs, these alternatives are, by themselves, insufficient to address the forecast growth in freight demand. Additionally, there are a number of economic, environmental and safety impacts associated with the road transport of freight (when compared to rail) including:

- higher cost
- increased road congestion
- increased potential for traffic accidents
- greater road traffic noise and greenhouse gas emissions, impacting amenity for sensitive receivers nearby.

To meet the forecast growth in freight demand while minimising the environmental and social impacts associated with the use of road for freight transport the NSW Government has highlighted the need to significantly increase the share of freight transported by rail. As a result, it is also necessary to invest in upgrades to the rail freight network.

### **5.3.2 Alternative freight network enhancement options**

As described in section 2.2.2 access to Port Botany and Sydney's main intermodal terminals is via the SSFL which connects to the MFN. Therefore, to support transporting increased freight volumes to and from Port Botany and the main intermodal terminals enhancement options needed to focus on these two lines. In conjunction with the Federal Government, ARTC developed a program of works to meet growing demand for container transport by rail from southern Sydney to Port Botany. These are described as follows:

- **Stage 1 works** – Botany Yard Reconfiguration. Major reconfiguration and upgrade of the Port Botany Rail Yard, which is the interface between the rail network and the Stevedore port loading facilities.
- **Stage 2 works** – Re-signalling. New staging works at Enfield Yard and new signalling systems along with signal control separation from Sydney Trains for the MFN. This provided train control of the of the full Port Botany rail line route by ARTC's Network Control Centre at Junee.
- **Stage 3A works** – Track Upgrading. Upgrade the existing condition of the Port Botany rail line between Botany and Sefton.
- **Stage 3B works** – Capacity Project. Analysis and design of enhancement options to the SSFL and MFN (includes this project).

ARTC considered a number of enhancement options as part of Stage 3B of ARTC's Port Botany Capacity Project. Options were developed to fulfil the following planning principles:

- **Connectivity:** located in areas providing effective capacity benefit and considerate of operational requirements and external impacts.
- **Efficiency:** efficient use of the existing network could release capacity and improve service levels.
- **Flexibility:** infrastructure and operations should be responsive to customer needs and predicted demand.
- **Staging:** staging and timing of construction is a significant consideration to meet predicted demand.
- **Environment:** reduce impacts to the environment and community, where possible.
- **Property:** reduce impacts to property or land requirements, where possible.

The modelling and desktop analysis identified the following potential locations and solutions available for enhancement:

- 1,300 metre loop at Cabramatta (SSFL)
- 1,300 metre loop at Minto South (SSFL)
- 350 metre Leightonfield loop extension (SSFL)
- 1,850 metre loop at Cabramatta (SSFL)
- 1,300 metre loop at Minto North (SSFL)
- 1,300 metre loop at Casula (SSFL)
- 900 metre track extension at Botany (MFN)
- Botany Yard modifications (MFN)
- 800 metre track extension at Mascot (MFN)
- track duplication Botany to Mascot (MFN).



Key criteria used to model a number of alternative options were as follows:

- maximum normal operating speeds for the SSFL and MFN based on track parameters, gradient and train operator requirements
- where loops were considered, the simultaneous entry loop standard was used to reduce track infrastructure requirements, increase operational performance and satisfy commercial rigour
- provision of bi-directional signalling to increase capacity, flexibility and reliability to the network and customers
- consultation with nearby Intermodal Terminal operators to identify the parameters for connection to the SSFL.

A range of assumptions for each of the options was based on their physical location, key constraints and risks. The modelling identified which options provided the greatest capacity benefit and when they would be required, based on predicted demand. The desktop analysis identified four preferred infrastructure enhancement options as requiring further concept design work:

- a simultaneous entry loop on the SSFL at Cabramatta (this project)
- 900 metre track extension at Botany on the MFN
- 800 metre track extension at Mascot on the MFN
- duplication of the single line track between Botany and Mascot on the MFN.

This EIS addresses the proposed capacity improvements on the SSFL at Cabramatta only. The duplication of the Port Botany line (the Botany Rail Duplication Project) is subject to a separate assessment and approval process, which is currently underway while concept assessment has been undertaken of the remaining two enhancement options.

### **5.3.3 Alternative passing loop locations**

As described in section 5.3.2, a number of alternative passing loop locations were identified for the SSFL.

Further modelling of demand forecasts was undertaken considering these locations, to determine infrastructure requirements. The modelling considered a number of characteristics, including:

- current volumes
- types of freight using the network
- train lengths
- signal clearance points
- track speeds
- breaking distances
- operational movements
- future predicted volumes
- transaction times
- twenty-foot equivalent units per day
- utilisation occupancy
- headways
- saleable paths.

ARTC modelling indicated that a loop would be required on the SSFL by 2022 to meet capacity targets, and that a 1,300 metre loop at Cabramatta, being the mid-point between existing loops at Glenfield and Leightonfield, would provide the best solution to increase capacity requirements to 2030. A loop in this location could increase capacity by up to 12 services per day.

#### **5.3.4 The ‘do-nothing’ alternative**

The ‘do-nothing’ alternative would involve operating the existing rail line in its existing configuration. Under this alternative, the section of the SSFL would continue to operate as a single track.

ARTC’s North-South Corridor Strategy (ARTC, 2006) was developed as an integrated investment strategy with the SSFL as a key element of that strategy. The primary consequence of excluding this upgrade to the SSFL would be to compromise the ability to achieve the freight efficiency and reliability objectives of the strategy.

The ‘do-nothing’ option would result in worsening delays (ie reliability due to the single track and increased freight demands) for freight access to and through Sydney, leading to a lower rate of rail freight growth than would otherwise be the case on the north-south corridor. This may result in road freight traffic volumes growing at a higher rate than rail freight, with attendant impacts on other road users and the environment.

### **5.4 Project design development**

The design process has involved the following general phases:

- Phase 1 – concept design. As part of the concept design three additional preferred infrastructure enhancement options were considered and are discussed in section 5.3.2.
- Phase 2 – feasibility design. The feasibility design addressed some of the unresolved issues and risks from the concept design phase and incorporated additional information (eg site survey, services, contamination and geotechnical information).
- Phase 3 – reference design. The project as described in this EIS is based on the outcomes of the reference design for the project.
- Phase 4 – detailed design (not commenced). The detailed design would take into account the outcomes of the reference design phase, the findings of this EIS, including the mitigation measures detailed in Chapters 8 to 21 (and summarised in Chapter 22) and any conditions of approval (if the project is approved).

The design has, and will continue to, evolve over these phases as a result of engineering, traffic, financial, economic and environmental considerations.

### **5.5 Options considered**

This section describes the options that were considered as part of the design development process for the project.

#### **5.5.1 Approach to the option development and design process**

Option development has been an integral part of the overall design process for the project. An iterative process of option selection, design development and evaluation has been undertaken to define the project to date.

Option assessments have been undertaken for the following features of the project:

- track alignment
- bridges
- retaining walls and noise wall
- road formations.

In general, the assessments involved the following tasks:

- confirm requirements
- identify options to be assessed
- review potential constraints (including environmental and social constraints), risks and opportunities associated with each option
- identify the preferred option
- reporting.

A summary of the outcomes of the options assessments is provided below.

#### **5.5.1.1 Track alignment**

A number of alignment options were considered for the passing loop. This included consideration of alternative locations closer to Cabramatta Station, shorter alignment lengths, reducing the width to the east of the passing loop (available for maintenance) and moving the locations of the turnouts. In total three different options were assessed:

- Option 1 was for the base case alignment of the loop adjacent to the SSFL on the eastern side of the rail corridor. This option included seven sub-options where the location of the alignment, alignment length and width adjacent to the passing loop varied.
- Option 2 involved changing the turnout at the northern end of the loop such that the SSFL was running on the turnout main line and the loop was running on the turnout diverge.
- Option 3 involved changing the turnout at the southern end of the loop such that the loop was between the SSFL and the existing Sydney Trains line.

A number of the sub-options to Option 1 which were closer to Cabramatta Station were discounted as they would require major works to the Cabramatta overbridge, the station and bus laybys and would also cause community impacts to users of Cabramatta Station, the Cabramatta town centre. The shorter loop sub-options were also discounted as the intent of having a shorter loop was to minimise the impacts and potential land take associated with private properties at the southern end of the project site. However, it was considered that there would be impacts to these commercial properties regardless and a shorter loop would not achieve the objectives of the project.

Option 2 was discounted as it would result in a reduced standing room for trains compared to the base-case (Option 1) and would also result in additional encroachment into Broomfield Street.

Option 3 was discounted as it would result in increased maintenance requirements and an increased in the amount of private land to be acquired at the southern end of the project site.

The existing passing loop alignment and length (Option 1 base-case with minor modifications to location and length) was determined to be the preferred option as it minimised the amount of land acquisition, did not result in major impacts to the Cabramatta town centre community and users of Cabramatta Station, and balanced the potential impacts to the existing rail corridor with potential land take and building impacts to the

residential and the commercial. It also met or exceeded ARTC's operational requirements and primary design objectives.

#### **5.5.1.2 Sussex Street and Cabramatta Creek bridges**

Three options were considered for each of the bridges as follows:

- Option 1 involved using the existing bridge design as a basis for a new structure crossing. This would mean that the new passing loop bridge would be attached to the existing bridge and there would be 4.5 metres clearance between the two track centre lines, which is the desirable clearance.
- Option 2 involved building a new bridge structure adjacent to the existing bridge structure with 5.5 metres clearance between the two track centre lines.
- Option 3 involved further refinement of the design associated with Option 2 such that the track clearance between the two centre lines was reduced to 4.5 metres due to an alternative bridge configuration.

Option 3 was considered the preferred option as providing a new bridge structure adjacent to the existing bridge would mean that the SSFL could continue to operate during construction of the new bridge. A reduced clearance of 4.5 metres between the track centre lines (compared to the 5.5 metres associated with Option 2) would also minimise land take requirements to the east of the rail corridor.

#### **5.5.1.3 Road formation/alignment**

A number of options were considered for realignment of Broomfield Street, to ensure there was sufficient space within the road corridor to fit the shared path, road profile and car parking. These included options associated with the offset of road corridor boundary from the centre of the new rail centreline, reducing the width of the retaining wall and shared path, reducing road lane width and revising the cross fall of the road surface.

The current road alignment, determined in consultation with Fairfield City Council, was considered the preferred option as it allowed sufficient clearance from the rail centre line for the retaining wall while ensuring the shared path was maintained and loss of car parking spaces was minimised. To enable the maximum amount of car parks to be retained, and ARTC and Council design requirements to be met, it was determined there would unlikely be the space to provide a similar level of landscaping to that which currently existing on both the eastern and western verge of Broomfield Street.

However, consultation with Council indicated that the loss of mature trees along Broomfield Street was a key concern as it would impact urban tree canopy and contribute to a heat island effect. Therefore, a landscape concept has been developed for the project that balances the need to retain street parking and ensure the road and rail corridor is design in accordance with relevant standards and design requirement (refer to section 6.2) with the need to maintain the landscape and visual amenity along Broomfield Street. This is discussed further in Chapter 17 (Landscape and visual amenity).

## 6 Project features and operation

*This chapter provides a description of the project's features and operation for the purposes of the EIS. It includes a description of the infrastructure proposed as part of the project and how the project would operate. The proposed approach to construction of the project is described in Chapter 7.*

### 6.1 Overview

#### 6.1.1 Design development

The design of the project commenced in May 2015. To date, developing the design has involved:

- preliminary evaluation and review of options – evaluation of key issues, potential options and the feasibility of the project
- scoping design – options evaluation and systems definition, constraints analysis and mapping
- definition design – option selection and preferred option development (concept and feasibility design)
- reference design – augmentation of the definition design to provide a considered basis for the project, with designs produced to support contract documentation.

The design of the project has evolved over these stages, with an increasing level of detail and incorporating a range of considerations and options at each stage.

The reference design is the current design for which approval is being sought and it forms the basis of the EIS. The reference design has evolved over a period of about 18 months, and has involved many iterations and regular refining, particularly in relation to the design of the bridges and works to Broomfield Street. The development of the design has been informed by the consideration of stakeholder and community feedback, as well as the findings of environmental studies.

#### 6.1.2 Approach to avoiding or minimising impacts

The approach to design development has included a focus on avoiding and/ or minimising the potential for impacts during all key phases of the process. As described in Chapter 5 (Project background, needs and options), the multi-criteria assessments undertaken during the option selection and design process for key pieces of infrastructure included consideration of environmental and social impacts. Various options assessments have been undertaken, and the preferred option chosen based on the outcome of the assessments. The options assessment process also included assessment of opportunities and risks.

The key constraints that have influenced the design of the project as described in this chapter are summarised in Table 6.1 together with how the project has developed to date to avoid/minimise potential impacts.

**Table 6.1** Key constraints and how the design has avoided/minimised environmental impacts to date

Key constraint	Approach to avoiding/minimising impacts
Operation of the surrounding road network	Existing functionality of Broomfield Street has been maintained by minimising widening of rail corridor to install new track.
Operation of Broomfield Street	The retaining walls proposed are as narrow as possible to minimise operational impacts on Broomfield Street.
Parking in Broomfield Street	Options assessment was undertaken to identify a parking configuration that would minimise the loss of car parking capacity in Broomfield Street.

Key constraint	Approach to avoiding/minimising impacts
Cabramatta Creek – including hydrology, flooding, biodiversity and water quality	The design of the new bridge over Cabramatta Creek (adjacent to the existing bridge) would match the pier arrangement of the existing bridge and not introduce any instream structure, to minimise hydraulic impacts on flow within the creek, and associated potential for flooding, biodiversity and water quality impacts. Existing stream widths would be maintained. The proposed bridge design aims to minimise the footprint of the project in this area.
Sensitive receivers, including residences, located close to the project site	A new noise wall is proposed in the same locations the existing noise wall parallel to the rail corridor (but five metres east of the existing to minimise the potential for changes to the existing noise environment.
Presence of Sydney Trains infrastructure, including the rail line and stations	The project has been located to avoid impacts to Sydney Trains stations at Cabramatta and Warwick Farm, and the Hume Highway overbridge.  The design has been refined to minimise the need for track realignment ('slewing') and potential impacts on Sydney Trains infrastructure. This has been undertaken in areas where a safety clearance risk exists such that realignment is required to meet operational requirements.
Land use	Project infrastructure such as the turnouts, slewing of the line, signalling, is proposed to be located within the existing rail corridor as far as practicable to minimise the potential for permanent impacts to land use and private property.
Use of Jacquie Osmond Reserve	The design of the project at Jacquie Osmond Reserve has been refined and the project footprint reduced to the extent practicable to minimise the potential impacts to use of Jacquie Osmond Reserve and the softball diamonds.

## 6.2 Design features

As noted in section 1.2.2, the project consists of the following key features:

- new rail track – providing a 1.65 kilometre long section of new track with connections to the existing track at the northern and southern ends
- track realignment – moving sections of existing track sideways (slewing) to make room for the new track
- bridge works – constructing two new bridge structures adjacent to the existing rail bridges over Sussex Street and Cabramatta Creek
- road works – reconfiguring Broomfield Street between Sussex and Bridge streets.

These features are described in more detail in sections 6.2.1 to 6.2.4.

Ancillary infrastructure to support the above features and operation of the project would include drainage, retaining and noise walls and other track and rail system works. These features are described in section 6.3. The project's features are shown on Figure 6.1.

It is noted that the project scope described in this chapter is based on the level of design developed to date. Detailed design would include further engineering and construction planning, and would be subject to further input from key stakeholders and the community. Any design modifications that occur as a result of matters arising during the exhibition of this EIS would be identified in a submissions report or a preferred infrastructure report.

Table 6.2 summarises some of the key criteria used to develop the design of the project which has been adopted in consultation with stakeholders including Sydney Trains and Fairfield City Council, in accordance with relevant design standards and Council specifications.

**Table 6.2** Key design criteria

Key feature	Description	Approximate Dimension	Reason for inclusion
New track	Centreline of new loop track to SSFL or any other structures	4.5 m	Standard track centres to allow trains to pass safely.
	Length of new loop track	1,650 m	Allows a 1,300 m long train to stand within the loop plus turnouts (connection into existing track).
Sussex Street Bridge works	Length of bridge spans	6.9 m to 8.4 m	Maintains existing traffic flow.
	Height clearance (road level to the base of the bridge girders)	2 m	Maintain traffic access for height of vehicles as per the existing bridges.
Cabramatta Creek bridge works	Distance of bridge abutments from top of bank of the waterway	17 m	Matches existing SSFL bridge to maintain existing flow width.
	Minimum distance between underside of bridge and top of bank	4 m	To allow for access and future maintenance.
	Vertical clearance above the 1:100 year ARI of the underside of bridge	Min 500/600 mm	Bottom of girder depth matches existing SSFL bridge to maintain existing flow.
Road works	Minimum distance between the shared path and retaining wall	0.5 m	To allow sufficient clearance between the wall and shared path to minimise the chance of collision with the wall.
	Width of shared path	2.5 m	Minimum width required to provide a safe shared path width in accordance with relevant standards and to attain the minimum road reserve width of 16.5 m.
	Minimum parallel parking length	2.1 m	Adopted standard length to replace angle parking.
	Minimum width of traffic lane	2.3 m	Council guided minimum width to create a safe space for passengers to open car doors and to alight from vehicles/
	Minimum road verge	2.7 m (consisting of 1.2 m footpath and 0.6 m boundary offset)	To attain a minimum road reserve width of 16.5 m.



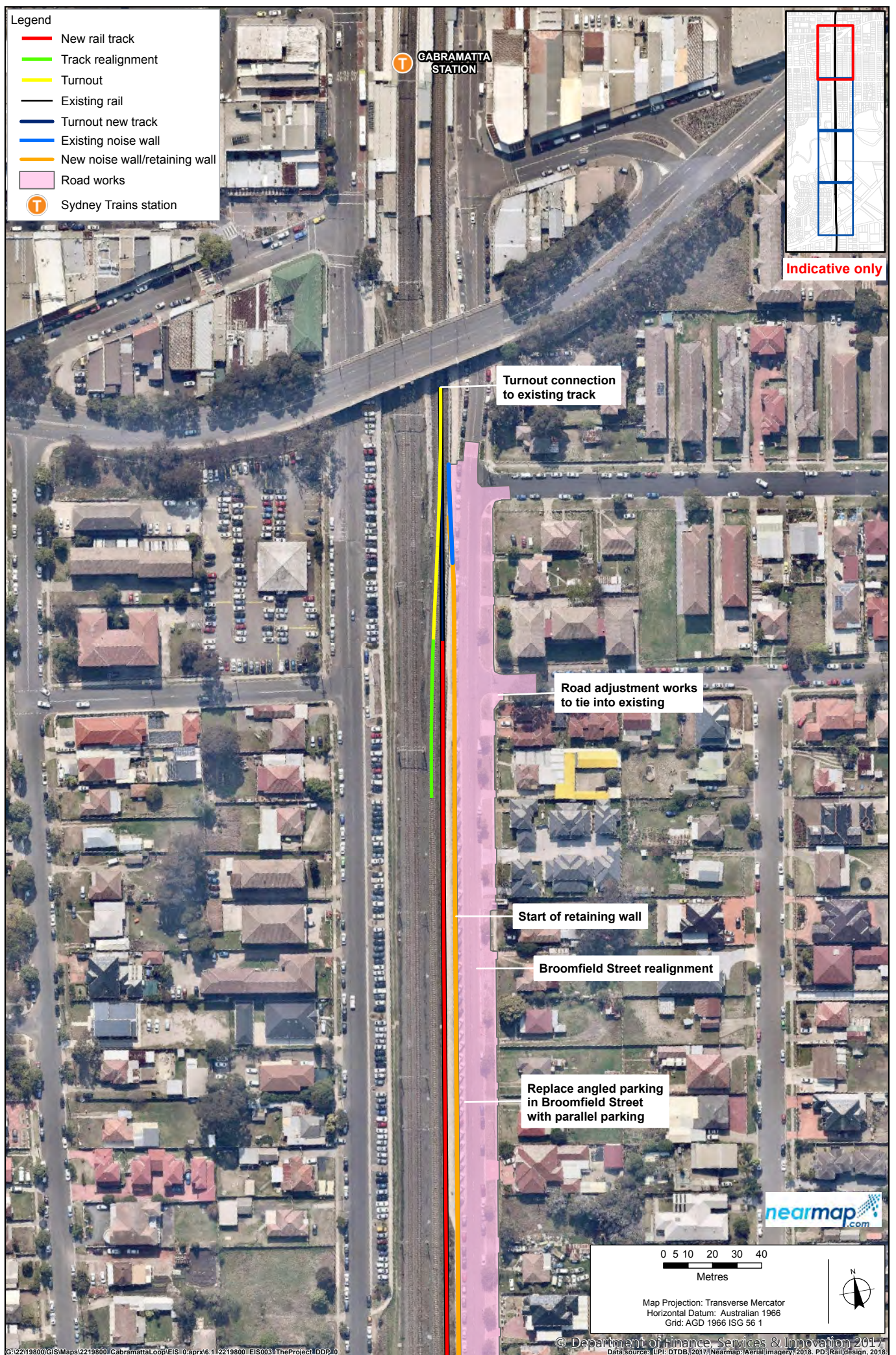


Figure 6.1a The project



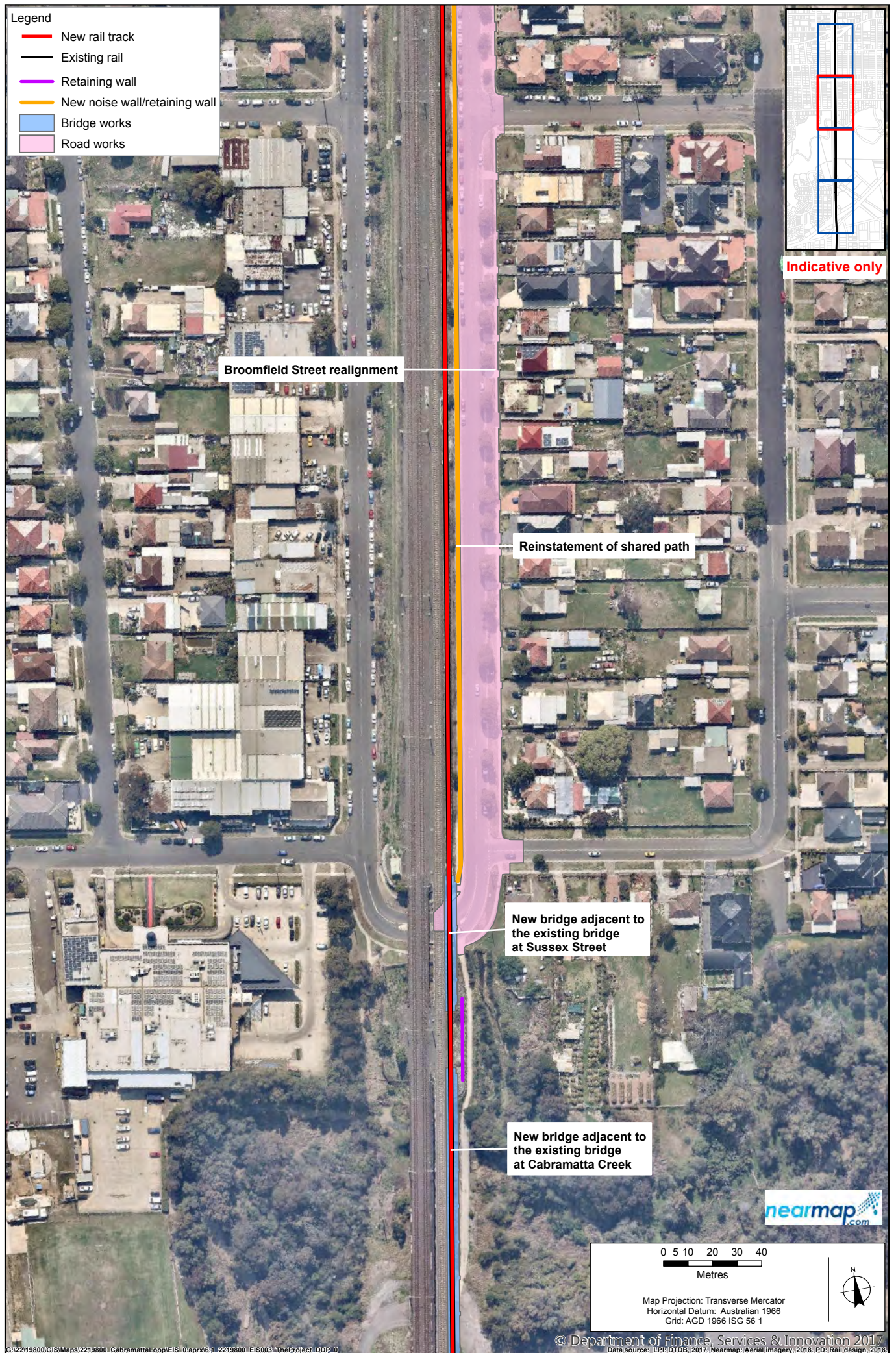


Figure 6.1b The project



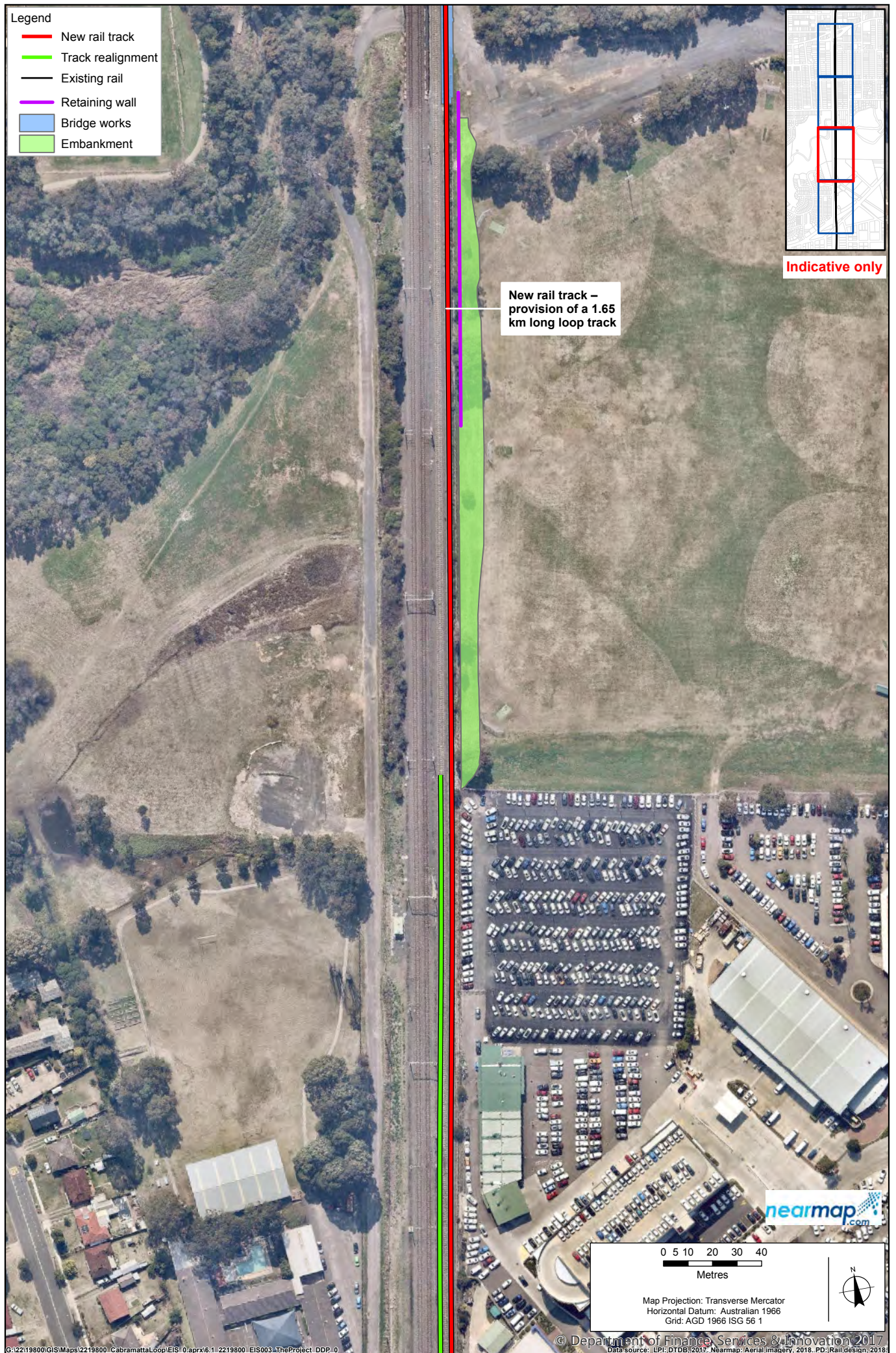


Figure 6.1c The project



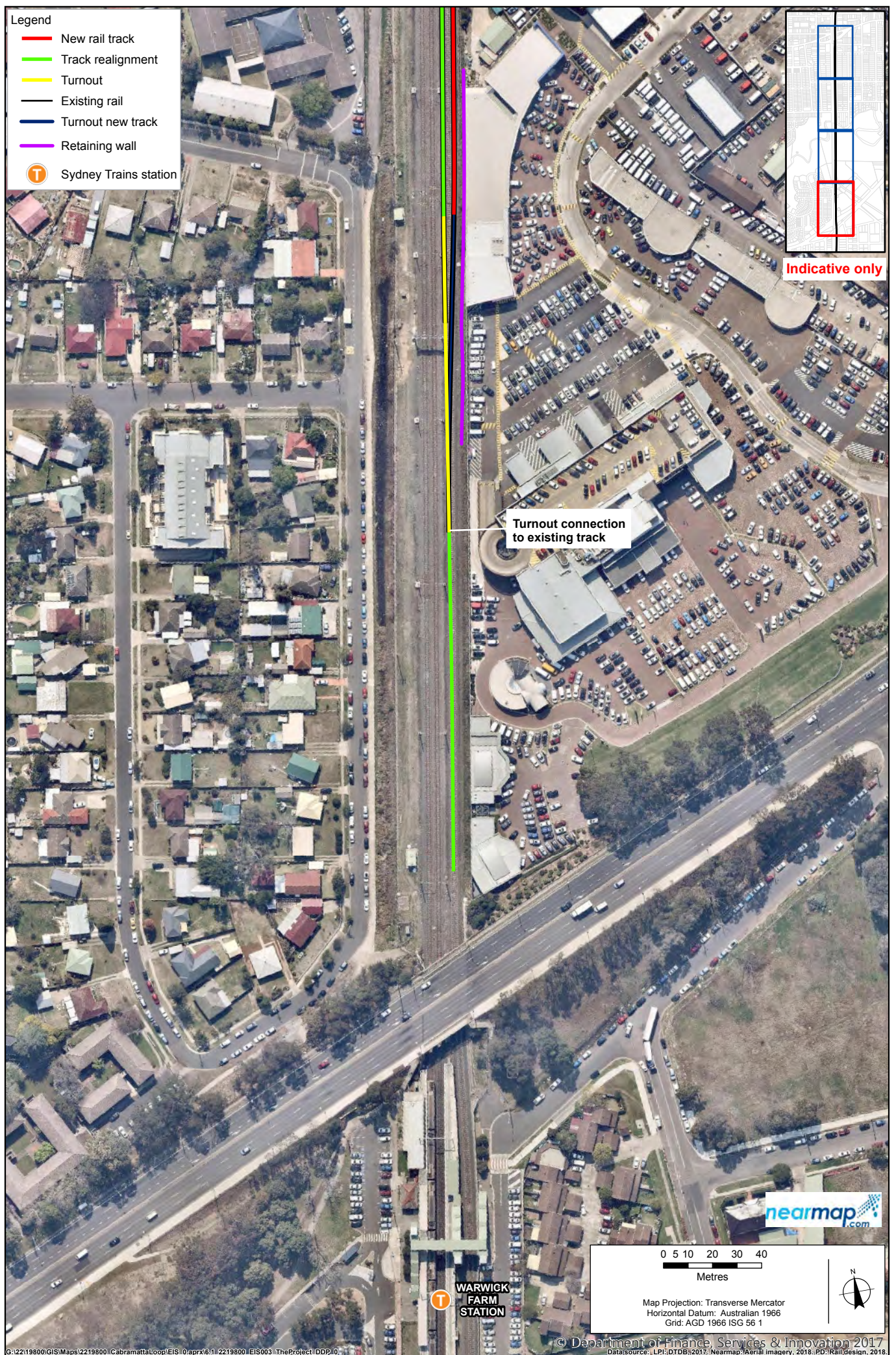


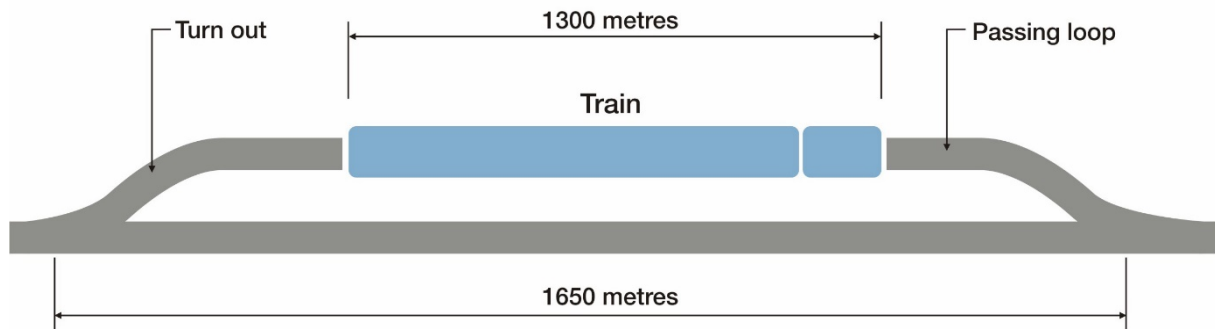
Figure 6.1d The project



## **6.2.1 New track**

### **6.2.1.1 Passing loop**

The project involves providing a new section of track adjacent to the existing track to function as a passing loop, which would allow one train to pass another. The proposed passing loop would provide standing room for a 1.3 kilometre long train. It would consist of about 1.65 kilometres of new track for the passing loop itself, which would connect to the existing track via the proposed turn outs (described below). An indicative layout for the passing loop is shown in Figure 6.2.



**Figure 6.2** Aerial view of proposed passing loop layout (indicative)

The existing rail corridor would be widened by about five metres to the east to accommodate the passing loop. The proposed widening is limited to the minimum acceptable width required to install and operate the passing loop. This would require Broomfield Street to be reconfigured as described in section 6.2.4.

The new track would consist of concrete sleepers laid on ballast. The ballast would overlay the formation, which would comprise capping and structural layers consisting of different grade quarry material. The track and formation for the passing loop would be designed consistent with ARTC's standards. An indicative design for the new track is shown in Figure 6.3.

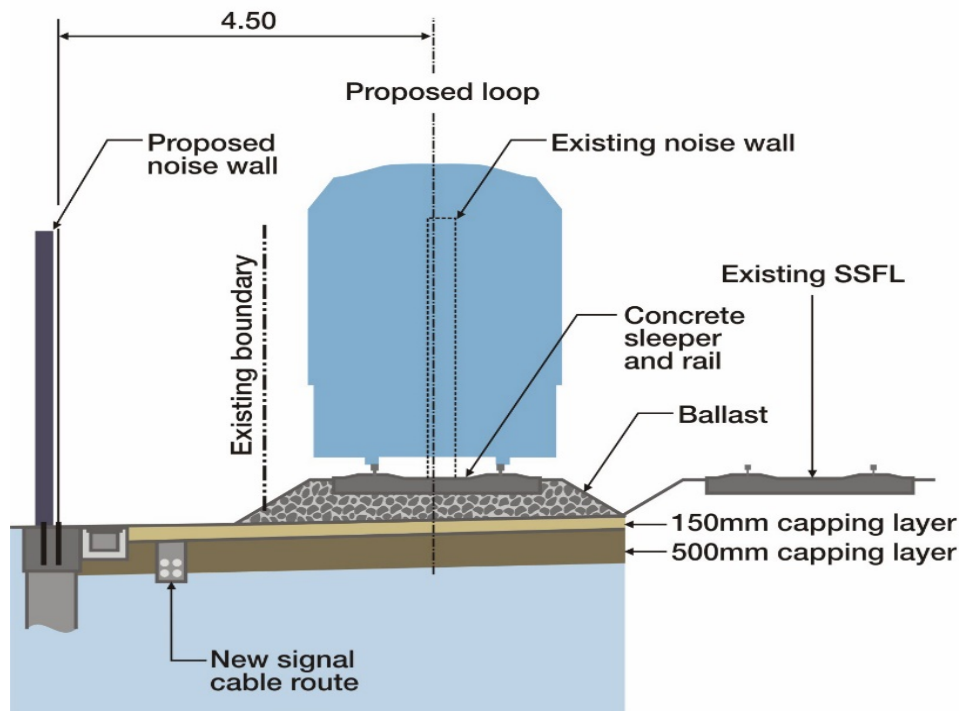


Figure 6.3 Side view of proposed passing loop layout (indicative)

#### 6.2.1.2 Turnouts

Turnouts allow the train to be guided from one track to another.

The project includes providing turnouts at both ends of the passing loop. The turnouts would consist of about 100 to 150 metres of new track and formation each.

The proposed locations of the turnouts are shown on Figure 6.1.

#### 6.2.2 Track realignment

At the southern end of the project site the existing SSFL track would be realigned (slewed) to the west, to provide room for the passing loop and minimise impact on adjoining land uses (on the Peter Warren Automotive site). This would involve realigning about 550 metres of the existing SSFL track and formation about two metres to the west within the rail corridor. In some locations the existing ballast may need to be replaced with new or reconditioned ballast.

The location of the proposed track realignment works is shown in Figure 6.1.

#### 6.2.3 New bridges

To accommodate the passing loop, two new rail bridges are proposed directly adjacent to the existing rail bridges over Sussex Street and Cabramatta Creek.

The new bridges would consist of a bridge foundation with reinforced concrete headstock walls placed on bored concrete piles. Bridge planks would be placed on the headstocks. Ballast walls would be connected on each side of the structure. These would function to hold the ballast and track in place.

The new bridges would be structurally independent from, and would not be connected to, the existing bridges.

To minimise the potential impacts of the new bridges, the form, abutment and pier locations of both bridges would match the existing SSFL bridges. Key design criteria for the bridges are provided in Table 6.2. The bridges are described below and their locations are shown in Figure 6.4 and Figure 6.5.

**6.2.3.1 *Sussex Street bridge***

The Sussex Street bridge would consist of a single ballasted track above a six span bridge structure. The bridge would be about 45 metres long and about 4.5 metres wide. It would have a height of about five metres from Sussex Street to the top of rail. Track and ballast would be laid on top of the bridge.

**6.2.3.2 *Cabramatta Creek bridge***

The Cabramatta Creek bridge would consist of a single ballasted track above an eight span bridge structure. The bridge would be about 125 metres long and about 4.5 metres wide. It would have a height of about seven metres from Cabramatta Creek to the top of rail. Track and ballast would be laid on top of the bridge.

No piers are proposed to be located within the creek bed.

Similar to the current arrangement, new rock armouring would be installed at the base of bridge piers and existing rock armouring would be reinstated where disrupted by the works.



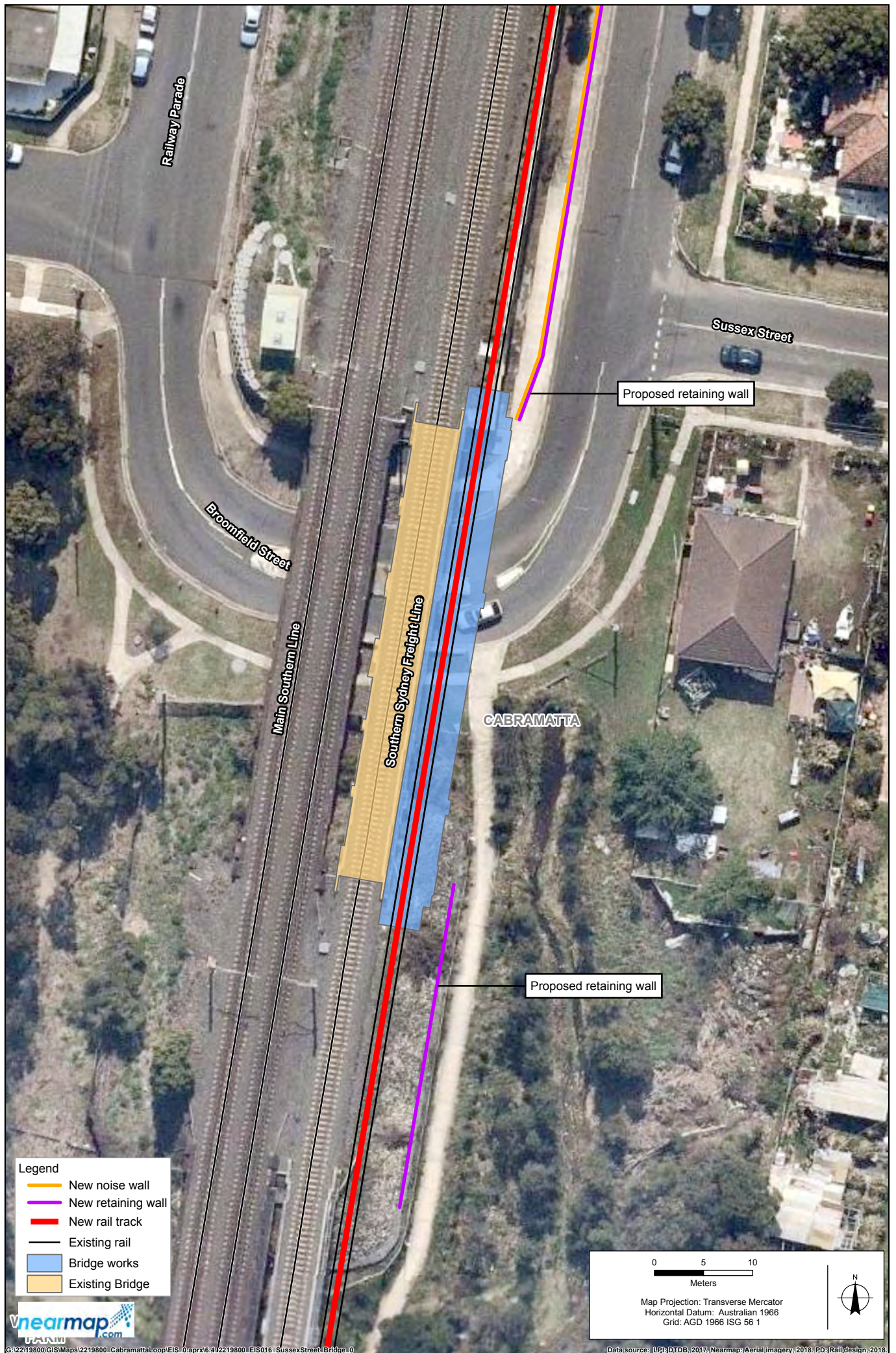


Figure 6.4 Sussex Street Bridge





Figure 6.5 Cabramatta Creek Bridge



## 6.2.4 Road works

### 6.2.4.1 Reconfiguration of Broomfield Street

The alignment of Broomfield Street would be reconfigured between Bridge Street and the Sussex Street bridge (a distance of about 680 metres). This is required to allow the rail corridor to be widened by about five metres to accommodate the proposed passing loop (described in section 6.2.1).

The proposed reconfiguration would involve reconfiguring road and pedestrian infrastructure to accommodate the change in the rail corridor boundary. The existing road configuration and an indicative design for the reconfiguration of Broomfield Street are shown in Figure 6.6.

The following infrastructure/facilities along Broomfield Street, between Bridge Street and Sussex Street, would be reconfigured.

#### Roadway

The current road configuration allows for two traffic lanes, one in each direction of travel. As part of the realignment works the centre line of the road corridor (consisting of traffic lanes and on-street parking) would be relocated generally about seven metres to the east. The resultant realignment would allow sufficient room for both traffic lanes to be retained, at widths in accordance with relevant Fairfield City Council requirements and specifications (refer to Table 6.2).

#### Changes to on-street parking

Untimed on-street parking, is located on both sides of Broomfield Street. For the majority of Broomfield Street within the project site, there is currently angled parking on the western side of the road, and kerbside parallel parking on the eastern side. Kerbside parallel parking on the eastern side of the road is not a formal parking lane as it does not meet current standards. North of Broomfield Lane, the parking consists of parallel parking on the western side only.

The project will reinstate kerbside parallel parking on the western side of the road. Kerbside parallel parking on the eastern side of the road would remain as per the current arrangement, however the parking lane will be widened to meet current standards as a result of consultation with Fairfield City Council. The potential impacts of this change on the availability of on-street parking is considered in Chapter 8 (Traffic, transport and access).

#### Shared path and western road verge

A shared path (shared pedestrian walkway and cycleway) that forms part of the Parramatta to Liverpool Cycle Rail Trail (the Cycleway) is located on the western side of Broomfield Street, between the rail corridor and angled parking. The shared path would be reinstated as per the current arrangement, however the overall width would be slightly reduced by about 20 centimetres.

Adjacent to the Cabramatta Creek and Sussex Street bridges, the shared path would be reinstated as per the current arrangement.

#### Footpath and eastern road verge

A footpath and grassed verge is located on the eastern side of Broomfield Street. The footpath and grassed verge would be reinstated as per the current arrangement and the existing width of the footpath would be maintained in accordance with relevant requirements (refer to Table 6.2). However the width of the grassed verge would be reduced by up to three metres to accommodate the realignment. This would result in the permanent removal of street trees along the eastern side of Broomfield Street (within the project site). The potential impacts of this change is considered in Chapter 17 (Landscape and visual amenity).

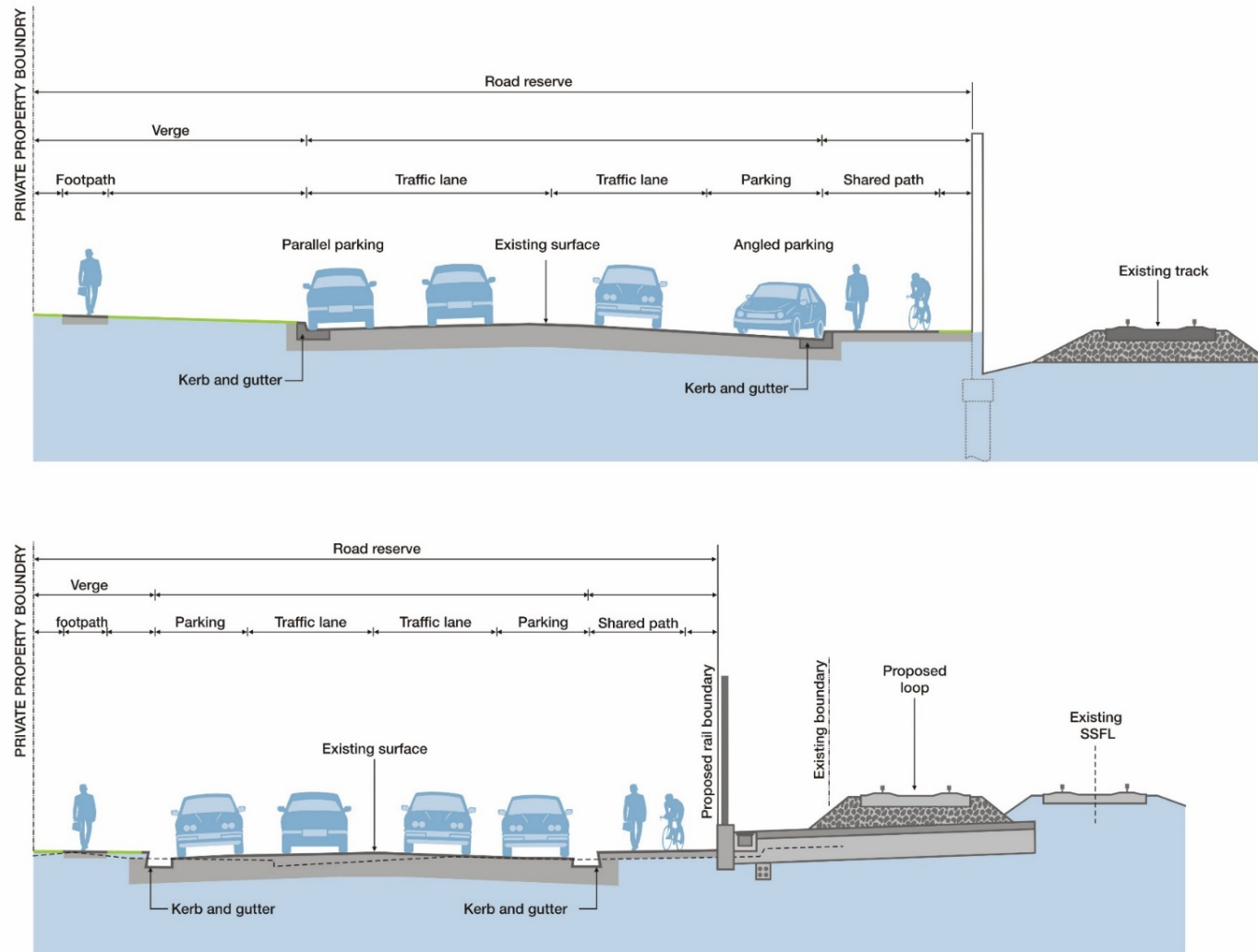


Figure 6.6 Existing configuration (top) and indicative proposed revised reconfiguration of Broomfield Street (bottom) (facing south)

### Changes in Sussex Street

The existing level of Sussex Street would be reconfigured to allow for the new bridge at Sussex Street. The existing road pavement and adjacent shared path would be regraded to match the proposed approach to the eastern side of the bridges. No works are proposed to the shared path where it crosses Cabramatta Creek.

## 6.3 Ancillary works and infrastructure

### 6.3.1 Track drainage

The project would involve retaining the existing track drainage. Minor alignment changes would be made at some locations to accommodate the new track.

### 6.3.2 Road drainage

Existing road drainage would be relocated in conjunction with the road works described in section 6.2.4. The existing flow regime, hydraulics and flood immunities would be matched as closely as possible. To accommodate the realignment of Broomfield Street, the project would involve relocating the existing stormwater inlet pits to the new kerbs. This would include

- reconstructing about seven existing stormwater kerb inlet pits
- installing a new 700 metre long, 1200 millimetre diameter wide stormwater pipeline
- installing 21 new stormwater kerb inlet pits, on the eastern and western side of Broomfield Street
- installing five cross drainage structures between the road corridor and the rail corridor
- installing new kerb and gutter on the eastern and western side of Broomfield Street.

### 6.3.3 Noise wall

The existing noise wall would be realigned to be placed on the eastern side of the new track.

The new noise wall would be constructed of a similar concrete material as the existing wall. Panels from the existing wall would be reused where practicable. The height of the new noise wall would range from about 4.2 metres to 7.5 metres above Broomfield Street ground level, and would generally match the height of the existing noise wall.

### 6.3.4 Retaining walls and embankment

Due to the difference in ground level between the rail corridor and land to the east, the existing retaining walls would be relocated to the eastern side of the new track. One new retaining wall would be required at the southern extent of the project.

The height of the relocated retaining walls would generally match the heights of the existing walls.

The walls are proposed to minimise the project footprint and impacts to Broomfield Street, Cabramatta Creek and the southern extent of the site.

The location and details of the proposed retaining walls are summarised in Table 6.3.

**Table 6.3 Proposed retaining wall structure**

No.	Location	Approximate length (metres)	Approximate height (metres)	Wall type
1	Bridge Street to Sussex Street Bridge	710	0 to 3	Reinforced concrete pile cap and wall
2	Sussex Street bridge to Cabramatta Creek bridge	40	3	Reinforced concrete pile cap and wall. Exposed concrete finish with handrail on top
3	Jacque Osmond Reserve	130	1 to 2	Reinforced concrete pile cap and wall. Exposed concrete finish with handrail on top
4	Southern extent of the site	90	1	Concrete block

An embankment would be constructed along the length of Jacquie Osmond Reserve. The length of the embankment would be about 260 metres. In consultation with Liverpool Council, it was identified that a hybrid of an embankment supported by a retaining wall at the northern extent of Jacquie Osmond Reserve would be required. The embankment allows for improved visual connectivity from the reserve to the rail line. As requested by Council, to support current maintenance practices in the Reserve the embankment would have a maximum height of 1.5 metres above ground surface, a width of about nine metres and a slope of one in six.

### 6.3.5 Other works

The following works would also be undertaken to accommodate the passing loop:

- provision of new and/or upgraded signalling, power and communications consisting of both under and above ground services and the in-situ decommissioning of the existing signalling, power and communications
- utility and rail system protection and relocation works within the construction footprint
- utility protection and relocation works potentially outside the construction footprint.

With the exception of the utility protection and relocation works, described in section 7.2.1, these works would be undertaken generally within the rail corridor.

## 6.4 Urban design

### 6.4.1 Project design principles and objectives

The urban landscape of the project site consists of the rail and road corridor, residential areas either side of the rail corridor, commercial and industrial land uses near the rail corridor and passive (Cabramatta Creek) and active recreation (Jacque Osmond Reserve and Warwick Farm Recreation Reserve). These areas are described further in Chapter 17 (Landscape and visual amenity).

Urban design principals and objectives have been developed to retain the existing urban quality of the project site, and are as follows:

- improve the physical, aesthetic and visual amenity of the project site for residents and the local community by:
  - using robust, high quality and durable materials that minimise opportunities for vandalism
  - providing simple finishes that remain subtle within the landscape
  - maximising opportunities for tree planting in areas that have had existing trees removed
  - reducing visual clutter to ensure heritage and landmark features are legible
- revegetating the project site where possible to improve the visual quality of adjacent residential and open space. enhance natural and urban character areas by:
  - protecting creeks and creek banks by maximising tree retention and planting at creek crossings and aligning shared pedestrian/ cycle paths in close proximity to the carriageway
- apply the use of Crime Prevention Through Environmental Design (CPTED) principles through the design process by:
  - maximising the visibility of footpaths and shared paths from adjoining areas for good surveillance, sight lines and ease of orientation
  - ensuring adequate lighting of public places and footpaths for safe night-time travel
  - ensuring the landscaping makes places attractive, but does not provide unsafe environments for entrapment.

## 6.5 Land requirements

### 6.5.1 Permanent land requirements

The project would require land to the east of the rail corridor to accommodate the passing loop and the associated widening of the rail corridor. Table 6.4 summarises the land requirements for the operational features of the project. These requirements are shown in Figure 6.7.

The acquisition of land to meet these required would be managed in consultation with landowners and in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991*. Where partial acquisitions are required, associated property adjustments, such as the realignment of property fencing, would be undertaken.

**Table 6.4**      **Operational land requirements for the project**

Lot/DP	Approximate amount of land required (m <sup>2</sup> )	Part/all of lot?	Owner	Existing use	Existing land zoning
Lot 10 DP 776165	550	Full	Liverpool City Council	Car parking	IN1 General Industrial
	0.1				RE1 Public Recreation
Lot 3 DP 1013680	120	Partial	Peter Warren	Car sales	IN1 General Industrial
Lot 12 DP 578199	100	Partial	Peter Warren	Car sales	IN1 General Industrial
Lot 2 DP 250138	0.1	Partial	Department of Planning, Industry and Environment (managed by Liverpool City Council)	Jacquie Osmond Reserve	IN1 General Industrial
	630				RE1 Public Recreation
	120				SP2 Infrastructure
Road Corridor	940	Partial	Fairfield City Council	Broomfield Street	R2 Low Density Residential
	1,150				R3 Medium Density Residential
	25				SP2 Infrastructure
	25				E2 Environmental Conservation
	120			Shared path between Sussex Street and Cabramatta Creek	R2- Low Density Residential E2- Environmental Conservation
Road Corridor	125	Partial	Liverpool City Council	Rail corridor	SP2- Infrastructure RE1-Public Recreation

Further information regarding property impacts is provided in Chapter 16 (Land use and property).





Figure 6.7a Proposed land requirements





Figure 6.7b Proposed land requirements



## 6.6 Operation of the project

### 6.6.1 Operational train movements

#### 6.6.1.1 Changes in operations from existing situation

The existing SSFL allows one freight train to run along the line in one direction at a time. The project would allow freight trains running in different directions to pass each other between Warwick Farm and Cabramatta stations. The project would include bi-directional signalling for the tracks within the project site to provide flexibility for operations.

This would increase the existing capacity of the freight line, allowing an increase in train volumes from 48 trains per day (24 in each direction) to 72 trains per day (36 in each direction).

#### 6.6.1.2 Train numbers

The existing SSFL and forecast (project at year of opening and 10 years after opening) freight operations are provided in Table 6.5 to Table 6.7.

The existing freight operation figures are based on a typical day in 2019, which are the number of timetabled trains sourced from the April 2019 Master Train Plan. These numbers do not capture the expected increase in services from the Moorebank Intermodal Terminal that is scheduled to open later in 2019.

It should be noted that there are often differences between the number of timetabled trains and the number of trains that actually operate. This is because some timetabled trains don't operate. There are also ad-hoc services that do not appear in the timetable. Table 6.5 captures this and shows an average of the timetabled services across the days of the week.

Table 6.6 and Table 6.7 are modelled train numbers. Given the difficulty of predicting likely future train timetables, it is assumed that the number of trains operating during the different time periods is equal to the proportion that those hours account for over a 24 hour period (ie 'Night', or 9 hours, is 37.5 per cent of a 24 hour day).

**Table 6.5 Existing SSFL freight operations – typical day 2019**

Travel time		Down direction (from Sydney)	Up direction (to Sydney)
Day	7.00 am – 10.00 pm	7.5	7.5
Night	10.00 pm – 7.00 am	4.5	4.5
<b>Total</b>		<b>12</b>	<b>12</b>

**Table 6.6 Forecast freight operations – typical day, year of opening (2023)**

Travel time		Down direction (from Sydney)	Up direction (to Sydney)
Day	7.00 am – 10.00 pm	15	15
Night	10.00 pm – 7.00 am	9	9
<b>Total</b>		<b>24</b>	<b>24</b>

**Table 6.7 Forecast freight operations – typical day, 2033**

Travel time		Down direction (from Sydney)	Up direction (to Sydney)
Day	7.00 am – 10.00 pm	22.5	22.5
Night	10.00 pm – 7.00 am	13.5	13.5
Total		36	36

#### **6.6.1.3 Train types and operating speeds**

The design of the project (including signalling) allows for the operation of trains up to 1,300 metres in length or two trains of up to 650 metres in length, operating at speeds of up to 80 kilometres per hour.

The trains that would use the passing loop once the project is operational would be similar to those that currently use the existing SSFL.

#### **6.6.1.4 Hours of operation**

The passing loop and existing SSFL would continue to operate during the existing operational hours, which are 24 hours per day, 365 days per year.

#### **6.6.1.5 Integration with the Metropolitan Freight Network**

With the commissioning of the project there would be no change to the way in which the existing SSFL integrates with the MFN and Sydney's freight network as a whole.

### **6.6.2 Operational management and coordination**

Operations along the line would continue to be controlled from ARTC's Network Control Centre South which is located in Junee. This represents no change to the operation of the ARTC network.

Operational activities would continue to be undertaken in accordance with ARTC's operating system which includes an Environmental Management System and ARTC's existing EPL (EPL # 3142).

### **6.6.3 Maintenance**

Standard ARTC maintenance activities would be undertaken during operations. Typically, these activities include minor maintenance works, such as bridge and culvert inspections, rail grinding and track tamping, through to major maintenance, such as replacement and repair of existing bridge components, culvert repairs and cleaning, reconditioning of track and topping up of ballast as required.

Maintenance activities would continue to be undertaken in accordance with ARTC's operating system which includes ARTC's Environmental Management System and ARTC's existing EPL (EPL # 3142).