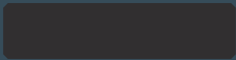
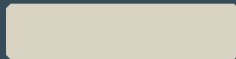
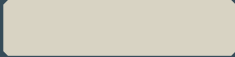
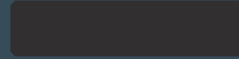




PART C

SYNTHESIS AND CONCLUSION



CABRAMATTA LOOP PROJECT

—
ENVIRONMENTAL
IMPACT STATEMENT

THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

22 Approach to environmental management and mitigation

This chapter, together with Chapter 23 (Project justification and conclusion), provides a synthesis of the EIS. This chapter compiles the key potential impacts that have not been avoided, and the measures proposed to avoid, minimise, manage or offset the impacts identified in Part B. The chapter also provides the outcomes the proponent is seeking to achieve through the implementation of the mitigation measures.

22.1 Compilation of impacts

Part B of the EIS provides an assessment of the potential impacts of the project during construction and operation. The key potential impacts requiring mitigation and management (that is, the impacts that have not been avoided) are summarised in Table 22.1.

Impacts would be mitigated by implementing the environmental management procedures and plans described in section 22.2, and the mitigation measures compiled in section 22.3.

Table 22.1 Summary of key potential impacts

Issue	Key potential impacts
Traffic, transport and access	<p>During construction there would be local traffic disruptions and short-term access restrictions and detours for road users, pedestrians and cyclists during road and bridge works. Access diversions would be in place for pedestrians and cyclists during works on Cabramatta Creek bridge. There may be temporary access restrictions to properties along Broomfield Street due to utility works.</p> <p>Up to about 46 on-street parking spaces (consisting of both formalised angled parking and informal kerbside parallel parking) would be unavailable during construction works on Broomfield Street, however options are being considered to provide an accessible temporary at-grade parking area during construction with provision for about 40 parking spaces within 800 metres of Cabramatta Station.</p> <p>Once operational, the project would result in the loss of some parking spaces on the western side of the road as a result of angled parking converted to parallel parking. Up to 11 spaces are anticipated to be impacted.</p>
Noise and vibration	<p>Given the nature and duration of works and close proximity of receivers, airborne noise during construction is expected to exceed noise management levels along the alignment. Receivers located along Railway Parade, Broomfield Street, Station Street, Lawrence Hargrave Road, Todman Road and Sappho Road would be expected to experience the worst-case noise impacts as they are located directly adjacent to the construction works.</p> <p>Construction works would be required outside standard construction hours, due to the need to minimise impacts on the road network. During the night time period, airborne noise levels are expected to exceed the criteria at some locations during certain activities.</p> <p>Residential receivers within 140 metres of vibration intensive works have the potential to experience impacts on human comfort. However, this assessment is considered conservative and the construction vibration would be intermittent.</p> <p>The existing noise wall would be replaced as part of the project. The predicted noise levels would be exceeded for one sensitive receiver with the replacement noise wall in place during operation. This receiver will be considered for mitigation.</p>

Issue	Key potential impacts
Air quality	<p>In general, air quality impacts are expected to be minor and manageable through established mitigation and management measures. Potential impacts would result from the generation of dust from construction works and the movement of equipment and machinery.</p> <p>Once operational, the increase in the number of diesel freight trains has the potential to increase levels of pollutants such as nitrogen oxides and particulate matter.</p>
Biodiversity	<p>The project would remove small areas of native vegetation which could provide some nesting and foraging habitat anticipated to total about half a hectare. This would not result in a significant impact on threatened species.</p>
Hydrology, flooding and water quality	<p>The majority of construction activities and the presence of construction compounds and work sites have the potential to impact local overland flows and flood behaviour. Runoff or rainfall within the project site has the potential to cause localised flooding issues and adverse downstream impacts. There may be impacts on downstream water quality as a result of key activities such as earthworks.</p> <p>The inclusion of structures such as the bridges will increase flood levels by up to 75 mm during a PMF flood event. This would only be in areas where the rail formation is predicted to be flooded by several metres depth.</p> <p>Works to the drainage design along Broomfield Street have the potential to increase existing flooding levels at a number of properties along Broomfield Street. The design of Broomfield Street would be refined during detailed design with the aim of not worsening the existing flooding conditions.</p>
Soils and water quality	<p>Erosion and sedimentation during construction could result in the contamination of soils and surface waters. This may impact on downstream water quality. Leaks and spills during construction and operation may cause contamination impacts to soil and water.</p> <p>During the operation of the project, maintenance and repair activities may require excavation and ground disturbance, which could result in short-term impacts such as exposure of soil to runoff and wind.</p>
Heritage	<p>During construction, there is potential for vibration impacts to two locally listed bridges adjacent to the proposed bridges (Cabramatta (Cabramatta Creek), Railway Parade and Sussex Street Underbridge (I19) and the archaeological remains of a locally listed federation cottage (Federation cottage (I10)). There is also the potential for disturbance to possible archaeological remains of the Federation cottage (I10) due to construction vibration.</p> <p>Impacts to the area of moderate archaeological potential within Jacquie Osmond Reserve cannot be avoided as utility works are required.</p>

Issue	Key potential impacts
Land use and property	<p>Within the project site, some areas of land would need to be temporarily leased or occupied to locate some of the proposed compounds and work sites and to relocate the Sydney Waters main. As a result, the use of this land would change from its existing use (mainly transport and public recreation) to use as a partial and temporary construction site.</p> <p>Where the compound and work sites are proposed, the recreational use of Jacquie Osmond Reserve and Warwick Farm Recreation Reserve would be temporarily restricted during construction.</p> <p>The partial acquisition of land at the southern extent of the project may impact on the businesses ability to access buildings adjacent to the acquired land. Additionally, the partial acquisition of Jacquie Osmond Reserve and construction of the embankment may require the movement of up to three of the existing softball diamonds up to ten metres to the east. This would be further refined during detailed design.</p>
Landscape and visual amenity	<p>Adverse impacts during construction and operation would occur where the project is located within or adjacent areas of landscape or visual sensitivity, such as heritage or natural landscapes (such as Cabramatta Creek), open spaces (such as Jacqui Osmond Reserve) or key urban landscapes (such as along Broomfield Street). In most cases this impact is due to the loss of established trees or vegetation.</p> <p>Urban design responses through plantings and selection of finishes to be determined during detailed design, would minimise the permanent impacts on landscape and visual setting; however, some adverse impacts would remain.</p>
Socio-economic	<p>Changes in existing access arrangements and connectivity along Broomfield Street, Sussex Street and the shared path could result in a temporary increase in the distance travelled, increased travel times, inconvenience and delays for some community members. There may be impacts on the amenity of the local community as a result of an increase in noise levels, traffic movements and congestion, dust, and changes in visual outlook.</p> <p>There are beneficial impacts of the project during construction. This includes employment (an estimated average workforce of 220 people), and flow on local and regional economic benefits.</p> <p>Once the project is in operation, there will be changes to access and connectivity due to parking losses along Broomfield Street. There may be potential impacts on the amenity of the local community due to the increased train volumes. There may also be potential impacts to the use of the softball fields in Jacquie Osmond Reserve.</p>
Health safety and hazards	<p>Adjustments or protection works would be carried out with the involvement of the asset owner, and potential impacts are manageable through established mitigation and management measures.</p> <p>During construction, there would be public health and safety risks due to the proximity of sensitive receivers to the project site. This may result in traffic confusion, injury, potential exposure to contaminated land, access issues, air quality impacts and noise and vibration impacts. During construction and operation, the storage and handling of dangerous goods and hazardous materials could cause leaks and spills, with resultant contamination and health impacts.</p> <p>Once operational, there may be potential security risks associated with unauthorised access to the rail corridor.</p>

22.2 Approach to environmental management

The approach to environmental mitigation and management for the project involves:

- Project design – as described in section 6.1.2, the project incorporates measures to avoid and minimise impacts.
- Environmental performance outcomes – establishes the intended outcomes to be achieved by the project. The environmental performance outcomes are provided in section 22.4.
- Mitigation measures – mitigation measures provided in Chapters 8 to 21 are identified as an outcome of the environmental impact assessment, and are consolidated in section 22.3.
- Engagement of suitably qualified and experienced Environmental Representative (ER) who is independent from the design and construction personnel for the project and those involved in the delivery of it. The ER would:
 - receive and respond to communication from the Secretary of the Department of Planning, Industry and Environment in relation to the environmental performance of the project
 - consider and recommend to ARTC any improvements that may be made to work practices to avoid or minimise adverse impact to the environment and the community
 - review the EMPs for enabling works, and the CEMP (and associated sub-plans) for the main construction works.
- ARTC's Site EMP(s) for enabling works– ARTC's existing Site EMP template will be used to guide the approach to environmental management during the enabling works, as described in section 22.2.1. The Site EMP(s) would:
 - detail how the mitigation measures detailed in the EIS and as relevant to the enabling works would be implemented to project personnel
 - show (using a graphical tool) where environmental controls will be located and how they will be used
 - document processes for environmental monitoring to demonstrate compliance.
 - be reviewed and approved by the independent ER prior to commencement of the relevant enabling works
- Project specific CEMP– prepared to guide the approach to environmental management during the main construction works, as described in section 22.2.1. The CEMP would:
 - outline the environmental management practices and procedures to be followed
 - detail how the mitigation measures and performance outcomes would be implemented and achieved during construction
 - document processes for demonstrating compliance with the commitments made in this EIS, the submissions/preferred infrastructure report (to be prepared), and relevant approval conditions
 - be prepared in consultation with relevant agencies and in accordance with the *Guideline for the Preparation of Environmental Management Plans* (DIPNR, 2004).
- Community and stakeholder engagement plan – The plan would aim to detail the approach to communicate between ARTC and its Construction Contractor(s), and the community and government authorities.

- ARTC's Environmental Management System – ARTC's Environmental Management System is a structured framework for the consideration, evaluation, management, regulatory compliance and reporting of environmental issues associated with its activities. The Environmental Management System supports ARTC's environment policy and outlines processes to guide compliance with environmental laws, statutes, regulations and corporate policies while managing potential environmental impacts.

The principal benefits of operating the ARTC Environmental Management System is that it provides clear definition of the corporate environmental goals, documented policies and procedures to prevent or minimise environmental damage and achieve legal compliance, improved management of environmental risks, documented roles and responsibilities and improved community relationships.

Given that the operation of the project would be consistent with the adjacent existing operating line, environmental issues and impacts which occur during operation and maintenance, would be managed under ARTC's Environmental Management System, which accommodates relevant management measures to the operation phase identified in this EIS.

22.2.1 Site EMP(s)

The Site EMP(s) for enabling works would include:

- key project information relevant to the relevant enabling works being undertaken including:
 - a description of the relevant activities as per the approved EIS
 - timeframes and hours of work for the tasks being undertaken (including any out of hours works and restriction on high noise-generating activities).
- contact details for key project personnel (including after hours) and community response line (Enviroline) contact number
- consultation requirements as it relates to the relevant activities proposed
- a site plan with a north point, legend and scale that shows:
 - the worksite layout and boundary, including entry/exit points, internal and adjacent roads, adjoining land use and nearest noise sensitive receivers
 - contours/elevation points and/or direction of slope/s
 - existing major services that may be in conflict or high risk
 - key environmental risk issues and the specific mitigation measures that apply to the enabling works as identified in the EIS including:
 - location and type of sediment and erosion control measures,
 - dust control measures
 - location of monitoring equipment (eg dust, noise, vibration monitors) and frequency of monitoring/inspections
 - location of environmentally sensitive areas (eg threatened species, critical habitat, contaminated areas, heritage zones, etc)
 - location of the construction compound, waste management facilities and worker car parking (including any parking restrictions)
 - vegetation and trees to be protected or removed, with any actions required prior to felling
 - location of known heritage (Aboriginal or non-Aboriginal) items

- location of spill containment and clean-up equipment
- location of stormwater drainage and watercourses leading to/from the worksite.
- document control and approval details.

The Site EMP(s) would be reviewed and approved by the independent ER. They would be reviewed regularly, in response to changes such as activities and environmental conditions, to ensure ongoing environmental management. The Site EMP(s) would be used in project inductions and tool box talks and would be placed in central locations for reference by all project personnel.

22.2.2 CEMP

Developed prior to commencement of main construction works, the CEMP would include:

- ARTC's environmental policy, objectives, and performance targets for construction
- relevant sub-plans as specified by the mitigation measures provided in Chapters 8 to 21
- reference to all relevant statutory and other obligations, including consents, licenses, approvals, and voluntary agreements required
- management policies, procedures, and review processes to assess the implementation of environmental management practices and the environmental performance of the project against the objective and targets
- requirements and guidelines for management in accordance with:
 - the conditions of approval for the project
 - the mitigation measures specified in this EIS
 - relevant construction management guidelines (including those provided in Chapters 8 to 21).
- requirements in relation to incorporating environmental protection measures and instructions in all relevant standard operating procedures and emergency response procedures
- roles and responsibilities of all personnel and contractors to be employed on site
- incident and contingency management procedures
- procedures for complaints handling and ongoing communication with the community
- a monitoring and auditing program, as defined by this EIS.

The CEMP would be adaptive, establishing a continuous cycle of monitoring, assessment, investigation and corrective actions. This process would be used to continuously evaluate and monitor the effectiveness of the environmental management measures proposed in this EIS and identify the corrective actions to be carried out should such measures be identified as being ineffective.

Compliance monitoring would be undertaken in the form of audits, including site audits as undertaken by ARTC and the ER. Frequency and reporting parameters would be identified in the CEMP.

Prior to commencement of main construction works, a compliance tracking and reporting program would be developed as part of the CEMP and implemented by the Construction Contractor(s). It would aim to monitor compliance with this EIS, relevant conditions of approval, licences and permits.

22.2.3 Community and Stakeholder Engagement Plan

A community and stakeholder engagement plan would be prepared prior to the commencement of main construction works, and would be developed in consultation with Fairfield City Council and Liverpool City Council. The plan would aim to detail the approach to communicate between ARTC and its Construction

Contractor(s), and the community and government authorities. The community and stakeholder engagement plan would:

- identify people, organisations and government authorities to be consulted during the works,
- set out procedures and mechanisms for the regular distribution of accessible information to keep the community and stakeholders informed in accordance with the measures outlined in this EIS
- set out the procedures and mechanisms for consulting with relevant councils and government authorities including procedures for nil responses
- describe the method for advertising the 24 hour response line and email address for enquiries
- set out procedures and mechanisms for response to enquiries and feedback
- include a complaints management system which outlines parameters for recording information on all complaints received during main construction work
- set out procedures and mechanisms to resolve any issues and disputes that might arise in relation to environmental management associated with the project.

22.3 Compilation of mitigation measures

Table 22.2 to Table 22.4 provide a compilation of the measures proposed to mitigate and manage the potential impacts of the project, as detailed in Part C. The measures listed may be revised in response to submissions raised during public exhibition of the EIS and/or any design changes made following exhibition. The final list of mitigation measures would be provided in the submissions/preferred infrastructure report.

If the project is approved, the project would be undertaken in accordance with the conditions of approval and the final list of mitigation measures.

The measures are broadly grouped according to the main stage of implementation. However, it is noted that the implementation of some measures may occur across a number of stages.

Table 22.2 Compilation of mitigation measures for detailed design

Ref	Issue	Mitigation measures
D1	Noise and vibration	
D1.1	Vibration impacts on heritage sites: Villawood Railway Station Group and Liverpool Railway Station Group	The signalling works near Liverpool Railway Station and Villawood Railway Station will be located outside of vibration buffer distances, where possible.
D2	Hydrology, flooding and water quality	
D2.1	Stormwater runoff	Where feasible and reasonable, detailed design will result in no net increase in stormwater runoff rates in all storm events, unless it can be demonstrated that increased runoff rates as a result of the project would not increase downstream flood risk.
D2.2	Scour potential	Any existing rip rap that is impacted or removed during construction would be reinstated. This would include the provision of rip rap around the piers and abutments of Cabramatta Creek bridge. The design of the rip rap will take into consideration the size, quantity and type of rip rap with the aim of not causing additional impacts to water quality.

Ref	Issue	Mitigation measures
D2.3	Water quality	The project will be designed to ensure there is minimal potential for water quality impacts, including incorporating water sensitive urban design elements.
D2.4	Groundwater	A water license will be obtained as necessary in accordance with Part 5 of the <i>Water Act 1912</i> if dewatering of excavations is required.
D2.5	Flooding	<p>Further assessment and design refinement will be undertaken during detailed design with the objective of not exceeding the following flooding characteristics during the one per cent AEP event:</p> <ul style="list-style-type: none"> ■ a maximum increase in time of inundation of one hour in a one per cent AEP event ■ a maximum increase in 50 mm in inundation at properties where floor levels are currently not exceeded ■ a maximum increase in 10 mm in inundation at properties where floor levels are currently exceeded. <p>In the event this cannot be met further mitigation would be proposed in consultation with the relevant councils.</p>
D3	<i>Non-Aboriginal heritage</i>	
D3.1	Changes to aesthetic significance and views to/from Cabramatta (Cabramatta Creek), Railway Parade and Sussex Street Underbridge (I19)	As per the current reference design, detailed design of the bridges will ensure the height, form, abutment and pier locations of both bridges matches the existing SSFL bridges.
D3.2	Changes to the aesthetic significance by the size and placement of the project. obscuring or blocking views to/from: <ul style="list-style-type: none"> • Liverpool Railway Station Group (72) • Villawood Railway Station Group (I103) 	The visible infrastructure will be as small as possible to not obscure views to/from the item and not to visually dominate the landscape.
D3.3	Changes to the aesthetic significance of the Federation cottage (I10).	ARTC will consult with Council to request the heritage significance of this item is updated to reflect the fact that the cottage has burnt down.
D4	<i>Aboriginal heritage</i>	
D4.1	Potential impacts to areas of high archaeological potential	If works are proposed outside the current project footprint (such as utility relocations) and impacts could occur within areas of high archaeological potential, further assessment in the form of subsurface investigations (test excavations) prior to impacts will be required (refer to methodology provided in Appendix 3 of Technical Report 9 – Aboriginal and cultural heritage impact assessment)..
D4.2	Impacts to archaeological heritage with the area of moderate potential in	Further assessment will be carried out in Jacquie Osmond Reserve in the form of subsurface investigations (test excavations) prior to construction commencing (refer to methodology provided in Appendix 3 of Technical Report 9 – Aboriginal and cultural heritage impact assessment). Should any Aboriginal objects be

Ref	Issue	Mitigation measures
	Jacquie Osmond Reserve.	encountered during investigation a long term care agreement setting out the obligations and methods of long term safekeeping will be developed in consultation with the RAPs.
D5	Land use and property	
D5.1	Property acquisition	All acquisitions/adjustments will be undertaken in consultation with landowners and relevant acts.
D5.2	Impacts to services and utilities	Utility and service providers will continue to be consulted during detailed design to identify possible interactions and develop procedures to minimise the potential for service interruptions and impacts on existing land uses.
D5.3	Temporary land use impacts on Council and privately owned land	Individual property agreements/licenses will be developed in consultation with the relevant council and land owners. These will detail any restoration requirements and relocation of impacted infrastructure as required.
D5.4	Temporary land use impacts on Council and privately owned land	<p>The overall disturbance footprint will be refined during detailed design to identify areas where the footprint could be minimised to reduce impacts on existing public recreation land uses and privately owned land.</p> <p>Detailed construction staging of the project will also be considered further during detailed design and will aim to minimise the time that affected land uses are impacted during construction.</p>
D6	Landscape and visual amenity	
D6.1	Visual impacts due to addition of new structures and removal of vegetation	<p>An urban design and landscape plan will be developed as part of the detailed design with the objective of maintaining and improving pedestrian and cycling connectivity, reinstating vegetation where possible and, ensuring constructed elements improve on existing design and materiality.</p> <p>It will build on the existing landscape concept and consider the urban design principles and objectives and the mitigation measures provided in this table.</p> <p>The urban design and landscape plan will be developed in consultation with Fairfield and Liverpool City Councils.</p>
D6.2	Vegetation clearance	The urban design and landscape plan will include a planting pallet consistent with the existing area. Native species selected will be of local significance, from the relevant ecological vegetation community and will be sourced from nurseries in the local area, where possible.
D6.3		Where revegetation of riparian areas and bank stabilisation is required, the design will be prepared in consultation with an experienced waterway rehabilitation consultant and Fairfield and Liverpool City Councils.
D6.4	Visual impact from new bridges	<p>The design and materiality of the bridges will integrate with the existing built form in accordance with <i>Bridge Aesthetics: Design guidelines to improve the appearance of bridges in NSW</i> (RMS, 2012).</p> <p>The bridge design will minimise visual clutter where possible, through incorporating cabling and barriers into a single bridge façade.</p> <p>The bridge design will be in accordance with ARTC's requirements to ensure bridge structures can be visually monitored as part of ongoing maintenance.</p>
D6.5	Visual impacts from noise wall	The noise walls along Broomfield Street will be reused in the project due to the existing value placed on them by the local community. Where vegetation screening is implemented views to the artwork panels will be retained.

Ref	Issue	Mitigation measures
		<p>Along Broomfield Street where retaining walls are to be replaced, colour is to match existing noise wall.</p> <p>High quality materials, textured and graffiti resistant surfaces will be used, where possible, on retaining walls along Broomfield Street and Jacquie Osmond Reserve to deter graffiti, particularly at lower levels of the walls. The design will be finalised following consultation with maintenance stakeholders.</p>
D6.6	Light spill	Permanent lighting will be designed in accordance with AS 4282-1997 Control of obtrusive effects of outdoor lighting. This will avoid light spill into residential properties along Broomfield Street and surrounding residential streets and ecologically sensitive areas along Cabramatta Creek.
D7	Socio- economic impacts	
D7.1	Socio-economic impacts	<p>ARTC will continue to work with stakeholders and the community to ensure they are informed about the project and have opportunities to provide feedback to the project team.</p> <p>The existing community contact and information tools will remain in place throughout the duration of the project.</p> <p>Consultation prior to and during construction will involve the use of appropriate tools, including, but not limited to, tools such as community information sessions, briefings, and displays; distribution of project materials in a variety of languages; door knocks; and site signage.</p>
D7.2	Community facilities	Prior to construction, consultation will be undertaken with community facilities and event organisers (Cabramatta Moon Festival and Chinese New Year's) with the potential to be impacted by the project, including the cultural centres along Broomfield Street, Fairfield City Council, Liverpool City Council, the SDSA and Lawrence Hargrave Special Education School. Consultation will aim to identify and develop measures to manage the specific construction impacts for individual community facilities and events. These measures would be incorporated into the relevant management plans.
D7.3	Community facilities	During design development consultation will be undertaken with Liverpool City Council and the SDSA to minimise impacts on use of the softball fields due to the presence of the embankment and passing loop.
D7.4	Community facilities	During design development consultation will be undertaken with Lawrence Hargrave Special Education School regarding existing and future construction noise impacts to identify appropriate mitigation measures.
D7.5	Amenity impacts	The community will be given the opportunity through implementation of the existing Stakeholder Engagement Strategy (refer Chapter 4 (Consultation) to provide comment on design and project features which provide local community benefits.
D8	Waste	
D8.1	Excess waste generation	Detailed design will include measures to minimise excess spoil generation during construction of the project. This will include a focus on optimising the design to minimise spoil volumes, and the reuse of material on-site.
D9	Health, safety and environment	

Ref	Issue	Mitigation measures
D9.1	Public health and safety	A hazard analysis will be undertaken during the detailed design stage to identify further risks to public safety from the project, and how these will be mitigated through safety in design and construction methodology.
D9.2	Public safety from collapse of structures, embankments or walls	All structures such as the retaining wall in Jacquie Osmond Reserve and the noise wall on Broomfield Street will be designed to meet appropriate standards, with sufficient tolerances to loads and wind gusts to prevent collapse.
D9.3	Safety of road, pedestrian and cycle connections under the widened Sussex Street bridge	Lighting design under the Sussex Street bridge will consider the Crime Prevention Through Environmental Design principles.
D10	Climate change and greenhouse gases	
D10.1	Design development changing climate change risk	ARTC will: <ul style="list-style-type: none"> • apply the climate change risk assessment and its existing control measures as incorporated into the reference design, in implementing the project, or • in the event of design changes, during detailed design, review the climate change risks identified in this assessment in order to amend existing control measures or identify additional control measures to reduce the climate change related risks to the project with no 'very high' or 'high' residual climate related risks remaining.
D10.2	Risks from climate change	ARTC will implement all potential adaptation measures identified in Table 21.5 so far as is reasonably practicable to reduce climate change risk.
D10.3	Improvements in climate change projections	In the event of significant new scientific climate change projections becoming available during detailed design, ARTC will review the relevant climate change risks and control measures identified in this assessment in order to confirm that there are no 'very high' or 'high' residual climate related risks remaining.
D10.4	Reduction in greenhouse emissions	Opportunities to reduce greenhouse gas emissions will be investigated during detailed design. This will include: <ul style="list-style-type: none"> • opportunities for low emission construction materials • locally sourced materials to reduce travel related emissions • use of recycled material options (eg asphalt).

Table 22.3 **Compilation of mitigation measures for construction**

Ref	Issue	Mitigation measures
C1	Traffic, transport and access	
C1.1	General impacts of construction activities on traffic, transport, access, pedestrians and cyclists	A construction traffic management plan will be prepared by the contractor and implemented as part of the CEMP. It 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. The construction traffic management plan will be developed in consultation with relevant emergency services, Liverpool City Council, Fairfield City Council, Roads and Maritime Services, and public transport/bus operators.
C1.2	Traffic delays	Oversized vehicles will use designated heavy vehicle routes or routes approved by Roads and Maritime Services.

Ref	Issue	Mitigation measures
		<p>Oversized traffic movements will be carried out, where possible, outside of peak road network periods, minimising the impacts on the road network.</p> <p>Should oversized vehicles be required, the contractor will be responsible for obtaining necessary permits/approvals, where required. Where possible, major road networks such as Cabramatta Road East and the Hume Highway will be used for access to the site by heavy vehicles.</p>
C1.3	Temporary parking space loss	Where parking spaces are lost or access is impeded, particularly for extended periods, alternative parking will be provided wherever feasible and reasonable. This will include consideration of other privately owned (or vacant) land within close proximity to Cabramatta Station.
C1.4	Delays to Emergency services	A minimum lane width of about 3.5 m will be provided along Broomfield Street during construction to facilitate the access of emergency service vehicle.
C1.5	Parking space loss	<p>The project site will be managed to minimise construction worker parking on surrounding streets. A worker car parking strategy will be developed in consultation with the relevant local council to identify measures to reduce the impact on the availability of on street and off street parking. The strategy will identify potential mitigation measures including alternative parking locations. The strategy will encourage contractor staff to:</p> <ul style="list-style-type: none"> • park within compound sites • use public transport • car share.
C1.6	Traffic impacts	Where possible, heavy vehicle activity will be avoided, during school pick-up and drop-off periods (8:00 am to 9:30 am and 2:30 pm to 4:00 pm school days) in the vicinity of schools, when pedestrian and vehicle activity is generally greater.
C1.7	Traffic impacts	The extent and duration of temporary road closures along Broomfield Street and Sussex Street will be minimised to reduce the impact on local traffic, with diversions in place to the adjoining road network.
C1.8	Traffic impacts	Work areas will provide safe clearances from through traffic lanes in line with Roads and Maritime's Traffic Control at Works Sites Manual. Should road works speed zones be required, the contractor will develop necessary plans and obtain approvals by the governing authority (Roads and Maritime) in consultation with the local council.
C1.9	Residential access	<p>Driveway and pedestrian access to properties adjoining the works is to be maintained.</p> <p>Where disruptions to access cannot be avoided, consultation will be undertaken with the owners and occupants of affected properties, to confirm their access requirements and to discuss alternatives.</p> <p>Potentially affected property owners and residents will be contacted before the commencement of works. Residents will be notified via door knocks, newsletters or letter box drops providing information on the proposed works, working hours and a contact name and number should any enquiries wish to be registered.</p> <p>Open trenches will be filled or covered using road plates at the end of each day to minimise impacts on vehicular access to properties, where necessary.</p>
C1.10	Access to Jacquie Osmond Reserve	The contractor will consult with Liverpool City Council and the relevant sporting associations to minimise potential conflicts between vehicles, pedestrians and cyclists at the reserve, particularly during weekend periods when sporting activities are likely to occur.
C1.11	Informal parking within Jacquie Osmond Reserve	The contractor will consult with Liverpool City Council and the relevant sporting associations with regards to scheduling and access arrangements when works are being undertaken on Cabramatta Creek bridge, to minimise the potential impacts associated with the loss of access to informal parking in Jacquie Osmond Reserve.

Ref	Issue	Mitigation measures
C1.12	Heavy vehicles damaging local roads	A dilapidation survey will be undertaken of the Fairfield City Council and Liverpool City Council owned/managed roads within the proposed haulage routes prior to works commencing and provided to the relevant council.
C1.13	Temporary closure of shared path	The Western Sydney cycling network will be notified prior to the proposed closure and/or diversion of the Parramatta to Liverpool Rail Train Cycleway within the project site.
C2	Noise and vibration	
C2.1	General impacts of construction activities on sensitive receivers	<p>A construction noise and vibration management plan will be prepared by the contractor and implemented as part of the CEMP. It will include measures to minimise the potential for noise and vibration impacts on the community, including those listed in this EIS. It will also consider relevant noise mitigation measures and notification procedures outlined in ARTC's EPL #3142.</p> <p>The construction noise and vibration management plan will be developed in consultation with Liverpool City Council, Fairfield City Council, and the EPA.</p>
C2.2	Noise impacts during out of hours work	<p>An out of hours protocol will be developed as part of the construction noise and vibration management plan. It will at a minimum:</p> <ul style="list-style-type: none"> • provide a process for the consideration of out of hours work against the relevant noise and vibration criteria • document procedures to manage potential impacts • identify responsibilities for implementation and management including managing complaints.
C2.3	Vibration impacts on structures including heritage items.	<p>Strategies to minimise the vibration of construction activities will be considered during construction planning. This will include a detailed review of work methods and equipment selection with the aim of avoiding the use of equipment within the relevant vibration safe working buffer distances.</p> <p>Where this is not possible, attended vibration measurements of vibration generating equipment (eg bored piling, vibratory rolling works) will be undertaken prior to works near the sensitive structures located within the vibration buffer distances identified in Figure 4-12 and Figure 4-13 provided in Technical Report 2 – Noise and vibration impact assessment. This will confirm the project specific minimum working distances for vibration intensive activities.</p>
C2.4	Vibration impacts on structures including heritage items.	Building dilapidation surveys will be carried out on all structures located within the vibration buffer distance prior to major project construction activities with the potential to cause property damage.
C2.5	Vibration impacts from the increase number of trains passing by Cabramatta (Cabramatta Creek), Railway Parade and Sussex Street Underbridge (I19).	If following a dilapidation survey of the heritage items the structures are found to be unsound, then a structural engineer will advise if there is a risk from increasing operational train numbers and identify strategies to avoid risks.
C2.6	Noise impacts during sensitive periods	<p>Where feasible and reasonable, construction will be carried out during the standard daytime working hours.</p> <p>The use of highly intensive noise and vibration generating equipment (such as jack and rock hammering, sheet and pile driving, rock breaking and vibratory rolling) less sensitive times (eg the middle of the day).</p>
C2.7	Noise impacts from continuous activities.	Highly intensive noise and vibration generating equipment (such as jack and rock hammering, sheet and pile driving, rock breaking and vibratory rolling) will

Ref	Issue	Mitigation measures
		<p>only be used in continuous blocks not exceeding three hours each, with a minimum respite period of one hour between each block.</p> <p>'Continuous' includes any period during which there is less than one hour respite between ceasing and recommencing any of the work.</p> <p>Additionally, this equipment will not be used for more than two consecutive nights over any seven day period adjacent to the same sensitive receivers.</p>
C2.8	Noise impacts from worker activities	<p>All employees, contractors and subcontractors are to receive an environmental induction. The induction will include at least:</p> <ul style="list-style-type: none"> • all relevant project specific and standard noise and vibration mitigation measures • relevant licence and approval conditions • permissible hours of work • any limitations on noise generating activities with special audible characteristics • location of nearest sensitive receivers • construction employee parking areas • designated loading/unloading areas and procedures • site opening/closing times (including deliveries). • environmental incident procedures.
C2.9	Noise impacts from worker activities	<p>While on site, construction workers will refrain from:</p> <ul style="list-style-type: none"> • swearing or unnecessary shouting or loud stereos/radios on site • dropping of materials from height, throwing of metal items and slamming of doors • excessive revving of plant and vehicle engines • uncontrolled release of compressed air.
C2.10	Construction traffic noise	<p>Traffic flow, parking and loading/unloading areas will be planned to minimise reversing movements within the site.</p>
C2.11	Construction traffic noise	<p>To reduce the impact of noise from construction traffic the following mitigation measures will be implemented:</p> <ul style="list-style-type: none"> • Loading and unloading of materials/deliveries will occur as far as possible from sensitive receivers. • Site access points and roads will be selected as far as possible away from sensitive receivers. • Dedicated loading/unloading areas will be shielded if close to sensitive receivers, where reasonable and feasible. • Delivery vehicles will be fitted with straps rather than chains for unloading, wherever possible. • Vehicle movements will be scheduled away from sensitive receivers and during less sensitive times, where possible. • The speed of vehicles within and approaching construction compounds will be reduced

Ref	Issue	Mitigation measures
		<ul style="list-style-type: none"> The use of engine compression brakes during night time periods will be avoided, where possible On-site storage capacity will be maximised to reduce the need for truck movements during sensitive times. Vehicles will be fitted with a maintained original equipment manufacturer exhaust silencer that complies with the National Transport Commissions <i>National Stationary Exhaust Noise Test Procedures for In-service Motor Vehicles</i> (2006).
C2.12	Construction noise and vibration	<p>Quieter and less vibration emitting construction methods and equipment will be used where feasible and reasonable.</p> <p>For example, when piling is required, bored piles rather than impact-driven piles will minimise noise and vibration impacts. Similarly, diaphragm wall construction techniques, in lieu of sheet piling, will have significant noise and vibration benefits.</p>
C2.13	Construction noise and vibration	Where practicable, materials will be pre-fabricated and/or prepared off-site to reduce noise with special audible characteristics occurring on site. Materials can then be delivered to site for installation.
C2.14	Noise from construction equipment	The noise of plant and equipment must have operating Sound Power or Sound Pressure Levels compliant with the allowable noise levels.
C2.15	Noise from construction equipment	<p>To reduce the impact of noise from construction equipment the following mitigation measures will be implemented:</p> <ul style="list-style-type: none"> The offset distance between noisy plant and adjacent sensitive receivers will be maximised. Plant used intermittently will be throttled or shut down. <p>Noise-emitting plant will be directed away from sensitive receivers</p>
C2.16	Noise from construction equipment	Non-tonal reversing beepers (or an equivalent mechanism) will be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work, including delivery vehicles.
C2.17	Noise from construction equipment	<p>Noise from mobile plant will be reduced where possible, through additional fittings including:</p> <ul style="list-style-type: none"> residential grade mufflers damped hammers such as 'City' Model Rammer Hammers air parking brake engagement silenced.
C2.18	Noise impact from compound (C1)	Use of the construction compound (C1) near Warwick Farm Station will where practicable, be limited to standard hours only with the exception of plant storage and material delivery.
C2.19	Noise from construction compounds	Stationary noise sources on construction compounds will be enclosed or shielded where practicable, to ensure that the occupational health and safety of workers is maintained. Appendix F of AS 2436:1981 lists materials suitable for shielding.

Ref	Issue	Mitigation measures
C2.20	Noise from construction compounds	Structures will be used to shield residential receivers from noise where practicable such as site shed placement; earth bunds; fencing; erection of operational stage noise barriers (where practicable) and consideration of site topography when siting plant.
C2.21	Construction noise resulting in highly intrusive levels	A noise monitoring program will be carried out for the duration of works at sensitive receivers identified as experiencing highly intrusive noise levels and as a result of complaints received, in accordance with the CEMP.
C2.22	Vibration impacts on heritage sites: Cabramatta (Cabramatta Creek), Railway Parade and Sussex Street Underbridge	Where building dilapidation surveys indicate that the heritage listed bridges are unsound, then the conservative criteria of 3.0 mm/s provided by DIN 4150-3 will be used for construction equipment used within the vibration buffer distances, where practicable.
C3	Air quality	
C3.1	Dust deposition and decrease in receptor amenity – minor and temporary	Dust suppression will be undertaken as required using water sprays, water carts or other media on: <ul style="list-style-type: none"> • unpaved work areas subject to traffic or wind • sand, spoil and aggregate stockpiles • the loading and unloading of dust generating materials.
C3.2	Vehicle emissions	Plant and equipment will be maintained in good condition and in accordance with manufacturer's specifications to minimise spills and air emissions that may cause nuisance.
C3.3	Dust deposition and decrease in receptor amenity – minor and temporary	If the works are creating levels of dust which significantly impact on residential amenity, the works will be modified or stopped until the dust hazard is reduced to an acceptable level.
C3.4	Dust deposition and decrease in receptor amenity – minor and temporary	The size of stockpiles will be minimised, where possible.
C3.5	Dust deposition and decrease in receptor amenity – minor and temporary	Construction vehicles with potential for loss of loads (such as dust or litter) will be covered when using public roads
C4	Biodiversity	
C4.1	Vegetation clearance	Impacts to <i>Acacia pubescens</i> will be avoided. The locations of <i>Acacia pubescens</i> will be marked on plans, outlined in the CEMP, fenced on site, and avoided. Signage will be placed on relevant fencing to inform of prohibited activities in that area as part of the works.
C4.2	Vegetation clearance	Disturbance of vegetation will be limited to the minimum necessary to construct works. Micro-siting of infrastructure will be undertaken during detailed design where practicable to minimise or avoid impacts on planted native species.

Ref	Issue	Mitigation measures
C4.3	Vegetation clearance	Where the project site adjoins native vegetation, the limits of clearing will be marked and temporary fencing or flagging tape installed around the vegetated area prior to the commencement of construction activities to avoid unnecessary vegetation and habitat removal or damage.
C4.4	Vegetation clearance	Equipment storage and stockpiling of resources will be restricted to designated areas within compound sites in cleared land.
C4.5	Vegetation clearance	The design and placement of any associated ancillary works such as utilities or signalling outside of the project site will avoid impacts to <i>Acacia pubescens</i> or other biodiversity values. These works will affect only cleared land or exotic vegetation.
C4.6	Revegetation	Following removal of the temporary shared path between Sussex Street and Cabramatta Creek, revegetation will be undertaken to stabilise the site. Opportunities to work with local groups such as the Fairfield Creeks and Wetlands Group will be explored where possible. Revegetation will aim to be consistent with the pre-existing vegetation and surrounding vegetation.
C4.7	Weeds	Weed management actions will be included in the CEMP to manage weeds in accordance with the NSW Weed Control Handbook (DPI, 2018). This will include the management and disposal of the weeds that were recorded within the project site including priority weeds in accordance with the biosecurity duties under the <i>Biosecurity Act 2015</i> .
C4.8	Weeds	Vehicles and other equipment to be used within the rail corridor will be cleaned to minimise seeds and plant material entering the project site to prevent the introduction of further exotic plant species or disease. This will include the use of vehicle wash bays or portable vehicle wash equipment such as high pressure wash units, shovels, crow bars or stiff brushes.
C4.9	Fauna habitat	<p>The CEMP will include the locations of potential roost sites as identified in this report (eg. hollow-bearing trees, disused buildings, bridges and culverts). The CEMP will include measures to manage potential impacts to roost sites such as:</p> <ul style="list-style-type: none"> • Any potential roost sites that will be removed or modified will be checked for roosting bats immediately prior to work. • Culverts are to remain open on at least one side at all times to allow any roosting bats to fly in or out. • Habitat to be identified for the release of microbats or any fauna encountered during clearing surveys • Habitat trees will be felled using equipment that allows the trees to be lowered to the ground with minimal impact (eg claw extension) • Animals that emerge from felled trees will be captured, inspected for injury, then relocated to pre-determined habitat identified for fauna release. <p>Where the presence or potential presence of roosting bats is noted then management measures for managing bats will be implemented in accordance with the CEMP.</p>
C4.10	Fauna habitat	An unexpected finds procedure will be developed specifying measures for the management of any threatened biota or habitat resources identified during construction. The unexpected finds procedure will include the requirement for work to stop immediately if any threatened fauna is encountered and the Construction Environmental Manager to be notified. Work will recommence only

Ref	Issue	Mitigation measures
		once relevant approvals have been obtained as required. The species will be included in subsequent toolbox talks.
C4.11	Fauna habitat	Protocols to prevent introduction or spread of chytrid fungus will be implemented following OEH Hygiene protocol for the control of disease in frogs (DECC, 2008b).
C4.12	Fauna habitat	<p>A suitably qualified person will be present during the removal of potential fauna habitat (ie the hollow-bearing tree in Jacqui Osmond Reserve and areas of planted native species) to avoid impacts on resident fauna and to salvage habitat resources as far as is practicable. Clearing surveys will include:</p> <ul style="list-style-type: none"> • inspections of vegetation for resident fauna and/or nests or other signs of fauna occupancy • capture and relocation or captive rearing of less mobile fauna (such as nestling birds) by a trained fauna handler and with assistance from Wildlife Information Rescue and Education Service (WIRES) as required • inspection and identification/marketing of hollow-bearing trees or other habitat resources adjacent to the project site to help ensure against accidental impacts • salvage of habitat features such as mature tree trunks and woody debris within the project site and placement within revegetation areas as far as is practicable (eg if vegetated areas are not separated by fences).
C5	Soils and contamination	
C5.1	General soil and erosion management	<p>A soil and water management plan will be prepared as part of the CEMP for the project and implemented for the duration of construction, in accordance with <i>Soils and Construction - Managing Urban Stormwater Volume 1</i> (Landcom, 2004) and Volume 2D (DECC, 2008a) (commonly known as 'the Blue Book')</p> <p>The soil and water management plan will include but not be limited to:</p> <ul style="list-style-type: none"> • a primary erosion and sedimentation control plan and a maintenance schedule for ongoing maintenance of temporary erosion and sediment controls. The erosion and sedimentation control plan will include site-specific details for managing sediment and erosion near Cabramatta Creek and associated drainage lines • measures and controls for the management of disturbed and stockpiled soils, including surface stabilisation of disturbed ground, covering of stockpiles where appropriate and implementation of clean-water diversions • an incident emergency spill procedure which will include measures to avoid spillages of fuels, chemicals, and fluids onto any surfaces or into any adjacent/nearby waterways.
C5.2	Acid sulfate soils	A field pH testing and field peroxide pH testing regime will be undertaken prior to piling work around Cabramatta Creek, in accordance with the <i>Acid Sulfate Soils Assessment Guidelines</i> (ASSMAC, 1998). Should ASS or potential ASS be identified during the testing, then measures to manage the potential impacts associated with encountering ASS or potential ASS will need to be developed and implemented in accordance with the <i>Acid Sulfate Soils Assessment Guidelines</i> (ASSMAC, 1998).
C5.3	Unexpected contamination	An unexpected findings protocol pertaining to contamination will be included in the soils and water management plan. The protocol will include procedures for

Ref	Issue	Mitigation measures
		the assessment and management of unexpected contamination encountered (if any) during construction.
C5.4	Unexpected contamination	<p>Awareness training will be provided for all onsite staff to assist in the identification of potentially contaminated material.</p> <p>In the event that indicators of contamination are encountered during construction (such as odours or visually contaminated materials), work in the area will cease, and the finds will be managed in accordance with the unexpected contamination finds protocol.</p>
C5.5	Contamination of soils	<p>Prior to the acceptance of any imported fill onsite (regardless of volume), the following actions will be taken to reduce the risk of receiving contaminated material:</p> <ul style="list-style-type: none"> • all fill used will be checked to confirm it is virgin excavated natural material (VENM) (eg clay, gravel, sand, soil or rock) or excavated natural material (ENM) (eg naturally occurring rock and soil) that is not mixed with any other waste • the supplier will provide formal certification that the fill material is clean VENM or ENM • the supplier will provide information on what activities previously occurred onsite where their fill was sourced • signs of contamination will be checked for, such as odours (chemical/petrol), staining from chemicals, and rubbish such as bricks, timber, and masonite • the delivery of the material will be supervised to check the material received matches the material ordered. • all required documents and records will be maintained.
C5.6	Contamination incident management	Spill containment kits will be present and maintained on site during all activities
C5.7	Contamination incident management	All staff will be inducted about incident and emergency procedures in accordance with the incident emergency spill procedure and made aware of the locations of spill containment kits. Information regarding the correct and safe storage and handling of fuels and chemicals will be communicated to personnel.
C6	<i>Hydrology, flooding and water quality</i>	
C6.1	Flooding, changes to surface water and water quality	<p>A flood management procedure will be prepared as part of the soil and water management plan. It will include specific controls to be implemented during wet weather or forecasts of heavy rainfall for works undertaken near Cabramatta Creek and Jacquie Osmond Reserve and appropriate monitoring strategies following the flood to verify design performance and impact predictions</p> <p>It will also include a flood warning and evacuation procedure for emergency management of flooding up to the PMF event. Development of a flood warning and evacuation procedure for the project will be undertaken in consultation with stakeholders including Liverpool City Council and Fairfield City Council and the NSW SES.</p>

Ref	Issue	Mitigation measures
C6.2	Flooding	<p>The site layout and staging of construction activities will:</p> <ul style="list-style-type: none"> • avoid or minimise obstruction of overland flow paths and limit the extent of flow diversion required • consider how the works will affect the existing stormwater network such that alternatives are in place prior to any disconnection or diversion of stormwater infrastructure.
C6.3	Flooding	<p>Detailed construction planning will consider flood risk for compounds and work sites near Jacquie Osmond Reserve and Cabramatta Creek. This will include identification of measures to not worsen existing flooding characteristics.</p> <p>Not worsen is defined as:</p> <ul style="list-style-type: none"> • a maximum increase in flood levels of 50 mm in a one per cent AEP event • a maximum increase in time of inundation of one hour in a one per cent AEP event • no increase in the potential for soil erosion and scouring from any increase in flow velocity in a one per cent AEP flood event.
C6.4	Watercourse impacts	<p>Works within or near Cabramatta Creek will be undertaken with consideration given to the NSW Department of Primary Industries (Water) <i>Guidelines for controlled activities on waterfront land – Riparian corridors</i> (2018).</p>
C6.5	Water quality	<p>Dewatered groundwater will be stored and reused on site for wetting down and reducing dust in disturbed areas (within existing erosion and sediment controls), or for irrigation in grassed areas. Requirements for testing will be included in the soils and water management plan and will include the following at a minimum:</p> <ul style="list-style-type: none"> • No visible sheen or odour is noted. • Water pH is between 6.5 and 8.5. • Total suspended solids are less than 60 mg/L (approximately equivalent to a turbidity level of 50 NTU). Water may be dosed with gypsum, alum or a similar product to reduce sediment levels if required. • All litter and debris must be filtered out and removed prior to reuse. • Pump-out events are supervised at all times, and the pump is positioned to prevent reuse of sediment-laden water settled at the bottom of the trench or tank. • Sludge from the bottom of the trench or tank can be placed in a shallow pit lined with heavy duty plastic sheeting to dry out (evaporation pit). Once the sludge has dried out sufficiently to allow it to be spaded this waste can be stored with excess excavated spoil and disposed in accordance with the findings of the preliminary waste classification assessment (refer to Technical Report 6 – Soils and contamination impact assessment).
C6.6	Water quality	<p>A water quality monitoring program will be developed and implemented, to monitor water quality due to the proximity of construction activities to surface water receiving environments.</p> <p>The program will include relevant water quality objectives, parameters, and criteria and specific monitoring locations identified in consultation with DPI (Water) and the EPA.</p>

Ref	Issue	Mitigation measures
C7	<i>Non-Aboriginal heritage</i>	
C7.1	Disturbance to possible archaeological remains within the curtilage of the Federation cottage (I10)	Works in the road corridor including utility works that need to be adjusted will not encroach on the curtilage of this heritage item so as not to disturb any possible archaeological remains.
C7.2	Impact to archaeological heritage	The CEMP will contain measures to protect non-Aboriginal archaeological relics. This will include an unexpected finds protocol and heritage induction materials to ensure all onsite staff can identify items with potential archaeological heritage significance. During pre-work briefings, onsite staff will be made aware of the unexpected finds procedure and obligations under the <i>Heritage Act 1977</i> .
C7.3	Impact to archaeological heritage	The unexpected finds protocol will include the following at a minimum: <ul style="list-style-type: none"> • In the event that unexpected archaeological remains, relics, or potential heritage items are discovered during construction, all works in the immediate area would cease, and the remains and potential items would be assessed by a qualified archaeologist or heritage consultant. If necessary, the Heritage Division of OEH would be notified in accordance with the requirements of section 146 of the Heritage Act 1977.
C8	<i>Aboriginal heritage</i>	
C8.1	Impact to archaeological heritage	The CEMP will contain measures to protect Aboriginal heritage. This will include an unexpected finds protocol and heritage induction materials to ensure all onsite staff can identify items with potential archaeological Aboriginal heritage significance. During pre-work briefings, onsite staff will be made aware of the unexpected finds procedure and obligations under the <i>National Parks and Wildlife Act 1974</i> . The unexpected finds protocol will be prepared and provided to all staff and contractors as part of a site induction.
C8.2	Impact to archaeological heritage	The unexpected finds protocol will include the following at a minimum: <ul style="list-style-type: none"> • If potential Aboriginal items are uncovered, works within 10 metres of the item will cease and the find should not be moved. The item would then be assessed and managed by qualified archaeologist. If the find is determined to be an Aboriginal object the archaeologist will provide further recommendations which may include notifying the OEH and Aboriginal stakeholders.
C8.3	Damage to artefact found	A long term care agreement for any artefacts found as part of the works will be developed in consultation with the RAPs.
C8.4	Impacts to archaeological heritage with the area of high potential in Warwick Farm Recreational Reserve.	Areas of high archaeological potential will be clearly marked and fenced off as exclusion zones to ensure these areas are not impacted on by the proposed works. If changes to the proposed works occur which will result in impacts to these areas, subsurface investigations (test excavations) will be required.
C8.5	Impacts to unexpected finds	Consistent with the <i>NSW Skeletal Remains: Guidelines for Management of Human Remains</i> (Heritage Office, 1998), if any suspected human remains are discovered during any activity the following will occur: <ol style="list-style-type: none"> 1. Immediately cease all work at that location and not further move or disturb the remains.

Ref	Issue	Mitigation measures
		<p>2. Notify the NSW Police and OEH's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.</p> <p>3. Not recommence work at that location unless authorised in writing by OEH.</p>
C9	Land use and property	
C9.1	Temporary use	Temporary use areas, including public open space, will be restored to their pre-existing condition (as a minimum) as soon as practicable following completion of construction. This will be undertaken in consultation with the relevant council.
C10	Land use and visual amenity	
C10.1	Visual impact from construction compounds and work sites	<p>Construction compounds located within Jacquie Osmond Reserve, Warwick Farm Recreation Reserve and within the rail corridor should, where possible, have screening measures implemented such as hoarding or temporary vegetation.</p> <p>Where equipment or stockpiles are to be located in a visually prominent location for any reasonable period of time, screening measures and practices will be incorporated to ensure sites are kept tidy.</p>
C10.2	Temporary light spill	Temporary lighting required during the construction period will be sited and designed to avoid light spill into residential properties along Broomfield Street and surrounding residential streets and ecologically sensitive areas along Cabramatta Creek.
C10.3	Vegetation to be retained	Existing vegetation will be protected and retained where possible, particularly mature canopy trees. Tree removal and protection measures for trees to be retained, will be carried out as stated in the Arboricultural assessment provided in Appendix B of Technical Report 10 – Landscape and visual impact assessment.
C11	Socio-economic impacts	
C11.1	Economic benefits	Local suppliers will be identified and approached for procurement of goods and services where practicable.
C11.2	Community facilities	Access to community facilities and infrastructure will be maintained during construction. Where alternative access arrangements need to be made, these would be developed in consultation with relevant service providers, and communicated to users.
C12	Waste	
C12.1	Waste generation and recycling	A recycling target of at least 90 per cent will be adopted for the project. Where possible and fit for purpose; materials will be reused within the project before off-site reuse or disposal options are pursued
C12.2	Waste management	A waste management procedure will be prepared and implemented as part of the CEMP. It will include measures to minimise the potential for impacts on the local community and environment, including those listed in Table 19.5.
C12.3	Waste segregation	A waste segregation bin scheme will be included in the CEMP and will include locations of segregated bins within compounds, to facilitate segregation and prevent cross contamination.
C12.4	Materials	Material quantities will be recorded to monitor usage during each stage of construction.

Ref	Issue	Mitigation measures
C12.5	Waste and spoil management	Spoil will be managed in accordance with the spoil management hierarchy provided in Table 19.3.
C12.6	Waste and spoil management	A reusable spoil target of 90 percent will be adopted for the project. Where possible and fit for purpose, spoil will be beneficially reused within the project before off-site reuse or disposal options are pursued.
C12.7	Waste and spoil management	Construction waste will be minimised by accurately calculating materials brought to the site and limiting materials packaging.
C12.8	Waste and spoil management	All waste will be assessed, classified, managed and disposed of in accordance with the Waste Classification Guidelines (EPA, 2014a) and waste would be managed in accordance with <i>The Australian Rail Track Corporation excavated material order 2019</i> .
C12.9	Waste and spoil management	Waste segregation bins will be located at various locations within the project area, if space permits, to facilitate segregation and prevent cross contamination.
C13	Health, safety and environment	
C13.1	Public safety from, fires, explosions, flooding and inundation	The CEMP will include emergency response procedures in consultation with relevant stakeholders. It would include measures to minimise the potential for health and safety impacts on the local community and environment such as fire management procedures.
C13.2	Public safety from collapse of structures, embankments or walls	Construction methodology will be selected to ensure collapse of partially built structures so not occur during construction. The CEMP will include emergency response procedures in consultation with relevant stakeholders. It would include measures to minimise the potential for health and safety impacts on the local community and environment should an incident occur.
C13.3	Rupture or damage to services and utilities	The location of utilities, services, and other infrastructure will be identified prior to construction to determine requirements for access to, diversion, protection and/or support. This will include as required, undertaking utilities investigations, including intrusive investigations, and consultation with service providers.
C13.4	Anxiety, confusion and safety concerns from changes to roads, footpaths and cycle routes	A construction traffic management plan will be prepared as part of the CEMP as per mitigation measure C1.1. This will detail the actions and infrastructure needed to ensure a continuous, safe and efficient movement of traffic for both the general public and construction workers. This will include defined routes, diversions, signage, safe crossing points for pedestrians and cyclists and where needed, traffic management staff.
C13.5	Public health and safety from falling items contact with construction sites.	An appropriate layout of compounds sites, construction methodology and hoardings to will be established to prevent any construction items exiting the site in an uncontrolled manner. This will meet all relevant requirements of NSW workplace safety laws.
C13.6	Reduced health benefits from changes to areas of public recreation and active transport routes	Public consultation will be carried out prior and during construction to inform the public about the routes to access and the availability of public reserves and softball area. Signage will be provided to identify access points to reach areas of public recreation and active transport routes.

Ref	Issue	Mitigation measures
		Consultation with key stakeholders such as Southern Districts Softball Association will be carried out to ensure the active lifestyle of members could be maintained at this location.
C13.7	Unauthorised access to the project site resulting in injury or fatalities	NSW workplace safety laws which require construction sites to have adequate site security, such as appropriate fencing will be followed. Appropriate actions or security devices will be used to prevent construction plant and equipment being activated by unauthorised people.
C13.8	Reduced public use of Jacquie Osmond Reserve and Warwick Farm Recreation Reserve	All public areas will be returned to their pre-construction condition and the same public access routes to these areas. The existing 12 softball diamonds within Jacquie Osmond Reserve will be reinstated to pre-construction condition in consultation with the Southern Districts Softball Association.
C14	<i>Climate change and greenhouse gases</i>	
C14.1	Emission of greenhouse gases	<p>The CEMP will include the following requirements:</p> <ul style="list-style-type: none"> • All plant and equipment used during the construction works will be regularly maintained to ensure fuel efficiency. • Sustainable procurement practices will be adopted where feasible • Plant and equipment will be switched off when not in constant use and not left idling. • Air conditioning and lights in site compound buildings will be turned off when not in use. • Energy efficient vehicles or equipment will be selected where available.

Table 22.4 **Compilation of mitigation measures for operation**

Ref	Issue	Mitigation measures
O1	Noise and vibration	
O1.1	Impacts to second floor of 106 Broomfield Street	Receiver at 106 Broomfield Street will be consulted regarding potential noise mitigation. This may include a review of the existing internal acoustic properties of the building and identification of where improvements can be made to reduce the exceedance of the trigger level.
O2	Air quality	
O2.1	Emissions - Negligible	The project will be managed in accordance with ARTC's existing EPL (EPL #3142) and ARTC's standard operating procedures including those within the Environmental Management System.
O3	Biodiversity	
O3.1	Weeds	Maintenance activities within the rail corridor and weed management during operation will be undertaken in accordance with ARTC's standard operating procedures and the relevant requirements of the <i>Biosecurity Act 2015</i> .
O4	Soils and contamination	
O4.1	Soil erosion and sedimentation	Erosion and sediment controls will be implemented during maintenance activities where soils are exposed, in accordance with ARTC's standard environmental management measures included within its Environmental Management System.

Ref	Issue	Mitigation measures
O4.2	Contamination	ARTC’s existing spill response procedures will be complied with to minimise the potential for impacts on the local community and the environment as a result of any leaks and spills. Additionally, leaks and spills will be managed in accordance with ARTC’s EPL #3142.
O5	Waste	
O5.1	Waste management	Waste management measures will be implemented in accordance ARTC’s standard environmental management measures included within its Environmental Management System and the mitigation measures listed in Table 19.6.
O6	Health, safety and hazards	
O6.1	Unauthorised access to the rail corridor	Security of the rail corridor will be undertaken in accordance with ARTC’s standard operating procedures and risk management framework which will include continued maintenance of security features such as fencing.
O6.2	Public health and safety from emissions/leaks of dangerous goods and hazardous materials	Operation of the project will be undertaken in accordance with ARTC’s standard operating procedures and ARTC’s EPL #3142.

22.4 Compilation of performance outcomes

The SEARs identify a number of desired performance outcomes for the project. These desired performance outcomes outline the broader objectives to be achieved during design, construction, and operation. Based on the outcomes of the environmental impact assessment, and implementation of the mitigation measures (chapters 8 to 21), environmental performance outcomes have been established (refer to Table 22.5).

Future design development and any design changes would be considered against these environmental performance outcomes.

Table 22.5 **Compilation of environmental performance outcomes**

Key issue (as listed in the SEARs)	SEARs desired performance outcomes	Project specific environmental performance outcomes
1. Transport and traffic	<p>Network connectivity, safety and efficiency of the transport system in the vicinity of the project are managed to minimise impacts.</p> <p>The safety of transport system customers is maintained.</p> <p>Impacts on network capacity and the level of service are effectively managed.</p> <p>Works are compatible with existing infrastructure and future transport corridors.</p>	<p>The project assists in meeting the forecast demand for container freight transport on the SSFL.</p> <p>The project assists in encouraging a shift in freight transport from road to rail, supporting a reduced rate of growth in truck movements and associated traffic congestion.</p> <p>The performance of the local and regional network is not significantly impacted during construction.</p> <p>Motorist, pedestrian and cyclist safety is maintained or improved.</p>

Key issue (as listed in the SEARs)	SEARs desired performance outcomes	Project specific environmental performance outcomes
		Safe access to properties is maintained.
2. Noise and vibration - amenity	<p>Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimise adverse impacts on acoustic amenity.</p> <p>Increases in noise emissions and vibration affecting nearby properties and other sensitive receivers during operation of the project are effectively managed to protect the amenity and well-being of the community.</p>	<p>The project minimises impacts to the local community by:</p> <ul style="list-style-type: none"> • controlling noise and vibration at the source • controlling noise and vibration on the source to receiver transmission path • controlling noise and vibration at the receiver • implementing practicable and reasonable measures to minimise the noise and vibration impacts of construction activities on local sensitive receivers.
3. Noise and vibration - structural	<p>Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimise adverse impacts on the structural integrity of buildings and items including Aboriginal places and environmental heritage.</p> <p>Increases in noise emissions and vibration affecting environmental heritage as defined in the <i>Heritage Act 1977</i> during operation of the project are effectively managed.</p>	<p>The project minimises impacts to structures by:</p> <ul style="list-style-type: none"> • controlling vibration at the source • controlling vibration on the source to receiver transmission path • implementing practicable and reasonable measures to minimise vibration impacts during construction and operation.
4. Air quality	The project is designed, constructed and operated in a manner that minimises air quality impacts (including nuisance dust and odour) to minimise risks to human health and the environment to the greatest extent practicable.	<p>The project is constructed and operated in accordance with the requirements of the POEO Act and ARTC's existing EPL #3142.</p> <p>Dust generated during construction will not exceed the relevant criteria in the <i>National Environment Protection (Ambient Air Quality) Measure and the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales</i> (DEC, 2005).</p>
5. Biodiversity	<p>The project design considers all feasible measures to avoid and minimise impacts on terrestrial and aquatic biodiversity.</p> <p>Offsets and/or supplementary measures are assured which are equivalent to any remaining impacts of project construction and operation</p>	<p>The project is designed to minimise impacts on biodiversity. Where practicable, the design minimises the need to clear vegetation.</p> <p>The project would minimise further impacts on biodiversity through the implementation of relevant mitigation measures.</p> <p>Potential impacts on biodiversity are managed in accordance with relevant legislation.</p> <p>No offsets are required for the project.</p>

Key issue (as listed in the SEARs)	SEARs desired performance outcomes	Project specific environmental performance outcomes
6. Soils, protected and sensitive lands	<p>The environmental values of land, including soils, subsoils and landforms, are protected.</p> <p>Risks arising from the disturbance and excavation of land and disposal of soil are minimised, including disturbance to acid sulfate soils and site contamination.</p>	<p>Site-specific soil characteristics are taken into consideration during detailed design and construction.</p> <p>Any contamination is managed in accordance with relevant regulatory requirements.</p> <p>Any soil waste is assessed, classified, managed and disposed of in accordance with the Waste Classification Guidelines (EPA, 2014) and <i>The Australian Rail Track Corporation excavated material order 2019</i>.</p>
7. Water - hydrology	<p>Long term impacts on surface water and groundwater hydrology (including drawdown, flow rates and volumes) are minimised.</p> <p>The environmental values of nearby, connected and affected water sources, groundwater and dependent ecological systems including estuarine and marine water (if applicable) are maintained (where values are achieved) or improved and maintained (where values are not achieved).</p> <p>Sustainable use of water resources.</p>	<p>Construction compounds and work areas are laid out such that flows are not significantly impeded.</p> <p>The project avoids long term impacts to surface water.</p> <p>Opportunities to reuse water resources are considered during the design process.</p> <p>The use of water during construction is minimised.</p>
8. Water - quality	<p>The project is designed, constructed and operated to protect the NSW Water Quality Objectives where they are currently being achieved, and contribute towards achievement of the Water Quality Objectives over time where they are currently not being achieved, including downstream of the project to the extent of the project impact including estuarine and marine waters (if applicable).</p>	<p>Impacts to water quality are minimised during construction and operation.</p> <p>Erosion and sediment controls during construction are implemented in accordance with <i>Managing Urban Stormwater: Soils and Construction Volume 1</i> (Landcom, 2004) and <i>Managing Urban Stormwater: Soils and Construction Volume 2</i> (DECC, 2008a).</p> <p>The project will protect or contribute to achieving the Water Quality Objectives, during construction and operation.</p> <p>Construction water quality discharge will comply with the requirements of ARTC's existing EPL #3142.</p>

Key issue (as listed in the SEARs)	SEARs desired performance outcomes	Project specific environmental performance outcomes
9. Flooding	<p>The project minimises adverse impacts on existing flooding characteristics.</p> <p>Construction and operation of the project avoids or minimises the risk of, and adverse impacts from, infrastructure flooding, flooding hazards, or dam failure.</p>	<p>Construction is undertaken in a manner that minimises the potential for adverse flooding impacts, through staging of works and the implementation of mitigation measures.</p> <p>Construction compounds and work areas are laid out such that flows are not significantly impeded.</p> <p>Flooding design criteria will be achieved.</p> <p>The performance of the downstream drainage network is maintained during construction and operation.</p>
10. Heritage	<p>The design, construction and operation of the project facilitates, to the greatest extent possible, the long term protection, conservation and management of the heritage significance of items of environmental heritage and Aboriginal objects and places.</p> <p>The design, construction and operation of the project avoids or minimises impacts, to the greatest extent possible, on the heritage significance of environmental heritage and Aboriginal objects and places.</p>	<p>The project is designed to minimise the surface footprint.</p> <p>The design is sympathetic to the heritage significance of surrounding listed heritage items, and where practicable, avoids and minimises impacts to heritage.</p> <p>Impacts on heritage are managed in accordance with relevant legislation, including the EP&A Act, the <i>Heritage Act 1977</i>, and relevant guidelines.</p>
11. Climate change risk	<p>The project is designed, constructed and operated to be resilient to the future impacts of climate change.</p>	<p>Climate change risks are considered throughout the design and development process.</p> <p>The project is designed to maximise climate change resilience while minimising costs, community, and environmental impacts.</p> <p>The climate change risk assessment is maintained in line with updated global climate models and regional projection data.</p> <p>The project is designed, constructed, and operated in accordance with relevant climate change legislation and guidelines.</p>

Key issue (as listed in the SEARs)	SEARs desired performance outcomes	Project specific environmental performance outcomes
12. Health and safety	<p>The project avoids or minimises any adverse health impacts arising from the project.</p> <p>The project avoids, to the greatest extent possible, risk to public safety.</p>	<p>Construction targets zero safety incidents.</p> <p>All dangerous goods are stored, handled and transported in accordance with relevant regulatory requirements and Australian Standards.</p> <p>Dust, odour and other emissions will be effectively managed to avoid human health impacts.</p> <p>Noise will be managed to comply with relevant criteria and minimise the potential for health impacts.</p>
13. Urban design & visual amenity	<p>The project design complements the visual amenity, character and quality of the surrounding environment.</p> <p>The project contributes to the accessibility and connectivity of communities.</p> <p>The project minimises adverse impacts on the visual amenity of the built and natural environment (including public open space) and capitalises on opportunities to improve visual amenity.</p>	<p>The project is designed to have regard to the surrounding landscape and visual environment and to minimise the potential for visual impacts.</p> <p>The project is visually integrated with its surroundings.</p> <p>Vegetation providing screening to the rail corridor is retained where practicable.</p>
14. Waste	<p>All wastes generated during the construction and operation of the project are effectively stored, handled, treated, reused, recycled and/or disposed of lawfully and in a manner that protects environmental values.</p>	<p>Suitable spoil will be recycled or reused.</p> <p>Off-site waste re-use will be managed in accordance with relevant NSW EPA resource recovery exemptions and requirements.</p> <p>Waste will be disposed of at appropriately licensed facilities.</p>

22.5 Proposal uncertainties and approach to design refinements

22.5.1 Proposal uncertainties

The EIS is based on the concept design for the project. Given the current level of design development, there remain some uncertainties relating to technical requirements and how the project would be constructed. These details would be resolved as the design progresses.

A summary of the uncertainties around the design, construction and/or operational methodologies of the project, and how these will be resolved, is provided in Table 22.6.

Table 22.6 Proposal uncertainties

Category	Key uncertainty	How uncertainties will be resolved
Land use and property	Property acquisition – exact areas that need to be acquired	Refining the amount and location of property acquisition will involve a detailed survey of the proposal site and surrounding properties, and confirmation of the final detailed design for the proposal.
Waste management	Spoil quantity	Further development of the design will inform the identification of material reuse opportunities and offsite spoiling requirements and volumes.
Hydrology and flooding	Drainage along Broomfield Street	The existing flooding situation along Broomfield Street is complex. Flood modelling and drainage design will continue to progress as the design develops with the aim of matching existing conditions as closely as possible.
Hydrology and flooding	Drainage within Jacquie Osmond Reserve	Currently a trapped low point exists at the southern end of Jacquie Osmond Reserve. Flood modelling and drainage design will continue to progress as the design develops to resolve this issue.
Landscape and visual	Jacquie Osmond Reserve – retaining wall/embankment	The final configuration of the retaining wall and embankment will be confirmed during detailed design.
Across a number of potential impact areas	Utilities – impacts to utilities to be defined in detail	Utility investigations are ongoing and will be completed during detailed design, to validate current assessments, and confirm relocation/protection requirements.

22.5.2 Approach to design refinements

The design of the project as described in the EIS would be subject to ongoing refinements during the detailed design phase. Refinements may be made to:

- avoid services that present significant construction difficulties in terms of logistics, time and/or cost
- reduce the construction timeframe
- avoid areas of environmental sensitivity identified following approval
- reduce impacts on the community
- improve operation without increasing the potential environmental impacts.

Such refinements may include, for example:

- minor changes to the location of construction compounds and work area access
- minor changes to the location of key infrastructure, refinement or reorientation of site boundaries
- minor changes in technology or the features of key project components.

Refinements would not include significant changes to the project.

For design refinements a consistency review would be undertaken to consider whether the refinement:

- would result in any of the conditions of approval not being met
- be consistent with the objectives and operation of the project as described in the environmental assessment
- result in a significant change to the approved project

- would result in any potential environmental or social impacts of a greater scale or different nature than that considered by the EIS.

A refinement that does not meet these criteria would be considered a design modification. Approval would be sought from the Minister for Planning for any such modifications in accordance with the requirements of Division 5.2 of the EP&A Act.

THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

23 Conclusion

This chapter provides the conclusion to the EIS. It summarises the project for which approval is sought; the uncertainties that still exist and how these will be resolved; and provides the justification for the project, having regard to biophysical, economic and social considerations.

23.1 Summary description of the project for which approval is sought

The project is State significant infrastructure in accordance with Division 5.2 of the EP&A Act and is subject to approval by the NSW Minister for Planning and Public Spaces.

This EIS considers the potential impacts of the project to construct and operate the Cabramatta Loop. It has been prepared to support ARTC's application for approval of the project in accordance with the requirements of Division 5.2. The EIS addresses the environmental assessment requirements of the Secretary of the Department of Planning, Industry and Environment, dated 17 May 2018.

Further information on the location of the project is provided in Chapter 2 (Location and setting).

23.1.1 Project overview

The project is partly located within the existing rail corridor between the Hume Highway and Cabramatta Road East road overbridges in the suburbs of Warwick Farm and Cabramatta, and the local government areas of the City of Fairfield and the City of Liverpool. In addition, the project includes works to Broomfield Street and Jacquie Osmond Reserve, adjacent to the rail corridor.

The project would allow freight trains to pass and provide additional rail freight capacity along the SSFL. The project would involve:

- new rail track – providing a 1.65 kilometre long section of new track adjacent to the existing track, with connections to the existing track at the northern and southern ends
- track realignment – moving about 550 metres 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 for a distance of about 680 metres between Sussex and Bridge streets.

Ancillary works would include communication, signalling and power upgrades, works to existing retaining and noise walls, drainage work and protecting/relocating utilities. In addition, minor works in the form of new signalling would be installed at a number of locations within the rail corridor.

Further information on the project's features is provided in Chapter 6 (Project features and operation).

23.1.2 Construction

Subject to approval of the project, construction is planned to start in early 2021, and is expected to take about two years. Construction is expected to be completed in early 2023.

It is anticipated that some features of the project would be constructed while the existing rail line continues to operate. Other features of the project would need to be constructed during programmed rail possession periods when rail services along the line cease to operate. Possession periods typically occur for 48 hours four times per year.

Construction of the project would broadly involve the following main work phases:

- enabling works
- main construction works
- testing and commissioning works.

Further information on how the project would be constructed is provided in Chapter 7 (Construction).

23.1.3 Operation

The project would operate as part of the SSFL and would continue to be managed by ARTC. ARTC is not responsible for the operation of rolling stock. Train services are currently, and would continue to be, provided by a variety of operators.

It is estimated that once the project is operational, there would be an increase in freight train movements from 48 to 72 per day by 2033.

Further information on operation is provided in Chapter 6 (Project features and operation).

23.2 Justification of the project

23.2.1 Summary of project justification

Australia's freight task is set to experience significant growth over the coming decades. The existing freight infrastructure cannot support this projected growth, with increasing pressure on already congested roads and rail lines through Sydney, and increasing use of heavy trucks. The Australian and NSW Governments have identified clear objectives to increase the share of freight moved by rail – from 17.5 per cent in 2016 to 28 per cent by 2021 (Transport for NSW 2018d, Infrastructure Australia 2018).

Over the next 20 years, container rail freight volumes on Sydney's rail freight network are predicted to increase substantially. This will put more pressure on existing rail infrastructure, which includes the SSFL. Efficient access to and from Port Botany is critical to the economic growth and prosperity of Sydney.

ARTC's *Sydney Metropolitan Freight Strategy* (ARTC 2015) considers existing rail freight capacity issues and identifies priority actions to respond to rail freight demands on Sydney's rail freight network, including the SSFL. This includes the Cabramatta Loop Project.

The project is one of a number of initiatives proposed to increase the capacity of Sydney's rail freight network. In addition to the project, ARTC is also proposing to undertake the Botany Rail Duplication Project, which would involve duplicating a section of the Botany Line.

The Australian Government has recognised the need for the Cabramatta Loop and Botany Rail Duplication projects and announced a funding commitment of \$400 million in the 2018 budget for both projects.

23.2.2 Summary of project benefits

The project is one of a number of initiatives proposed to improve freight rail transport from Port Botany through the Sydney Metropolitan Freight Network in response to a growing economy and policy objectives to increase the rail modal share for container freight.

The primary objective of the project is to increase the capacity of the freight rail network to meet the forecast demand for container freight transport along the Southern Sydney Freight Line.

Secondary benefits of the project would include:

- provide increased operational efficiency, flexibility and reliability for freight customers
- increase rail market share for containerised freight

- support connection to, and operation of, intermodal terminals to meet their targeted freight capacity.

It is intended that the project would:

- alleviate constraints and increase the capacity of Sydney's freight rail network to meet existing and future demands
- support the operation of intermodal terminals, including Moorebank
- encourage a shift in freight transport from road to rail, and support a reduced rate of growth in truck movements and associated traffic congestion around Sydney.

23.2.3 Consequences of not proceeding

Without the project, there would not be sufficient capacity to provide for the predicted growth in rail freight in Sydney, particularly between the proposed Moorebank Intermodal Terminal and Port Botany.

23.2.4 Environmental considerations

Environmental investigations were undertaken during preparation of the EIS to assess the potential impacts of the project. These included specialist assessments of traffic, transport and access, noise and vibration, air quality, biodiversity, soils and contamination, hydrology and flooding, surface water quality and groundwater, Aboriginal and non-Aboriginal heritage, landscape and visual amenity, socio-economic impacts and climate change. The EIS has documented the potential environmental impacts, considering both potential positive and negative impacts, and identifies mitigation measures (compiled in section 22.3) to protect the environment where required.

The key potential impacts on the biophysical, social and cultural environments are summarised in section 22.1.

As described in section 22.2, the project would incorporate environmental management and design features to ensure that potential impacts are managed and mitigated as far as practicable.

23.2.5 Ecologically sustainable development

The EP&A Act adopts the definition of ecologically sustainable development contained in the *Protection of the Environment Administration Act 1991*. An assessment of the project against the principles of ecologically sustainable development as per clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 is provided below.

23.2.5.1 Precautionary principle

A range of environmental investigations, as described in Part B of the EIS, have been undertaken during the development of the project and the environmental assessment process, to ensure that potential impacts are understood with a high degree of certainty. The assessment of the potential impacts of the project is considered to be consistent with the precautionary principle. The assessments undertaken are consistent with accepted scientific and assessment methodologies, and have taken into account relevant statutory and agency requirements. The assessments have applied a conservative approach with regard to construction and operational arrangements, and the modelling used.

The project has evolved to avoid impacts where possible and to reflect the findings of the studies undertaken.

Examples of the application of the precautionary principle include the biodiversity assessment, and the noise and vibration assessment. For the biodiversity assessment, although the project would result in the removal of only a small area of foraging habitat for the Grey-headed Flying fox, the potential impacts on this species were still assessed.

The noise and vibration assessment involved a 'worst case' construction noise impact assessment, even though the likelihood of the worst-case is considered to be low and therefore potential noise impacts are considered to be lower than assessment. The noise and vibration assessment has been undertaken on the basis that there will be no noise wall in place during the entire construction period, however the demolishing and construction of the noise wall will be undertaken in stages during the construction period. Therefore, the predicted noise impacts due to construction works within the rail corridor are likely to be conservative for sensitive receivers located on Broomfield Street.

The project has evolved to avoid impacts where possible, and to reflect the findings of the assessments undertaken. A number of safeguards have been proposed to minimise potential impacts. These safeguards would be implemented during construction and operation. No safeguards have been postponed as a result of lack of scientific certainty.

23.2.5.2 Principle of inter-generational equity

Construction along a long linear corridor has the potential for some degree of environmental and social disturbance. These disturbances include the clearing of vegetation, amenity impacts during construction, and changes to traffic movements and access. However, the potential for environmental and social disturbance as a result of construction has to be balanced against the long term benefits of the project in terms of rail freight transport.

Should the project not proceed, the principle of intergenerational equity may be compromised, as future generations would experience the increased environmental and safety impacts associated with the transport of large volumes of freight via road. The strategic planning studies summarised in Chapter 5 (Project background, needs and options) have identified a strong need and justification for freight rail transport. As a result, the project would benefit future generations by providing a safer, more efficient, means of freight transport.

23.2.5.3 Conservation of biological diversity and ecological integrity

Ecological studies have been undertaken to identify potential adverse impacts on biodiversity. Where potential impacts cannot be avoided, mitigation measures would be implemented to reduce the impact as far as possible.

The project would result in the removal of a very small area of fauna habitat. Mitigation measures are proposed to minimise and manage the significance of the impact on native vegetation and flora and fauna.

23.2.5.4 Improved valuation and pricing of environmental resources

The assessment has identified the environmental and other consequences of the project, and identified mitigation measures where appropriate to manage potential impacts. If approved, the construction and operation of the project would be in accordance with relevant legislation, the conditions of approval, and the construction and operation environmental management plans. These requirements would result in an economic cost to the proponent. The implementation of mitigation measures would increase both the capital and operating costs of the project. This signifies that environmental resources have been given appropriate valuation.

The concept design for the project has been developed with an objective of minimising potential impacts on the surrounding environment. This indicates that the concept design has been developed with an environmental objective in mind.

23.3 Concluding statement

The project involves the provision of rail track and other works to provide a passing loop for freight trains between Warwick Farm and Cabramatta stations. The project is needed to meet the demands for increased freight rail capacity along the SSFL.

Potential impacts resulting from the project are considered manageable through the implementation of the proposed mitigation measures.

The detailed design for the project would be developed with the objective of minimising potential impacts on the local and regional environment, and the local community. The design and construction methodology would continue to be developed with this overriding objective in mind, taking into account the input of stakeholders.

To manage the potential impacts identified by the EIS, and in some cases remove them completely, the assessment chapters outline a range of mitigation measures that would be implemented during construction and operation of the project. Chapter 22 (Approach to environment management and mitigation) summarises the mitigation measures that would be implemented. The environmental performance of the project would be managed by the implementation of the Site EMP(s), CEMP and ARTC's Environmental Management System. This would also ensure compliance with relevant legislation and any conditions of approval.

With the implementation of the proposed mitigation and management measures the potential environmental impacts of the project would be adequately managed.

THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

24 References

- ABMARC, 2016, *Diesel Locomotive Fuel Efficiency and Emissions Testing* prepared for NSW EPA.
- Australian Rail Track Corporation (ARTC), 2005 *North-South Corridor Strategy*. 9 February 2015.
- ANZECC and ARMCANZ, 1994, *National Water Quality Management Strategy*.
- ANZECC and ARMCANZ, 2000, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.
- ARTC, 2012, *Southern Sydney Freight Line Operational Air Quality Management Plan*.
- ARTC, 2015, *2015-2024 Sydney Metropolitan Freight Strategy*, October 2015.
- ARTC, 2015a, *PBRL Stage 3 Capacity Project Scoping Report*.
- ARTC, 2017, *NSW EPA Environmental protection licence for licensee ARTC*. 8 December 2017.
- Australian Standards (AS), 1993, AS2890.5 *Parking Facilities Onstreet Parking*.
- AS, 1997, AS4282 *Control of the obtrusive effects of outdoor lighting*
- AS, 1997, AS1055.1 *Acoustics – Description and measurement of environmental noise*.
- AS, 2009, AS 1742.3 *Traffic Control for Works on Roads*.
- AS, 2010, AS2436:2010 *Guide to noise and vibration control on construction, demolition and maintenance sites*.
- AS, 2013, AS 5334, *Climate change adaptation for settlements and infrastructure – a risk based approach*.
- AS/NZS, 2018, AS/NZS ISO 31000:2018 *Risk management – principles and guidelines*.
- Attenbrow, V 2002, *Sydney's Aboriginal Past: Investigating the archaeological and historical records*, University of New South Wales Press Ltd, Sydney.
- AU ISO 14064-2 2006, *Greenhouse gases Part 2: Specification with guidance at the project level for quantification and report of greenhouse gas emissions reductions and removal of enhancements (MOD)*
- Australia ICOMOS, 2013, *Charter for Places of Cultural Significance, The Burra Charter*.
- Australian Government, 2012, *Atlas of Groundwater Dependent Ecosystems (GDE Atlas), Phase 2 Task 5 Report: Identifying and mapping GDEs*. Final report prepared by CSIRO and SKM.
- Australian Greenhouse Office, 2006, *Climate Change Impacts and Risk Management – A Guide for Business and Government*.
- Austrroads, 2015, *Guide to Road Design Austrroads 30 June 2018*.
- Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors) 2016, *Australian Rainfall and Runoff: A Guide to Flood Estimation*, Commonwealth of Australia.
- Bannerman SM and Hazelton PA, 1990, *Soil landscapes of the Penrith 1: 100 000 Soil Landscape Series – Sheet 9030*, Soil Conservation Service of NSW, Sydney.
- Bewsher Consulting Pty Ltd, 2004, *Georges River Floodplain Risk Management Study and Plan*, Georges River Floodplain Management Committee.
- Bewsher Consulting Pty Ltd, 2004a, *Cabramatta Creek Floodplain Risk Management Study & Plan*, Liverpool City Council and Fairfield City Council.
- British Standard (BS), 1993, BS7385-2:1993 *Evaluation and measurement for vibration in buildings*.
- BS 2009, BS 5228.2 – *Code of Practice for noise and vibration control on construction and open sites: Part 2 Vibration*.

- BS, 1992, BS 6742-1:1992. *The Vibration Dose Value*.
- BS, 2009, BS 5228.2: 2009, *Code of Practice Part 2 Vibration for noise and vibration on construction and open sites – Part 2: Vibration*.
- Commonwealth of Australia 2018,, *Inquiry into National Freight and Supply Chain Priorities*.
- Commonwealth Department of Environment and Energy, 2018, *National Greenhouse and Energy Reporting (NGER) (Measurement) Determination 2008*, 1 July 2018.
- Countess Environmental, 2006, *Western Regional Air Partnership Fugitive Dust Handbook (WRAP)*.
- Dangerous Goods (Road and Rail Transport) Act 2008*, *Dangerous Goods (Road and Rail Transport) Regulation 2009*.
- Department of Environment and Conservation (DEC), 2005, *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*
- DEC, 2006, *Assessing Vibration: a Technical Guideline*
- Department of Environment and Climate Change NSW (DECC), 2008, *Soils and Construction - Managing Urban Stormwater Volume 2*
- DECC, 2009, *Interim Construction Noise Guideline*.
- Department of Environment, Climate Change and Water (DECCW), 2010 *Aboriginal cultural heritage consultation requirements for proponents*.
- DECCW, 2010, *Code of practice for archaeological investigation of Aboriginal objects in NSW (the Code)*
- DECCW, 2011, *Road Noise Policy*.
- Department of the Environment and Energy (DEE), 2018, *Quarterly Update of Australia's National Greenhouse Gas Inventory: December 2017*.
- Department of Land and Water Conservation (DLWC), 2002, *Site Investigations for Urban Salinity*.
- Department for Environment, Food and Rural Affairs (DEFRA), 2014, *UK Government GHG Conversion Factors for Company Reporting*.
- DEE, 2018, *State and Territory Greenhouse Gas Inventories 2016*.
- DEE, 2018a, *Protected Matters Online Search Tool* for MNES listed under the EPBC Act and predicted to occur in the locality.
- DEE, 2018b, online *Species profiles and threats database (SPRAT)*.
- Department of the Environment, 2013, *Matters of National Environmental Significance Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999*.
- Department of Environment and Climate Change, 2008 *Managing Urban Stormwater: Soils and Construction Volume 2A*
- Department of Planning, 2011, *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 ('Applying SEPP 33')*.
- Department of Primary Industries (DPI), 2018, *Freshwater threatened species distribution maps*.
- DPI, 2012, *NSW Aquifer Interference Policy*, NSW Government policy for the licensing and assessment of aquifer interference activities, September 2012.
- DSEWPaC, 2012, *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy*.
- Enhealth, 2012, *Environmental health risk assessment, guidelines for assessing human health risks from environmental hazards*.
- Enhealth, 2017, *Health Impact assessment guidelines 2017*.

- Environmental Protection Authority (EPA), 1995, *Contaminated Sites Sampling Design Guidelines*
- EPA, 2000, *Industrial Noise Policy*.
- EPA, 2013, *Rail Infrastructure Noise Guideline*.
- EPA, 2016, *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*.
- EPA, 2017, *Noise Policy for Industry*.
- Federal Transit Administration, 2006, *Transit Noise and Vibration Impact Assessment*.
- Fairfield City Council Standard, 2011, *Specification for Roadworks and Drainage associated with subdivision or other development*, 12 September 2011.
- Fairfield City Council, 2013, *Fairfield City Wide Development Control Plan* 31 May 2013.
- Fairfield City Council, 2013, *Local Environmental Plan* Current version for 28 February 2019 to date.
- Fairfield City Council, 2014, *Cabramatta Town Centre Development Control Plan No. 5/2000*, September 2014.
- Fairfield City Council, 2017, *Stormwater Management Policy*.
- Georges River Combined Councils Committee, 2018, 2016-2017 River Health Report Card for the Georges River.
- German Standards, 1999, DIN 4155-3 *Structural Vibration Part 3: Effects of vibration on structures*.
- Greater Sydney Commission, 2018, *Western City District Plan*.
- Greater Sydney Commission, 2018a, *Greater Sydney Region Plan, A Metropolis of Three Cities – connecting people*, March 2018
- Heritage Office, 2001, *Assessing Heritage Significance*.
- Infrastructure Australia and the National Transport Commission (IA/NTC), 2011, *National Ports Strategy - Infrastructure for an economically, socially, and environmentally sustainable future*, endorsed by COAG in July 2011.
- Infrastructure Australia, 2016, *Australian Infrastructure Plan, Priorities and Reforms for our Nation's Future*, February 2016.
- Infrastructure Australia, 2018, *Infrastructure Priority List, Australian Infrastructure Plan, Project and Initiative Summaries*, March 2018.
- Infrastructure NSW, 2018, *Building Momentum State Infrastructure Strategy 2018–2038*, February 2018.
- KMH Environmental, 2016, *PBRL Stage 3 Capacity Project – Cabramatta Loop Preliminary Environmental Assessment*.
- Landcom, 2004, *Managing Urban Stormwater: Soils and Construction Volume 1 (the Blue Book)*
- Landscape Institute and Institute of Environmental Management & Assessment, 2013, *Guidelines for Landscape and Visual Impact Assessment*, 3rd Edition.
- Liverpool City Council, 2008, *Development Control Plan 2008*, 17 April 2019.
- Liverpool City Council, 2008, *Local Environmental Plan 2008*, 22 March 2019.
- Nathan, R and Weinmann, E., 2016, *Estimation of Very Rare to Extreme Floods, Book 8 in Australian Rainfall and Runoff - A Guide to Flood Estimation*, Commonwealth of Australia.
- National Transport Commission, 2017, *Australian Code for the Transport of Dangerous Goods by Road & Rail ('the Dangerous Goods Code')*.
- NSW National Parks and Wildlife Service (NPWS), 2002, Available regional-scale vegetation mapping of the site.

- NSW Department of Mineral Resources, 1991, *Penrith 1:100 000 Geological Map 9030*.
- NSW Department of Industry, 2018, Guidelines for controlled activities on waterfront land – Riparian corridors.
- NSW Government, 1991, *Land Acquisition (Just Terms Compensation) Act 1991*.
- NSW Government, 2004, *Planning Guidelines for Walking and Cycling*.
- NSW Government, 2005, *The Floodplain Development Manual- the management of flood liable land (the Floodplain Development Manual)*.
- NSW Government, 2012, *South West Metropolitan Emergency Management District Disaster Plan*.
- NSW Health, 2007, *Health impact assessment: A practical guide*.
- NSW Ports, 2015, Navigating the Future - NSW Ports' 30 Year Master Plan, October 2015.
- Office of Environment and Heritage (OEH), (2011), *Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW*.
- OEH, 2015, *Technical Guideline for Urban Green Cover in NSW*.
- OEH, 2017, *Guidance to assist a decision-maker to determine a serious and irreversible impact*.
- OEH, 2018a, *Biodiversity Assessment Method Operational Manual Stage 1*.
- OEH, 2018b, *NSW BioNet data, including NSW Wildlife Atlas database records and Threatened Species Data Collection profiles of threatened species listed under the BC Act*.
- OEH, 2018c, *Threatened biodiversity profile search online database for threatened ecological communities listed under the BC Act*.
- OEH, 2018d, *NSW BioNet Vegetation Classification to identify PCTs in the study area*.
- Parsons Brinckerhoff, 2006, *South Sydney Freight Line Environmental Assessment. Main Volume*.
- Parsons Brinckerhoff, 2009, *Factual geotechnical investigation and limited phase 2 environmental site assessment report South Sydney Freight Line (SSFL) project – Draft. With ARTC*.
- Parsons Brinckerhoff, 2015, *Australian Rail Track Corporation Capacity Project Stage 3B - Concept Design Report*.
- Parsons Brinckerhoff, 2016, *Australian Rail Track Corporation Capacity Project Stage 3B - Feasibility Design Report, September 2016*.
- NSW Department of Mineral Resources, 1991, *Penrith 1: 100 000 Geological Map 9030*.
- RTA, 2002, *Guide to Traffic Generating Developments Version 2.2*.
- Roads and Maritime Services (RMS), 2012, *Bridge Aesthetics: Design guidelines to improve the appearance of bridges in NSW*.
- Roads and Maritime Services, 2013, *Environmental Impact Assessment Guidance Note - Guidelines for landscape character and visual impact assessment (EIA-N04), Version 2*.
- Roads and Maritime Services, 2013, *Traffic Modelling Guidelines*.
- Roads and Maritime Services, 2014, *Beyond the Pavement: RTA urban design policy, procedures and design principles*.
- Roads and Maritime Services, 2016 *Construction Noise and Vibration Guideline*
- Roads and Maritime Services, 2017, *Water Sensitive Urban Design Guideline, Applying water sensitive urban design principle to NSW transport projects*.
- RMS, 2018, *Traffic Control at Works Sites Manual*.

Transport for NSW, 2017, *NSW Sustainable Design Guidelines* Version 4.0 May 2017.

Transport for NSW, 2018a, *Construction Noise and Vibration Strategy*, 1 July 2017.

Transport for NSW, 2018b, *Future Transport Strategy 2056*, March 2018.

Transport for NSW, 2018c, *Greater Sydney Services and Infrastructure Plan*, a component of Future Transport 2056, March 2018.

Transport for NSW, 2018d, *NSW Freight and Ports Plan 2018-2023*, September 2018.

Transport for NSW, 2018e, *TAP3 North Strathfield Station Noise and Vibration Impact Assessment*, September 2018.

WorkCover NSW, 2005, *Code of practice for the storage and handling of dangerous goods*.

WSP Parsons Brinkerhoff, 2016, *Australian Rail Track Corporation Capacity Project Stage 3B - Feasibility Design Report*.

APPENDICES

CABRAMATTA LOOP PROJECT

—
ENVIRONMENTAL
IMPACT STATEMENT

THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

APPENDIX A

SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

ENVIRONMENTAL IMPACT
STATEMENT

ARTC

THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

A. ENVIRONMENTAL ASSESSMENT REQUIREMENTS

Table A.1 General standard SEARs

Item	Requirement	Where addressed?
1. Environmental Impact Assessment Process	1. The Environmental Impact Statement must be prepared in accordance with Part 3 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (the Regulation).	Certification page, Section 3.2.4 and Appendix B
	2. It is the Proponent's responsibility to determine whether the project needs to be referred to the Commonwealth Department of the Environment for an approval under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act).	No approval is required. Refer to Section 3.4
	3. The onus is on the Proponent to ensure legislative requirements relevant to the project are met.	The statutory context and approval pathway is provided in Chapter 3
2. Environmental Impact Statement	1. The EIS must include, but not necessarily be limited to, the following: (a) executive summary	Executive Summary
	(b) a description of the project , including all components and activities (including ancillary components and activities) required to construct and operate it	Chapter 6 and Chapter 7
	(c) a statement of the objective(s) of the project	Section 1.3
	(d) a summary of the strategic need for the project with regard to its State significance and relevant State Government policy	Section 5.1 and 5.2
	(e) an analysis of any feasible alternatives to the project	Section 5.3
	(f) a description of feasible options within the project	
	(g) a description of how alternatives to and options within the project were analysed to inform the selection of the preferred alternative / option. The description must contain sufficient detail to enable an understanding of why the preferred alternative to and options(s) within the project were selected	Section 5.5
	(h) a concise description of the general biophysical and socio-economic environment that is likely to be impacted by the project (including offsite impacts). Elements of the environment that are not likely to be affected by the project do not need to be described	Section 2.2
	(i) a demonstration of how the project design has been developed to avoid or minimise likely adverse impacts	Section 5.4 and Chapter 8 to 21
	(j) the identification and assessment of key issues as provided in the 'Assessment of Key Issues' performance outcome	Chapters 8 to 21
	(k) a statement of the outcome(s) the proponent will achieve for each key issue	Chapters 8 to 21
	(l) measures to avoid, minimise or offset impacts must be linked to the impact(s) they treat, so it is clear which measures will be applied to each impact	Section 22.3
	(m) consideration of the interactions between measures proposed to avoid or minimise impact(s), between impacts themselves and between measures and impacts	Chapters 8 to 21

Item	Requirement	Where addressed?
	(n) an assessment of the cumulative impacts of the project taking into account other projects that have been approved but where construction has not commenced, projects that have commenced construction, and projects that have recently been completed	Chapter 8 to 21 and Appendix E
	(o) statutory context of the project as a whole, including: <ul style="list-style-type: none"> • how the project meets the provisions of the EP&A Act and EP&A Regulation 	Section 3.2
	<ul style="list-style-type: none"> • a list of approvals that must be obtained under other Acts or laws before the project may lawfully be carried out 	Section 3.3
	(p) a chapter that synthesises the environmental impact assessment and provides: <ul style="list-style-type: none"> • a succinct but full description of the project for which approval is sought 	Part C Section 23.1
	<ul style="list-style-type: none"> • a description of uncertainties that still exist around design, construction methodologies and/or operational methodologies and how these will be resolved in the next stages of the project 	Section 22.5
	<ul style="list-style-type: none"> • a compilation of the impacts of the project that have not been avoided 	Section 22.1
	<ul style="list-style-type: none"> • a compilation of the proposed measures associated with each impact to avoid or minimise (through design refinements or ongoing management during construction and operation) or offset these impacts 	Section 22.3
	<ul style="list-style-type: none"> • a compilation of the outcome(s) the proponent will achieve 	Section 22.4
	<ul style="list-style-type: none"> • the reasons justifying carrying out the project as proposed, having regard to the biophysical, economic and social considerations, including ecologically sustainable development and cumulative impacts 	Section 23.2
	(q) relevant project plans , drawings, diagrams in an electronic format that enables integration with mapping and other technical software.	Throughout the EIS
	2. The EIS must only include data and analysis that is reasonably needed to make a decision on the proposal. Relevant information must be succinctly summarised in the EIS and included in full in appendices. Irrelevant, conflicting or duplicated information must be avoided.	Throughout the EIS
3. Assessment of key issues	1. The level of assessment of likely impacts must be proportionate to the significance of, or degree of impact on, the issue, within the context of the proposal location and the surrounding environment. The level of assessment must be commensurate to the degree of impact and sufficient to ensure that the Department and other government agencies are able to understand and assess impacts	Chapters 8 to 21
	2. For each key issue the Proponent must: <p>(a) describe the biophysical and socio-economic environment, as far as it is relevant to that issue</p>	A general description of the biophysical and socio-economic environment is provided in Sections 2.2. Further detail is provided in Chapters 8 to 21.

Item	Requirement	Where addressed?
	(b) describe the legislative and policy context , as far as it is relevant to the issue	Section 3.3 and Chapter 8 to 21
	(c) identify, describe and quantify (if possible) the impacts associated with the issue , including the likelihood and consequence (including worst case scenario) of the impact (comprehensive risk assessment), and the cumulative impacts	Chapters 8 to 21 and Technical Reports 1 to 12
	(d) demonstrate how potential impacts have been avoided (through design, or construction or operation methodologies);	An overview of how the design has been developed to minimise potential impacts is provided in Section 6.1.2. A description of how further impacts would be avoided during construction and operation are provided in Chapters 8 to 21.
	(e) detail how likely impacts that have not been avoided through design will be minimised , and the predicted effectiveness of these measures (against performance criteria where relevant)	A description of how impacts would be further refined during detailed design to minimise potential impacts is provided in Chapters 8 to 21
	(f) detail how residual impacts will be managed or offset, and the approach and effectiveness of these measures.	Chapter 8 to 21
	3. Where multiple reasonable and feasible options to avoid or minimise impacts are available, they must be identified and considered and the proposed measure justified taking into account the public interest.	Refer to the approach to mitigation and management in Chapters 8 to 21
4. Consultation	1. The project must be informed by consultation, including with relevant government agencies, infrastructure and service providers, special interest groups, affected landowners, businesses and the community. The consultation process must be undertaken in accordance with the current guidelines.	Chapter 4
	2. The Proponent must document the consultation process, and demonstrate how the project has responded to the inputs received.	Section 4.1, 4.2 and 4.3
	3. The Proponent must describe the timing and type of community consultation proposed during the design and delivery of the project, the mechanisms for community feedback, the mechanisms for keeping the community informed, and procedures for complaints handling and resolution.	Section 4.4

Table A.2 Key issue requirements

Key issue	Requirement	Where addressed?
1. Transport and Traffic	1. The Proponent must assess construction transport and traffic (vehicle, pedestrian and cyclists) impacts, including, but not necessarily limited to:	A summary of the results of the operation traffic, transport and access assessment is provided in Chapter 8. The full results are provided as Technical Report 1.
	(a) a considered approach to route identification and scheduling of transport movements, including haulage routes;	Section 7.6.1
	(b) the number, frequency and size of construction related vehicles (passenger, commercial and heavy vehicles, including spoil management movements);	Section 7.6.3
	(c) construction worker parking	Section 7.6.4
	(d) changes to parking along Broomfield Street including identification of replacement options prior to displacement;	Section 7.6.5
	(e) the nature of existing traffic (types and number of movements) on construction access routes (including consideration of peak traffic times and sensitive road users and parking arrangements)	Section 8.2.4
	(f) access constraints and impacts on public transport, pedestrians and cyclists:	Section 8.3.4, 8.3.6 and 8.3.7
	(g) the need to close, divert or otherwise reconfigure elements of the road and cycle network associated with construction of the project, particularly the pedestrian and cycleway along Broomfield Street, across Cabramatta Creek and the Sussex Street underpass.	Sections 7.6.5, 8.3.4, 8.3.6 and 8.3.7
	2. The Proponent must assess (and model) the operational transport impacts of the project, including:	A summary of the results of the operation traffic, transport and access assessment is provided in Chapter 8. The full results are provided as Technical Report 1.
	(a) impact to parking along Broomfield Street and surrounding streets and the identification of replacement parking;	Section 8.4.3
(b) impacts on cyclists and pedestrian access and safety; and	Section 8.4.1	
(c) opportunities to integrate cycling and pedestrian elements with surrounding networks	Section 8.4.1	

Key issue	Requirement	Where addressed?
2. Noise and Vibration - Amenity	1. The Proponent must assess construction and operational noise and vibration impacts in accordance with relevant NSW noise and vibration guidelines. The assessment must cover typical and realistic construction and operation activities (such as bringing trains to idle or holding trains in the loop). The assessment must include consideration of:	A summary of the results of the construction and operational noise and vibration assessment is provided in Chapter 9. The full results are provided as Technical Report 2.
	(a) impacts to sensitive receivers including small businesses	Sections 9.4.3, 9.4.4 and 9.4.5
	(b) noise impacts from the removal of the existing noise walls and construction of any new noise walls (permanent or temporary) during construction, including the consideration of implementing permanent noise walls prior to the removal of the existing noise walls;	Section 9.4.2 and 9.6.3
	(c) noise impacts of out-of-hours works including proposed activities, justification for these activities, estimation of the number of out-of-hours activities required and timeframes for these activities;	Section 9.4 and 9.5
	(d) sleep disturbance; and (e) the characteristics of noise and vibration, as relevant (for example, low frequency noise).	Section 9.4.4
	2. The Proponent must demonstrate that blast impacts are capable of complying with the current guidelines, if blasting is required.	No blasting is required
3. Noise and Vibration - Structural	1. The Proponent must assess construction and operation noise and vibration impacts in accordance with relevant NSW noise and vibration guidelines. The assessment must include consideration of impacts to the structural integrity and heritage significance of items (including Aboriginal places and items of environmental heritage).	A summary of the results of the vibration assessment is provided in Chapter 9. The full results are provided as Technical Report 2. Consideration of potential construction impacts to structural integrity and heritage items is provided in Section 14.3. Impacts to the heritage significance of items is considered in Chapter 14 (Non-Aboriginal Heritage).
	2. The Proponent must demonstrate that blast impacts are capable of complying with the current guidelines, if blasting is required.	No blasting is required

Key issue	Requirement	Where addressed?
4. Air quality	1. The Proponent must undertake an air quality impact assessment (AQIA) for construction and operation of the project in accordance with the current guidelines.	A summary of the results of the air quality impact assessment is provided in Chapter 10. The full results are provided as Technical Report 3.
	2. The Proponent must ensure the AQIA also includes: (a) Demonstration of compliance with the relevant regulatory framework, specifically the <i>Protection of the Environment Operations Act 1997</i> and the <i>Protection of the Environment Operations (Clean Air) Regulation (2010)</i> ; and	Section 10.1
	(b) a cumulative local and regional air quality impact assessment	Sections 10.3.3 and 10.4.3
5. Biodiversity	1. The Proponent must assess biodiversity impacts in accordance with the current guidelines including the Biodiversity Assessment Method (BAM), and documented in a Biodiversity Development Assessment Report (BDAR).	A summary of the results of the biodiversity assessment is provided in Chapter 11. The full results are provided as Technical Report 4.
	2. The BDAR must include details of the measures proposed to address the offset obligation as follows: (a) the total number and classes of biodiversity credits required to be retired for the development/project	No biodiversity offsets are required for the project.
	(b) the number and classes of like-for-like biodiversity credits proposed to be retired	
	(c) the number and classes of biodiversity credits proposed to be retired in accordance with the variation rules	
	(d) any proposal to fund a biodiversity conservation action	
	e) any proposal to make a payment to the Biodiversity Conservation Fund.	
	3. The Proponent must assess any impacts on biodiversity values not covered by the BAM as specified in s2.3.5	The project would not result in any impacts on biodiversity values not covered by the BAM
	4. The Proponent must assess impacts on the following [EECs, threatened species and/or populations] and provide the information specified in s8, s9 and s10 of the BAM6, specifically the Grey Headed Flying Fox colony located in the Jacqui Osmond Reserve..	Section 11.3.2 and section 6.7 of Technical Report 4.
5. The Proponent must identify whether the project as a whole, or any component of the project, would be classified as a Key Threatening Process (KTP) in accordance with the listings in the <i>Biodiversity Conservation Act 2016</i> (NSW) (BC Act), <i>Fisheries Management Act 1994</i> (FM Act) and <i>Environmental Protection and Biodiversity Conservation Act 2000</i> (EPBC Act).	Section 11.5	

Key issue	Requirement	Where addressed?
6. Soils, Protected and Sensitive Lands	1. The Proponent must verify the risk of acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Risk Map) within, and in the area likely to be impacted by, the project.	Section 12.2.2
	2. The Proponent must assess the impact of the project on acid sulfate soils (including impacts of acidic runoff offsite) in accordance with the current guidelines.	Section 12.3.2
	3. The Proponent must assess whether the land is likely to be contaminated and identify if remediation of the land is required. Where assessment and/or remediation is required, the Proponent must document how the assessment and/or remediation would be undertaken in accordance with current guidelines	Sections 12.2.3 and 12.3.3
	4. The Proponent must assess the impacts on soil and land resources (including erosion risk or hazard). Particular attention must be given to soil erosion and sediment transport consistent with the practices and principles in the current guidelines	Section 12.3.1
	5. The Proponent must assess the impacts of the project on environmentally sensitive land and processes (and the impact of processes on the project), including:	The Project would not have any impact on environmentally sensitive land and processes.
	(a) Key Fish Habitat as mapped and defined in accordance with the <i>Fisheries Management Act 1994</i> (FM Act); and	
	(b) waterfront land as defined in the <i>Water Management Act 2000</i> .	
7. Water - hydrology	1. The Proponent must describe (and map) the existing hydrological regime for any surface and groundwater resource (including reliance by users and for ecological purposes) likely to be impacted by the project, including stream orders, as per the BAM.	Section 13.2
	2. The Proponent must assess (and model if appropriate) the impact of the construction and operation of the project and any ancillary facilities (both built elements and discharges) on surface and groundwater hydrology in accordance with the current guidelines, including:	A summary of the results of the hydrology, flooding and water quality assessment is provided in Chapter 13. The full results are provided as Technical Report 5.
	(a) impacts from any permanent and temporary interruption of groundwater flow, including the extent of draw down, barriers to flows, implications for groundwater dependent surface flows, ecosystems and species, groundwater users and the potential for settlement;	Section 13.3.2 and 13.4.2
	(b) direct or indirect increases in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses;	Section 13.3.2 and 13.4.2
	(c) minimising the effects of proposed stormwater and wastewater management during construction and operation on natural hydrological attributes (such as volumes, flow rates, management methods and re-use options) and on the conveyance capacity of existing stormwater systems where discharges are proposed through such systems	Section 13.3.3 and 13.4.3
	3. The Proponent must identify any requirements for baseline monitoring of hydrological attributes.	Technical Report 7

Key issue	Requirement	Where addressed?
8. Water - Quality	1. The Proponent must:	A summary of the results of the hydrology, flooding and water quality assessment is provided in Chapter 13. The full results are provided as Technical Report 7.
	(a) state the ambient NSW Water Quality Objectives (NSW WQO) and environmental values for the receiving waters relevant to the project, including the indicators and associated trigger values or criteria for the identified environmental values	Section 13.1.1
	(b) demonstrate that all practical measures to avoid or minimise water pollution and protect human health and the environment from harm are investigated and implemented	Sections 13.3.3, 13.4.3 and 13.5.3
	(c) identify sensitive receiving environments (which may include estuarine and marine waters downstream) and develop a strategy to avoid or minimise impacts on these environments	Section 13.2, 13.3.3 and 13.4.3
	(d) identify proposed monitoring locations, monitoring frequency and indicators of surface water quality.	Section 13.4.3
9. Flooding	1. The Proponent must assess and (model where required) the impacts on flood behaviour during construction and operation for a range of flood events up to the probable maximum flood (taking into account sea level rise and storm intensity due to climate change).	A summary of the results of the hydrology, flooding and water quality assessment is provided in Chapter 13. The full results are provided as Technical Report 5.
10. Heritage	1. The Proponent must identify and assess direct and/or indirect impacts (including cumulative impacts) to the heritage significance of:	A summary of the results of the non-Aboriginal heritage impact assessment is provided in Chapter 14. A summary of the results of the Aboriginal heritage impact assessment is provided in Chapter 15. The full results are provided as Technical Report 9.
	(a) Aboriginal places and objects, as defined under the <i>National Parks and Wildlife Act 1974</i> and in accordance with the principles and methods of assessment identified in the current guidelines	Section 15.2
	(b) Aboriginal places of heritage significance, as defined in the Standard Instrument – Principal Local Environmental Plan	Section 15.2
	(c) environmental heritage, as defined under the <i>Heritage Act 1977</i>	Section 14.2
	(d) items listed on the National and World Heritage lists.	Section 14.2
	2. Where impacts to State or locally significant heritage items are identified, the assessment must: (a) include a statement of heritage impact for all heritage items (including significance assessment)	Section 14.3

Key issue	Requirement	Where addressed?
	(b) consider impacts to the item of significance caused by , but not limited to, vibration, demolition, archaeological disturbance, altered historical arrangements and access, visual amenity, landscape and vistas, curtilage, subsidence and architectural noise treatment (as relevant)	Section 14.3
	(c) outline measures to avoid and minimise those impacts in accordance with the current guidelines	Section 14.5
	(d) be undertaken by a suitably qualified heritage consultant(s) (note: where archaeological excavations are proposed the relevant consultant must meet the NSW Heritage Council's Excavation Director criteria)	Section 14.1 and
	3. Where archaeological investigations of Aboriginal objects are proposed these must be conducted by a suitably qualified archaeologist, in accordance with section 1.6 of the <i>Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW</i> (DECCW 2010).	Section 15.5.2
	4. Where impacts to Aboriginal objects and/or places are proposed, consultation must be undertaken with Aboriginal people in accordance with the current guidelines.	Section 15.5.2
11. Climate Change Risk	1. The Proponent must assess the risk and vulnerability of the project to climate change in accordance with the current guidelines.	A summary of the results of the climate change assessment is provided in Chapter 21. The full results are provided as Technical Report 12.
	2. The Proponent must quantify specific climate change risks with reference to the NSW Government's climate projections at 10km resolution (or lesser resolution if 10km projections are not available) and incorporate specific adaptation actions in the design.	Section 21.1.3
12. Health and Safety	1. The Proponent must assess the potential health impacts of the project, in accordance with the current guidelines.	Chapter 20
	2. The Proponent must assess the likely risks of the project to public safety, paying particular attention to pedestrian safety and the handling and use of dangerous goods.	Section 20.3.1
13. Urban Design & Visual Amenity	1. The Proponent must:	A summary of the results of the landscape and visual impact assessment is provided in Chapter 17. The full results are provided as Technical Report 10.
	(a) identify the urban design and landscaping aspects of the project and its components (including noise barriers and shared pedestrian paths);	Section 6.4
	(b) assess the impact of the project on the urban and natural fabric	Sections 17.3 and 17.4
	(c) explore the use of Crime Prevention Through Environmental Design (CPTED) principles during the design development process, including natural surveillance, lighting, walkways, signage and landscape	Section 17.5.1
	(d) identify urban design strategies and opportunities to enhance healthy, cohesive and inclusive communities.	Section 17.5.1

Key issue	Requirement	Where addressed?
	(e) opportunities to offset visual impacts from the loss of trees along Broomfield Street such as incorporating greening initiatives on street facing infrastructure (i.e noise barrier).	Section 17.5.4
	2. The Proponent must provide artist impressions and perspective drawings of the project to illustrate how the project will respond to the visual impacts.	Technical Report 10
14. Waste	1. The Proponent must assess predicted waste generated from the project during construction and operation.	Section 19.2.1 and 19.3.1
	2. The Proponent must assess potential environmental impacts from the excavation, handling, storage on site and transport of the waste particularly with relation to sediment/leachate control, noise and dust.	Section 19.2

Table A.3 Agency requirements – in response to consultation by the Department of Planning and Environment in relation to the SEARs

Agency	Issues raised	Where addressed?
Fairfield City Council	Property	
	<ul style="list-style-type: none"> Interim arrangements should be made during construction (and confirmed with council) to provide parking to replace that lost in Broomfield Street so that commuters are not inconvenienced. 	Section 8.3.5
	<ul style="list-style-type: none"> Potential business impacts to council's car parking facilities as a result of the loss of parking in Broomfield Street 	
	<ul style="list-style-type: none"> An accurate valuation should be obtained for council owned land proposed for acquisition. 	
	<ul style="list-style-type: none"> A licence agreement should be obtained for the temporary use of council land during construction 	Section 16.3.2
	<ul style="list-style-type: none"> Road closure permits should be obtained prior to implementing road closures during construction 	Section 8.5.2
	Open space	
	<ul style="list-style-type: none"> Impacts on the Parramatta to Liverpool Rail Train (shared walkway/cycleway) as a result of works to Broomfield Street 	Section 16.4.2
	<ul style="list-style-type: none"> Broomfield Street should be realigned so that this portion of the cycleway network is retained 	Section 6.2.4
	Catchment planning	
Flooding		
<ul style="list-style-type: none"> The replacement section of shared pathway should be designed in accordance with council's requirements (outlined in the letter) in relation to height and distance from the top of the bridge and bank 	The replacement section of the shared pathway would be designed to meet a like for like replacement. Section 6.2.4 Section 13.3 and Section 13.4	
<ul style="list-style-type: none"> The project should not create any adverse flooding impacts 	Section 13.3 and Section 13.4	
<ul style="list-style-type: none"> Council's update to the TUFLOW model of Cabramatta Creek should be used to assess any possible flooding impacts 	Section 13.4.1 and Section 13.5.2	

Agency	Issues raised	Where addressed?
	<p>Hydrology – Cabramatta Creek</p> <ul style="list-style-type: none"> Provide details on the integration of the bridge works with Cabramatta Creek and the shared pathway The new bridge should be designed in accordance with council's requirements (as outlined in the letter) in relation to height and distance from the top of the bank No bridge abutments are to be located in the creek/waterway area A management plan is required for gross pollutants generated by the construction works <p>Biodiversity – revegetation and riparian works</p> <ul style="list-style-type: none"> All creek banks (riparian zone) should be revegetated with native species of local significance from the endangered ecological vegetation community of River Flat Eucalypt or River Flat Forest, sourced from Fairfield City Council's Local Community Nursery Revegetation should be undertaken in accordance with council requirements (as outlined in the letter), including council approval of the vegetation management plan, proposed landscape plan and species list 	<p>Section 6.2.3 and Section 6.2.4</p> <p>Section 6.2.3 and Section 6.2.4</p> <p>Section 6.2.3</p> <p>Section 13.5.2</p> <p>Section 17.5.2</p> <p>Section 17.5.2</p>
	<ul style="list-style-type: none"> All waterway rehabilitation designs, hydraulic modelling and native revegetation landscape plans shall be prepared by an experienced environmental consultant in waterway rehabilitation works for freshwater environments All waterway, bank protection and riparian revegetation works should be undertaken in accordance with council requirements and reviewed and approved by council. <p>Cabramatta Place Team EIS – parking near Cabramatta Station</p> <ul style="list-style-type: none"> Parking close to Cabramatta train station entry must remain available during construction. Any temporary parking must be safely located with adequate lighting and sign posting, within 100 metres walking distance of the station <p>Biodiversity – flying fox colony</p> <ul style="list-style-type: none"> The Cabramatta Creek flying fox colony should be protected <p>Consultation</p> <ul style="list-style-type: none"> A management plan for freight train operations should be developed for residents to understand the impact of the proposed change Face to face consultation with each affected land owner and or tenant should be undertaken in community languages A committee, similar to the SSFL committee, should be established to deal with stakeholder engagement 	<p>No works would occur within waterways. Section 13.5.2 Section 17.5.2</p> <p>Section 13.5.2 Section 17.5.2</p> <p>Section 8.3.5</p> <p>Section 8.3.5</p> <p>Section 11.8.4</p> <p>Impacts of freight train operations on residents are provided in Section 18.4.</p> <p>Sections 18.5.1</p> <p>A community and stakeholder engagement plan would be prepared to facilitate communication with the community as described in Section 18.5.2 and Chapter 4.</p>

Agency	Issues raised	Where addressed?
	<ul style="list-style-type: none"> A project officer should be provided to assist impacted residents 	A community and stakeholder engagement plan would be prepared to facilitate communication with the community as described in Section 18.5.2 and Chapter 4
	<p>Visual amenity</p> <ul style="list-style-type: none"> Graffiti management on the new sound wall should be of a high standard; it is currently poor 	Section 17.5.2
	<p>Festivals</p> <ul style="list-style-type: none"> Construction should not affect Cabramatta's large street festivals 	Section 8.3.1
Liverpool City Council	<p>Flooding and water quality</p> <p>Flood assessment</p> <ul style="list-style-type: none"> The proposal traverses high, medium and low flood risk areas of the Cabramatta Creek floodplain in Warwick Farm. There should be no adverse flooding impacts due to the proposed works 	Sections 13.3, 13.4 and Technical Report 5
	<ul style="list-style-type: none"> Any increase in flood levels, extent and velocities should be mitigated by flood mitigation works. 	Sections 13.3, 13.4 and Technical Report 5
	<ul style="list-style-type: none"> A flood study should be undertaken in accordance with council's requirements (as outlined in the letter), including modelling and flood difference mapping of pre/post development, and submitted for council review 	No further flood studies are being undertaken. Flood modelling has been undertaken, refer to Technical Report 5.
	<ul style="list-style-type: none"> Council's 2D TUFLOW model should be used for the flooding assessment 	Section 13.4.1 and Section 13.5.2
	<p>Erosion protection</p> <ul style="list-style-type: none"> Erosion protection should be provided on creek banks upstream/downstream of the new bridge at Cabramatta Creek 	Sections 13.3.3 and 13.5.2
	<p>Water quality assessment</p> <ul style="list-style-type: none"> A water quality assessment should be undertaken 	Section 13.1.2 and Technical Report 7
	<ul style="list-style-type: none"> Mitigation measures should be considered to address the potential risk of pollution of the creek during construction 	Section 13.5.2
	<ul style="list-style-type: none"> Water quality improvement devices should be considered to treat storm runoff from project areas before discharging to the creek 	Section 13.5.2
	<p>Heritage</p> <p>Indigenous</p> <ul style="list-style-type: none"> There is potential for Indigenous archaeology, especially along Cabramatta Creek where new pylons will be required for two new bridges. 	Section 15.2
	<ul style="list-style-type: none"> An Indigenous Heritage Assessment should be undertaken, focusing mainly on the Cabramatta Creek area and including unexpected finds protocols 	Technical Report 9
	<p>Traffic</p> <ul style="list-style-type: none"> A construction traffic management plan should be provided 	Section 8.5.2
	<ul style="list-style-type: none"> Provide an assessment of cumulative impacts associated with other construction activities 	Section 8.4.4

Agency	Issues raised	Where addressed?
	<ul style="list-style-type: none"> Provide an assessment of road safety at key intersection and locations subject to heavy vehicle construction traffic movements and high pedestrian activity 	Section 8.3.9
	<ul style="list-style-type: none"> Provide details of construction program detailing the anticipated construction duration and highlighting significant and milestone stages and events during the construction process 	Section 7.3
	<ul style="list-style-type: none"> Provide details of anticipated peak hour and daily construction vehicle movements to and from the site 	Section 7.6
	<ul style="list-style-type: none"> Provide details of on-site car parking and access arrangements for construction vehicles, construction workers, emergency vehicles and service vehicle 	Section 8.3.5
	<ul style="list-style-type: none"> Provide details of temporary cycling and pedestrian access during the construction 	Section 8.3.4
	<ul style="list-style-type: none"> Provide haulage routes for construction vehicles 	Section 7.6
Office of Environmental and Heritage	<p>Biodiversity</p> <ul style="list-style-type: none"> Biodiversity impacts are to be assessed in accordance with the <i>Biodiversity Conservation Act 2016</i> using the Biodiversity Assessment Method (BAM) and documented in a Biodiversity Development Assessment Report (BDAR). 	A summary of the results of the biodiversity assessment is provided in Chapter 11. The full results are provided as Technical Report 4.
	<ul style="list-style-type: none"> The BDAR must document application of the avoid, minimise and offset hierarchy including assessing impacts in accordance with the Biodiversity Assessment Method. 	No biodiversity offsets are proposed
	<ul style="list-style-type: none"> The BDAR must include details of the measures proposed to address the offset obligation as defined by OEH (as outlined in the letter) 	No biodiversity offsets are proposed
	<ul style="list-style-type: none"> The BDAR must be submitted with all digital spatial data associated with the survey and assessment 	The BDAR has been submitted with all digital spatial data.
	<ul style="list-style-type: none"> The BDAR must be prepared by a person with the nominated accreditation 	Section 2.8 of Technical Report 4
	<ul style="list-style-type: none"> Impacts on the Grey Headed Flying Fox colony located nearby in Jacqui Osmond Reserve need to be assessed 	Section 11.3.2 and section 6.7 of Technical Report 4
	<p>Flooding</p> <ul style="list-style-type: none"> The latest data from Liverpool and Fairfield councils' relevant flood studies should be used and the councils should be consulted 	Section 13.1 and 13.2.2
	<ul style="list-style-type: none"> Features relevant to flooding, as described in the Floodplain Development Manual 2005 (including those outlined the letter) should be mapped 	Section 13.1 and Technical Report 5
	<ul style="list-style-type: none"> Describe the flood assessment and modelling undertaken, including the 1 in 10 year, 1 in 100 year flood levels and the PMF or an equivalent extreme event 	Section 13.2.2
	<ul style="list-style-type: none"> Model the effect on flood behaviour under the listed scenarios 	Summary of results are in Section 13.2.3 with full results provided in Technical Report 5
	<ul style="list-style-type: none"> Modelling must consider and document OEH's requirements (as outlined in the letter) 	Technical Report 5

Agency	Issues raised	Where addressed?
	<ul style="list-style-type: none"> The impacts of the project on flood behaviour must be assessed in accordance with OEH's requirements (as outlined in the letter) 	Section 13.3.1 and Section 13.4.1
	<p>Water and soils</p> <ul style="list-style-type: none"> Features relevant to water and soils must be mapped, including acid sulphate soils; rivers, streams and estuaries, wetlands, groundwater, groundwater dependent ecosystems, proposed intake and discharge locations 	Chapters 12 and 13
	<ul style="list-style-type: none"> Describe the background conditions for any water resource likely to be affected in accordance with OEH's requirements (as outlined in the letter) 	Section 13.2
	<ul style="list-style-type: none"> Assess the impacts on water quality in accordance with OEH's requirements (as outlined in the letter) 	Section 13.3.3 and Section 13.4.3
	<ul style="list-style-type: none"> Assess the impacts on hydrology in accordance with OEH's requirements (as outlined in the letter) 	Section 13.3.1 and Section 13.4.1
	<p>Aboriginal Cultural Heritage</p> <ul style="list-style-type: none"> Identify and describe the Aboriginal cultural heritage values that will be affected by the development and document these in an Aboriginal Cultural Heritage Assessment Report (ACHAR) 	Technical Report 9
	<ul style="list-style-type: none"> Consultation with Aboriginal people must be undertaken and documented in accordance with the <i>Aboriginal cultural heritage consultation requirements for proponents 2010</i> (DECCW) 	ACHAR is provided at part of Technical Report 9
	<ul style="list-style-type: none"> Impacts on Aboriginal cultural heritage values are to be assessed and documented in an ACHAR, including mitigation measures 	Chapter 2 and Technical Report 9
	<ul style="list-style-type: none"> The ACHAR must outline procedures to be followed if Aboriginal objects are found 	Chapter 2 and Technical Report 9
	<p>Coastal hazards</p> <ul style="list-style-type: none"> Describe the potential effects of coastal processes and hazards Consider the effects of coastal hazards on the proposal 	These requirements are not relevant given the distance from the coast
NSW EPA	<p>Air quality</p> <ul style="list-style-type: none"> An air quality assessment should be undertaken for the construction and operational phases of the project in accordance with the EPA's requirements (as outlined in the letter), including an assessment of the impact of exhaust emissions from locomotives and measures to mitigate these impacts 	A summary of the results of the air quality impact assessment is provided in Chapter 10. The full results are provided as Technical Report 3.
	<p>Noise and vibration</p> <ul style="list-style-type: none"> Noise and vibration impacts should be assessment in accordance with the ICNG and RING and EPA's requirements (as outlined in the letter) 	A summary of the results of the construction and operational noise and vibration assessment is provided in Chapter 9. The full results are provided as Technical Report 2.
	<ul style="list-style-type: none"> The assessment should clearly state what type of rail infrastructure development the project constitutes under the RING 	Section 3.2 of Technical Report 2

Agency	Issues raised	Where addressed?
	<ul style="list-style-type: none"> The assessment must provide clear justification for construction activities to be conducted outside the recommended standard hours in Section 2.2 of the ICNG, and assess these impacts 	Section 5 of Technical Report 2
	<ul style="list-style-type: none"> Approval to work outside of the recommended standard hours may be required from the EPA 	Noted
	<ul style="list-style-type: none"> The NSW EPA should be included as a stakeholder for consultation 	Noted
	<ul style="list-style-type: none"> Details should be provided of the current and estimated productivity of the rail line for 2030 	Section 6.6
Transport for NSW	A traffic and transport assessment should be prepared addressing TfNSW's requirements, including the matters summarised below.	Chapter 8 and Technical Report 1
	<ul style="list-style-type: none"> Proposed operational arrangements for all vehicles, pedestrians and cyclists, and measures to mitigate impacts 	Section 8.4
	<ul style="list-style-type: none"> Details of access arrangements for emergency vehicles and protocols for emergencies 	Section 8.3.8
	<ul style="list-style-type: none"> Details of loss of parking in Broomfield St (permanent and temporary) and alternate parking provision 	Sections 8.3.5 and 8.3.4
	<ul style="list-style-type: none"> Detailed acoustic assessment, including noise impacts of holding an Up freighter in the new loop 	A summary of the results of the construction and operational noise and vibration assessment is provided in Chapter 9. The full results are provided as Technical Report 2.
	<ul style="list-style-type: none"> Illustrate how the existing walking and cycling networks will be maintained across Cabramatta Creek and at the Sussex Street underpass during construction of the new bridges 	Section 8.4.1
	<ul style="list-style-type: none"> Pedestrian and bicycle rider movements should be maintained along footways and shared paths, with adequate safety and diversion measures provided if required 	Section 8.4.1
	<ul style="list-style-type: none"> Include a preliminary Construction Traffic and Pedestrian Management Plan 	Preliminary CTMP guide provided in section 7.1 of Technical Report 1
	<ul style="list-style-type: none"> Details of construction staging and coordination of possessions with Sydney Trains, including any potential for freight access to Sydney Trains network during an ARTC possession 	Section 7.3
	<ul style="list-style-type: none"> Plans demonstrating how all vehicles associated with construction and operation can be accommodated on the site to avoid queuing in the street network. 	Technical Report 1 section 7.1.5
	<ul style="list-style-type: none"> Construction impacts on the existing and future public transport network, pedestrian and bicycle networks 	Technical Report 1 section 4
	<ul style="list-style-type: none"> Sweep path diagrams for vehicles entering, exiting and manoeuvring throughout the site 	Technical Report 1 section 7.1.5
	<ul style="list-style-type: none"> Address the relevant planning provisions, goals and strategic planning objectives in the listed strategies and guidelines 	Chapter 3
	<ul style="list-style-type: none"> Consult with TfNSW, Roads and Maritime and Sydney Trains during the preparation of the assessment 	To be completed during detailed design.

Agency	Issues raised	Where addressed?
Department of Industry	DPI Fisheries <ul style="list-style-type: none"> The proposed bridge crossing should be designed and constructed to avoid harm key fish habitat at Cabramatta Creek or block fish passage 	Technical Report 4 section 4.2 and section 6
	<ul style="list-style-type: none"> Minimise harm to mangroves associated with bridge construction 	Not relevant
	<ul style="list-style-type: none"> Bridge construction should use best practice erosion and sediment control measures 	Technical Report 7 section 5 and 6
	DPI Water <ul style="list-style-type: none"> Identification of an adequate and secure water supply for the life of the project 	Technical Report 7 section 5
	<ul style="list-style-type: none"> A detailed and consolidated site water balance 	Technical Report 7 section 5
	<ul style="list-style-type: none"> Assessment of impacts on surface and ground water sources, related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems 	Technical Report 7 section 5 and 6
	<ul style="list-style-type: none"> Assess impacts from construction and operation on potentially affected properties, businesses, recreational users and land and water users 	Section 18.4 and 18.5
	<ul style="list-style-type: none"> Proposed surface and groundwater monitoring activities and methodologies 	Technical Report 7 section 7
	<ul style="list-style-type: none"> Consideration of relevant legislation, policies and guidelines, including the NSW Aquifer Interference Policy, the DPI Water Guidelines for Controlled Activities on Waterfront Land and the Water Sharing Plans for the Greater Metropolitan Region Groundwater 	Technical Report 7 section 1.5

APPENDIX B

EIS FORM AND CONTENT REQUIREMENTS –
ENVIRONMENTAL PLANNING AND ASSESSMENT REGULATION 2000

ENVIRONMENTAL IMPACT
STATEMENT

ARTC

THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

B. REQUIREMENTS OF SCHEDULE 2 (PART 3) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT REGULATION 2000

Requirement	EIS reference
6. Form of the environmental impact statement	
An environmental impact statement must contain the following information:	
(a) the name, address and professional qualifications of the person by whom the statement is prepared	Refer certification at the front of the EIS with respect to (a) – (f)
(b) the name and address of the responsible person	
(c) the address of the land: (i) in respect of which the development application is to be made, or (ii) on which the activity or infrastructure to which the statement relates is to be carried out	
(d) a description of the development, activity or infrastructure to which the statement relates	
(e) an assessment by the person by whom the statement is prepared of the environmental impact of the development, activity or infrastructure to which the statement relates, dealing with the matters referred to in this Schedule	
(f) a declaration by the person by whom the statement is prepared to the effect that: (i) the statement has been prepared in accordance with this Schedule, and (ii) the statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure to which the statement relates, and (iii) that the information contained in the statement is neither false nor misleading.	
7. Content of environmental impact statement	
(1) An environmental impact statement must also include each of the following:	
(a) a summary of the environmental impact statement	Executive summary
(b) a statement of the objectives of the development, activity or infrastructure	Chapter 1
(c) an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to its objectives, including the consequences of not carrying out the development, activity or infrastructure	Chapter 5
(d) an analysis of the development, activity or infrastructure, including: (i) a full description of the development, activity or infrastructure, and	Chapters 6 and 7
(ii) a general description of the environment likely to be affected by the development, activity or infrastructure, together with a detailed description of those aspects of the environment that are likely to be significantly affected, and	Chapter 2 and Part B (Chapters 8 to 21)
(iii) the likely impact on the environment of the development, activity or infrastructure, and	Part B
(iv) a full description of the measures proposed to mitigate any adverse effects of the development, activity or infrastructure on the environment, and	Part B
(v) a list of any approvals that must be obtained under any other Act or law before the development, activity or infrastructure may lawfully be carried out	Chapter 3
(e) a compilation (in a single section of the environmental impact statement) of the measures referred to in item (d) (iv)	Chapter 22
(f) the reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development set out in subclause (4).	Chapter 23

THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

APPENDIX C

STRATEGIC PLANNING CONTEXT



THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

C. STRATEGIC PLANNING REVIEW

A summary of the plans and strategies that are relevant to the need for, and development of, the project is provided below.

National strategic planning

National Land Freight Strategy

The *National Land Freight Strategy – A place for freight* (Commonwealth of Australia, 2012) recognised that a coordinated national approach was required to ensure more efficient and sustainable freight logistics in Australia. It noted that over the four preceding decades, the Australian freight task had quadrupled, with major increases evident in road and rail, and that this trend was expected to continue, with the total freight tasks expected to nearly double by 2030 based on 2010 levels.

The Strategy sought to direct the efforts of all governments and industry and outcomes for freight in Australia. The objective of the Strategy was to improve the efficiency of freight movements across infrastructure networks, minimise the negative impacts associated with such freight movements and influence policy making relevant to the movement of freight. It identified six major challenges facing freight that required coordinated policy action and effort by government and industry to:

- ensure that there are long term and integrated plans in place for freight
- invest in the right infrastructure at the right time
- improve access, investment and charging arrangements for heavy vehicles
- create better and more consistent regulation
- enhance understanding of the freight task and its associated challenges
- build community understanding and support for the role of freight in society.

It committed governments to a work plan of practical first steps to addressing these key challenges. This included a requirement for States and Territories to put in place long term freight plans consistent with the objectives of the Strategy. The Strategy recognised that several States were in the process of developing long term freight plans for their own jurisdiction, including NSW who was developing the *Draft NSW Freight and Ports Strategy* at the time (discussed further below). The Strategy noted that long term planning was required, and provided the case study of the Moorebank Intermodal Terminal, the objective of which is to provide greater freight container capacity and efficiency, reduce congestion and use rail to transfer goods from Port Botany. The project was developed to increase capacity for rail freight traffic accessing Port Botany, and to provide for future growth patterns, including the Moorebank Intermodal Terminal to 2030.

Inquiry into National Freight and Supply Chain Priorities

The Inquiry into National Freight and Supply Chain Priorities was initiated by the former Australian Minister for Infrastructure and Transport in 2017. The inquiry was tasked with identifying priorities for Australia for the next 20 years, to improve freight and supply chain efficiency and capacity, and manage the costs of transporting goods through Australia's major national container ports, airports, intermodal terminals and pipelines.

Feedback from Ports Australia during the Inquiry process concluded that while terminal capacity at most ports across Australia can meet predicted needs for the next 20 years with reasonable investment, some container ports such as Port Botany and the Port of Melbourne have constraints associated with their land based transport connections.

The inquiry report (Commonwealth of Australia 2018) noted that road transport will experience increased congestion and associated higher costs over the next 20 years, and that investing in efficient rail freight connections to major ports and rail freight paths through metropolitan networks will take pressure off the road system.

The report includes a number of critical action areas, of which action 4.3 is relevant to the project: 'Provide additional funding to ensure efficient rail freight connections to major ports and rail freight paths through metropolitan networks, including port rail projects, such as completing the duplication of the Port Botany freight rail line.' The project is noted to increase the benefits of this duplication and will help support the more efficient movement of freight to Port Botany.

Australian Infrastructure Plan and Priority List

The *Australian Infrastructure Plan* (Infrastructure Australia 2016) sets out the infrastructure challenges and opportunities that Australia faces over the next 15 years and the solutions required. The plan was informed by a comprehensive review of existing and required infrastructure over the coming decades. The plan has four main themes:

- Productive cities, productive regions
- Efficient infrastructure markets
- Sustainable and equitable infrastructure
- Better decisions and better delivery.

In relation to the second theme, the plan recognises that 'Demand for freight rail infrastructure is projected to grow substantially in coming decades.'

As part of the *Australian Infrastructure Plan*, the Infrastructure Priority List (Infrastructure Australia 2018) is designed to give guidance to decision makers and provide transparency for industry and the community. It is a 'rolling' list that is updated periodically as proposals move through development and delivery and in response to emerging challenges and opportunities.

The 'Port Botany freight rail duplication' is included as a high priority near-term (0–5 years) initiative on the Infrastructure Priority List in the national connectivity category. The priority list notes that:

The rail line is currently operating close to capacity. Additional demand arising from growth in interstate, intrastate and import/export freight has the potential to create a bottleneck along this line, impacting on reliability and restricting the efficient movement of freight across the broader Sydney rail network.

As Sydney's primary container port, it is vital that Port Botany maintains throughput capacity to meet demand over the long term.

Currently, around 19 per cent of Port Botany containerised freight is moved using the rail network. Increasing this mode share will require additional capacity on the Port Botany Rail Line and the broader Sydney freight rail network.

The project and the Port Botany duplication are being undertaken as part of Stage 3 of a Nation Building funded Program to improve capacity on the Port Botany Rail Line. The project will support the benefits realised by the Port Botany duplication.

National Ports Strategy

The *National Ports Strategy* (Infrastructure Australia and the National Transport Commission 2011) was developed as part of a collaborative approach to the future development and planning of Australia's port and freight infrastructure. The Strategy covers both bulk commodity ports and container ports, identifying:

- the most effective regulatory and governance frameworks
- ways to improve land planning and corridor preservation
- future infrastructure requirements of Australia's ports, including road and rail links.

The Strategy notes that there are major efficiency implications for Australia if significant improvements are not made to ports and related landside road and rail systems over the coming decades.

The project is consistent with this strategy as it involves improvements to the rail network accessing Port Botany.

NSW planning

Future Transport Strategy 2056

The *Future Transport Strategy 2056* (Transport for NSW 2018b) is a suite of strategies and plans for transport developed in conjunction with the Greater Sydney Commission's *A Metropolis of Three Cities – the Greater Sydney Region Plan* and supporting regional plans, and Infrastructure NSW's *State Infrastructure Strategy*. The *Future Transport Strategy 2056* provides an integrated 40 year vision, directions and outcomes for transport in NSW. The vision for the future of transport is based on six outcomes:

- Customer focussed
- Successful places
- A strong economy
- Safety and performance
- Accessible services
- Sustainability.

The Strategy recognises that the freight rail network will be an integral part of Sydney's transport system into the future. It notes that: 'The strategic freight network will use major city-shaping corridors and increasingly rely on dedicated freight rail corridors for movements between ports and intermodal terminals in the Central and Western Cities'.

The Strategy recognises the Botany rail line as part of Sydney's strategic freight network, and notes that:

The strategic freight network includes the most significant corridors that support the movement of goods. This includes corridors connecting trade gateways, freight precincts and centres across Greater Sydney as well as corridors that connect the region with outer metropolitan areas and regional NSW. Supporting the safe, efficient and reliable movement of goods around Greater Sydney will require a high capacity network for movement between trade gateways and convenient access to service centres.

The project is consistent with the strategy as it will support the functioning of the Port Botany Rail Line as part of Sydney's freight network, and the safe, efficient and reliable movement of goods along the line.

State Infrastructure Strategy 2018-2038: Building Momentum

The *State Infrastructure Strategy 2018-2038* (Infrastructure NSW 2018) establishes the strategic directions, projects and initiatives to meet the infrastructure needs of a growing population and a growing economy.

The Strategy investigates infrastructure demands over the next 20 years. With respect to Port Botany, it notes that container trade through the port is expected to grow by 62 per cent between 2016 and 2036, increasing from 2.36 to 3.83 million twenty foot equivalent units. The Strategy notes that 'maintaining the

efficiency of infrastructure networks and access to the international trade gateways of Sydney Airport and Port Botany will be critical to support the ongoing competitiveness of the city and of NSW'.

With respect to transport, the Strategy notes that rising congestion on parts of the road network and crowding on sections of the rail network will increase travel times and affect the reliability of the freight network. The strategy recommends shifting demand towards more efficient modes of transport, and unlocking the capacity of current assets by modernising systems and addressing bottlenecks.

The project is consistent with the following strategic directions in the Strategy:

- Improve access to international gateways.
- Optimise existing infrastructure networks to provide greater capacity for better services.

It is also consistent with the following key recommendations for the transport sector:

- Overcome local constraints on the regional road and rail networks that limit the use of high productivity freight vehicles and rail freight.
- Further develop the Sydney rail network with new rail links and system-wide upgrades.
- 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.

Providing additional capacity on the SSFL is also identified as a transport project within the Strategy.

NSW Freight and Ports Plan 2018-2023

The *NSW Freight and Ports Plan* (Transport for NSW 2018), which forms part of *Future Transport Strategy 2056*, sets the strategic direction for freight and ports over the next 40 years. The Plan identifies key objectives and goals to create a transport network where goods move efficiently to their markets. The Plan notes that access by both road and rail to and from freight facilities such as ports is becoming increasingly constrained, and that congestion and constraints on the supporting land transport network can reduce the performance of ports.

The project is consistent with the following key objectives:

- Economic growth: Providing confidence and certainty that encourages continued investment in the freight industry to support economic growth.
- Efficiency, connectivity and access: Improving the efficiency of existing infrastructure and ensuring greater connectivity and access along key freight routes.
- Capacity: Maximising infrastructure investment and increasing land use capacity to accommodate growth.

To meet the 'capacity' key objective, the NSW Government has a goal to deliver new infrastructure to increase rail freight capacity. The project is identified as one of the committed initiatives to address this goal:

- Amplification of the Southern Sydney Freight Line: Construct a passing loop at Cabramatta to support operations at Moorebank Intermodal Terminal (subject to Final Business Case, 3 – 5 years).

Metropolitan/regional planning

A Metropolis of Three Cities – the Greater Sydney Region Plan

A Metropolis of Three Cities – the Greater Sydney Region Plan (Greater Sydney Commission 2018a) sets a 40 year vision (to 2056) and establishes a 20 year plan to manage Greater Sydney's growth and change.

The Plan is built on a vision of three cities, where most residents live within 30 minutes of jobs, education, health facilities, and other services:

- Western Parkland City
- Central River City
- Eastern Harbour City.

The Plan notes that:

- efficient trade gateways, freight and logistics networks are required for the region to be more internationally competitive
- Port Botany and Sydney Airport are Greater Sydney's two nationally significant trade gateways, with significant growth projected
- retaining internationally competitive operations at Port Botany and Sydney Airport is vital for a productive NSW economy
- ensuring transport networks can support the needs of the trade gateways is of national significance
- providing for a growing Greater Sydney requires an efficient and effective road and rail freight network integrated with ports and airports.

The Plan includes ten directions and 40 objectives for the future of Sydney. The project is consistent with the following objectives:

- Objective 3 – Infrastructure adapts to meet future needs
- Objective 15 – The Eastern, Greater Parramatta and the Olympic Peninsula, and Western Economic Corridors are better connected and more competitive
- Objective 16 – Freight and logistics network is competitive and efficient.

Western City District Plan

The Greater Sydney Commission's five district plans are a guide for implementing *A Metropolis of Three Cities – the Greater Sydney Region Plan* at a district level. These 20 year plans are a bridge between regional and local planning. Their purpose is to inform local environmental plans, community strategic plans and the assessment of planning proposals.

The project is located in an area subject to the *Western City District Plan* (Greater Sydney Commission 2018b). The plan notes that as the Western City District develops, opportunities to improve freight network efficiencies will become more important. It notes that the Western City District must also connect port and airport activities, linking Western Sydney Airport, Moorebank Intermodal Terminal and a potentially expanded container port at Port Kembla.

The project is consistent with the following planning priorities:

- W1 Planning for a city supported by infrastructure
- W7 Establishing the land use and transport structure to deliver a liveable, productive and sustainable Western Parkland City
- W10 Maximising freight and logistics opportunities and planning and managing industrial and urban services land
- W11 Growing investment, business opportunities and jobs in strategic centres.

The Moorebank Intermodal Terminal will provide integrated service including interstate terminals, warehousing, retail and service offerings, and rail connection to the Southern Sydney Freight Line, which also provides dedicated freight rail access all the way to Port Botany. The plan notes that Transport for NSW and the Australian Government are committed to supporting efficient movement of goods close to the Moorebank Intermodal Terminal by facilitating freight rail and road access. The project will support the increased demand associated with operation of the Moorebank Intermodal Terminal.

Greater Sydney Services and Infrastructure Plan

The *Greater Sydney Services and Infrastructure Plan* (Transport for NSW 2018c), which forms part of the *Future Transport Strategy 2056*, sets the strategic direction for transport in NSW over the next 40 years. Building on the state-wide transport outcomes identified in the *Future Transport Strategy 2056*, the plan identifies specific transport outcomes for Greater Sydney, and the policy, service and infrastructure initiatives to achieve these outcomes.

The project will assist in achieving outcome 8, which relates to the ‘safety and performance’ outcome under the *Future Transport Strategy 2056*. Outcome 8 is ‘Efficient and reliable freight journeys supported by 24/7 rail access between key freight precincts with convenient access to centres’. Relevant to this outcome, the plan recognises that the productivity of Sydney and many regional NSW communities depends on container goods being moved safely, efficiently and reliably within Greater Sydney, and that the efficiency of freight movements in Sydney has a significant impact on the wider freight industry and economy. The plan commits to investigating capacity improvements to the Southern Sydney Freight Line to improve the reliability of connections between Greater Sydney and regional NSW.

The plan also defines the vision for Sydney’s future transport networks, including the strategic freight network. The plan notes that ‘A key task for the freight network over the next 40 years will be to support growing demand between ports in the east, particularly Port Botany’. The plan includes ‘improve reliability and journey times for freight movements between regional NSW and Greater Sydney through upgrades to the Southern Sydney Freight Line’ as an initiative for investigation (0–10 years), as one of the transport initiatives for the Western Parkland City. These initiatives include those focussed on supporting the efficient movement of freight between the city and ports and regions including providing additional capacity on the Southern Sydney Freight Line.

Navigating the Future: NSW Ports’ 30 Year Master Plan

NSW Ports began operations in mid-2013 under a 99-year lease for Port Botany, Port Kembla, the Cooks River Intermodal Terminal and the Enfield Intermodal Logistics Centre. *Navigating the Future: NSW Ports’ 30 Year Master Plan* documents the actions required to create a sustainable port supply chain that will meet the needs of NSW over the next 30 years and beyond. It details expected trade growth and outlines the actions to address this growth. The Master Plan notes that:

- Port Botany is vital to the economic wellbeing of Sydney and NSW and is NSW’s only container port and the largest bulk liquid and gas port.
- Most of Port Botany’s trade caters for Sydney’s consumers and businesses, with 80 per cent of import containers delivered within a 40 kilometres radius from Port Botany.
- Port Botany will be required to cater for growing trade volumes over the next 30 years.

More containers will be transported by rail, supported by a network of existing and new metropolitan intermodal terminals – NSW Ports’ has a target of three million TEUs (basic container units) of containers being moved to and from Port Botany by rail by 2045 (around 40 per cent of forecast container volumes), with the Cooks River Intermodal Terminal and Enfield Intermodal Logistics Centre supporting this task

The Enfield and Cooks River intermodal terminals will be inland extensions to Port Botany, with Cooks River operating as an extended port gate and the Enfield Intermodal Logistics Centre a key logistics hub in the central-west of Sydney

Container volumes could more than triple from 2.3 million to 8.4 million TEUs over the next 30 years

Maximising the capacity of Port Botany and its ability to meet the predicted growth in freight throughput requires a combined investment in, and optimisation of, both road and rail networks.

The Master Plan identifies five objectives to respond to these needs and sustainably cater for forecast trade growth. The project will assist in achieving objective 2 'Grow rail transport of containers'. With regard to this objective, the plan notes that:

Maximising the transport of containers by rail between Port Botany and Sydney metropolitan intermodal terminals will be essential for cost-effective, efficient and sustainable container distribution throughout Sydney. Growth in use of rail will benefit the road networks surrounding the port by reducing the numbers of trucks. Significant growth in containers moved by rail will reduce the growth of trucks around Port Botany and will enable the port to achieve its optimum capacity.

Port Botany will not achieve an annual container throughput of over seven million TEU without rail becoming a more significant component of the port logistics chain.

The Master Plan specifically mentions the requirement for the project, noting that capacity improvements on rail beyond the Enfield Intermodal Logistics Centre, for example a passing loop near Warwick Farm on the Southern Sydney Freight Line, will also be required to cater for the growth of the Moorebank Intermodal Terminal and future intermodal terminals in western Sydney.

Sydney Metropolitan Freight Strategy

The purpose of ARTC's *Sydney Metropolitan Freight Strategy* (ARTC 2015) is to document the challenges, opportunities and the most effective solutions to achieve rail freight growth in Sydney. The Strategy notes that ARTC's fundamental objective in the Sydney area is to facilitate the growth of rail freight in the short, medium and long term.

The Strategy notes that rail market share at Port Botany is predicted to increase from 14 per cent in 2014 to 42 per cent in 2028, and that capacity improvements on the network are required to address this increase.

The Strategy describes how ARTC has developed a staged upgrading program. Stage 1 and Stage 2 of this program have been completed and the strategy notes a third phase has now been funded under the current infrastructure investment program. The Stage 3 works included a capacity study looking at future enhancements of the Southern Sydney Freight Line to accommodate increased freight traffic to Port Botany, including Moorebank Intermodal Terminal. As an outcome of this capacity study, required to meet future capacity requirements under the most likely future demand scenario, the Strategy notes the need to proceed with a new entry loop at Warwick Farm.

THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

APPENDIX D

ENVIRONMENTAL RISK ASSESSMENT



THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

1 OVERVIEW

1.1 Background

As part of the process of undertaking a detailed environmental impact statement (EIS) for the Cabramatta Loop Project (the project), a preliminary environmental risk assessment was undertaken. The purpose of undertaking the risk assessment process was to identify key issues and impacts to be incorporated into the impact assessment.

To inform the preliminary environmental risk assessment an initial risk analysis workshop was held on 14 November 2018 with representatives from ARTC, the design team and the environmental impact assessment team. The preliminary environmental risk analysis was undertaken in general accordance with the principles of the Australian/New Zealand Standard AS/NZS ISO 31000:2009 Risk management – Principles and guidelines (Australian/New Zealand Standard 2009).

The environmental risk assessment was carried out in the form of a preliminary, desktop level risk assessment, to broadly assess the potential environmental impacts and risks associated with construction and operation of the project. The assessment was based on evidence, previous experience and professional judgement of potential risks, and their consequence, likelihood and significance (without mitigation). The environmental risk assessment identified and ranked potential impacts with the aim of refining and prioritising the scope of the environmental assessment including the specialist studies which support this environmental impact statement.

The environmental impact assessment addresses the issues that were confirmed as key issues through this initial environmental risk assessment process. Key issues are those issues that have high or very high impacts (actual or perceived) and require comprehensive assessment to determine the severity of potential effects and to identify appropriate management and mitigation measures.

Those risks that were identified as medium or above as part of the preliminary environmental risk assessment are detailed in Chapter 8 to Chapter 21.

Based on the impacts identified as part of the environmental impact assessment (refer to Chapter 8 to Chapter 21) the preliminary risk assessment has been re-evaluated to assess the residual risks of the project, taking into account the mitigation measures identified in Chapter 22.

1.2 Risk analysis framework

The residual environmental risk analysis was undertaken in general accordance with the principles of the Australian/New Zealand Standard AS/NZS ISO 31000:2009 Risk management – Principles and guidelines (Australian/New Zealand Standard 2009). The risk analysis involved assessing the risk level of each identified potential impact by identifying the consequences of the impact and the likelihood that the impact can occur.

Definitions of the 'consequence' and 'likelihood' of the impacts are discussed in more detail in the following sections.

1.2.1 Evaluating consequence

Consequence is defined as the implication of an impact. The consequences of an impact require a degree of subjective assessment as the likely consequences of an impact may consist of several elements.

The elements that have been considered in this risk assessment are described in Table D.4

Table D.4 Consequences of occurrence

Consequence level	Description
Extreme	<ul style="list-style-type: none"> ▶ Long-term (greater than 12 months) and irreversible large-scale environmental, social or economic impacts ▶ May be local or wider spatial extent (including up to state-wide) ▶ One or more fatalities ▶ Resulting in major prosecution under relevant environmental legislation ▶ Extended substantial disruption and impacts to stakeholders or customers
Major	<ul style="list-style-type: none"> ▶ Medium to long-term (6 to 12 months) and potentially irreversible ▶ May be local or wider spatial extent (no greater than nearby local government areas) ▶ Two to ten serious injuries ▶ Extensive remediation required ▶ Resulting in a fine or equivalent penalty under relevant environmental legislation ▶ Severe disruptions or long-term impacts to stakeholders or customers
Moderate	<ul style="list-style-type: none"> ▶ Short to medium-term (1 to 6 months), reversible and/or well-contained impacts ▶ May be local spatial extent (the site and nearby surrounds) ▶ One serious injury ▶ Minor remedial actions ▶ Moderate disruptions or impacts to stakeholders or customers
Minor	<ul style="list-style-type: none"> ▶ Short-term (less than 1 month), and reversible ▶ May be localised spatial extent (within site boundaries) ▶ One or more minor injuries ▶ Within environmental regulatory limits ▶ Minor or short-term disruptions or impacts to stakeholders or customers
Not significant	<ul style="list-style-type: none"> ▶ Very short-term and readily reversible (not significant) ▶ No appreciable changes to environment ▶ No injuries ▶ Negligible impacts to environment, stakeholders or customers

1.2.2 Evaluating likelihood

The likelihood of an impact occurring can be described in terms of probability. Overlaying this is the need to recognise the uncertainty that may be associated with the possible impacts, particularly during the initial risk assessment process. Where there is scientific uncertainty a cautious approach will identify a higher level of risk (worst-case scenario).

Each identifiable impact can be assigned likelihood between rare and almost certain (refer to Table D.5). In simplifying the possible impacts for the purpose of a risk assessment, an element of subjectivity is

introduced. The purpose of the risk assessment is not necessarily to agree on the probability of any particular impact, but to facilitate an understanding of the relative probability of different impacts.

Table D.5 Likelihood and probability of occurrence

Likelihood	Description	Probability
Almost Certain	Expected to occur	>85%
Likely	Probably will occur	50-85%
Possible	May occur	21-49%
Unlikely	Not expected to occur in most circumstances	1-20%
Rare	May occur in exceptional circumstances	<1%

1.2.3 Environmental risk assessment matrix

Based on the assessment of consequence and likelihood any foreseeable impact can be assigned a risk level. This determines the significance of the environmental risk associated with a given impact. Table D.6 to be read as a matrix, with increasing consequence left to right and decreasing likelihood top to bottom.

Table D.6 Environmental risk assessment matrix

Consequence					
Likelihood	Not significant	Minor	Moderate	Major	Extreme
Almost Certain	Medium	Medium	High	Very high	Very high
Likely	Low	Medium	High	High	Very high
Possible	Low	Medium	Medium	High	High
Unlikely	Low	Low	Medium	Medium	High
Rare	Low	Low	Low	Medium	High

Very high impacts were considered the highest priority and were the focus of the concept design and environmental assessment. In general, the following was applied when scoping requirements for the environmental assessment.

- **Very high impacts** – Assessment and planning is necessary to avoid these impacts to the greatest extent possible.
- **High impacts** – Detailed specialist investigation and assessment is necessary to enable identification of appropriate management and mitigation options.
- **Medium impacts** – Further investigation as part of the environmental assessment is desirable, to address some uncertainties. Impacts could be mitigated through the application of relatively standard environmental mitigation measures.
- **Low impacts** – May not require specialist investigations, particularly where identifiable management/mitigation guidelines exist then potentially only broad or desktop investigation is

necessary. Impacts could be mitigated through other working controls (such as detailed design requirements, normal working practice, safety and quality controls).

1.3 Residual environmental risk assessment

Using the risk framework discussed in section 1.2 a residual environmental risk assessment was undertaken for the construction and operation of the project and is presented in Table 3.1. The residual environmental risk assessment included consideration of the impact assessment undertaken as part of the EIS, including the detailed specialist assessments, where available. This enabled the preliminary risk analysis to be refined and to also take into account available mitigation measures, hence representing an analysis of residual risks. The assessment was based on evidence, previous experience and professional judgement of potential risks, and their consequence, likelihood and significance (without mitigation).

No impacts were identified as having a high residual risk following implementation of the environmental management approach and mitigation measures proposed in section 22.2 and 22.3. The risk analysis has identified that the following issues would have medium residual risks:

- **Traffic, transport and access** - specifically impacts to property access and delays and/or reduced access to road users (including pedestrians/cyclists) due to construction activities and impacts to parking during construction and operation.
- **Biodiversity** – specifically impacts associated with the removal of a limited amount of vegetation particularly around Cabramatta Creek.
- **Noise and vibration** – specifically noise from construction activities including out of hours works.
- **Aboriginal heritage** – specifically potential impacts on unidentified items or places of Aboriginal heritage significance.
- **Visual amenity** – due to the introduction of built elements, including the new noise wall and embankment, and the removal of vegetation along Broomfield Street, Cabramatta Creek and in Jacquie Osmond Reserve.
- **Land use and property** – temporary impacts on users of Jacquie Osmond Reserve and Warwick Farm Recreational Reserve and impacts due to partial property acquisition.
- **Socio-economic** – temporary impacts to users of community recreational facility and amenity impacts during operation due to increased trains.
- **Health and safety** – safety hazards to road users (including pedestrians and cyclists) due to construction activities.

For the majority of these impacts the risk ranking was high prior to mitigation, indicating that implementation of the environmental management approach and mitigation measures proposed in this EIS would effectively minimise the impacts associated with the project.

Table D.7 Residual environmental risk assessment

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
Transport and traffic – Construction	Road network impacts, including temporary delays to local traffic due to diversions and shut downs	Almost Certain	Moderate	High	Refer to section 22.3	Almost Certain	Minor	Medium
	Congestion in surrounding road networks due to diversion of road users during construction	Almost Certain	Moderate	High	Refer to section 22.3	Almost Certain	Minor	Medium
	Reduced pedestrian and cyclist access due to works on the shared path	Almost Certain	Moderate	High	Refer to section 22.3	Likely	Minor	Medium
	Impacts to existing parking spaces on the western side of Broomfield Street due to the works encroaching in this area	Almost Certain	Moderate	High	Refer to section 22.3	Almost Certain	Minor	Medium
	Impacts to emergency services through delays in access due to works	Possible	Moderate	Medium	Refer to section 22.3	Unlikely	Major	Medium

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
	Construction staff parking resulting in impacts to street parking	Almost Certain	Moderate	High	Refer to section 22.3	Unlikely	Moderate	Medium
	Impacts to land owners and occupiers due to property access restrictions	Almost Certain	Moderate	High	Refer to section 22.3	Possible	Moderate	Medium
Transport and traffic - Operation	Permanent loss of parking along Broomfield Street	Almost Certain	Moderate	High	Refer to section 22.3	Almost certain	Not significant	Medium
	Additional maintenance activities due to loop - additional traffic, traffic noise, etc.	Likely	Minor	Medium	Refer to section 22.3	Unlikely	Minor	Low
Biodiversity - Construction	Potential impacts on a limited amount of identified vegetation communities and/or threatened flora species, in particular in the vicinity of Cabramatta Creek	Almost Certain	Moderate	High	Refer to section 22.3	Likely	Minor	Medium
	Potential impacts from tree removal along Broomfield Street and Jacquie Osmond Reserve	Almost Certain	Minor	Medium	Refer to section 22.3	Possible	Minor	Medium
	Potential impacts on habitat due to vegetation removal	Almost Certain	Moderate	High	Refer to section 22.3	Possible	Minor	Medium

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
	Indirect impacts due to increased dust, weeds, sedimentation and erosion, noise, light including disturbance to flying fox habitat	Almost Certain	Minor	Medium	Refer to section 22.3	Unlikely	Minor	Low
Biodiversity - Operation	Impacts on fauna and habitat from noise and light during operation	Unlikely	Minor	Low	Refer to section 22.3	Rare	Minor	Low
	Increased potential for pest plants and animals during maintenance from movement of vehicles, machinery and materials in and out of the rail corridor	Unlikely	Minor	Low	Refer to section 22.3	Rare	Minor	Low
Noise and vibration (amenity) - Construction	Noise impacts on local residents and sensitive receivers from construction activities including out of hours works	Almost certain	Moderate	High	Refer to section 22.3	Possible	Moderate	Medium
	Noise impacts on local residents and sensitive receivers from construction traffic	Likely	Minor	Medium	Refer to section 22.3	Unlikely	Minor	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
Noise and vibration (amenity) - Operation	Noise impacts on local residents and sensitive receivers from the operation of trains due to the loop (idling in loop, slowing down/accelerating into/out of loop, closer to receivers on loop)	Possible	Minor	Medium	Refer to section 22.3	Unlikely	Minor	Low
	Impacts to new receivers due to change in noise wall from current	Almost certain	Minor	Medium	Refer to section 22.3	Unlikely	Minor	Low
Noise and vibration (structural) - Construction	Damage to structures including heritage structures from vibration caused by construction activities	Possible	Moderate	Medium	Refer to section 22.3	Unlikely	Moderate	Medium
Air quality – Construction	Generation of dust during construction (from exposed soil/stockpiles, excavation and vehicle movements)	Almost Certain	Minor	Medium	Refer to section 22.3	Possible	Not significant	Low
	Emissions from vehicles or plant during construction	Likely	Minor	Medium	Refer to section 22.3	Likely	Not significant	Low
	Odours/emissions from disturbance of contaminated soils	Unlikely	Minor	Low	Refer to section 22.3	Rare	Minor	Low
	Generation of dust from transport of uncovered loads	Almost Certain	Minor	Medium	Refer to section 22.3	Rare	Minor	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
Air quality - Operation	Impacts on local air quality during operation from maintenance vehicle and train emissions	Unlikely	Not significant	Low	Refer to section 22.3	Unlikely	Not significant	Low
Soils (including site contamination and saline soils) - Construction	Impacts associated with the disturbance of contaminated, ASS or soil salinity/saline soils during construction.	Possible	Minor	Medium	Refer to section 22.3	Unlikely	Minor	Low
	Increased erosion and sedimentation due to excavation activities and vehicle movement	Likely	Moderate	High	Refer to section 22.3	Rare	Moderate	Low
	Contamination of soils/groundwater due to spills and leaks during construction	Possible	Minor	Medium	Refer to section 22.3	Unlikely	Minor	Low
Soils (including site contamination and saline soils) - Operation	Increased erosion and sedimentation due to excavation activities and vehicle movement during maintenance activities	Possible	Moderate	Medium	Refer to section 22.3	Rare	Moderate	Low
	Contamination of soils/groundwater due to spills and leaks during maintenance	Unlikely	Moderate	Medium	Refer to section 22.3	Rare	Moderate	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
Flooding - Construction	Impact of flooding on unprotected areas during construction resulting in wash-outs or erosion	Possible	Moderate	Medium	Refer to section 22.3	Rare	Minor	Low
	Temporary impact to the behaviour of local surface water systems during construction	Possible	Minor	Medium	Refer to section 22.3	Possible	Not significant	Low
Flooding - Operation	Presence of or change to structures associated with the project could impact upstream and downstream local flood behaviour (including bridges and changes to drainage infrastructure)	Likely	Moderate	High	Refer to section 22.3	Rare	Moderate	Low
Water (hydrology) - Construction	Changes to flow patterns and altered hydrology due to construction in Cabramatta Creek	Possible	Moderate	Medium	Refer to section 22.3	Unlikely	Minor	Low
	Blockages of flow paths affecting low flows through construction within Cabramatta Creek and through erosion and sedimentation control structures	Possible	Moderate	Medium	Refer to section 22.3	Unlikely	Minor	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
	Sedimentation and changes to geomorphology (aggradation in bed channels) in Cabramatta Creek	Possible	Major	High	Refer to section 22.3	Unlikely	Minor	Low
Water (hydrology) - Operation	Impacts on upstream and downstream drainage due to the introduction of built structures such as embankment and bridges	Possible	Major	High	Refer to section 22.3	Rare	Moderate	Low
Water (water quality) - Construction	Reduced water quality (increased TSS and turbidity) due to earthworks and erosion and sedimentation near watercourses	Possible	Moderate	Medium	Refer to section 22.3	Rare	Moderate	Low
	Impacts on water quality from contamination from spills and leaks during construction	Unlikely	Moderate	Medium	Refer to section 22.3	Rare	Minor	Low
	Impacts on water quality from discharge of excess water from dewatering	Possible	Moderate	Medium	Refer to section 22.3	Rare	Minor	Low
Water (water quality) – Operation	Potential for pollution of Cabramatta Creek due to operation (freight materials, contaminants from train operation)	Unlikely	Minor	Low	Refer to section 22.3	Rare	Minor	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
	Modification to existing drainage infrastructure resulting in water quality impacts	Possible	Moderate	Medium	Refer to section 22.3	Rare	Minor	Low
	Impacts on water quality from contamination from spills and leaks during operation/maintenance	Unlikely	Moderate	Medium	Refer to section 22.3	Unlikely	Minor	Low
	Impact to surface water quality and receiving environments due to increased runoff from minor increase in impervious surfaces	Possible	Minor	Medium	Refer to section 22.3	Rare	Not significant	Low
Aboriginal heritage – Construction	Disturbance of known or unidentified items or places of Aboriginal heritage significance	Possible	Major	High	Refer to section 22.3	Unlikely	Moderate	Medium
Non-Aboriginal – Construction	Design that detracts from the heritage significance of nearby items	Possible	Moderate	Medium	Refer to section 22.3	Unlikely	Minor	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
	Impacts on listed heritage items or items with heritage values due to demolition, altered historical arrangements and access, visual amenity, landscape and vistas, curtilage, subsidence and architectural noise treatment	Possible	Moderate	Medium	Refer to section 22.3	Unlikely	Minor	Low
	Damage to heritage items from vibration during construction	Possible	Major	High	Refer to section 22.3	Rare	Moderate	Low
	Disturbance of known or unidentified items or places of non-Aboriginal heritage significance	Unlikely	Major	Medium	Refer to section 22.3	Rare	Moderate	Low
Non-Aboriginal – Operation	Change to the aesthetic significance of nearby heritage items due to the presence of introduced structures blocking or obscuring views	Possible	Moderate	Medium	Refer to section 22.3	Rare	Moderate	Low
	Damage to heritage items from vibration during operation	Possible	Major	High	Refer to section 22.3	Rare	Moderate	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
Visual amenity - Construction	Impacts to nearby residents and users of recreational areas due to the presence of construction compounds and activities	Likely	Minor	Medium	Refer to section 22.3	Unlikely	Minor	Low
	Light impacts from out-of-hours work during construction	Possible	Minor	Medium	Refer to section 22.3	Unlikely	Minor	Low
	Adverse impacts on landscape character during construction	Possible	Moderate	Medium	Refer to section 22.3	Unlikely	Minor	Low
Visual amenity - Operation	Impacts on visual amenity due to the introduction of built elements, including the new noise wall and embankment, and the removal of vegetation along Broomfield Street, Cabramatta Creek and in Jacquie Osmond Reserve	Almost certain	Moderate	High	Refer to section 22.3	Likely	Minor	Medium
	Visual impact of operational lighting	Unlikely	Minor	Low	Refer to section 22.3	Unlikely	Minor	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
Land use property – Construction	Temporary impacts on land use during construction including impacts to neighbouring residential properties and users of Jacquie Osmond Reserve and Warwick Farm Recreational Reserve. Impacts include reduced access and reduced amenity.	Likely	Moderate	High	Refer to section 22.3	Likely	Minor	Medium
	Impacts on services and utilities during construction resulting in a loss of services.	Likely	Moderate	High	Refer to section 22.3	Rare	Moderate	Low
	Impacts on land use as a result of property acquisition	Almost certain	Moderate	High	Refer to section 22.3	Likely	Minor	Medium
Land use and Property - Operation	Severance of properties (Peter Warren Automotive) resulting in smaller lot sizes that may impact on use.	Likely	Minor	Medium	Refer to section 22.3	Likely	Minor	Medium

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
Socio-economic - Construction	Positive impacts due to job creation				Benefit			
	Increased trade for food during construction				Benefit	-	-	-
	Impacts on the use and functionality of community facilities, including Jacquie Osmond Reserve and Warwick Farm Recreation Reserve	Almost Certain	Moderate	High	Refer to section 22.3	Almost certain	Minor	Medium
	Amenity impacts (noise, air, traffic, visual) to nearby residential receivers and users of recreational grounds	Almost Certain	Moderate	High	Refer to section 22.3	Unlikely	Minor	Medium
Socio-economic Operation	Positive economic impacts due to enhanced efficiencies and capacity for transporting goods				Benefit	-	-	-

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
	Impacts to local amenity due to increased frequency of trains and visual and character changes along Broomfield Street and in Jacquie Osmond Reserve	Likely	Moderate	High	Refer to section 22.3	Likely	Minor	Medium
GHG and Climate change – Construction	Increased electricity and fuel use during construction	Almost Certain	Minor	Medium	Refer to section 22.3	Likely	Not significant	Low
	Increased demand on local and regional resources during construction	Almost Certain	Minor	Medium	Refer to section 22.3	Likely	Not significant	Low
	Greenhouse gas emissions from combustion of fuels during plant/vehicle operation	Almost Certain	Minor	Medium	Refer to section 22.3	Likely	Not significant	Low
	Increased energy consumption associated with the operation of site compounds	Almost Certain	Minor	Medium	Refer to section 22.3	Likely	Not significant	Low

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
GHG and Climate change risk – Operation	Increase in efficiency of transportation of freight goods	Benefit						
	Greenhouse gas emissions due to operation of the rail line, predominantly burning of diesel.	Likely	Minor	Medium	Refer to section 22.3	Likely	Not significant	Low
	Impacts to infrastructure due to extreme weather events	Unlikely	Major	Medium	Refer to section 22.3	Unlikely	Minor	Low
Waste - Construction	Inappropriate management of waste generated during construction resulting in excessive waste being directed to landfill	Possible	Moderate	Medium	Refer to section 22.3	Rare	Minor	Low
Waste - Operation	Increased littering from maintenance teams	Rare	Not significant	Low	Refer to section 22.3	Rare	Not significant	Low
Health and safety - Construction	Impacts from transport, storage and use of hazardous substances and dangerous goods	Possible	Minor	Medium	Refer to section 22.3	Unlikely	Minor	Low
	Reduced safety for road users, cyclists and pedestrians during construction particularly in the vicinity of houses and shared path.	Likely	Major	High	Refer to section 22.3	Possible	Minor	Medium

Key issue	Potential impact/risk	Initial risks			Comment/response	Post mitigation risks		
		Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
	Adverse health from noise and air pollution during construction	Possible	Minor	Medium	Refer to section 22.3	Unlikely	Minor	Low
	Potential rupture of utilities during works	Rare	Minor	Low	Refer to section 22.3	Rare	Minor	Low
	Safety impacts due to the presence of construction activities (moving vehicles etc) particularly within recreational areas and near Lawrence Hargrave Special Education School.	Possible	Major	High	Refer to section 22.3	Unlikely	Minor	Low
Health and safety – Operation	Impact from spill or accident during the transport, storage and use of hazardous substances and dangerous goods	Unlikely	Moderate	Medium	Refer to section 22.3	Rare	Moderate	Low
	Increased safety risks due to changes to infrastructure (eg additional length of shared path under bridge)	Possible	Moderate	Medium	Refer to section 22.3	Unlikely	Minor	Low
	Adverse health from noise during operation	Possible	Minor	Medium	Refer to section 22.3	Unlikely	Minor	Low

THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

APPENDIX E

PROJECTS WITH POTENTIAL FOR CUMULATIVE IMPACTS

ENVIRONMENTAL IMPACT
STATEMENT

ARTC

THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

E. PROJECTS WITH POTENTIAL FOR CUMULATIVE IMPACTS

For an environmental impact statement, cumulative impacts can be defined as the successive, incremental, and combined effect of multiple impacts, which may in themselves be minor, but could become significant when considered together.

The assessment of potential cumulative impacts has been undertaken in accordance with the SEARs, and considers the potential for impacts taking into account other projects in close proximity to the project (referred to as the 'Cabramatta Loop project for the purpose of this chapter). The assessment draws on the findings of Chapters 8 to 21, and environmental impact assessments for other projects, where these are available.

The potential for cumulative impacts for each environmental issue is considered in each of the key issue chapters (refer to Chapters 8 to 21) and considers the projects listed in Table E.1 where relevant to the environmental issue.

Methodology

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

- identifying existing (approved or under construction) and proposed projects in the vicinity of the Sydenham to Bankstown upgrade, based on information available in the public domain
- screening identified projects for their potential to interact with the Cabramatta Loop project
- identifying and assessing the significance of potential cumulative impacts by:
- considering project-specific impacts for the key projects with the potential for cumulative impacts when combined with the construction and/or operation of the Cabramatta Loop project (refer to Chapters 8 to 21)
- undertaking an issue-specific cumulative assessment for the key environmental issues listed in the SEARs (refer to Chapters 8 to 21).

The screening of projects took into account the following:

- The project location – projects in close proximity to the Cabramatta Loop project where there is potential for impacts to spatially overlap. This included potential for shared use of roads for construction access, for example.
- The project timeframe and planning approval – only projects likely to be built concurrently with the Cabramatta Loop Project were assessed. This includes projects currently under construction and/or projects that have received planning approval. Projects at a conceptual or pre-approval stage were generally not able to be considered due to an absence of project and/or environmental impact details or development timeframes.
- The project size – projects considered are typically larger scale projects identified on the Department of Planning, Industry and Environment's Major Projects Register and council development application registers.
- Projects considered to have the potential for cumulative impacts with the Cabramatta Loop project are listed in Table E.1, and are shown in Figure E.

Table E.1 Projects with the potential for cumulative impacts

Project	Proponent	Type	Status	LGA	Approx. distance from the proposal site (km)
Existing projects					
Moorebank Intermodal West	Moorebank Intermodal Company (MIC)- Australian government entity	Rail transport facilities	Existing	Liverpool	5.0 km south
Moorebank Intermodal East	Moorebank Intermodal Company (MIC)- Australian government entity	Rail transport facilities	Existing	Liverpool	4.59 km south
Sydney Third CBD	Liverpool City Council	Urban renewal	Existing	Liverpool	0.7 km south
Georges River Marina	Liverpool City Council	Marine development	Existing	Liverpool	3.4 km south east
Development proposal for a multistorey residential centre at the corner of Broomfield Street and Cabramatta Road.	Moon Investments Star Dust Hotels	Urban renewal	Existing- 2021	Fairfield	East- adjacent to Cabramatta Station
New car park proposed in Cabramatta town centre	Fairfield City Council	Urban renewal	Existing- 2020	Fairfield	0.3 km west
Redevelopment of Fairfield showground	Fairfield City Council	Facility redevelopment	Existing- 2020	Fairfield	4.2 km north west
Future projects					
Smithfield Road upgrade	Fairfield City Council	Transport- road upgrade	Proposed mid 2019	Fairfield	5.0 km west
Neighbourhood park for Villawood and Carramar	Fairfield City Council	Public open space renewal	Proposed	Fairfield	3.4 km north east
Fairvale High school	Fairfield City Council	Education	Proposed	Fairfield	2.5 km north west
Badgerys Creek Aerotropolis	University of Wollongong Western Sydney University University of New castle University of NSW	Education	Proposed	Liverpool	2.2 km south west
Villawood Intermodal Terminal	Unknown	Transport and storage infrastructure	Proposed	Canterbury/ Bankstown	4.9 km north east

Project	Proponent	Type	Status	LGA	Approx. distance from the proposal site (km)
Moorebank Voluntary Planning Agreement New bridge Road/Heathcote Road/Moorebank Avenue intersection upgrade	Qube Holdings RMS	Transport infrastructure	Proposed	Liverpool	1.8 km south
Moorebank Voluntary Planning Agreement Governor Macquarie Drive Upgrade	Qube Holdings RMS	Transport infrastructure	Proposed	Liverpool	0.2 km east to 3.0km south east
Moorebank Voluntary Planning Agreement Sections of the M5 Motorway, Hume Highway and Cumberland Highway	Qube Holding RMSs	Transport infrastructure	Proposed	Liverpool/Fairfield	Various locations surrounding project
Moorebank Voluntary Planning Agreement Moorebank Avenue South	Qube Holding RMSs	Transport infrastructure	Proposed	Liverpool	3.3 km south

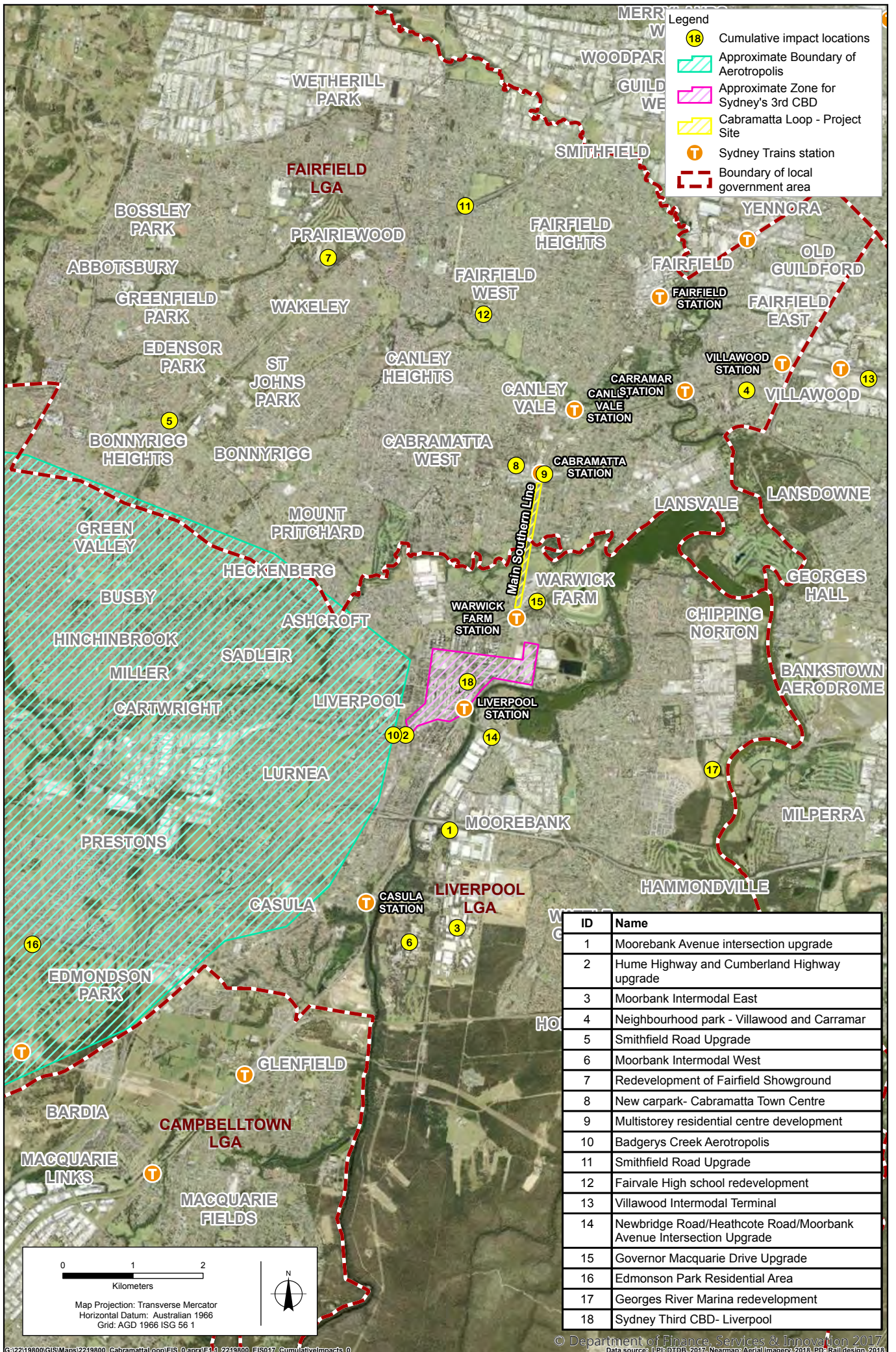


Figure E1.1 Cumulative impacts



CABRAMATTA LOOP PROJECT

ENVIRONMENTAL
IMPACT STATEMENT

VOLUME 1 — MAIN REPORT