

More Trains, More Services

Mortdale Maintenance Centre Upgrade

Review of Environmental Factors



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Abbreviations

Term	Meaning
A	Amps (electrical current)
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AIMD	Active Implanted Medical Devices
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
ASA	Asset Standards Authority (refer to Definitions)
ASS	Acid Sulfate Soils
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
bgs	Below ground surface
Biosecurity Act	<i>Biosecurity Act 2015 (NSW)</i>
CBD	Central Business District
CCTV	Closed Circuit Television
CDEGS	CDEGS (Current Distribution, Electromagnetic Interference, Grounding and Soil Structure Analysis)
CEMP	Construction Environmental Management Plan
CLM Act	<i>Contaminated Land Management Act 1997 (NSW)</i>
CNVMP	Construction Noise and Vibration Management Plan
CPTED	Crime Prevention Through Environmental Design
Dead running	When a train operates without carrying or accepting passengers
DoEE	Commonwealth Department of the Environment and Energy
DPE	(former) NSW Department of Planning and Environment
DPIE	Department Planning Industry and Environment
ECM	Environmental Controls Map
EMF	Electric and magnetic fields
EMS	Environmental Management System
EPA	NSW Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>

Term	Meaning
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000 (NSW)</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)</i>
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development (refer to Definitions)
FM Act	<i>Fisheries Management Act 1994 (NSW)</i>
Heritage Act	<i>Heritage Act 1977 (NSW)</i>
HIFREQ	High Frequency (Module in CDEGS)
HV	High voltage
ICNG	<i>Interim Construction Noise Guideline</i> (Department of Environment and Climate Change, 2000).
ICNIRP	International Commission on Non-Ionizing Radiation Protection
Infrastructure SEPP	<i>State Environmental Planning Policy (Infrastructure) 2007 (NSW)</i>
ISCA	Infrastructure Sustainability Council of Australia
kV	Kilovolts
LEP	Local Environmental Plan
LGA	Local Government Area
LV	Low voltage
mG	milligauss
MNES	Matters of National Environmental Significance
μT	Microteslas
NPfi	Noise Policy for Industry
NPW Act	<i>National Parks and Wildlife Act 1974 (NSW)</i>
NSW	New South Wales
OEH	NSW Office of the Environment and Heritage
OHW	Overhead Wiring
OOHW	Out of hours works
POEO Act	<i>Protection of the Environment Operations Act 1997 (NSW)</i>
ppm	Parts per million

Term	Meaning
RailCorp	(former) Rail Corporation of NSW
RBL	Rating Background Level
REF	Review of Environmental Factors (this document)
RNP	NSW Road Noise Policy
Roads Act	<i>Roads Act 1993</i> (NSW)
Roads and Maritime	(former) NSW Roads and Maritime Services
SEPP	State Environmental Planning Policy
SHR	State Heritage Register
SoHI	Statement of Heritage Impact
TCP	Traffic Control Plan
TfNSW	Transport for NSW
TfNSW (former RMS)	Transport for NSW (former Roads and Maritime Services)
TMP	Traffic Management Plan
TWA	Trade Wastewater Agreement
TPZ	Tree Protection Zones
UDP	Urban Design Plan
V	Volts
WARR Act	<i>Waste Avoidance and Resource Recovery Act 2001</i> (NSW)

Definitions

Term	Meaning
Average Recurrence Interval	The likelihood of occurrence, expressed in terms of the long-term average number of years, between flood events as large as or larger than the design flood event. For example, floods with a discharge as large as or larger than the 100-year ARI flood will occur on average once every 100-years.
Asset Standards Authority	The ASA is an independent body within TfNSW, responsible for engineering governance, assurance of design safety, and ensuring the integrity of transport and infrastructure assets. Design Authority functions formerly performed by RailCorp are now exercised by ASA.
Bogie	The underside portions of a train carriage, generally comprising the structural frame, wheels axles, brakes and suspension.
Bogie exchange workshop	The building where bogie servicing is undertaken. Bogies are removed from the trains, to be taken for maintenance, then refitted with serviced bogies.
Cess	The area either side of the track which is kept at a lower level in order to provide for drainage away from the rail track.
Concept design	The concept design is the preliminary design presented in this REF, which would be refined by the Construction Contractor (should the Proposal proceed) to a design suitable for construction (subject to TfNSW acceptance).
Construction Contractor	The organisation(s) engaged by TfNSW to undertake the design and construction of the Proposal.
Crossover	A short section of track which creates a path for a train to cross from one line to another.
CDEGS	Software for earthing and the EMF study
Design and Construct Contract	A method to deliver a project in which the design and construction services are contracted by a single entity known as the Construction Contractor. The Construction Contractor completes the project by refining the concept design presented in the REF and completing the detailed design so that it is suitable for construction (subject to TfNSW acceptance). The Construction Contractor is therefore responsible for all work on the project, both design and construction.
Detailed design	Detailed design broadly refers to the process that the Construction Contractor undertakes (should the Proposal proceed) to refine the concept design to a design suitable for construction (subject to TfNSW acceptance).
Disability Standards for Accessible Public Transport	The Commonwealth <i>Disability Standards for Accessible Public Transport 2002</i> ("Transport Standards") (as amended) are a set of legally enforceable standards, authorised under the Commonwealth <i>Disability Discrimination Act 1992</i> (DDA) for the purpose of removing discrimination 'as far as possible' against people with disabilities. The Transport Standards cover premises, infrastructure and conveyances, and apply to public transport operators and premises providers.

Term	Meaning
Down (direction)	The railway direction being away from a major destination i.e. away from Sydney for trains in NSW. Down is also referred to as 'country'.
Ecologically Sustainable Development	As defined by clause 7(4) Schedule 2 of the EP&A Regulation. Development that uses, conserves and enhances the resources of the community so that ecological processes on which life depends are maintained, and the total quality of life, now and in the future, can be increased.
Feasible	In terms of addressing noise impacts, a work practice or abatement is feasible if a work practice or abatement measure is feasible if it is capable of being put into practice or of being engineered and is practical to build given project constraints such as safety and maintenance requirements.
Interchange	Transport interchange refers to the area/s where passengers transit between vehicles or between transport modes. It includes the pedestrian pathways and cycle facilities in and around an interchange.
Noise sensitive receiver	In addition to residential dwellings, noise sensitive receivers include, but are not limited to, hotels, entertainment venues, pre-schools and day care facilities, educational institutions (e.g. schools, TAFE colleges), health care facilities (e.g. nursing homes, hospitals), recording studios and places of worship/religious facilities (e.g. churches).
NSW Trains	From 1 July 2013, NSW Trains became the new rail provider of services for regional rail customers.
Opal card	The integrated ticketing smartcard being introduced by TfNSW.
Out of hours works	Defined as works <i>outside</i> standard construction hours (i.e. outside of 7am to 6pm Monday to Friday, 8am to 1pm Saturday and no work on Sundays/public holidays).
Proponent	A person or body proposing to carry out an activity under Division 5.1 of the EP&A Act - in this instance, TfNSW.
(the) Proposal	The construction and operation of the Mortdale Maintenance Centre Upgrade.
Rail possession	Possession is the term used by railway building/maintenance personnel to indicate that they have taken possession of the track (usually a section of track) for a specified period, so that no trains operate for a specified time. This is necessary to ensure the safety of workers and rail users.
Reasonable	In terms of address noise impacts, selecting reasonable measures from those that are feasible involves making a judgment to determine whether the overall benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the measure.
Sensitive receivers	Land uses which are sensitive to potential noise, air and visual impacts, such as residential dwellings, schools and hospitals.
South Coast Line	The intercity element of the Sydney Trains and NSW TrainLink service connecting Sydney to the Illawarra Region.

Term	Meaning
Sydney Trains	From 1 July 2013, Sydney Trains replaced CityRail as the provider of metropolitan train services for Sydney.
T4 Eastern Suburbs and Illawarra Line	An existing commuter rail line on the Sydney Trains Network connecting Bondi Junction to Cronulla and Waterfall.
T8 Airport and South Line	An existing commuter rail line on the Sydney Trains Network connecting the Sydney CBD with the southwestern suburbs.
Tactiles	Tactile tiles or Tactile Ground Surface Indicators (TGSIs) are textured ground surface indicators to assist pedestrians who are blind or visually impaired. They are found on many footpaths, stairs and train station platforms.
Transport for NSW (formerly Roads and Maritime Services)	Roads and Maritime Services was amalgamated into Transport for NSW on 1 July 2019.
Up (Direction)	The railway direction being towards a major destination i.e. towards Sydney for trains in NSW. Up is also referred to as 'city'.
Vegetation Offset Guide	<p>The TfNSW guide that applies where there is vegetation clearing proposed, and where the impact of the proposed clearing is not deemed 'significant' for the purposes of section 5.7 of the EP&A Act.</p> <p>The Guide provides for planting of a minimum of eight trees for each large tree with a diameter at breast height (DBH) of more than 60 cm, four trees where the DBH is 15-60 cm, or two trees where DBH is less than 15 cm.</p>

Executive summary

Overview

Transport for NSW (TfNSW) proposes to deliver service improvements on Sydney's busiest rail lines including the T4 Eastern Suburbs and Illawarra Line, South Coast Line and T8 Airport and South Line. These improvements are part of the More Trains, More Services program (the Program) that over the next ten years will transform the rail network and provide customers with more reliable, high capacity turn up and go services.

As part of the Program, TfNSW proposes to undertake an upgrade of the Mortdale Maintenance Centre (the Proposal).

TfNSW is the government agency responsible for the delivery of major transport infrastructure projects in NSW and is the proponent for the Proposal.

The main features of the Proposal are:

- demolition of two existing sheds adjacent to the western side of the existing facility
- construction of a bogie exchange workshop within the western side of the existing facility
- construction of two bogie transfer chambers between roads 1 and 2 (existing rail tracks within the Mortdale Maintenance Centre) and the new bogie exchange workshop adjacent to the western boundary
- installation of a bogie exchange system, which includes components such as a hydraulic jack and mechanically operated bogie drop table
- extension of the existing driveway on Hurstville Road and construction of a new driveway exit as part of the bogie delivery/collection area within the western side of the facility
- decommissioning of an existing electrical substation at the eastern boundary
- installation of three electrical padmount substations in the staff parking area adjacent to the eastern boundary
- reinstatement of staff parking spaces at the location of the decommissioned substation
- civil works to support the above works, including track modification at the loop siding, drainage and new retaining walls
- associated electrical works including combined services route and lighting
- provision for additional maintenance activities, including 24 hours a day, seven days a week operation of the bogie exchange workshop.

This Review of Environmental Factors (REF) has been prepared to assess the environmental impacts associated with the construction and operation of the Proposal under the provisions of Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Subject to planning approval, construction is expected to commence in June 2020 and take around nine months to complete.

Need for the Proposal

Sydney's population is growing, and the rail network is one of the busiest in the southern hemisphere, with a record 400 million trips each year. There has been unprecedented customer demand, with rail patronage increasing by 30 per cent over the last five years. Even

after the full commencement of Sydney Metro in 2026, the heavy rail network will continue to carry 80 percent of all rail passengers, and around 60 percent of all peak hour transport travel.

Along with building a new metro train system, the Program will simplify the rail network and create high capacity, turn up and go services for customers. While More Trains, More Services will eventually deliver benefits to the entire network, TfNSW propose to start by targeting improvements on Sydney's busiest lines. The first lines to benefit from the Program will be the T4 Eastern Suburbs and Illawarra Line, the South Coast Line and the T8 Airport and South Line. These are some of the busiest lines on the Sydney Trains network, catering for 410,000 return trips in a typical day, representing around one third of all daily Sydney Trains customers.

The upgrade of the Mortdale Maintenance Centre, the subject of this REF, forms part of the More Trains, More Services Program. This upgrade will increase the capacity for maintenance of Tangara suburban trains, allowing the majority of servicing of the entire fleet to be conducted at this location. This will relieve Hornsby Maintenance Centre of maintenance duties for Tangara trains, allowing it to focus on other train types within the Sydney Trains fleet. An upgrade of Mortdale Maintenance Centre would reduce dead running time by locating maintenance of the Tangara fleet near to where the trains operate.

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

Community and stakeholder consultation

Community consultation activities for the Proposal would be undertaken during the public display period of this REF and the public invited to submit feedback to help TfNSW understand what is important to customers and the community. The REF would be displayed for a period of two weeks. Further information about these specific consultation activities is included in **Section 4.5** of this REF.

During the display period a Project Infoline (1800 684 490) and email address (projects@transport.nsw.gov.au) would also be available for members of the public to make enquiries.

View the plans:

The REF can be viewed at:

- transport.nsw.gov.au/projects/mtms
- nsw.gov.au/improving-nsw/haveyoursay
- **Oatley Public Library**, 26 Letitia Street, Oatley
- **Georges River Council**, 24 Macmahon Street, Hurstville
- **Transport for NSW**, 241 O’Riordan Street, The Gateway, Mascot

Feedback can be sent to:

- projects@transport.nsw.gov.au
- More Trains, More Services Program – Mortdale Maintenance Centre Upgrade
Associate Director, Environmental Impact Assessment
Transport for NSW
Locked Bag 6501
St Leonards NSW 2065

In accordance with the requirements of *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP), consultation is required with local councils and/or public authorities under certain circumstances. This includes where infrastructure managed by a council or other public authority is affected by the Proposal. Initial consultation has been undertaken during the development of design options with Georges River Council and Sydney Trains. Consultation with these stakeholders would continue throughout the detailed design and construction of the Proposal.

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

Should the Proposal proceed to construction, the community would be kept informed throughout the duration of the construction period. **Figure E1.1** shows the planning approval and consultation process for the Proposal.



Figure E1.1 Planning approval and consultation process for the Proposal

Environmental impact assessment

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

The Proposal would provide the following benefits:

- increase the capacity for maintenance of the Tangara fleet. It would enable the majority of servicing required for the Tangara fleet to be undertaken at Mortdale Maintenance Centre. This would avoid the dead running time and reduced fleet and crew availability that would occur if Tangara trains continued to be serviced between this location and the Hornsby Maintenance Centre, which is the current scenario.

The likely key impacts of the Proposal are as follows:

- noise and vibration from construction related activities, as well as operational noise associated with the additional maintenance activities conducted 24 hours a day, seven days a week at the new bogie exchange workshop
- removal of four trees and underlying mid-storey vegetation on the western side of the Mortdale Maintenance Centre
- potential for contamination to be exposed during the excavation within the Mortdale Maintenance Centre given its extensive history as an industrial site utilised for train maintenance
- removal of five on street parking spaces.

Further information regarding these impacts is provided in **Chapter 6** of the REF.

Conclusion

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

The impact assessment undertaken within this REF indicates that the Proposal would not result in a significant impact upon the environment, including areas of outstanding biodiversity value, threatened species, populations, ecological communities or their habitats.

Impacts associated with the key issues outlined above would be temporary during construction or of a low magnitude during operation. As such none of these impacts would be significant.

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

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1 Introduction

Transport for NSW (TfNSW) was established in 2011 as the lead agency for integrated delivery of public transport services across all modes of transport in NSW. TfNSW is the proponent for the Mortdale Maintenance Centre Upgrade (the Proposal).

1.1 Overview of the Proposal

1.1.1 The More Trains, More Services Program

Over the next ten years the More Trains, More Services program will simplify and modernise the rail network, creating high capacity and turn up and go services for many customers. Customers will experience more frequent train services, with less wait times and less crowding on a simpler, more reliable network.

While More Trains, More Services will eventually deliver benefits to the entire network, it will start by targeting improvements on Sydney's busiest lines. The first lines to benefit from the program will be the T4 Eastern Suburbs and Illawarra Line, the South Coast Line and the T8 Airport and South Line.

The More Trains, More Services Program is about building a modern and up to date rail system that will play its part in making Sydney a more productive and liveable city. The NSW Government's *Future Transport Strategy 2056* (TfNSW, 2018a) identifies More Trains, More Services as a priority initiative and is a commitment to the state's transport and infrastructure needs.

More Trains, More Services is key to enabling Greater Sydney Commission's vision for the Greater Sydney Region Plan, *A Metropolis of Three Cities*, where most residents live within 30 minutes of their jobs, education and health facilities, services and great places.

More Trains, More Services is a program of staged investments that will progressively transform the rail network into a modern and reliable system using world class technology.

The program is already delivering better customer outcomes through timetable enhancements and the integration of the Sydney Metro Northwest with the existing heavy rail network. The current stage of More Trains, More Services will focus on delivering greater capacity, reliability and connectivity for customers on the T4 Eastern Suburbs and Illawarra Line, South Coast Line and T8 Airport and South Line.

These services will be enabled by upgrading and modernising signalling and control systems and using digital technology that, when combined with other infrastructure upgrades, will deliver major increases in the capacity and reliability of the network.

1.1.2 Need for the proposal

Sydney's population is growing and the rail network is one of the busiest in the southern hemisphere, with a record 400 million trips each year. There has been unprecedented customer demand, with rail patronage increasing by 30 per cent over the last five years. Even after the full commencement of Sydney Metro in 2026, the heavy rail network will continue to carry 80 percent of all rail passengers, and around 60 percent of all peak hour transport travel.

Along with building a new metro train system, the More Trains, More Services program will simplify the rail network and create high capacity, turn up and go services for customers.

While More Trains, More Services will eventually deliver benefits to the entire network, TfNSW propose to start by targeting improvements on Sydney's busiest lines. The first lines to benefit from the Program will be the T4 Eastern Suburbs and Illawarra Line, the South Coast Line and the T8 Airport and South Line. These are some of the busiest lines on the Sydney Trains

network, catering for 410,000 return trips in a typical day, representing around one third of all daily Sydney Trains customers.

Future stages of More Trains, More Services will deliver a 30 per cent increase in peak services on the T4 Illawarra Line, and an 80 per cent increase at stations between Green Square and Wollie Creek, meaning trains at least every four minutes on average instead of every six minutes.

Under the More Trains, More Services Program, an additional 29 Tangara trains will be introduced to the T4 Eastern Suburbs and Illawarra Line and potentially the South Coast Line, subject to further development of the operational requirements of the network. A goal of the Program is to consolidate the majority of maintenance of the entire Tangara fleet (55½ 8-car sets) at Mortdale Maintenance Centre. This change aims to avoid the dead running time and reduced fleet and crew availability that would occur if Tangara trains were maintained elsewhere. To achieve this goal, TfNSW propose to upgrade Mortdale Maintenance Centre so that it is capable of undertaking all types of maintenance of the Tangara fleet.

1.1.3 Key features of the Proposal

The key features of the Proposal at the Mortdale Maintenance Centre are summarised as follows:

- demolition of the existing sheds in the proposed workshop footprint, adjacent to the western boundary of the site
- construction of a bogie exchange workshop within the western side of the existing facility
- construction of two bogie transfer chambers between roads 1 and 2 (existing rail tracks within the Mortdale Maintenance Centre) and the new bogie exchange workshop adjacent to the western boundary
- installation of a bogie exchange system, which includes components such as a hydraulic jack and mechanically operated bogie drop table
- extension of the existing driveway on Hurstville Road and construction of a new driveway exit as part of the bogie delivery/collection area within the western side of the facility
- decommissioning of an existing electrical substation at the eastern boundary
- installation of three electrical padmount substations in the staff parking area adjacent to the eastern boundary
- reinstatement of staff parking spaces at the location of the decommissioned substation
- civil works to support the above works, including track modification at the loop siding, drainage and new retaining walls
- associated electrical works including combined services route and lighting
- provision for additional maintenance activities, including 24 hours a day, seven days a week operation of the bogie exchange workshop.

Subject to planning approval, construction is expected to commence in June 2020 and take around nine months to complete.

A detailed description of the Proposal is provided in **Chapter 3** of this Review of Environmental Factors (REF).

1.2 Location of the Proposal

The Proposal area is located within the existing Mortdale Maintenance Centre, 195-235 Hurstville Road (Lot 100/ DP 1141151). Mortdale Maintenance Centre is located about 600 metres to the south of the Mortdale Railway Station in Mortdale, NSW and about 20 kilometres south west of the Sydney CBD. Oatley Railway Station is located about 500 metres south of the Proposal area.

Mortdale Maintenance Centre is under the ownership of RailCorp. The Mortdale Maintenance Centre is situated on a 3.2-hectare area of land to the east of the T4 Eastern Suburbs and Illawarra Line and South Coast Line. The area is bounded by Hurstville Road/Boundary Road to the west and south, Georges River College and the Ausgrid Oatley Depot to the east, and the rail line to the north. The Proposal area contains several rail sidings, and a complex of storage/workshop sheds.

The location of the Proposal area in context of the region is shown in **Figure 1.1**.

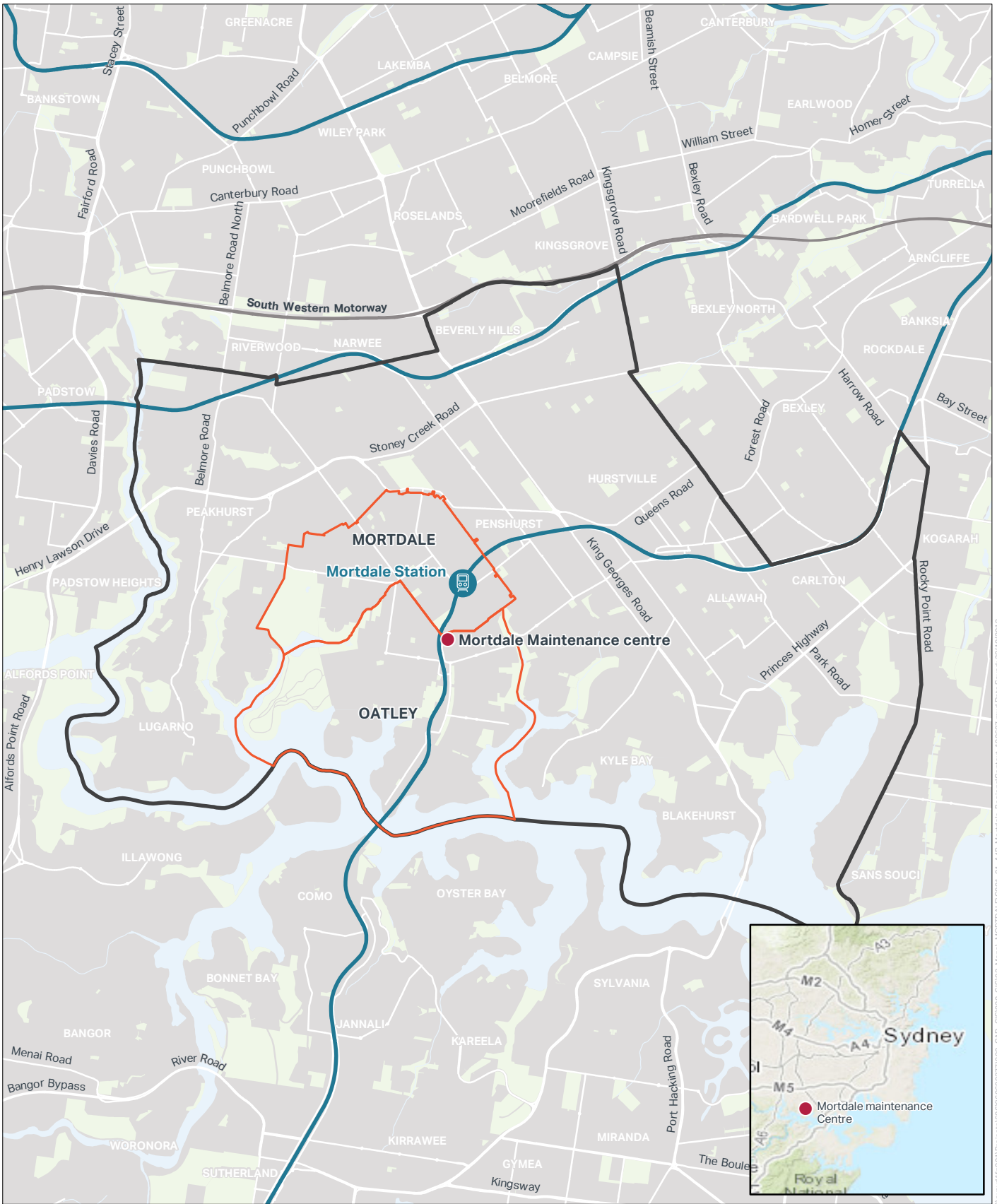


FIGURE 1.1 REGIONAL CONTEXT



Legend

- Suburb boundary
- Georges River LGA
- Park/Reserve
- Railway station
- Railway
- Motorway

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1.3 Existing infrastructure and land uses

The Proposal area is within the Georges River Local Government Area (formerly Kogarah and Hurstville Local Government Areas), at the border of the former Kogarah and Hurstville Councils. Mortdale is a predominately residential suburb with some educational, recreational and commercial land use. Under the *Kogarah Local Environmental Plan 2012* (Kogarah LEP) the Proposal area is on land zoned as SP2 Rail Infrastructure Facilities. The surrounding land uses include educational establishments, an electricity maintenance depot, public recreation spaces, commercial businesses and low and medium density residential areas. Land zoning in the vicinity of the Proposal area is shown on **Figure 1.2**.

The Proposal area is currently a rail maintenance centre for Sydney Trains. The centre includes the following components:

- train wash shed
- maintenance shed
- substation
- permanent and demountable buildings for site offices
- staff car parking.

The Proposal area contains several short rail sidings, and a complex of storage and workshop sheds. There is a wastewater treatment plant onsite which treats wastewater collected from the train washing area.

The closest arterial road is King Georges Road (about three kilometres to the east) which links to the M5 East Motorway.

Sensitive receivers in the vicinity of the Proposal include:

- residential dwellings about 100 metres south and west
- Mortdale Community Centre about 200 metres north west
- Carinya School (School for Specific Purpose) about 400 metres north east
- Mortdale Public School about 500 metres north east
- Georges River College immediately east
- Oatley Senior Citizen's Club on the southern portion of the Mortdale Maintenance Centre
- Mortdale-Oatley Baptist Church about 200 metres north west.

Figure 1.2 shows the location of the Proposal area and the corresponding land use zoning. Photographs of the existing maintenance centre are provided in **Figure 1.3** and **Figure 1.4**.

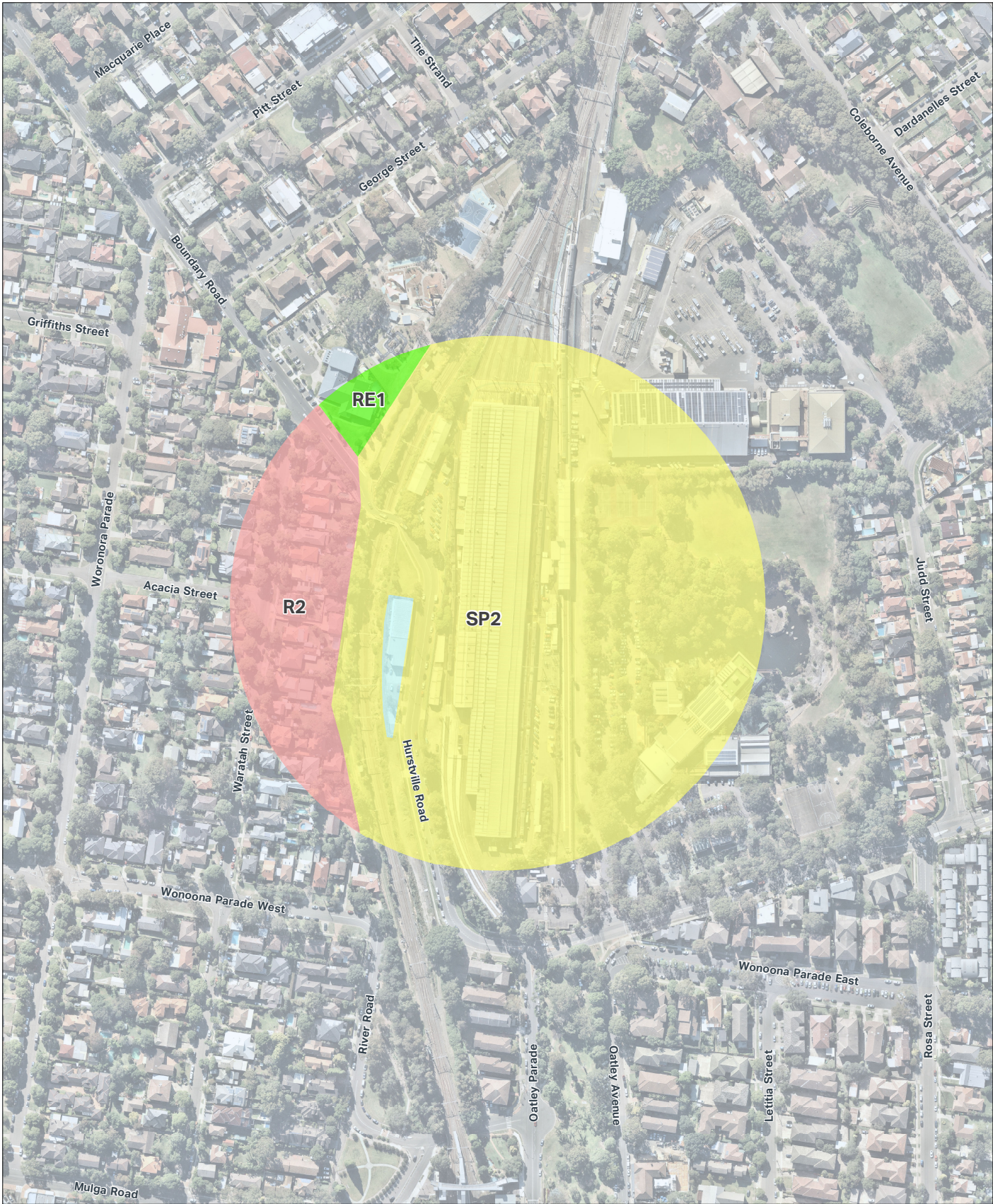


FIGURE 1.2 SITE LOCATION (AND LAND ZONING)



Legend

Land Zoning

- B1 Neighbourhood Centre
- R2 Low Density Residential
- RE1 Public Recreation
- SP2 Infrastructure

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Figure 1.3 Photograph adjacent to the western boundary, facing north, showing the existing maintenance sheds. The shed on the left is to be demolished and replaced with a new bogie exchange shed, similar in style to the shed on the right.



Figure 1.4 View of the Mortdale Maintenance Centre from Hurstville Road looking east. This photograph shows the existing entry/exit gate which would become entry only. A new exit gate would be constructed to the right of the frame.

1.4 Purpose of this Review of Environmental Factors

The purpose of this REF is to describe the Proposal, to assess the likely impacts of the Proposal having regard to the provisions of section 5.5 of the EP&A Act, and to identify mitigation measures to avoid, reduce, mitigate or offset the likely adverse impacts. This REF has been prepared in accordance with clause 228 of the *Environment Planning and Assessment Regulation 2000* (the EP&A Regulation). For the purposes of this Proposal, TfNSW is the proponent and the determining authority under Division 5.1 of the EP&A Act.

This assessment has also considered the relevant provisions of other relevant environmental legislation, including the *Biodiversity Conservation Act 2016* (BC Act), *Fisheries Management Act 1994* (FM Act) and the *Roads Act 1993* (Roads Act).

Having regard to the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), this REF considers the potential for the Proposal to have a significant impact on Matters of National Environmental Significance (MNES) or Commonwealth land. It also considers the need to make a referral to the Commonwealth Minister for the Environment should the action have the potential to result in a significant impact on MNES. Refer to **Chapter 4** for more information on statutory considerations.

2 Need for the Proposal

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

2.1 Strategic justification

2.1.1 Overview

The NSW Government's *Future Transport Strategy 2056* (NSW Government, 2018) identifies More Trains, More Services as a 'priority initiative for investigation' that will provide modern and reliable 'turn up and go' services to customers.

Over the next 40 years, it is expected that the train network in Sydney will need to cater for 28 million trips a day and double the current metropolitan freight capacity. By 2026, it is expected that the heavy rail network will carry around 80 percent of peak hour rail travel and 60 percent of all peak hour transport travel.

More Trains, More Services is key to enabling Greater Sydney Commission's vision for the Greater Sydney Region Plan, *A Metropolis of Three Cities* (Greater Sydney Commission, 2018), where most residents live within 30 minutes of their jobs, education and health facilities, services and great places.

More Trains, More Services is a program of staged investments that will progressively transform the rail network into a modern and reliable mass transit system using world class technology. The program is already delivering better customer outcomes through timetable enhancements and the integration of the Sydney Metro Northwest with the existing heavy rail network. The current stage of More Trains, More Services will focus on delivering greater capacity, reliability and connectivity for customers on the T4 Eastern Suburbs and Illawarra Line, South Coast Line and T8 Airport and South Line.

These services will be enabled by upgrading and modernising signalling and control systems and using digital technology that, when combined with other infrastructure upgrades, will deliver major increases in the capacity and reliability of the network.

2.1.2 Objectives of the More Trains, More Services Program

The objectives of the More Trains, More Services Program are to:

- maintain connectivity and support efficient functioning of urban and regional centres
- meet future mass transit demand on the T4 and T8 Lines
- improve travel experience for each customer passenger group
- reduce complexity on the heavy rail network
- meet freight customer needs.

2.1.3 Customer outcomes of the More Trains, More Services Program

Customer outcomes of the More Trains, More Services Program are to:

- provide additional train and station capacity for T4 and T8 customers in line with forecast peak demand

- provide dedicated intercity services on the South Coast Line that improve the customer in-vehicle experience and provides a service consistent with other intercity lines
- improve off-peak services on the T4 and South Coast lines to align with customer requirements
- provide regular freight opportunities on the Illawarra corridor which maintains (and where possible enhances) the network capacity for freight services
- reduce network complexity on the T4 and T8 lines through simplified service routes, stopping patterns and asset utilisation
- minimise the impact on other lines that may be affected by service changes on the T4, T8 and South Coast Lines.

2.1.4 Objectives of the proposed Mortdale Maintenance Centre Upgrade

The specific objectives of the upgrade of the Mortdale Maintenance Centre are to:

- maintain a single fleet type on the T4 Eastern Suburbs and Illawarra Line
- reduce dead running of fleet on the T4 Eastern Suburbs and Illawarra Line by removing the need for all Tangara trains to travel to the Hornsby Maintenance Centre or Flemington Maintenance Centre for bogie exchanges
- ensure the Mortdale Maintenance Centre is capable of performing bogie exchange maintenance activities for the Tangara fleet
- increase the efficiency of Sydney Trains maintenance capabilities
- optimise the performance of the T4 Eastern Suburbs and Illawarra Line
- minimise cost and maximise benefits of project requirements
- minimise impacts to current rail operations during implementation
- ensure that safety is maintained throughout the delivery of the Proposal
- ensure that project works are delivered to TfNSW high standards of safety, quality, stakeholder engagement and environmental management.

2.2 Design development

The concept design for the proposal has been developed with consideration of requirements for lighting, dust and weather protection, access for staff servicing the trains, construction and emergency vehicle access and egress, rail clearances, the location of utilities and stormwater and drainage infrastructure.

2.3 Alternative options considered

2.3.1 The ‘do-nothing’ option

Under a ‘do-nothing’ option, the capacity of the Mortdale Maintenance Centre would remain the same and there would be no changes to the way the Mortdale Maintenance Centre currently operates. All of the Tangara fleet would still need to be transferred to Hornsby Maintenance Centre or Flemington Maintenance Centre for bogie exchanges.

2.3.2 Option 1 – Construction of a new bogie exchange workshop and upgrade of the existing Mortdale Maintenance Centre

Option 1 consists of the construction of a new bogie exchange workshop and upgrade of the existing Mortdale Maintenance Centre, associated civil works, driveway access alterations and electrical and other infrastructure upgrades as detailed in **Section 3.1**.

2.4 Justification for the preferred option

The 'do-nothing' option was rejected as this option would not address the need to increase the capacity for maintenance of Tangara suburban trains and would not meet the objectives outlined in **Section 2.1.4**.

Option 1 was selected as the preferred option. This option would successfully meet the required objectives increasing the capacity for maintenance of Tangara suburban trains, allowing the majority of servicing of the entire fleet to be conducted at this location.

3 Description of the Proposal

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

3.1 The Proposal

As described in **Section 1.1**, the Proposal involves upgrading the existing maintenance facilities of the Mortdale Maintenance Centre by providing a bogie exchange system and workshop and a power supply upgrade (three new padmount substations) as part of the More Trains, More Services Program. These upgrades would improve the capacity and efficiency of the Sydney Trains network by enabling the majority of servicing required by the Tangara fleet to be undertaken at this location, rather than the current scenario where maintenance is shared between this location and the Hornsby Maintenance Centre.

The Proposal would include the following key elements:

- demolition of the existing sheds in the proposed workshop footprint, adjacent to the western boundary of the site
- construction of a bogie exchange workshop within the western side of the existing facility
- construction of two bogie transfer chambers between roads 1 and 2 (existing rail tracks within the Mortdale Maintenance Centre) and the new bogie exchange workshop adjacent to the western boundary
- installation of a bogie exchange system, which includes components such as a hydraulic jack and mechanically operated bogie drop table
- extension of the existing driveway on Hurstville Road and construction of a new driveway exit as part of the bogie delivery/collection area within the western side of the facility
- decommissioning of an existing electrical substation at the eastern boundary
- installation of three electrical padmount substations in the staff parking area adjacent to the eastern boundary
- reinstatement of staff parking spaces at the location of the decommissioned substation
- civil works to support the above works, including track modification at the loop siding, drainage and new retaining walls
- associated electrical works including combined services route and lighting
- provision for additional maintenance activities, including 24 hours a day, seven days a week operation of the bogie exchange workshop.

Figure 3.1 shows the general layout of key elements of the Proposal.

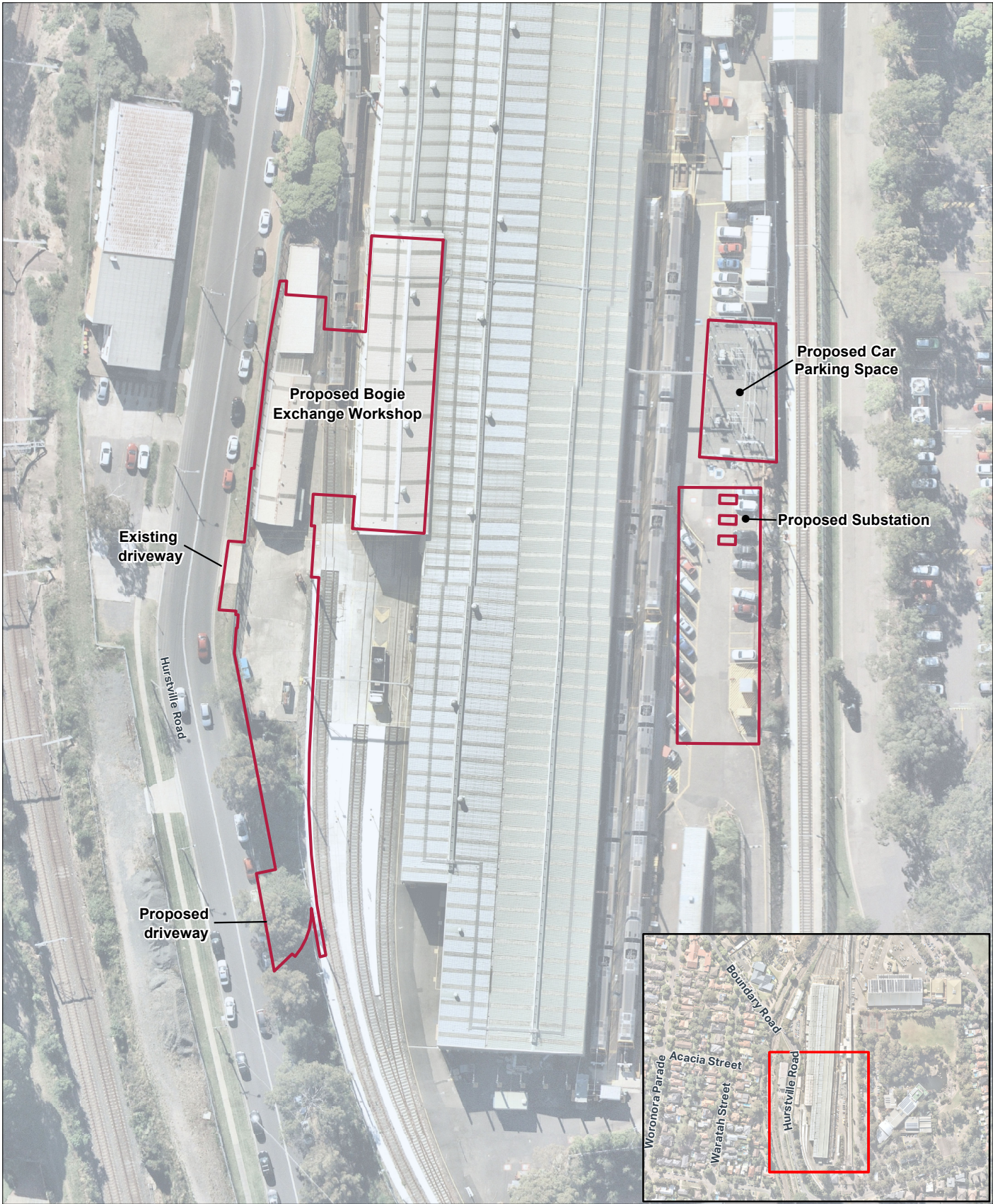


FIGURE 3.1 PROPOSED WORKS



Legend
 Proposed works

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3.1.1 Scope of works

The scope of works associated with the construction of the new bogie exchange system includes:

- establish temporary site compounds for storage of materials and equipment
- removal of four trees and underlying mid-storey vegetation on the western side
- demolition of the existing sheds in the proposed workshop footprint, adjacent to the western boundary
- excavation and backfilling to about five metres below ground level for construction of the underground transfer chamber
- construction and fit out of new bogie exchange workshop including crane, gantries and safety equipment within the existing maintenance sheds
- services relocation and/or adjustments, including lighting and communications systems (e.g. closed circuit television (CCTV))
- construction of new stormwater drainage and retaining walls
- adjustments to boundary fencing, extension of the existing driveway and construction of a new exit driveway
- civil works to adjust the road layout of the bogie delivery/collection area.

The scope of works associated with the relocation of the electrical substation includes:

- installation of three new electrical padmount substations in the staff parking area adjacent to the eastern boundary of the site. The new padmount substations would be a similar size to the padmount substations shown in **Figure 3.2**.
- demolition of the existing electrical substation located adjacent to the eastern boundary of the site
- rehabilitation of the redundant substation site to provide staff parking.



Figure 3.2 Example of padmount substations. The new padmount substations would be similar in size to this example.

Materials and finishes

Materials and finishes for the Proposal have been selected primarily based on their suitability for meeting design requirements. Other important factors considered were availability, constructability, durability, low maintenance and cost effectiveness. This selection has sought to accord with heritage requirements, minimise visual impacts, and to be aesthetically pleasing.

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

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

- building facade – concrete footings with structural steel construction frames and steel cladding
- retaining walls – concrete piles and capping.

The Proposal's design will be submitted to TfNSW's Urban Design and Sustainability Review Panel at various stages for comment before being accepted by TfNSW. An Urban Design Plan (UDP) and/or Public Domain Plan (PDP) would also be prepared by the Construction Contractor, prior to finalisation of detailed design for endorsement by TfNSW.

3.1.2 Engineering constraints

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

Existing structures: the placement and integrity of existing structures was considered during the development of the design – these structures included the existing maintenance shed and access points. The existing substation must remain operational until the new padmount substations are commissioned, which therefore meant that the new padmount substations cannot be built on the site of the existing substation.

Sydney Trains' requirements: modifications to existing structures and new structures within the rail corridor must be designed and constructed with consideration of train impact loads, structural clearances to the track, and safe working provisions.

Utilities: A Dial Before You Dig search has identified a number of utilities in the vicinity of the proposed works.

Other considerations: A number of other constraints have also been considered, including:

- topography – the natural ground level at the Mortdale Maintenance Centre grades gently from north to south. There is a retaining wall on the south western side of the Centre
- the Centre must remain operational whilst the works are being carried out
- the new assets including the bogie exchange systems, new buildings, substations, and civil infrastructure have been designed to minimise the impact on existing infrastructure during construction and in the final arrangement
- the access and egress was designed to accommodate a 20 metre articulated vehicle as per AS 2890.2:2018 *Parking facilities, Part 2: Off-street commercial vehicle facilities*, allowing for sufficient turning paths and vertical clearance

- trucks will be approaching and leaving the site from the south as this is the most appropriate route from King Georges Road. A separate entrance will make the movement of trucks through the site more efficient
- utilities and drainage will be relocated or rerouted to enable the construction of the two underground bogie transfer chambers.

3.1.3 Design standards

The Proposal would be designed having regard to the following:

- Building Code of Australia
- relevant Australian Standards
- Asset Standards Authority standards
- Sydney Trains standards
- Infrastructure Sustainability Council of Australia (ISCA) Version 1.2
- *Guidelines for the Development of Public Transport Interchange Facilities* (Ministry of Transport, 2008)
- Crime Prevention Through Environmental Design (CPTED) principles
- other TfNSW policies and guidelines.

3.1.4 Sustainability in design

The development of the concept design for the Proposal has been undertaken in accordance with the project targets identified in the *Sustainability Report for More Trains, More Services Stage 2 Program* (Aurecon, 2018) and further developed in the *More Trains, More Services Civil Concept with Site Investigations Packages 1 & 2 Sustainability Strategy* (Aurecon, 2019).

TfNSW has an ongoing commitment to sustainability through supporting project solutions that deliver environmental and social benefits whilst reducing lifecycle costs. To reinforce these sustainability goals, TfNSW have developed a set of Sustainable Design Guidelines which aim to minimise the impacts to the environment and procure, deliver and promote sustainable transport and develop, expand and manage a transport network that is sustainable and climate resilient.

As the latest version of the Sustainable Design Guidelines (SDG Version 4) has been designed to align more intuitively with the ISCA rating system, TfNSW has taken the view that for projects with a capital cost of over \$50 million TfNSW will aim to achieve an 'Excellent' rating through the ISCA rating scheme.

To achieve an Infrastructure Sustainability rating More Trains, More Services will be assessed on the following ISCA sustainability themes:

- management and governance
- using resources
- emissions
- pollution and waste
- ecology
- people and place
- innovation.

Within each theme there are multiple categories in which credits may be achieved based on how successfully the infrastructure supports or achieves sustainable guidelines. Credits then contribute to an overall score or rating out of 100, which places the infrastructure either into Commended (25 to <50), Excellent (50 to <75) or Leading (75 to 100) rating levels.

As provided in the Sustainability Strategy, TfNSW have nominated a preferred pathway to achieve an IS Rating for the More Trains, More Services Program. TfNSW has proposed that the rating be achieved as an ISCA Program rating with the ISCA Rating to be obtained within the 'Excellent' rating band.

3.2 Construction activities

3.2.1 Work methodology

Subject to approval, construction is expected to commence in June 2020 and take around nine months to complete. The construction methodology would be further developed during the detailed design of the Proposal by the nominated construction contractor and in consultation with TfNSW.

The proposed construction activities for the Proposal are identified in **Table 3.1**. This staging is indicative and is based on the current concept design (Rail Planning Services, Mortdale Maintenance Centre - Bogie Exchange System Construction Staging and Constructability Report, July 2018) and may change once the detailed design methodology is finalised. The staging is also dependent on the Contractor's preferred methodology, program and sequencing of work.

Table 3.1 Indicative construction staging for key activities

Stage	Activities
Site establishment and enabling works	<ul style="list-style-type: none"> establishment of site compounds/laydown areas (i.e. erect fencing, tree protection zones (TPZs), site offices, amenities and plant/material storage areas) establishment of temporary facilities as required (e.g. hoarding, temporary toilets etc.).
Utility relocation	<ul style="list-style-type: none"> drop electricity wires and undertake overhead wiring (OHW) adjustments relocation of electrical and communications services relocate existing drainage and drop pits install local routes and run cables for access gate install CCTV.
Infrastructure adjustments	<ul style="list-style-type: none"> relocate boom gate remove gate remove redundant footings relocate access road clip and lock existing track closest to Hurstville Road.

Stage	Activities
New bogie tracks, road and shed	<ul style="list-style-type: none"> • demolish existing sheds – including part of the maintenance shed • construct retaining wall adjacent to new bogie shed • install footings and construct new bogie shed structure along western boundary (20 metres x 50 metres) • construct bogie racks • excavate pits for bogie drop table and bogie turntable • install new track for bogie road • replace OHW • install gantry crane – if required • install new track between bogie road and No. 1 storage.
Driveway adjustments	<ul style="list-style-type: none"> • redirect and/or provide temporary traffic management through the existing entry gate • demolish and extend parts of the existing driveway • construct new retaining wall along extended driveway • construct new exit gate, crossover and kerb layback • construct new driveway surface and provide line marking.
Partial demobilisation	<ul style="list-style-type: none"> • reopen Mortdale car sidings shed door • unclip and unlock existing track closest to Hurstville Road.
Testing and commissioning	<ul style="list-style-type: none"> • test electrical, communications and signalling components • test and commission new bogie road and turntables.
Substation site establishment and enabling works	<ul style="list-style-type: none"> • remove staff car parking spaces to allow for future padmount substations.
Substation infrastructure adjustments	<ul style="list-style-type: none"> • install padmount substations and run cables through Mortdale Maintenance Centre • commission new padmount substations.
Redundant substation demolition	<ul style="list-style-type: none"> • demolish redundant existing substation • resurface and create new staff car parking spaces.
Final demobilisation	<ul style="list-style-type: none"> • demobilise site establishment • remove safety fence/barriers and hoarding

3.2.2 Plant and equipment

The plant and equipment likely to be used during construction includes:

- Dump trucks
- Excavators
- Jackhammer
- Light vehicles
- Front end loader
- Roller
- Agitator
- Concrete pump
- Piling rig
- Trucks

3.2.3 Working hours

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

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

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

Out of hours works are required in some cases to minimise disruptions to customers, pedestrians, motorists and nearby sensitive receivers; and to ensure the safety of railway workers and operational assets. It is estimated that approximately six rail possessions would be required.

Out of hours works may also be scheduled outside rail possession periods. The construction contractor would require approval from TfNSW for any out of hours work. The affected community would be notified as outlined in TfNSW's *Construction Noise and Vibration Strategy* (TfNSW, 2019) (refer to Section 6.3 for further details).

3.2.4 Operating hours

Mortdale Maintenance Centre operates 24 hours a day, seven days a week.

3.2.5 Earthworks

Excavations and earthworks would generally be required for the construction of the transfer chambers and retaining walls. About 2,400 cubic metres (m³) of spoil would result from the construction of the transfer chambers and 1,400 cubic metres (m³) of spoil would result from the remainder of the excavation activities, primarily being the construction of the retaining walls.

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

3.2.6 Source and quantity of materials

The source and quantity of materials would be determined during the detailed design phase of the Proposal and would consider the requirements of ISCA. Materials would be sourced from local suppliers where practicable. Reuse of existing and recycled materials would be undertaken where practicable.

3.2.7 Traffic access and vehicle movements

Traffic generated by construction activities includes construction worker light vehicles (including utility vans), as well as heavy vehicles for periodic delivery and removal of materials, and construction plant and equipment. Vehicle types and sizes would vary depending on the required use, but typically include medium and large rigid vehicles and articulated vehicles for import of bulk materials or spoil removal, as well as concrete trucks.

Traffic and transport impacts associated with the Proposal are assessed in **Section 6.1** of this REF.

A detailed construction methodology, management plans (such as Traffic Control Plans (TCPs)) and a Construction Environmental Management Plan (CEMP) would be developed prior to construction. These would be implemented and updated throughout construction to manage potential traffic and access impacts.

3.2.8 Ancillary facilities

Two construction compound/laydown areas would be required to accommodate a site office, amenities, laydown and storage area for materials. The proposed areas for the site compounds/laydown areas are outlined in **Table 3.2** and shown in **Figure 3.3**.

Table 3.2 Proposed site compound/laydown areas

Number	Construction compound / laydown area	Location	Ownership
1	Construction compound / laydown area	Eastern side within the Mortdale Maintenance Centre on land currently used as staff car parking	RailCorp
2	Construction compound / laydown area	Western side within the Mortdale Maintenance Centre on land currently used as staff car parking	RailCorp

Impacts associated with utilising these areas have been considered in the REF including requirements for rehabilitation, where required.

3.2.9 Public utility adjustments

The Proposal has been designed to avoid relocation of services where feasible, however further investigation may be required to confirm the need to relocate services within Mortdale Maintenance Centre. It is likely some services may require relocation, including electricity, communications and signal routes. Relocation of services may be required outside of the immediate footprint of the works but would be contained within the Mortdale Maintenance Centre. The appropriate utility providers would be consulted during the detailed design phase.

3.3 Property acquisition

TfNSW does not propose to acquire any property as part of the Proposal.

3.4 Operation management and maintenance

The future operation and maintenance of the Mortdale Maintenance Centre would be managed by Sydney Trains.



FIGURE 3.3 PROPOSED SITE ACCESS AND COMPOUNDS

AECOM



Legend

- Proposed works
- ▲ Site access point
- Proposed construction compounds/laydown areas

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4 Statutory considerations

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

4.1 Commonwealth legislation

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The (Commonwealth) EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places - defined in the EPBC Act as 'Matters of National Environmental Significance (MNES)'. The EPBC Act requires the assessment of whether the Proposal is likely to significantly impact on MNES or Commonwealth land. These matters are considered in full in **Appendix A**.

The Proposal would not impact on any MNES or on Commonwealth land. Therefore, a referral to the Commonwealth Minister for the Environment is not required.

4.2 NSW legislation and regulations

4.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act establishes the system of environmental planning and assessment in NSW. This Proposal is subject to the environmental impact assessment and planning approval requirements of Division 5.1 of the EP&A Act. Division 5.1 of the EP&A Act specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as TfNSW, which do not require development consent under Part 4 of the Act.

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

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

4.2.2 Other NSW legislation and regulations

Table 4.1 provides a list of other relevant legislation applicable to the Proposal.

Table 4.1 Other legislation applicable to the Proposal

Applicable legislation	Considerations
<i>Biodiversity Conservation Act 2016</i> (BC Act) (NSW)	The site does not contain suitable habitat for any listed threatened species or community and is unlikely to have a significant impact on any threatened species or community (refer Section 6.7).
<i>Biosecurity Act 2015</i> (NSW)	<p>Clause 22 requires that any person who deals with a biosecurity matter has a duty to ensure that in so far as is reasonably practicable, the potential biosecurity risk is prevented, eliminated or minimised. Appropriate management methods would be implemented during construction if declared priority weeds in the Georges River Local Government Area (LGA) are identified (refer to Section 6.7).</p> <p>Under the <i>Biosecurity Regulation 2017</i>, an owner, occupier or person in charge of a premises must notify the presence of a pest or disease listed in Schedule 1 of the Regulation. Notification must be made in accordance with Part 6 of the Regulation and within one working day after the person first suspects or becomes aware of the presence.</p>
<i>Contaminated Land Management Act 1997</i> (CLM Act) (NSW)	<p>Section 60 of the CLM Act imposes a duty on landowners to notify the Department of Planning, Industry and Environment (DPIE), and potentially investigate and remediate land if contamination is above EPA guideline levels.</p> <p>The site has not been declared under the CLM Act as being significantly contaminated (refer Section 6.8).</p>
<i>Crown Land Management Act 2016</i> (NSW)	The Proposal does not involve works on any Crown land.
<i>Heritage Act 1977</i> (Heritage Act) (NSW)	<ul style="list-style-type: none"> • Sections 57 and 60 (approval) where items listed on the State Heritage Register are to be impacted • Sections 139 and 140 (permit) where relics are likely to be exposed • Section 170 where items listed on a government agency Heritage and Conservation Register are to be impacted. <p>The Mortdale Railway Station and car sheds listing on the RailCorp S170 Heritage and Conservation Register previously included the shed at the Mortdale Maintenance Centre. However, the original shed has been modified to such an extent that there is no original fabric left and as such it has been removed from the heritage register.</p>
<i>National Parks and Wildlife Act 1974</i> (NPW Act) (NSW)	<p>Sections 86, 87 and 90 of the NPW Act require consent from DPIE for the destruction or damage of Indigenous objects. The Proposal is unlikely to disturb any Indigenous objects (refer Section 6.4).</p> <p>However, if unexpected archaeological items or items of Indigenous heritage significance are discovered during the construction of the Proposal, all works would cease and appropriate advice sought.</p>

Applicable legislation	Considerations
<p><i>Protection of the Environment Operations Act 1997 (PoEO Act) (NSW)</i></p>	<p>Schedule 1 of the PoEO Act details numerous activities that are deemed to be scheduled activities and consequently require an environment protection licence (EPL) to be obtained. Clause 33 of Schedule 1 details where an EPL is required for railway activities – railway infrastructure construction.</p> <p>Railway activities – railway infrastructure construction, means <i>inter alia</i> the construction of railway infrastructure. Clause 33(2) sets triggers for where an EPL is required if the construction of railway infrastructure is undertaken. An EPL is required where it results in one or more of the following:</p> <ul style="list-style-type: none"> • the extraction or processing (over the life of the construction) of more than: <ul style="list-style-type: none"> ○ 50,000 tonnes of materials in the case of premises in the regulated area or in the LGAs of Bega Valley, Eurobodalla, Goulburn Mulwaree, Queanbeyan-Palerang Regional or Snowy Monaro Regional, or ○ 150,000 tonnes of material in any other case • the construction of new railway track that is: <ul style="list-style-type: none"> ○ in the metropolitan area – 3 kilometres or more in length, or ○ outside the metropolitan area – 5 kilometres or more in length <p>The Proposal would not involve the extraction or processing of more than 50,000 tonnes of materials nor would the Proposal involve the construction of railway track 3 kilometres or more in length, and therefore does not require an EPL.</p> <p>The operation of the Proposal would be regulated under the existing Sydney Trains EPL (12208).</p> <p>TfNSW must notify the EPA of any pollution incidents that occur onsite where triggered under Part 5.7 of the PoEO Act. This would be managed in the CEMP to be prepared and implemented by the Construction Contractor.</p>
<p><i>Sydney Water Act 1994 (NSW)</i></p>	<p>The Proposal would not involve discharge of wastewater to the sewer.</p>
<p><i>Waste Avoidance and Resource Recovery Act 2001 (WARR Act) (NSW)</i></p>	<p>TfNSW would carry out the Proposal having regard to the requirements of the WARR Act. A site-specific Waste Management Plan would be prepared.</p>
<p><i>Water Management Act 2000 (NSW)</i></p>	<p>The Proposal would not involve any water use (from a natural source e.g. aquifer, river – only from the network), water management works, drainage or flood works, controlled activities or aquifer interference.</p>

4.3 State Environmental Planning Policies

4.3.1 State Environmental Planning Policy (Infrastructure) 2007

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

Clause 79 of the Infrastructure SEPP allows for the development of ‘rail infrastructure facilities’ by or on behalf of a public authority without consent on any land (i.e. assessable under Division 5.1 of the EP&A Act). Clause 78 defines ‘rail infrastructure facilities’ as ‘facilities for the assembly, maintenance and stabling of rolling stock’ and ‘buildings for or related to railway purposes’.

The Proposal would meet the above definition of ‘rail infrastructure facilities’ and as such development consent is not required for the Proposal. The environmental impacts of the Proposal have been assessed under the provisions of Division 5.1 of the EP&A Act.

Part 2 of the Infrastructure SEPP contains provisions for public authorities to consult with local councils and other agencies prior to the commencement of certain types of development. **Section 5** of this REF discusses the consultation undertaken under the requirements of the Infrastructure SEPP.

It is noted that the Infrastructure SEPP prevails over all other environmental planning instruments except where *State Environmental Planning Policy (Major Development) 2005* or *State Environmental Planning Policy (Coastal Management) 2018* applies. The Proposal does not require consideration under these SEPPs and therefore these instruments have not been further considered as part of this REF.

4.3.2 State Environmental Planning Policy No 55 – Remediation of Land

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

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

4.4 Local environmental planning instrument and development controls

The Proposal is located within the Georges River LGA. Georges River Council was formed in 2016 as a result of the amalgamation of Hurstville Council and Kogarah Council however the Hurstville and Kogarah Local Environmental Plans (LEPs) still apply to the respective areas. The provisions of the Infrastructure SEPP prevail over LEPs prepared by councils for an LGA. However, the provisions of the Kogarah LEP have been considered.

4.4.1 Kogarah Local Environmental Plan 2012

The *Kogarah Local Environmental Plan 2012* (Kogarah LEP) is the governing plan for the former Kogarah LGA, including Mortdale. **Table 4.2** summarises the relevant aspects of the Kogarah LEP applicable to the Proposal. **Figure 4.1** shows the relevant section of the zoning map from the Kogarah LEP, with the indicative location of the Proposal.

Table 4.2 Relevant provisions of the Kogarah LEP

Provision description	Relevance to the Proposal
<p>Clause 2.3 – Zone objectives and land use tables</p>	<p>The Mortdale Maintenance Centre and the associated rail corridor is zoned SP2 – Rail Infrastructure Facilities.</p> <p>Other nearby land zones include:</p> <ul style="list-style-type: none"> • B1 - Neighbourhood Centre to the west • R2 - Low Density Residential to the west • a small area of land zoned RE1 – Public Recreation to the north west. <p>The Proposal is consistent with the objectives of the SP2 zoned land in which it is located. The Proposal would not substantially affect the land use objectives within other nearby zoned land.</p>
<p>Clause 5.10 – Heritage conservation</p>	<p>Clause 5.10 of the Kogarah LEP aims to:</p> <ul style="list-style-type: none"> • conserve the environmental heritage of Kogarah • conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, setting and views • conserve archaeological sites • conserve Aboriginal objects and Aboriginal places of heritage significance.
<p>Clause 5.12 – Infrastructure development and use of existing buildings of the Crown</p>	<p>Clause 5.12 of the Kogarah LEP does not restrict or prohibit the carrying out of any development, by or on behalf of a public authority, which is permitted to be carried out with or without development consent.</p> <p>The Proposal would be undertaken by a public authority, in this case, TfNSW and is permitted without development consent.</p>
<p>Clause 6.2 – Earthworks</p>	<p>Clause 6.2 aims to ensure that earthworks for which development consent is required will not have a detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land.</p> <p>Consideration of the potential impacts and mitigation measures for earthworks for the Proposal is outlined in Section 6.8.</p>
<p>Clause 6.3 – Flood Planning</p>	<p>Clause 6.3 of the Kogarah LEP seeks to minimise flood risks to life and property, allow compatible development with the land's flood hazard rating, including accounting for climate change and avoiding significant adverse impacts on flood behaviour.</p> <p>A discussion of potential impacts resulting from flooding and surface water flows is discussed in Section 6.9.</p>

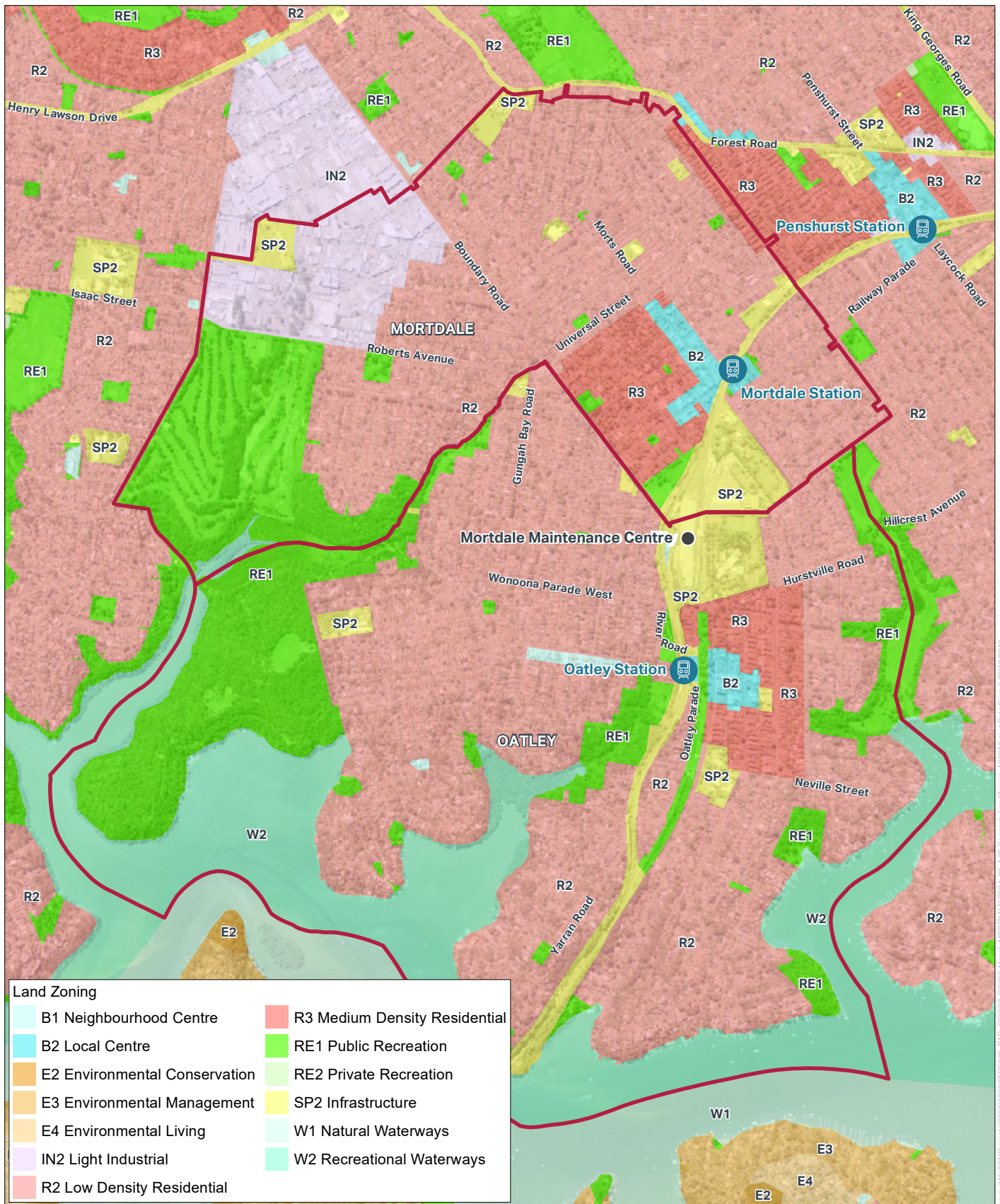


FIGURE 4.1 KOGARAH AND HURSTVILLE LEP LAND USE ZONING



Legend

- Railway station
- Suburb boundary

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4.5 NSW Government policies and strategies

Table 4.3 provides an overview of other NSW Government policies and strategies relevant to the Proposal.

Table 4.3 NSW Government policies and strategies applicable to the Proposal

Policy/Strategy	Commitment	Comment
<p><i>NSW: Making It Happen</i> (NSW Government, 2015)</p>	<p>In September 2015, the NSW Government announced a series of State Priorities as part of <i>NSW: Making It Happen</i> (NSW Government, 2015). The State Priorities are intended to guide the ongoing actions of the NSW Government across the State, and guide resource allocation and investment in conjunction with the NSW Budget. <i>NSW: Making it Happen</i> focuses on 12 key 'priorities' to achieve the NSW Government's commitments. These priorities range across a number of issues including infrastructure, the environment, education, health, wellbeing and safety in addition to Government services.</p> <p>One of the 12 priorities identified as part of <i>NSW: Making It Happen</i> relates to investment in building infrastructure. The ongoing development and investment in transport infrastructure is identified as part of the wider building infrastructure priority.</p>	<p>The Proposal assists in meeting the priority by assisting in the delivery of infrastructure to support NSW population growth over the next 10 years.</p>
<p><i>Future Transport Strategy 2056</i> (NSW Government, 2018)</p>	<p><i>Future Transport 2056</i> is an update of NSW's <i>Long Term Transport Master Plan</i>. It is a suite of strategies and plans for transport to provide an integrated vision for the state.</p> <p>The strategy places the customer at the centre of works undertaken by TfNSW. It includes issue specific and place based supporting plans that seek to integrate transport modes.</p> <p>The strategy outlines six state-wide outcomes:</p> <ul style="list-style-type: none"> • customer focused • successful places • a strong economy • safety and performance • accessible services • sustainability. 	<p>The Proposal would support the improvement in safety and performance of train services resulting in improved customer service outcomes.</p> <p>The More Trains, More Services Program is specifically referenced in the strategy as an example of initiatives to be implemented.</p>
<p><i>Building Momentum State Infrastructure Strategy 2018-2038</i> (Infrastructure NSW, 2018)</p>	<p><i>The State Infrastructure Strategy 2018-2038</i> is a strategy to plan and fund the infrastructure that the NSW Government delivers over the next 20 years.</p> <p>Public transport is viewed as critical to productivity, expanding employment opportunities by connecting people to jobs, and reducing congestion.</p>	<p>The Proposal invests in public transport and supports the safe and reliable growth of public transportation in NSW.</p>

Policy/Strategy	Commitment	Comment
South District Plan (Greater Sydney Commission, 2018)	The plan includes an initiative to investigate train improvements on the T4 Eastern Suburbs and Illawarra Line and T8 Airport Line to improve capacity and reliability.	The Program, including the Proposal, would deliver this initiative.

4.6 Ecologically sustainable development

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

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

The principles of ESD have been adopted by TfNSW throughout the development and assessment of the upgrade of the Mortdale Maintenance Centre. **Section 3.1.4** summarises how ESD would be incorporated in the design development of the Proposal. **Section 6.14** includes an assessment of the Proposal on climate change and sustainability, and **Section 7.2** lists mitigation measures to ensure ESD principles are incorporated during the construction phase of the Proposal.

5 Community and stakeholder consultation

Chapter 5 discusses the consultation undertaken to date for the Proposal and the consultation proposed for the future. This chapter discusses the consultation strategy adopted for the Proposal and the results of consultation with relevant government agencies and stakeholders. **Figure 5.1** shows the planning approval and consultation process for the Proposal.

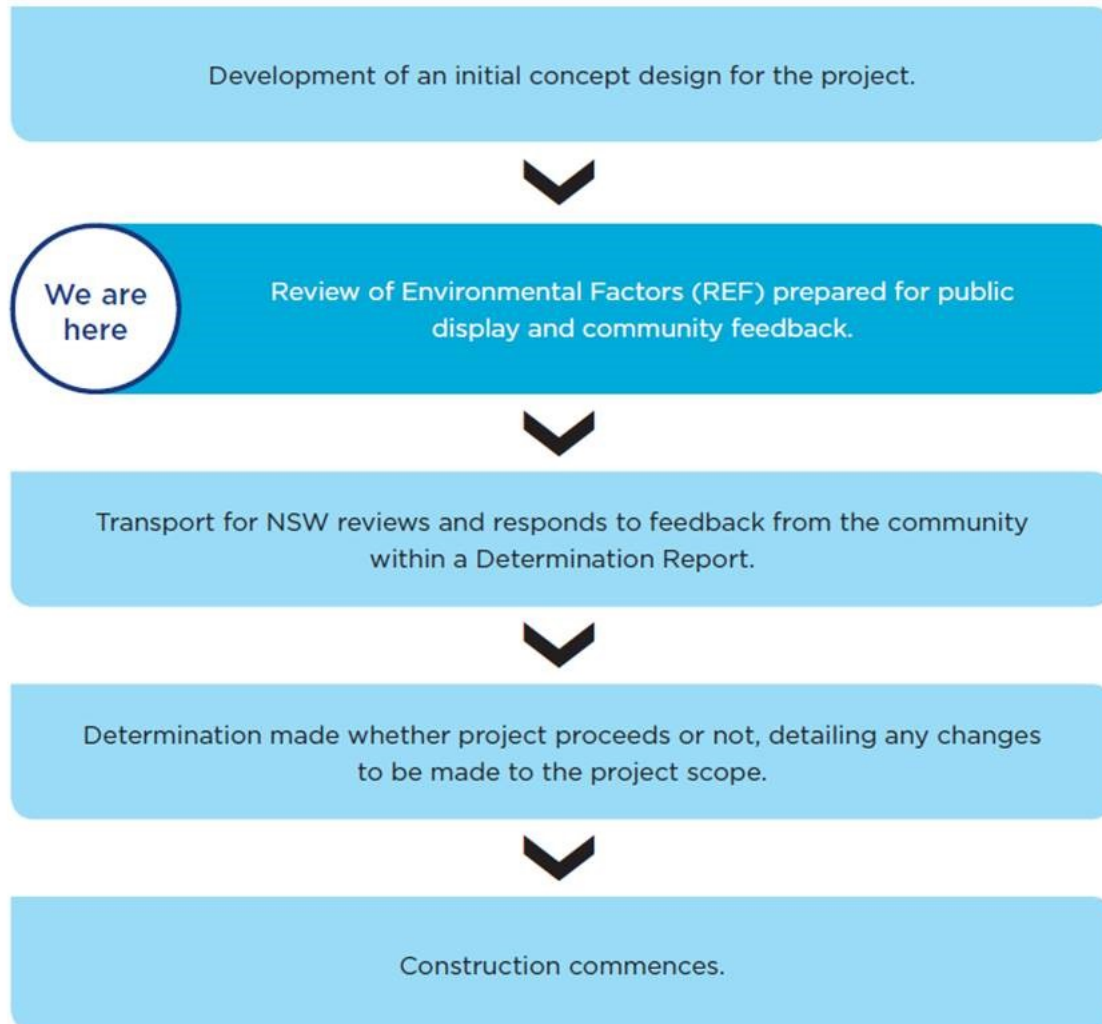


Figure 5.1 Planning approval and consultation process for the Proposal

5.1 Stakeholder consultation during concept design

Throughout the concept design phase stakeholders have been engaged proactively. Stakeholders relevant to the design phase have included TfNSW, Georges River Council and Sydney Trains. As the project progresses further stakeholders may be engaged such as the nearby residents, school and business owners.

Throughout the design process there has been regular meetings with the Design Management Team and Electrical Team.

A record of the engagement with stakeholders and the topics discussed has been included in **Table 5.1** below.

Table 5.1 Stakeholder engagement undertaken for the Proposal

Stakeholder	Type of engagement	Date	Topics discussed
Sydney Trains	Meeting	27 November 2018	Bogie exchange system stakeholder consultation concept design
Sydney Trains	Meeting	15 January 2019	Bogie exchange system stakeholder consultation concept design – safety and design workshop
Sydney Trains	Meeting	01 March 2019	Mortdale Maintenance Centre interface workshop
Sydney Trains	Workshop	23 May 2019	Sydney Trains fleet facilities upgrade – risk management workshop
Sydney Trains	Workshop	06 June 2019	Fleet facilities and More Trains, More Services interface
Sydney Trains	Meeting	04 July 2019	Monthly meeting
Georges River Council	Meeting	02 August 2019	Drainage concept design.

5.2 Consultation requirements under the Infrastructure SEPP

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

Table 5.2 provides details of consultation requirements under the Infrastructure SEPP for the Proposal.

Table 5.2 Infrastructure SEPP consultation requirements

Clause	Clause particulars	Relevance to the Proposal
<p>Clause 13 Consultation with Councils – development with impacts on council related infrastructure and services</p>	<p>Consultation is required where the Proposal would result in:</p> <ul style="list-style-type: none"> • substantial impact on stormwater management services • generating traffic that would place a local road system under strain • involve connection to or impact on a council owned sewerage system • involve connection to and substantial use of council owned water supply • significantly disrupt pedestrian or vehicle movement • involve significant excavation to a road surface or footpath for which Council has responsibility. 	<p>The Proposal includes modifications to the existing railway stormwater system, traffic generation, disruption to pedestrian and vehicle movement as well as existing driveway extension and new driveway construction.</p> <p>Consultation with Georges River Council under this clause would be undertaken.</p>
<p>Clause 14 Consultation with Councils – development with impacts on local heritage</p>	<p>Where railway station works:</p> <ul style="list-style-type: none"> • substantially impact on a local heritage item (if not also a State heritage item) • substantially impact on a heritage conservation area. 	<p>The Mortdale Maintenance Centre is not listed on any current heritage registers. Accordingly, consultation with Council is not required in regard to this aspect. Refer to Section 6.5.</p>
<p>Clause 15 Consultation with Councils – development with impacts on flood liable land</p>	<p>Where railway station works impact on land that is susceptible to flooding – reference would be made to <i>Floodplain Development Manual: the management of flood liable land</i>.</p>	<p>The Proposal is not located on land that is susceptible to flooding. Accordingly, consultation with Council is not required in regard to this aspect. Refer to Section 6.9.</p>
<p>15AA Consultation with State Emergency Service – development with impacts on flood liable land</p>	<p>Consultation is required with the NSW State Emergency (SES) where the Proposal would be developed on flood liable land, defined as the probable maximum flood extent.</p>	<p>The Proposal is not located within the mapped probable maximum flood extent as shown in the Hurstville LGA Overland Flood Study. Consultation with the SES is therefore not required. Refer to Section 6.9.</p>
<p>15A Consultation with councils – development with impacts on certain land within the coastal zone</p>	<p>Consultation is required where the Proposal would be undertaken on land that is within a coastal vulnerability area and is inconsistent with a certified coastal management program that applies to that land.</p>	<p>The Proposal is not located on land within a coastal vulnerability area. Consultation with Council is therefore not required.</p>

Clause	Clause particulars	Relevance to the Proposal
Clause 16 Consultation with public authorities other than Councils	<p>For <i>specified development</i> which includes consultation with DPIE for development that is undertaken adjacent to land reserved under the NPW Act, and other agencies specified by the Infrastructure SEPP where relevant.</p> <p>Although not a specific Infrastructure SEPP requirement, other agencies TfNSW may consult with could include:</p> <ul style="list-style-type: none"> • Sydney Trains • NSW Trains. 	The Proposal is not located adjacent to land reserved under the NPW Act. Accordingly, consultation with DPIE on this matter is not required.

5.3 Consultation strategy

The consultation strategy for the Proposal was developed to encourage stakeholder and community involvement and foster interaction between stakeholders, the community and the project team. The consultation strategy that was developed, having regard to the requirements of the planning process ensures that stakeholders, customers and the community are informed of the Proposal and have the opportunity to provide input.

The objectives of the consultation strategy are to:

- provide accurate and timely information about the Proposal and REF process to relevant stakeholders
- raise awareness of the various components of the Proposal and specialist environmental investigations
- keep the local community and stakeholders informed of the proposed upgrade work at the Mortdale Maintenance Centre and encourage direct communication/identification of issues, concerns or suggestions
- engage with directly impacted community near the Proposal area and seek opportunities to minimise impacts on amenity, their properties and business operations
- provide opportunities for stakeholders and the community to express their views about the Proposal
- listen and record community and stakeholder feedback and ensure it is considered during the development of the Proposal and responded to in the Determination Report
- work collaboratively with statutory regulators/authorities to facilitate the environmental approval process
- build positive relations with identified community stakeholders
- ensure a comprehensive and transparent approach
- identify and resolve issues in a timely manner.

5.4 Public display

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

- public display of the REF at various locations

- distribution of a project update to the local community, outlining the Proposal and inviting feedback on the REF
- advertisement of the REF public display in local newspapers with a link to the TfNSW website that includes a summary of the Proposal and information on how to provide feedback
- consultation with Georges River Council, Sydney Trains, NSW Trains and other key stakeholders.

Community consultation activities for the Proposal would be undertaken during the public display of this REF. The display period of the REF would be advertised in the week that the public display commences. The REF would be displayed for a period of two weeks.

The REF would be placed on public display at the following locations:

- **transport.nsw.gov.au/projects/mtms**
- **nsw.gov.au/improving-nsw/haveyoursay**
- **Oatley Public Library**, 26 Letitia Street, Oatley
- **Georges River Council**, 24 Macmahon Street, Hurstville
- **Transport for NSW**, 241 O’Riordan Street, The Gateway, Mascot

The REF would also be available on the [TfNSW website¹](https://www.transport.nsw.gov.au/projects/more-trains-more-services) and [Have Your Say website²](https://www.nsw.gov.au/improving-nsw/have-your-say/). Information on the Proposal would be available through the Project Infoline (1800 684 490) or by [email³](mailto:projects@transport.nsw.gov.au). During this time feedback is invited. Following consideration of feedback received during the public display period, TfNSW would determine whether to proceed with the Proposal and what conditions would be imposed on the project should it be determined to proceed.

5.5 Aboriginal community involvement

An Aboriginal Heritage Information Management System (AHIMS) search was undertaken on 30 April 2019. The Search consisted of a 6 km by 10 km search area centred around the Project area (Mortdale Maintenance Centre). An additional 50 metre buffer was included around the search area. A total of 120 registered AHIMS sites were identified within the search area. An Aboriginal Heritage Information Management System (AHIMS) extensive search was undertaken for the search area on 8 May 2019 (AHIMS Search #419349). The extensive search indicated the closest Aboriginal site (45-6-0566) is about 200 metres from the Proposal area (Mortdale Maintenance Centre). The site contained a shell midden and two identified stone artefacts within a matrix of brown sandy soil. This site is not within the Proposal area and would not be affected by the works.

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

¹ <https://www.transport.nsw.gov.au/projects/more-trains-more-services>

² <https://www.nsw.gov.au/improving-nsw/have-your-say/>

³ projects@transport.nsw.gov.au

5.6 Ongoing consultation

At the conclusion of the public display period for this REF, TfNSW would acknowledge receipt of feedback from each respondent. The issues raised by the respondents would be considered by TfNSW before determining whether to proceed with the Proposal (refer **Figure 5.1**)

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

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

6 Environmental impact assessment

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

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

6.1 Traffic and transport

6.1.1 Existing environment

Surrounding Road network

The Proposal area is bounded by Hurstville Road/Boundary Road to the west, Oatley Avenue to the east and Hurstville Road to the south. The closest main road is King Georges Road (to the east) which links to the M5 East Motorway. Directly west of the site is a one lane road bridge, Boundary Road bridge (**Figure 6.1**).



Figure 6.1 Boundary Road bridge facing south east towards Mortdale Maintenance Centre (Source: Google maps)

Parking conditions and site access

The Proposal area can be accessed by two gates on Hurstville Road and one gate on an unnamed road on the eastern side of the centre (shown in **Figure 3.3** and **Figure 6.2**). Gate 1 is used as the entrance to the main car park for staff and visitors and is located next to the administration building on Hurstville Road. Gate 2 is located on Hurstville Road, about 110 metres south of Gate 1. Gate 2 provides an additional entry point used for emergency access/egress and Gate 3 is located at the southern end of the facility and provides wider access for deliveries.

Additional on-site staff parking is situated adjacent to the main administration building, on the eastern side of the main maintenance shed and adjacent to Gate 3. There is existing staff parking around the existing substation consisting of mostly 90 degree as well as some 45 degree parking. There are also a number of unmetered on-street parking spaces along Hurstville Road adjacent to the site.



FIGURE 6.2 PROPOSED SITE ACCESS AND COMPOUNDS



Legend

- Proposed works
- ▲ Site access point
- Proposed construction compounds/laydown areas

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Pedestrians and cyclists

Council-managed pedestrian pathways are located within the vicinity of the Proposal area and can be used to walk to and from either Mortdale Station or Oatley Station.

There are no dedicated cycle paths adjacent to the Proposal area however local roads can be used. There are no dedicated cyclist parking or facilities at the Proposal area.

Access to public transport

Mortdale Maintenance Centre currently stables and undertakes maintenance works for suburban trains servicing the T4 Eastern Suburbs and Illawarra Line and South Coast Line.

Passenger trains pass to the west of the stabling facility on the western side of Hurstville Road.

Mortdale Station is located about 600 metres north of the site and Oatley Station is located about 500 metres south of the site.

Punchbowl Bus Company operates a local bus route (route 955) between Hurstville Station and Mortdale Station (via Oatley Station) (see **Figure 6.3**).



FIGURE 6.3 BUS ROUTES IN THE VICINITY OF THE PROPOSAL



- Legend**
- Railway station
 - Proposed works
 - Bus Routes**
 - 944
 - 945
 - 955
 - N10

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6.1.2 Potential impacts

Construction phase

Trip generation

Traffic movements are likely to include a maximum of about 50 additional staff travelling to and from the site daily by private vehicle. Some staff may utilise public transport to access the site. Traffic impacts as a result of staff traveling to and from the site are expected to be minor and would not cause a significant increase to traffic numbers within the local area.

Trucks would approach and leave the construction site from the south/east along Hurstville Road as this is the most appropriate route from King Georges Road. This means trucks would not use the narrow bridge on Boundary Road.

Parking

Construction parking would take place within the Mortdale Maintenance Centre with additional requirements met by utilising on-street parking on Hurstville Road. There may be a minor reduction in on-street parking on Hurstville Road however as local parking in the surrounding area is not currently considered at capacity, this impact is anticipated to be minor.

As per the current concept design, about five parking spaces would be permanently removed on Hurstville Road to accommodate the new exit driveway. These are not paid parking and no designated line marking of the parking exists.

Public transport

Bus services in the vicinity of the Proposal would not be affected during construction. Bus services within Mortdale and Oatley would continue to operate during construction activities. Access to existing bus stops would be maintained throughout construction and any changes would be communicated to the public via signage or appropriate methods. Impacts to other commuter services would be minimal as the Proposal is not located at a railway station.

Operational phase

Surrounding road network

The Proposal aims to increase the number and type of maintenance works undertaken on the Sydney Trains fleet at Mortdale Maintenance Centre. This includes bogie exchange operations that currently do not occur within this site. These expanded activities would result in a small increase in the number of vehicles accessing and leaving the centre. These vehicles would include trucks delivering and collecting bogies for servicing off site, as well as additional maintenance staff and additional supplies and waste arising from the expanded operations. These vehicles would generally be non-articulated trucks and other light vehicles.

Bogie collection trucks would not utilise the one lane bridge on Boundary Road over the railway line adjacent to the Mortdale Maintenance Centre. As such, these vehicles will enter and exit the site towards the south/east along Hurstville Road. All heavy vehicles currently accessing the Mortdale Maintenance Centre are subject to this same arrangement.

The number of additional vehicles required for bogie delivery and collection would be approximately three per working day. This would not result in a substantial impact upon traffic levels on the surrounding road network.

Public transport

The Proposal does not include changes to bus/rail services as part of the works and would not impact on the operation (service operation or timetabling) of public transport in the vicinity of the Mortdale Maintenance Centre.

Parking

About five parking spaces on Hurstville Road would be removed to accommodate the new exit driveway on Hurstville Road. These are unpaid parking spaces and no designated line marking of the parking spaces exists. As local parking in the surrounding area is not currently considered at capacity, this impact is anticipated to be minor.

The construction of three new padmount substations in the existing staff carpark just south of the existing 33kV substation would require the removal of six angled parking spaces. An additional four spaces will be lost once the circulation roadway is realigned around the padmount substations. A new parking area has been proposed at the site of the existing substation with a total of 10 new staff parking spaces creating a neutral balance of parking spaces lost to parking spaces gained.

6.1.3 Mitigation measures

The following mitigation measures would apply to the Proposal:

- prior to the commencement of construction, a Traffic Management Plan (TMP) would be prepared as part of the CEMP and would include at a minimum:
 - ensure adequate road signage at construction work sites to inform motorists and pedestrians of the work site ahead to ensure that the risk of road accidents and disruption to surrounding land uses is minimised
 - maximise safety and accessibility for pedestrians and cyclists
 - ensure adequate sight lines to allow for safe entry and exit from the site
 - ensure access to residential properties is maintained (unless affected property owners have been consulted and appropriate alternative arrangements made)
 - manage impacts and changes to on and off-street parking and requirements for any temporary replacement provision
 - routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses
 - measures to manage traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the TMP.
- consultation with the relevant roads authorities would be undertaken during preparation of the construction TMP. The performance of all project traffic arrangements must be monitored during construction
- communication would be provided to the community and local residents to inform them of changes to parking, pedestrian access and/or traffic conditions including vehicle movements and the anticipated effects on the local road network relating to site works.

Refer to **Table 7.1** for a list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.2 Urban design, landscape and visual amenity

6.2.1 Existing environment

Visual character

The Proposal area consists of an existing rail maintenance centre. The Proposal area contains several short rail sidings, and a complex of storage and workshop sheds. The visual character of the Mortdale Maintenance Centre is heavy industrial.

The dominant character of the area surrounding the Proposal area is suburban. The Proposal area is situated on the border of the suburbs of Oatley and Mortdale in the Georges River LGA. These suburbs are predominately residential.

The Proposal area is located on a crest above the surrounding landscape, with the location of the maintenance sheds having been previously cut and levelled. A retaining wall is located along a portion of the western border of the Proposal area. Vegetation including trees and shrubs are located around the boundary of the Proposal area.

The landscape character of the area around the Proposal is dominated by the linear infrastructure corridor of the rail line, educational and community facilities, roads and low density residential properties.

Visibility

The Mortdale Maintenance Centre is visible to users of Hurstville Road and passengers passing on the rail line. The centre is partially visible from the western car park of Georges River College Oatley Senior Campus, albeit filtered by medium height shrubs and vegetation. The rail corridor, associated security fencing and Hurstville Road provide buffered views for the sensitive receivers on the western side including residents on the eastern side of Waratah Street.

The crest landform provides a buffer for the sensitive receivers on the southern side of the Proposal area. Due to the urban nature of the landscape character and its current use as a rail maintenance centre, the landscape character of the site and its immediate surrounds have a low sensitivity; meaning that the landscape can more easily absorb changes as a result of the Proposal.

6.2.2 Potential impacts

Construction phase

Visual impacts during construction would be limited to minor temporary visual impacts to road users and some residents due to construction hoarding, fencing, barriers, equipment, lighting and workers. Overall visual impacts are likely to be minor as there would not be a direct line of sight from nearby sensitive receivers.

Operational phase

The site would be upgraded during construction to remove a small shed on the south west boundary of the site (refer to **Section 1.1.2**). The new shed to house the bogie exchange system would be constructed to be a similar height to other maintenance sheds at the site (approximately eight metres in height) and would be finished using similar materials.

This would increase the mass of buildings adjacent to the road, providing a sense of compression and closed in space for road users. Road users are considered to have low sensitivity and magnitude as they are moving through the area temporarily. Given the urban nature of the surroundings and low sensitivity of the area, this change would be negligible.

The Proposal would involve the removal of four trees and underlying mid-storey vegetation for the new exit driveway along the western side of the Mortdale Maintenance Centre. The receivers of this change include road users on Hurstville Road and residents on the eastern side of Waratah Street. Road users in this area move through the area temporarily and would not be expected to be highly sensitive to the surrounding character.

Similarly, views for residents in Waratah Street are limited to a small number of properties (less than four) and are somewhat distant and filtered by intervening infrastructure and vegetation. These properties are also located on a negative gradient away from the Mortdale Maintenance Centre so the taller shed structure and removed vegetation would not be clearly visible from the houses. Whilst these residents may have a greater sensitivity, the magnitude of change for them would be lower.

The Proposal would include the installation of lighting for operational, safety, security and maintenance purposes with the potential for light spill to surrounding receivers. However, light spill would be easily managed by design and installation to relevant standards.

Overall the existing landscape character would remain largely similar to the current view of the maintenance centre. The changes are consistent with the character of the maintenance centre and as such would result in a minor to negligible visual impact on the surrounding sensitive receivers.

6.2.3 Mitigation measures

The following mitigation measures would apply to the Proposal:

- a Public Domain Plan (PDP) would be prepared by the Construction Contractor, in consultation with Georges River Council, and submitted to TfNSW for endorsement by the Precincts and Urban Design team, prior to finalisation of the detailed design. The PDP, at a minimum, would address the following:
 - materials, finishes, colour schemes and maintenance procedures including graffiti control for new walls, barriers and fences
 - total water management principles to be integrated into the design where considered appropriate
 - design measures included to meet ISCA Standards
 - identification of design and landscaping aspects that will be open for stakeholder input, as required
- all permanent lighting would be designed and installed in accordance with the requirements of standards relevant to *AS 1158 Road Lighting* and *AS 4282 Controlling the Obtrusive Effects of Outdoor Lighting*
- the detailed design of the Proposal would comply with Crime Prevention Through Environmental Design principles
- worksite compounds would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations
- temporary hoardings, barriers, traffic management and signage would be removed when no longer required
- during construction, graffiti would be removed in accordance with TfNSW's Standard Requirements.

Refer to **Table 7.1** for a list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.3 Noise and vibration

A Noise and Vibration Impact Assessment (Appendix C) (AECOM, 2019) was completed for the proposal and included the following scope:

- establish the noise management levels (NMLs) and vibration limits that would apply to the Proposal
- predict environmental noise and vibration levels at nearby residential and other sensitive receivers due to the construction and operation of the Proposal
- predict noise levels from additional off-site construction and operational traffic generated by the Proposal
- recommend mitigation measures, where necessary, to reduce and manage noise and vibration impacts from the Proposal to comply with established noise management levels and vibration limits
- consider noise from the operation of the upgraded Mortdale Maintenance Centre.

The findings of this assessment are summarised below.

6.3.1 Existing environment

Mortdale is a predominantly residential suburb, with residential receivers surrounding the Mortdale Maintenance Centre, in addition to some educational, recreational and commercial receivers. The acoustic environment is characterised by typical suburban noise, in addition to road traffic noise from Hurstville Road/Boundary Road and some noise contribution from the existing site activities of the Mortdale Maintenance Centre.

Receivers

Residential and non-residential receivers potentially affected by the construction and operation of the Proposal have been identified within the Proposal area (refer to **Figure 6.4** below). Receivers predominantly comprise one and two storey residential properties located within the suburbs of Mortdale and Oatley.

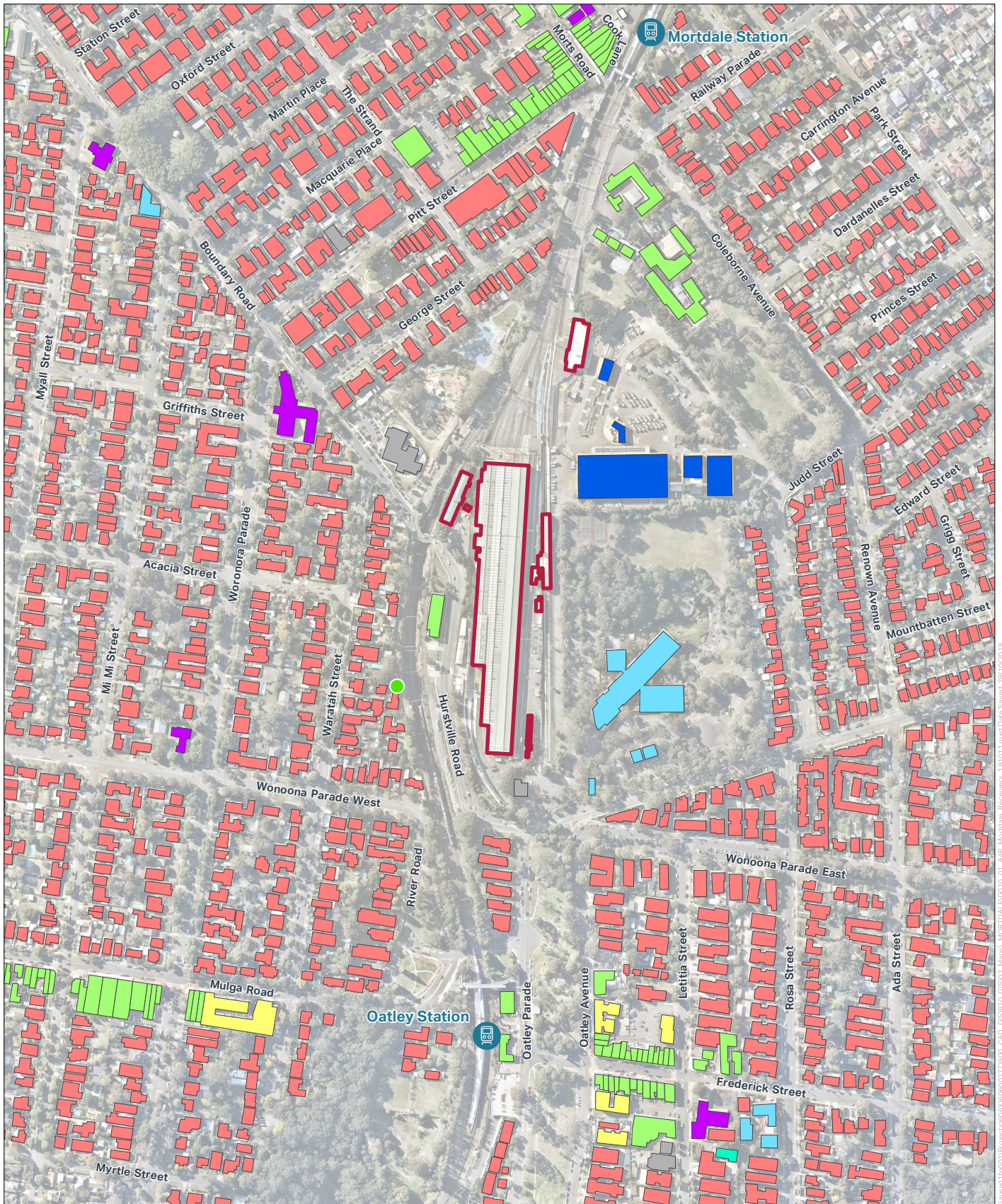


FIGURE 6.4 RESIDENTIAL AND NON-RESIDENTIAL RECEIVERS POTENTIALLY AFFECTED BY PROPOSAL



Legend

- Mortdale Maintenance Centre
- Community Centre
- Residential
- Passive Recreation
- Commercial
- School
- Place of Worship
- Industrial
- Mixed Use
- Not Assessed
- RT Railway station
- Noise monitoring location

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Unattended noise monitoring

The unattended noise measurements define the long-term noise environment throughout the Proposal area and are used to define the construction and operational noise criteria.

Unattended noise monitoring was carried out from 9 May 2019 to 17 May 2019 at one location considered to be representative of the noise sensitive receivers within the Proposal area. The noise monitoring location is shown graphically in **Figure 6.4** below and described in **Table 6.1**.

Table 6.1 Noise monitoring details

Address	Model	Serial number
23 Waratah Street, Oatley	SVAN 977	45416

A summary of the measured L_{A90} background noise levels and existing L_{Aeq} ambient noise levels is presented in **Table 6.2**.

Table 6.2 Existing background and ambient noise levels, dB(A)

Address	Rating background level, L_{A90} dB(A)			Ambient noise levels, L_{Aeq} dB(A)		
	Day	Evening	Night	Day	Evening	Night
23 Waratah Street, Oatley	39	37	30	52	51	50

Note: In accordance with the Noise Policy for Industry, time of day is defined as follows:

Day – the period from 7 am to 6 pm Monday to Saturday or 8 am to 6 pm on Sundays and public holidays.

Evening – the period from 6 pm to 10 pm.

Night – the remaining periods.

Attended noise monitoring

Attended noise measurements are carried out to determine what noise sources contribute to the local noise environment. Attended noise monitoring was conducted at the unattended monitoring location on 9 May 2019. The monitoring results from the attended measurements are presented in **Table 6.3**.

Table 6.3 Attended noise monitoring details

Address	Date	Time	Description	L _{Amax} , 15min dB(A)	L _{A10} , 15min dB(A)	L _{Aeq} , 15min dB(A)	L _{A90} , 15min dB(A)
23 Waratah Street, Oatley	9/5/2019	10:14 am	Noise environment dominated by distant road traffic from Hurstville Road and bird noise 42 dB(A). Distant banging from local construction barely audible. Train horns from the Mortdale Maintenance Centre in distance audible, approximately 52 dB(A). Train air brake release whistling noise 50 dB(A) clearly audible from the Mortdale Maintenance Centre. Distant conversation and door slam from nearby carpark audible. Aircraft flyover 53 dB(A).	82	52	51	40

6.3.2 Noise criteria

The EPA's *Interim Construction Noise Guideline* (ICNG) (DECC, 2009) is the principal guideline for the assessment and management of construction noise in NSW. A quantitative assessment, based on likely construction scenarios, has been carried out for these works.

The ICNG recommends standard hours of construction as:

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

For residential receivers, the ICNG recommends the following NMLs during standard construction hours: the applicable Rating Background Level (RBL) + 10 dB(A). Where NMLs are predicted to be exceeded the ICNG recommends feasible and reasonable measures to be implemented to minimise adverse impacts. Where construction noise levels reach 75 dB(A) at residences (during standard construction hours), residential receivers can be considered as 'highly noise affected' and the proponent may be required to consider restricting hours of very noisy works to provide respite periods.

Outside of recommended standard hours the ICNG recommends the following NMLs for residential receivers: the applicable RBL + 5 dB(A).

The ICNG recommends separate NMLs for non-residential sensitive receivers, which applies when the applicable receiver is in use.

The construction NMLs developed for the Proposal for residential, non-residential sensitive receivers and commercial and industrial receivers are listed in **Table 6.4**, **Table 6.5** and **Table 6.6** respectively.

Table 6.4 Construction NMLs – Residential receivers

Period	RBL L_{A90} , dB(A)	Standard hours noise management levels, $L_{Aeq,15min}$, dB(A)	Out of hours noise management levels, $L_{Aeq,15min}$, dB(A)
Day	39	49	44
Evening	37	-	42
Night	30	-	35

Table 6.5 Construction NMLs – Non-residential receivers

Land use	Noise management level, $L_{Aeq}(15 \text{ min})$
Classrooms at schools and other educational institutions	Internal noise level 45 dB(A)
Hospital wards and operating theatres	Internal noise level 45 dB(A)
Places of worship	Internal noise level 45 dB(A)
Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	External noise level 65 dB(A)
Passive recreation areas (characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External noise level 60 dB(A)
Community centres	Depends on the intended use of the centre. Refer to the recommended “maximum” internal levels in AS2107 for specific uses.

Table 6.6 Construction NMLs – Commercial and industrial land uses

Land use	Noise management level, $L_{Aeq}(15 \text{ min})$
Industrial premises	External noise level 75 dB(A)
Offices, retail outlets	External noise level 70 dB(A)

Sleep Disturbance Criteria

Sleep disturbance noise goals have also been established for residential receivers which are based on the NSW Road Noise Policy (RNP) (DECCW, 2011). Based on the Policy, the sleep disturbance criteria for the Noise Catchment Area are a screening level of 54 dB(A) $L_{A1}(1 \text{ minute})$ and an awakening reaction level of 65 dB(A) $L_{A1}(1 \text{ minute})$.

Construction Traffic Noise Criteria

To assess noise impacts from construction traffic an initial screening test should be undertaken by evaluating whether existing road traffic noise levels would increase by more than 2 dB(A), in line with the RNP. Where the predicted noise increase is 2 dB(A) or less, then no further assessment is required. However, where the predicted noise level increase is greater than 2 dB(A), and the predicted road traffic noise level exceeds the road category specific criterion then noise mitigation should be considered for those receivers affected.

Construction Vibration Criteria

Vibration assessment criteria relate to human comfort (tactile vibration) and structural or building damage.

Structural damage to buildings

No Australian Standards exist for the assessment of building damage caused by vibration at present. The German standard (DIN 4150) provides recommended maximum levels of vibration that reduce the likelihood of building damage caused by vibration and are presented in **Table 6.7**. DIN 4150 states that buildings exposed to higher levels of vibration than recommended limits would not necessarily result in damage.

Table 6.7 DIN 4150: Structural damage safe limits for building vibration

Group	Type of structure	At foundation Less than 10 Hz	At foundation 10 Hz to 50 Hz	At foundation 50 Hz to 100 Hz ¹	Vibration at the horizontal plane of the highest floor for all frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20 mm/s	20 to 40 mm/s	40 to 50 mm/s	40 mm/s
2	Dwellings and buildings of similar design and/or use	5 mm/s	5 to 15 mm/s	15 to 20 mm/s	15 mm/s
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Group 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order/heritage listed)	3 mm/s	3 to 8 mm/s	8 to 10 mm/s	8 mm/s

Note 1: At frequencies above 100 Hz, the values given in this column may be used as minimum values.

Human comfort

The assessment of intermittent vibration outlined in the NSW EPA guideline *Assessing Vibration: A Technical Guideline* (DEC, 2006) is based on Vibration Dose Values (VDVs). The VDV accumulates the vibration energy received over the daytime and night-time periods.

Maximum and preferred VDVs for intermittent vibration arising from construction activities are listed in **Table 6.8**. The VDV criteria are based on the likelihood that a person would be annoyed by the level of vibration over the entire assessment period.

Table 6.8 Preferred and maximum vibration dose values for intermittent vibration (m/s^{1.75})

Location	Daytime ¹ Preferred	Daytime Max	Night time Preferred	Night time Max
Critical areas (examples include hospital operating theatres and precision laboratories where sensitive operations are occurring)	0.1	0.2	0.1	0.2
Residences	0.2	0.4	0.13	0.26
Offices, schools, educational institutions, commercial premises and places of worship	0.4	0.8	0.4	0.8
Workshops or factory environments	0.8	1.6	0.8	1.6

Note 1: Day is defined as 7:00 am to 10:00 pm. Night is defined as 10:00 pm to 7:00 am.

Operational noise criteria

Intrusive noise levels

The *Noise Policy for Industry* (EPA, 2017) (NPfI) states that the intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (L_{Aeq} level), measured over a 15 minute period, does not exceed the RBL measured by more than 5 dB(A). The RBL is the background noise level to be used for assessment purposes and is determined by the methods given in Fact Sheet B of the NPfI.

The intrusiveness noise levels applicable to the Proposal are presented in **Table 6.9**.

Table 6.9 Intrusiveness noise levels

Period	RBL L_{A90} , dB(A)	Intrusiveness noise level (RBL + 5), dB(A)
Day	39	44
Evening	37	42
Night	30	35

Notes: In accordance with the Noise Policy for Industry, time of day is defined as follows:

Day – the period from 7 am to 6 pm Monday to Saturday or 8 am to 6 pm on Sundays and public holidays.

Evening – the period from 6 pm to 10 pm.

Night – the remaining periods.

Protecting noise amenity

To limit continuing increases in noise levels, the maximum ambient noise level resulting from all industrial noise sources in an area should not normally exceed the acceptable levels specified in Table 2.2 of the NPfI. As per the definitions of receiver types in Table 2.3 of the NPfI, residential receivers likely to be affected by noise from the operation of the facility are classed as being suburban residential.

The project amenity noise level is equal to the recommended amenity level minus 5 dB(A). In addition, the project amenity level is converted from a period to 15 minutes by adding 3 dB(A).

Therefore, the relevant project noise amenity level for each applicable type of receiver is shown below in **Table 6.10**.

Table 6.10 Recommended L_{Aeq} noise levels from industrial noise sources

Type of receiver	Indicative noise amenity area	Period	Recommended amenity noise level, $L_{Aeq}(\text{period})$	Project amenity noise level, $L_{Aeq,15\text{min}}$
Residential	Suburban	Day	55	53
		Evening	45	43
		Night	40	38
School classroom	All	Noisiest 1-hour period when in use	45 ¹	43
Place of worship	All	When in use	50	48
School playground	All	When in use	55	53
Area specifically reserved for passive recreation (e.g. national park)	All	When in use	50	48
Commercial premises	All	When in use	65	63

Note 1: External noise levels are based on a 10 dB(A) reduction from outside to inside through an open window.

Project noise level trigger levels

The project noise trigger level is the lower of the intrusiveness and the amenity noise levels. Provided in **Table 6.11** are the established project noise trigger levels for the assessment locations within the Proposal area. The table presents the project noise trigger levels for the day, evening and night-time periods.

Table 6.11 Operational noise criteria

Type of receiver	Assessment Period	Intrusive noise levels, $L_{Aeq,15min}$	Amenity noise levels, $L_{Aeq,15min}$	Project noise trigger levels, $L_{Aeq,15min}$
Residential suburban	Day	44	53	44
	Evening	42	43	42
	Night	35	38	35
School classroom - internal	Noisiest 1-hour period when in use	-	43	43
School playground	When in use	-	53	53
Area specifically reserved for passive recreation (e.g. national park)	When in use	-	48	48
Place of worship - internal	When in use	-	48	48
Commercial premises	When in use	-	63	63

Maximum noise level assessment

The NPfl requires the potential for sleep disturbance to be assessed by considering maximum noise levels events during the night-time period.

Where the subject development/premises night-time noise levels at a residential location exceed the following screening levels a detailed maximum noise level event assessment should be undertaken:

- $L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater.

The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the RBL, and the number of times this happens during the night-time period.

Based on the measured background noise levels during the night, the sleep disturbance criteria for the nearest noise sensitive residential receivers are presented in **Table 6.12**.

Table 6.12 Night-time sleep disturbance screening levels

Type of receiver	Measured night time RBL, $L_{A90,15min}$, dB(A)	Sleep disturbance screening levels	
		$L_{Aeq,15min}$	L_{AFmax}
Residential	30	40	52

Operational road traffic noise

Table 6.13 presents the EPA’s road traffic noise assessment criteria for residential land use developments with potential to create additional traffic on existing roads. The external criteria are assessed at 1 metre from the affected residential building façades and at a height of 1.5 metres from the floor.

Table 6.13 Road traffic noise assessment criteria for residential land uses

Road category	Type of project/Land use	Assessment criteria dB(A)	
		Day (7 am – 10 pm)	Night (10 pm – 7 am)
Freeway/ arterial/ sub-arterial roads	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	L _{Aeq} , (15 hour) 60	L _{Aeq} , (9 hour) 55

To assess noise impacts from operational road traffic, an initial screening test has been undertaken by evaluating whether existing road traffic noise levels would increase by more than 2 dB(A). Where the predicted noise increase is 2 dB(A) or less, then no further assessment is required.

However, where the predicted noise level increase is greater than 2 dB(A), and the predicted road traffic noise level exceeds the road category specific criterion then noise mitigation should be considered for those receivers affected. The RNP does not require assessment of noise impact to commercial or industrial receivers.

6.3.3 Potential impacts

Construction phase

Predicted construction noise levels

Nine distinct work packages, each consisting of a number of construction activities, have been assumed for the Proposal. These work packages are listed above in **Table 3.1**.

In order to assess noise impacts from the site during construction, a noise model was created to represent a conservative worst case scenario. Construction noise was modelled in SoundPLAN Version 8.0, with the model being based on ground topography, ground absorption and reflection, receivers and from the use of plant and equipment listed in **Section 3.2.2**.

A summary of the number of receivers where construction noise levels are predicted to exceed NMLs during the loudest construction stages are presented for standard hours construction activities in **Table 6.14** and for out-of-hours construction activities in **Table 6.15**.

The results presented in **Table 6.14** show that there is a very limited number of exceedances of the NMLs during the daytime. During standard construction hours, there are up to four receivers where noise levels are anticipated to exceed the NMLs by more than 10 dB(A), and no receivers are expected to be considered highly noise affected (> 75 dB(A)).

The results presented in **Table 6.15** show that during the night-time, noise levels at a large number of receivers are predicted to exceed the NMLs. Up to 665 receivers are predicted to exceed the NMLs in the worst-case scenario, which is during the ‘new bogie tracks, road and shed’ scenario. This is due to the high noise levels associated with this activity, in addition to the low NMLs applicable during the night-time.

It is important to consider that this assessment is representative of the worst case 15 minute period of construction activity, while the construction equipment is at the nearest location to each sensitive receiver location. The assessed scenario does not represent the ongoing day to day noise impact at noise sensitive receivers for an extended period of time.

Particularly noisy activities, such as bored piling, are likely to persist for only a portion of the overall construction period.

Table 6.14 Predicted construction noise impacts for residential receivers – Daytime

Construction scenario	NML	Number of receivers where noise levels >10 dB(A) above NML	Number of highly noise affected receivers where noise levels ≥75 dB(A)
New bogie tracks, road and shed	49	4	0
Driveway adjustments	49	1	0
Substation infrastructure adjustments	49	0	0

Table 6.15 Predicted construction noise impacts for residential receivers – Night-time

Construction scenario	NML	Number of receivers where noise levels may exceed the NML			
		NML exceedance <5 dB(A)	NML exceedance 5 14 dB(A)	NML exceedance 15 25 dB(A)	NML exceedance >25 dB(A)
New bogie tracks, road and shed	35	360	271	33	1
Driveway adjustments	35	311	135	26	0
Substation infrastructure adjustments	35	393	215	12	0

Sleep disturbance assessment

A sleep disturbance assessment has been undertaken for the proposed night works with the construction information available to date. The noise modelling results are provided in **Table 6.16** below with predicted noise levels compared with the sleep awakening reaction criterion.

A large number of exceedances of the sleep disturbance screening criteria have been predicted due to the potential night-time construction works associated with the Proposal. These receivers are predominantly located along Waratah Street and Judd Street.

Noise associated with construction works are not anticipated to exceed the awakening reaction criteria, with the exception of the 'New bogie tracks, road and shed' construction scenario, where it is predicted that noise at up to five receivers may exceed the awakening reaction criterion. These exceedances are attributed to the proximity of the construction site to residences located along Waratah Street.

Table 6.16 Predicted LA1(1min) sleep disturbance impacts at residential receivers

Construction scenario	Sleep disturbance criteria, dB(A)	Maximum LA1(1min) noise level, dB(A)	Number of receivers where noise levels exceed	
			Sleep disturbance criteria	Awakening reaction criteria
New bogie tracks, road and shed	45	68	512	5
Driveway adjustments	45	60	231	0
Substation infrastructure adjustments	45	65	375	0

Construction traffic assessment

Construction activities were based on indicative construction movements and have been used in lieu of rigorously defined vehicle movements which would be determined during detailed design. Construction traffic movements in this assessment were used to conservatively assess the following number of vehicles:

- 50 light vehicle movements during the daytime and night-time periods.
- 50 heavy vehicle movements during the daytime and night-time periods.

Traffic counts for the existing AM peak (8am – 9am) and PM peak (5pm – 6pm) traffic flows have been sourced from a survey in a previous assessment completed for TfNSW titled ‘Oatley Station Accessibility Upgrade – Preliminary Design – Traffic, Transport and Access Impact Assessment’ (GHD, 2014). These values have been converted to a daytime (15 hour) and night-time (9 hour) traffic volume. These volumes are presented in **Table 6.17** below.

Table 6.17 Existing traffic flows and additional traffic flows due to construction traffic

Road	Period	Existing traffic flow		Additional traffic flow		Relative noise increase, dB(A)
		Light	Heavy	Light	Heavy	
Hurstville Road (East of Oatley Parade)	Daytime	8,388	932	50	50	0.1
	Night-time	1,088	272	50	50	0.5

The results indicate that the predicted noise increases are significantly lower than the 2 dB(A) screening criteria presented in the RNP. As a result, no further consideration of construction traffic is required at this stage.

Vibration

Vibration intensive work has the potential to occur as part of the construction work. Work may include the use of pile driving and jackhammering activities.

Typical minimum distances for the construction equipment that may be part of this Proposal are provided in **Table 6.18**. Minimum working distances have been developed to meet the recommended levels of vibration in British Standard 6472-1992 and DIN 4150 and are based upon the safe working distances presented in TfNSW's *Construction Noise and Vibration Strategy* (TfNSW, 2019) (CNVS) and AECOM's library of vibration data.

Minimum working distances should be adhered to when operating vibration intensive equipment near buildings in order to minimise the risk of discomfort to occupants and structural damage.

Table 6.18 Recommended minimum working distances for vibration intensive equipment

Equipment	Rating/description	Minimum working distance (metres)	
		Cosmetic damage ¹	Human response
Piling rig – bored	≤ 800 mm	2 (nominal)	N/A
Jackhammer	Hand held	1 (nominal)	Avoid contact with structure

Note 1: More stringent conditions may apply to heritage or other sensitive structures.

The minimum working distances presented in **Table 6.18** assume individual items of plant would be operating independently. Concurrent operation of vibration intensive equipment should be avoided, however if it is necessary to operate multiple items of equipment concurrently close to the safe working distance then vibration monitoring is recommended.

The minimum working distances for cosmetic damage are general considered to be conservative and working within them would not necessarily result in damage. However, factors such as work practices and intervening ground conditions can affect vibration levels so vibration monitoring is recommended within these distances and should be carried out at the beginning of the work in order to refine the safe working distances for site specific conditions.

Operational phase

To undertake the operational noise assessment in accordance with the NPfl, the existing and future operations were considered for both the daytime and the night-time periods. These scenarios have been assumed to represent 'reasonable' worst case operational conditions. The noise sources and assumptions that have been considered in each scenario are detailed below:

Scenario 1 – Daytime - Existing operations

- one 8-car T-set train would move in the parking bay in the Mortdale Maintenance Centre, sounding its horn prior to moving
- one train would move through the wash bay
- car door slam in carpark
- all roller doors on the existing Mortdale Maintenance Centre and the wash bay would be open during operations as a conservative assumption.

Scenario 2 – Daytime - Future operations

- one 8-car T-set train would move in the parking bay in the Mortdale Maintenance Centre, sounding its horn prior to moving
- one train would move through the wash bay
- bogie drop would occur within the proposed bogie exchange workshop

- one truck movement within the site boundary, using the proposed driveway layout would occur
- one forklift movement would occur outside the proposed bogie exchange workshop on the western site boundary
- reversing beeper from forklift
- car door slam in carpark
- all roller doors on the existing Mortdale Maintenance Centre, the proposed bogie exchange workshop and the wash bay would be open during operations as a conservative assumption.

Scenario 3 – Night-time - Existing operations

- one 8-car T-set train would move in the parking bay in the Mortdale Maintenance Centre, sounding its horn prior to moving
- car door slam in carpark
- all roller doors on the existing Mortdale Maintenance Centre and the wash bay would be open during operations as a conservative assumption.

Scenario 4 – Night-time - Future operations

- one 8-car T-set train would move in the parking bay in the Mortdale Maintenance Centre, sounding its horn prior to moving
- bogie drop would occur within the proposed bogie exchange workshop
- all roller doors on the existing Mortdale Maintenance Centre and the proposed bogie exchange workshop and the wash bay would be open during operations as a conservative assumption
- car door slam in carpark.

A summary of the predicted operational noise impacts associated with the existing operations of the Mortdale Maintenance Centre, and of the proposed Mortdale Maintenance Centre with bogie exchange workshop is presented for the daytime in **Table 6.19** and for the night-time in **Table 6.20**. A conservative approach was taken in developing the operational assumptions used to complete this assessment. This was done in order to ensure that operational noise impacts at sensitive receivers are not under-predicted, and adequate noise management and mitigation measures are considered early in the Proposal. The modelling in this assessment has been based off site measurements from the Hornsby Maintenance Centre. It is noted that the Hornsby bogie exchange system is older and likely to have a higher noise level than what is proposed at Mortdale Maintenance Centre and hence is a conservative assumption. The actual activities of the Proposal once fully operational are therefore likely to be less than what has been considered here and as such, the operational noise impacts would be lower.

Table 6.19 Summary of predicted noise levels for daytime operations of the Mortdale Maintenance Centre

Operations	Meteorological condition	Project noise trigger level, dB(A)	Maximum L _{Aeq} noise level dB(A)	Number of receivers exceeding project noise trigger levels
Existing	Standard meteorological conditions	44	42	0
	Noise-enhancing meteorological conditions	44	45	1
Future	Standard meteorological conditions	44	45	1
	Noise-enhancing meteorological conditions	44	45	4

Table 6.20 Summary of predicted noise levels for night-time operations of the Mortdale Maintenance Centre

Operations	Meteorological condition	Project noise trigger level, dB(A)	Maximum L _{Aeq} noise level dB(A)	Number of receivers exceeding project noise trigger levels
Existing	Standard meteorological conditions	35	26	0
	Noise-enhancing meteorological conditions	35	27	0
Future	Standard meteorological conditions	35	38	3
	Noise-enhancing meteorological conditions	35	38	4

Table 6.21 presents a summary of the sleep disturbance noise levels associated with forklift reversing beepers, car door slams, and train horns for the existing and future operations. These noise levels were predicted at nearby residential receivers to the Proposal area.

Table 6.21 Summary of predicted L_{Aeq} and L_{Amax} noise levels for maximum noise level assessment

Operations	Meteorological condition	Sleep disturbance L_{Aeq}		Sleep disturbance L_{Amax}	
		Screening level, dB(A)	Number of receivers exceeding L_{Aeq} noise levels	Screening level, dB(A)	Number of receivers exceeding L_{Amax} noise levels
Existing	Standard meteorological conditions	40	0	52	11
	Noise-enhancing meteorological conditions	40	0	52	18
Future	Standard meteorological conditions	40	0	52	11
	Noise-enhancing meteorological conditions	40	0	52	18

The results of the assessment of the existing and future operations of the Mortdale Maintenance Centre identified a number of exceedances of the project noise trigger levels during the daytime and night-time. As noted above, a conservative approach was taken in developing the operational assumptions used to complete this assessment. The actual activities of the Proposal once fully operational are likely to be less than what has been considered here and as such, the operational noise impacts would be lower.

Table 6.19 shows that during the daytime operational scenarios, noise levels at one receiver are currently predicted to exceed the project noise trigger level by up to 1 dB(A). This receiver is located at 31 Judd Street, the closest residential receiver to the wash facility. By comparison, the assessment of the future daytime operations of the Mortdale Maintenance Centre indicated that up to four receivers are predicted to exceed the project noise trigger levels during the worst-case meteorological condition. Exceedances of up to 1 dB(A) are predicted. These exceedances are located at 31 Judd Street, 3B Wonoona Parade, 25C Waratah Street and 27 Waratah Street. These exceedances are predominantly due to the use of the bogie exchange system and associated warning siren with both roller doors of the building open, with the exception of the exceedance at 31 Judd Street, which is due to the operation of the wash facility.

Table 6.20 shows that the existing night-time operational scenario predicts that there are no exceedances of the project noise trigger levels. However, in the future night-time scenario, noise levels at up to four receivers are predicted to exceed the project noise trigger levels by up to 3 dB(A).

Table 6.21 shows that considering maximum noise levels associated with the operation of the Mortdale Maintenance Centre, there may be up to 18 exceedances of the nominated sleep disturbance criteria for both the existing and future night-time scenarios.

The largest contribution to these exceedances is noise associated with the use of train horns. It should be noted that exceedances of the nominated sleep disturbance occur for both

existing and future assessed scenarios, with no change in maximum noise levels between existing and future operations.

6.3.4 Mitigation measures

Construction phase

A Construction Noise and Vibration Management Plan (CNVMP) should be developed for the Proposal and implemented prior to commencement of construction activities. The CNVMP should include all feasible and reasonable safeguards to manage the noise emissions from the site and any complaints which may occur due to construction noise. The CNVMP should include, as a minimum, the following:

- identification of nearby residences and other sensitive land uses
- description of approved hours of work
- description and identification of all construction activities, including work areas, equipment and duration
- description of what work practices (generic and specific) would be applied to minimise noise and vibration
- a complaints handling process
- noise and vibration monitoring procedures, including for heritage structures
- overview of community consultation required for identified high impact works.

Construction works should be planned and carried out during standard construction hours wherever possible. The standard mitigation measures contained within the *Construction Noise and Vibration Strategy* (TfNSW, 2019) will be considered as mitigation measures as part of the CNVMP.

All residents and sensitive receivers impacted by noise levels from the Proposal which are expected to exceed the NML should be consulted prior to the commencement of the particular activity, with the highest consideration given to those that are predicted to be most affected as a result of the works.

The information provided to the receivers would include:

- programmed times and locations of construction work
- the hours of proposed works
- construction noise and vibration impact predictions
- construction noise and vibration mitigation measures being implemented on site.

Community consultation regarding construction noise and vibration would be detailed in a Community Liaison Management Plan for the construction of the Proposal and would include a 24 hour hotline and complaints management process.

TfNSW's CNVS provides practical guidance on how to minimise, to the fullest extent practicable, the impacts on the community from airborne noise, ground-borne noise and vibration generated during the construction of TfNSW projects. This is managed through the application of all feasible and reasonable mitigation measures. Where exceedances are still expected to occur after standard mitigation measures have been applied, the CNVS recommends the implementation of additional mitigation measures. These mitigation measures are specified within the CNVS and presented in **Table 6.22**.

The provision of additional mitigation is based on the predicted exceedances above RBLs and when the exceedances occur.

Table 6.22 How to implement additional airborne noise management levels

Construction hours	Receiver perception	dB(A) above RBL	dB(A) above NML	Additional management measures
Standard hours Monday-Friday (7am-6pm) Saturday (8am-1pm)	Noticeable	5 to 10	0	-
	Clearly audible	> 10 to 20	< 10	-
	Moderately intrusive	> 20 to 30	> 10 to 20	PN, V
	Highly intrusive	> 30	> 20	PN, V
	75 dB(A) or greater	N/A	N/A	PN, V, SN
OOHW Period 1 Monday-Friday (6pm-10pm) Saturday (7am-8am, 1pm-10pm) Sunday/PH (8am-6pm)	Noticeable	5 to 10	< 5	-
	Clearly audible	> 10 to 20	5 to 15	PN
	Moderately intrusive	> 20 to 30	> 15 to 25	PN, V, SN, RO
	Highly intrusive	> 30	> 25	PN, V, SN, RO, RP#, DR#
OOHW Period 2 Monday-Saturday (12am-7am, 10pm-12am) Sunday/PH (12am-8am, 6pm-12am)	Noticeable	5 to 10	< 5	PN
	Clearly audible	> 10 to 20	5 to 15	PN, V
	Moderately intrusive	> 20 to 30	> 15 to 25	PN, V, SN, RP, DR
	Highly intrusive	> 30	> 25	PN, V, SN, AA, RP, DR

Notes: PN = Project notification
V = Verification monitoring
RP = Respite period
AA = Alternative accommodation

SN = Specific notification, individual briefings, or phone call
DR = Duration respite
RO = Project specific respite order

* SWLs used for the purpose of estimating noise impact shall be increased by 5 dB(A) where works will include: power saws for the cutting of timber, masonry & steel; grinding of metal, concrete or masonry; rock/line drilling; bitumen milling & profiling; jack hammering, rock hammering & rock breaking; or impact piling as a correction factor for noise with special audible characteristics.

Respite periods and duration reduction are not applicable when works are carried out during OOHW Period 1 Day only (i.e. Saturday 6am-7am & 1pm-6pm, Sundays / Public Holidays 8am-6am).

Operational phase

As noted above, a conservative approach was taken in developing the operational assumptions used to complete this assessment. This was done in order to ensure that operational noise impacts at sensitive receivers are not under-predicted, and adequate noise management and mitigation measures are considered early in the Proposal. The actual activities of the Proposal once fully operational may be less than what has been considered here and as such, the operational noise impacts would be lower. TfNSW would undertake ongoing monitoring and would manage any noise arising from the operation of the Proposal.

It is noted that the NPfl noise trigger levels do not represent mandatory noise limits. The project noise trigger level is a level that, if exceeded, would indicate a potential noise impact

on the community, and so would 'trigger' a management response. In this case, the assessment should identify reasonable and feasible mitigation. For new developments and redevelopments, mitigation strategies should be considered in a hierarchical approach:

- Controlling noise at the source
- Once the controls at the source are exhausted, controlling the transmission of noise
- Once source and transmission controls are exhausted, considering mitigation measures at the noise-sensitive receivers.

Site measurements conducted on 22 August 2019 of an existing bogie exchange system indicated that a warning siren is used when the system is in use. It is noted that this bogie exchange system is older and likely to have a higher noise level than what is proposed at Mortdale Maintenance Centre and hence is a conservative assumption. It is proposed that the selection of a warning siren with a lower sound power level than what has been assessed in **Section 6.3.3** would help achieve the project noise trigger levels and would be examined further during the detailed design phase.

6.4 Indigenous heritage

6.4.1 Methodology

A due diligence assessment was undertaken for the Proposal in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010). An Aboriginal Heritage Information Management System (AHIMS) extensive search was undertaken for the area covered by the Proposal (the area around Mortdale Maintenance Centre) on 8 May 2019 (AHIMS Search #419349). The basic search is included as **Appendix D**.

6.4.2 Existing environment

A total of 120 registered AHIMS sites were identified. The majority of identified AHIMS sites in the vicinity of the Proposal Area were Rock shelters, followed by Middens. Other site types included Potential Archaeological Deposits (PADs), Art Sites, Artefact Scatters, Burials, Grinding Groove/s and an area of Aboriginal Resource and Gathering.

The closest Aboriginal site (45-6-0566) is about 200 metres from the Proposal area. The site contained a shell midden and two identified stone artefacts within a matrix of brown sandy soil. It is not within the Proposal area and would not be affected by the works. The extensive landscape modification and high level of disturbance that has occurred across the Proposal area suggests that the presence of culturally sensitive buried items is unlikely within the boundaries of the Proposal area.

6.4.3 Potential impacts

Construction phase

Construction of the Proposal would involve some excavation and other ground disturbance for the following activities:

- earthworks and trenching and regrading works for the bogie exchange system including transfer chamber
- excavation for construction of the new driveway and retaining walls
- trenching excavation for the relocated stormwater drainage and drop pits.

As no known indigenous heritage items are located in the vicinity of the Proposal area, no high-risk landscape features are located at or near the Proposal area and the Proposal area has experienced a high level of past disturbance the potential for unknown items to be present is considered to be low. The Proposal is unlikely to affect indigenous heritage during construction. The management measures recommended in **Section 6.4.4** would be implemented should previously unidentified Indigenous objects be found during construction.

Operational phase

The operation of the proposal would not result in any ongoing impacts upon Indigenous heritage.

6.4.4 Mitigation measures

The following mitigation measure would apply to the Proposal:

- all construction staff would undergo an induction in the recognition of Indigenous cultural heritage material. This training would include information such as the importance of Indigenous cultural heritage material and places to the Indigenous community, as well as the legal implications of removal, disturbance and damage to any Indigenous cultural heritage material and sites
- if unforeseen indigenous heritage objects are uncovered during construction, the procedures contained in TfNSW's *Unexpected Heritage Finds Guideline* (TfNSW, 2019b) would be followed, and works within the vicinity of the find would cease immediately. The Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager so they can assist in co-ordinating next steps which are likely to involve consultation with an Aboriginal heritage consultant, DPIE and the Local Aboriginal Land Council. If human remains are found, work would cease, the site secured and the NSW Police and the DPIE notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained prior to works recommencing at the location

Refer to **Table 7.1** for a list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.5 Non-Indigenous heritage

6.5.1 Methodology

A desktop search of historic heritage registers was undertaken on 30 April 2019 to assess the extent of known historical heritage items in proximity to the Proposal. This included a search of the:

- World Heritage List
- Commonwealth Heritage List
- National Heritage List
- Register of the National Estate (non-statutory archive)
- NSW State Heritage Register (SHR)
- RailCorp's Section 170 Heritage and Conservation Register
- *Hurstville Local Environmental Plan 2012*
- *Kogarah Local Environmental Plan 2012*.

The database searches are included in **Appendix E**.

An Aboriginal and Non-Aboriginal Heritage Impact Assessment Report was prepared by Artefact Heritage in February 2017. The scope of works covered by the assessment were upgrades and additions to the Mortdale Maintenance Centre, including internal and external works within the maintenance sheds and administration building.

Although the scope of work differs from those covered in this REF, the proposal area is the same and therefore the heritage report is deemed relevant for both proposals. The purpose of the heritage assessment is to identify Aboriginal and non-Aboriginal sites or heritage items which may be potentially impacted by the proposed works and provide advice regarding the management of identified heritage issues. The findings of the report have been considered in this assessment. Since the report in 2017, the original shed at the Mortdale Maintenance Centre has been removed from the Mortdale Railway Station and car sheds listing on the RailCorp S170 Heritage and Conservation Register. The reason for the removal is the Mortdale Maintenance Centre has been modified to such an extent that there is no original fabric left.

6.5.2 Existing environment

Database results

The desktop search identified no items listed on the World, Commonwealth or National Heritage Lists within proximity of the Proposal. The location of items near the Proposal area are shown in **Figure 6.5**.

Table 6.23 shows the heritage listed items located within 500 metres of the Proposal area. The items are listed as they appear on Schedule 5 of the relevant LEPs. The listing for each item is also noted, along with the distance from the Proposal area. The location of items near the Proposal area are shown in **Figure 6.5**.

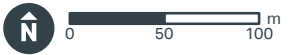
Table 6.23 Locally listed heritage items, S170 and SHR items within 500 metres of the Mortdale Maintenance Centre

LEP	Item name	Address	Property description	Item number	Distance	In view?
Kogarah LEP 2012	Mortdale Public School (Buildings A and B)	52 Colebourne Avenue and 35 Judd Street	Lot 1, DP 910638; Lot 1, DP 723943; Lot 1, DP 182917; Lots 5 and 6, DP 622396	LEP (I116)	170 m	No
Kogarah LEP 2012	Oatley Memorial Clock	On traffic island in Frederick Street, west of intersection with Oatley Avenue	N/A	LEP (I122)	275 m	No
Kogarah LEP 2012	Oatley Masonic Lodge	11A Letitia Street	Lot A, DP 325569; Lot 20, DP 1043366	LEP (I124)	230 m	No
Kogarah LEP 2012	Oatley Memorial Gardens	2B and 2C Oatley Avenue	Lots 1–26, DP 16690	LEP (I127)	45 m	Yes

LEP	Item name	Address	Property description	Item number	Distance	In view?
Kogarah LEP 2012, RailCorp S170 Register, SHR	Oatley Railway Station group	80 Railway Lands	Lot 14, DP 839742	LEP (I129) S170 SHR 01214	145 m	No
Hurstville LEP 2012, Ausgrid S170 Register	Electricity Substation No 10020	31 Cook Street, Mortdale	Lot B, DP 154171	LEP (70), S170	490 m	No
Hurstville LEP 2012, RailCorp S170 Register	Mortdale Railway Station and car sheds	Illawarra rail line	N/A	LEP (71) S170	400 m	No
Hurstville LEP 2012	Mortdale Uniting Church (Church only)	18 Morts Road, Mortdale	Lots 11 and 12, DP 4817	LEP (73)	480 m	No
Hurstville LEP 2012	Mortdale Memorial Park	65 Oxford Street, Mortdale	Lot 2, DP 232106; Lots 27–44, Section J, DP 2921	LEP (76)	750 m	No
Hurstville LEP 2012, RailCorp S170 Register, SHR	Oatley Railway Station Group	Illawarra rail line	N/A	LEP (78) S170 SHR 01214	145 m	No
Hurstville LEP 2012	“Bangala”	7 Myall Street, Oatley	Lot 24, Section 15, DP 4513	LEP (81)	470 m	No



FIGURE 6.5 HERITAGE ITEMS NEAR THE PROPOSAL



Legend
 General heritage item

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Historical background

The Mortdale Maintenance Centre had been assessed as having local heritage significance for its association with the Bradfield Electrification plan in the mid-1920s which established the car sheds as the first of its kind on a suburban line. The structure of the Mortdale Maintenance Centre has undergone significant redevelopment throughout its history. The Mortdale Railway Station and car sheds listing on the RailCorp S170 Heritage and Conservation Register previously included the shed at the Mortdale Maintenance Centre. However, the original shed has been modified to such an extent that there is no original fabric left and it has been removed from the heritage register. The heritage listing for the Mortdale Station and Car Sheds states: *'The Mortdale sheds have been extensively redeveloped over time, and the centre, now known as the Mortdale Maintenance Centre, is essentially a modern complex'*.

6.5.3 Potential impacts

Construction phase

Given the distance between the site and the other listed non-Indigenous heritage items, the potential for the Proposal to impact on these heritage items is considered negligible.

Operational phase

Given the distance between the site and the nearest listed non-Indigenous heritage items, it is unlikely that the Proposal would adversely affect these items.

6.5.4 Mitigation measures

The following mitigation measures would apply to the Proposal:

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

Refer to **Table 7.1** for a list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.6 Socio-economic

6.6.1 Existing environment

The Proposal is located within the Georges River LGA, across the suburbs of Mortdale and Oatley. The Proposal area is in the south of the Sydney metropolitan area, about 20 kilometres from the Sydney CBD. The Proposal is located on RailCorp owned land.

The Mortdale Maintenance Centre is considered a disturbed site with the current land use as a rail maintenance centre for Sydney Trains. The site is located on land zoned for Rail Infrastructure Facilities (refer to **Figure 4.1**).

The surrounding land uses include educational establishments, an electricity maintenance depot, public recreation spaces and community facilities, commercial businesses and low and medium density residential areas (refer to **Figure 4.1**). Sensitive receivers such as residential, education and community facilities in the vicinity of the Proposal include:

- residential dwellings, about 100 metres south and west
- Mortdale Community Centre, about 200 metres north west
- Carinya School (School for Specific Purpose), about 400 metres north east
- Mortdale Public School, about 500 metres north east
- Georges River College, immediately east
- Oatley Senior Citizen's Club, on the southern portion of the Mortdale Maintenance Centre
- Mortdale-Oatley Baptist Church, about 200 metres north west.

Mortdale Station is located about 600 metres north of the site and Oatley Station is located about 500 metres south of the site.

Oatley is an established residential area, with substantial parklands, and small commercial areas near the railway station and along Mulga Road. Mortdale is an established residential area, with industrial areas in the north west, and commercial areas near the railway station.

A review of the Australian Bureau of Statistics 2016 census data (ABS) was undertaken for Mortdale and Oatley. Mortdale and Oatley have a population of 10,419 and 10,486 people respectively with a median age of 37 and 42 years respectively. About half of the Mortdale and Oatley populations are females (51.6 and 51.5 percent respectively). Over half of the population (62.9 and 58.6 percent respectively) over the age of 15 are employed full time (ABS, 2016). These suburbs have a lower density of residential housing compared with the Greater Sydney region.

6.6.2 Potential impacts

Construction phase

No property acquisition would be required as a result of the Proposal.

Construction of the Proposal has the potential to temporarily affect customers, pedestrians, residents, motorists and other receivers as a result of:

- temporary disruptions to local traffic movements near the Proposal area
- temporary loss of on-street parking on Hurstville Road
- increased truck movements delivering materials and equipment and transporting waste
- construction noise, vibration, dust and visual impacts.

The closest educational facility is located adjacent the construction works (eastern side of the centre). This facility is unlikely to be adversely affected by the works as works would be confined within the boundary of the maintenance centre and mitigation measures would be implemented to control noise.

As outlined in **Section 6.1**, there may be a reduction in on-street parking in the vicinity of the Proposal due to an increased workforce on site.

The proposal would also result in the loss of five on-street parking spaces. Given that on-street parking in this area does not appear to be at capacity the loss of these spaces is not expected to be significant.

Operational phase

As outlined in **Section 6.3**, some additional operational noise impacts may be experienced by the local community. This noise would be the result of increased levels of activity within the maintenance centre, including additional truck and train movements. However, with the implementation of appropriate mitigation measures, operational noise levels at sensitive receivers would be reduced as far as practicable.

As outlined in **Section 6.1.2** operational traffic associated with the Proposal would be negligible. As such there is not expected to be any traffic amenity impacts.

The proposal would result in the loss of five on-street parking spaces on Hurstville Road. Given that on-street parking in this area does not appear to be at capacity the loss of these spaces is not expected to be significant.

The impact of changes to other amenity factors such as those associated with the visual environment and air quality would be minor. Consequently, the potential socio-economic impact from amenity changes during operation are considered to be negligible.

As the operation of the Mortdale Maintenance Centre is largely consistent with existing activities currently undertaken on site, the Proposal is not anticipated to result in any additional socio-economic impacts to the surrounding community or businesses.

6.6.3 Mitigation measures

Mitigation of potential socio-economic impacts can be considered in line with mitigation of traffic impacts and noise impacts outlined in **Sections 6.1** and **Section 6.3** respectively.

In addition, the following mitigation measures are proposed:

- a Community Liaison Management Plan (refer to Section 5) would identify all potential stakeholders and the best practice methods for consultation with these groups
- sustainability criteria would be established to encourage construction personnel to purchase goods and services locally helping to ensure the local community benefits from the construction of the Proposal
- feedback through the submissions process would be encouraged and opportunities and channels for the community and stakeholders to have input into the project would be provided.
- contact details for a 24-hour construction response line, Project Infoline and email address would be provided for ongoing stakeholder contact throughout the construction phase
- the community would be kept informed of construction progress, activities and impacts in accordance with the Community Liaison Management Plan to be developed prior to construction.
- mitigation measures would be implemented in respect of potential impacts on amenity (e.g. noise, dust and visual) as listed in **Section 7.2**

Refer to **Table 7.1** for a list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.7 Biodiversity

6.7.1 Existing environment

Landscape context

The Proposal is located within an urban area that has been extensively modified from its natural condition. This includes complete clearance of all remnant native vegetation throughout the area and replacement with native and exotic vegetation/trees for landscaping purposes.

The Proposal area contains a small number of planted trees around the perimeter of the site, including on top of the existing retaining wall on the west of the site (**Figure 6.7**). The tree species comprise of *Casuarina glauca* (Casuarina) and *Syncarpia glomulifera* (Turpentine) with a number of weedy species such as *Ageratina adenophora* (Crofton weed) and *Bidens pilosa* (Cobbler's pegs) and native species such as *Lomandra longifolia* (Basket grass) acting as ground cover. No EPBC Act or BC Act listed threatened flora or fauna species have been identified within or near the Proposal area.

The nearest remnant vegetation occurs in the riparian corridor of the Georges River about 1.8 kilometres to the south west of the Proposal area. There is no contiguous corridor between the Proposal area and this riparian area. The Proposal area is not deemed as bushfire prone. No waterways or key fish habitat are within the Proposal area.

There are a number of priority weeds that have been identified in the Georges River LGA which may be present within the Proposal area.

Threatened species and communities

A search of the Atlas of NSW Wildlife (May 2019) identified a number of records of threatened flora and fauna listed under the BC Act or EPBC Act near the Proposal area. One species, *Pteropus poliocephalus* (Grey-headed Flying-fox), which is listed as vulnerable under both the BC Act and the EPBC Act, was recorded within 200 metres of the Proposal area (sighting location shown in **Figure 6.6**).

An EPBC Act Protected Matters search identified the following threatened ecological communities as likely to occur within five kilometres of the Proposal area:

- Shale Sandstone Transition Forest of the Sydney Basin Bioregion
- Subtropical and Temperate Coastal Saltmarsh
- Turpentine-Ironbark Forest in the Sydney Basin Bioregion.

None of these threatened ecological communities, or any other threatened ecological communities listed under the BC Act or EPBC Act were identified within the Proposal area during the site inspection.

The results of the database searches are included as **Appendix F**.



Figure 6.6 Pteropus poliocephalus (Grey-headed Flying fox) record within 200 metres of the proposal area



Legend

Proposed works

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Figure 6.7 Existing vegetation and fencing along the western boundary (photo facing south)

6.7.2 Potential impacts

Construction phase

The majority of the Proposal would be undertaken within the existing Mortdale Maintenance Centre on an existing paved area.

Vegetation removal including the removal of shrubs and four trees would be required on the western perimeter of the site to accommodate the new exit driveway. The four trees to be removed have been identified as comprising of three *Casuarina glauca* (Casuarina) and one *Syncarpia glomulifera* (Turpentine). The groundcover species consist of *Lomandra longifolia* (Basket grass) and a variety of common exotic grasses and weeds. The trees to be removed are shown in **Figure 6.8**. The loss of this vegetation would not be significant in the context of the low biodiversity value of the surrounding urban area. All vegetation removed would be subject to the *Vegetation Management (Protection and Removal) Guideline* (TfNSW, 2019c).

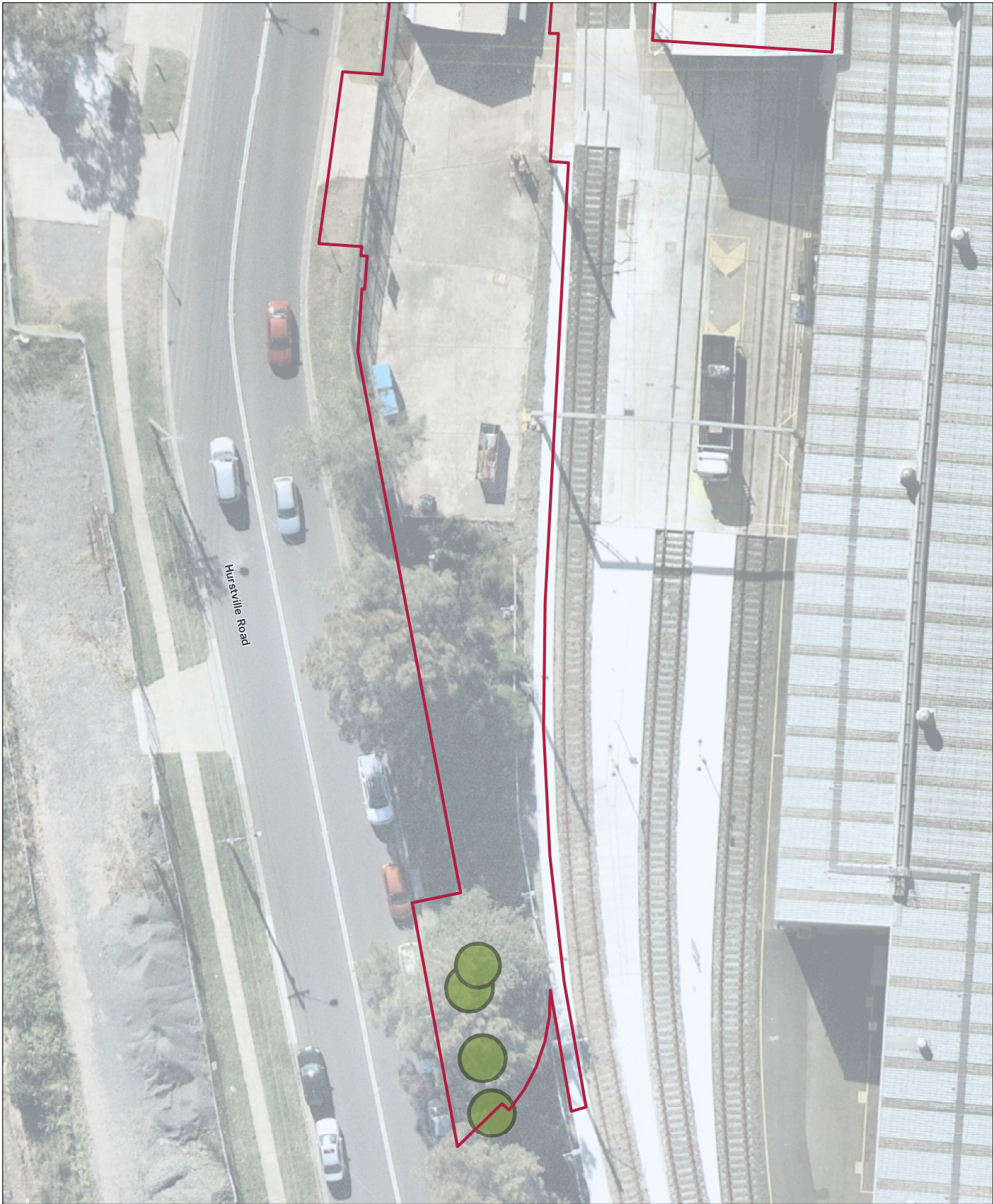
Without the implementation of appropriate mitigation measures, there is potential for the proliferation of weed species as a result of construction activities, including species listed as priority weeds under the *Biosecurity Act 2015*. Construction activities also have the potential to import new weed species into the Proposal area.

During construction, noise, dust, light and contaminated pollution (uncontrolled stormwater runoff) impacts upon biodiversity are predicted to be minimal; however, there may be some indirect impacts to fauna species that may use the trees outside of the Proposal area as habitat.

Grey-headed Flying-foxes do not feed on Casuarina seeds, nor are these trees usually suitable temporary roosting sites due to relatively dense foliage and typically small branches. The species does use Casuarinas as permanent camp roosts, to access other resources that may be surrounding the tree, however given the lack of surrounding feeding resources, this is not relevant in this location. As such the removal of these trees would not result in a significant impact upon habitat for this species. Similarly, the removal of one Turpentine would not be expected to result in adverse impacts to any species given the availability of other suitable habitat trees in the wider area.

A significant impact assessment under the NSW BC Act or Commonwealth EPBC Act has not been undertaken as the Proposal is unlikely to result in a significant impact to any threatened species including the Grey-headed Flying-fox. Given the minor extent of the Proposal and minimal vegetation requiring removal, the Proposal is not likely to disrupt the lifecycle or ongoing viability of the population within the wider Sydney area.

Mitigation measures outlined in **Section 6.7.3** would be implemented to minimise indirect impacts on biodiversity.



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FIGURE 6.8 TREES PLANNED TO BE REMOVED

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- Legend**
- Proposed works
 - Tree to be removed

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Operational phase

Biodiversity impacts associated with the operation of the Proposal would be limited to direct disturbance of fauna in the area as a result of activities within the Mortdale Maintenance Centre. These activities would not be extensive and impacts upon biodiversity values would be negligible.

6.7.3 Mitigation measures

The following mitigation measures would apply to the Proposal:

- construction of the Proposal must be undertaken in accordance with TfNSW's *Vegetation Management (Protection and Removal) Guideline* (TfNSW, 2019c) and TfNSW's *Fauna Management Guideline* (TfNSW, 2019d)
- all workers would be provided with an environmental induction prior to commencing work onsite. This induction would include information on the protection measures to be implemented to protect vegetation, penalties for breaches and locations of areas of sensitivity
- disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal. Trees nominated to be removed would be clearly demarcated onsite prior to construction, to avoid unnecessary vegetation removal. Trees to be retained would be protected through temporary protection measures discussed below
- tree Protection Zones (TPZs) would be established around trees on the western perimeter of the site to be retained. Tree protection would be undertaken in line with *AS 4970-2009 Protection of Trees on Development Sites* and would include exclusion fencing of TPZs
- in the event of any tree to be retained becoming damaged during construction, the Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible
- should the detailed design or onsite works determine the need to remove or trim any additional trees, which have not been identified in the REF, separate approval would be required and the Contractor would be required to complete TfNSW's Tree Removal Application Form and submit it to TfNSW for approval in accordance with TfNSW's *Vegetation Management (Protection and Removal) Guideline* (TfNSW, 2019c).
- for new landscaping works, mulching and watering would be undertaken until plants are established
- weed control measures, consistent with TfNSW's *Weed Management and Disposal Guideline* (TfNSW, 2019e), would be developed and implemented as part of the CEMP to manage the potential dispersal and establishment of weeds during the construction phase of the project. This would include the management and disposal of weeds in accordance with the *Biosecurity Act 2015*.

Refer to **Table 7.1** for a list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.8 Contamination, landform, geology and soils

6.8.1 Methodology

The geotechnical investigation fieldwork at Mortdale Maintenance Centre was carried out on 27 November 2018 and 3 December 2018. The field investigation involved:

- drilling of two cored boreholes at the proposed new maintenance shed location to a depth of 4.77 metres and 8.79 metres below the existing ground surface
- walk over and visual observation of the ground condition at the proposed location of the new substations.

The location of the two boreholes are shown in **Figure 6.9** and described in **Table 6.24**.

Table 6.24 Borehole location descriptions

Borehole ID	Approximate location (MGA94)	Existing Ground level (metres Australian Height Datum (AHD))	Borehole depth (metres)	Borehole location description
MMC-BH01	322535.4, 6238778.7	46.9	4.77	On the north boundary of proposed new shed.
MMC-BH02R	322526.5, 6238722.2	46.7	8.79	On the south boundary of proposed new shed, and close to the existing access gate on Hurstville Road.



FIGURE 6.9 BOREHOLE LOCATIONS FOR THE SOIL AND GROUNDWATER TESTING AROUND THE PROPOSAL



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Legend

⊕ Borehole

6.8.2 Existing environment

Geology

The elevation of the site is about 40 metres above sea level and is consistent across the area. The site is less than two kilometres from Georges River, and in the proximity of a small tributary. Fill and pavement form the uppermost ground layers. The general topography of the locality has a gentle slope from west to east, with the Mortdale Maintenance Centre built on levelled land using retaining walls, rock cuts and/or fill batters along the western side of the centre (Hurstville Road side).

The site is largely underlain by Middle Triassic period Wianamatta Group Ashfield Shale comprising black to dark grey shale and laminate. The geology of the Proposal area is dominated by silt and clay sized alluvial materials derived from the Wianamatta Group. A portion of the Proposal area overlies Hawkesbury Sandstone, consisting of medium to coarse grained quartz sandstone.

The Proposal area is at an interface of the Blacktown, Lucas Heights, and Gymea soil landscapes. Soils within the Proposal area are most likely to be Blacktown Soils, consisting of shallow to moderately deep (<100 centimetres) Red and Brown Podzolic Soils on crests, upper slopes and well-drained areas; and deep (150-300 centimetres) Yellow Podzolic Soils and Soloths on lower slopes and in areas of poor drainage. Soils of the Lucas Heights and Gymea landscape, consisting of moderately deep Yellow Earths and Earthy Sands, hardsetting Yellow Podzolic Soils and Siliceous Sands may also occur.

The site investigation undertaken in November and December 2018 identified the following key findings with regard to the ground profile at the project area:

- new padmount substations: existing shale batter of about 2 to 3 metres high comprising of highly to moderately weathered shale of very low to medium strength, with sub horizontal bedding and sub-vertical joints on the batter surface. Based on the site observation, existing fill and residual soil layers may be relatively thin at the new substations
- over the northern section of the shed, near borehole MMC-BH01 location, the weathered shale bedrock would likely be encountered close to the underside of the existing hardstand surface
- at borehole MMC-BH02R location near the existing gate on Hurstville Road, the encountered shale bedrock was at about 1.8 metres to 2 metres deep. Medium to high strength shale bedrock was encountered below about 5 metres deep
- on the eastern side fill material may be expected up to about 3 metres and reducing in thickness towards the west.

Acid sulfate soils

Acid sulfate soil risk maps have been obtained from the Kogarah LEP 2012. Based on these maps, there is no known occurrence of acid sulfate soils at the site.

Contamination

Railway corridors have the potential to contain various contaminated materials from historical and operational sources. Such sources relate to the long-term operation of the railway and the history of nearby contaminating activities. The Mortdale Maintenance Centre has an extensive history as an industrial site utilised for train maintenance. Possible sources of contamination may include fill materials, hazardous materials from structures, leaks and spills of fuels.

The *AS 4482.1-2005 - Guide to the investigation and sampling of sites with potentially contaminated soil - Non-volatile and semi-volatile compounds* lists the chemicals used by

specific industries. The Standard lists the following chemicals that are commonly associated with railway yards and therefore may be present at the Mortdale Maintenance Centre:

- hydrocarbons
- arsenic
- phenolics
- heavy metals
- nitrates and ammonia.

A Limited Contamination Investigation (Coffey, 2019), was undertaken for the More Trains, More Services Project and included an investigation of contamination at the Mortdale Maintenance Centre. The investigation included the core drilling of two boreholes at the proposed new shed location. The following ground conditions were encountered during the drilling of the boreholes:

- hardstand concrete (200 mm thick), followed by a layer of fill which ranged in thickness from 0.2 metres to 0.7 metres thick and comprised Gravelly Clay/Clay. The fill material was underlain by residual soils, 0.3 metres thick. Siltstone, shale and sandstone bedrock was encountered at depths from between 0.7 metres below ground surface (bgs) and 1.7 metres bgs
- PID readings for volatile hydrocarbons were reported at 0.7 ppm to 1.1 ppm indicating that volatile hydrocarbons were unlikely to be present
- no evidence of contamination such as odours, staining or visual asbestos were reported in the boreholes.
- groundwater inflow was recorded a depth of approximately 3.1 metres bgs within the weathered sandstone bedrock.

A search of the NSW EPA contaminated land record was undertaken on 30 April 2019. The Hurstville LGA and Kogarah LGA were searched. The searches indicated the following:

- there were no records for the site under Section 58 of the CLM Act. There was a record for a landfill located 472 metres to the southeast of the site
- the site has not been notified under Section 60 of the CLM Act. There were two notified properties in the report buffer. These were a motor mechanic located 470 metres to the south east of the site and a landfill located 472 metres to the south east of the site. Both these sites are down gradient and unlikely to present a potential contamination source
- records were identified for licenced activities at the site under the POEO Act including waste generation and storage associated with the maintenance centre. The records included a licence for waste generation at the adjacent Ausgrid site. The waste under both licences is likely to include waste oil and other products associated with maintenance works. Current and historical licences were identified for several properties within the report buffer, however these activities are considered unlikely to pose a contamination risk to the site.

The database searches are included as **Appendix G**.

6.8.3 Potential impacts

Construction phase

Soil disturbance, erosion and sedimentation

The following excavation works are anticipated for the Proposal:

- excavation and removal of the fill and residual soil required over the eastern section of the Proposal area for pad foundation construction required for the new substations
- excavation of a trench 4 metres wide by 10 metres long, and up to 3 metres – 4 metres deep below the existing ground surface would be required for a new bogie drop table installation
- excavation and removal of the fill and residual soil required for pad foundation construction for the new shed
- excavation of soil for the retaining walls.

Piling for the retaining walls and the footings for the shed would be constructed using a mechanical auger. As the auger extracts soil, it would be classified and disposed of offsite appropriately in accordance with the *NSW EPA Waste Classification Guideline – Part 1: Classifying Waste* (EPA, 2014). The Limited Contamination Investigation (Coffey, 2019), identified that concentrations of chemicals above the general solid waste criteria were present at one borehole location, subject to further testing, it is expected that some pockets/portions of the material would not meet the General Solid Waste (non-putrescible) definition.

About 2,400 cubic metres (m³) of spoil would be excavated to accommodate the transfer chamber. Similarly, the spoil would be classified and disposed of offsite appropriately in accordance with the *NSW EPA Waste Classification Guideline – Part 1: Classifying Waste* (EPA, 2014). Once the chamber has been constructed, areas in between the two chambers and to the side of the chambers would be back filled. The chambers and footings would be installed to a depth of up to five metres bgs.

Over the northern section of the shed, near the borehole MMC-BH01 location, the weathered shale bedrock would likely be encountered close to the underside of the existing hardstand surface. The weathered shale bedrock level was gradually deeper toward the south. At borehole MMC-BH02R location near the existing gate on Hurstville Road, the encountered shale bedrock was at about 1.8 metres to 2 metres depth. Hence excavation and removal of the fill and residual soil may be required over the southern section of the shed for pad foundation construction.

For the new substations to the east of the Mortdale Maintenance Centre, foundations would be located on weathered shale bedrock below the hard stand asphalt surface of the existing car park.

About 1,400 cubic metres (m³) of spoil would be excavated for the retaining walls. Retaining walls to be constructed are listed below and shown in **Figure 6.10**.

- approximately 35 metres along the western side of the site, adjacent to the new maintenance shed
- approximately 50 metres long and 1.4 metres high at the south western corner of the site near the new exit driveway
- approximately 50 metres along the newly outlined footpath at the south western corner of the site.

Based on the observed ground conditions, it is expected that excavated materials will comprise some fill, residual soil and potentially in the lower part of excavations, weathered shale of very low to medium strength.

Excavation and other earthworks, if not adequately managed, could result in the following impacts:

- erosion of exposed soil
- dust generation from excavation and vehicle movements over exposed soil
- increase in sediment loads entering the stormwater systems and/or local runoff.

These impacts are considered to be minor given the limited level of ground disturbance required for the Proposal and the relatively flat surrounding topography and stability of the Proposal area. Erosion risks can be adequately managed through the implementation of standard measures as outlined in *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004) (the Blue Book).

Contamination

Excavation and other earthworks have the potential to expose contaminants, which, if not appropriately managed, can present a health risk to construction workers and the community. Contaminants can also pose an environmental risk if they are to enter nearby waterways through the stormwater infrastructure. As there is potential for onsite contamination, chemical testing and visual characterisation in accordance with the NSW EPA *Waste Classification Guideline – Part 1: Classifying Waste* (EPA, 2014) would be undertaken to confirm the composition and nature of excavated material. Where spoil is classified as unsuitable for reuse, it would be transported to an appropriately licensed offsite facility.

Potential contamination impacts may also arise from the use of fuels, lubricants and chemicals for construction plant and equipment for the Project. Fuels, lubricants and chemicals have the potential to be spilled during construction and transfer offsite to adjacent properties or may contaminate the stormwater system.

The storage, use and disposal of chemicals would be undertaken in accordance with Australian Standards, EPA Guidelines and TfNSW's *Chemical Storage and Spill Response Guidelines* (TfNSW, 2018). There is potential for excavation works to encounter areas of unclassified fill because of historic filling and contaminating activities. Unclassified fill has the potential to contain contaminated material such as asbestos, which would impact human health and the surrounding environment if disturbed.

Hydrocarbons and chemicals such as fuels, lubricants and oils would be stored onsite in dedicated facilities such as secure sheds, containers, storage tanks and proprietary hazardous substance cupboards, and in accordance with the applicable Safety Data Sheet (SDS).

Operational phase

The Proposal is not anticipated to contribute to the contamination of the site as operational activities would be undertaken in accordance with relevant legislation, standards and guidelines.

6.8.4 Mitigation measures

The following mitigation measures would apply to the Proposal:

- prior to commencement of works, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the 'Blue Book' *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004) and updated throughout construction so it remains relevant to the activities. The Erosion and Sediment Control Plan measures would be implemented prior to commencement of works and maintained throughout construction

- erosion and sediment control measures would be established prior to any clearing, grubbing and site establishment activities and would be maintained and regularly inspected (particularly following rainfall events) to ensure their ongoing functionality. Erosion and sediment control measures would be maintained and left in place until the works are complete and areas are stabilised
- vehicles and machinery would be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment would also be refuelled offsite, or in a designated refuelling area
- all fuels, chemicals and hazardous liquids would be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards, EPA Guidelines and TfNSW's *Chemical Storage and Spill Response Guidelines* (TfNSW, 2018)
- an appropriate Unexpected Finds Protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. Procedures for handling asbestos containing materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal to be undertaken in accordance with SafeWork NSW requirements
- where soil excavation is required, any surplus excavated material after backfilling would need to be disposed of at an appropriately equipped and licenced facility in accordance with the *Waste Classification Guidelines – Part 1: Classifying Waste* (EPA, 2014)
- adequate water quality and hazardous materials procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implemented in accordance with relevant EPA guidelines and the TfNSW *Chemical Storage and Spill Response Guidelines* (TfNSW, 2018) during the construction phase. All staff would be made aware of the location of the spill kits and be trained in how to use the kits in the case of a spill
- in the event of a pollution incident, works would cease in the immediate vicinity and the Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager. The EPA would be notified by TfNSW if required, in accordance with Part 5.7 of the POEO Act
- storage and use of fuels, chemicals and hazardous liquids during construction of the Proposal would be adequately managed by implementing the *Chemical Storage and Spill Response Guidelines* (TfNSW, 2018).

Refer to **Table 7.1** for a list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.9 Hydrology and water quality

6.9.1 Existing environment

The Proposal area is located about 1.8 kilometres north of the Georges River, one kilometre north east of Gungah Bay, and one kilometre north west of Oatley Bay. Renown Creek, a first order tributary of Georges River is 800 metres west. Georges River extends to Botany Bay, located 6.5 kilometres east of the Proposal area.

Groundwater

The preliminary environmental site investigation (stage 1), undertaken by Environmental Investigation Services in January 2016 (TfNSW, 2017), identified hydrogeological information

for the Proposal area. There are a total of three registered bores within 50 metres of the site. All three bores were installed on the adjacent Ausgrid site, registered for monitoring purposes and installed to depths of about 10.11 metres to 10.25 metres. Standing water levels in the bores ranged from four metres bgs to 8.5 metres bgs. Groundwater was not observed during the auger drilling of the boreholes up to about 2.15 metres depth. It was not possible to assess whether groundwater was present beyond 2.15 metres depth. A Limited Contamination Investigation (Coffey, 2019) however recorded groundwater inflow at a depth of approximately 3.1 metres bgs within the weathered sandstone bedrock.

Stormwater

The Proposal area is located on a hardstand area with a sloping gradient from north to south. There is an existing drainage system within the Proposal area including underground pipework, underground pits/grates, roof drainage, downpipes, spoon drains and swales which collects stormwater drainage from the centre and discharges to the local council drainage system. Stormwater drainage discharge points are located in the north west and south east of the site. A small section of vegetated land at the south western side of the Proposal area assists in retaining some water runoff.

Flooding

The Proposal area is not mapped within a flood planning area under the Kogarah LEP. The mapping of areas subject to flood related development controls indicates that the 100 year Average Recurrence Interval storm event flood does not affect the site. The *Draft Hurstville LGA Overland Flood Study* (SMEC, 2016) further identifies that the Proposal area is not located within the mapped probable maximum flood extent.

Wastewater

A wastewater treatment plant is in operation on site to predominately treat wastewater from train cleaning. Wastewater is currently discharged in accordance with Sydney Water discharge standards in the Sydney Water Trade Wastewater Agreement (TWA) for the site.

The existing wastewater treatment plant consists of aerated holding tank, duty-standby diaphragm pumps, oil water separator, duty-standby caustic soda dosing pumps, pH instrument, flow monitoring instrument and caustic soda chemical drums (bundled).

The wastewater treatment plant is currently operated in accordance with Sydney Water TWA requirements and meets the agreement discharge standard limits.

6.9.2 Potential impacts

Construction phase

Excavation below the existing ground surface would be required for construction of the bogie drop table and new exit driveway. Trench excavation of approximately 4 metres wide by 10 metres long, and up to 3 metres to 4 metres below the existing ground surface would be required for the installation of the new bogie drop table.

The Limited Contamination Investigation (Coffey, 2019), identified that groundwater within the Proposal area is encountered at approximately three metres. However, after heavy rainfall events, perched water may be temporarily encountered at higher elevations. Any encountered groundwater in excavations, including perched water would be managed using sump and pump.

Should groundwater be encountered, the requirements for an aquifer interference approval/licence would be investigated and obtained if required.

Without appropriate safeguards, pollutants (fuel, chemicals or wastewater from accidental spills and sediment from excavations) could potentially reach nearby stormwater drains.

Activities which would disturb soil during construction work also have the potential to impact on local water quality as a result of erosion and run off sedimentation.

Direct impacts to the underground stormwater may therefore occur due to the modification and construction works. Appropriate controls would be detailed in the CEMP to ensure the drainage points are adequately protected during construction activities.

Works would need to ensure that the drains within the site are kept unobstructed during construction. Dewatering activities would be undertaken in accordance with the 'Blue Book' *Managing Urban Stormwater: Soils and Construction Guidelines* (Landcom, 2004) and *Water Discharge and Reuse Guideline* (TfNSW, 2019f).

Operational phase.

The Proposal would result in an overall increase in hardstand area as vegetation is removed to accommodate a paved access road and exit driveway, which would increase the total impervious area of the Mortdale Maintenance Centre. This could potentially result in larger peak flows entering the stormwater network downstream of the Mortdale Maintenance Centre. This impact is not considered to be significant given the minor extent of hard ground cover in the area and as such the overall change to local hydrology is expected to be negligible.

New drainage and pits are proposed as part of the Mortdale Maintenance Centre upgrade works as shown in **Figure 6.10**. These would be connected to the existing drainage network, along with the establishment of new drainage outlets to connect to existing stormwater pits forming part of the Georges River Council's stormwater system.

No major additional water uses would be required for the operation the Proposal.

No flooding or groundwater impacts onsite or to the surrounding area are anticipated as a result of the Proposal.

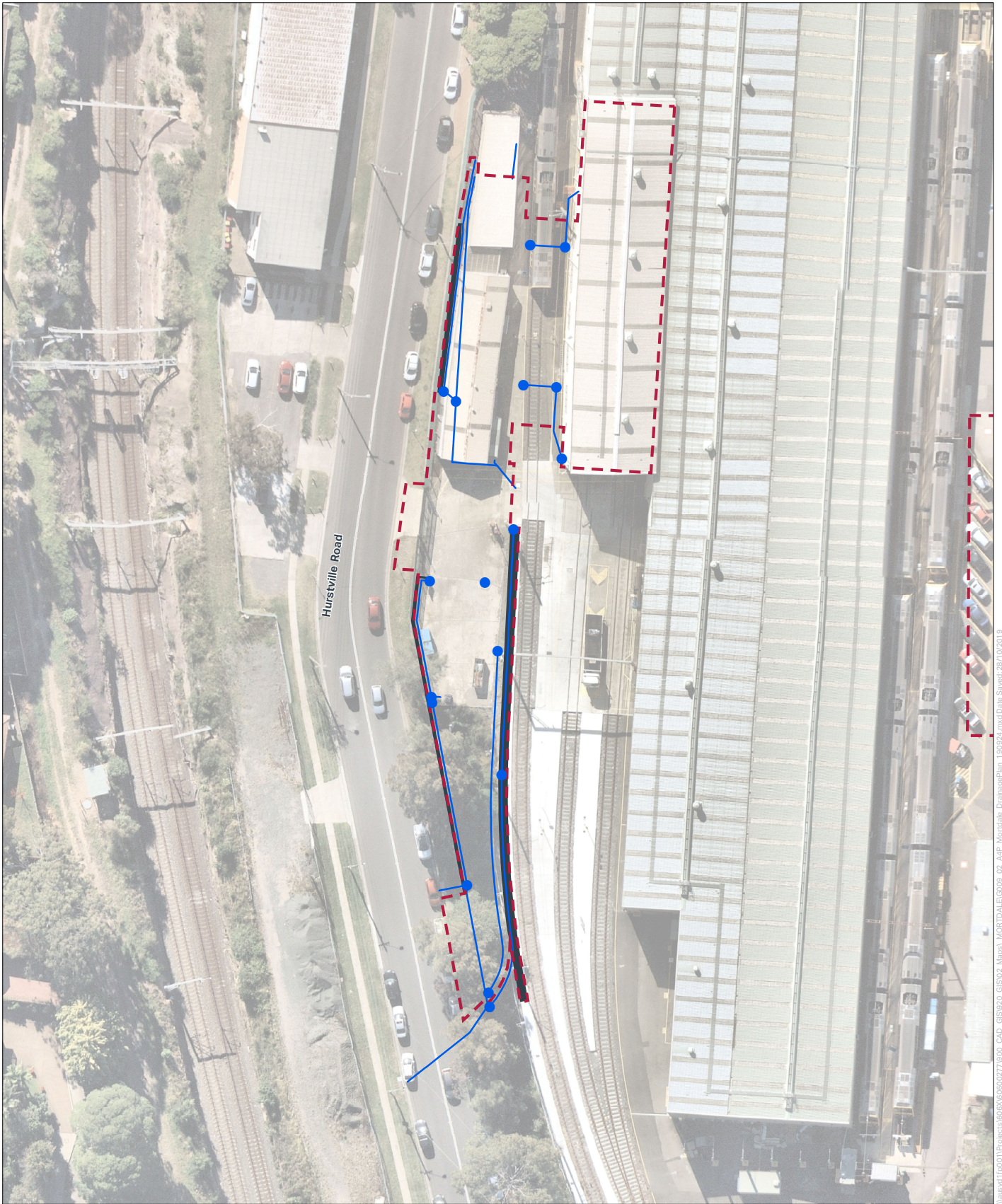


FIGURE 6.10 PROPOSED RETAINING WALLS, DRAINAGE AND PITS AS PART OF THE PROPOSAL

AECOM



- Legend**
- Extent of proposed works
 - Retaining wall
 - Drainage pit
 - Drainage pipe

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6.9.3 Mitigation measures

The following mitigation measures would apply to the Proposal:

- potential risks to local water quality during construction would be adequately managed by implementing standard erosion and sediment controls and managing water discharges from construction sites in accordance with TfNSW's *Water Discharge and Reuse Guideline* (TfNSW, 2019f) and *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004)
- the existing drainage systems would remain operational throughout the construction phase
- should groundwater be encountered during excavation works, groundwater would be managed in accordance with the requirements of the *Waste Classification Guidelines* (EPA, 2014) and TfNSW's *Water Discharge and Reuse Guideline* (TfNSW, 2019f)
- consultation would be undertaken with the Georges River Council regarding any additional discharge in stormwater from the centre into Council's existing drainage system.

Refer to **Table 7.1** for a list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.10 Electric and magnetic fields (EMF)

6.10.1 Methodology

An EMF assessment report was prepared by AECOM (AECOM, 2019b) to assess the impact of the new substation proposed as part of the Mortdale Maintenance Centre upgrade works.

The EMF assessment is included as **Appendix H**.

The assessment is based on the documents detailed in **Table 6.25**.

Table 6.25 Reference drawings and design packages

Drawing number	Title
EL 0011123 (Rev C)	Mortdale Substation HV Outdoor Area Arrangement & Earthing Plan
CV 719350 (Rev B)	MTMS2 – Mortdale Maintenance Centre Bogie Exchange System – Concept Design Package

6.10.2 Health Legislation and Guidelines

Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) has adopted International Commission on Non-Ionizing Radiation Protection's (ICNIRP) 2010 'Guidelines for limiting exposure to time varying electric and magnetic fields (1Hz to 100 kHz)', which it regards as international best practice, for application in Australia.

EMF are found wherever electricity is present, including home and office appliances, sub-stations and electrical cables. All electrical equipment creates electrical and magnetic fields. The electric field is associated with the voltage of the equipment and the magnetic field is associated with the current. In combination, these fields cause energy to be transferred along electric wires. With both electric and magnetic fields, the strength of the field is strongest when close to its source and diminishes rapidly with distance from the source. ARPANSA provide a

summary of typical magnetic field levels that may be encountered in daily life. The levels are shown in **Table 6.26**.

Table 6.26 Typical magnetic field levels encountered

Location	Source	Typical range	
		µT	mG
Home	Television	0.02 - 0.2	0.2 - 2
	Pedestal fan	0.02 - 0.2	0.2 - 2
	Refrigerator	0.2 – 0.5	2 - 5
	Kettle	0.2 - 1	2 - 10
	Toaster	0.2 - 1	2 - 10
	Hairdryer	1 - 7	10 - 70
	Electric Stove	0.2 - 3	2 - 30
	Electric Blanket	0.5 - 3	5 - 30
Public Streets / Neighbourhood	Directly under LV/MV Distribution Line	0.2 - 3	2 - 30
	10 m away from LV/MV Distribution Line	0.05 – 0.1	0.5 - 10
	Directly under HV Transmission Line	1 - 20	10 - 200
	At the edge of HV Transmission Line Easement	0.2 - 5	2 - 50
	Above underground cables (voltage not defined)	0.5 - 20	5 - 200

Note 1: The range of typical magnetic field levels associated with common household/office appliances are at normal user distances.

The possibility of adverse health effects due to the EMF associated with electrical equipment has been comprehensively studied over several decades worldwide. To date the scientific evidence does not establish that exposure to EMF found around the home, office or near power lines causes health effects.

Personal medical devices

For persons wearing Active Implanted Medical Devices (AIMDs), which include pacemakers and implantable defibrillators, the most relevant standard is considered to be European Standard *EN 50527-1 (2016) Procedure for the assessment of the exposure to electromagnetic fields of workers bearing active implanted medical devices*. Clause 4.1.2 of this standard states that:

“AIMDs are expected to function as described in their product standards as long as the General Public Reference levels of Council Recommendation 1999/519/EC (except for static magnetic fields) are not exceeded... and where no specific warnings have been issued to the AIMD-Employee.”

In regard to AIMD manufacturers, what this means in practice is that the devices need to be designed with an immunity up to the general public reference levels. Based on the date of the referred European Council recommendation, this means that older AIMDs are considered to be immune up to 100µT (1,000mG).

For persons wearing a hearing aid or cochlear implant there is the standard risk of 50Hz magnetic field noise occurring, which will not damage the devices or the ear. Where the device has a loop system receiver, operating the device in this mode will also function correctly as the magnetic field strength of the induction loop transmissions are to be designed with a high enough signal-to-noise ratio over background magnetic fields (as per EN 60118-4).

Whilst modern AIMDs are expected to be designed with consideration of the current published Reference Levels, due to differences between manufacturers and countries of origin, we recommend any persons concerned consult with their physician.

6.10.3 Existing environment

The existing substation is located on the eastern side of the Mortdale Maintenance Centre.

It is an outdoor HV substation supplied via Sydney Trains 33kV Feeder 705 with the following details:

- two 33kV/415V, 500kVA transformers
- busbars and termination structures for two 33kV incoming feeders.

AECOM has performed an EMF measurement of the existing Mortdale Maintenance Centre substation to the public. The chosen location was at the road between Mortdale Maintenance Centre substation and Georges River College carpark. It was found that the EMF level at the site fence/public boundary is negligible (<1mG).

The existing substation is analysed by using HIFREQ CDEGS to estimate the EMF level.

The main source of EMF is at the 33kV busbar with a height of 4.5 metres. During full load, the current flowing to the busbar is approximately 30A.

The calculated magnetic field contribution at a height of 1 metre above ground level under full loading is shown in **Figure 6.11** below.

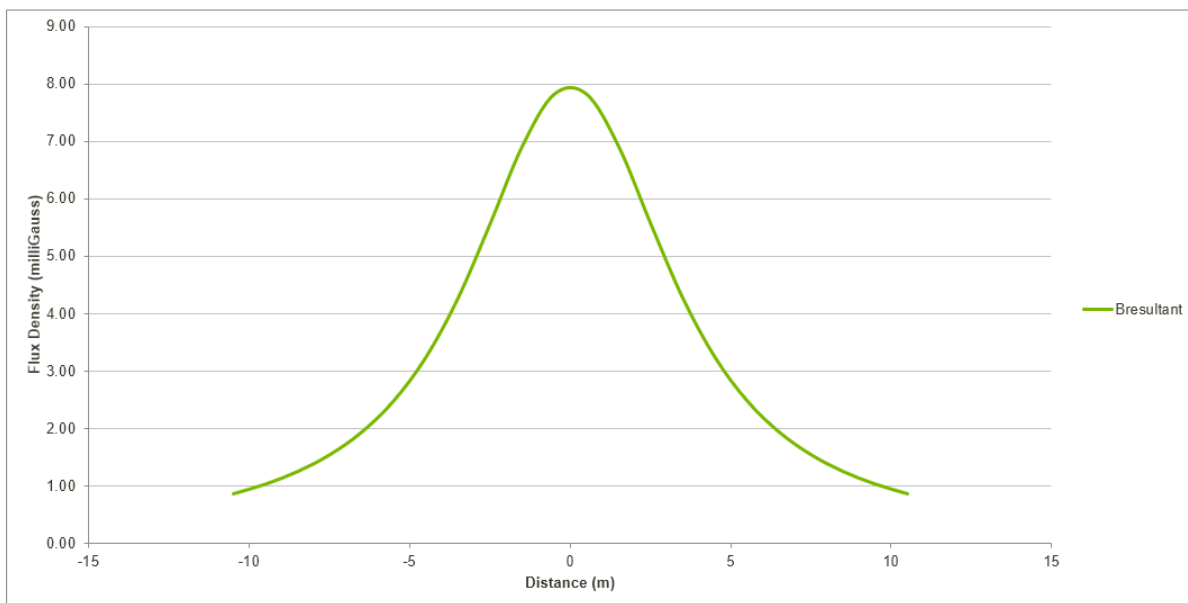


Figure 6.11 Existing substation

From the results shown in **Figure 6.11**, the magnetic field has a maximum of 8mG near the equipment and drops to a negligible value (<1mG) at 10 metres distance. The public boundary fence is 10 metres away from the substation.

6.10.4 Potential impacts

Construction phase

The construction of the proposal, including new padmount substations, would not result in additional EMF impacts over the existing environment at the Mortdale Maintenance Centre.

Operation phase

The proposed new substation would consist of three padmount substations supplied via Sydney Trains 11kV Feeder 663 with the following details:

- two 11kV/415V, 800kVA transformers
- one 11kV/415V, 500kVA transformer
- each transformer will be connected to a Ring Main Unit (RMU)
- 3C x 95mm² 11kV cable from Pole 44 and Pole 45
- new LV cable bridge from substation to the workshop
- new Mortdale Maintenance Centre Installation Supply Main Switchboard (ISMSB)

The proposed substation was analysed using Ausgrid's EMF calculator for 11kV and 415V electrical systems.

11kV/415V Substation

The maximum LV current flowing at the substation will be 800A. The predicted EMF is shown in **Figure 6.12** below.

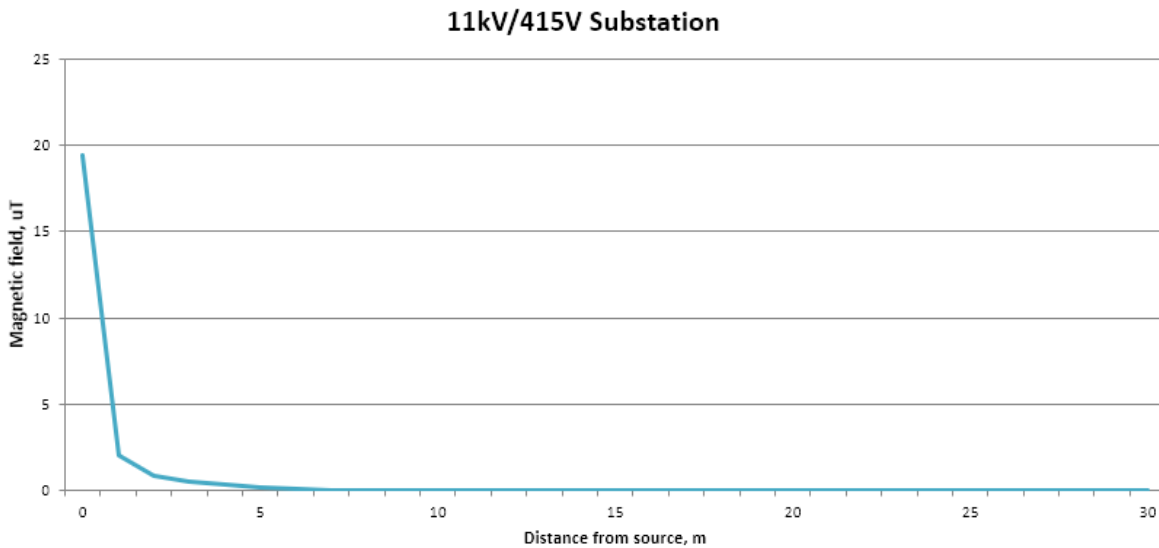


Figure 6.12 11kV/415V Substation predicted EMF

From the results above, the magnetic field has a maximum of 200mG (20µT) at the equipment and drops rapidly to negligible value at 6 metres distance. The proposed substation has an enclosure for the live equipment.

11kV Cable Trench

The 11kV cables will be installed in a trench at 800 millimetres deep in conduits. The estimated current flowing in 11kV cables will be 120A as shown in **Figure 6.13**.

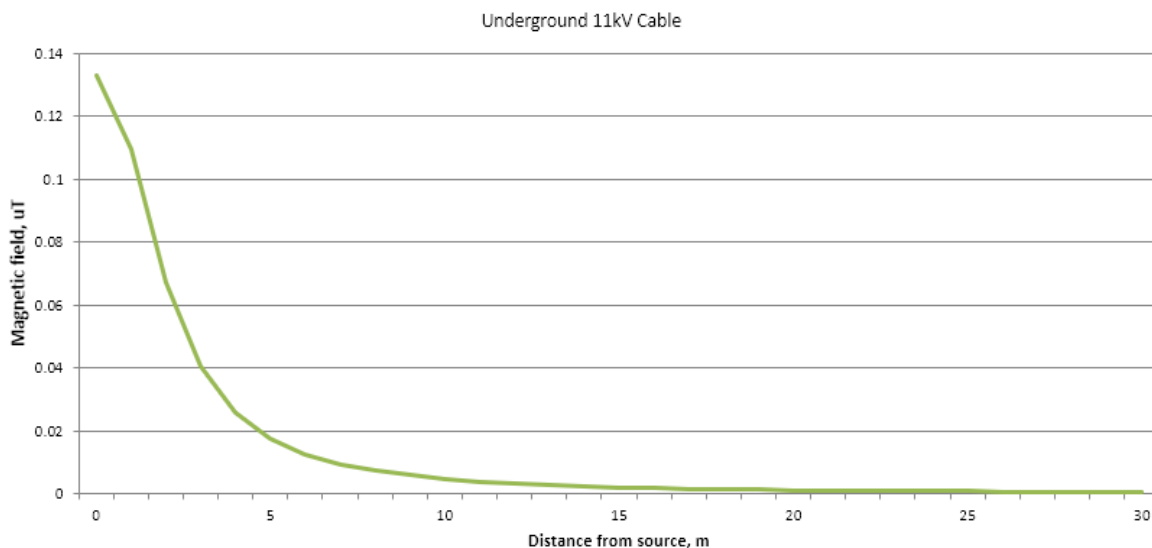


Figure 6.13 11kV Cable EMF

The EMF exposure for 11kV cables is predicted to have a maximum of 1.4mG (0.14µT) and reduced to a negligible level at 2 metres distance.

The calculated magnetic field in all locations are confirmed to be well beneath the recommended Reference Levels applied to the general public and personnel at full loading conditions.

6.10.5 Mitigation measures

The following mitigation measures are in accordance with Prudent Avoidance and would apply to the Proposal:

- for the new 33kV aerial line section, we recommend the design apply a delta arrangement, if practical, to maximise the magnetic field cancellation
- the new 11kV cable is understood to be a three core cable, which is preferred over single core cables to maximise the magnetic field cancellation
- the design has located the substation within the Mortdale Maintenance Centre site, in an area where general public access is unlikely
- openly share to public and staff the EMF health issue and the proposed facilities
- ensure staff awareness of the EMF health issue and field sources within the substation
- staff with medical implants should consult with their physician if working in high EMF exposure areas.

6.11 Air quality

6.11.1 Existing environment

Based on a review of the existing land uses surrounding the Proposal, the existing air quality is considered to be characteristic of a typical suburban environment in Sydney. There are several sources that may be contributing to the air quality in the study area as discussed below.

DPIE monitor air quality across NSW. Ground-level ozone (a key component of photochemical smog which appears as white haze in summer) remains an issue for Sydney and concentrations generally continue to exceed national air quality standards on a number of days each year.

A search of the National Pollutant Inventory database was undertaken on 30 April 2019. The database search indicated that there are no industrial sources that have reported emissions in the suburbs of Mortdale or Oatley.

A number of non-industrial sources in the study area have the potential to influence the local air quality to varying degrees. These include:

- vehicle exhaust from the surrounding road network, with particular focus on vehicles on Hurstville/Boundary Road
- domestic solid fuel burning
- railways (diesel freight).

Potentially affected receivers within the vicinity of the site Proposal include local residents, businesses, community centres and schools surrounding the site.

6.11.2 Potential impacts

Construction phase

Temporary air quality impacts that have the potential to occur during construction include minor increases in dust and emissions of carbon monoxide, sulphur dioxide, particulate matter, nitrous oxides, volatile organic compounds and other substances associated with excavation and the combustion of diesel fuel and petrol from construction plant and equipment.

Anticipated sources of dust and dust-generating activities include:

- demolition of existing infrastructure
- trenching and excavation for the bogie exchange system, utility relocation and new driveway
- vegetation removal
- stockpiling activities
- loading and transfer of material from trucks
- other general construction activities.

The air quality impact associated with the above activities would be localised and generally contained within the Mortdale Maintenance Centre. These impacts would be small scale, involving low numbers of machinery, vehicles and equipment. They would also be intermittent and temporary, being restricted to operating hours over the construction period. Appropriate measures would be established to manage dust emissions from construction and demolition works. On this basis the overall significance of air quality impacts associated with the construction of the Proposal are expected to be minor.

Operational phase

The Proposal would result in minor increases in the number of vehicles accessing the Mortdale Maintenance Centre. These would be associated with additional staff required to service the full Tangara fleet, as well as trucks to deliver and collect bogies for off-site reconditioning. This additional traffic is not expected to generate substantially more emissions in the context of the moderately busy surrounding road network.

6.11.3 Mitigation measures

The following mitigation measures would apply to the Proposal:

- air quality management and monitoring for the Proposal would be undertaken in accordance with TfNSW's Air Quality Management Guideline (TfNSW, 2018b)
- methods for management of emissions would be incorporated into project inductions, training and pre-start/toolbox talks
- plant and machinery would be regularly checked and maintained in a proper and efficient condition. Plant and machinery would be switched off when not in use, and not left idling
- vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable.

To minimise the generation of dust from construction activities, the following measures would be implemented:

- apply water (or alternate measures) to exposed surfaces (e.g. unpaved roads, stockpiles, hardstand areas and other exposed surfaces)
- cover stockpiles when not in use
- appropriately cover loads on trucks transporting material to and from the construction site and securely fix tailgates of road transport trucks prior to loading and immediately after unloading
- prevent mud and dirt being tracked onto sealed road surfaces.

Refer to **Table 7.1** for a list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.12 Waste

6.12.1 Potential impacts

Construction of the Proposal would result in the generation of the following waste materials:

- excavated spoil
- asphalt and concrete
- surplus building materials and building waste (metal, timber, plastics, etc.)
- electrical wiring and conduit waste
- hazardous waste (chemicals)
- green waste (including weeds)
- packaging waste
- oil and lubricants
- general waste, including food scraps generated by construction workers.

Efforts to minimise the volume of surplus materials have been undertaken during planning and design of construction activities. Waste management would be outlined in the CEMP and undertaken in accordance with the WARR Act. A Waste Management Plan (WMP) would be prepared to identify potential waste streams associated with the Proposal and outline methods of disposal, reuse and recycling as well as other onsite waste management practices.

The handling, storage, transport and disposal of asbestos (if required) and hazardous waste (including lead waste, if found) would be in accordance with the requirements of relevant EPA and SafeWork NSW guidelines.

Waste management targets in accordance with the *ISCA IS Rating Tool v1.2 (2017)* would be developed for the Proposal and would include reuse and recycling.

The Proposal would not result in changes to operational waste management arrangements.

Mitigation measures to address waste generated during construction of the Proposal are found in **Section 6.12.2** and **Section 7.2**. All measures would be incorporated into the CEMP.

6.12.2 Mitigation measures

The following mitigation measures would apply to the Proposal. The CEMP (or separate Waste Management Plan, if necessary) must address waste management and would at a minimum:

- identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities
- detail other onsite management practices such as keeping areas free of rubbish
- specify controls and containment procedures for hazardous waste and asbestos waste
- outline the reporting regime for collating construction waste data
- an appropriate Unexpected Finds Protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. Procedures for handling asbestos containing materials, including licensed contractor involvement as

required, record keeping, site personnel awareness and waste disposal to be undertaken in accordance with SafeWork NSW requirements

- all spoil to be removed from site would be tested to confirm the presence of any contamination. Any contaminated spoil would be disposed of at an appropriately licensed facility
- any concrete washout would be established and maintained in accordance with TfNSW's *Concrete Washout Guideline* (TfNSW, 2019g) with details included in the CEMP and location marked on the Environmental Controls Map (ECM)
- all spoil and waste must be classified in accordance with the *Waste Classification Guidelines Part 1: Classifying waste* (EPA, 2014) prior to disposal
- the Proponent shall ensure that any transport, handling and management of Hazardous Materials during operation does not result in a potentially hazardous storage environment or present a significant risk to human health, life or property, or the biophysical environment, consistent with State Environmental Planning Policy No. 33 - Hazardous and Offensive Development and associated guidelines.

Refer to **Table 7.1** for a list of proposed mitigation measures. All mitigation measures are to be incorporated into the CEMP.

6.13 Cumulative impacts

In accordance with clause 228 of the EP&A Regulation, any cumulative environmental effects of the Proposal associated with other existing and likely future activities must be taken into account in determining the potential impacts of the Proposal on the environment.

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

A search of DPIE's Major Projects Register, Development and Planning Register, and Georges River Council Development Application Register on 1 May 2019 identified two relevant proposed developments within the area:

- major project – Modification to Mortdale Resource Recovery Facility – Changes to site layout including entry and exit and new loadout bay. Reduced storage bays and changes to the maximum amount of waste that can be stored in these bays. Located 1.6 km north west of Mortdale Maintenance Centre
- Georges River Council – 296 Forest Road Hurstville – construction of the new Hurstville Plaza including public domain works and landscaping. Located 2.5 km northeast of Mortdale Maintenance Centre. No other major developments are within 2 km of Mortdale Maintenance Centre.

6.13.1 Construction

Should the Mortdale Maintenance Centre upgrade Proposal coincide with the above proposals the potential for cumulative impacts is considered to be limited. This is due to their substantial separation from the Proposal, as well as the low likelihood that residual impacts from either would contribute to any environmental or amenity factors exceeding suitable thresholds.

Construction of the Proposal would be coordinated with any other NSW government agency, such as TfNSW (formerly RMS) or Sydney Trains, so as to minimise cumulative construction impacts such as traffic and noise.

6.13.2 Operation

As outlined above, the Proposal would result in negligible operational and transport impacts upon the performance of the surrounding road network. As such it is anticipated that the cumulative impacts would be minor/negligible, provided that consultation with relevant stakeholders and mitigation measures in **Chapter 7** are implemented.

6.13.3 Mitigation measures

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

6.14 Climate change and sustainability

6.14.1 Greenhouse gas emissions

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

The detailed design process would undertake an AS 14064-2 (Greenhouse Gases - project level) compliant carbon footprinting exercise in accordance with TfNSW's *Greenhouse Gas Inventory Guide for Construction Projects* (TfNSW, 2013). The carbon footprint would be used to inform decision making in design and construction.

Due to the small scale of the Proposal and the short-term temporary nature of the individual construction works, it is considered that greenhouse gas emissions resulting from the construction of the Proposal would be minimal. Furthermore, greenhouse gas emissions generated during construction would be kept to a minimum through the implementation of the standard mitigation measures detailed in **Table 7.1**.

6.14.2 Climate change

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

Climate change could lead to an increase in the intensity of rainfall events, whereby the rainfall expected to occur in a 100-year average recurrence interval flood event would occur more frequently. The Proposal is not located on flood liable land or near a major water body thus it is not expected to be impacted by potential rainfall events amplified by climate change.

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

6.14.3 Sustainability

The design of the Proposal would be based on the principles of sustainability, including the incorporation of ISCA V1.2 and the TfNSW Environmental Management System (EMS). These

guidelines require a number of mandatory and discretionary initiatives to be applied. Refer to **Section 3.1.4** for more information regarding the application of these guidelines.

Sustainability is a key priority for More Trains, More Services. TfNSW is committed to delivering sustainable transport for NSW. More Trains, More Services will contribute to the achievement of a sustainable transport system through:

- minimising impacts to the environment through design, construction and maintenance
- reinforcing inherent sustainability benefits
- driving sustainability through recognised rating tools
- maximising energy efficiency, renewables and greenhouse gas reduction
- advocating for sustainable communities
- reporting on progress and achievements.

The construction contractor will (in conjunction with TfNSW) play a role in endeavouring to achieve an ISCA rating of “Excellent” (in accordance with Version 1.2 of ISCA Guidelines) for the delivery, operation and maintenance phases of More Trains, More Services.

7 Environmental management

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

7.1 Environmental management plans

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

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

7.2 Mitigation measures

Mitigation measures for the Proposal are listed below in **Table 7.1**. These proposed measures would minimise the potential adverse impacts of the Proposal identified in **Chapter 6** should the Proposal proceed.

Table 7.1 Proposed mitigation measures

No.	Mitigation measure
	General
1.	A CEMP would be prepared by the Contractor in accordance with the relevant requirements of <i>Guideline for Preparation of Environmental Management Plans</i> (Department of Infrastructure, Planning and Natural Resources, 2004) for approval by TfNSW, prior to the commencement of construction and following any revisions made throughout construction.
2.	A project risk assessment including environmental aspects and impacts would be undertaken by the Contractor prior to the commencement of construction and documented as part of the CEMP.
3.	An Environmental Controls Map (ECM) would be developed by the Contractor in accordance with TfNSW's <i>Guide to Environmental Controls Map</i> (TfNSW, 2018c) for approval by TfNSW, prior to the commencement of construction and following any revisions made throughout construction.
4.	Prior to the commencement of construction, all contractors would be inducted on the key project environmental risks, procedures, mitigation measures and conditions of approval.
5.	Site inspections to monitor environmental compliance and performance would be undertaken during construction at appropriate intervals.
6.	Service relocation would be undertaken in consultation with the relevant authority. Contractors would mark existing services on the ECM to avoid direct impacts during construction.

No.	Mitigation measure
7.	Any modifications to the Proposal, if approved, would be subject to further assessment and approval by TfNSW. This assessment would need to demonstrate that any environmental impacts resulting from the modifications have been minimised.
Traffic and site access	
8.	<p>A construction TMP would be prepared by the construction contractor in consultation with TfNSW and provided to Georges River Council and TfNSW (formerly RMS). The construction TMP would be the primary tool to manage potential traffic and pedestrian impacts associated with construction. At a minimum, the construction TMP would include:</p> <ul style="list-style-type: none"> • ensuring adequate signage at construction work sites • consideration of safety and accessibility for pedestrians and cyclists • ensuring adequate sight lines to allow for safe entry and exit from the site • managing impacts and changes to on and off street parking, and parking locations for construction workers • routes to be used by heavy construction-related vehicles to minimise impacts on sensitive land uses and businesses • details for relocating kiss and ride, taxi ranks and rail replacement bus stops if required, including appropriate signage to direct patrons, in consultation with the relevant bus/taxi operators. Particular provisions would also be considered for the accessibility impaired • measures to manage traffic flows around the area affected by the Proposal, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the TMP.
9.	Consultation with the relevant road authorities would be undertaken during preparation of the construction TMP. The performance of all project traffic arrangements would be monitored during construction
Urban design, landscape and visual amenity	
10.	<p>A Public Domain Plan (PDP) would be prepared by the Contractor, in consultation with Georges River Council, and submitted to TfNSW for endorsement by the Precincts and Urban Design team, prior to finalisation of the detailed design. The PDP, at a minimum, would address the following:</p> <ul style="list-style-type: none"> • materials, finishes, colour schemes and maintenance procedures including graffiti control for new walls, barriers and fences • total water management principles to be integrated into the design where considered appropriate • design measures included to meet ISCA Standards • identification of design and landscaping aspects that will be open for stakeholder input, as required.
11.	All permanent lighting would be designed and installed in accordance with the requirements of standards relevant to <i>AS 1158 Road Lighting</i> and <i>AS 4282 Controlling the Obtrusive Effects of Outdoor Lighting</i> .
12.	The detailed design of the Proposal would comply with Crime Prevention Through Environmental Design principles.
13.	Worksite compounds would be screened with shade cloth (or similar material, where necessary) to minimise visual impacts from key viewing locations.

No.	Mitigation measure
14.	Temporary hoardings, barriers, traffic management and signage would be removed when no longer required.
15.	During construction, graffiti would be removed in accordance with TfNSW's Standard Requirements.
Noise and vibration	
16.	Prior to commencement of works, a Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented in accordance with the requirements of the <i>Interim Construction Noise Guideline</i> (Department of Environment and Climate Change, 2009), <i>Construction Noise Strategy</i> (TfNSW, 2019) and the Noise and Vibration Impact Assessment for the Proposal (AECOM, 2019). The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable.
17.	<p>The CNVMP would outline measures to reduce the noise impact from construction activities. Reasonable and feasible noise mitigation measures which would be considered, include:</p> <ul style="list-style-type: none"> • regularly training workers and contractors (such as at the site induction and toolbox talks) on the importance of minimising noise emissions and how to use equipment in ways to minimise noise • avoiding any unnecessary noise when carrying out manual operations and when operating plant • ensuring spoil is placed and not dropped into awaiting trucks • avoiding/limiting simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver where practicable • switching off any equipment not in use for extended periods e.g. heavy vehicles engines would be switched off whilst being unloaded • avoiding deliveries at night/evenings wherever practicable • no idling of delivery trucks • keeping truck drivers informed of designated vehicle routes, parking locations and acceptable delivery hours for the site • minimising talking loudly; no unnecessary shouting, or loud stereos/radios onsite; no dropping of materials from height where practicable, no throwing of metal items and slamming of doors.
18.	<p>The CNVMP would include measures to reduce the construction noise and vibration impacts from mechanical activities. Reasonable and feasible noise mitigation options which would be considered, include:</p> <ul style="list-style-type: none"> • maximising the offset distance between noisy plant and adjacent sensitive receivers and determining safe working distances • using the most suitable equipment necessary for the construction works at any one time • directing noise-emitting plant away from sensitive receivers • regularly inspecting and maintaining plant to avoid increased noise levels from rattling hatches, loose fittings etc • using non-tonal reversing/movement alarms such as broadband (non-tonal) alarms or ambient noise-sensing alarms for all plant used regularly onsite (greater than one day), and for any out of hours works • use of quieter and less vibration emitting construction methods where feasible and reasonable.

No.	Mitigation measure
19.	Works would generally be carried out during standard construction hours (i.e. 7.00 am to 6.00 pm Monday to Friday; 8.00 am to 1.00 pm Saturdays). Any works outside these hours may be undertaken if approved by TfNSW and the community is notified prior to these works commencing. An Out of Hours Work application would need to be submitted by the Contractor to the TfNSW Environment and Planning Manager for any works outside normal hours.
20.	Where the $L_{Aeq(15\text{minute})}$ construction noise levels are predicted to exceed 75 dBA and/or 30 dBA above the Rating Background Level at nearby affected sensitive receivers, respite periods would be observed, where practicable, and in accordance with TfNSW's <i>Construction Noise and Vibration Strategy</i> (TfNSW, 2019). This would include restricting the hours that very noisy activities can occur.
21.	To avoid structural impacts as a result of vibration or direct contact with structures, the proposed works would be undertaken in accordance with the safe work distances outlined in the Noise and Vibration Assessment (AECOM, 2019) and attended vibration monitoring or vibration trials would be undertaken where these distances are required to be challenged.
22.	Vibration resulting from construction and received at any structure outside of the project would be managed in accordance with: <ul style="list-style-type: none"> • for structural damage vibration - German Standard DIN 4150: Part 3 – 1999 <i>Structural Vibration in Buildings: Effects on Structures</i> and British Standard BS 7385-2:1993 <i>Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)</i> • for human exposure to vibration the acceptable vibration - values set out in the <i>Environmental Noise Management Assessing Vibration: A Technical Guideline</i> (Department of Environment and Conservation, 2006) which includes British Standard BS 7385-2:1993 <i>Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)</i>.
23.	Property condition surveys would be completed prior to piling, excavation of bulk fill or any vibratory works including jack hammering and compaction for all buildings/structures/roads with a plan distance of 50 metres from the works and all heritage listed buildings and other sensitive structures within 150 metres of the works (unless otherwise determined following additional assessment they are not likely to be adversely affected).
24.	A warning siren with a lower sound power level than what has been assessed will be considered further during the detailed design phase.
Indigenous heritage	
25.	All construction staff would undergo an induction in the recognition of Indigenous cultural heritage material. This training would include information such as the importance of Indigenous cultural heritage material and places to the Indigenous community, as well as the legal implications of removal, disturbance and damage to any Indigenous cultural heritage material and sites.

No.	Mitigation measure
26.	If unforeseen Indigenous objects are uncovered during construction, the procedures contained in TfNSW's <i>Unexpected Heritage Finds Guideline</i> (TfNSW, 2019b) would be followed, and works within the vicinity of the find would cease immediately. The Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager so they can assist in co-ordinating the next steps which are likely to involve consultation with an Aboriginal heritage consultant, DPIE and the Local Aboriginal Land Council. If human remains are found, work would cease, the site secured and the NSW Police and DPIE notified. Where required, further archaeological investigations and an Aboriginal Heritage Impact Permit would be obtained prior to works recommencing at the location.
Non-Indigenous heritage	
27.	A heritage induction would be provided to workers prior to construction, informing them of the location of known heritage items and guidelines to follow if unanticipated heritage items or deposits are located during construction.
28.	In the event that any unanticipated archaeological deposits are identified within the project site during construction, the procedures contained in TfNSW's <i>Unexpected Heritage Finds Guideline</i> (TfNSW, 2019b) would be followed, and works within the vicinity of the find would cease immediately. The Contractor would immediately notify the TfNSW Project Manager and the TfNSW Environment and Planning Manager so they can assist in co-ordinating the next steps which are likely to involve consultation with an archaeologist and DPC (Heritage). Where required, further archaeological work and/or consents would be obtained for any unanticipated archaeological deposits prior to works recommencing at the location.
Socio-economic	
29.	A Community Liaison Management Plan would be prepared prior to construction to identify all potential stakeholders and best practice methods for consultation with these groups during construction. The plan would also encourage feedback and facilitate opportunities for the community and stakeholders to have input into the project, where practicable
30.	Sustainability criteria for the Proposal would be established to encourage the Contractor to purchase goods and services locally, helping to ensure the local community benefits from the construction of the Proposal.
31.	Feedback through the submissions process would be encouraged to facilitate opportunities for the community and stakeholders to have input into the project, where practicable.
32.	Contact details for a 24-hour construction response line, Project Infoline and email address would be provided for ongoing stakeholder contact throughout the construction phase.
33.	The community would be kept informed of construction progress, activities and impacts in accordance with the Community Liaison Management Plan to be developed prior to construction.
Biodiversity	
34.	Construction of the Proposal must be undertaken in accordance with TfNSW's <i>Vegetation Management (Protection and Removal) Guideline</i> (TfNSW, 2019c) and TfNSW's <i>Fauna Management Guideline</i> (TfNSW, 2019d).

No.	Mitigation measure
35.	All workers would be provided with an environmental induction prior to commencing work onsite. This induction would include information on the protection measures to be implemented to protect vegetation, penalties for breaches and locations of areas of sensitivity.
36.	Disturbance of vegetation would be limited to the minimum amount necessary to construct the Proposal. Trees nominated to be removed would be clearly demarcated onsite prior to construction, to avoid unnecessary vegetation removal. Trees to be retained would be protected through temporary protection measures discussed below.
37.	Tree Protection Zones (TPZs) would be established around trees on the western perimeter of the site to be retained. Tree protection would be undertaken in line with <i>AS 4970-2009 Protection of Trees on Development Sites</i> and would include exclusion fencing of TPZs.
38.	In the event of any tree to be retained becoming damaged during construction, the Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager to coordinate the response which may include contacting an arborist to inspect and provide advice on remedial action, where possible.
39.	Should the detailed design or onsite works determine the need to remove or trim any additional trees, which have not been identified in the REF, the Contractor would be required to complete TfNSW's Tree Removal Application Form and submit it to TfNSW for approval.
40.	For new landscaping works, mulching and watering would be undertaken until plants are established.
41.	Weed control measures, consistent with TfNSW's <i>Weed Management and Disposal Guideline</i> (TfNSW, 2019e), would be developed and implemented as part of the CEMP to manage the potential dispersal and establishment of weeds during the construction phase of the project. This would include the management and disposal of weeds in accordance with the <i>Biosecurity Act 2015</i> .
Soils and water	
42.	Prior to commencement of works, a site-specific Erosion and Sediment Control Plan would be prepared in accordance with the 'Blue Book' <i>Managing Urban Stormwater: Soils and Construction Guidelines</i> (Landcom, 2004) and updated throughout construction so it remains relevant to the activities. The Erosion and Sediment Control Plan measures would be implemented prior to commencement of works and maintained throughout construction.
43.	Erosion and sediment control measures would be established prior to any clearing, grubbing and site establishment activities and would be maintained and regularly inspected (particularly following rainfall events) to ensure their ongoing functionality. Erosion and sediment control measures would be maintained and left in place until the works are complete and areas are stabilised.
44.	Vehicles and machinery would be properly maintained and routinely inspected to minimise the risk of fuel/oil leaks. Construction plant, vehicles and equipment would also be refuelled offsite, or in a designated refuelling area.
45.	All fuels, chemicals and hazardous liquids would be stored away from drainage lines, within an impervious bunded area in accordance with Australian Standards, EPA Guidelines and TfNSW's <i>Chemical Storage and Spill Response Guidelines</i> (TfNSW, 2018).

No.	Mitigation measure
46.	Adequate water quality and hazardous materials procedures (including spill management procedures, use of spill kits and procedures for refuelling and maintaining construction vehicles/equipment) would be implemented in accordance with relevant EPA guidelines and the TfNSW <i>Chemical Storage and Spill Response Guidelines</i> (TfNSW, 2018) during the construction phase. All staff would be made aware of the location of the spill kits and be trained in how to use the kits in the case of a spill.
47.	An appropriate Unexpected Finds Protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. Procedures for handling asbestos containing materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal to be undertaken in accordance with SafeWork NSW requirements.
48.	Where soil excavation is required, any surplus excavated material after backfilling would need to be disposed of at an appropriately equipped and licenced facility in accordance with the <i>Waste Classification Guidelines – Part 1: Classifying Waste</i> (EPA 2014).
49.	In the event of a pollution incident, works would cease in the immediate vicinity and the Contractor would immediately notify the TfNSW Project Manager and TfNSW Environment and Planning Manager. The EPA would be notified by TfNSW if required, in accordance with Part 5.7 of the POEO Act.
50.	The existing drainage systems would remain operational throughout the construction phase.
51.	Should groundwater be encountered during excavation works, groundwater would be managed in accordance with the requirements of the <i>Waste Classification Guidelines– Part 1: Classifying Waste</i> (EPA, 2014) and TfNSW's <i>Water Discharge and Reuse Guideline</i> (TfNSW, 2019f).
52.	Consultation would be undertaken with the Georges River Council regarding any additional discharge of stormwater from the Mortdale Maintenance Centre into Council's existing drainage system
53.	Potential risks to local water quality during construction would be adequately managed by implementing standard erosion and sediment controls and managing water discharges from construction sites in accordance with the <i>Water Discharge and Reuse Guideline</i> (TfNSW, 2019f) and <i>Managing Urban Stormwater: Soils and Construction</i> (Landcom, 2004)
Electromagnetic fields	
54.	For the new 33kV aerial line section, it is recommended the design apply a delta arrangement, if practical, to maximise the magnetic field cancellation.
55.	The public and staff are to be made aware of the EMF health issue and field sources within and around the proposed facilities.
Air quality	
56.	Air quality management and monitoring for the Proposal would be undertaken in accordance with TfNSW's <i>Air Quality Management Guideline</i> (TfNSW, 2018b).
57.	Methods for management of emissions would be incorporated into project inductions, training and pre-start/toolbox talks.
58.	Plant and machinery would be regularly checked and maintained in a proper and efficient condition. Plant and machinery would be switched off when not in use, and not left idling.

No.	Mitigation measure
59.	Vehicle and machinery movements during construction would be restricted to designated areas and sealed/compacted surfaces where practicable.
60.	<p>To minimise the generation of dust from construction activities, the following measures would be implemented:</p> <ul style="list-style-type: none"> • apply water (or alternate measures) to exposed surfaces (e.g. unpaved roads, stockpiles, hardstand areas and other exposed surfaces) • cover stockpiles when not in use • appropriately cover loads on trucks transporting material to and from the construction site and securely fix tailgates of road transport trucks prior to loading and immediately after unloading • prevent mud and dirt being tracked onto sealed road surfaces.
Waste and contamination	
61.	<p>The CEMP (or separate Waste Management Plan, if necessary) must address waste management and would at a minimum:</p> <ul style="list-style-type: none"> • identify all potential waste streams associated with the works and outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities • detail other onsite management practices such as keeping areas free of rubbish • specify controls and containment procedures for hazardous waste and asbestos waste • outline the reporting regime for collating construction waste data.
62.	An appropriate Unexpected Finds Protocol, considering asbestos containing materials and other potential contaminants, would be included in the CEMP. Procedures for handling asbestos containing materials, including licensed contractor involvement as required, record keeping, site personnel awareness and waste disposal to be undertaken in accordance with SafeWork NSW requirements.
63.	All spoil to be removed from site would be tested to confirm the presence of any contamination. Any contaminated spoil would be disposed of at an appropriately licensed facility.
64.	All spoil and waste must be classified in accordance with the <i>Waste Classification Guidelines Part 1: Classifying waste</i> (EPA, 2014) prior to disposal.
65.	Any concrete washout would be established and maintained in accordance with TfNSW's <i>Concrete Washout Guideline</i> (TfNSW, 2019g) with details included in the CEMP and location marked on the ECM.
66.	The Proponent shall ensure that any transport, handling and management of Hazardous Materials during operation does not result in a potentially hazardous storage environment or present a significant risk to human health, life or property, or the biophysical environment, consistent with <i>State Environmental Planning Policy No. 33 - Hazardous and Offensive Development</i> and associated guidelines.
Climate change and sustainability	
67.	Detailed design of the Proposal would seek to achieve an excellent rating in accordance with ISCA V1.2.

No.	Mitigation measure
	Cumulative impacts
68.	The potential cumulative impacts associated with the Proposal would be further considered as the design develops and as further information regarding the location and timing of potential developments is released. Environmental management measures would be developed in the CEMP and implemented as appropriate.

8 Conclusion

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

The Proposal would provide the following benefits:

- increase the capacity for maintenance of the Tangara fleet. It would enable the majority of servicing required for the Tangara fleet to be undertaken at Mortdale Maintenance Centre. This would avoid the dead running time and reduced fleet and crew availability that would occur if Tangara trains continued to be serviced between this location and the Hornsby Maintenance Centre, which is the current scenario.

The likely key impacts of the Proposal are as follows:

- noise and vibration from construction related activities, as well as operational noise associated with the additional maintenance activities conducted 24 hours a day, seven days a week at the new bogie exchange workshop
- removal of four trees and underlying mid-storey vegetation on the western side of the Mortdale Maintenance Centre
- potential for contamination to be exposed during the excavation within the Mortdale Maintenance Centre given its extensive history as an industrial site utilised for train maintenance
- removal of five on street parking spaces.

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

The detailed design of the Proposal would be carried out in accordance with the relevant requirements of the *Infrastructure Sustainability Rating Scheme - Version 1.2* (ISCA, 2017) considering the principles of ESD.

The Proposal would also take into account the principles of ESD (refer to **Section 3.1.4 and Section 4.6**). These would be considered during the detailed design, construction and operational phases of the Proposal. This would ensure the Proposal is delivered to maximum benefit to the community, is cost effective and minimises any adverse impacts on the environment.

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Appendix A Consideration of Matters of National Environmental Significance

The table below demonstrates TfNSW’s consideration of the MNES under the EPBC Act to be considered in order to determine whether the Proposal should be referred to Commonwealth Department of the Environment and Energy.

MNES	Impacts
Any impact on a World Heritage property?	Nil
Any impact on a National Heritage place?	Nil
Any impact on a wetland of international importance?	Nil
Any impact on a listed threatened species or communities?	Although the Grey-headed Flying-fox has been recorded in the vicinity of the Proposal, given the scope of the Proposal and minimal requirement for vegetation clearing, no significant impact on this species is anticipated.
Any impacts on listed migratory species?	Nil
Does the Proposal involve a nuclear action (including uranium mining)?	Nil
Any impact on a Commonwealth marine area?	Nil
Does the Proposal involve development of coal seam gas and/or large coal mine that has the potential to impact on water resources?	Nil
Additionally, any impact (direct or indirect) on Commonwealth land?	Nil

Appendix B Consideration of clause 228

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

Factor	Impacts
<p>(a) Any environmental impact on a community?</p> <p>There would be some temporary impacts to the community during construction resulting from increased traffic, noise and reduced visual amenity.</p> <p>There is likely to be operational noise impacts to nearby properties which may impact the local community. Exceedances of up to 1 dB(A) during the day and up to 3 dB(A) during the night are predicted at 31 Judd Street, 3B Wonoona Parade, 25C Waratah Street and 27 Waratah Street. These exceedances are predominantly due to the use of the bogie exchange system and associated warning siren with both roller doors of the building open, with the exception of the exceedance at 31 Judd Street, which is due to the operation of the wash facility. It is proposed that the selection of a warning siren with a lower sound power level than what has been assessed in Section 6.3 would help achieve the project noise trigger levels and would be examined further during the detailed design phase.</p> <p>Mitigation measures, as outlined in Section 7.2, would be implemented to manage and minimise adverse impacts.</p>	<p>minor</p>
<p>(b) Any transformation of a locality?</p> <p>The Proposal would not transform the locality as the site would remain as the existing land use of a rail maintenance centre.</p>	<p>Nil</p>
<p>(c) Any environmental impact on the ecosystem of the locality?</p> <p>Environmental impacts are anticipated to be minor and temporary in nature and would not be expected to result in adverse impacts to the ecosystem of the locality.</p>	<p>Nil</p>
<p>(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?</p> <p>The Proposal would result in a short-term reduction in environmental quality during construction, primarily in relation to noise, traffic and visual amenity. As this reduction would be short in duration, impacts are anticipated to be minor.</p> <p>There is likely to be operational noise impacts to nearby properties which may impact the locality. Exceedances of up to 1 dB(A) during the day and 3 dB(A) during the night are predicted at 31 Judd Street, 3B Wonoona Parade, 25C Waratah Street and 27 Waratah Street. These exceedances are predominantly due to the use of the bogie exchange system and associated warning siren with both roller doors of the building open, with the exception of the exceedance at 31 Judd Street, which is due to the operation of the wash facility. It is proposed that the selection of a warning siren with a lower sound power level than that which has been assessed in Section 6.3 would help achieve the project noise trigger levels. This would be investigated further during the detailed design phase.</p> <p>Mitigation measures, as outlined in Section 7.2, would be implemented to manage and minimise adverse impacts.</p>	<p>Minor</p>

Factor	Impacts
<p>(e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?</p> <p>The Mortdale Maintenance Centre has been removed from the S170 Register listed 'Mortdale Railway Station and car sheds' due to a series of modifications and additions which has left no original fabric on the structure. Given the distance between the site and the nearest listed non-Indigenous heritage items, it is unlikely that the Proposal would adversely affect these items.</p>	Nil
<p>(f) Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)?</p> <p>The Proposal is unlikely to impact on the habitat of protected fauna.</p>	Nil
<p>(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?</p> <p>The Proposal is unlikely to endanger any species of animal, plant or other form of life living on land, in water or in the air.</p>	Nil
<p>(h) Any long-term effects on the environment?</p> <p>There is likely to be operational noise impacts to nearby properties which may result in the degradation of the overall locality and environment. Exceedances of up to 1 dB(A) during the day and 3 dB(A) during the night are predicted at 31 Judd Street, 3B Wonoona Parade, 25C Waratah Street and 27 Waratah Street. These exceedances are predominantly due to the use of the bogie exchange system and associated warning siren with both roller doors of the building open, with the exception of the exceedance at 31 Judd Street, which is due to the operation of the wash facility. It is proposed that the selection of a warning siren with a lower sound power level than this which has been assessed in Section 6.3 would help achieve the project noise trigger levels. This would be investigated further during the detailed design phase.</p>	Minor
<p>(i) Any degradation of the quality of the environment?</p> <p>There is likely to be operational noise impacts to nearby properties which may result in the degradation of the overall locality and environment. Exceedances of up to 1 dB(A) during the day and 3 dB(A) during the night are predicted at 31 Judd Street, 3B Wonoona Parade, 25C Waratah Street and 27 Waratah Street. These exceedances are predominantly due to the use of the bogie exchange system and associated warning siren with both roller doors of the building open, with the exception of the exceedance at 31 Judd Street, which is due to the operation of the wash facility. It is proposed that the selection of a warning siren with a lower sound power level than this which has been assessed in Section 6.3 would help achieve the project noise trigger levels. This would be investigated further during the detailed design phase.</p>	Minor
<p>(j) Any risk to the safety of the environment?</p> <p>The Proposal is unlikely to cause any pollution or safety risks to the environment provided the recommended mitigation measures are implemented.</p>	Nil
<p>(k) Any reduction in the range of beneficial uses of the environment?</p> <p>The Proposal is unlikely to have any reduction in the range of beneficial uses of the environment.</p>	Nil

Factor	Impacts
<p>(l) Any pollution of the environment?</p> <p>The Proposal could result in pollution of the environment, however provided the recommended management and mitigation measures are implemented, this risk is expected to be minor.</p>	Minor
<p>(m) Any environmental problems associated with the disposal of waste?</p> <p>The Proposal is unlikely to cause any environmental problems associated with the disposal of waste.</p> <p>All waste would be managed and disposed of in accordance with a site-specific Waste Management Plan. Mitigation measures would be implemented to ensure waste is reduced, reused or recycled where practicable.</p>	Nil
<p>(n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?</p> <p>The Proposal is unlikely to increase demands on resources that are or are likely to become in short supply.</p>	Nil
<p>(o) Any cumulative environmental effect with other existing or likely future activities?</p> <p>Cumulative effects of the Proposal are described in Section 6.12. The Proposal is unlikely to have any cumulative adverse long term impacts.</p>	Nil
<p>(p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?</p> <p>The Proposal would not affect or be affected by any coastal processes or hazards.</p>	Nil