



Transport  
for NSW

# **Automatic Train Protection (ATP) Project North Shore, Northern & Western Line – Area 1**

Determination Report

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# 1 Introduction

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## 1.1 *Background*

Transport for NSW (TfNSW) is the NSW Government's lead public transport agency that ensures planning and policy is fully integrated across all modes of transport in NSW. It manages a multi-billion dollar budget allocation for rail, bus, ferry and taxi services and related infrastructure in NSW.

Transport for NSW is responsible for improving the customer experience of transport services, transport policy and regulation, planning and program administration, procuring transport services, and infrastructure and freight.

The North Shore, Northern & Western Line – Area 1 is part of the Automatic Train Protection (ATP) Project (previously known as the Advanced train control Migration System (AMS) Project), which will play a key role in delivering faster and more reliable services as part of the NSW Government's Sydney's Rail Future (June 2012). The project will deliver significant safety benefits to customers and rail staff, and responds to one of the key recommendations from the Waterfall Special Commission of Inquiry.

Transport for NSW is the proponent for the North Shore, Northern & Western Line – Area 1 ATP Project (referred to as 'the Proposed Activity' for the purposes of this document).

## 1.2 *Review of environmental factors*

A Review of Environmental Factors (REF) was prepared in February 2018 by WSP on behalf of TfNSW in accordance with section 5.5 of the *Environmental Planning and Assessment 1979* (EP&A Act), and clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), to ensure that TfNSW takes into account to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the Proposed Activity. The REF is included as an Appendix.

## 1.3 *Determination report*

Prior to proceeding with the Proposed Activity, the Secretary of TfNSW must make a determination in accordance with the provisions of Part 5 Division 5.1 of the EP&A Act.

The objectives of this Determination Report are to:

- assess the environmental impacts with respect to the Proposed Activity which are detailed in the REF (and any proposed modifications, as detailed and assessed in this Determination Report)
- identify mitigation measures to minimise potential environmental impacts
- determine whether potential environmental impacts are likely to be significant
- address whether the provisions of the *Commonwealth Environment Protection & Biodiversity Conservation Act 1999* (the EPBC Act) applies to the Proposed Activity.

This report has been prepared having regard to, among other things, the objectives of TfNSW under the *Transport Administration Act 1988*:

- to plan for a transport system that meets the needs and expectations of the public
- to promote economic development and investment
- to provide integration at the decision-making level across all public transport modes
- to promote greater efficiency in the delivery of transport infrastructure projects
- to promote the safe and reliable delivery of public transport and freight services.

#### **1.4 Description of the Proposed Activity in the REF**

An overview of the Proposed Activity, which is the subject of the North Shore, Northern & Western Line – Area 1 REF, is provided in the Executive Summary with full details set out in Section 3 of the REF. In summary, the Proposed Activity would involve the installation of trackside signalling equipment on the North Shore, Northern & Western Line and as outlined in the REF comprises:

- new track assets (i.e. controlled balises)
- new signalling cabling
- extension to existing signal cabinets and if required the installation of new cabinets to house ATP equipment.

The need for, and benefits of the Proposed Activity are outlined in Section 2 of the REF.

## **2 Consultation**

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The communications approach for the proposal has been designed to serve as an educational tool for interested stakeholders and communities located in close proximity to works being undertaken in the rail corridor.

The works being undertaken as part of the proposal are based on safety and rail system requirements. For this reason, there is limited opportunity for any community feedback into project deliverables. As such, the REF for the North Shore, Northern & Western Line - Area 1 has not been placed on public display.

## **3 Consideration of the environmental impacts**

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### **3.1 Environmental Planning and Assessment Act 1979 (EP&A Act)**

The REF addresses the requirements of section 5.5 of the EP&A Act. In considering the Proposed Activity, all matters affecting or likely to affect the environment are addressed in the REF, the Determination Report, and associated documentation.

In accordance with the checklist of matters pursuant to clause 228(3) of the EP&A Regulation, an assessment is provided in Section 6 and Appendix 1 of the REF.

In respect of the Proposed Activity an assessment has been carried out regarding potential impacts on critical habitat, threatened species, populations or ecological communities or their habitats, under section 112 of the EP&A Act.

The likely significance of the environmental impacts of the Proposed Activity have been assessed in accordance with the then NSW Department of Planning's 1995 best practice guideline *Is an EIS Required?* It is concluded that the Proposed Activity is not likely to significantly affect the environment (including critical habitat) or threatened species, populations of ecological communities, or their habitats. Accordingly, an

environmental impact statement under Part 5 Division 5.2 of the EP&A Act is not required.

### **3.2 *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)***

As part of the consideration of the Proposed Activity, all matters of national environmental significance (NES) and any impacts on Commonwealth land for the purposes of the EPBC Act have been assessed. In relation to NES matters, this evaluation has been undertaken in accordance with Commonwealth Administrative Guidelines on determining whether an action has, will have, or is likely to have a significant impact. A summary of the evaluation is provided in Section 4.5 and Appendix 2 of the REF.

It is considered that the Proposed Activity described in the REF is not likely to have a significant impact on any Commonwealth land and is not likely to have a significant impact on any matters of NES.

### **3.3 *Heritage Act 1977***

The Proposed Activity would be undertaken within the curtilage of the Strathfield Rail underbridges (flyover) and Rhodes Railway Station Group (Waiting Shed) which are listed on the State Heritage Register (SHR). The potential heritage impacts of the Proposed Activity are assessed in Section 6.6.2 of the REF. The works would not affect the heritage significance of these items. A Heritage exemption under Section 57(2) of the *Heritage Act 1977* would be obtained for all works within the curtilage of items listed on the SHR.

## **4 Conditions of Approval**

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If approved, the Proposed Activity would proceed subject to the Conditions of Approval included in Appendix 2.

## **5 Conclusion**

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Having regard to the assessment in the REF it can be concluded that the Proposed Activity is not likely to significantly affect the environment (including critical habitat) or threatened species, populations of ecological communities, or their habitats. Consequently, an environmental impact statement is not required to be prepared under Part 5 Division 5.2 of the EP&A Act.

It is also considered that the Proposed Activity does not trigger any approvals under Part 3 of the EPBC Act.

The environmental impact assessment (REF and Determination Report) is recommended to be approved subject to the proposed mitigation and environmental management measures included in the Conditions of Approval.

# Appendix 1: Review of Environmental Factors



Transport  
for NSW

# **Automatic Train Protection (ATP) Project**

## **North Shore, Northern & Western Line - Area 1 (Strathfield to Berowra)**

Review of Environmental Factors

## Document History

Version	Date of drafting	Author	Reviewer
#1.1	21 JUN 2017	Morgan Cardiff	Paul Greenhalgh
#1.2	11 SEP 2017	Morgan Cardiff	Paul Greenhalgh
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#1.6	12 MAR 2018	TfNSW	TfNSW

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## Abbreviations

Term	Meaning
<b>ASS</b>	Acid Sulfate Soils
<b>AHIMS</b>	Aboriginal Heritage Information Management System
<b>AMS</b>	Advanced train control Migration System
<b>ATP</b>	Automatic Train Protection
<b>BC Act</b>	<i>Biodiversity Conservation Act 2016 (NSW)</i>
<b>BMP</b>	Best Management Practice
<b>BATEA</b>	Best Available Technology Economically Achievable
<b>CEMP</b>	Construction Environmental Management Plan
<b>DoEE</b>	Department of Environment and Energy
<b>DP&amp;E</b>	NSW Department of Planning and Environment
<b>ECM</b>	Environmental Control Maps
<b>EEC</b>	Endangered Ecological Community
<b>EIS</b>	Environmental Impact Statement
<b>EMS</b>	Environmental Management System
<b>EPA</b>	Environment Protection Authority
<b>EP&amp;A Act</b>	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
<b>EP&amp;A Regulation</b>	<i>Environmental Planning and Assessment Regulation 2000 (NSW)</i>
<b>EPBC Act</b>	<i>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)</i>
<b>EPL</b>	Environment Protection Licence
<b>ESD</b>	Ecologically sustainable development (refer to Definitions)
<b>ETCS</b>	European Train Control System
<b>GST</b>	Galvanised steel troughing
<b>ICNG</b>	Interim Construction Noise Guideline
<b>Heritage Act</b>	<i>Heritage Act 1977 (NSW)</i>
<b>Infrastructure SEPP</b>	<i>State Environmental Planning Policy (Infrastructure) 2007</i>
<b>I&amp;S</b>	Infrastructure and Services (Division of Transport for NSW)
<b>LEP</b>	Local environmental plan
<b>LEU</b>	Lineside electrical unit
<b>LGA</b>	Local government area
<b>LOC</b>	Rail location case or cabinet to house signalling infrastructure
<b>NES</b>	(Matters of) National Environmental Significance
<b>NPW Act</b>	<i>National Parks and Wildlife Act 1974 (NSW)</i>
<b>NSW</b>	New South Wales

Term	Meaning
<b>PASS</b>	Potential Acid Sulfate Soils
<b>POEO Act</b>	<i>Protection of the Environment Operations Act 1997 (NSW)</i>
<b>OEH</b>	Office of the Environment and Heritage
<b>REF</b>	Review of Environmental Factors
<b>Roads Act</b>	<i>Roads Act 1993 (NSW)</i>
<b>RMS</b>	Roads and Maritime Service
<b>SEPP</b>	State environmental planning policy
<b>SHR</b>	State Heritage Register
<b>TEC</b>	Threatened Ecological Community
<b>TfNSW</b>	Transport for NSW
<b>ULX</b>	Underline crossing
<b>WARR Act</b>	<i>Waste Avoidance and Resource Recovery Act 2001</i>

## Definitions

Term	Meaning
<b>Automatic Train Protection (ATP)</b>	<p>ATP is a generic name, used globally to describe a range of train safety technologies, designed to ensure additional passenger and train crew safety through:</p> <ol style="list-style-type: none"> <li>1. Ceiling speed supervision to prevent a train from travelling over a predetermined speed limit</li> <li>2. Brake-to-target supervision to supervise the safe deceleration of a train (e.g. approaching a signal at stop, railway crossing or a worksite).</li> </ol>
<b>Balise</b>	An electronic beacon or transponder placed between the rails of a railway as part of an automatic train protection (ATP) system.
<b>Concept design</b>	The concept design is the preliminary design presented in this REF, which would be refined (should the Proposal proceed) to a design suitable for construction (subject to TfNSW acceptance).
<b>Detailed design</b>	Detailed design broadly refers to the process that is undertaken (should the Proposal proceed) to refine the concept design to a design suitable for construction (subject to TfNSW acceptance).
<b>ecologically sustainable development</b>	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 (refer to Section 4.1).
<b>Out of hours works</b>	Defined as works <i>outside</i> standard construction hours (i.e. outside of 7:00am to 6:00pm Monday to Friday, 8:00am to 1:00pm Saturday and no work on Sundays/public holidays).
<b>the Proposal</b>	The construction and operation of Automatic Train Protection (ATP) infrastructure within Area 1, located on the North Shore, Northern & Western Line between Berowra and Strathfield.
<b>Rail Possession</b>	Possession is the term used by railway building/maintenance contractors to indicate they have taken possession of the track (usually a block 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.
<b>Underline crossing</b>	An underline crossing (under track crossing) where the cable route crosses under the track from one side of the line to the other.

## Executive summary

Transport for NSW (TfNSW) is the government agency responsible for the delivery of major transport infrastructure projects in NSW, including the Automatic Train Protection (ATP) Project (previously known as the Advanced train control Migration System (AMS) Project).

The ATP Project plays a key role in delivering faster, safer and more reliable services under the NSW Government's *draft Future Transport Strategy 2056*. The ATP Project will deliver significant safety benefits to customers and rail staff and responds to one of the key recommendations from the Waterfall Special Commission of Inquiry.

The ATP Project has a phased integration and implementation process and will be progressively deployed in stages across nine discrete areas, with separate environmental impact assessments being prepared for each area. The works which are subject to this environmental impact assessment pertain to the deployment the ATP Project within Area 1 located on the North Shore, Northern & Western Line between Strathfield and Berowra.

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 Part 5 Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

## Description of the Proposal

The Proposal involves the installation and operation of trackside signalling equipment at 25 locations between Strathfield and Berowra on the North Shore, Northern & Western Line. Figure 1-1 provides an overview map of the Proposal.

Area 1 traverses a 30 kilometre section of the railway corridor located in the Canada Bay, Ryde, Parramatta and Hornsby local government areas (LGAs). Depending on the topography, ATP sites are generally located up to 15 metres from the existing rail tracks.

The proposed ATP trackside signalling equipment would communicate with a train mounted system to improve network capacity and passenger safety by providing information to the driver such as speed limits and signal location and applying brakes automatically if the driver does not respond appropriately. The installation of the train mounted system will be carried out at a train maintenance facility and does not form part of this environmental assessment.

Construction of the Proposal is expected to commence in mid-2018 and continue for about 18 months.

## Statutory considerations

The EP&A Act provides for the environmental impact assessment of development in NSW. Part 5 Division 5.1 of the EP&A Act generally specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as TfNSW, which do not require development consent under the EP&A Act.

The *State Environmental Planning Policy (Infrastructure) 2007* (the Infrastructure SEPP) is the primary environmental planning instrument relevant to the proposed development. 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. Clause 78 defines 'rail infrastructure facilities' as including 'signalling, train control, communication and security systems'.

As TfNSW is a public authority and the proposed activity falls within the definition of rail infrastructure facilities under Infrastructure SEPP, the Proposal is permissible without consent. Consequently, the environmental impacts of the Proposal have been assessed by TfNSW under Part 5 Division 5.1 of the EP&A Act.

This REF has been prepared to assess the construction and operational environmental impacts of the Proposal. The REF has been prepared in accordance with clause 228 of the *Environmental Planning and Assessment Regulation 2000* (the EP&A Regulation).

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

## **Stakeholder communication**

The communications approach for the Proposal has been designed to serve as an educational tool for interested stakeholders and communities located near works being undertaken in the rail corridor.

The works being undertaken as part of the Proposal are based on safety and rail system requirements. For this reason, there is minimal opportunity for any community feedback into project deliverables. An educational approach to the communication activities has been adopted to allow interested stakeholders to find out more about the Project and any likely resulting impacts.

The communication approach being implemented for the program has also been developed having regard for the requirements of the planning process.

Refer to Chapter 5 for more information about the communications approach 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. This REF identifies that, subject to the implementation of mitigation measures, potential environmental impacts can be controlled and reduced to acceptable levels and will not significantly affect the environment.

The main environmental issues relate to works adjacent to endangered ecological communities and heritage items. In addition to minor construction impacts such as erosion and sedimentation risks, and noise issues for nearby receivers. The proposal requires some minor vegetation removal and trimming in areas adjacent to threatened ecological communities, however as all works are confined to the rail corridor.

Work at 10 locations would be undertaken adjacent to endangered ecological communities and sensitive site areas. Works at a number of locations would be undertaken within the curtilage of the following items listed on the State Heritage Register and/or RailCorp s170 Heritage and Conservation Register:

#### Items listed on the State Heritage Register

- Strathfield Railway Station Group
- Strathfield Rail Underbridges (flyover) – Note: specifically the Powell creek railway viaduct
- Rhodes Railway station group (Waiting Shed).

#### Items listed on the RailCorp Heritage and Conservation Register

- Strathfield Railway Station Group
- Strathfield Railway Triangle
- Homebush (Parramatta Road) Railway Underbridge
- Hornsby Railway station group and barracks
- Asquith Railway station group.

The proposed works cross a waterway at one location. Six locations have the potential for asbestos containing materials to be within the work area. Such impacts will be managed through the implementation of a Proposal wide Construction Environmental Management Plan (CEMP) and location specific Environmental Control Maps (ECM).

No operational impacts are anticipated as a result of the Proposal.

## **Conclusion**

This REF has been prepared having regard to section 5.5 of the EP&A Act, and clause 228 of the EP&A Regulation, to ensure that TfNSW considers fully possible, all matters affecting or likely to affect the environment as a result of the Proposal.

Should the Proposal proceed, the likely impacts would be appropriately managed in accordance with the mitigation measures outlined in this REF. TfNSW has determined that an environmental impact statement (EIS) is not required for the Proposal, nor is the approval of the Minister for Planning.

## 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 North shore, Northern & Western Line Automatic Train Protection (ATP) Project (the Proposal), to be delivered by Infrastructure and Services (I&S).

### 1.1. Overview of the Proposal

The Proposal involves the installation of trackside signalling equipment at 24 locations between Strathfield and Berowra on the North Shore, Northern & Western Line (refer to Figure 1-1).

The installation of trackside signalling equipment would comprise new track assets installed on rail sleepers, new signalling cabling installed above and below ground, the extension of a number of existing LOCs and the installation of new LOCs or annexes to house ATP equipment. A detailed description of the Proposal is provided in Chapter 3.

The 30 kilometre stretch of railway corridor between Strathfield and Berowra is in the Canada Bay, Ryde, Parramatta and Hornsby local government areas local government areas.

Depending on the topography, the ATP sites would generally be located up to 15 metres from the rail tracks. The proposed trackside signalling equipment will communicate with a train mounted system which will improve network capacity and passenger safety by providing information to the driver such as speed limits and signal location and applying brakes automatically if the driver does not respond appropriately. The installation of the train mounted system would be carried out at a train maintenance facility and does not form part of the environment assessment.

The Proposal will deliver significant safety benefits to customers and rail staff and responds to one of the key recommendations from the Waterfall Special Commission of Inquiry.

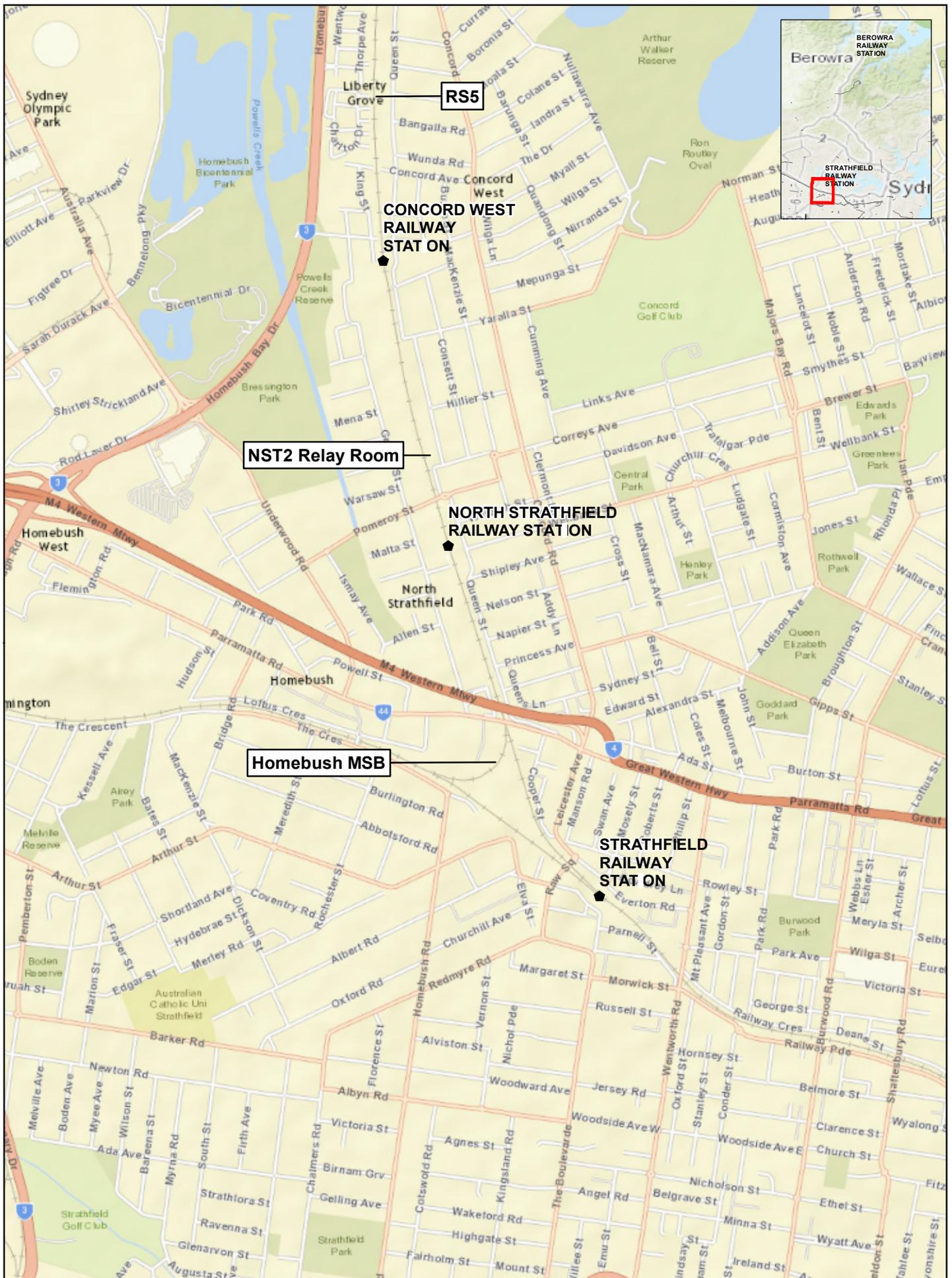
Construction of the Proposal is expected to commence in early 2018 and continue for about 18 months.

### 1.2. 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 reduce the likely impacts of the Proposal.

This REF has been prepared by TfNSW in accordance with clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation). For the purposes of these works, TfNSW is the proponent and the determining authority under Part 5 Division 5.1 of the EP&A 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 significantly impact a matter of national environmental significance (NES) or Commonwealth land and the need to make a referral to the Commonwealth Department of Environment and Energy for any necessary approvals under the EPBC Act.

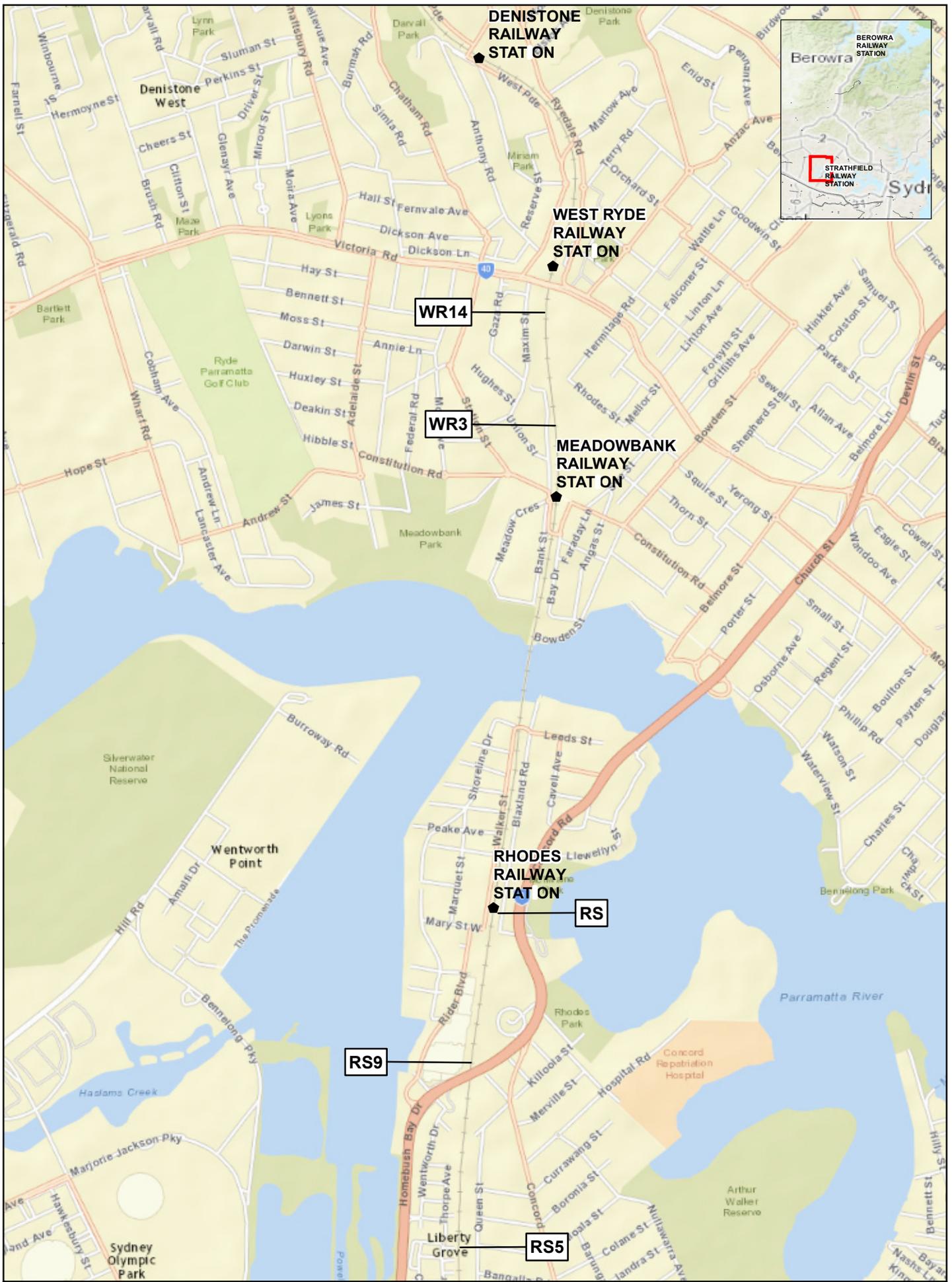


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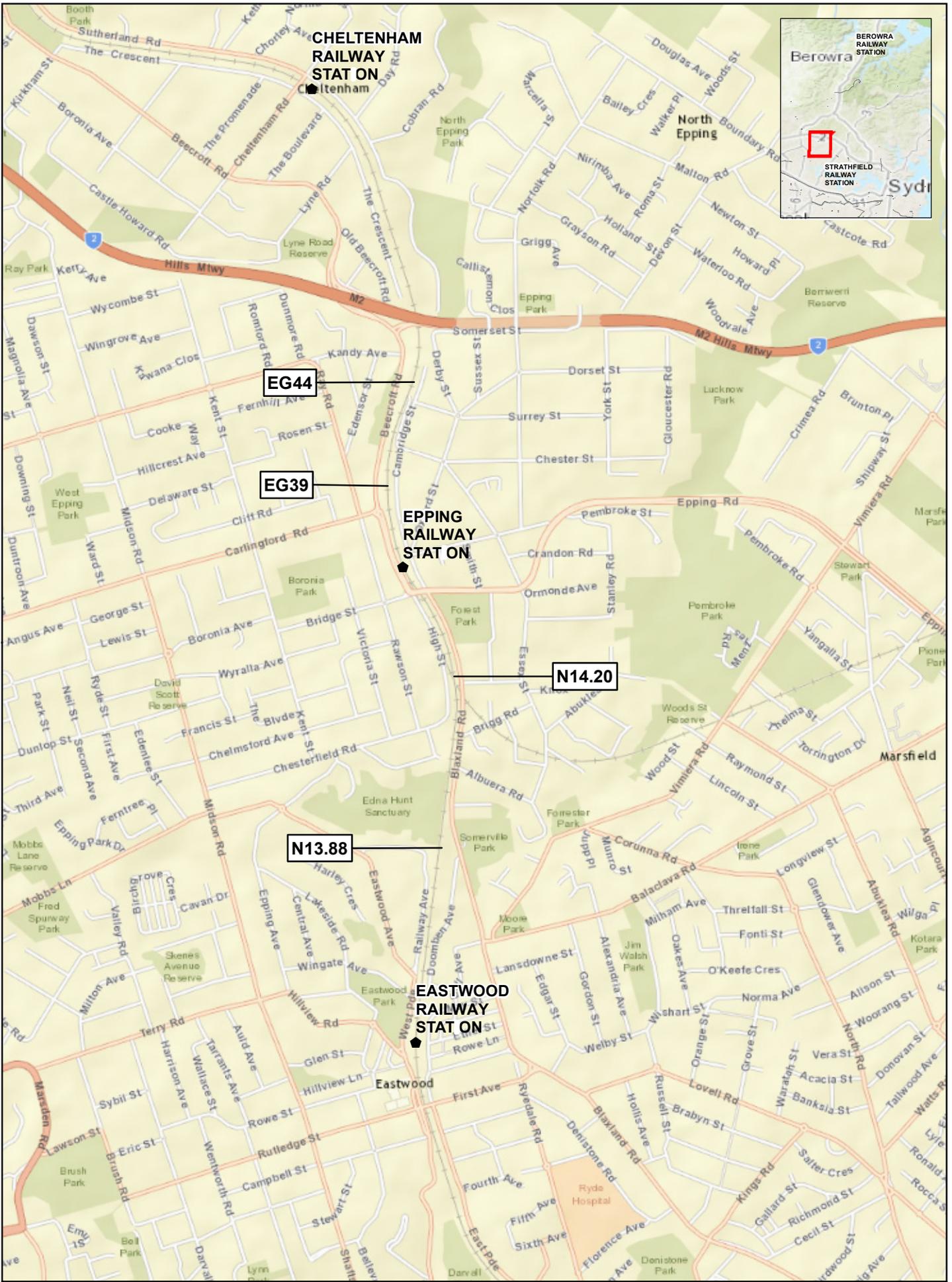
**Automatic Train Protection REF**  
**Figure 1a**  
Map of Proposal



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**Automatic Train Protection REF**  
**Figure 1b**  
 Map of Proposal

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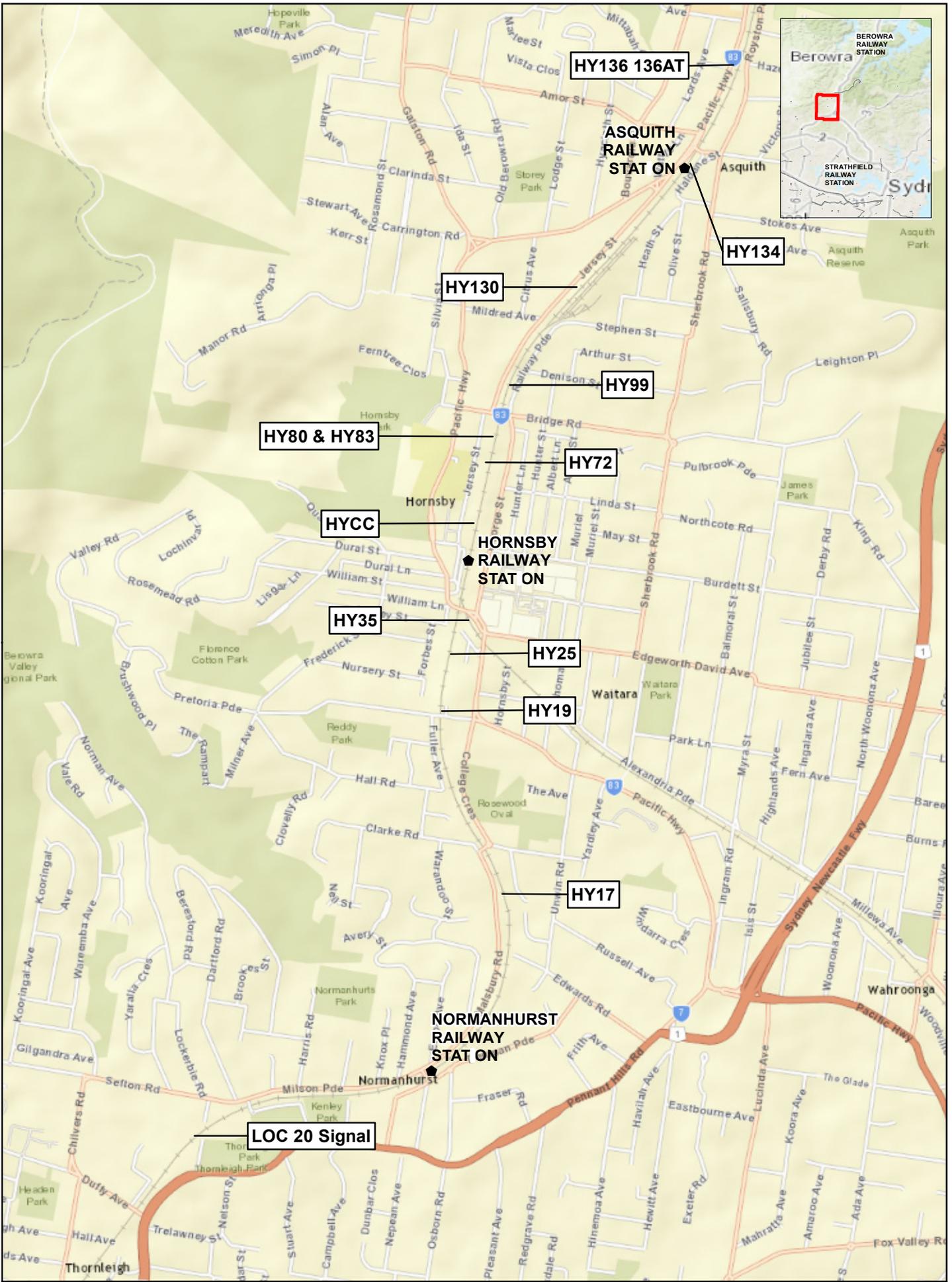


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**Automatic Train Protection REF**  
**Figure 1c**  
**Map of Proposal**

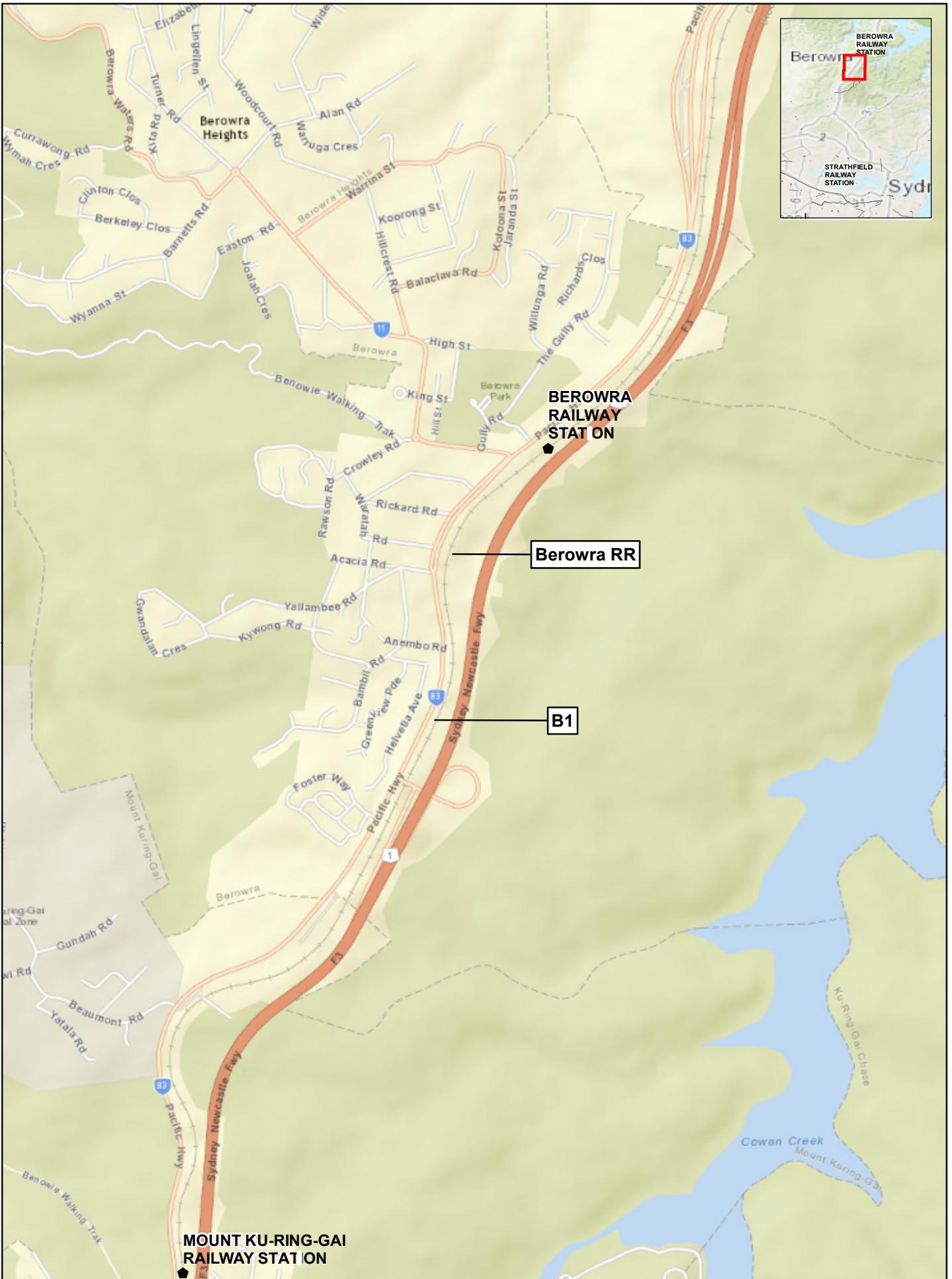


Map: 2177516_GIS_002_A4	Author: AL		 1:20,000 Coordinate system: GDA 1994 MGA Zone 56 Scale ratio correct when printed at A4
Date: 26/02/2018	Approved by: MC		

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**Automatic Train Protection REF**  
**Figure 1d**  
 Map of Proposal



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**Automatic Train Protection REF**  
**Figure 1e**  
 Map of Proposal

## 2. Need for the Proposal

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

### 2.1. Strategic justification

The requirement to implement automatic train protection technology was one of the key recommendations from the Waterfall Special Commission of Inquiry.

The ATP Project would implement the European Train Control System (ETCS) (Limited Supervision) which is internationally recognised and reliable automatic train protection technology that has been tailored to meet the needs of the Sydney rail network. The ETCS enhances passenger and train crew safety through ceiling speed supervision to prevent a train from travelling over a predetermined speed limit and by brake-to-target supervision which supervises the safe deceleration of a train (e.g. approaching a signal at stop, railway crossing or a worksite).

The ATP system monitors train speed against a set rail speed limit (ceiling speed) and alerts the driver if the train is over-speeding. The system applies the brakes automatically if the driver does not respond appropriately.

The ATP Project would upgrade the signalling system across the electrified rail network. The ATP Project would be progressively deployed in stages across nine discrete until around 2019, with separate environmental impact assessments being prepared for each area. As noted in Section 1.1, this REF addresses AMS works in Area 1.

ATP will benefit the North Shore, Northern & Western Line by providing greater reliability and safety to the train services along the line and associated community and customer benefits.

### 2.2. Alternative options considered

A comprehensive review of automatic train protection technology options has been undertaken which assessed technology options against key criteria including technical capability, economic viability and level of risk mitigation.

The review recommended an ETCS Level 1 (Full Supervision) system be adopted as the preferred automatic train protection technology. However, ongoing technology improvements lead to the development of an ETCS Level 1 Limited Supervision (LS) system which provided TfNSW with the opportunity to improve the safety of the rail network in line with recommendations of the Waterfall Inquiry at a lower cost and over a reduced timeframe.

ETCS Level 1 LS is technically less complex with a reduced number of interfaces with the existing signalling system and less trackside equipment to install and maintain than the ETCS Level 1 (Full Supervision) system. In addition, ETCS Level 1 LS would provide a greater flexibility for future functionality enhancements under *Sydney's Rail Future* (June 2012) (refer Section 4.2) with less associated equipment redundancy.

ETCS automatic train protection technology was recommended as the preferred technology because it:

- is a high integrity safety system that controls risks associated with drivers over-speeding or exceeding the limit of their movement authority
- is available 'off the shelf' from multiple suppliers designing to common specifications
- is a mature technology with a large and rapidly growing user base
- is flexible in its application and can be overlaid, with minimal impact, to existing signalling systems and rolling stock
- will provide a major risk mitigation of the rail network's direct risks
- has a defined upgrade path to allow future functionality enhancements
- has the potential to enable future signalling changes which will deliver significant capacity benefits.

The NSW government response to the recommendations of the Waterfall Special Commission of Inquiry outlines its commitment to installing automatic train protection technology across the electrified rail network. As such, a 'do nothing' option was not considered a feasible alternative.

### 3. Description of the Proposal

Chapter 3 describes the Proposal and summarises key design parameters, construction method, and associated infrastructure and activities.

#### 3.1. The Proposal

The Proposal involves the installation of trackside ATP signalling equipment on the North Shore, Northern & Western line between Strathfield and Berowra (Area 1). The Proposal would take place at 25 locations along the railway line.

The works at each ATP site comprise:

- new track assets (i.e. controlled balises)
- new signalling cabling
- extension to existing signal cabinets and (if required) the installation of new cabinets to house ATP equipment.

Figure 3-1 provides a schematic of the typical proposed works at each ATP site in Area 1 and Table 3-1 provides further information on the scope of ATP works being undertaken in Area 1.

The typical construction footprint at each ATP site would incorporate the footprint required for installation of new track assets, cabling and ATP equipment. The site-specific footprint for each ATP site assessed in this REF is shown in Appendix 3.

Additional cabling extending beyond this footprint may be required at particular locations for controlled balises associated with level crossings, catch points and high risk turnouts, deficient overlaps and buffer stop locations.

The new signalling cabling would connect to the existing 120 volt electricity network at each ATP site. All cabling would be located wholly within the rail corridor and underline crossings (ULXs) or under road crossings (URX) would be constructed to provide a crossing beneath the rail track where necessary.

##### 3.1.1. New track assets

A balise would be mounted to the rail sleepers in the area between load bearing rails (referred to as the four foot) on the approach to a trackside signal. Depending on the type of sleeper (i.e. concrete or timber), the balise may be mounted using a combination of cable clips, vortok brackets, mechanical anchors or adhesives. A series of balises are required at each signal location and are spaced at intervals. Balises are categorised as fixed or control balises depending on their proximity to the signal.

It is noted the installation of fixed balises which are generally placed at speed signs and other hazards has been addressed in a separate environmental assessment and approval process and does not form part of this REF. Fixed balises which always send the same passive data (i.e. speed limit) are installed within the four foot and do not have any associated cabling activities

Table 3-1 provides further information on the installation of controlled balises within Area 1 along with the proposed balise group name. The ATP site location plans provided as Appendix 3 show the proposed location of the controlled balises within the site footprint. The

actual location of the controlled balises may be revised during the detailed design phase. The revised location would remain within the site footprint assessed as part of this REF.

### **3.1.2. New signalling cabling**

Cables would connect the balises to an ETCS junction box which would be positioned adjacent to the track. These cables would be installed in elevated galvanised steel troughing or inside buried conduits. Other options for cable installation include pit and pipe, galvanised pipe or surface pipes.

Buried conduits may be installed by directional bores within or near the cess (the area immediately adjacent to the ballast shoulder). Underline crossings (ULXs) would be constructed to provide a crossing beneath the rail track where necessary. The ULX and underbore depths can vary depending on site conditions but would, as a minimum, be 1.8 metres from the top of the rail.

A combination of ULX and above ground troughing may be used at each ATP site depending on the ground conditions and site access constraints. If existing troughing and pipes have sufficient spare capacity, the new signalling cabling would be installed in these facilities. If existing troughing and pipes do not have sufficient spare capacity a new cable route would be required.

It is possible that supersucking, a form non-destructive digging using pressurised water and a vacuum source, would be required at some ATP sites.

Cables from the ETCS junction box would terminate at a lineside electrical unit (LEU), which is housed in either a signal cabinet (i.e. LOC), annex, bungalow, huts or relay rooms.

### **3.1.3. Signal cabinets**

Where space within the LOC, annex, bungalow, hut or relay room is constrained, a new LOC or annex would be installed to house the ATP equipment or the existing LOC would be extended by around six square metres to house ATP equipment.

The new LOC or annex would generally be installed on a newly constructed concrete plinth adjacent to the slab for the existing LOC, annex, bungalow, hut or relay room. Alternatively, the new signal cabinet would be bolted to the existing cabinet.

ATP equipment housing would be fitted out with a LEU. Table 3-1 provides further information on the proposed location of ATP equipment housing within Area 1.

Where possible, the concrete plinths and cabinets would be pre-fabricated off site and delivered to the ATP site in time for works to commence.

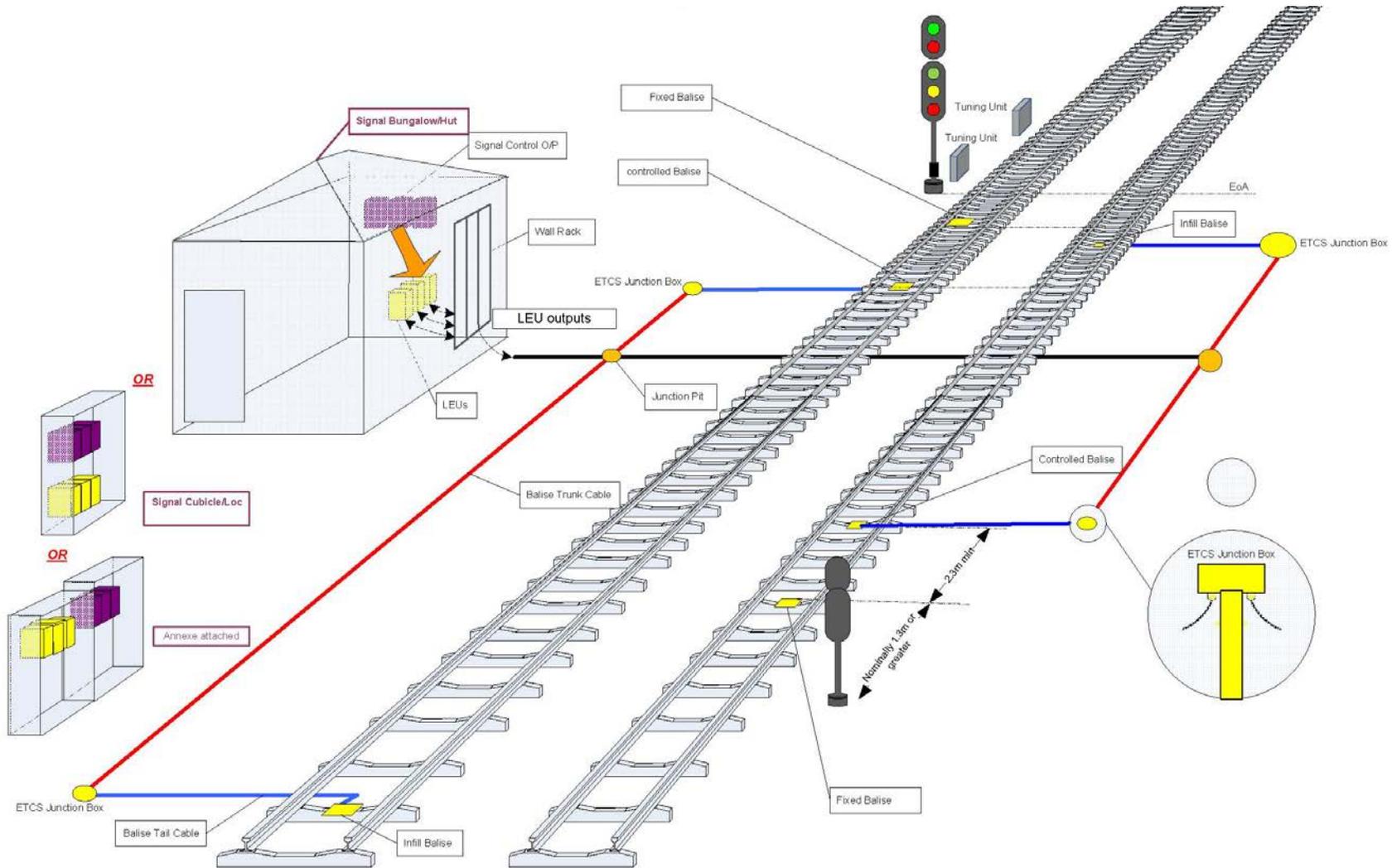
**Table 3-1 Proposed ATP works in Area 1**

Cabinet (i.e. LOC) / Bungalow / Hut / Relay Room <small>(i.e. proposed location of ATP Equipment Housing) (referred to as the ATP Area 1 Site Name hereafter in this REF</small>	LOC / Bungalow / Hut / Relay room Chainage (km) <sup>1</sup>	Signal / function name <small>(i.e. Proposed location of Controlled Balises</small>	Balise Group Name
Homebush MSB	12.563	STR141 / HRTO 565A	STR12162_DNMN_0_C
		ST143 / HRTO 536A and 565A	STRST143_DNNS_0_C
		NST144 / HRTO 538A	NSTST144_UPMN_0_C
		ST163 / Approach Balise	STR12434_DNNM_0_C
NST2 Relay Room	14.261	ST176	NSTST176_UPNM_0_C
		ST181	CRDST181_DNRL_0_C
		ST172	NSTST172_UPNM
RS	16.467	RS14	RDSRS14_UPNM_0_C
RS5 Relay Room	15.252	RS7 / HRTO50B	RDSRS7_DNNM_0_C
RS9	15.987	RS8 / HRTO's 584B, 581B RS11 / Approach Balise	RDSRS8_UNM_0_C RDSRS11_DNNM_0_C
WR3	18.566	WR3 / HRTO 101A	WRDWR3_DNNM_0_C
WR14	19.229	WR5 / Approach Balise	WRDWR5_DNNM_0_C
N13.88	22.287	EG23 / HRTO 104A	EWDEG23_DM_0_C
N14.20	22.845	EG27 / HRTO 107A	EPGEG27_DM_0_C
EG39	23.670	HRTO 103B Approach Balise (107B)	EPGEG40_UM_0_C
EG44	24.065	EG 44 / HRTO 107B	EPGEG44_UM_0_C
Loc 20 Signal	30.661	TH20 (HRTO 55B)	NMHTH20_UPMN_0_C
HY17	32.455	HY17 / HRTO's 500A, 502A	HBYHY17_DNMN_0_CHY17
HY19	33.294	HY21 / Approach Balise (502A)	HBYHY21_DNMN_0_C
HY25	33.542	HY25 / HRTOs 520A, 529A, 540A, 552 Repositioning 501A, 502B Wrong Running Protection UP	HBYHY25_DNMN_0_C
HYCC	34.082	HY53 / Approach Balise 520A, 529A, 540A, 552A, 571A	HBYHY53_DNMN_0_C
HY72	34.272	HY74 / Approach Balise (523B, 529B repositioning 520A, 521A, 523A, 526A, 529A, 530A, 541A	HBYHY74_UPMN_1_C
HY83	34.418	HY93 / HRTO 516A HY87 / HRTO 571A	HBYHY87_DNRL_0_C HBYHY93_DNMN_0_C
HY35	25.105	HY35 / HRTO 515A	HBYHY35_DNSH_0_C

Cabinet (i.e. LOC) / Bungalow / Hut / Relay Room <small>(i.e. proposed location of ATP Equipment Housing) (referred to as the ATP Area 1 Site Name hereafter in this REF</small>	LOC / Bungalow / Hut / Relay room Chainage (km) <sup>1</sup>	Signal / function name <small>(i.e. Proposed location of Controlled Balises</small>	Balise Group Name
		HY101 / Approach Balise 551A	HBVHY101_DNMN_0_C
HY99	34.700	HY103 / HRTPs 523A, 529B	HBVHY103_UPMN_1_C
		HY106 / HRTO 573A	HBVHY106_UPMN_0_C
HY130	34.980	HY132	HBVHY132_UPMN_0_C
HY134	35.601	HY134 / HRTOs 564B, 571B	HBVHY134_UPMN_0_C
HY136 <sup>2</sup>	36.680	HY136 HY136AT	N22_97_SG_0_C
B1	43.326	B1 / HRTO 51A	BERB1_DNMN_0_C
Berowra RR	44.451	B3 / Approach Balise 51A	BERB3_DNMN_0_C

<sup>1</sup> Chainage refers to the distance in kilometres from Sydney's Central Railway Station

<sup>2</sup> Existing control balises installed under the ATP piolet project to be removed/decommissioned



**Figure 3-1 Schematic of proposed works**

## 3.2. Construction methodology

### 3.2.1. Work methodology

The work methodology would involve the following stages:

- identify and mark up areas for stockpiling materials and segregating waste
- establish site access, including fenced off exclusion zones
- install erosion and sediment controls
- trenching and pit and pipe work (if required)
- install new signal equipment
- test all equipment prior to commissioning
- clear the signal locations of any remaining construction plant or materials.

It is anticipated ATP works would require a yard and compound area(s) for administrative purposes (project office) and for the storage and management of construction materials, plant and equipment. The establishment and use of a yard and compound area(s) would be subject to further assessment and approval by TfNSW.

### 3.2.2. Plant and equipment

The following plant and equipment is likely to be used for the works:

- Supersucker
- Excavator (7 tonne) for excavation as well as rock breaking where required
- Hand and power tools
- Bobcat
- Compactor
- Generator
- Boring equipment
- Front end loader (5 tonne).

### 3.2.3. Timing

Construction of the Proposal is expected to commence in mid-2018 and continue for about 18 months.

Main civil and structural construction works at each ATP site would be complete within around three weeks. Installation of trackside signalling equipment would follow the civil and structural works and take about one week to complete.

The construction team would complete civil works and the installation of trackside signalling equipment at each ATP site prior to progressing to the next location.

Works would generally be scheduled to take place during standard working hours:

- 7.00am to 6.00pm Monday to Friday
- 8.00am to 1.00pm Saturday
- No work on Sunday or public holidays.

However, due to access constraints and the requirement for a safe working site, some works may be undertaken outside standard working hours and during scheduled track possessions.

As discussed in Section 6.5, if works are required outside the standard working hours, further approval would be obtained by TfNSW and the affected community would be advised in accordance with the TfNSW *Construction Noise Strategy* (7TP-ST-157) and the communication protocol for the proposal.

#### **3.2.4. Site access and storage of materials**

Access to the ATP sites would be via existing railway corridor access gates and access tracks. Access gates are locked at all times except for site deliveries and access / egress by site personnel. Distance from the access gates to the work sites can range around 10 metres to 60 metres.

The construction process would require an average of 10 to 20 vehicle movements and a team of 5 to 10 people on site per day.

Temporary site storage areas would be established in cleared areas within the ATP site footprint. In locations where storage areas are limited or not available, materials or spoil will be directly removed from site.

Amenities such as portable toilets may be provided at some ATP sites where there is adequate space and suitable access.

### **3.3. Operations, management and maintenance**

The operation of the new signalling system would commence following the installation and commissioning of the train mounted system.

Sydney Trains or its appointed contractor would maintain the system. Maintenance would be undertaken in accordance with Sydney Trains standards.

## 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. 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 *Environmental Planning and Assessment Regulation 2000* 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 ATP Program. The principles for ESD would be facilitated through the application of a range of environmental management tools such as the implementation of the construction environmental management plan and adherence to the TfNSW environmental management system. Table 4-1 identifies how the Proposal complies with the principles of ESD.

**Table 4-1 ESD principles and how they relate to the Proposal**

Principle	Compliance
Precautionary principle	There are no threats of serious or irreversible damage posed by the Proposal. The signal locations are generally within a previously disturbed area in the rail corridor. All of the environmental risks have been carefully considered through the preparation of this REF and would be managed through the implementation of the construction environmental management plan. The plan is unlikely to be stalled by a lack of scientific certainty.
Intergenerational equity	The Proposal will help ensure that future generations have a safer, more comfortable and more reliable rail transport options.
Biodiversity conservation and ecological integrity	Due to the highly modified nature of the signal locations along the rail corridor, no biodiversity of ecological significance is anticipated to be encountered. However, construction of the Proposal would be undertaken in accordance with a construction environmental management plan which would ensure the biodiversity conservation and ecological integrity of the receiving environmental is retained.

Principle	Compliance
Improved valuation and pricing of environmental resources	The REF has examined all environmental impacts associated with the Proposal and has recommended mitigation measures for the identified environmental risks that may result. The management of these risks has been factored into the overall budget allocation for the project, hence demonstrating that environmental resources have received appropriate valuation in the context of the Proposal.

## 4.2. NSW Government policies and strategies

In addition to statutory requirements, a number of NSW Government policies and strategies are relevant to the Proposal. Table 4-2 summarises the NSW Government policies and strategies applicable to the Proposal.

**Table 4-2 Relevant NSW Government policies/strategies**

Policy/Strategy	Commitment	Comment
<b>State Priorities – NSW: Making It Happen (NSW Government, 2015)</b>	<p>In September 2015, the NSW Government announced a series of State Priorities as part of NSW: Making It Happen (NSW Government, 2015). The State Priorities are intended to guide the ongoing actions of the NSW Government across the State, and guide resource allocation and investment in conjunction with the NSW Budget. NSW: Making it Happen focuses on 12 key ‘priorities’ to achievement 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 NSW: Making It Happen 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>	The Proposal would support the objective of improving the reliability of the public transport network.
<b>Draft Future Transport Strategy 2056</b>	<p>In October 2017, the NSW Government released the draft Future Transport Strategy 2056. The strategy is an update of the 2012 NSW Long Term Transport Master Plan which has guided service and infrastructure investments in the NSW transport network. The strategy sets the 40 year vision, strategic directions and outcomes framework for greater customer mobility in NSW. This will guide transport investments in the long term.</p> <p>Future transport sets out a series of issue-specific and place-based plans. These plans move away from looking at the network in terms of individual modes of transport, towards more integrated solutions. The strategy recognises new technology and innovative service models are providing opportunities to change the way we travel which will achieve the dual objective of improving performance and significantly improving safety.</p>	The Proposal would be consistent with the draft Future Transport Strategy 2056 as it would modernise and support future technological innovation and growth across the transport system
<b>Sydney’s Rail Future</b>	<p>Sydney’s Rail Future, released in June 2012, is a plan developed to transform and modernise Sydney’s rail network so that it can grow with our future population.</p> <p>The plan is an integral part of the NSW Long Term Transport Master Plan.</p>	The Proposal would support the plan for Sydney’s Rail Future. The plan specifically identifies the Automatic Train Protection Program as an important technological advancement to support faster, more reliable train services.

Policy/Strategy	Commitment	Comment
<b>Draft Metropolitan Strategy for Sydney to 2031</b>	<p>In 2013, the NSW Government released the draft Metropolitan Strategy for Sydney to 2031 for consultation.</p> <p>The draft Strategy identifies nine key 'city shapers' that will play an important role in shaping the future growth of Sydney.</p> <p>The draft Strategy has been aligned with the NSW Long Term Transport Master Plan.</p>	<p>The Proposal would be consistent with the draft Metropolitan Strategy by ensuring the ongoing safe and efficient operation of the rail network, supporting the growth of Sydney.</p>

### 4.3. NSW legislation and regulations

#### 4.3.1. 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 Part 5 Division 5.1 of the EP&A Act. Part 5 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 consider to the fullest extent possible all matters affecting or likely to affect the environment by reason of the Proposal. Having regard to these provisions, TfNSW has determined that no significant environmental impact is likely, and therefore an environmental impact statement is not required, nor is the approval of the Minister for Planning and Infrastructure.

Clause 228 of the EP&A Regulation defines the factors which must be considered when determining if an activity assessed under Part 5 Division 5.1 of the EP&A Act has a significant impact on the environment. Chapter 6 of this REF provides an environmental impact assessment of the Proposal in accordance with clause 228. Appendix 1 specifically responds to the factors for consideration under clause 228.

### 4.3.2. Other NSW legislation and regulations

Table 4-3 provides a list of other relevant legislation applicable to the Proposal.

**Table 4-3 Other relevant legislation applicable to the Proposal**

Applicable legislation	Considerations
<i>Heritage Act 1977</i>	<p>Section 57(1) of the <i>Heritage Act 1977</i> (Heritage Act) lists the types of activities/works that require approval from the Office of Environment and Heritage (OEH) Heritage Division when working on/in an item/place listed on the State Heritage Register (SHR). An application for an exemption can also be made under some circumstances. Approval from the Heritage Division is also required under Section 139 of the Heritage Act prior to the disturbance or excavation of land if a project will, or is likely to result in, a relic being discovered, exposed, moved, damaged or destroyed.</p> <p>The Proposal involves works within or near items listed on the SHR, Sydney Train's section 170 heritage register, or the Strathfield, Canada Bay, Ryde, Parramatta and Hornsby Council local environmental plans. Given the disturbed nature of the rail corridor and limited excavation required, it is unlikely that the proposed works would affect any archaeological items of heritage significance.</p> <p>Where works are located within the curtilage of an item listed on the SHR and no adverse impact on the heritage significance of that item is expected as a result of the proposed works, an application will be submitted to Sydney Trains to obtain exemption in accordance with the Rail-Specific Heritage Exemptions from Approval. Where works may adversely affect the heritage significance of a State heritage item, an application will be submitted to the OEH Heritage Division.</p> <p>More information about heritage is included in Section 6.6.</p>
<i>National Parks and Wildlife Act 1974</i>	<p>The excavating, moving or exhibiting of Aboriginal objects requires a permit under Section 87 of the <i>National Parks and Wildlife Act 1974</i> (NPW Act). The harming or desecrating of Aboriginal objects or places is an offence under Section 86 of the NPW Act. Under Section 90, an Aboriginal heritage impact permit may be issued in relation to a specified Aboriginal object, Aboriginal place, land, activity or person or specified types or classes of Aboriginal objects, Aboriginal places, land, activities or people.</p> <p>There are nine Aboriginal objects or places known to occur within a 200m radius of two locations. However, none of these places are in the immediate vicinity of the signal locations and no known items or places would be affected by the proposed work.</p> <p>Safeguards have been proposed to address circumstances if an unexpected find occurs.</p> <p>All native birds, reptiles, amphibians and mammals, except the dingo, are protected in NSW under the NPW Act. The harming of protected fauna is prohibited under the NPW Act, but an exemption applies in relation to things that are essential to the carrying out of an activity to which Part 5 Division 5.1 of the EP&amp;A Act applies and where the determining authority has complied with the provisions of that part.</p>
<i>Biodiversity Conservation Act 2016</i>	<p>The <i>Biodiversity Conservation Act 2016</i> (BC Act) is directed at conserving threatened species, populations and ecological communities of animals and plants. A number of threatened species, populations, and endangered ecological communities occur in the vicinity of the Proposal. However, it is anticipated that due to the nature of works and the location of construction footprint primarily within disturbed rail corridor, no vegetation removal except for the clearing of grasses and weeds would be required</p> <p>The potential impact on vegetation and biodiversity would be minimised through a hierarchy of controls outlined in Section 6.4.2. Should vegetation other than grass and weeds need to be trimmed or removed to support the construction of the Proposal, further consideration of the BC Act would be undertaken and approval from TfNSW obtained.</p> <p>Section 6.4 provides further information about the biodiversity constraints associated with the proposal</p>

Applicable legislation	Considerations
<i>Protection of the Environment Operations Act 1997</i>	The <i>Protection of the Environment Operations Act 1997</i> (POEO Act) provides a licensing framework for certain activities as defined in Schedule 1 of the POEO Act. The proposal is not considered to fall within the definition of Section 33 'Railway systems activities' of Schedule 1. As such, the proposal does not require an environment protection license (EPL) under the POEO Act.
<i>Roads Act 1993</i>	Under Section 138 of the <i>Roads Act 1993</i> , a person must not "erect a structure or carry out a work in, on or over a public road, or dig up or disturb the surface of a public road..." other than with the consent of the appropriate roads authority. However, clause 5(1) in Schedule 2 of the Act states that public authorities do not require consent for works on unclassified roads.  The proposal does not require any work to be undertaken in, on or over a classified road. Therefore, approval from Roads and Maritime Services (RMS) would not be required.
<i>Crown Lands Act 1987</i>	The proposed work would not be undertaken on crown land and the provisions of this Act are not applicable to the Proposal.

## 4.4. Environmental planning instruments

### 4.4.1. State Environmental Planning Policy (Infrastructure) 2007

The Infrastructure SEPP is the key environmental planning instrument which determines the permissibility of the Proposal.

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. Clause 78 defines 'rail infrastructure facilities' as including 'signalling, train control, communication and security systems'.

Consequently, development consent is not required, however the environmental impacts of the Proposal have been assessed under the provisions of Part 5 Division 5.1 of the EP&A Act.

Part 2 of the Infrastructure SEPP contains provisions for public authorities to consult with local councils prior to the commencement of certain types of development. Chapter 5 of this REF discusses the consultation undertaken in relation to the Proposal.

### 4.4.2. Other environmental planning instruments

Table 4-4 provides a list of other relevant environmental planning instruments applicable to the Proposal.

**Table 4-4 Other relevant environmental planning instruments applicable to the Proposal**

Applicable instrument	Considerations
<i>State Environmental Planning Policy No. 14 – Coastal Wetlands</i>	The Proposal is not located within an area covered by the SEPP and therefore no further consideration of SEPP 14 is necessary.
<i>State Environmental Planning Policy No. 19 – Bushland in Urban Areas</i>	This SEPP protects and preserves bushland within certain urban areas, as part of the natural heritage or for recreational, educational and scientific purposes. Hornsby, Ryde and Strathfield LGAs are listed in Schedule 1 as areas where bushland needs to be preserved. The proposed work would not require removal or disturbance to bushland on or adjacent to land reserved or zoned for public open space. Therefore, no further consideration of SEPP 19 is required.

Applicable instrument	Considerations
<i>State Environmental Planning Policy No. 44 – Koala Habitat Protection</i>	Hornsby LGA is listed in Schedule 1 as an area possessing habitat or feed trees for koalas. However, the proposed work would not require the removal of koala habitat or feed trees, so no further consideration of this SEPP is required.
<i>State Environmental Planning Policy No. 55 – Remediation of Land</i>	SEPP 55 provides for a consistent state-wide planning approach to the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. If contaminated land is encountered during the construction works a suitable remediation plan would be developed, if required.
<i>State Environmental Planning Policy No. 71 – Coastal Protection</i>	The Proposal is within the coastal protection zone designated in the Coastal Protection SEPP. Approval under this SEPP is not required as the SEPP relates to the development of local environmental plans and assessment of Part 4 development applications. The Proposal complies with the aims and matters for consideration of the SEPP. No further consideration of the SEPP is required.
<i>State Environmental Planning Policy (Major Development) 2005</i>	This SEPP identifies certain developments which are deemed major projects. The Proposal is not listed in this SEPP.
<i>State Environmental Planning Policy (State and Regional Development) 2011</i>	The Proposal is not listed in the SEPP and has not been declared as State Significant Infrastructure or State Significant Development under the SEPP.
<i>Strathfield Local Environmental Plan 2011</i>	<p>The Proposal includes four sites, and one partial site with the Canada Bay LGA and is subject to the Canada Bay Local Environmental Plan 2013 (Canada Bay LEP). The proposed works would be undertaken on land zoned SP2 Infrastructure Railway.</p> <p>The proposed works in the Canada Bay LGA are permissible with consent in zone SP2 Infrastructure.</p> <p>As the Infrastructure SEPP overrides the development consent requirements of any LEP, the Proposal can proceed without development consent.</p>
<i>Canada Bay Local Environmental Plan 2013</i>	<p>The Proposal includes three sites and one partial site within the Canada Bay LGA and is subject to the Canada Bay Local Environmental Plan 2013 (Canada Bay LEP). The proposed works would be undertaken on land zoned SP2 Infrastructure Railway, and B4 Mixed Use.</p> <p>The proposed works in the Ryde LGA are permissible with consent in zone SP2 Infrastructure and B4 Mixed Use.</p> <p>As the Infrastructure SEPP overrides the development consent requirements of any LEP, the Proposal can proceed without development consent.</p>
<i>Ryde Local Environmental Plan 2014</i>	<p>The Proposal includes four sites within the Parramatta LGA and is subject to the Parramatta Local Environmental Plan 2011(Parramatta LEP). The proposed works would be undertaken on land zoned SP2 Infrastructure (Railway Corridor).</p> <p>The proposed works in the Parramatta LGA are permissible with consent in zone SP2 Infrastructure.</p> <p>As the Infrastructure SEPP overrides the development consent requirements of any LEP, the Proposal can proceed without development consent.</p>
<i>Parramatta Local Environmental Plan 2011</i>	<p>The Proposal includes four sites within the Parramatta LGA and is subject to the Parramatta Local Environmental Plan 2011(Parramatta LEP). The proposed works would be undertaken on land zoned SP2 Infrastructure (Railway Corridor).</p> <p>The proposed works in the Parramatta LGA are permissible with consent in zone SP2 Infrastructure.</p> <p>As the Infrastructure SEPP overrides the development consent requirements of any LEP, the Proposal can proceed without development consent.</p>

Applicable instrument	Considerations
<i>Hornsby Local Environmental Plan 2013</i>	<p>The Proposal includes 13 sites within the Hornsby LGA and is subject to the Hornsby Local Environmental Plan 2011 (Hornsby LEP). The proposed works would be undertaken on land zoned SP2 Infrastructure - Railway and B4 Mixed use.</p> <p>The proposed works are permissible with consent in Zone SP2 Infrastructure and B4 mixed use.</p> <p>As the Infrastructure SEPP overrides the development consent requirements of any LEP, the Proposal can proceed without development consent.</p>

## 4.5. Commonwealth legislation

### 4.5.1. *Environment Protection and Biodiversity Conservation Act 1999*

The Commonwealth EPBC Act requires the assessment of whether the Proposal is likely to significantly impact on matters of NES or Commonwealth land. These matters are considered in full in Appendix 2.

The Proposal would not impact on any matters of NES or on Commonwealth land. A referral to the Commonwealth Department of Environment and Energy is therefore not required.

## 5. Stakeholder communication

Chapter 5 discusses the information that will be provided to the community on the Proposal both during the planning approval process and during construction.

### 5.1. Communication approach

The communications approach for the Proposal has been designed to serve as an educational tool for interested stakeholders and communities located near works being undertaken in the rail corridor.

The works being undertaken as part of the Proposal are based on safety and rail system requirements. For this reason, there is minimal opportunity for any community feedback into projects deliverables. An educational approach to the communication activities has been adopted to allow interested stakeholders to find out more about the ATP Project and any likely resulting impacts.

The communication approach being implemented for the program has also been developed having regard for the requirements of the planning process.

The following principles for the Proposal would be adopted:

- generally raising awareness of the Proposal through notifications, site signage, door knocks, advertisements in local newspapers and directing interested stakeholders to the Transport for NSW website
- ensuring that up to date information about the Proposal is available on the Transport for NSW website
- making information available about the appropriate planning processes being followed and are compliant with legislative requirements
- recording any enquiries and interactions from the community regarding the Proposal
- ensuring a transparent approach.

### 5.2. Consultation requirements

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

**Table 5-1 Infrastructure SEPP consultation requirements**

Consultation with Councils – development with impacts on council related infrastructure and services	Relevance to the Proposal
<p>Consultation with the local council is required where railway station works:</p> <ul style="list-style-type: none"> <li>substantially impact on storm water management services</li> <li>place a local road system under strain</li> <li>involve connection to or impact on a council owned sewerage system</li> <li>involve connection to and substantial use of council owned water supply</li> <li>significantly disrupt pedestrian or vehicle movement</li> <li>involve significant excavation to a road surface or footpath for which Council has responsibility.</li> </ul>	<p>The proposed works are minor and should not have an impact on council related infrastructure or services. Accordingly, no consultation with councils is required.</p>
Consultation with Councils – development with impacts on local heritage	Relevance to the Proposal
<p>Where railway station works:</p> <ul style="list-style-type: none"> <li>substantially impact on local heritage item (if not also a State heritage item)</li> <li>substantially impact on a heritage conservation area.</li> </ul>	<p>The proposed works are not expected to have a substantial impact on local heritage items or heritage conservation areas.</p>
Consultation with Councils – development with impacts on flood liable land	Relevance to the Proposal
<p>Where railway station works:</p> <ul style="list-style-type: none"> <li>impact on land that is susceptible to flooding – reference would be made to ‘Floodplain Development Manual: the management of flood liable land’.</li> </ul>	<p>The proposed works are not expected to impact on flood liable land or change flood patterns.</p>
Consultation with public authorities other than Councils	Relevance to the Proposal
<p>Where development is identified as ‘specified development’ (i.e. adjacent to land reserved under the NPW Act or within the foreshore area identified in the Sydney Harbour Foreshore Authority Act), the relevant agency should be consulted.</p>	<p>The proposed works are not specified development.</p>

### 5.3. Communication activities

Table 5-2 identifies the communication activities are intended to be undertaken during the planning, construction and commissioning phase of the Proposal.

**Table 5-2 Communication activities**

Project phase	Communication tool or activity	Timeframe
Planning	Establish a 1800 number for any enquiries related to the Proposal and log these interactions in a register (Consultation Manager).	Prior to REF determination
	Install standard signage at each of the access gates identifying that works being undertaken as part of the Proposal and timeframe for delivery.	Prior to construction commencement
Construction	Maintain the 1800 number for any enquiries related to the Proposal and log these interactions in a register (Consultation Manager)	Throughout construction phase
	Use a variety of communication tools such as letter box notifications, door knocks and website updates to keep stakeholders informed of construction activities.	Throughout construction phase
Commissioning	Update information on the website to reflect completion of the Proposal including overall benefits of work undertaken.	At completion

## 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. The site-specific footprint for each ATP site assessed in this REF is provided in Appendix 3.

To determine the likely impact of the overall Proposal, a preliminary environmental risk assessment has been undertaken for each proposed ATP site in Area 1. The preliminary environmental risk assessment has been undertaken for the following environmental issues:

- water quality / hydrology
- acid sulfate soils
- biodiversity
- noise
- heritage
- contamination
- land use
- traffic and access.

A number of other environmental issues, such as air quality and waste, would generally pose the same potential risk at each proposed ATP site in Area 1. As such, these issues have not been included in the risk assessment. The potential risk and likely impact of these issues are discussed in the relevant section and appropriate standard mitigation measures have been identified to be implemented at all ATP sites in Area 1.

The risk assessment has identified whether the ATP Project works at the proposed ATP sites would present a low, medium or high risk of impact for the relevant environmental issue. The risk has been determined based on proximity to a sensitive waterbody, heritage item and /or residential property as well as the occurrence of actual or potential acid sulfate soils, threatened species and/or communities and contamination. A copy of the risk assessment criteria which was used to guide the risk classification at each ATP site in Area 1 is provided in Appendix 5.

Where a high risk has been identified at a proposed ATP site in Area 1, a site-specific assessment has been provided in the relevant section. Where required, appropriate site-specific mitigation measures have been identified to be implemented at these ATP sites.

The results of the preliminary environmental risk assessment are provided in Table 6-1.

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 1.

**Table 6-1 Preliminary environmental risk assessment**

ATP Area 1 Site Name	Water quality / hydrology	ASS	Biodiversity	Noise	Non-Indigenous Heritage	Indigenous Heritage	Potential Contamination	Land use	Traffic and access
Homebush MSB	High	Low	Low	Low	High	Low	High	Low	Low
NST2 Relay Room	Low	Low	High	Medium	Medium	Low	High	Low	Low
RS	Low	Low	Medium	Low	High	Low	High	Low	Low
RS5 Relay Room	Low	Low	Low	Medium	Low	Low	High	Low	Low
RS9	Low	Low	Medium	Low	Low	Low	Low	Low	Low
WR3	Medium	Low	Medium	Low	Medium	Low	Medium	Low	Low
WR14	Low	Low	Low	Medium	Medium	Low	Low	Low	Low
N13.88	Low	Low	Medium	Low	Medium	Low	High	Low	Low
N14.20	Low	Low	Medium	Low	Low	Low	High	Low	Low
EG39	Low	Low	Low	Low	Low	Low	Medium	Low	Low
EG44	Medium	Low	High	Low	Low	Medium	Medium	Low	Low
LOC 20 Signal	Low	Low	High	Low	Low	Low	High	Low	Low
HY17	Medium	Low	Medium	Low	Low	Low	Medium	Low	Low
HY19	Medium	Low	High	Low	Low	Low	Medium	Low	Low
HY25	Medium	Low	Medium	Low	Low	Low	Low	Low	Low
HYCC	Low	Low	Low	Low	Medium	Low	Low	Low	Low
HY72	Low	Low	Low	Low	Medium	Low	Low	Low	Low
HY83	Low	Low	Low	Low	Medium	Low	Low	Low	Low
HY35	Low	Low	High	Low	Medium	Low	Low	Low	Low
HY99	Low	Low	Medium	Low	Low	Low	Low	Low	Low
HY130	Low	Low	Low	Low	Low	Low	Medium	Low	Low

ATP Area 1 Site Name	Water quality / hydrology	ASS	Biodiversity	Noise	Non-Indigenous Heritage	Indigenous Heritage	Potential Contamination	Land use	Traffic and access
HY134	Low	Low	Low	Low	Medium	Low	Low	Low	Low
HY136	Medium	Low	Low	Low	Low	Low	Low	Low	Low
B1	Low	Low	High	Low	Low	Medium	Low	Low	Low
Berowra RR	Low	Low	High	Low	Low	Medium	Low	Low	Low

## 6.1. Landforms, geology and soils

### 6.1.1. Existing environment

The North Shore, Northern & Western Line (Area 1) from Strathfield and Berowra is generally low lying and flat, with topography rising towards the north towards Beecroft. To the north of Beecroft, the rail corridor is generally situated along a ridge line running roughly in a north east to south west direction. The elevation ranges from less than 10 metres at Meadowbank and Rhodes to about 200 metres at Berowra.

The geology throughout the proposal area identified in the Department of mineral resources geological survey is Ashfield Shale and Hawksbury sandstone.

Potential Acid Sulfate Soils (PASS) are soils rich in iron sulfides (pyrite). If these soils are brought into contact with oxygen, oxidation occurs and they become Acid Sulfate Soils (ASS) which are highly acidic. There is a risk of encountering potential acid sulfate soils along the margins of estuarine floodplains and coastal lowlands.

A review of the ASS Risk mapping for each ATP site was undertaken to assess the:

- probability of occurrence of acid sulfate soil
- depth to acid sulfate soil
- environmental risk associated with disturbing the soil
- the landform element on which the soil occurs.

The review indicated ATP sites in Area 6A are classified as low risk (i.e. no risk of ASS occurring within four metres of the natural soil surface) with respect to potential ASS. No ATP sites in Area 6A are within areas mapped as having a high risk of ASS and a review of the Acid Sulfate Soil (ASS) Risk mapping noted no known occurrence of ASS at any of the proposed ATP sites in Area 1.

### 6.1.2. Potential impacts

Some soil disturbance would be required at each ATP site during the construction of the Proposal. Where space is available, existing conduits or GST would be used for the cabling works. Where space within existing cabling conduits or GST is not available, cabling would be installed using underground cables installed in 0.3 metre wide trench at a depth of 0.6 metres. Land disturbance may also be required at ATP sites to install new cabinets where space is not available within existing cabinets. Up to 20 square metres of land would be disturbed at each ATP site during construction of the Proposal.

Excavated soil and rock for any cable trenching would be temporarily stockpiled on site and backfilled upon completion, provided it is not contaminated or weed infested.

Where trenching is difficult to undertake in rocky terrain, rock breaking may be required.

Trenching activities may result in erosion if appropriate mitigation measures are not in place. Soil erosion has the potential to destabilise landforms and deposit sediments in drainage systems and waterways. Sediment deposition and fine particles in suspension within waterways have direct impact on water quality and aquatic life.

As noted in Section 6.1, all ATP sites in Area 1 were found to pose a low risk of ASS (refer Table 6-1). As excavation works are not proposed to extend to depths greater than four

metres below the natural soil surface potential impacts associated with ASS are not anticipated.

Given the site characteristics and the scope and size of the proposed work at each ATP site, it is anticipated that erosion and sediment risks are minimal and can be effectively managed through the implementation of standard measures as outlined in the *Managing Urban Stormwater, Soils and Construction Guidelines* (the Blue Book) (Landcom 2004).

No operational impacts are expected.

### 6.1.3. Mitigation measures

Site specific erosion and sediment control measures would be identified as part of CEMP/ECM. The proposed erosion and sediment control measures will be implemented in accordance with *Managing Urban Stormwater Soils and Construction* (Landcom 2004) (the Blue Book) and would include, but not be limited to, those outlined below:

- Appropriate stockpiling of materials would take place away from drainage lines, waterways and drains.
- Any soil that may be contaminated or weed infested would be stockpiled separately before being removed from the site.
- Stockpiles and disturbed areas shall be appropriately stabilised to minimise erosion.
- Disturbed areas would be reinstated as soon as possible.

## 6.2. Water quality and hydrology

### 6.2.1. Existing environment

The North Shore, Northern & Western Line between Strathfield and Berowra crosses Powell Creek, Parramatta River, Terrys Creek, Charity Creek and Devlins Creek which feeds into the Lane Cover River. The rail corridor is part of the Parramatta, Lane Cove and Hawksbury-Nepean River catchments.

Track drainage and runoff generally discharges into nearby creeks and drainage lines. The existing drainage system within the railway corridor consists of an informal arrangement of pit and pipe and outfall points to stormwater. Overland flows from adjoining properties generally pass beneath the ballasted areas via culverts and buried pipes.

Existing shelters above signal cabinets and bungalows are located at a number of ATP sites. Rainwater runoff from these shelters discharges to the ground and do not present a risk to local water quality

ATP Sites in Area 1 which are located within 25 metres of a waterway are listed in Table 6-2. Under the preliminary environmental risk assessment (refer Table 6-1) these ATP sites have been classified as high risk from a water quality and hydrology perspective due to their proximity (i.e. within 25 metres) to a waterway.

**Table 6-2 ATP sites in Area 1 within 25 metres of a waterway**

ATP Area 1 Site Name	Waterway	Comments
Homebush MSB	Powell Creek	The proposal uses existing cable routes that pass over Powell Creek via the Power Creek Railway Viaduct. Powell Creek is a highly modified waterway that crosses Homebush Bay Drive and Bicentennial Park, before discharging into the Parramatta river around 3.3 kilometres to the north. No new cable routes are proposed to be installed adjacent or directly over the creek.

ATP Area 1 site WR3 is located within 100 metres of Charity Creek which crosses the Northern Line immediately north of the Meadowbank railway station. Charity creek is a highly modified waterway draining to the Parramatta River 650 metres to the south. ATP Area 1 site HY17, HY19 and HY25, are greater than 60m from Tributaries of Waitara Creek, which lead to Berowra Creek around 2 kilometres to the north. All remaining ATP sites are greater than 150 meters from any waterway.

A search of the NSW Office of Water, Groundwater Bore Database indicated there are 25 groundwater bores within 500 metres of ATP sites in Area 1, these are generally clustered monitoring bores with depths of up to five metres below the ground surface. The groundwater level was recorded at 0.62 metres below ground level at one bore within 500 metres of sites HY130 and HY134 and at 0.90 metres below ground level at site Homebush Station MSB.

A review of flood mapping sourced from the Parramatta LGA indicates ATP Area 1 Homebush MSB which is within 25 metres of Powells Creek is in an area which may be prone to flooding during a wet weather event. No other ATP sites in Area 1 are located in areas prone to flooding.

### **6.2.2. Potential impacts**

Without appropriate safeguards, contaminants such as fuels and hydraulic oils from plant and equipment may reach nearby drains and discharge into local waterways. These contaminants may have the potential to harm aquatic life and affect the quality of water downstream. However, the risk of such an occurrence is generally low provided the mitigation measures noted in Section 6.2.3 are implemented throughout construction.

During excavation works there is the potential for sediment-laden water to be discharged into local water bodies and/or the nearby stormwater system during a rainfall event. Rain or groundwater may enter trench excavations. If inappropriately managed, sediment-laden water could be discharged into local water bodies and/or the nearby stormwater system.

The Proposal requires minimal excavations. It is anticipated that the proposed trenching would generally be at a maximum of 0.6 metres deep. The likelihood of encountering groundwater is considered low. ATP Area 1 Homebush MSB is within an area mapped as flood prone under Parramatta LEP, hence there is potential for flooding during heavy rain. The proposed work at each ATP site is relatively minor and would not have any potential impacts on surface water movements

No operational impacts are expected. The works would not affect the landform or the flow of water in the area. No impacts on groundwater are expected as a result of the proposed works.

### 6.2.3. Mitigation measures

During construction, water quality impacts would be minimised through a range of control measures in addition to the erosion and sedimentation controls included in Section 6.1. The water quality measures would include, but would not be limited to those outlined below:

- Erosion and sediment controls at each worksite would be detailed on the ECM and comply with *Managing Urban Stormwater: Soils and Construction* (Landcom 2004) (The Blue Book).
- Erosion and sediment controls would be regularly inspected and maintained, particularly following heavy rainfall.
- The effectiveness of erosion and sediment controls would be monitored daily and adjusted if required.
- Plant and equipment would be maintained in accordance with the manufacturer's specifications and checked regularly for oil leaks.
- Refuelling of plant and equipment would occur in impervious bunded areas located a minimum of 40 metres from drainage lines and/or waterways.
- Concrete slurries and wash-out should be collected for reuse where appropriate or off-site disposal.
- Appropriately sized spill response kits must be kept on site and staff trained in their use.
- Earthworks should be suspended during periods of heavy or prolonged rainfall.
- Dry street sweepers or hand-held brooms should be used to clean local roads in the event of tracked sediment.
- Works are to be undertaken in accordance with the TfNSW *Chemical Storage and Spill Response Guidelines* (9TP-SD-066).
- Water discharge from the ATP site must be carried out as per TfNSW *Water Discharge Guidelines* (7TP-SD-024).

## 6.3. Air quality

### 6.3.1. Existing environment

The local air quality along the rail corridor between Strathfield and Berowra (Area 1) is typical of an urban environment and is largely influenced by vehicle emissions, and industrial, commercial and domestic sources.

### 6.3.2. Potential impacts

There is a risk of impact on local air quality during the following activities, particularly during warm and dry weather:

- stockpiling of virgin and spoil materials
- excavation of trenches
- backfilling of trenches
- transporting of wastes
- plant movement on access
- emissions from plant and machinery.

No dust or emissions are anticipated during the operation of the ATP Project.

### 6.3.3. Mitigation measures

Air quality impacts throughout construction would be minimised through a range of control measures which would include, but would not be limited to, those outlined below:

- Plant and equipment would be maintained in accordance with manufacturers' specifications.
- Regular inspection of plant and equipment would be undertaken to ascertain that fitted emission controls are operating efficiently.
- Plant or machinery would not be left idling.
- All work areas and stockpiles would be monitored by construction personnel for dust generation during working hours.
- Stockpiles would be maintained and contained appropriately, which could include covering or regular watering to minimise dust.
- Trucks transporting spoil and other waste materials from site would be covered appropriately.
- Disturbed areas would be rehabilitated as soon as practicable.

## 6.4. Biodiversity

### 6.4.1. Existing environment

The North Shore, Northern & Western Line between Strathfield and Berowra (Area 1) experienced significant disturbance during construction of the rail line. The Proposal generally traverses an urban area, however some areas are about 80 metres west of the Lane Cove National Park, and about 250 metres east of Bicentennial Park. The northern extent of the proposal is located about 150 metres west of Kuring-Gai National Park.

A desktop review of Endangered Ecological Communities (EECs) and a search of the Office of Environment and Heritage (OEH) NSW BioNet Atlas of NSW Wildlife and the EPBC Protected Matters Search Tool (refer Appendix 2) identified the potential occurrence of the following matters of national environmental significance (NES) within a ten km radius of the rail corridor:

- 8 Threatened Ecological Communities (TECs)
- 53 threatened fauna species
- 24 threatened flora species
- 51 migratory bird species.

The BioNet Atlas of NSW Wildlife returned 98 records of threatened flora and fauna species (listed under the BC Act) occurring within the within ten kilometres of the rail corridor including:

- 59 threatened fauna species
- 39 threatened flora species
- 29 Endangered Ecological Communities.

Records of threatened species/communities increase within the areas of Homebush Bay and Lane Cove National Park. Generally, the number of records increase towards the North of the proposal area as the amount of urban bushland and National Parks increases.

Table 6-3 lists threatened species which have previously been recorded in the vicinity of the Proposal within the rail corridor. Disturbance of native vegetation at these ATP Sites has the potential to impact these species

**Table 6-3 Threatened species locations**

ATP Area 1 Site Name	Threatened species	Conservation status		Proximity to site
		BC Act	EPBC Act	
N13.88	Kanangra Wattle ( <i>Acacia clunies-rossiae</i> )	Vulnerable	Not listed	Identified within the site footprint
B1 Berowra RR	<i>Darwinia biflora</i>	Vulnerable	Vulnerable	Identified within the site footprint
B1	<i>Lasiopetalum joyceae</i>	Vulnerable	Vulnerable	Identified within the site footprint

There is potential for threatened flora and fauna species to occur within the rail corridor other than those records currently within the BioNet Atlas of NSW Wildlife Database and EPBC Protected Matters Search Tool. However, this potential is considered to be very low, due to the disturbed nature of the rail corridor and the lack of habitat for both flora and fauna species. Figure 6-1 to Figure 6-3 show the general vegetation in a typical section of rail corridor at the ATP sites.



**Figure 6-1 Typical section of rail corridor in Area 1 (N13.88)**



**Figure 6-2 Typical section of rail corridor in Area 1 (N13.88)**



**Figure 6-3 Typical section of rail corridor in Area 1 (B1)**

Table 6-4 provides the vegetation communities listed under the BC Act and EPBC Act which been mapped inside the rail corridor and within the footprint of ATP sites in Area 1.

**Table 6-4 Endangered ecological communities mapped within the site footprints**

ATP Area 1 Site Name	Vegetation community	BC Act Status / Name	EPBC Act Status / Name
N13.88 LOC 20 SIGNAL HY17 HY19 HY35	Blue Gum High Forest	Critically Endangered as Blue Gum High Forest in the Sydney Basin Bioregion	Critically Endangered as Blue Gum High Forest in the Sydney Basin Bioregion
HY17	Turpentine-Ironbark Forest	Critically Endangered as Sydney Turpentine-Ironbark Forest	Critically Endangered as Turpentine-Ironbark Forest
EG44	Shale/Sandstone Transition Forest	Critically Endangered as Shale Sandstone Transition Forest in the Sydney Basin Bioregion	Critically Endangered as Shale Sandstone Transition Forest of the Sydney Basin Bioregion

The preliminary environmental risk assessment notes ATP sites are high risk from a biodiversity (refer Table 6-1) perspective where threatened species and/or EECs are located within the site footprint (refer Appendix 3 ATP Area 1 site location plans).

The presence of noxious weeds was noted during site surveys, and not reviewed during this investigation.

### 6.4.2. Potential impacts

All construction works would be carried out within the rail corridor, and predominantly in areas subject to regular slashing/clearing for ongoing track maintenance and access. Most the new assets would either be installed within or close to the ballasted rail track area or around the existing LOCs, huts, bungalow or relay rooms. Where possible, the new infrastructure would utilise existing conduits for power and signal connections. In circumstances where there is no additional capacity in existing conduits; preference would be given to installing galvanised steel troughing and if this is not possible, underground conduits to connect new assets would be excavated.

In circumstances where new underground conduits or crossings are required, the construction impact would be minimised through a hierarchy of controls outlined in the Section 6.4.3, particularly near any threatened species or endangered ecological community.

It is anticipated due to the nature of works and location of construction footprint, no removal of native vegetation would be required. Site surveys complete for the concept design indicate minor clearing and/or trimming of overgrown grasses and weeds may be required at ATP sites Area 1. Should vegetation other than grass and weeds need to be trimmed or removed, further approval would be obtained from TfNSW.

Vegetation removal and trimming may be required to ensure plant, vehicles and/or equipment can safely access the ATP site. Any trimming activities are expected to be minor and given the extent of the surrounding bushland, trimming is not expected to significantly impact fauna habitat.

It is likely, that if not controlled correctly, the proposed works at ATP sites could cause the spread of weeds. Noxious weeds within the proposed areas of works are required to be appropriately treated and disposed of. All vegetation removal would be assessed by an ecologist to ensure that any identified noxious weeds are removed appropriately.

Three threatened flora species have been recorded within the site footprints of ATP Area 1 site N13.88, B1 and Berowra RR (refer Figure 6-1 to Figure 6-3). Site surveys undertaken for the concept design phase noted no disturbance to vegetation would be required at these sites and the vegetation within the site footprint was confined to the embankment areas on the eastern and western boundary of the site footprint. Hence, hence it is unlikely removal of native vegetation would be required, consequently impacts to this species are not anticipated provided in Section 6.4.3 are implemented.

There is a low risk of damage to other stands of existing vegetation (i.e. Kanangra Wattle (*Acacia clunies-rossiae*), *Darwinia biflora* and *Lasiopetalum joyceae*) due to stockpiling of materials or vehicle movements. Appropriate control measures, such as fencing, would be installed to ensure the risk of damage to existing vegetation is minimised.

Results from the desktop review (refer Section 6.4.1) indicate a number of ATP sites in Area 1 are located in areas of mapped EEC (refer Table 6-4). Any minor clearing of weeds and grasses required at these sites and the stockpiling of materials or vehicle movements has the potential to impact these communities if mitigation measures provided in Section 6.4.3 are not implemented.

EECs are also located adjacent to the site footprint and rail corridor boundary at a number of other ATP sites in Area 1. Potential direct and/or indirect impacts to these communities are not anticipated provided the mitigation measures in Section 6.4.3 are implemented.

Native fauna is unlikely to be impacted by proposed works in Area 1 although there is a low risk animals could potentially fall into an open trench and become trapped or injured.

Proposed works are not expected to create any operational impacts.

### 6.4.3. Mitigation measures

Impacts to flora and fauna throughout construction would be minimised through a range of mitigation measures which would include, but would not be limited to, those outlined below:

- Construction staff would be made aware of the ecological constraints and the requirements for no impact to any native vegetation at the following ATP sites in Area 1. This information would be included in the location and/or the activity specific ECMs and would be marked as “no go zones” with associated signage established at the site(s):
  - **ATP Area 1 site N13.88:** Kanangra Wattle (*Acacia clunies-rossiae*) recorded in the site footprint
  - **ATP Area 1 site B1 and Berowra RR:** *Darwinia biflora* recorded in the site footprint
  - **ATP Area 1 site B1:** *Lasiopetalum joyceae* recorded in the site footprint
  - ATP Area 1 site N13.88, LOC 20 Signal, HY17, HY19, HY35, HY17 and EG44: Blue Gum High Forest EECs located in the site footprint
  - **ATP Area 1 site HY17:** Turpentine-Ironbark Forest EEC located in the site footprint
  - **ATP Area 1 site EG44:** Shale/Sandstone Transition Forest located in the site footprint.

- **ATP Area 1 site N13.88, LOC 20 Signal HY17, HY19, HY35, HY17 and EG44:** Prior to the commencement of construction a targeted ecological assessment is to be undertaken by a suitably qualified ecologist to determine the presence of EECs at these ATP sites. Where possible, the final alignment of any underground cabling within the site footprint would be designed to avoid potential impacts on these EECs. The location of EECs would be included in the location and/or the activity specific ECMs and would be marked as “no go zones” with associated signage established at the site(s).
- **ATP Area 1 sites N13.88, B1 and Berowra RR:** Where disturbance to vegetation is required targeted flora surveys would be undertaken to determine the presence of the Kanangra Wattle (*Acacia clunies-rossiae*), *Darwinia biflora* and *Lasiopetalum joyceae* in the site footprint. Any cabling routes would be designed to avoid impacts to any identified plants. Where impacts are unavoidable, further assessment would be undertaken to consider the likely impacts, for the approval of TfNSW.
- Following confirmation of the detailed design where disturbance to native vegetation is required, and prior to the commencement of construction works, an experienced and qualified ecologist would undertake a survey to establish the presence of any threatened flora and fauna species and/or communities. Where a threatened species and/or community is identified, further would be undertaken to consider the likely impacts, for the approval of TfNSW.
- All workers would be provided an environmental induction prior to commencing work. This would include information on the ecological values within the ATP sites, mitigation measures to be implemented to protect biodiversity, and penalties for breaches.
- Where trenching or excavation is required for installing new underground conduits or crossings, the route or location would be modified or altered to avoid any damage to trees or tree roots, where possible.
- If threatened and/or protected flora or fauna species are identified at a ATP site, work near the subject flora or fauna would stop immediately. A spotter/catcher or ecologist would be engaged to survey the area, in conjunction with TfNSW’s Environmental Officer, and advise on species management.
- Vehicle turning circles and parking areas shall be clearly marked and would occur in areas free of native vegetation.
- Construction areas would be kept to a minimum and be clearly demarcated to prevent accidental damage to native vegetation.
- Stockpiles, plant, equipment and materials storage would be located on existing cleared lands away from the drip zone of trees or other native vegetation.
- Weeds would be treated and disposed of appropriately and not mixed with other vegetation to be mulched for reuse.
- Soil and vegetation that could contain weed material would be removed from machinery prior to any movements off site.
- Where space within existing conduits is not available, new GST would be preferred over underground conduits to connect new assets.
- Trenches/excavations would be covered at the end of each day and inspected before they are backfilled to ensure that no fauna species are harmed.
- Where trenching or excavation is required for installing new underground conduits or crossings, the route or location would be modified or altered to avoid any damage to trees or tree roots, where possible.

- Any trees requiring trimming or pruning must be assessed and approved for works using the TfNSW *Application for Removal or Trimming of Vegetation* (9TP-FT-078).
- All cleared vegetation shall be offset in accordance with TfNSW's *Vegetation Offset Guide* (9TP-SD-087).
- Management in accordance with TfNSW's guidelines, as applicable:
  - Fauna Management Guideline (3TP-SD-113)
  - Vegetation Management (Protection and Removal) Guideline (9TP-SD-111)
  - Weed Management and Disposal Guideline (3TP-SD-110).

## 6.5. Noise and vibration

### 6.5.1. Existing environment

The works at each ATP site would take place within the railway corridor which is surrounded by urban residential, commercial and recreational open space land uses. Residential receivers are located on both the eastern and western sides of the rail corridor along most of its length. The noise environment in the surrounding areas is generally dominated by the rail corridor and main road network.

Table 6-5 identifies sensitive receivers within proximity to the Proposal. The preliminary environmental risk assessment (refer to Table 6-1) has initially classified ATP sites which are located within 50 metres of sensitive receivers as high risk from a noise perspective. The distance from the works sites to the nearest residential receivers varies from around 10 metres to 200 metres (refer Table 6-5).

**Table 6-5 Summary of nearest residential receiver to each ATP site**

ATP Area 1 Site Name	Suburb	Nearest residential receiver (m)	Other comments
Homebush MSB	Homebush	50 to 100 metres	The proposed work area is in a commercial and industrial area, with residential properties located beyond the rail corridor to the south and east. The great Western highway and M4 motorway are 60 metres to 100 metres north of the proposal.
NST2 Relay Room	Concord West	10 metres	The proposal is located within an urban environment, with a number of residential, high density residential properties located directly adjacent to the rail corridor and work area.
RS9	Rhodes	50 metres	The proposal is located directly adjacent to a large commercial shopping centre; the closest residential receiver is located beyond Homebush Bay drive.
RS	Rhodes	50 metres	The proposal is located within an urban area with commercial and residential properties adjacent to the rail corridor. The proposal is within the curtilage of the Rhodes Railway station.
WR3	West Ryde Meadowbank	30 metres	The proposal is located within an urban area, residential properties are located to the west, a TAFE campus and open space areas are present to the east. Significant vegetation screening is present on both sides of the rail corridor and work area.

ATP Area 1 Site Name	Suburb	Nearest residential receiver (m)	Other comments
WR14	West Ryde	20 metres	The proposal is located within an urban/commercial area, with residential properties located on the western side of the rail corridor. Vegetation screening is present in portions of the work area.
N13.88	Eastwood Epping	30 metres	The proposal is in an urban residential environment with residential properties immediately to the east of the work area, a large area of open space and bushland to the west. Vegetation screening is present between the work area and the residential receivers. Blaxland road runs adjacent to the north east of the site.
N14.20	Eastwood Epping	20 metres	The proposal is located within an urban residential area, with residential properties located beyond Blaxland Road, and high Street, to the east and west respectively. Vegetation screening is present along both east and west sides of the rail corridor.
EG39	Epping	100 metres	The proposal is located within an urban environmental dominated with commercial and properties. Epping railway station is located immediately to the south.
EG44	Epping	20 metres	The proposal is located with an urban residential environment. Low density housing is located to the east of the work area. Vegetation screening is present within this area. The M2 motor way is located 200 metres to the north.
Loc 20 Signal	Thornleigh	180-200 metres	To the north west and north of the proposal are a number of commercial and industrial properties. To the east and south east a large sports centre and open space is present, some vegetation screening is present along the rail corridor.
HY17	Wahroonga	50 metres	The proposal is in an urban residential area, residential properties back onto the rail corridor with vegetation screening present.
HY19 HY25 HY35	Hornsby	30-50 metres	The proposal is located in an urban residential and commercial area. Commercial properties are located east with residential properties to the west. Vegetation screening varies over the distance with increases in the southern area. The pacific highway also passes immediately to the west of HY35.
HYCC HY72	Hornsby	None	The site is located immediately to the north of Hornsby Railway station surrounded on both sides by commercial and vehicle parking areas.
HY99	Hornsby	30-40 metres	The site is located to the north of Hornsby Railway station in an urban area, with low density residential properties on either side of the rail corridor, beyond Jersey Street north and Railway Parade respectively.
HY130	Asquith	50 metres (School) 70 metres (Residential)	The site is located adjacent to the Hornsby rail yard to the east. Beyond Jersey Street North to the west lies Asquith Boys high. Some vegetation screening is present along the corridor and roadway.
HY134	Asquith	50 metres	The site sites between commercial properties to the west, and residential properties to the east. The Pacific highway is located immediately to the west.

ATP Area 1 Site Name	Suburb	Nearest residential receiver (m)	Other comments
HY136	Asquith	40 metres	The site is located in a urban residential and open space area. Residential properties are located to the west, and the Asquith golf course to the east beyond Royston Parade.
B1	Berowra	50 metres	The site is located between the Pacific highway and M1 Motorway. Ku-rin-gai National Park lies beyond the motor way to the east; residential prosperities lie to the west beyond the Pacific Highway.
Berowra RR	Berowra	50 metres	The site is located between the Pacific highway and M1 Motorway. Ku-rin-gai National Park lies beyond the motor way to the east; residential prosperities lie to the west beyond the Pacific Highway.

### 6.5.2. Potential impacts

The *Interim Construction Noise Guideline* (ICNG) (DECC 2009) defines noise management levels (measured in decibels) for residential receivers and other types of receivers including commercial and industrial premises, places of worship and schools.

The ICNG states:

- where the predicted or measured LAeq, 15 min is greater than the noise affected level, the proponent would apply all feasible and reasonable work practices to meet the noise affected level
- the proponent would also inform all potentially affected residents of the nature of works to be carried out, the expected noise levels and duration and contact details
- for works above the highly affected noise criteria, respite periods may be required, and for works outside standard hours there needs to be a strong justification and negotiation with the community.

The ICNG introduces a qualitative method of construction noise assessment to simplify the identification of potential noise impacts, without complex predictions, for short-term works. Short-term works are defined as not likely to affect an individual or sensitive land use for more than three weeks.

The main civil and structural construction works at each ATP site in Area 1 is expected to be complete within three weeks. Construction noise would be generated during rock breaking (if required), supersucking and excavation associated with trenching and ULX construction. Following completion of civil construction works, testing and commissioning of the newly installed system would commence, this is expected to have a negligible noise impact.

The qualitative noise assessment methodology has been adopted for the Proposal due to the anticipated short-term nature of ATP construction works. The assessment uses the ATP construction noise estimation matrix which has been developed utilising inputs and guidance from the ICNG, *Australian Standard 2436 (AS2436) Guide to noise and vibration control on construction, demolition and maintenance sites* and *AS1055 Acoustics – Description and measurement of environmental noise General procedures*.

The qualitative construction noise assessment for the Proposal is provided in Table 6-6. This assessment evaluates key ATP construction activities based on distances to sensitive receivers, hours of works, construction methodology, plant and equipment and screening

between the noise source and the receiver. These work activities have been assessed as they represent the worst case scenario (where rock breaking is not required) at each ATP site in Area 1. Rock breaking and ULX construction would not generally be required. However, if required, this would represent the worst case scenario.

The results from the qualitative construction noise assessment undertaken during the site risk assessments, identified that works within 25 metres of an urban area (without screening) present a moderate risk of noise impact (refer Table 6-6). However, there is potential for noise impacts at locations where rock breaking and ULX construction is required. Where this is the case, all residents within 100 metres of the work would be notified prior to the start of works.

Due to access constraints and the requirement for a safe working site, selected construction work may be undertaken outside standard working hours and during scheduled track possessions, although this would be minimised as far as practicable. These works would include the installation of track assets (i.e. controlled balises). It is unlikely high noise generating equipment would be required outside standard working hours and therefore it is unlikely work outside standard working hours would present a high risk of noise impact.

Vibration effects from the operation of heavy machinery, such as vibratory rollers or large earth moving equipment have the potential to cause structural disturbance or discomfort. The proposed work would not require the use of vibration-causing heavy machinery.

During operation, the ATP Project is not likely to increase noise or vibration from the rail corridor.

**Table 6-6 Qualitative construction noise assessment**

Distance (m)	Rating	Category (refer AS2436)	Rating	Description	Rating	Description	Rating	Category	Rating	Duration	Rating
<10	0	110dB(A) (e.g. rock breaking)	110	Receivers screened from effective noise source	-10	Quiet, rural, or isolated	-35	Day (7am – 6pm weekdays, 8am to 1pm Sat)	0	<1 hr	-20
10-25	-10	≥100dB(A) (e.g. bored piling, dump truck unloading)	100	Receivers not screened	0	Suburban	-45	Evenings / weekends (6pm – 10pm weekdays, 1pm – 10pm Sat, 8am – 10pm Sunday / public holidays)	10	<1 day	-10
25-50	-16	≥90dB(A) (e.g. concreting, excavator, back hoe, grader, vibratory roller, front end loader, concrete saw)	90			Urban or near busy roads or industrial activity	-55	Night (10pm – 7am weekdays, 10pm – 8am weekends / public holidays)	20	<1 week	-5
50-100	-22	≥80dB(A) (e.g. small generators, trucks, cherry pickers, pneumatic drill)	80							1 to 3 weeks	0
100-200	-28									> 3 and < 26 weeks	10
200-500	-34									>26 weeks	20
500-1000	-40										
>1000	-46										

Distance (m)	Rating	Category (refer AS2436)	Rating	Description	Rating	Description	Rating	Category	Rating	Duration	Rating
ATP Area 1 Sites 10 to 25 metres from sensitive receivers	-10	≥90dB(A) (e.g. concreting, excavator, back hoe, grader, vibratory roller, front end loader, concrete saw)	90	Receivers screened from effective noise source	-10	Urban or near busy roads or industrial activity	-55	Day (7am – 6pm weekdays, 8am to 1pm Sat)	0	1 to 3 weeks	0
				Receivers not screened	0	Urban or near busy roads or industrial activity	-55				
ATP Area 1 Sites 25 to 50 metres away from sensitive receivers	-16	≥90dB(A) (e.g. concreting, excavator, back hoe, grader, vibratory roller, front end loader, concrete saw)	90	Receivers screened from effective noise source	-10	Urban or near busy roads or industrial activity	-55	Day (7am – 6pm weekdays, 8am to 1pm Sat)	0	1 to 3 weeks	0
				Receivers not screened	0	Urban or near busy roads or industrial activity	-55				

**Impact / risk level ranges**

Low: <25	Highly likely that noise mitigation will not be required, other than those identified above and if complaints “hot spots” have been considered
Moderate: 25-35	consider standard construction noise control measures as per the <i>TfNSW Construction Noise Strategy (7TP-ST-157)</i>
High: 35+	Inform community, implement all practical means to mitigate, >50 requires specialist noise study / advice

### 6.5.3. Mitigation measures

Construction works would adopt Best Management Practice (BMP) and Best Available Technology Economically Achievable (BATEA) practices as described in the ICNG and be carried out in accordance with TfNSW's *Construction Noise Strategy*. Control measures to minimise noise and vibration impacts would include, but would not be limited to, those outlined below:

- Maximise the offset distance between noisy plant items and sensitive receivers.
- Orient plant and equipment to minimise noise at sensitive receivers.
- Avoid the simultaneous operation of two or more noise plant items in close vicinity and adjacent to sensitive receivers.
- Carry out loading and unloading at times and locations to minimise impacts on sensitive receivers.
- Where necessary, use structures to shield sensitive receivers from noise sources.
- Work, other than the installation of track assets, would be restricted to standard working hours (7:00am to 6:00pm Monday to Friday and 8:00am to 1:00pm Saturdays) unless otherwise approved by TfNSW. Should works be required outside of standard working hours: community members would be advised where appropriate, and all relevant approvals would be sought, including submission and approval of TfNSW's *Out of Hours Works Application Form* (9TP-FT-079) in accordance with TfNSW's *Construction Noise Strategy* (7TP-ST-157).
- Provide mitigation in accordance with the requirements of the TfNSW *Construction Noise Strategy* (7TP-ST-157) periods of respite if high noise generating activities occur for extended periods.
- Noise complaints would be managed in accordance with TfNSW's *Construction Noise Strategy* (7TP-ST-157). Any noise complaints received would be addressed in accordance with TfNSW complaints management procedures.

In addition, residents within the main catchment area of ATP Area 6A sites identified in the Proposal would be notified of the works prior to the commencement of construction. Notification would include the duration of work, potential impacts and contact details for further information.

## 6.6. Heritage

### 6.6.1. Existing environment

A search for non-Aboriginal heritage items was undertaken by consulting the following databases: State Heritage Register, State Heritage Inventory, Strathfield, Canada Bay, Ryde, Hornsby LGAs LEPs, Australian Heritage Database, (including Commonwealth Register of the National Estate), world heritage sites and Sydney Train's Section 170 Heritage and Conservation Register (Section 170 Register).

The heritage items and conservation areas located in the footprint of the proposed ATP sites in Area 1 are identified in Table 6-7. The ATP sites within the curtilage of a heritage item listed on the State Heritage Register (SHR) have been classified as high risk from a heritage perspective (refer Table 6-1). Where required site-specific mitigation measures have been

identified and are listed in Section 6.6.3. A number of other heritage items and conservation areas are located adjacent to the Proposal, these include:

- Homebush Railway Station Group which is listed on the SHR is located to the west of ATP Area 1 Homebush MSB
- Bakehouse Quarter which is of local significance is located immediately east of ATP Area 1 site Homebush MSB
- street trees adjacent to North Strathfield Railway Station which are of local significance is located immediately east of ATP Area 1 site NST2 Relay Room
- Rhodes Industrial Park which is of local significance is located immediately east of ATP Area 1 site RS
- Ryde Pumping Station and site which is of local significance is located immediately east of ATP Area 1 site WR14
- two residential properties on Pacific Highway, Asquith which is of local significance is located immediately east of ATP Area 1 site HY136 and 136AT.

Given the proposed scope of works at each ATP site, there would be no impact on adjacent heritage items.

**Table 6-7 Heritage items located in the footprint of the proposed signal locations**

ATP Area 1 Site Name	Heritage item	Heritage listing	Heritage significance
Homebush MSB	Strathfield Railway Triangle and Flyover (including the Strathfield Rail underbridges (flyover))	SHR 01055 (part) (Strathfield Rail underbridges (flyover)) Section 170 Register Strathfield LEP	Strathfield triangle is significant as an important specialised and highly productive rail industrial workshop, laboratory and administrative centre, and is a significant site associated with the planning, maintenance and operations of the electric railway system in NSW from 1927 until present. This listing includes the Strathfield Rail underbridges (flyover) which is listed on the SHR, built of brick to take the northern line suburban electric trains over the other tracks to avoid conflicts of traffic movement. The underbridge is a major structure at a busy intersection and is a good example of this type of structure.
	Homebush (Parramatta Road) Railway Underbridge (also known as Arnott's Biscuits Bridge, Strathfield underbridge)	Section 170 Register Strathfield LEP	The southern underbridge over Powells Creek also forms part of this listing was mostly replaced in 2008 with a modern concrete structure. The brick abutments of the original bridge remain.  Parramatta Road Railway Underbridge at Homebush has significance as a representative example of a common type of steel web girder bridges constructed by NSW Railways up until the 1960s. It is a fine example of its type and has landmark qualities because of its high visibility from Parramatta Road, its imposing size and the large Arnott's advertisement at each end which is associated in turn with Arnott's biscuit factory which was once located nearby.

ATP Area 1 Site Name	Heritage item	Heritage listing	Heritage significance
RS	Rhodes Railway Station Group (including the waiting shed)	SHR 01235 (part) (Waiting Shed) Section 170 Register Canada Bay LEP	Rhodes Railway Station, serving the district since opening c.1887, has historical significance as a key part of the public transport network which opened Rhodes to industrial and residential development. The station continues to be an important component of the local transport infrastructure for the area.  This listing includes the timber waiting shed on Platforms 2/3 at Rhodes Railway Station which has high significance as an example of a small 1880s timber waiting shed, the only remaining example in NSW.
HYCC HY72 HY83	Hornsby Railway Station Group and Barracks	Section 170 Register Hornsby LEP	The Hornsby Railway Station has local heritage significance. The station was one of the original stops on the first section of the Short North line completed in 1886 and as such has historic association with the linkage of Sydney and Newcastle, which was a major event in the history of NSW railways.  The listing includes the platforms, concourse, timber footbridge, former signal box, substation and barracks and the modern buildings.
HY134	Asquith Railway Station Group	Section 170 Register Hornsby LEP	Asquith Railway Station Group has local heritage significance as, like many railway stations, it supported the urban development of the local area. The station building has aesthetic significance for its small standard timber platform building, demonstrating the key characteristics of its type including gabled roof, continuous awning, timber cladding and lining.
	Street Trees (Landscape) Haldane Street (Asquith Station)	Hornsby LEP	Indigenous and cultural trees forming notable element in streetscape. Of local significance.

A search for known items of Aboriginal heritage value was undertaken for the Proposal, (with a 200-metre buffer of the site locations between Strathfield and Mt Ku-ring-gai using the Office of Environment and Heritage’s Aboriginal Heritage Information Management System (AHIMS). One registered item of aboriginal heritage significance is located between 50 metres and 200 metres of the ATP Area 1 site EG44 and eight are located between 50 metres and 200 metres of the ATP Area 1 site B1 and Berowra RR. A copy of AHIMS search records is included in Appendix 4.

The proposal is located within the Metropolitan Local Aboriginal Land Council (LALC).

### 6.6.2. Potential impacts

Proposed ATP works within Area 1 would be within the curtilage of two items listed on the SHR (refer Table 6-8). The proposed works would involve trenching and the installation of trackside equipment. Where possible, the final alignment of any underground cabling would be designed to avoid any potential impacts on this item and / or an existing cable route with spare capacity would be used.

Given the proposed scale of ATP works, the proposal is not anticipated to have a significant impact on the SHR listed Strathfield Rail underbridges (flyover) or the Rhodes Railway

Station Waiting Shed which form part of the respective Strathfield Railway Triangle and Flyover and the Rhodes Railway Station Group heritage listings. As noted in Table 6-7, the heritage values associated with these items relate to the role they played in the history of the local area and/or their aesthetic significance (i.e. rare examples of historic construction or building design methods). No direct and/or indirect impacts to the heritage values and/or aesthetic significance of these heritage items is expected and proposed works would not result in any visual impacts. A heritage exemption under Section 57(2) of the Heritage Act 1977 would be obtained for all works within the curtilage of SHR listed items.

Proposed ATP works in Area 1 would also be within the curtilage of locally significant heritage items listed under the Section 170 Heritage Register and Strathfield, Canada Bay and Hornsby LEP (refer Table 6-7). Proposed works would not impact any building fabric or architectural style and where possible existing cable routes with spare capacity would be used in preference for a new cable route, hence ATP works are unlikely to result in direct and/or indirect impacts on the heritage significance of these items. Consultation with Sydney Trains Heritage and Strathfield, City of Canada Bay and Hornsby Shire Councils would be required prior to works commencing.

The proposed works would not result in any visual impacts on heritage listed items adjacent to ATP sites in Area 1.

There are no anticipated impacts on Aboriginal heritage as a result of the Proposal. Due to highly disturbed nature of the rail corridor, it is expected that the potential for items of Aboriginal heritage significance to be buried within the footprint of the ATP Sites is low.

### 6.6.3. Mitigation measures

Impacts on heritage throughout construction would be minimised through a range of control measures, which would include, but would not be limited to, those outlined below:

- **ATP Area 1 Site Homebush MSB:** Works would be within the heritage curtilage of the SHR listed Strathfield Rail Underbridges (flyover) (SHR 01055). A Heritage exemption under s.57 (2) of the Heritage Act 1977 would be obtained from Sydney Trains prior to any construction commencing at this site. Consultation would also be undertaken with Strathfield Council prior to works commencing at this location.
- **ATP Area 1 Site Homebush MSB:** Works would be within the heritage curtilage of the locally significant Strathfield Railway Triangle and Flyover and the Homebush (Parramatta Road) Railway Underbridge. Consultation with Sydney Trains and Strathfield Council would be undertaken prior to any works commencing at this location.
- **ATP Area 1 Site RS:** Works would be within the heritage curtilage of the SHR listed Rhodes Railway Station Waiting Shed (SHR - 01235) which forms part of the Rhodes Railway Station Group. A Heritage exemption under s.57 (2) of the *Heritage Act 1977* would be obtained from Sydney Trains prior to any construction commencing at this site. Consultation would also be undertaken with City of Canada Bay Council prior to works commencing at this location.
- **ATP Area 1 Site HYCC, HY72, HY83:** Works would be within the heritage curtilage of the locally significant Hornsby Railway Station and Barracks. Consultation with Sydney Trains and Hornsby Shire Council would be undertaken prior to any works commencing at this location.

- **ATP Area 1 Site HY134:** Works would be within the heritage curtilage of the locally significant Asquith Railway Station Group. Consultation with Sydney Trains and Hornsby Shire Council would be undertaken prior to any works commencing at this location.
- **ATP Area 1 Site HY134:** Works would be within the heritage curtilage of the locally significant Street trees along Haldane Street. Consultation with Hornsby Shire Council would be undertaken prior to any works commencing at this location.
- Heritage items and conservation areas which are located adjacent to ATP Area 1 sites would be identified in the location and/or the activity specific ECMs and would be marked as “no go zones” with associated signage established at the site(s).
- If a non-Aboriginal historical relic is discovered, all work likely to affect it would cease and the Project Manager would be contacted immediately. TfNSW Project Manager and Environmental Representative would be notified and will be responsible for notifying the Office of Environment and Heritage (OEH), if required. An investigation would be undertaken by a suitably qualified archaeologist to identify suitable measures to reduce the impact on the relic discovered before work resumes.
- Should Aboriginal heritage items be uncovered, all work in the vicinity would cease and the Project Manager would be contacted immediately. TfNSW Project Manager and Environmental Representative and will be responsible for notifying the Office of Environment and Heritage (OEH), if required. The Local Aboriginal Land Council would be notified by TfNSW and an assessment by an archaeologist would be arranged to determine the significance of the objects and any other requirements before work resumes.

## 6.7. Waste

### 6.7.1. Overview

TfNSW is required to manage waste in accordance with the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act). The Proposal will follow the waste hierarchy of Avoid, Reuse, Recycle, Energy Recovery and Disposal.

### 6.7.2. Potential impacts

The main waste streams that may be generated during construction include:

- excavated material
- slurry from sucking excavations
- slurry from underbore arisings
- concrete
- steel
- wood
- vegetation
- packaging
- general litter including glass, plastic, metal and paper waste.

The volume of concrete waste is expected to be minimal as concrete plinths used for extending existing signal cabinets and bungalows would be pre-manufactured off-site, where possible, and transport to site when required.

No operational impacts are expected.

### 6.7.3. Mitigation measures

A waste management plan would be prepared to detail waste types and quantities as well as methods for segregation, handling, storing and disposal. Furthermore, waste impacts would be minimised through a range of control measures, (consistent with the WARR Act) which would include, but not be limited to, those outlined below:

- All waste would be classified in accordance with the *Waste Classification Guidelines* (EPA 2014) and transported to a place that can lawfully accept the waste.
- Any material that may be classified as a hazardous waste would be managed appropriately and in accordance with TfNSW procedures.
- Packaging would be minimised, where possible and where the safety and delivery of services is not compromised.
- Wherever possible, suitable excavated material would be reused on site for backfilling, landscaping and other purposes.
- Wherever possible, excess material shall be beneficially reused in accordance with a Resource Recovery Exemption rather than classified and disposed as waste.
- Any spoil or waste material tracked onto roads would be swept up immediately.
- Adequate numbers of bins and waste containers would be placed at the site. The site manager would ensure bins are not overflowing and are appropriately covered.
- Wastewater generated by non-destructive excavation would be taken off site for treatment and disposal.
- All waste would be removed from the site when work is completed.

## 6.8. Contaminated land and hazardous materials

### 6.8.1. Existing environment

The proposed ATP Sites have been initially investigated for potential land contamination. The investigation included:

- site assessment
- a review of soil testing undertaken at selected signal locations
- search of OEH register of contaminated sites
- search of Sydney Trains records
- review of all materials that will be used at the subject site to establish their potential for land contamination.

Due to the historical and ongoing use of proposed ATP sites as part of the rail corridor, the following potential sources of contamination may be present in the vicinity of the sites:

- fuel and oil spills and engine emissions
- rail corridor maintenance activities, such as application of pesticides and herbicides
- brake linings
- historical cables / pipework ducting and former site structures, with potential asbestos containing materials
- fabric of old rolling stock
- imported fill.

WSP has undertaken a site survey and ballast contamination risk assessment at each proposed ATP sites in Area 1. The following information was recorded during the assessments:

- visual evidence of contamination
- presence of hazardous building materials
- waste materials
- surrounding land use.

The following information sources were searched as part of the assessment:

- hazardous sites register
- contaminated land register
- local knowledge
- track maintenance history.

The desktop and site assessments confirmed whether ATP sites had known or potential contamination risks, these ATP sites were classed as high risk from a contamination perspective (refer to Table 6-1). Details of potential sources contamination at ATP sites in Area 8 are provided in Table 6-8.

ATP sites with no known contamination are classed as low risk (refer to Table 6-1). An area of moderate risk was identified between Cheltenham and Epping stations based on the presence of friable asbestos, no specific location was available. During site visits for concept design sites with materials potentially containing asbestos were identified and considered high risk (Refer to Table 6-1 and Table 6-8). No soil testing at any locations has been completed for this proposal.

**Table 6-8 ATP Sites with potential contamination**

ATP Area 1 Site Name	Contamination	Location (metres (m))
Homebush MSB	Potential asbestos containing materials present within the location cases and older equipment. Asbestos toughing on bridge over Parramatta Rd.	Location cases Parramatta Rd Bridge
NST2 Relay Room	Potential asbestos containing materials present within the location case and older equipment.	Location cases
RS5 Relay Room	Potential asbestos containing materials present within the location case and older equipment.	Location cases
RS	Fibro boards possibly containing asbestos.	Within work area
WR3	No asbestos present, however old equipment potentially containing asbestos is present in the area.	Location cases
N13.88	Asbestos containing materials located in Location Case.	Location case
N14.20	Asbestos containing materials located in Location Case.	Location case
EG39 EG44	Desktop assessments indicated the potential for friable asbestos between Cheltenham and Epping stations. No specific contaminated was noted during the site survey visit.	Unknown
LOC 20 Signal	Asbestos present under signal box.	Signal Box

ATP Area 1 Site Name	Contamination	Location (metres (m))
HY130	The Hornsby Train Maintenance Centre located adjacent to site HY130 is currently listed as 'Under Assessment' on the list of NSW contaminated sites notified to the EPA.	25 metres

### 6.8.2. Potential impacts

The Proposal requires minimal excavations. It is anticipated that the proposed trenching would generally range from a minimum of 4 metres to a maximum of 120 metres in length, 0.3 metres wide and 0.9 metres deep. Supersucking may be undertaken to find empty conduits and once found this practice replaces trenching.

There is a risk of encountering contaminated material and asbestos during excavations, and disruptions to older equipment potentially containing asbestos. If encountered, contaminants may pose a risk to health of workers and the environment in general.

Where possible, the quantity of spoil generated would be minimised. Contaminated spoil must be removed off site and disposed at a licensed facility. If uncontrolled, stockpiling of contaminated spoil could lead to pollution of nearby watercourses due to rainfall runoff or stockpile slippage.

The Hornsby Train Maintenance Centre located adjacent to site HY130 is currently listed as 'Under Assessment' on the list of NSW contaminated sites notified to the EPA. The site is not located within the site footprint, and therefore is not considered to be a potential impact to the proposed works.

Construction of the Proposal would not require the use of any chemicals and/or hazardous materials.

The operation of the ATP Project system is not expected to cause contamination or generate hazardous materials.

### 6.8.3. Mitigation measures

The risk of encountering unknown contaminants during excavation shall be managed in accordance with TfNSW's procedures, the CEMP, ECM and land contamination legislation. Control measures to manage contamination risks would include, but not be limited to, those outlined below:

- All waste spoil would be managed in accordance with the Waste Classification Guidelines (NSW EPA 2014) and National Environment Protection (Assessment of Site Contamination) Measure 1999.
- All hazardous materials removal and clean-up operations must be carried out in accordance with the NSW *Work Health and Safety Act and Regulations 2011* and the Safe Work NSW requirements.
- As part of the Project induction, construction personnel would receive training in the identification, management and handling of contaminated and hazardous materials should they be encountered during the works.
- During excavation, site workers would look for signs of potential contamination such as presence of waste and/or other imported materials, odours, soil colouring, floating layer in groundwater etc.

- If any previously unidentified contamination is encountered, or suspected, works at the relevant signal location would be immediately stopped and the affected area fenced off. The site would be investigated and validated, with works to resume after approval from a suitably qualified and experienced Health, Safety and Environment professional is obtained.
- Personnel dealing with the hazardous substances should be appropriately trained.
- Contaminated soil would be segregated and appropriately contained prior to classification and ultimate disposal.
- The quantity of spoil generated would be minimised.
- If hazardous materials are required for any unforeseen reason, a Hazardous Waste Management Plan would be prepared. The plan would detail terms applying to the purchase, storage, use, handling and disposal of such materials.
- If required, hazardous materials would be transported, stored and used in accordance with the corresponding material safety data sheets which would be available on the site.
- No fuels would be stored on site.
- Removal of suspected and/or known asbestos, including building structures likely to contain asbestos requires an experienced, appropriately licensed removal contractor in accordance with the *How to Safely Remove Asbestos Code of Practice* (Safe Work Australia 2016). An Occupational Hygienist should be on site during removal works.

## **6.9. Visual amenity**

### **6.9.1. Existing environment**

The Proposal is located in the rail corridor of the North Shore, Northern & Western Line between Strathfield and Berowra. The rail corridor is generally surrounded by residential, commercial and recreational land uses; with some industrial land use located to the south of the Parramatta River. Commercial centres are generally located near the railway stations. Residents are generally located along both sides of the rail corridor at all signal location.

Areas of bushland, including Lane Cove National Park, Berowra Valley National Park and Ku-Ring-gai National Park, are located near the proposal. Lane Cove National park lies around 500 metres to the north east of Cheltenham and 600 metres east of Pennant Hills. Berowra Valley National Park lies at its closest beyond the Pacific Highway at Mount Kuring-Gai Station. Kuring-Gai National Park is located parallel to the Northern Line around Mount Colah and Berowra Stations, to the east beyond the M1 Motorway. Homebush Bay and Bicentennial Park are located about 250 metres to the west of the proposal at Concord west, with Sydney Olympic Park further west.

Major roadways generally follow the north-south alignment of the Northern Line including Homebush Bay Drive, Concord Road, Pennant Hills Road, and the Pacific Highway. The Northern Line crosses Victoria Road south of West Ryde Station, and the M2 motorway north of Epping Station. The Southern extent of the proposal is located about 500 metres north of the M4 motorway. The northern Line crosses the Parramatta River between Rhodes and Meadowbank. The northern Line runs parallel to the Pacific highway and the M1 Pacific Motorway between Hornsby station and Berowra Station for approximately 10 kilometres.

Residential properties adjoin the rail corridor, and are within 100 metres at all signal locations except for LOC 20 Signal, HYCC and HY72 which are in commercial and industrial areas.

The existing signals are generally visible to train passengers but are generally not visible from outside the rail corridor.

### **6.9.2. Potential impacts**

During construction, the visual environment would be temporarily altered through the presence of temporary work buildings, plant and equipment.

Due to the relative minor scale of the works, the Proposal is not anticipated to have a long-term impact on the character of the railway corridor. It is not expected to cause additional light reflection or shadowing.

Any trimming of native vegetation (refer Section 6.4.2) is expected to be minor and is not anticipated to not reduce privacy for adjacent property owners.

### **6.9.3. Mitigation measures**

Visual impacts during construction would be minimised through a range of control measures which would include, but would not be limited to, those outlined below:

- Clearance of vegetation shall be minimised.
- The work area shall be maintained in an orderly manner.
- All temporary signage associated with the works must be appropriately displayed.
- All work equipment and materials would be contained within the designated boundaries of the work site.

## **6.10. Land use**

### **6.10.1. Existing environment**

The proposed signal locations are on land owned by TfNSW and zoned SP2 Infrastructure, or B4 mixed use under the Canada Bay, Ryde, Paramatta and Hornsby LEPs LEP. The Proposal location is currently in the rail corridor of the North Shore, Northern & Western Line and currently used for heavy rail purposes. The immediate neighbouring land uses include low to high density residential areas, commercial centres and recreational areas. Industrial land uses also surround the Proposal to the south of the Parramatta River. The immediate neighbouring land uses are mainly urban residential, commercial and recreational (open space), with some urban industrial land uses south of the Parramatta River.

### **6.10.2. Potential impacts**

The Proposal would not affect or alter the current use of the proposed signal locations or the immediate surrounding area as a rail corridor. It would not have any effects on the use of the neighbouring properties.

### **6.10.3. Mitigation measures**

No specific control measures are required.

## 6.11. Socio-economic impacts

### 6.11.1. Existing environment

The Proposal is in the Canada Bay, Ryde, Parramatta, and Hornsby LGAs, which in the 2016 census had populations of 88,015; 116,302; 226,149; 142,667 respectively, with a median age of 36, 36, 34 and 40 respectively. Most of the population within the LGAs are employed as professionals, clerical and administrative workers, managers or technicians and trade workers.

The North Shore, Northern & Western Line is regularly used by passenger and freight traffic. The rail line plays an important role in the economic activity of the local areas and enables commuters to travel to and from other major economic areas.

### 6.11.2. Potential impacts

Social and economic considerations typically focus on the effect on the local community as a whole and on any local businesses. Amenity issues such as noise and traffic are some of the key areas that can affect the community and are discussed in detail in Sections 6.5 and 6.12.

The proposal is not expected to have any impact on pedestrian movements, access or commuter parking at stations, or to any business near the signal locations. The construction of the Proposal would require scheduled track possessions. Noise impacts would be temporary (less than three weeks).

There would be positive long term effects resulting from the Proposal, as the new AMS would provide a more reliable and safe rail network.

### 6.11.3. Mitigation measures

In addition to the control measures proposed in the noise and traffic sections, other control measures are outlined below:

- Nearby residents and businesses would be informed about the nature and timing of works.
- Signage would notify the public about the works.
- Appropriate fencing around the site would help maintain public safety during construction.

## 6.12. Traffic and access

### 6.12.1. Existing environment

Access to the railway corridor is obtained using existing access gates. Distances from the access gates to the work sites can range between 10 metres and 60 metres. These access gates are used regularly by Sydney Train for periodic maintenance activities along the corridor. It is estimated that staff and contractors currently use the gates and access tracks around 14-20 times a year.

Access gates are generally positioned in areas to enable safe access to the surrounding road network. Volumes of traffic on the surrounding road network vary according to time of day and are expected to be busiest during morning and evening peak periods.

### **6.12.2. Potential impacts**

During construction, there would be an increased number of vehicles using the local streets; however, the anticipated increase in the volume of traffic is relatively small (about one vehicle per hour would access / egress the corridor).

Pedestrians are not expected to be affected by vehicles accessing or egressing the work sites.

As works are to take place in the rail corridor, access changes to local roads or access to driveways are not expected.

### **6.12.3. Mitigation measures**

Impacts associated with traffic and access would be minimised through a range of control measures, which would include, but would not be limited to those outlined below:

- A site traffic speed limit shall be enforced.
- Scheduled road movements would be minimised where possible.
- Deliveries of plant and materials would be undertaken outside peak periods where possible.
- Vehicles shall be parked within the rail corridor and not in public commuter parking spaces.

## **6.13. Light spill**

### **6.13.1. Existing environment**

Ambient artificial lighting varies at each signal location depending on the surrounding land use. In many cases, light spillage from suburban street lighting provides artificial light at the signal locations. More remote signal locations such as those between Hornsby and Berowra have minimal artificial light.

The existing signal locations are not fitted with external lighting.

### **6.13.2. Potential impacts**

Some work may be undertaken during night-time periods. Lighting towers would be required to illuminate the work areas, which may result in temporary light spill impacts on nearby residents.

No operational light spill is expected.

### 6.13.3. Mitigation measures

Lighting required during night works shall be directed towards the work area and away from adjacent sensitive receivers.

## 6.14. Demand on resources

The Proposal would not significantly increase the demand on any current or likely scarce resource. Water, electricity or materials supplies required for the Proposal would not be significant in comparison to other large scale construction projects. All materials used in the construction of the Proposal are common construction materials.

## 6.15. Cumulative impacts

Cumulative impacts often result when several different construction projects are scheduled for similar times and locations.

A search of the Department of Planning and Environments' Major Projects register, Strathfield, Canada Bay, Ryde, Paramatta and Hornsby councils' development application registers and the TfNSW projects website was undertaken on 23 August 2017.

Several projects were identified including M4 Western Motorway widening, and West Connex, however due to the size of the current proposal, and footprint within the rail corridor, it is unlikely these would impact the project. In addition, there are a number of TfNSW projects identified include:

- The Hornsby junction remodelling and commuter car park to increase capacity and reliability on the T1 North Shore line, construction is currently underway and expected to be completed in early 2018.
- New inner city fleet program to improve passenger services on the intercity and Sydney outer suburban rail network, by replacing current trains with upgraded trains. The trains are to come into service progressively with the first delivered in 2019.
- Sydney Metro stage 1 North West, which includes eight new railway stations and commuter car parking spaces in the north west. This would interface with the Northern Line at Epping station. Construction is currently underway, and will be open to customers in the first half of 2019.
- The Transport Access Program, which is currently being undertaken to improve station accessibility, improve buildings and improve interchanges. Works are currently underway at Homebush, Eastwood, Hornsby and Asquith stations to provide easier access to public transport. Works at other stations along the Northern line have been completed.
- Planning is underway on the Eastwood commuter car park. The project is proposed to take 12 months to construct, and is currently in a design and community consultation phase.
- Construction of a new commuter car park is underway on the Asquith station on the Northern line.
- Other smaller TfNSW projects are also scheduled for delivery along the Northern line, including digital train radio system and power supply upgrade projects.

Where other works are planned during the same scheduled track possessions, coordination meetings will identify the appropriate responsibilities for undertaking notifications to affected stakeholders.

There is also a risk of cumulative impacts if unscheduled work, e.g. emergency work by other utilities or developers, is required. Such situations would be monitored and addressed by the Project Manager.

The Proposal involves works at signal locations along the rail corridor. The construction team would complete works at each signal location prior to progressing to the next signal location so cumulative impacts are minimised.

#### **6.15.1. Mitigation measures**

- Any other major development or works planned near the site would be further investigated before work begins and cumulative impacts minimised where possible.
- Consultation with Strathfield, Canada Bay, Ryde, Paramatta and Hornsby LGAs and any other relevant stakeholders regarding other developments would be undertaken on an ongoing basis.

## 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.

### 7.1. Environmental management plans

A construction environmental management plan (CEMP) for the construction phase of the Proposal would be prepared in accordance with the requirements of TfNSW (Infrastructure and Services) Environmental Management System (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

#### 7.2.1. Standard mitigation measures

Standard mitigation measures for the Proposal are listed 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 standard mitigation measures**

No.	Standard mitigation measures
<b>General</b>	
G1	This REF has been developed based on the ATP Concept Design. Further environmental approvals may be required if design developments during the detailed design phase extend proposed works outside the assessed site footprint provided on the ATP Area1 site location plans.
G2	Should ATP works be required outside the site footprint provided in the ATP Area 1 site location plans, a risk assessment would be complete using the ATP preliminary environmental risk assessment criteria (refer Appendix 4). ATP works assessed in consultation with TfNSW as low risk can proceed in accordance with standard mitigation measures for Area 1 provided in this REF. ATP works assessed as medium or high risk would be subject to further assessment and the consideration of likely impacts, for approval by TfNSW.
G3	Location and/or activity specific Environmental Controls Map (ECM) would be developed prior to commencement of construction in accordance with TfNSW's <i>Guide to Environmental Control Map</i> (3TP-SD-015). The ECM would be implemented for the duration of construction.
G4	An ATP Project risk assessment including environmental aspects and impacts would be undertaken prior to the commencement of construction.
G5	Weekly inspections to monitor environmental compliance and performance would be undertaken during construction.
G6	Prior to the commencement of construction, all contractors would be inducted on the key project environmental risks, mitigation measures and conditions of approval.

No.	Standard mitigation measures
<b>Landforms, geology and soil</b>	
LGS1	Appropriate stockpiling of materials would take place away from drainage lines, waterways and drains.
LGS2	Any soil that may be contaminated or weed infested would be stockpiled separately before being removed from the site.
LGS3	Stockpiles and disturbed areas shall be appropriately stabilised to minimise erosion.
LGS4	Disturbed areas would be reinstated as soon as possible.
<b>Water quality and hydrology</b>	
WQ1	Erosion and sediment controls at each worksite would be detailed on the ECM and comply with <i>Managing Urban Stormwater: Soils and Construction</i> (Landcom 2004) (the Blue Book).
WQ2	Erosion and sediment controls would be regularly inspected and maintained, particularly following heavy rainfall.
WQ3	The effectiveness of erosion and sediment controls would be monitored daily and adjusted if required.
WQ4	Plant and equipment would be maintained in accordance with the manufacturer's specifications and checked regularly for oil leaks.
WQ5	Refuelling of plant and equipment would occur in impervious bunded areas located a minimum of 40 metres from drainage lines or waterways.
WQ6	Concrete slurries and wash-out would be collected for reuse or for off-site disposal.
WQ7	Appropriately sized spill response kits must be kept on site and staff trained in their use.
WQ8	Earthworks would be suspended during periods of heavy or prolonged rainfall. Plant and equipment would be removed from site where there is a high risk of inundation.
WQ9	Dry street sweepers or hand-held brooms would be used to clean local roads in the event of tracked sediment.
WQ10	Works are to be undertaken in accordance with the TfNSW <i>Chemical Storage and Spill Response Guidelines</i> (9TP-SD-066).
WQ11	Water discharge from site must be carried out as per TfNSW <i>Water Discharge Guidelines</i> (7TP-SD-024).
<b>Air quality</b>	
AQ1	Plant and equipment would be maintained in accordance with manufacturers' specifications.
AQ2	Regular inspection of plant and equipment would be undertaken to ascertain that fitted emission controls are operating efficiently.
AQ3	Plant or machinery would not be left idling.
AQ4	All work areas and stockpiles would be monitored by construction personnel for dust generation during working hours.
AQ5	Stockpiles would be maintained and contained appropriately, which could include covering or regular watering to minimise dust.
AQ6	Trucks transporting spoil and other waste materials from site would be covered appropriately.
AQ7	Disturbed areas would be rehabilitated as soon as practicable.

No.	Standard mitigation measures
<b>Biodiversity</b>	
B1	<p>Construction staff would be made aware of the ecological constraints and the requirements for no impact to any native vegetation at the following ATP sites in Area 1. This information would be included in the location and/or the activity specific ECMs and would be marked as “no go zones” with associated signage established at the site(s):</p> <ul style="list-style-type: none"> <li>• <b>ATP Area 1 site N13.88:</b> Kanangra Wattle (<i>Acacia clunies-rossiae</i>) recorded in the site footprint.</li> <li>• <b>ATP Area 1 site B1 and Berowra RR:</b> <i>Darwinia biflora</i> recorded in the site footprint.</li> <li>• <b>ATP Area 1 site B1:</b> <i>Lasiopetalum joyceae</i> recorded in the site footprint.</li> <li>• <b>ATP Area 1 site N13.88, LOC 20 Signal, HY17, HY19, HY35, HY17 and EG44:</b> Blue Gum High Forest EECs located in the site footprint.</li> <li>• <b>ATP Area 1 site HY17:</b> Turpentine-Ironbark Forest EEC located in the site footprint.</li> <li>• <b>ATP Area 1 site EG44:</b> Shale/Sandstone Transition Forest located in the site footprint.</li> </ul>
B2	<p><b>ATP Area 1 site N13.88, LOC 20 Signal, HY17, HY19, HY35, HY17 and EG44:</b> Prior to the commencement of construction a targeted ecological assessment is to be undertaken by a suitably qualified ecologist to determine the presence of EECs at these ATP sites. Where possible, the final alignment of any underground cabling within the site footprint would be designed to avoid potential impacts on these EECs. The location of EECs would be included in the location and/or the activity specific ECMs and would be marked as “no go zones” with associated signage established at the site(s).</p>
B3	<p><b>ATP Area 1 sites N13.88, B1 and Berowra RR:</b> Where disturbance to vegetation is required targeted flora surveys would be undertaken to determine the presence of the Kanangra Wattle (<i>Acacia clunies-rossiae</i>), <i>Darwinia biflora</i> and <i>Lasiopetalum joyceae</i> in the site footprint. Any cabling routes would be designed to avoid impacts to any identified plants. Where impacts are unavoidable, further assessment would be undertaken to consider the likely impacts, for the approval of TfNSW.</p>
B4	<p>Following confirmation of the detailed design where disturbance to native vegetation is required, and prior to the commencement of construction works, an experienced and qualified ecologist would undertake a survey to establish the presence of any threatened flora and fauna species and/or communities. Where a threatened species and/or community is identified, further would be undertaken to consider the likely impacts, for the approval of TfNSW.</p>
B5	<p>All workers would be provided an environmental induction prior to commencing work. This would include information on the ecological values within the ATP sites, mitigation measures to be implemented to protect biodiversity, and penalties for breaches.</p>
B6	<p>Where trenching or excavation is required for installing new underground conduits or crossings, the route or location would be modified or altered to avoid any damage to trees or tree roots, where possible.</p>
B7	<p>If threatened and/or protected flora or fauna species are identified at a ATP site, work near the subject flora or fauna would stop immediately. A spotter/catcher or ecologist would be engaged to survey the area, in conjunction with TfNSW’s Environmental Officer, and advise on species management.</p>
B8	<p>Vehicle turning circles and parking areas shall be clearly marked and would occur in areas free of native vegetation.</p>
B9	<p>Construction areas would be kept to a minimum and be clearly demarcated to prevent accidental damage to native vegetation.</p>
B10	<p>Stockpiles, plant, equipment and materials storage would be located on existing cleared lands away from the drip zone of trees or other native vegetation.</p>
B11	<p>Weeds would be treated and disposed of appropriately and not mixed with other vegetation to be mulched for reuse.</p>
B12	<p>Soil and vegetation that could contain weed material should be removed from machinery prior to any movements off site.</p>
B13	<p>Where space within existing conduits is not available, new GST would be preferred over underground conduits to connect new assets.</p>

No.	Standard mitigation measures
B14	Trenches/excavations would be covered at the end of each day and inspected before they are backfilled to ensure that no fauna species are harmed.
B15	Where trenching or excavation is required for installing new underground conduits or crossings, the route or location would be modified or altered to avoid any damage to trees or tree roots, where possible.
B16	Any trees requiring removal, trimming or pruning that have not been previously assessed in accordance with this REF must be assessed and approved for removal using the <i>TfNSW Application for Removal or Trimming of Vegetation</i> (9TP-FT-078).
B17	All cleared vegetation (if any) shall be offset in accordance with <i>TfNSW's Vegetation Offset Guide</i> (9TP-SD-087).
B18	<p>Management in accordance with TfNSW's guidelines, as applicable:</p> <ul style="list-style-type: none"> <li>• <i>Fauna Management Guideline</i> (3TP-SD-113)</li> <li>• <i>Vegetation Management Guidelines</i> (9TP-SD-111)</li> <li>• <i>Weed Management and Disposal Guideline</i> (3TP-SD-110).</li> </ul>
<b>Noise and vibration</b>	
NV1	Maximise the offset distance between noisy plant items and sensitive receivers.
NV2	Orient plant and equipment to minimise noise at sensitive receivers.
NV3	Avoid the simultaneous operation of two or more noisy plant items in close vicinity and adjacent to sensitive receivers.
NV4	Carry out loading and unloading at times and locations to minimise impacts on sensitive receivers.
NV5	Where necessary, use structures to shield sensitive receivers from noise sources.
NV6	Work would be restricted to standard working hours (7:00am to 6:00pm Monday to Friday and 8:00am to 1:00pm Saturdays) unless otherwise approved by TfNSW. Should works be required outside of standard working hours, community members would be advised where appropriate, and all relevant approvals would be sought, including submission and approval of TfNSW's <i>Out of Hours Works Application Form</i> (9TP-FT-079) in accordance with TfNSW's <i>Construction Noise Strategy</i> (7TP-ST-157).
NV7	Provide mitigation in accordance with the requirements of the TfNSW <i>Construction Noise Strategy</i> (7TP-ST-157) if high noise generating activities occur for extended periods.
NV8	Noise complaints would be managed in accordance with TfNSW <i>Construction Noise Strategy</i> (7TP-ST-157). Any noise complaints received would be addressed in accordance with TfNSW complaints management procedures.
NV9	Residents within the main catchment area of ATP Area 1 sites identified in the Proposal would be notified of the works prior to the commencement of construction. Notification would include the duration of work, potential impacts and contact details for further information.
<b>Heritage</b>	
H1	<b>ATP Area 1 Site Homebush MSB:</b> Works would be within the heritage curtilage of the SHR listed Strathfield Rail Underbridges (flyover) (SHR 01055). A Heritage exemption under s.57 (2) of the Heritage Act 1977 would be obtained from Sydney Trains prior to any construction commencing at this site. Consultation would also be undertaken with Strathfield Council prior to works commencing at this location.
H2	<b>ATP Area 1 Site Homebush MSB:</b> Works would be within the heritage curtilage of the locally significant Strathfield Railway Triangle and Flyover and the Homebush (Parramatta Road) Railway Underbridge. Consultation with Sydney Trains and Strathfield Council would be undertaken prior to any works commencing at this location.
H3	<b>ATP Area 1 Site RS:</b> Works would be within the heritage curtilage of the SHR listed Rhodes Railway Station Waiting Shed (SHR - 01235) which forms part of the Rhodes Railway Station Group. A Heritage exemption under s.57 (2) of the <i>Heritage Act 1977</i> would be obtained from Sydney Trains prior to any construction commencing at this site. Consultation would also be undertaken with City of Canada Bay Council prior to works commencing at this location.

No.	Standard mitigation measures
H4	<b>ATP Area 1 Site HYCC, HY72, HY83:</b> Works would be within the heritage curtilage of the locally significant Hornsby Railway Station and Barracks. Consultation with Sydney Trains and Hornsby Shire Council would be undertaken prior to any works commencing at this location.
H5	<b>ATP Area 1 Site HY134:</b> Works would be within the heritage curtilage of the locally significant Asquith Railway Station Group. Consultation with Sydney Trains and Hornsby Shire Council would be undertaken prior to any works commencing at this location.
H6	<b>ATP Area 1 Site HY134:</b> Works would be within the heritage curtilage of the locally significant Street trees along Haldane Street. Consultation with Hornsby Shire Council would be undertaken prior to any works commencing at this location.
H7	Heritage items and conservation areas which are located adjacent to ATP Area 1 sites would be identified in the location and/or the activity specific ECMs and would be marked as “no go zones” with associated signage established at the site(s).
H8	If a non-Aboriginal historical relic is discovered, all work likely to affect it would cease and the Project Manager would be contacted immediately. TfNSW Project Manager and Environmental Representative would be notified and will be responsible for notifying the Office of Environment and Heritage (OEH), if required. An investigation would be undertaken by a suitably qualified archaeologist to identify suitable measures to reduce the impact on the relic discovered before work resumes.
H9	Should Aboriginal heritage items be uncovered, all work in the vicinity would cease and the Project Manager would be contacted immediately. TfNSW Project Manager and Environmental Representative and will be responsible for notifying the Office of Environment and Heritage (OEH), if required. The Local Aboriginal Land Council would be notified by TfNSW and an assessment by an archaeologist would be arranged to determine the significance of the objects and any other requirements before work resumes.
<b>Waste</b>	
W1	All waste would be classified in accordance with the <i>Waste Classification Guidelines</i> (EPA 2014) and transported to a place that can lawfully accept the waste.
W2	Any material that may be classified as a hazardous waste would be managed appropriately and in accordance with TfNSW procedures.
W3	Packaging would be minimised, where possible and where the safety and delivery of services is not compromised.
W4	Wherever possible, suitable excavated material would be reused for backfilling, landscaping and other purposes.
W5	Wherever possible, excess material shall be beneficially reused in accordance with a Resource Recovery Exemption rather than classified and disposed as waste.
W6	Any spoil or waste material tracked onto roads would be swept up immediately.
W7	Adequate numbers of bins and waste containers would be made available on site. The site manager would ensure bins are not overflowing and are appropriately covered.
W8	Wastewater generated by non-destructive excavation would be taken off site for treatment and disposal.
W9	All waste would be removed when work is completed.
<b>Contaminated land and hazardous materials</b>	
C1	All waste spoil would be managed in accordance with the <i>Waste Classification Guidelines</i> (NSW EPA 2014) and <i>National Environment Protection (Assessment of Site Contamination) Measure 1999</i> .
C2	All hazardous materials removal and clean-up operations must be carried out in accordance with the <i>NSW Work Health and Safety Act and Regulations 2011</i> and the Safe Work NSW requirements.
C3	As part of the ATP Project induction, construction personnel would receive training in the identification, management and handling of contaminated and hazardous materials should they be encountered during the works.
C4	During excavation, particularly at ATP sites where no site surveys have been undertaken, site workers will look for signs of potential contamination such as presence of waste and/or other imported materials, odours, soil colouring, floating layer in groundwater etc.

No.	Standard mitigation measures
C5	If any previously unidentified contamination is encountered, or suspected, works in the vicinity of the find would be immediately stopped and the affected area fenced off. The site would be investigated and validated, with works to resume after approval from a suitably qualified and experienced Health, Safety and Environment professional is obtained.
C6	Personnel dealing with the hazardous substances should be appropriately trained.
C7	Contaminated soil would be segregated and appropriately contained prior to classification and ultimate disposal.
C8	The quantity of spoil generated would be minimised.
C9	If hazardous materials are required for any unforeseen reason, a Hazardous Waste Management Plan would be prepared. The plan would detail terms applying to the purchase, storage, use, handling and disposal of such materials.
C10	Hazardous materials would be transported, stored and used in accordance with the corresponding material safety data sheets which would be available at the on site.
C11	No fuels would be stored at on site.
C12	Removal of suspected and/or known asbestos, including building structures likely to contain asbestos requires an experienced, appropriately licensed removal contractor in accordance with the How to Safely Remove Asbestos Code of Practice (Safe Work Australia, 2016). An Occupational Hygienist should be on site during removal works.
<b>Visual amenity</b>	
VA	Clearance of vegetation shall be minimised.
VA	The work area shall be maintained in an orderly manner.
VA	All temporary signage associated with the works must be appropriately displayed.
VA	All work equipment and materials would be contained within the designated boundaries of the work site.
<b>Land use</b>	
-	Nil
<b>Socio-economic impacts</b>	
SE1	Nearby residents and businesses would be informed about the nature and timing of works.
SE2	Signage would notify the public about the works.
SE3	Appropriate fencing would help maintain public safety during construction.
<b>Traffic and access</b>	
TA1	A traffic speed limit shall be enforced at all sites.
TA2	Scheduled road movements must be minimised where possible.
TA3	Deliveries of plant and materials must be undertaken outside peak periods where possible.
TA4	Vehicles shall be parked within the rail corridor and not in public commuter car parking spaces.
TA5	Where access to the sites requires access through land not owned by TfNSW, consultation would be undertaken with land owners and consent to access the land would be obtained where required.
<b>Light spill</b>	
L1	Lighting required during night works shall be directed towards the work area and away from adjacent sensitive receivers.
<b>Cumulative impacts</b>	
C11	Any other major development or works planned in the vicinity of the site would be further investigated before work begins and cumulative impacts minimised where possible.
C12	Consultation with Strathfield, Canada Bay, Ryde, Parramatta and Hornsby LGAs and any other relevant stakeholders regarding other developments would be undertaken on an ongoing basis.

## 8. Conclusion

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

The Proposal will play a key role in delivering faster and more reliable rail services and will provide significant safety benefits to rail customers and staff.

The main environmental issues relate to works adjacent to endangered ecological communities and heritage items. The proposal may require disturbance to vegetation or excavation in areas adjacent to threatened ecological communities and heritage items. There are also construction impacts such as erosion and sedimentation risks and noise issues for nearby receivers. These impacts can be managed through the implementation of a proposal wide construction environmental Management Plan (CEMP), and signal location specific Environmental Control Maps (ECM).

This REF has considered and assessed these impacts in accordance with clause 228 of the EP&A Regulations and the requirements of the EPBC Act (refer to Chapter 6, and Appendices 1 and 2). Should the project proceed, these impacts will be effectively managed through the implementation of the mitigation measures and the conditions of approval. As a result, these environmental impacts are not considered to be significant. Accordingly an EIS is not required, nor is the approval of the Minister for Planning and Infrastructure.

The Proposal has also taken into account the principles of ESD (refer to Section 4.1). These will be considered further during the detailed design, construction and operational phases of the Proposal. This will 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 1 – Consideration of clause 228 factors

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><b>Any environmental impact on a community?</b></p> <p>During construction, there may be minor noise and traffic disturbances to the nearby community from deliveries and construction works. During track possession, some works would take place outside standard working hours.</p> <p>In the long term, the ATP Project will improve reliability and safety of the Sydney Train services on the North Shore, Northern &amp; Western Line.</p>	<input type="checkbox"/> nil <input checked="" type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any transformation of a locality?</b></p> <p>The Proposal would not transform the locality. The works would support the ongoing operation of the rail network.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any environmental impact on the ecosystem of the locality?</b></p> <p>With the implementation of the proposed control measures, the proposed works are not anticipated to impact on the ecosystem of the locality.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?</b></p> <p>There will be a minor reduction in the aesthetic values of the neighbourhood due to the anticipated noise, air quality and traffic impacts resulting during construction. However, these will be temporary and minor in nature. No long-term reduction in the quality or value of the locality is anticipated.</p>	<input type="checkbox"/> nil <input checked="" type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>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?</b></p> <p>With the implementation of the proposed control measures, the proposed works are not anticipated to have a significant impact on the aforementioned places.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)?</b></p> <p>No habitat on which protected or endangered species would be reliant on is anticipated to be impacted by the proposed works</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?</b></p> <p>No protected or endangered species are anticipated to be impacted by the proposed works.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any long-term effects on the environment?</b></p> <p>The proposed activities are not anticipated to pose any environmental risks in the long term.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any degradation of the quality of the environment?</b></p> <p>The proposed work is not expected to have any significant adverse impacts on the quality of the environment.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant

Factor	Impacts
<p><b>Any risk to the safety of the environment?</b> During construction there is a risk to the environment due to accidental spills and sedimentation. These risks would be minimised through the implementation of the proposed control measures.</p>	<input type="checkbox"/> nil <input checked="" type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any reduction in the range of beneficial uses of the environment?</b> Works are to take place within the existing rail corridor and would not reduce the beneficial uses of the environment.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any pollution of the environment?</b> During construction there is a risk of noise, water and air pollution. These risks would be minimised through the implementation of the proposed control measures.</p>	<input type="checkbox"/> nil <input checked="" type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any environmental problems associated with the disposal of waste?</b> During construction it is possible spoil may be contaminated and an appropriate remediation plan and/or waste disposal method would be required.</p>	<input type="checkbox"/> nil <input checked="" type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?</b> Construction materials are readily available and would be sourced from local contractors where possible.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any cumulative environmental effect with other existing or likely future activities?</b> The distance between the proposed signal locations is such that cumulative noise, air quality and traffic impacts are not expected. Overall this Proposal, as part of the ATP Project, would have significant benefits in providing a safer and more efficient rail network.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?</b> The Proposal would not contribute to or be affected by coastal processes or hazards.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant

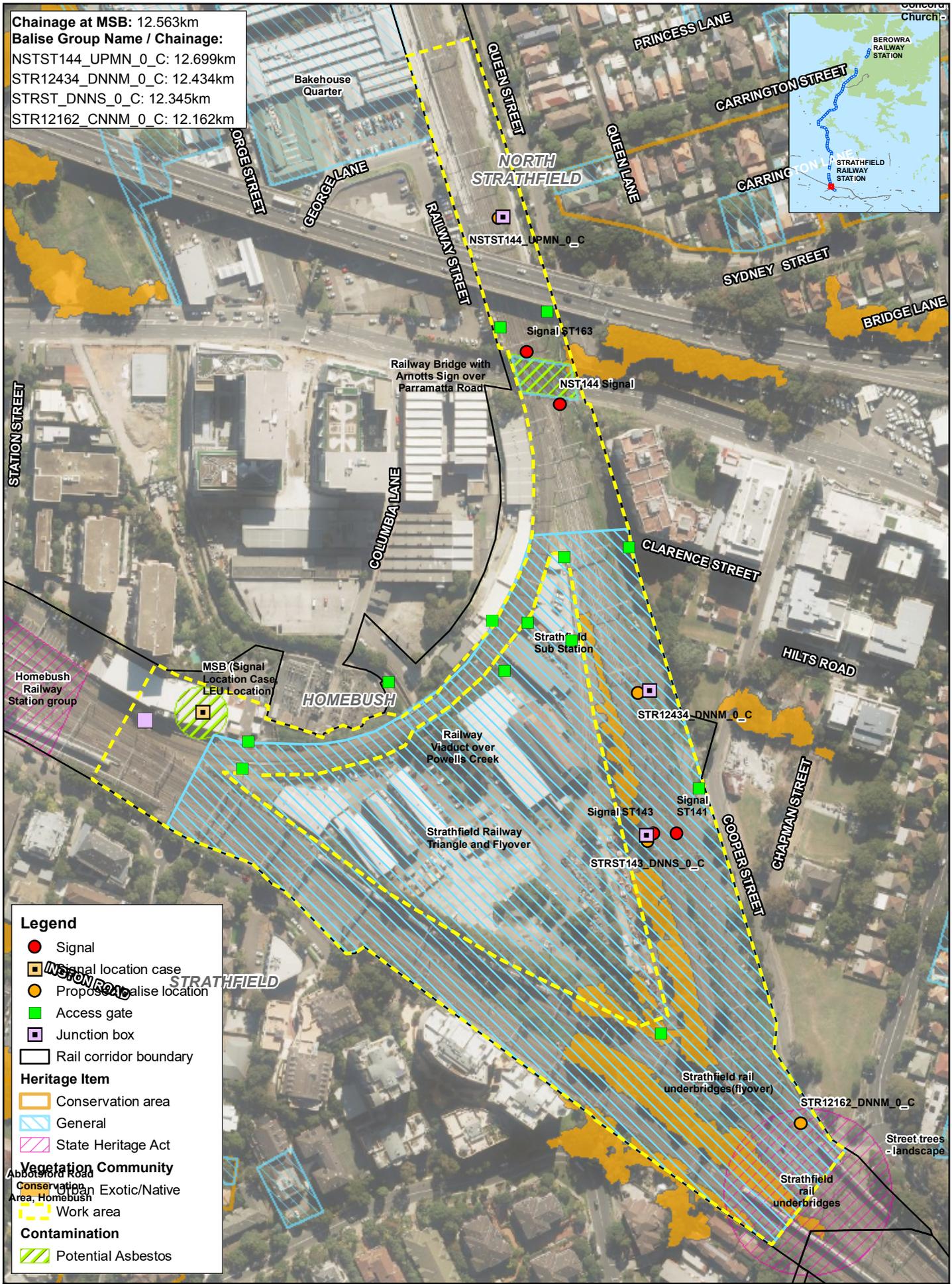
## Appendix 2 – Consideration of matters of national environmental significance

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

Factor	Impacts
<p><b>Any impact on a World Heritage property?</b> There are no World Heritage properties in the vicinity the site.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any impact on a National Heritage place?</b> There are no National Heritage places in the vicinity of the site.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any impact on a wetland of international importance?</b> There are no wetlands of international importance in the vicinity of the site.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any impact on a listed threatened species or communities?</b> The nature, scale and location of the works are such that impacts on any Commonwealth listed threatened species or ecological communities or their habitats are not expected. Indirect impacts are also not expected.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any impacts on listed migratory species?</b> The nature, scale and location of the works are such that impacts on any Commonwealth listed migratory species or their habitats are not expected. Indirect impacts are also not expected.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Any impact on a Commonwealth marine area?</b> The site is not in the vicinity of any Commonwealth marine areas.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Does the Proposal involve a nuclear action (including uranium mining)?</b> The proposal does not involve any nuclear actions.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>Additionally, any impact (direct or indirect) on Commonwealth land?</b> The site is not on or close to any Commonwealth land.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant
<p><b>In relation to coal seam gas and large coal mining developments, any impact on a water resource?</b> The Proposal does not relate to a coal seam gas or large coal mining development.</p>	<input checked="" type="checkbox"/> nil <input type="checkbox"/> minor <input type="checkbox"/> significant

## **Appendix 3 – Area 1 site location plans**

Chainage at MSB: 12.563km  
 Balise Group Name / Chainage:  
 NSTST144\_UPMN\_0\_C: 12.699km  
 STR12434\_DNNM\_0\_C: 12.434km  
 STRST\_DNNS\_0\_C: 12.345km  
 STR12162\_CNNM\_0\_C: 12.162km



**Legend**

- Signal
- Signal location case
- Proposed balise location
- Access gate
- Junction box
- ▭ Rail corridor boundary

**Heritage Item**

- ▭ Conservation area
- ▭ General
- ▭ State Heritage Act

**Vegetation Community**

- ▭ Conservation Area, Exotic/Native
- ▭ Work area

**Contamination**

- ▭ Potential Asbestos

Map: 2177516\_GIS\_001\_B10 Author: AS  
 Date: 14/02/2018 Approved by: MC  
 Data source: Land and Property Information (2015), Sydney Trains (2017), Office of Environment and Heritage (2013)  
 Coordinate system: GDA 1994 MGA Zone 56  
 Scale ratio correct when printed at A4

**Automatic Train Protection REF**  
**Appendix 3 Area 1 Site Location Plans**  
 ATP Area 1 Site Homebush MSB - Page 1 of 25

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Chainage at NST2: 14.261km  
 Balise Group Name / Chainage:  
 CRDST181\_DNRL\_0\_C: 14.037km  
 NST 2.4.1: 13.878km  
 NSTST176\_UPNM\_0\_C: 13.858km  
 NSTST172\_UPNM\_0\_C: 13.283km



**Legend**

- Signal
- Signal location case
- Proposed balise location
- Access gate
- Junction box
- ▭ Rail corridor boundary

**Heritage Item**

- ▨ General

**Vegetation Community**

- Urban Exotic/Native

**Contamination**

- ▨ Potential Asbestos

**Work area**

- ▨ Work area

Map: 2177516_GIS_001_B10	Author: AS		
Date: 14/02/2018	Approved by: MC		
Data source: Land and Property Information (2015), Sydney Trains (2017), Office of Environment and Heritage (2013)		Coordinate system: GDA 1994 MGA Zone 56 Scale ratio correct when printed at A4	

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**Automatic Train Protection REF**  
 Appendix 3 Area 1 Site Location Plans

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ATP Area 1 Site NST2 Relay Room - Page 2 of 25

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Chainage at LOC RR RS5: 15.252KM  
 Balise Group Name / Chainage:  
 RDSRS7\_DNNM\_0\_C: 15.164KM



**Legend**

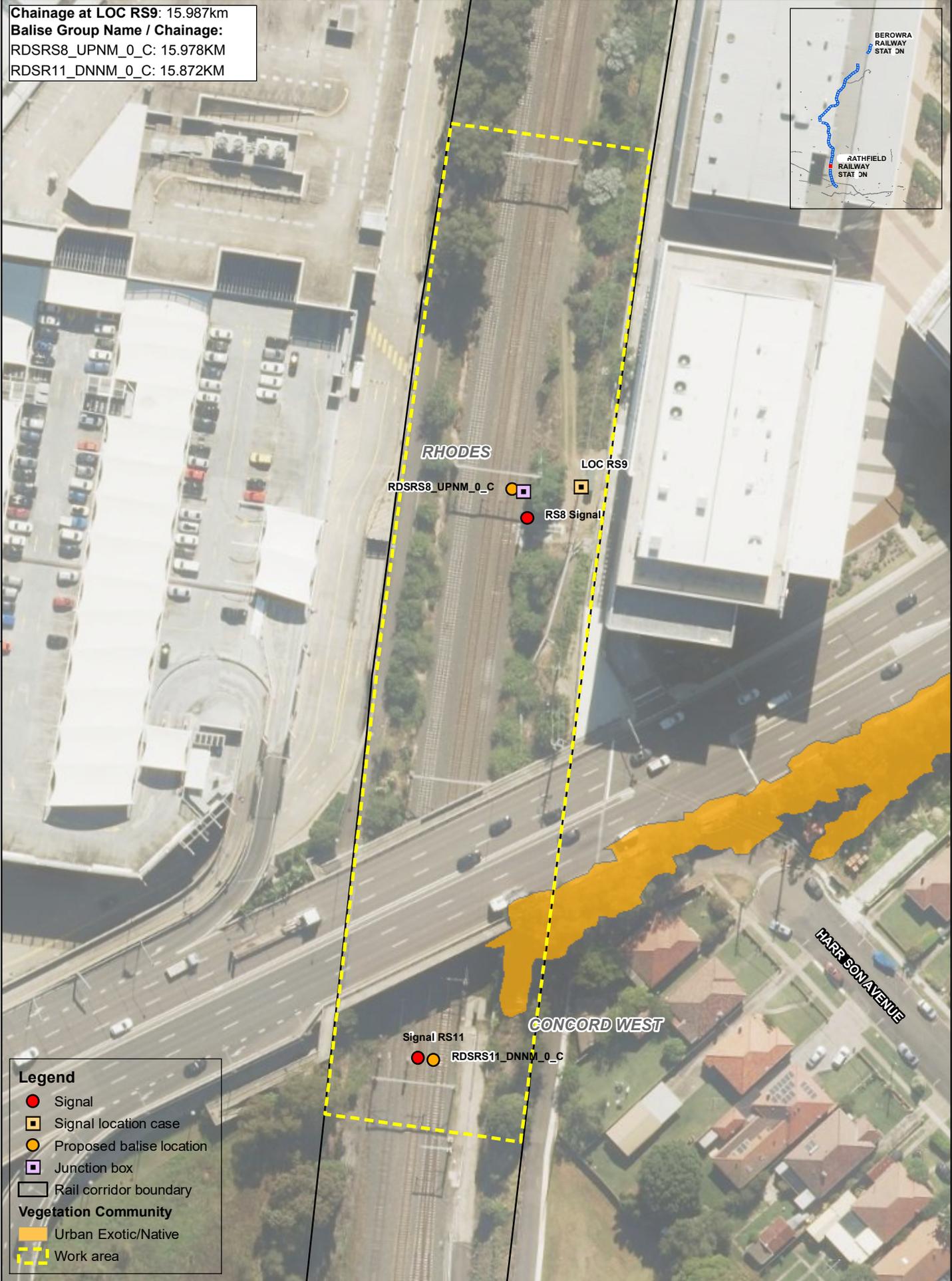
- Signal
- Signal location case
- Proposed balise location
- Junction box
- ▭ Rail corridor boundary
- ▭ Work area
- Contamination**
- ▨ Potential Asbestos

Map: 2177516_GIS_001_B10	Author: AS		
Date: 14/02/2018	Approved by: MC		
Data source: Land and Property Information (2015), Sydney Trains (2017), Office of Environment and Heritage (2013)		Coordinate system: GDA 1994 MGA Zone 56 Scale ratio correct when printed at A4	

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Chainage at LOC RS9: 15.987km  
 Balise Group Name / Chainage:  
 RDSRS8\_UPNM\_0\_C: 15.978KM  
 RDSR11\_DNNM\_0\_C: 15.872KM



**Legend**

- Signal
- Signal location case
- Proposed balise location
- Junction box
- Rail corridor boundary

**Vegetation Community**

- Urban Exotic/Native
- Work area

Map: 2177516_GIS_001_B10	Author: AS		
Date: 14/02/2018	Approved by: MC		
Data source: Land and Property Information (2015), Sydney Trains (2017), Office of Environment and Heritage (2013)		Coordinate system: GDA 1994 MGA Zone 56 Scale ratio correct when printed at A4	

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Chainage at RS: 16.467km  
 Balise Group Name / Chainage:  
 RDSRS14\_UPNM\_0\_C: 16.662km



- Legend**
- Signal
  - Signal location case
  - Proposed balise location
  - Access gate
  - Junction box
  - ▭ Rail corridor boundary
- Heritage Item**
- ▨ General
  - ▨ State Heritage Act
- Vegetation Community**
- Urban Exotic/Native
  - ▨ Work area

Map: 2177516\_GIS\_001\_B10 Author: AS  
 Date: 14/02/2018 Approved by: MC

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 Coordinate system: GDA 1994 MGA Zone 56  
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Chainage at LOC WR14: 19.229km  
 Balise Group Name / Chainage:  
 WRDWR5\_DNNM\_0\_C: 18.955km



**Legend**

- Signal
- Signal location case
- Proposed balise location
- ▭ Rail corridor boundary
- Heritage Item**
- ▭ Conservation area
- ▭ General
- ▭ State Heritage Act
- Vegetation Community**
- ▭ Urban Exotic/Native
- ▭ Work area

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Chainage at LOC NS 13.88: 22.287km  
 Balise Group Name / Chainage:  
 EWDEG23\_DNNM\_0\_C: 22.308km



**Legend**

- Signal
- Signal location case
- Proposed balise location
- Access gate
- Junction box
- ▭ Rail corridor boundary
- Threatened Species**
- Flora
- Heritage Item**
- ▭ Conservation area
- ▭ General
- Vegetation Community**
- Blue Gum High Forest (critically endangered)
- Coastal Enriched Sandstone Dry Forest
- Urban Exotic/Native
- ▭ Work area
- Contamination**
- ▭ Potential Asbestos

Map: 2177516_GIS_001_B10	Author: AS		
Date: 14/02/2018	Approved by: MC		
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Chainage at N14.20: 22.845km  
 Balise Group Name / Chainage:  
 EPG27\_DNMN\_0\_C: 22.861km



**Legend**

- Signal
- Signal location case
- Proposed balise location
- Access gate
- Rail corridor boundary

**Heritage Item**

- Conservation area
- Landscape

**Vegetation Community**

- Urban Exotic/Native
- Work area

**Contamination**

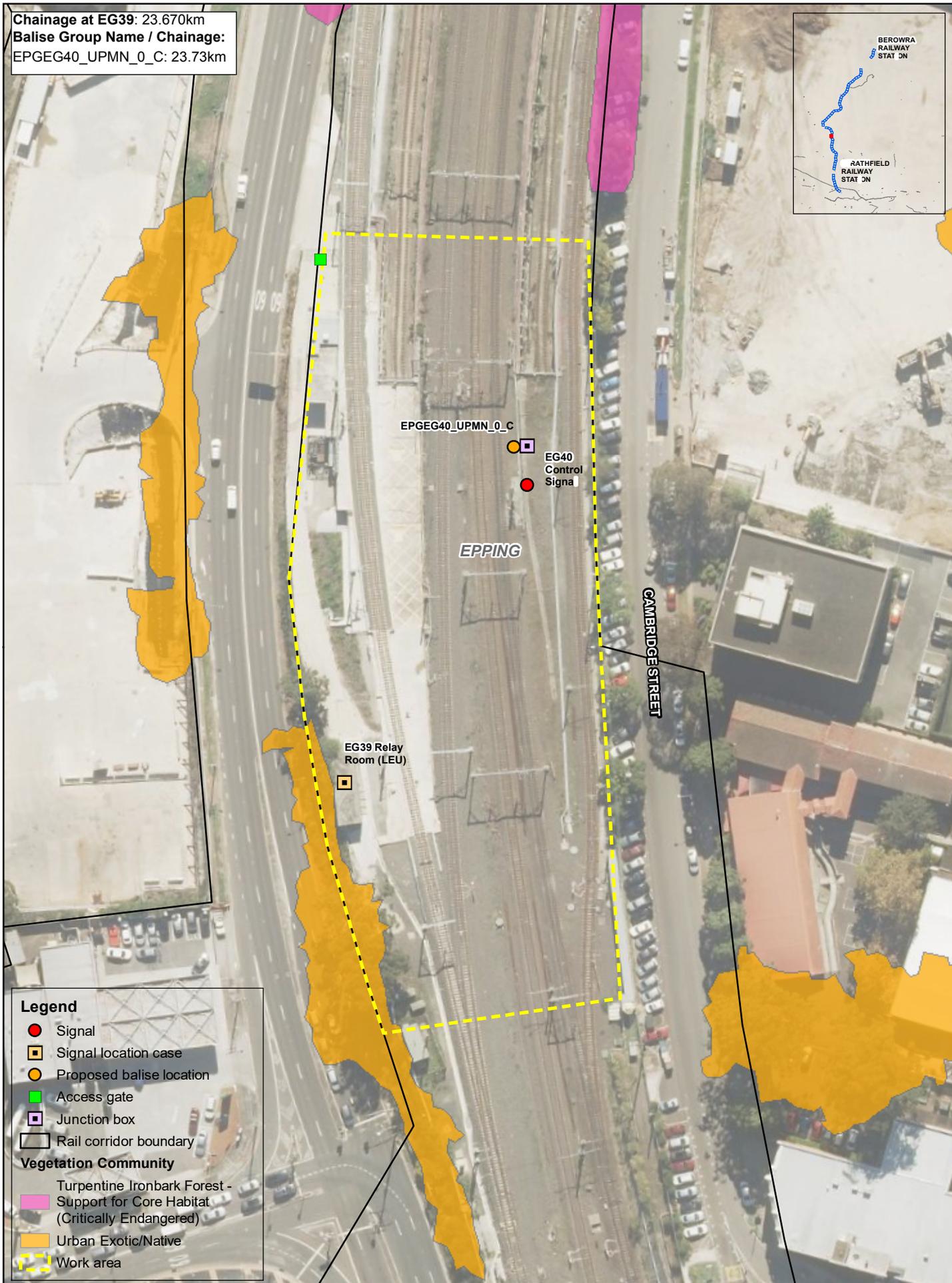
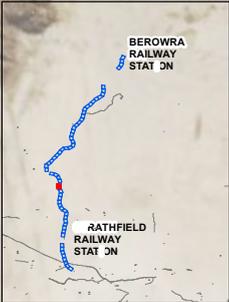
- Potential Asbestos

Map: 2177516_GIS_001_B10	Author: AS	 1:1,000
Date: 14/02/2018	Approved by: MC	
Data source: Land and Property Information (2015), Sydney Trains (2017), Office of Environment and Heritage (2013)		Coordinate system: GDA 1994 MGA Zone 56 Scale ratio correct when printed at A4

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Chainage at EG39: 23.670km  
 Balise Group Name / Chainage:  
 EPGE40\_UPMN\_0\_C: 23.73km



**Legend**

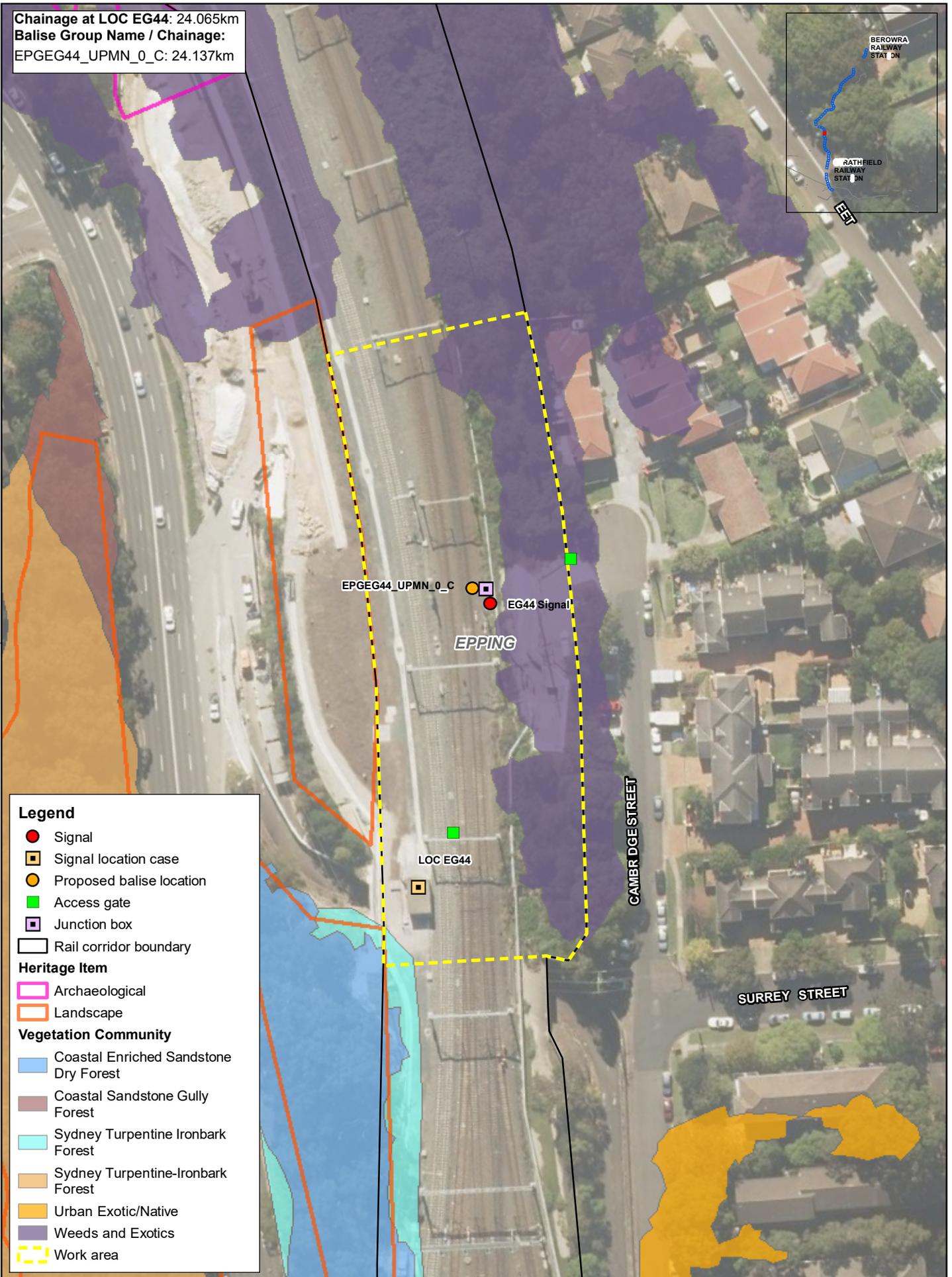
- Signal
  - Signal location case
  - Proposed balise location
  - Access gate
  - Junction box
  - Rail corridor boundary
- Vegetation Community**
- Turpentine Ironbark Forest - Support for Core Habitat (Critically Endangered)
  - Urban Exotic/Native
  - Work area

Map: 2177516_GIS_001_B10	Author: AS	 1:1,000
Date: 14/02/2018	Approved by: MC	
Data source: Land and Property Information (2015), Sydney Trains (2017), Office of Environment and Heritage (2013)		Coordinate system: GDA 1994 MGA Zone 56 Scale ratio correct when printed at A4

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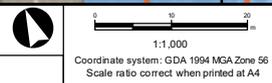
Chainage at LOC EG44: 24.065km  
 Balise Group Name / Chainage:  
 EPGEG44\_UPMN\_0\_C: 24.137km



**Legend**

- Signal
- Signal location case
- Proposed balise location
- Access gate
- Junction box
- Rail corridor boundary
- Heritage Item**
- Archaeological
- Landscape
- Vegetation Community**
- Coastal Enriched Sandstone Dry Forest
- Coastal Sandstone Gully Forest
- Sydney Turpentine Ironbark Forest
- Sydney Turpentine-Ironbark Forest
- Urban Exotic/Native
- Weeds and Exotics
- Work area

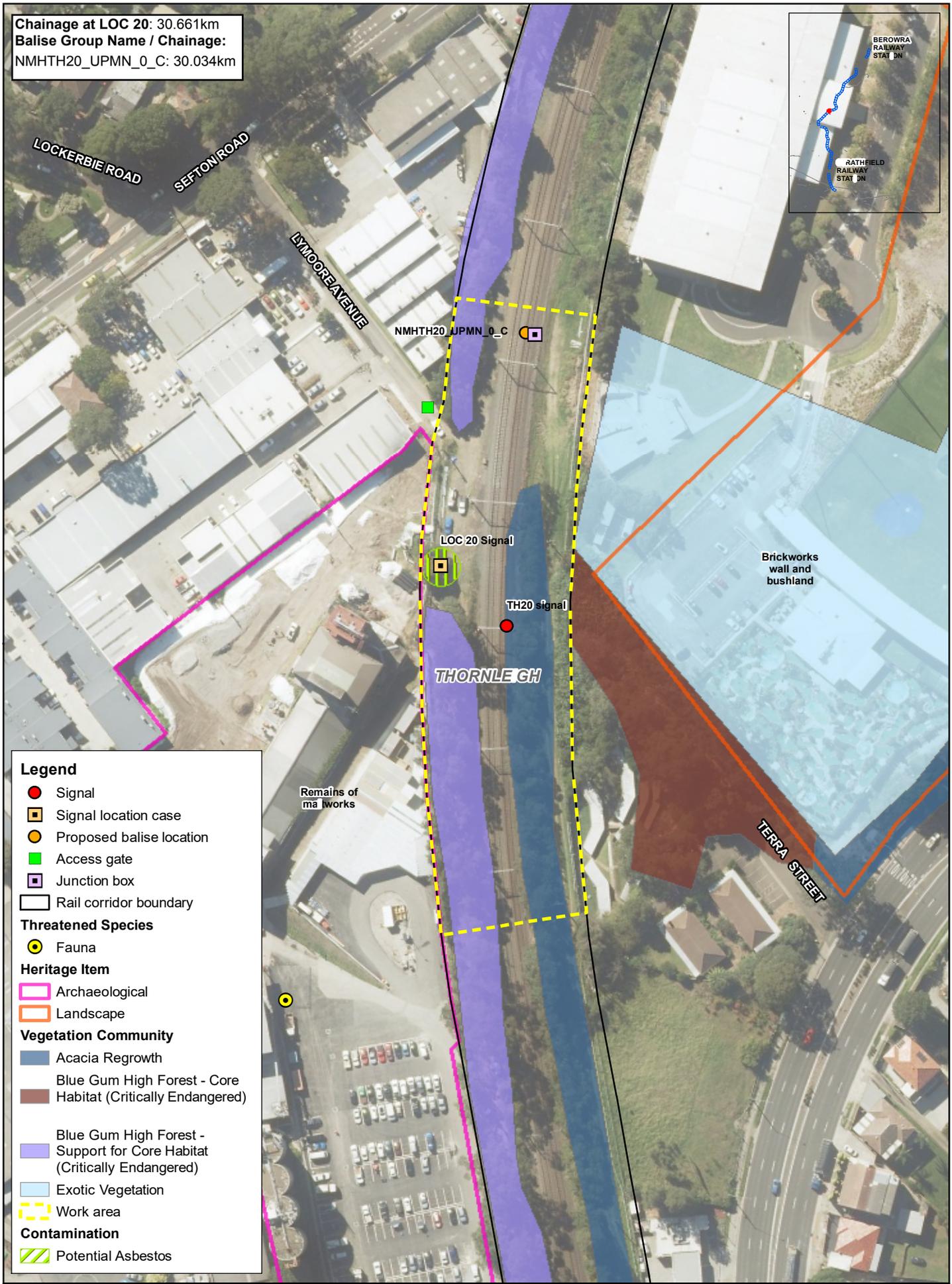
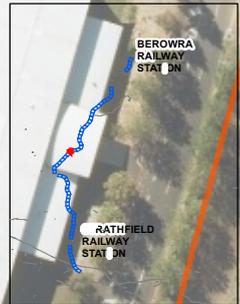
Map: 2177516\_GIS\_001\_B10 Author: AS  
 Date: 14/02/2018 Approved by: MC



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Chainage at LOC 20: 30.661km  
 Balise Group Name / Chainage:  
 NMH20\_UPMN\_0\_C: 30.034km



**Legend**

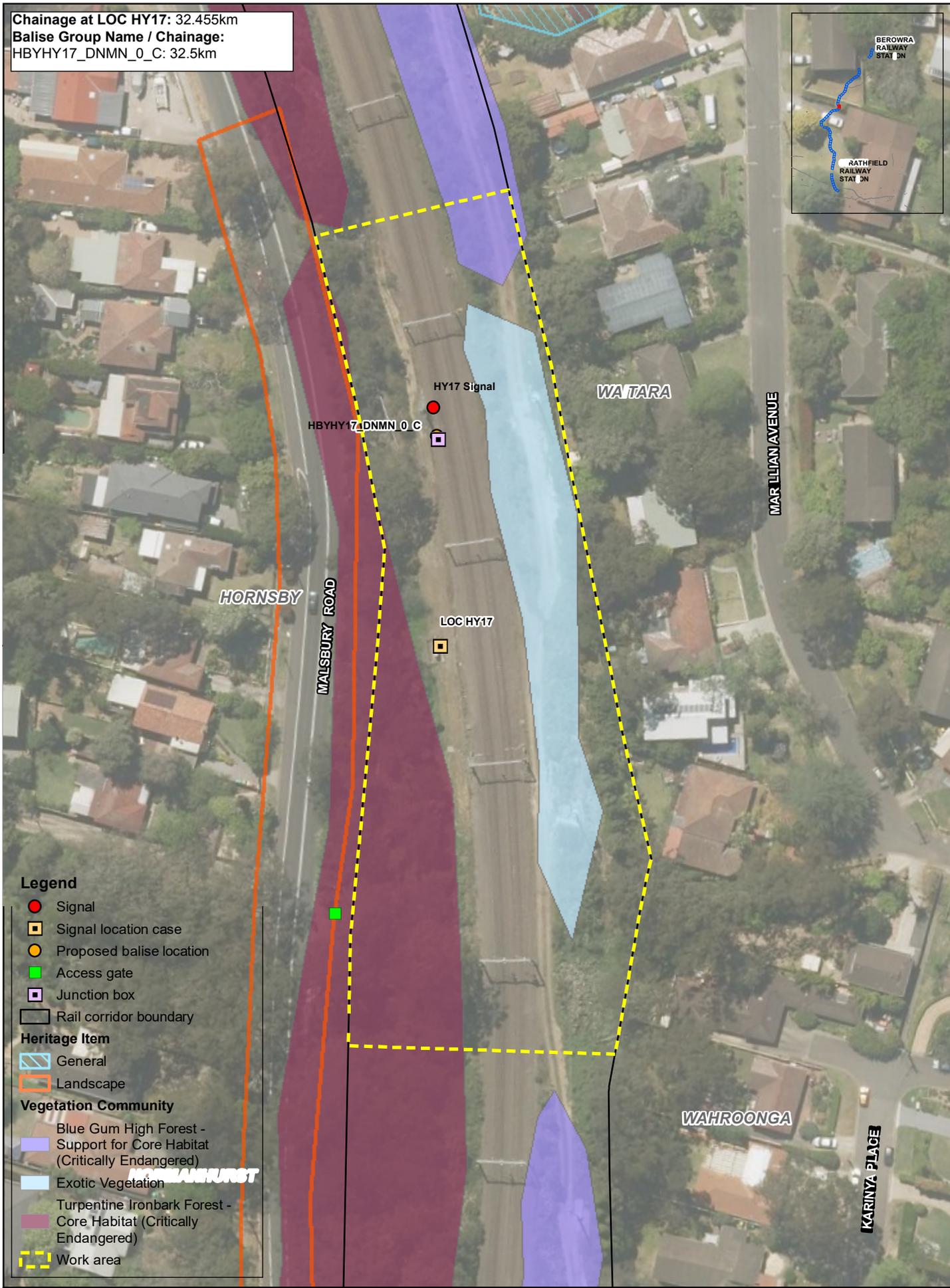
- Signal
- Signal location case
- Proposed balise location
- Access gate
- Junction box
- Rail corridor boundary
- Threatened Species**
- Fauna
- Heritage Item**
- Archaeological
- Landscape
- Vegetation Community**
- Acacia Regrowth
- Blue Gum High Forest - Core Habitat (Critically Endangered)
- Blue Gum High Forest - Support for Core Habitat (Critically Endangered)
- Exotic Vegetation
- Work area
- Contamination**
- Potential Asbestos

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Chainage at LOC HY17: 32.455km  
 Balise Group Name / Chainage:  
 HBYHY17\_DNMN\_0\_C: 32.5km



**Legend**

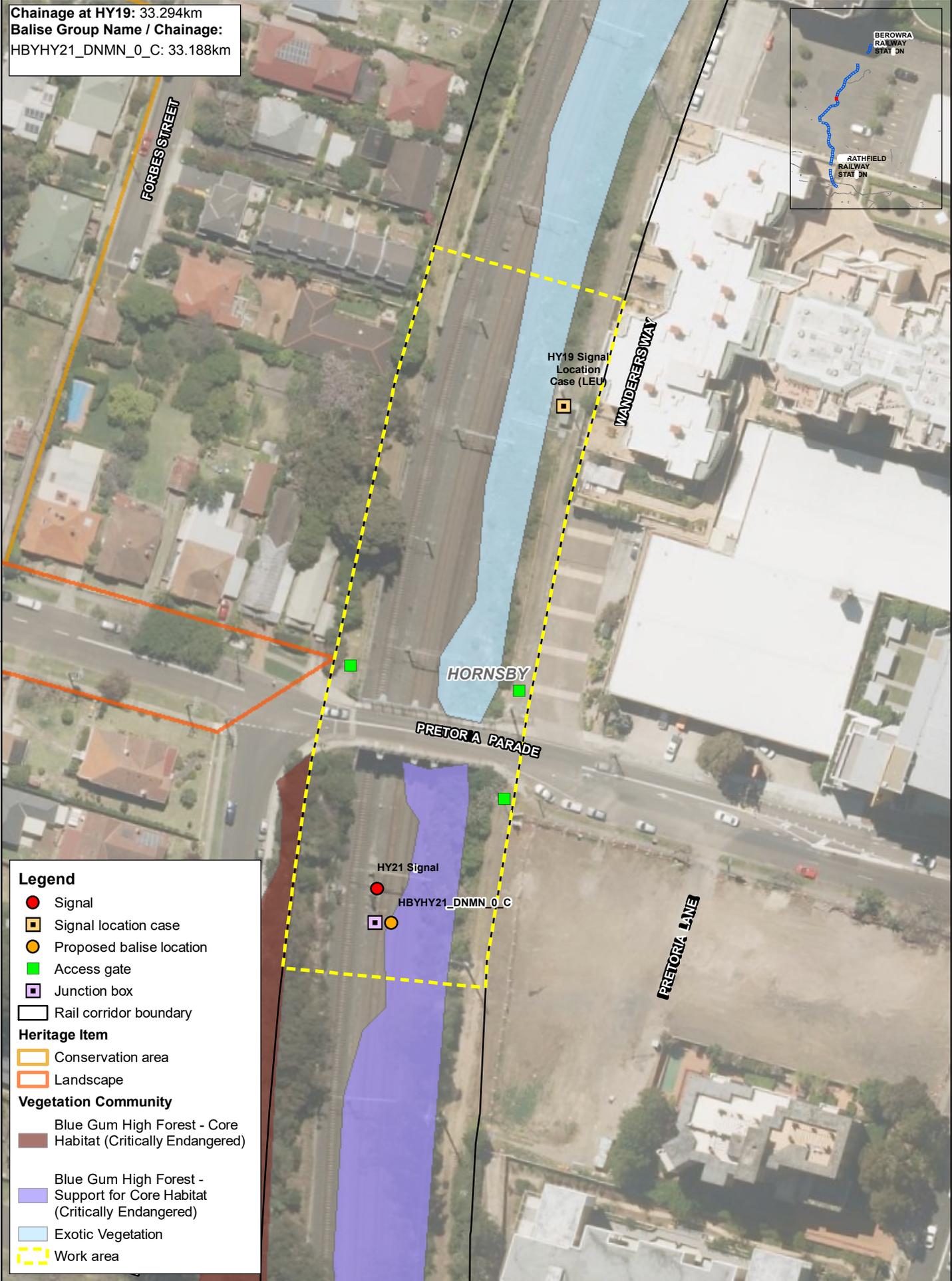
- Signal
- Signal location case
- Proposed balise location
- Access gate
- Junction box
- Rail corridor boundary
- Heritage Item**
- General
- Landscape
- Vegetation Community**
- Blue Gum High Forest - Support for Core Habitat (Critically Endangered)
- Exotic Vegetation
- Turpentine Ironbark Forest - Core Habitat (Critically Endangered)
- Work area

Map: 2177516_GIS_001_B10	Author: AS		
Date: 14/02/2018	Approved by: MC		
Data source: Land and Property Information (2015), Sydney Trains (2017), Office of Environment and Heritage (2013)		Coordinate system: GDA 1994 MGA Zone 56 Scale ratio correct when printed at A4	

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Chainage at HY19: 33.294km  
 Balise Group Name / Chainage:  
 HBYHY21\_DNMM\_0\_C: 33.188km



**Legend**

- Signal
- Signal location case
- Proposed balise location
- Access gate
- Junction box
- ▭ Rail corridor boundary

**Heritage Item**

- ▭ Conservation area
- ▭ Landscape

**Vegetation Community**

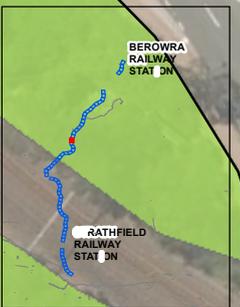
- Blue Gum High Forest - Core Habitat (Critically Endangered)
- Blue Gum High Forest - Support for Core Habitat (Critically Endangered)
- Exotic Vegetation
- ▭ Work area

Map: 2177516_GIS_001_B10	Author: AS		
Date: 14/02/2018	Approved by: MC		
Data source: Land and Property Information (2015), Sydney Trains (2017), Office of Environment and Heritage (2013)		Coordinate system: GDA 1994 MGA Zone 56 Scale ratio correct when printed at A4	



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Chainage at HY25: 33.542km  
 Balise Group Name / Chainage:  
 HBYHY25\_DNMN\_0\_C: 33.416km



**Legend**

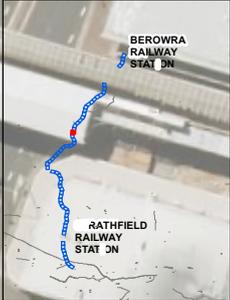
- Signal
  - Signal location case
  - Proposed balise location
  - Access gate
  - Junction box
  - Rail corridor boundary
- Vegetation Community**
- Blue Gum High Forest (critically endangered) (TfNSW)
  - Exotic Vegetation
  - Work area

Map: 2177516_GIS_001_B10	Author: AS		
Date: 14/02/2018	Approved by: MC		
Data source: Land and Property Information (2015), Sydney Trains (2017), Office of Environment and Heritage (2013)		Coordinate system: GDA 1994 MGA Zone 56 Scale ratio correct when printed at A4	

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Chainage at HY35: 25.105km  
 Balise Group Name / Chainage:  
 HBYHY35\_DNSH\_0\_C: 24.887km



**Legend**

- Signal
- Signal location case
- Proposed balise location
- Access gate
- Junction box
- Rail corridor boundary

**Heritage Item**

- General
- Landscape

**Vegetation Community**

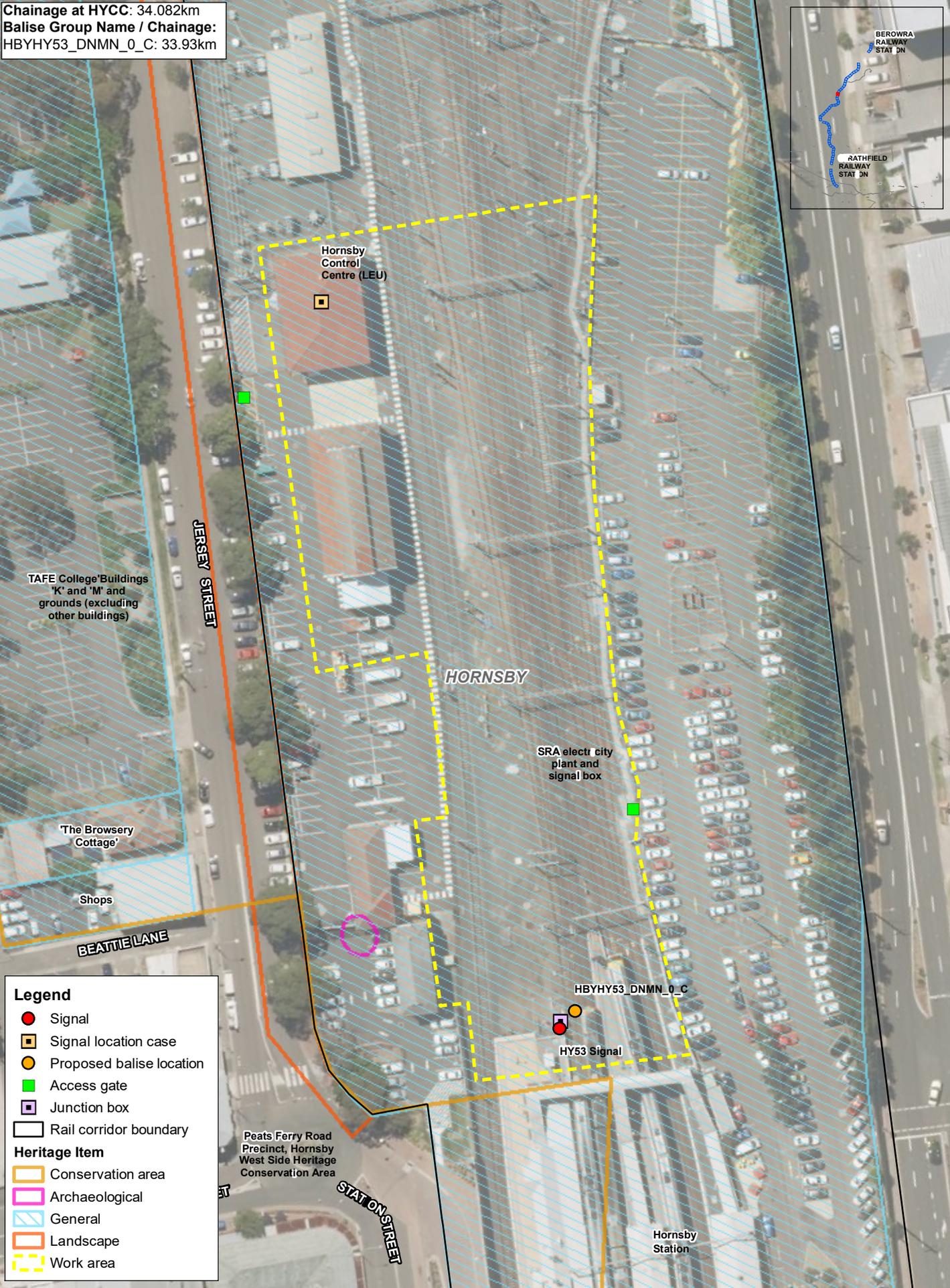
- Blue Gum High Forest (critically endangered) (TfNSW)
- Exotic Vegetation
- Work area

Map: 2177516_GIS_001_B10	Author: AS	 
Date: 14/02/2018	Approved by: MC	
Data source: Land and Property Information (2015), Sydney Trains (2017), Office of Environment and Heritage (2013)		Coordinate system: GDA 1994 MGA Zone 56 Scale ratio correct when printed at A4



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Chainage at HYCC: 34.082km  
 Balise Group Name / Chainage:  
 HBYHY53\_DNMM\_0\_C: 33.93km



**Legend**

- Signal
  - Signal location case
  - Proposed balise location
  - Access gate
  - Junction box
  - Rail corridor boundary
- Heritage Item**
- Conservation area
  - Archaeological
  - General
  - Landscape
  - Work area

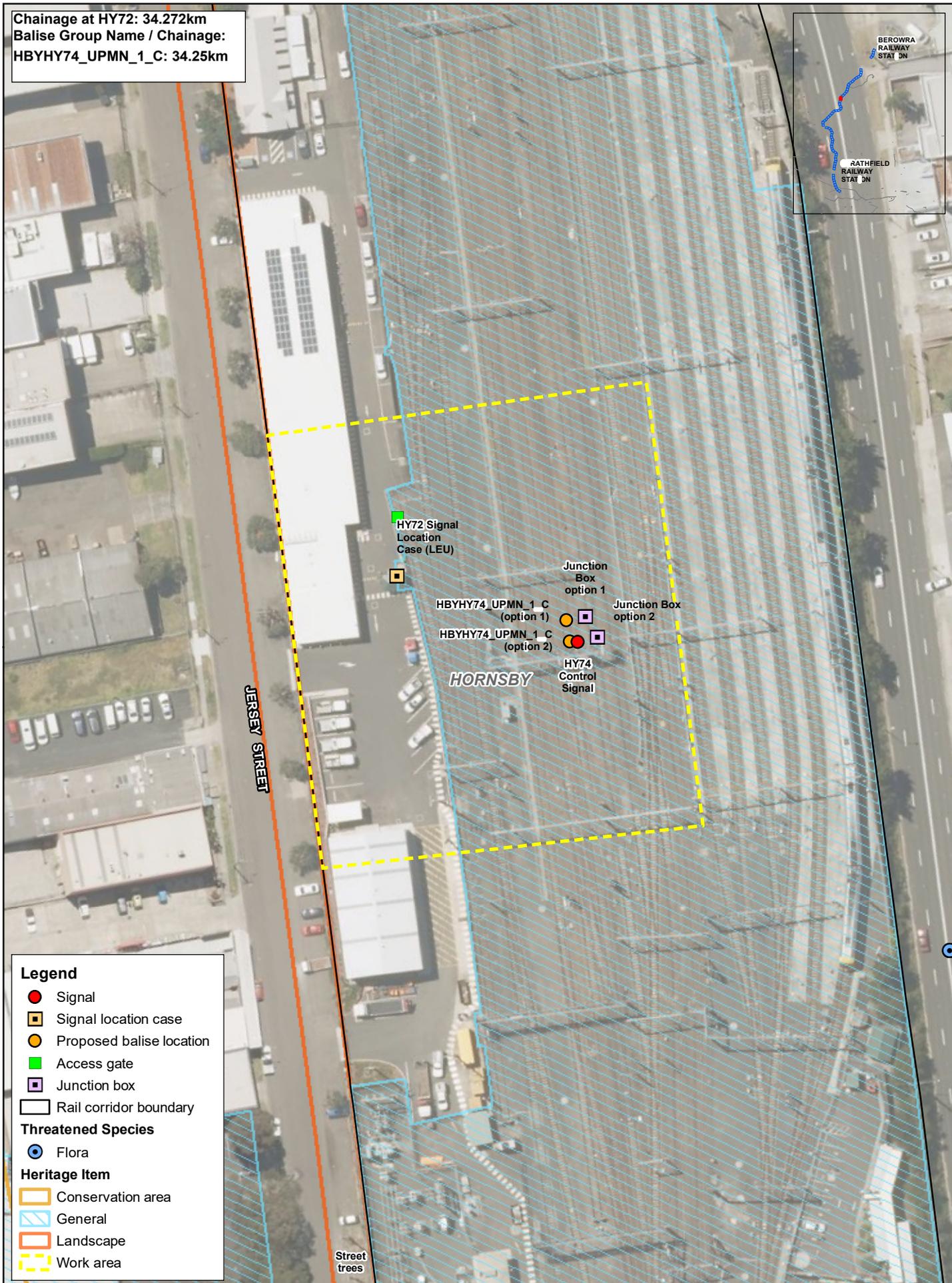
Map: 2177516\_GIS\_001\_B10 Author: AS  
 Date: 14/02/2018 Approved by: MC

Coordinate system: GDA 1994 MGA Zone 56  
 Scale ratio correct when printed at A4

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Chainage at HY72: 34.272km  
 Balise Group Name / Chainage:  
 HBYHY74\_UPMN\_1\_C: 34.25km



**Legend**

- Signal
- Signal location case
- Proposed balise location
- Access gate
- Junction box
- ▭ Rail corridor boundary

**Threatened Species**

- Flora

**Heritage Item**

- ▭ Conservation area
- ▭ General
- ▭ Landscape
- ▭ Work area

Map: 2177516_GIS_001_B10	Author: AS		
Date: 14/02/2018	Approved by: MC		
Data source: Land and Property Information (2015), Sydney Trains (2017), Office of Environment and Heritage (2013)		Coordinate system: GDA 1994 MGA Zone 56 Scale ratio correct when printed at A4	



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Chainage at HY83: 34.418km  
 Balise Group Name / Chainage:  
 HBYHY87\_DNRL\_0\_C: 34.381km  
 HBYHY93\_DNMN\_0\_C: 34.359km



**Legend**

- Signal
  - Signal location case
  - Proposed balise location
  - Access gate
  - Junction box
  - Rail corridor boundary
- Heritage Item**
- General
  - Landscape
  - Work area

Map: 2177516_GIS_001_B10	Author: AS		
Date: 14/02/2018	Approved by: MC		
Data source: Land and Property Information (2015), Sydney Trains (2017), Office of Environment and Heritage (2013)		Coordinate system: GDA 1994 MGA Zone 56 Scale ratio correct when printed at A4	

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Chainage at HY 99: 34.700km  
 Balise Group Name / Chainage:  
 HBYHY106\_UPMN\_0\_C: 34.694km  
 HBYHY103\_UPMN\_1\_C: 34.586km  
 HBYHY101\_DNMN\_0\_C: 34.586km



**Legend**

- Signal
- Signal location case
- Proposed balise location
- Access gate
- Junction box
- Rail corridor boundary

**Threatened Species**

- Flora

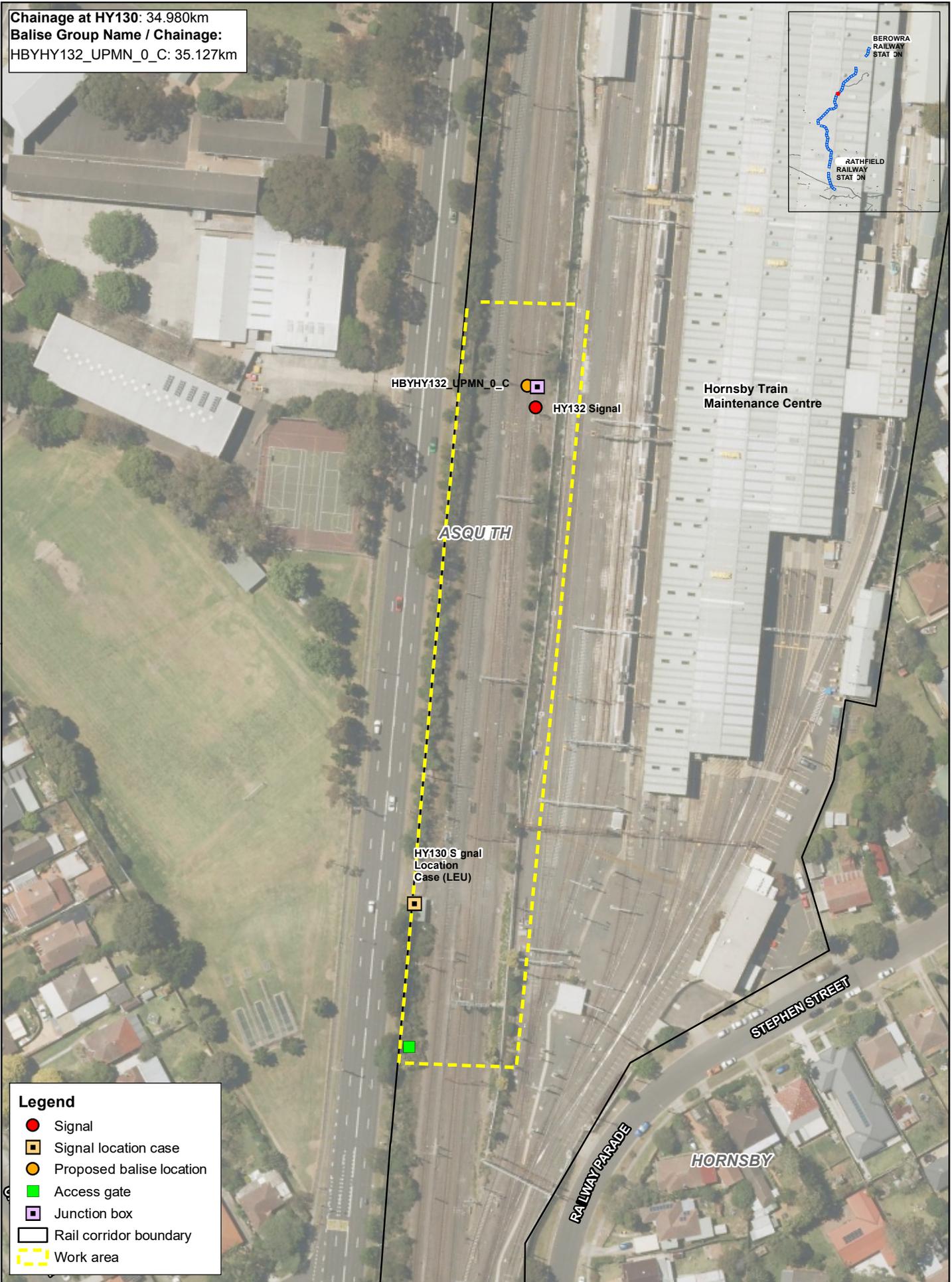
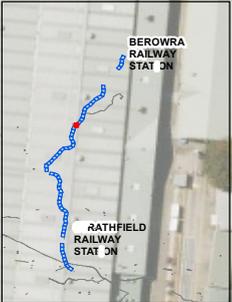
**Heritage Item**

- General
- Landscape
- Work area

Map: 2177516_GIS_001_B10	Author: AS		
Date: 14/02/2018	Approved by: MC		
Data source: Land and Property Information (2015), Sydney Trains (2017), Office of Environment and Heritage (2013)		Coordinate system: GDA 1994 MGA Zone 56 Scale ratio correct when printed at A4	
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Chainage at HY130: 34.980km  
 Balise Group Name / Chainage:  
 HBYHY132\_UPMN\_0\_C: 35.127km



HBYHY132\_UPMN\_0\_C [Symbol]  
 HY132 Signal [Symbol]

Hornsby Train Maintenance Centre

ASQUITH

HY130 Signal Location Case (LEU)

STEPHEN STREET

RAILWAY PARADE

HORNSBY

**Legend**

- [Red Circle] Signal
- [Yellow Square] Signal location case
- [Orange Circle] Proposed balise location
- [Green Square] Access gate
- [Purple Square] Junction box
- [Black Outline] Rail corridor boundary
- [Yellow Dashed Outline] Work area

Map: 2177516_GIS_001_B10	Author: AS		
Date: 14/02/2018	Approved by: MC		
Data source: Land and Property Information (2015), Sydney Trains (2017), Office of Environment and Heritage (2013)		Coordinate system: GDA 1994 MGA Zone 56 Scale ratio correct when printed at A4	

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Chainage at HY134: 35.601km  
 Balise Group Name / Chainage:  
 HBYHY134\_UPMN\_0\_C: 35.894km



**Legend**

- Signal
- Signal location case
- Proposed balise location
- Access gate
- Junction box
- Rail corridor boundary
- Heritage Item**
- General
- Landscape
- Work area

Map: 2177516_GIS_001_B10	Author: AS		
Date: 14/02/2018	Approved by: MC		
Data source: Land and Property Information (2015), Sydney Trains (2017), Office of Environment and Heritage (2013)		Coordinate system: GDA 1994 MGA Zone 56 Scale ratio correct when printed at A4	

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Kilometrage:  
 HY136: 36.680KM  
 HY136AT: 36.441 KM



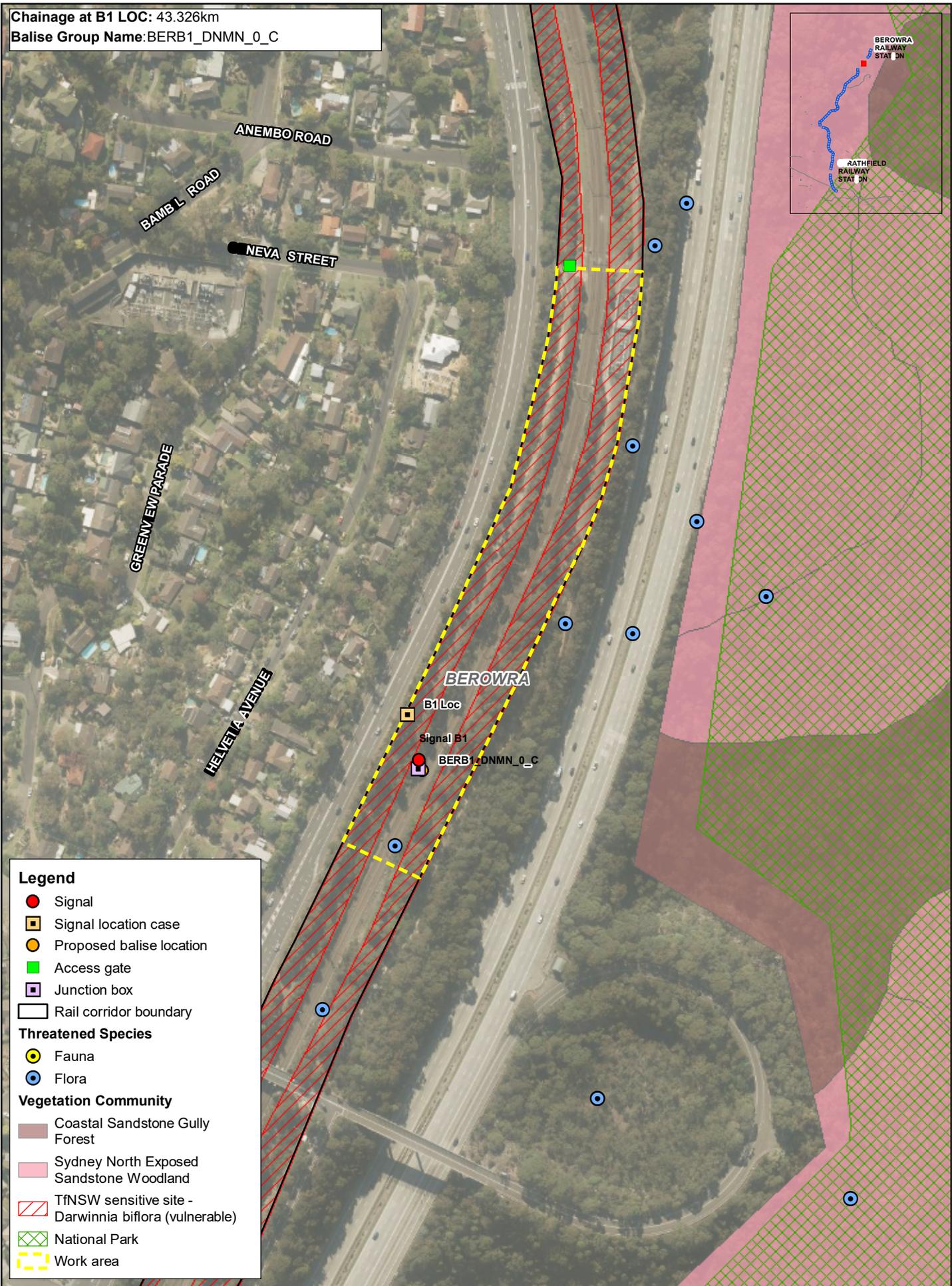
**Legend**

- Signal location case (to be removed)
- Rail corridor boundary
- Threatened Species**
- Flora
- Heritage Item**
- General
- Landscape

Map: 2177516_GIS_001_B11	Author: AS	  1:2,500 Coordinate system: GDA 1994 MGA Zone 56 Scale ratio correct when printed at A4
Date: 26/02/2018	Approved by: MC	
Data source: Land and Property Information (2015), Sydney Trains (2017), Office of Environment and Heritage (2013)		
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Chainage at B1 LOC: 43.326km  
 Balise Group Name: BERB1\_DNMN\_0\_C



- Legend**
- Signal
  - Signal location case
  - Proposed balise location
  - Access gate
  - Junction box
  - Rail corridor boundary
- Threatened Species**
- Fauna
  - Flora
- Vegetation Community**
- Coastal Sandstone Gully Forest
  - Sydney North Exposed Sandstone Woodland
  - TfNSW sensitive site - Darwinia biflora (vulnerable)
  - National Park
  - Work area

Map: 2177516_GIS_001_B10	Author: AS		
Date: 14/02/2018	Approved by: MC		
Data source: Land and Property Information (2015), Sydney Trains (2017), Office of Environment and Heritage (2013)		Coordinate system: GDA 1994 MGA Zone 56 Scale ratio correct when printed at A4	

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Chainage at Berowra RR: 44.451KM  
 Balise Group Name / Chainage:  
 BERB3\_DNMN\_0\_C: 44.094km



**Legend**

- Signal
  - Signal location case
  - Proposed balise location
  - Access gate
  - Junction box
  - Rail corridor boundary
- Vegetation Community**
- Sydney North Exposed Sandstone Woodland
  - TfNSW sensitive site - Darwinnia biflora (vulnerable)
  - Work area

Map: 2177516_GIS_001_B10	Author: AS	 1:1,500 Coordinate system: GDA 1994 MGA Zone 56 Scale ratio correct when printed at A4
Date: 14/02/2018	Approved by: MC	
<small>Data source: Land and Property Information (2015), Sydney Trains (2017), Office of Environment and Heritage (2013)</small>		
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## **Appendix 4 – AHIMS Search records**

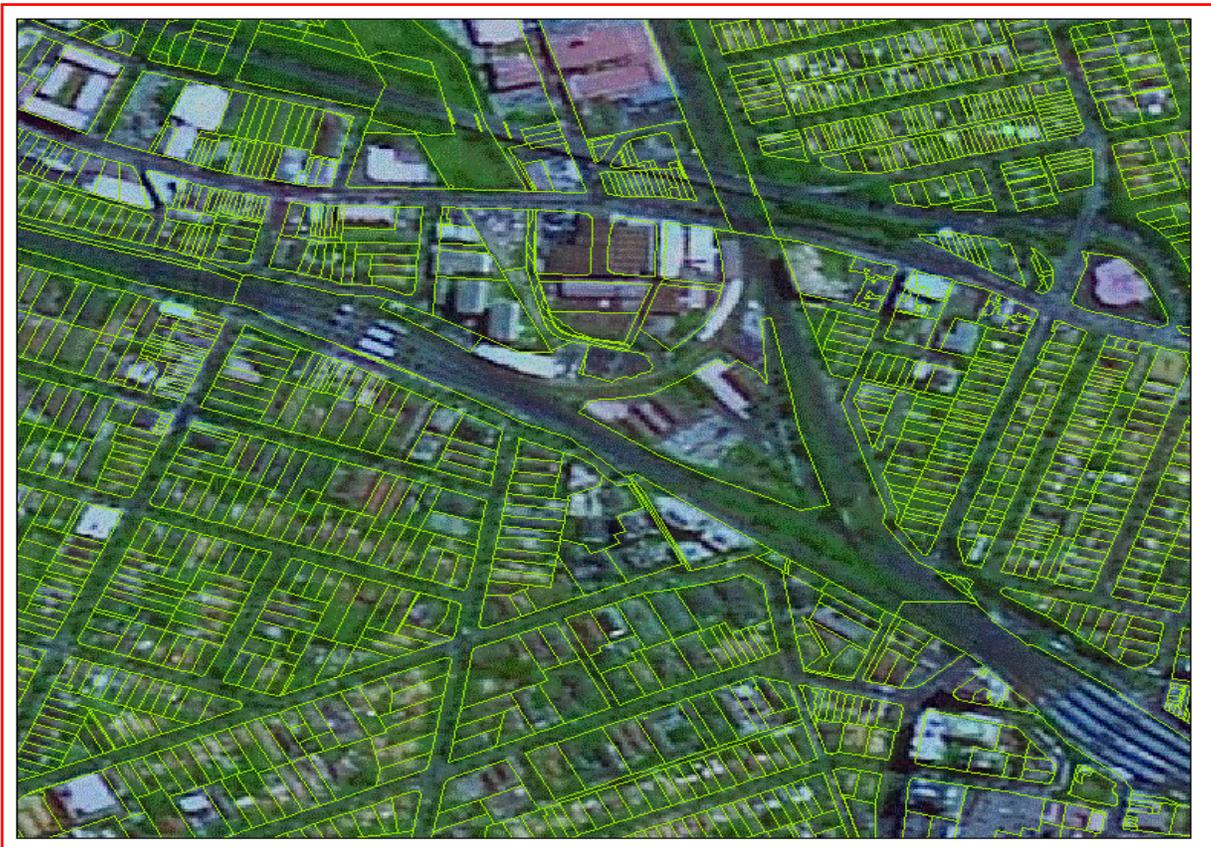
WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 1, DP:DP1015899 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 50, DP:DP1219136 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

<b>0</b>	<b>Aboriginal sites are recorded in or near the above location.</b>
----------	---

<b>0</b>	<b>Aboriginal places have been declared in or near the above location. *</b>
----------	--

WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 1003, DP:DP1190817 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

<b>0</b>	<b>Aboriginal sites are recorded in or near the above location.</b>
<b>0</b>	<b>Aboriginal places have been declared in or near the above location. *</b>

WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 11 September 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 1005, DP:DP1190932 with a Buffer of 200 meters, conducted by Morgan Cardiff on 11 September 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 1003, DP:DP1190817 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

<b>0</b>	<b>Aboriginal sites are recorded in or near the above location.</b>
<b>0</b>	<b>Aboriginal places have been declared in or near the above location. *</b>

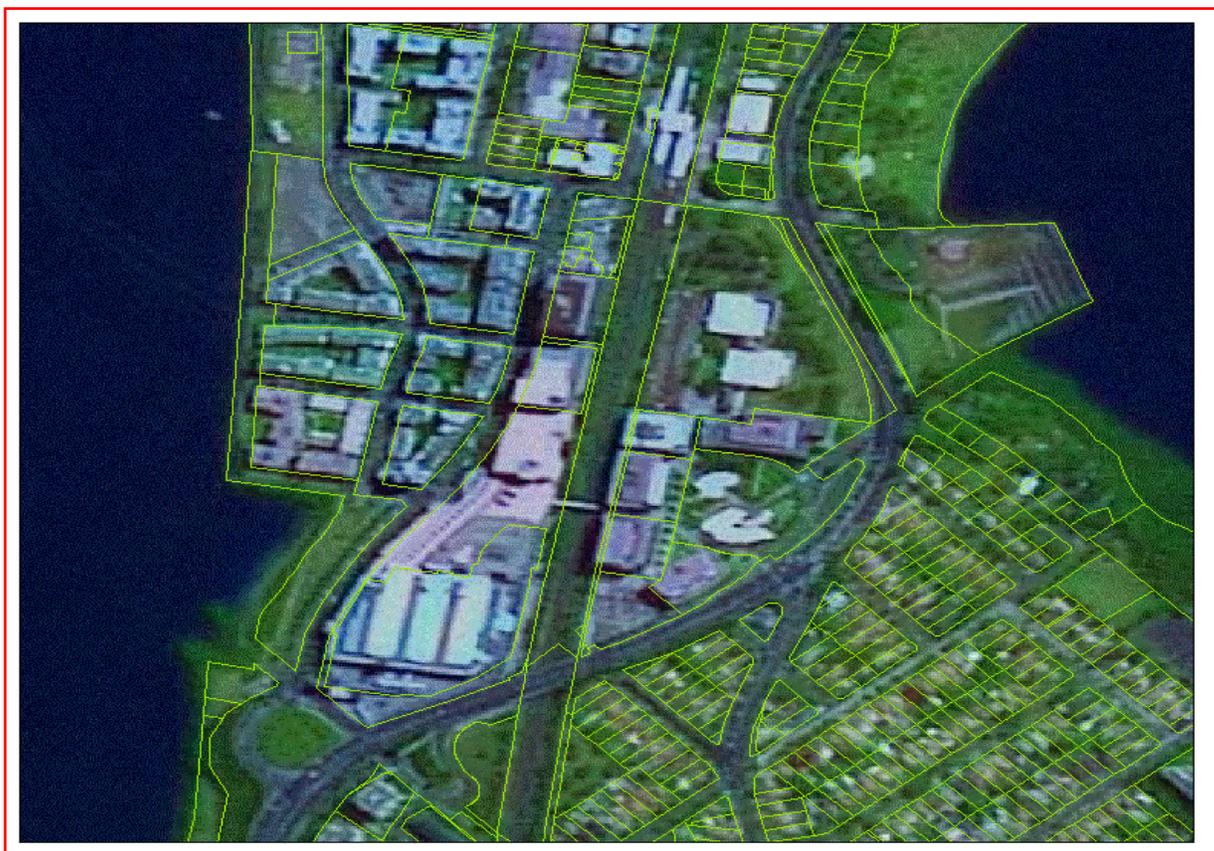
WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 1006, DP:DP1190977 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 1007, DP:DP1190983 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

<b>0</b>	<b>Aboriginal sites are recorded in or near the above location.</b>
<b>0</b>	<b>Aboriginal places have been declared in or near the above location. *</b>

WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 40, DP:DP1201802 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

<b>0</b>	<b>Aboriginal sites are recorded in or near the above location.</b>
<b>0</b>	<b>Aboriginal places have been declared in or near the above location. *</b>

WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 1, DP:DP1185525 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

<b>0</b>	<b>Aboriginal sites are recorded in or near the above location.</b>
<b>0</b>	<b>Aboriginal places have been declared in or near the above location. *</b>

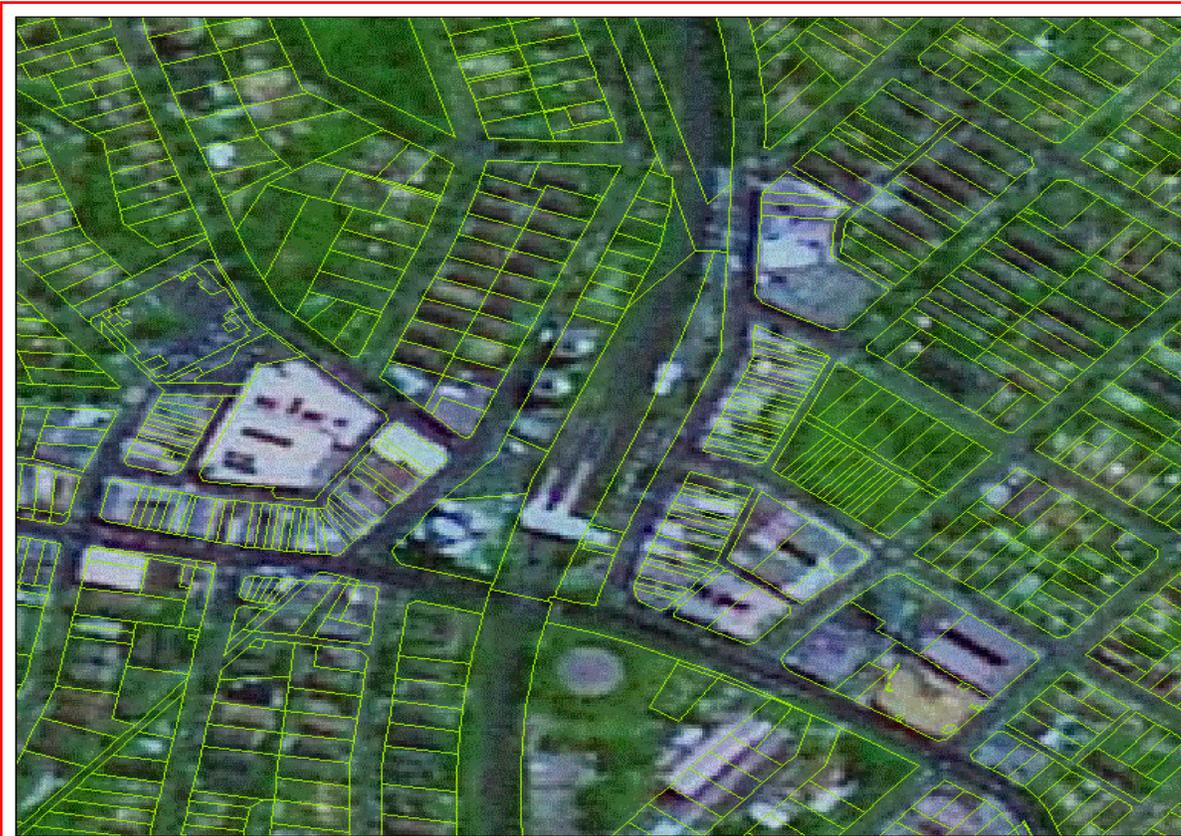
WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 41, DP:DP1201802 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

<b>0</b>	<b>Aboriginal sites are recorded in or near the above location.</b>
<b>0</b>	<b>Aboriginal places have been declared in or near the above location. *</b>

WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 1, DP:DP1154263 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 1011, DP:DP1191710 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 1, DP:DP1059484 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

<b>1</b>	<b>Aboriginal sites are recorded in or near the above location.</b>
<b>0</b>	<b>Aboriginal places have been declared in or near the above location. *</b>

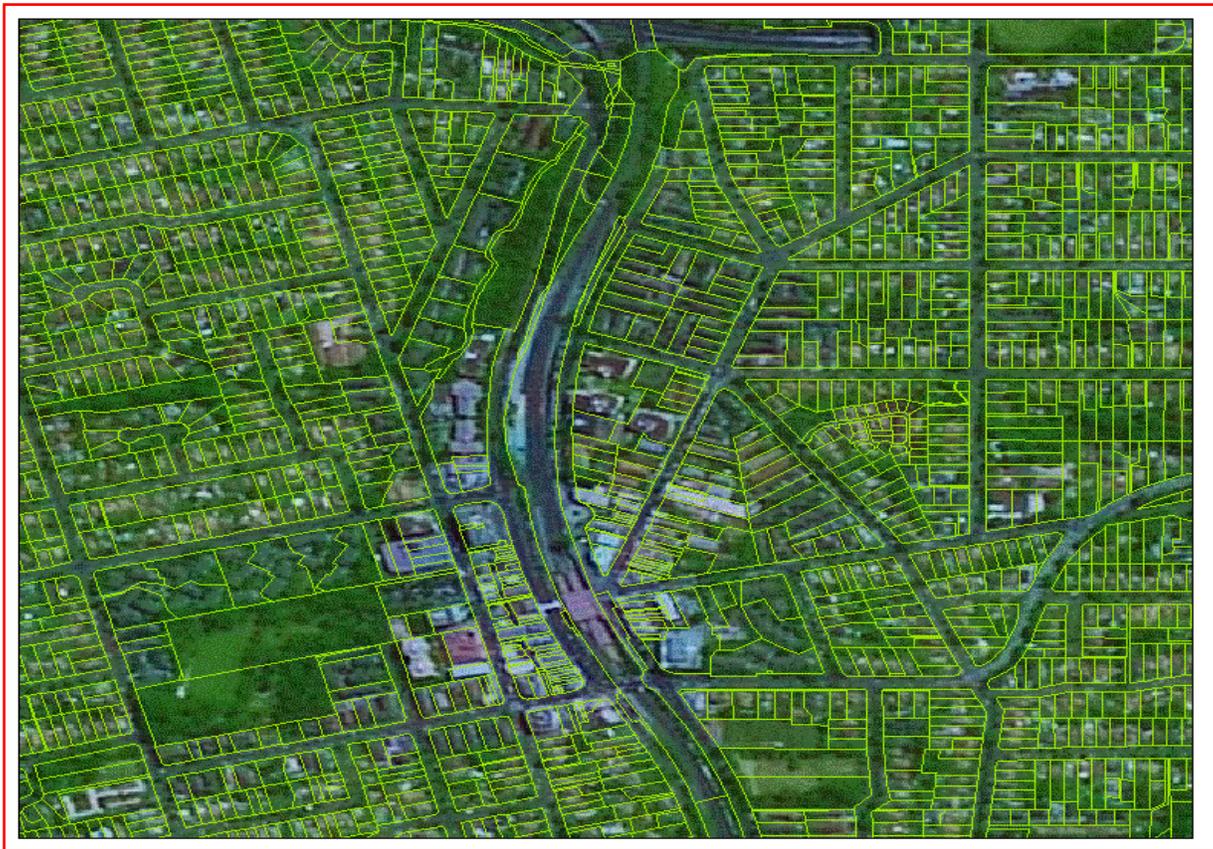
WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 1, DP:DP1059484 with a Buffer of 50 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 130, DP:DP907551 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 1021, DP:DP1192029 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 1022, DP:DP1192044 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

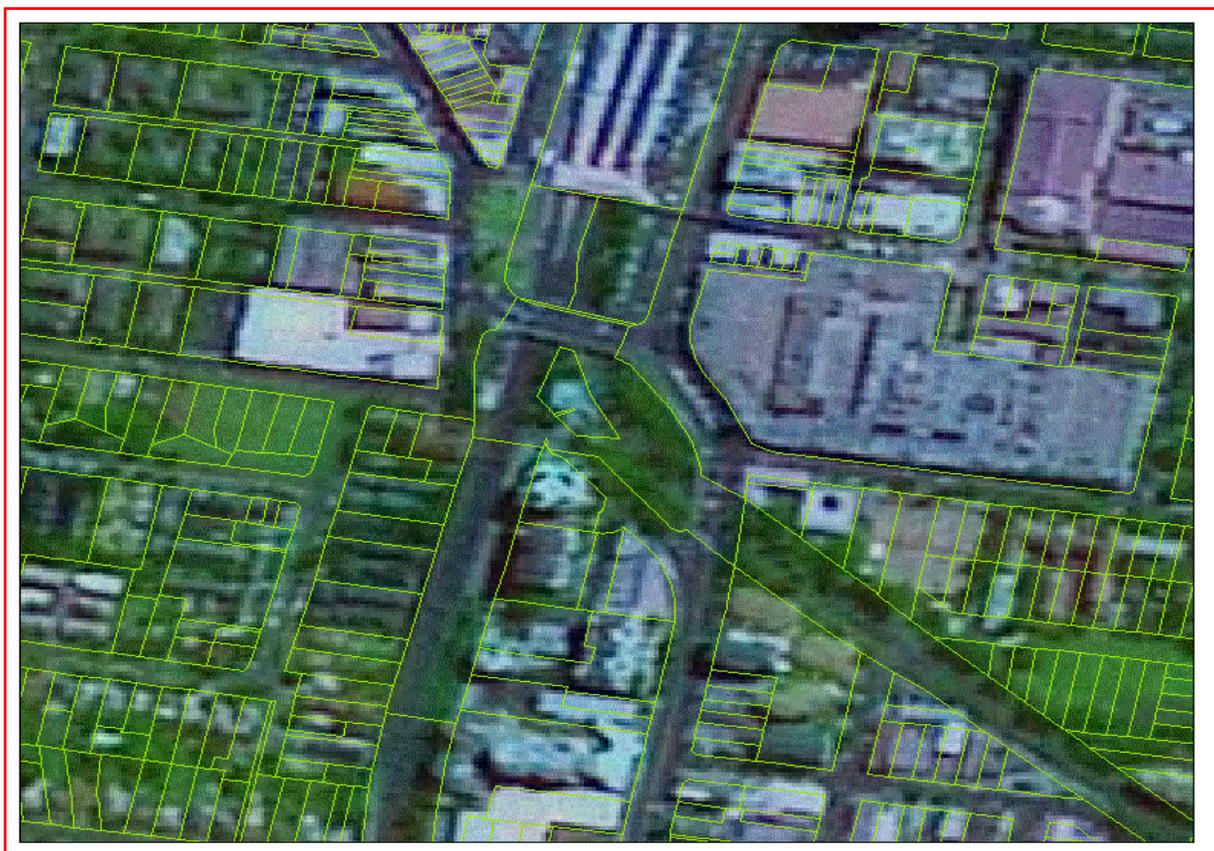
WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 1023, DP:DP1192060 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

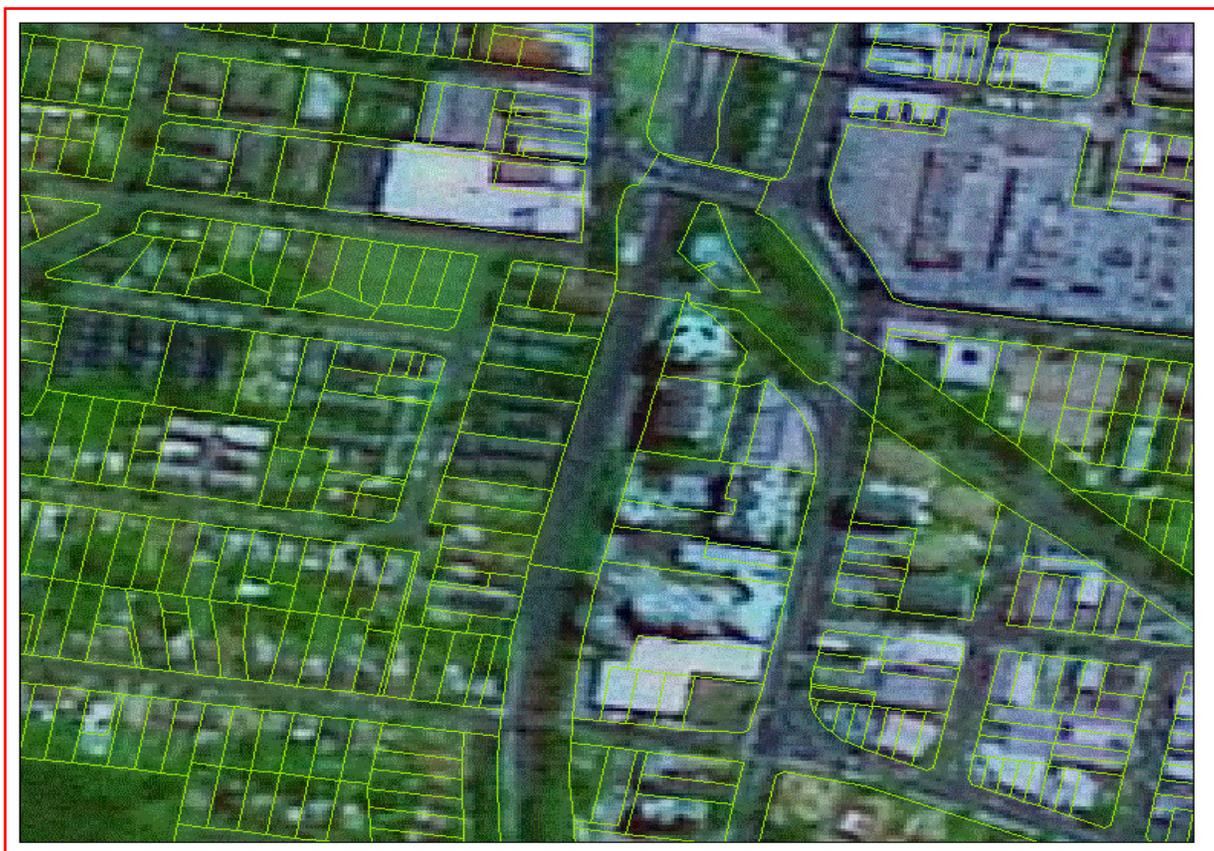
WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 2121, DP:DP1057131 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 164, DP:DP1043781 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 10, DP:DP1135022 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 2, DP:DP228785 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

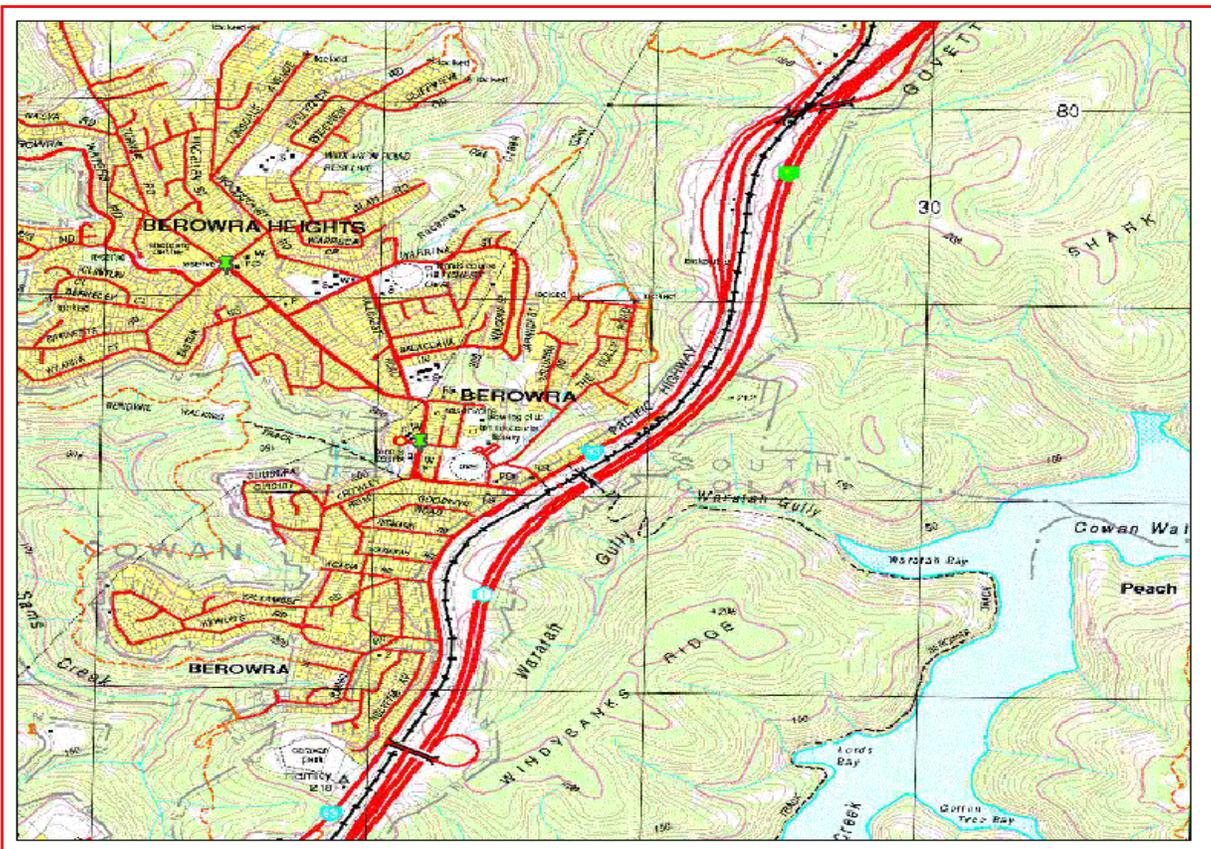
WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 70, DP:DP1204750 with a Buffer of 200 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

<b>8</b>	<b>Aboriginal sites are recorded in or near the above location.</b>
<b>0</b>	<b>Aboriginal places have been declared in or near the above location. *</b>

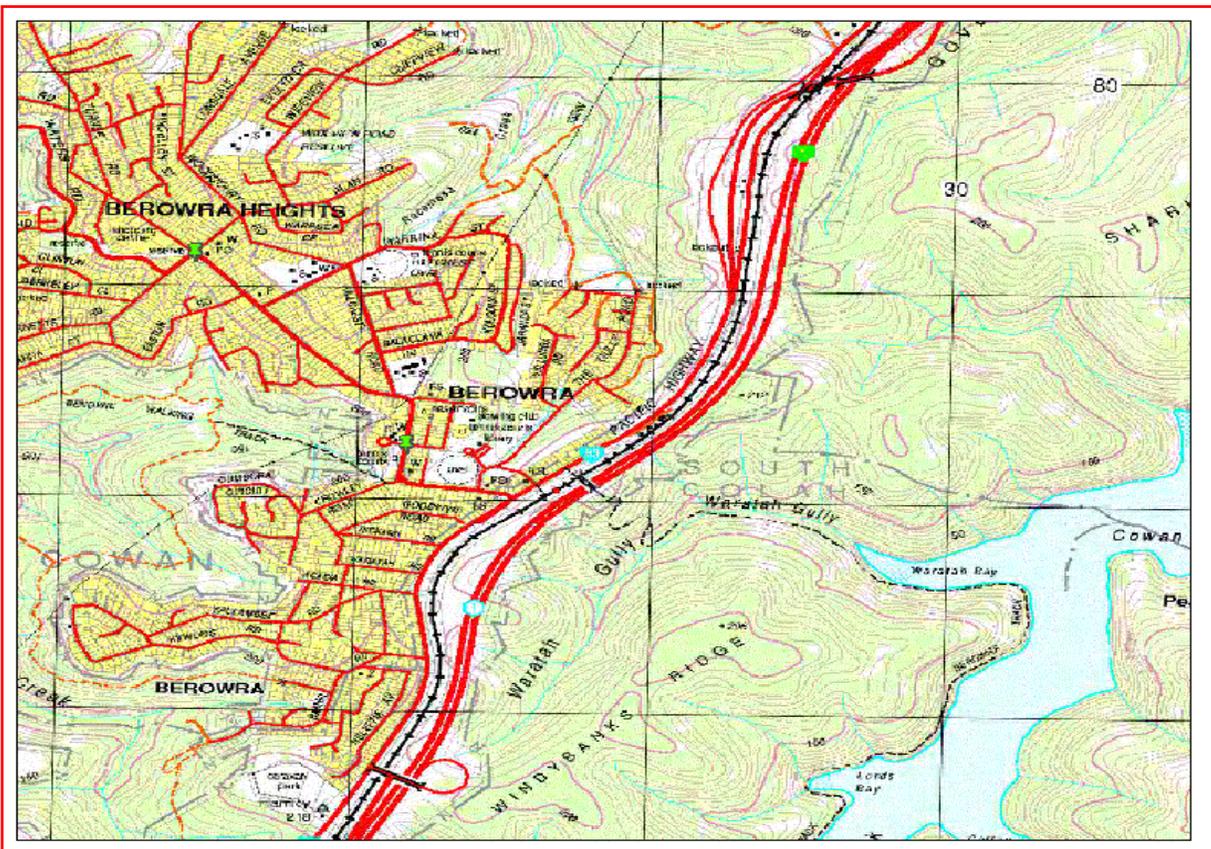
WSP Parsons Brinckerhoff  
Level 27 680 George St  
Sydney New South Wales 2000  
Attention: Morgan Cardiff  
Email: mcardiff@pb.com.au

Date: 27 July 2017

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lot : 70, DP:DP1204750 with a Buffer of 50 meters, conducted by Morgan Cardiff on 27 July 2017.**

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

<b>0</b>	<b>Aboriginal sites are recorded in or near the above location.</b>
<b>0</b>	<b>Aboriginal places have been declared in or near the above location. *</b>

## Appendix 5 – ATP Preliminary environmental risk assessment criteria

Environmental issue	Risk Assessment Category		
	Low	Medium	High
<b>Water Quality and Hydrology</b>	<ul style="list-style-type: none"> <li>Nearest waterway &gt;150m from works</li> </ul>	<ul style="list-style-type: none"> <li>Nearest waterway &gt;25m and ≤150m from works</li> </ul>	<ul style="list-style-type: none"> <li>Nearest waterway ≤25m from works</li> </ul>
	<ul style="list-style-type: none"> <li>Waterway is relatively degraded</li> </ul>	<ul style="list-style-type: none"> <li>Waterway is relatively sensitive</li> </ul>	<ul style="list-style-type: none"> <li>Waterway is highly sensitive and/or specifically protected</li> </ul>
<b>Non-Indigenous Heritage</b>	<ul style="list-style-type: none"> <li>Heritage item/place &gt;100m from works</li> </ul>	<ul style="list-style-type: none"> <li>Works within 100m of a heritage conservation area(s), item(s) of local or state heritage significance, or works within the curtilage of an item listed on a relevant Section 170 Register</li> </ul>	<ul style="list-style-type: none"> <li>Works within curtilage of item(s) on the State heritage register</li> </ul>
	<ul style="list-style-type: none"> <li>Heritage item/place &gt;100m from works</li> </ul>	<ul style="list-style-type: none"> <li>Works within 100m of heritage item /place</li> </ul>	<ul style="list-style-type: none"> <li>Works within curtilage of heritage item/place, or works may affect such a site</li> </ul>
<b>Biodiversity</b>	<ul style="list-style-type: none"> <li>No vegetation removal required</li> </ul>	<ul style="list-style-type: none"> <li>Tree pruning or lopping required</li> <li>Trees/vegetation within 5m of works</li> <li>Works within a bush regeneration area</li> </ul>	<ul style="list-style-type: none"> <li>Removal of trees/vegetation required</li> <li>Excavations likely to affect tree roots</li> </ul>
	<ul style="list-style-type: none"> <li>No threatened species or ecologically sensitive area(s) affected</li> </ul>	<ul style="list-style-type: none"> <li>Threatened species and/or ecologically important area(s) within 150m of works</li> </ul>	<ul style="list-style-type: none"> <li>Threatened species and/or ecologically important area(s) potentially impacted</li> </ul>
	<ul style="list-style-type: none"> <li>Negligible potential to encounter native fauna species</li> </ul>	<ul style="list-style-type: none"> <li>Potential to encounter native fauna species</li> </ul>	<ul style="list-style-type: none"> <li>High potential to encounter native fauna species</li> </ul>
<b>Potential Contamination</b>	<ul style="list-style-type: none"> <li>No contamination sites identified within vicinity of ATP site (EPA search)</li> </ul>	<ul style="list-style-type: none"> <li>Visual evidence of contamination in ballast environmental site survey, however no evidence of hazardous building materials, waste materials or contamination of land uses (EPA search)</li> </ul>	<ul style="list-style-type: none"> <li>Visual evidence of contamination, hazardous building materials and waste within ballast environmental site survey</li> </ul>
	<ul style="list-style-type: none"> <li>No contamination identified in ballast environmental site survey</li> </ul>		<ul style="list-style-type: none"> <li>Surrounding land uses indicate potential contamination (EPA search)</li> </ul>
<b>Noise</b>	<ul style="list-style-type: none"> <li>Sensitive receptors are identified greater than 500m of works</li> </ul>	<ul style="list-style-type: none"> <li>Sensitive receptors are located greater than 50m and less than 500m of works</li> </ul>	<ul style="list-style-type: none"> <li>Sensitive receptors are located equal to or less than 50m of works</li> </ul>

Environmental issue	Risk Assessment Category		
	Low	Medium	High
<b>Land Use</b>	<ul style="list-style-type: none"> <li>National park and/or reserve greater than 100m from works</li> </ul>	<ul style="list-style-type: none"> <li>National park and/or reserve within 100m of works</li> </ul>	<ul style="list-style-type: none"> <li>Works bounded by a national park and/or reserve</li> </ul>
	<ul style="list-style-type: none"> <li>Works unlikely to extend outside the rail corridor</li> </ul>	<ul style="list-style-type: none"> <li>Works may extend outside the rail corridor</li> </ul>	<ul style="list-style-type: none"> <li>Site access through national park and/or reserve</li> </ul>
	<ul style="list-style-type: none"> <li>No disruption to local land uses anticipated</li> </ul>	<ul style="list-style-type: none"> <li>Works could affect the amenity of adjacent land uses (e.g. recreational activities)</li> </ul>	<ul style="list-style-type: none"> <li>Works outside the rail corridor</li> <li>Works affect the amenity of adjacent land uses (e.g. recreational activities)</li> </ul>
<b>Potential ASS</b>	<ul style="list-style-type: none"> <li>No risk of ASS occurring within 4m of natural soil surface</li> </ul>	<ul style="list-style-type: none"> <li>Low risk of ASS occurring within 4m of natural soil surface</li> </ul>	<ul style="list-style-type: none"> <li>High risk of ASS occurring within 4m of natural soil surface</li> </ul>
<b>Traffic and access</b>	<ul style="list-style-type: none"> <li>Works are not considered to have an impact on access or parking for community places or sensitive receptors</li> </ul>	<ul style="list-style-type: none"> <li>Works have the potential to impact on access/parking for community places or sensitive receptors</li> </ul>	<ul style="list-style-type: none"> <li>The rail corridor access gate is located within close proximity to community places or sensitive receptors, the proposed works are considered likely to have an impact on access/parking for community places or sensitive receptors</li> </ul>

## Appendix 2: Conditions of Approval

### CONDITIONS OF APPROVAL

#### Automatic Train Protection Project North Shore, Northern & Western Line – Area 1

Note: these conditions of approval must be read in conjunction with the final mitigation measures in the Automatic Train Protection (ATP) Project - North Shore, Northern & Western Line – Area 1 Review of Environmental Factors.

#### Schedule of acronyms and definitions used:

Acronym	Definition
<i>ATP</i>	<i>Automatic Train Protection</i>
<i>CEMP</i>	<i>Construction Environmental Management Plan</i>
<i>CLP</i>	<i>Community Liaison Plan</i>
<i>CoA</i>	<i>Condition of Approval</i>
<i>ECM</i>	<i>Environmental Controls Map</i>
<i>EIA</i>	<i>Environmental Impact Assessment</i>
<i>EPA</i>	<i>NSW Environment Protection Authority</i>
<i>EP&amp;A Act</i>	<i>Environmental Planning and Assessment Act 1979</i>
<i>EPL</i>	<i>Environment Protection Licence issued by the Environmental Protection Authority under the Protection of the Environment Operations Act 1997.</i>
<i>ISO</i>	<i>International Standards Organisation</i>
<i>OEH</i>	<i>NSW Office of Environment and Heritage</i>
<i>OOHWP</i>	<i>Out of Hours Works Protocol</i>
<i>ADEM</i>	<i>Associate Director Environment Management, TfNSW (or nominated delegate)</i>
<i>REF</i>	<i>Review of Environmental Factors</i>
<i>TfNSW</i>	<i>Transport for NSW</i>

Term	Definition
Construction	<i>Includes all work in respect of the Project, other than survey, acquisitions, fencing, investigative drilling or excavation, building/road dilapidation surveys, or other activities determined by the TfNSW ADEM to have minimal environmental impact such as minor access roads, minor adjustments to services/utilities, establishing temporary construction compounds (in accordance with this approval), or minor clearing (except where threatened species, populations or ecological communities would be affected).</i>
Contamination	<i>The presence in, on or under land of a substance at a concentration above the concentration at which the substance is normally present in, on or under (respectively) land in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment.</i>
Emergency Work	<i>Includes works to avoid loss of life, damage to external property, utilities and infrastructure, prevent immediate harm to the environment, contamination of land or damage to a heritage (indigenous or non-indigenous) item.</i>
Environmental Impact Assessment (EIA)	<i>The documents listed in Condition 1 of this approval.</i>
Environmental Management Representative	<i>An independent environmental representative appointed to the Project (or a delegate) nominated by Transport for NSW.</i>
Feasible	<i>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.</i>
Noise Sensitive Receiver	<i>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, places of worship/religious facilities (e.g. churches), and other noise sensitive receivers identified in the environmental impact assessment.</i>
(the) Project	<i>The construction and operation of the Automatic Train Protection (ATP) Project as described in the environmental impact assessment.</i>
(the) Proponent	<i>A person or body proposing to carry out an activity under Part 5 Division 5.1 of the EP&amp;A Act – in the case of the Project, Transport for NSW.</i>
Reasonable	<i>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.</i>

# Conditions of Approval

## Condition

### General

#### 1. Terms of approval

The Project shall be carried out generally in accordance with the environmental impact assessment (EIA) for this Project, which comprises the following documents:

DOCUMENT	AUTHOR	DATE
Automatic Train Protection (ATP) Project – North Shore, Northern & Western Line – Area 1 Review of Environmental Factors.	WSP	March 2018
Automatic Train Protection (ATP) Project - North Shore, Northern & Western Line – Area 1 Determination Report	TfNSW	March 2018

In the event of an inconsistency between these conditions and the EIA, these conditions will prevail to the extent of the inconsistency.

#### 2. Project modifications

Any modification to the project as approved in the EIA would be subject to further assessment. This assessment would need to demonstrate that any environmental impacts resulting from the modifications have been minimised. The assessment shall be subject to approval under delegated authority by TfNSW. The Proponent shall comply with any additional requirements from the assessment of the project modification.

#### 3. Statutory requirements

These conditions do not relieve the Proponent of the obligation to obtain all other licences, permits, approvals and land owner consents from all relevant authorities and land owners as required under any other legislation for the Project. The Proponent shall comply with the terms and conditions of such licences, permits, approvals and permissions.

## Communications

#### 4. Community liaison plan

The Proponent shall develop and implement a community liaison plan (CLP) to engage with government agencies, relevant councils, landowners, community members and other relevant stakeholders (such as utility and service providers, bus companies and businesses) where required. The CLP shall comply with the obligations of these conditions and should include, but not necessarily be limited to:

- details of the protocols and procedures for disseminating information and liaising with the community and other key stakeholders about construction activities (including timing and staging) and any associated impacts during the construction period
- stakeholder and issues identification and analysis
- procedures for dealing with complaints or disputes and response requirements, including advertising the 24 hour construction response line number
- details (including a program) of training for all employees, contractors and sub-contractors on the requirements of the CLP.

Sub-plans to the CLP will be developed as required. These sub-plans will detail site-specific consultation and communication requirements for construction works that impact residents, other stakeholders and businesses. They will also identify further mitigation measures and processes to reduce construction impacts.

The CLP shall be prepared to the satisfaction of the Director Community Engagement prior to the commencement of construction and implemented, reviewed and revised as appropriate during construction of the Project.

# Conditions of Approval

## Condition

### 5. Community notification and liaison

The local community shall be advised of any activities related to the Project with the potential to impact upon them.

Prior to any site activities commencing and throughout the Project duration, the community is to be notified of works to be undertaken, the estimated hours of construction and details of how further information can be obtained (i.e. contact telephone number/email, website, newsletters etc.) including the 24 hour construction response line number.

Construction-specific impacts including information on traffic changes, access changes, detours, services disruptions, public transport changes, high noise generating work activities and work required outside the nominated working hours shall be advised to the local community at least seven (7) days prior to such works being undertaken or other period as agreed to by the Director Community Engagement or as required by Environment Protection Authority (EPA) (where an environment protection licence (EPL) is in effect).

### 6. Website

The Proponent shall provide electronic information (or details of where hard copies of this information may be accessed by members of the public) related to the Project, on dedicated pages within its existing website, including:

- (a) a list of environmental management reports that are publicly available
- (b) 24 hour contact telephone number for information and complaints.

All documents uploaded to the website must be compliant with the *Web Content Accessibility Guidelines V2.0*.

### 7. Complaints management

The Proponent shall set up a 24 hour construction response line number.

Details of all complaints received during construction are to be recorded on a complaints register. A verbal response to phone enquiries on what action is proposed to be undertaken is to be provided to the complainant within two (2) hours during all times construction is being undertaken and within 24 hours during non-construction times (unless the complainant agrees otherwise). A verbal response to written complaints (email/letter) should be provided within 48 hours of receipt of the communication. A detailed written response is to be provided to the complainant within seven (7) calendar days for verbal and/or written complaints.

Information on all complaints received during the previous 24 hours shall be forwarded to the environmental management representative (EMR) each working day.

## Environmental management

### 8. Construction environmental management plan

The Proponent shall prepare a construction environmental management plan (CEMP) prior to commencement of construction which addresses the following matters, as a minimum:

- (a) traffic and pedestrian management (in consultation with the relevant roads authority)
- (b) noise and vibration management
- (c) water and soil management
- (d) air quality management (including dust suppression)
- (e) indigenous and non-indigenous heritage management
- (f) flora and fauna management
- (g) storage and use of hazardous materials
- (h) contaminated land management (including acid sulphate soils)
- (i) weed management

## Conditions of Approval

### Condition

- (j) waste management
- (k) sustainability
- (l) environmental incident reporting and management procedures
- (m) non-compliance and corrective/preventative action procedures

The CEMP shall:

- i. comply with the Conditions of Approval, conditions of any licences, permits or other approvals issued by government authorities for the Project, all relevant legislation and regulations, and accepted best practice management
- ii. comply with the relevant requirements of *Guideline for Preparation of Environmental Management Plans* (Department Infrastructure, Planning and Natural Resources, 2004)
- iii. include an Environmental Policy.

The Proponent shall:

1. consult with government agencies and relevant service/utility providers as part of the preparation of the CEMP
2. submit a copy of the CEMP to the ADEM for approval at least 21 days prior to the commencement of construction (or within such time as otherwise agreed to by the ADEM)
3. review and update the CEMP at regular intervals, and in response to any actions identified as part of Project audits
4. ensure updates to the CEMP are made within seven days of the completion of the review or receipt of actions identified by any audit of the document, and be submitted to the ADEM for approval

The CEMP must be approved by the ADEM prior to the commencement of construction work associated with the Project.

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### 9. Environmental management representative

Not Used

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### 10. Environmental controls map

A site specific environmental controls map(s) (ECM) shall be prepared in accordance with TfNSW's *Guide to Environmental Controls Map* (3TP-SD-015) prior to the commencement of construction for implementation for the duration of construction, and may be prepared in stages as set out in the CEMP.

A copy of the ECMs must be submitted to the ADEM for approval, at least 14 days prior to commencement of construction of the Project (or within such time as otherwise agreed by the ADEM).

The ECM shall be prepared as a map – suitably enlarged (e.g. A3 size or larger) for mounting on the wall of a site office and included in site inductions, supported by relevant written information.

Updates to the ECM shall be made within seven days of the completion of the review or receipt of actions identified by any audit of the document, and submitted to the ADEM for approval.

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# Conditions of Approval

## Condition

### Hours of work

#### 11. Standard construction hours

Construction activities shall be restricted to the hours of 7:00 am to 6:00 pm (Monday to Friday); 8:00 am to 1:00 pm (Saturday) and at no time on Sundays and public holidays except for the following works which are permitted outside these standard hours:

- (a) any works which do not cause noise emissions to be more than 5dBA higher than the rating background level at any nearby residential property and/or other noise sensitive receivers
- (b) out of hours work identified and assessed in the EIA or the approved out of hours work protocol (OOHWP)
- (c) the delivery of plant, equipment and materials which is required outside these hours as requested by police or other authorities for safety reasons and with suitable notification to the community as agreed by the ADEM
- (d) emergency work to avoid the loss of lives, property and/or to prevent environmental harm
- (e) any other work as agreed by the ADEM (or nominated delegate) and considered essential to the Project, or as approved by EPA (where an EPL is in effect).

#### 12. High noise generating activities

Rock breaking or hammering, jack hammering, pile driving, vibratory rolling, cutting of pavement, concrete or steel and any other activities which result in impulsive or tonal noise generation shall not be undertaken for more than 3 hours, without a minimum 1 hour respite period unless otherwise agreed to by the ADEM (or nominated delegate), or as approved by EPA (where relevant to the issuing of an EPL), unless inaudible at nearby residential properties and/or other noise sensitive receivers.

### Noise and vibration

#### 13. Construction noise and vibration

Construction noise and vibration mitigation measures shall be implemented through the CEMP, in accordance with TfNSW's *Construction Noise Strategy* and the EPA *Interim Construction Noise Guideline* (July 2009). The mitigation measures shall include, but not necessarily be limited to:

- (a) details of construction activities and an indicative schedule for construction works
- (b) identification of construction activities that have the potential to generate noise and/or vibration impacts on surrounding land uses, particularly sensitive noise receivers
- (c) detail what reasonable and feasible actions and measures shall be implemented to minimise noise impacts (including those identified in the environmental impact assessment)
- (d) procedures for notifying sensitive receivers of construction activities that are likely to affect their noise and vibration amenity, as well as procedures for dealing with and responding to noise complaints
- (e) an out of hours work protocol (OOHWP) for the assessment, management and approval of works outside the standard construction hours identified in Condition 11 of this approval, including a risk assessment process which deems the out of hours activities to be of low, medium or high environmental risk, is to be developed. All out of hours works are subject to approval by the EMR and/or ADEM (or nominated delegate) or as approved by EPA (where relevant to the issuing of an EPL). The OOHWP should be consistent with the TfNSW *Construction Noise Strategy*
- (f) a description of how the effectiveness of actions and measures shall be monitored during the proposed works, identification of the frequency of monitoring, the locations at which monitoring shall take place, recording and reporting of monitoring results and if any exceedance is detected, the manner in which any non-compliance shall be rectified.

## Conditions of Approval

### Condition

#### 14. Vibration criteria

Vibration (other than from blasting) resulting from construction and received at any structure outside of the Project shall be limited to:

- (a) for structural damage vibration - German Standard DIN 4150:Part 3 – 1999: *Structural Vibration in Buildings: Effects on Structures*
- (b) for human exposure to vibration – the acceptable vibration values set out in the *Environmental Noise Management Assessing Vibration: A Technical Guideline* (DEC 2006).

These limits apply unless otherwise approved by the ADEM through the CEMP.

#### 15. Non-tonal reversing beepers

Non-tonal reversing beepers (or an equivalent mechanism) shall be fitted and used on all construction vehicles and mobile plant regularly used on site (i.e. greater than one day) and for any out of hours work.

### Contamination and hazardous materials

#### 16. Unidentified contamination (other than asbestos)

If previously unidentified contamination (excluding asbestos) is discovered during construction, work in the affected area must cease immediately, and an investigation must be undertaken and report prepared to determine the nature, extent and degree of any contamination. The level of reporting must be appropriate for the identified contamination in accordance with relevant EPA guidelines, including the *Guidelines for Consultants Reporting on Contaminated Sites* (OEH, 2011).

A copy of any contamination report must be submitted to the ADEM for review for a minimum period of seven days. The ADEM shall determine whether consultation with the relevant council and/or EPA is required prior to continuation of construction works within the affected area.

**Note:** *In circumstances where both previously unidentified asbestos contamination and other contamination are discovered within a common area, nothing in these conditions shall prevent the preparation of a single investigation report to satisfy the requirements of both Condition 16 and Condition 17.*

#### 17. Asbestos management

If previously unidentified asbestos contamination is discovered during construction, work in the affected area must cease immediately, and an investigation must be undertaken and report prepared to determine the nature, extent and degree of the asbestos contamination. The level of reporting must be appropriate for the identified contamination in accordance with relevant EPA and WorkCover guidelines and include the proposed methodology for the remediation of the asbestos contamination. Remediation activities must not take place until receipt of the investigation report.

Works may only recommence upon receipt of a validation report from a suitably qualified contamination specialist that the remediation activities have been undertaken in accordance with the investigation report and remediation methodology.

**Note:** *In circumstances where both previously unidentified asbestos contamination and other contamination are discovered within a common area, nothing in these conditions shall prevent the preparation of a single investigation report to satisfy the requirements of both Condition 16 and Condition 17.*

## Conditions of Approval

### Condition

#### 18. Storage and use of hazardous materials

Construction hazard and risk issues associated with the use and storage of hazardous materials shall be addressed through risk management measures, which shall be developed by the construction contractor prior to construction as part of the overall CEMP, in accordance with relevant EPA guidelines, TfNSW *Chemical Storage and Spill Response Guideline* and Australian and ISO standards. These measures shall include:

- (a) the storage of hazardous materials, and refuelling/maintenance of construction plant and equipment to be undertaken in clearly marked designated areas that are designed to contain spills and leaks
- (b) spill kits, appropriate for the type and volume of hazardous materials stored or in use, to be readily available and accessible to construction workers. Kits to be kept at hazardous materials storage locations, in site compounds and on specific construction vehicles. Where a spill to a watercourse is identified as a risk, spill kits to be kept in close proximity to potential discharge points in support of preventative controls
- (c) all hazardous materials spills and leaks to be reported to site managers and actions to be immediately taken to remedy spills and leaks
- (d) training in the use of spill kits to be given to all personnel involved in the storage, distribution or use of hazardous materials.

### Erosion and sediment control

#### 19. Erosion and sediment control

Soil and water management measures shall be prepared as part of the CEMP for the mitigation of water quality impacts during construction of the Project. The management measures shall be prepared in accordance with *Managing Urban Stormwater; Soils and Construction 4<sup>th</sup> Edition* (Landcom, 2004).

### Heritage management

#### 20. Indigenous and non-Indigenous heritage

If previously unidentified Indigenous or non-Indigenous heritage/archaeological items are uncovered during construction works, the procedures contained in the TfNSW *Unexpected Heritage Finds Guideline* (3TP-SD-115) shall be followed, and all works in the vicinity of the find shall cease and appropriate advice shall be sought from a suitably qualified heritage consultant (and in consultation with the OEH Heritage Branch where appropriate). Works in the vicinity of the find shall not re-commence until clearance has been received from the heritage consultant.

### Flora and Fauna

#### 21. Removal of Trees or Vegetation

Separate approval, in accordance with TfNSW's *Removal or Trimming of Vegetation Application* (9TP-FT-078), is required for the trimming, cutting, pruning or removal of trees or vegetation where the impact has not already been identified in the EIA for the Project. The trimming, cutting, pruning or removal of trees or vegetation shall be undertaken in accordance with the conditions of that approval.

#### 22. Replanting program

All cleared vegetation shall be offset in accordance with *TfNSW's Vegetation Offset Guide* (9TP-ST-149). All vegetation planted on-site is to consist of locally endemic native species, unless otherwise agreed by the ADEM, following consultation with the relevant council, where relevant, and/or the owner of the land upon which the vegetation is to be planted.

### END OF CONDITIONS

# Appendix 3: Environmental Impact Assessment

## Automatic Train Protection (ATP) Project – North Shore, Northern and Western Line – Area 1

### REVIEW OF ENVIRONMENTAL FACTORS AND DETERMINATION REPORT

#### APPROVAL

I, Ben Groth as delegate of the Secretary, Transport for NSW:

1. Have examined and considered the Proposed Activity in the *Automatic Train Protection (ATP) Project North Shore, Northern and Western Line – Area 1 Review of Environmental Factors* (March 2018) and *ATP North Shore, Northern and Western Line – Area 1 Project Determination Report* (March 2018) in accordance with the provisions of section 5.5 of the *Environmental Planning and Assessment Act 1979*.
2. Determine on behalf of Transport for NSW (the Proponent) that the Proposed Activity may be carried out in accordance with the Conditions of Approval in this Determination Report, consistent with the proposal described in the *ATP North Shore, Northern and Western Line – Area 1 Review of Environmental Factors* (March 2018) as amended by this Determination Report.



Ben Groth

Associate Director, Environmental Impact Assessment  
Planning and Environment Services  
Integrated Planning, Infrastructure and Services  
Transport for NSW

Date: 12/3/18

# MEMO

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**TO:** Ben Groth  
**FROM:** Lisa Montesin  
**DATE:** 12 March 2018  
**CC:** Geoff Webb, Peter Jones, Kee Foo, Stepanka Halik, Glenn Spark  
**SUBJECT:** **Recommendation to Determine  
Automatic Train Protection (ATP) Project – North Shore,  
Northern & Western Line – Area 1**

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**Issue:**

To determine the Automatic Train Protection (ATP) Project for the North Shore, Northern & Western Line – Area 1 (the Proposed Activity), as assessed in the Review of Environmental Factors (REF) prepared by Aurecon.

**Background:**

Transport for NSW is the proponent for the Proposed Activity. An environmental impact assessment has been carried out for the Project in accordance with the provisions of the *Environmental Planning and Assessment Act 1979* and the *Environmental Planning and Assessment Regulation 2000*.

Internal approval to the final reports, the mitigation measures and conditions has been obtained from the relevant directorates.

**Community feedback:**

The works being undertaken as part of the proposal are based on safety and rail system requirements. For this reason, there is limited opportunity for any community feedback into project deliverables. As such, the REF for the ATP North Shore, Northern & Western Line – Area 1 has not been placed on public display.

**Current Position:**

The Proposed Activity is ready to be approved, subject to mitigation measures contained in the REF (March 2018) and Conditions of Approval (attached)

**Recommendation:**

It is recommended that TfNSW determine to approve the Proposed Activity in accordance with the provisions of the *Environmental Planning and Assessment Act 1979* by signing the Approval in the attached Determination Report.



Lisa Montesin  
**Environment and Planning Manager**



Transport  
for NSW

# MEMO

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**TO:** Geoff Webb  
**FROM:** Ben Groth  
**DATE:** 12 March 2018  
**CC:** Lisa Montesin, Peter Jones, Jeremy Pereira  
**SUBJECT:** **Decision to Proceed**  
**Automatic Train Protection (ATP) Project – North Shore,**  
**Northern and Western Line – Area 1**

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**Issue:**

Decision to proceed with the ATP North Shore, Northern and Western Line – Area 1 (the Proposed Activity), as determined herein and assessed by the Review of Environmental Factors (REF) prepared by Aurecon (March 2018) and the Conditions of Approval prepared by Transport for NSW (March 2018)

**Background:**

The Proposed Activity is now approved, subject to mitigation measures contained in the REF and Conditions of Approval.

**Recommendation:**

It is agreed that the Decision to Proceed with the construction of the Proposed Activity may now be commenced, consistent with the proposal described in the REF and the Conditions of Approval.

A handwritten signature in blue ink, appearing to be 'B Groth'.

Ben Groth  
**Associate Director**  
**Environmental Impact Assessment**

Date: 12/3/18

A handwritten signature in blue ink, appearing to be 'Geoff Webb'.

Geoff Webb  
**Project Director**  
**Automatic Train Protection**

Date: 14/03/18