



Transport Access Program

Wahroonga Station Upgrade

Supporting Studies



Artist's Impression of the proposed Wahroonga Station Upgrade, subject to change during detailed design.

REPORT

Document status

| Version | Purpose of document | Authored by | Reviewed by | Approved by | Review date |
|---------|---------------------|-------------|-------------|-------------|-------------|
| 0.1 | Draft SOHI | V. Norman | G. Wright | G. Wright | 11.10.2019 |
| 0.2 | Draft SOHI | V. Norman | G. Wright | G. Wright | 17.10.2019 |
| 0.3 | Draft SOHI | V. Norman | G. Wright | G. Wright | 11.11.2019 |
| 0.4 | Final SOHI | V. Norman | G. Wright | G. Wright | 18.11.2019 |

Approval for issue

G. Wright



18 November 2019

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EXECUTIVE SUMMARY

Transport for NSW (TfNSW) commissioned RPS to prepare a Review of Environmental Factors (REF) for the proposed Wahroonga Station Upgrade (the Proposal) as part of the Transport Access Program (TAP). This Statement of Heritage Impact (SOHI) assesses the impact of the Proposal to the significance of Wahroonga Station, which is included on the State Heritage Register (SHR) and RailCorp Section 170 Heritage and Conservation Register. It is also identified as an item of State significance on the *Ku-ring-gai Local Environmental Plan (LEP) 2015*. This SOHI also recommends measures to avoid or minimise impact, and the approval required under the *NSW Heritage Act 1977*.

The SHR statement of significance for the 'Wahroonga Railway Station Group' is:

Wahroonga station is one of the best island platform buildings on the north shore line. As a group they provide a consistent style of high significance as all are in excellent condition, and display a unity of development rarely seen on the railway system. They are also of interest as they are all island platform structures except for the terminus points such as Lindfield and Gordon where an additional platform is provided. This station contributes an important part as a major transport outlet for residents.

It is sited in a garden setting which was typical of many stations throughout the State and many of which now have largely been removed. This gives the site added significance (OEH 2019a)

Wahroonga Station (the Proposal Area) is located in the suburb of Wahroonga in the Ku-ring-gai Local Government Area (LGA) about 20 kilometres north of the Sydney Central Business District (CBD). The Proposal Area also includes ancillary areas including proposed construction compounds, temporary laydown and storage areas (during rail shutdowns) and crane set-up locations. It also includes a temporary hi-rail pad.

This SOHI is limited to an assessment of non-Aboriginal heritage. No assessment of Aboriginal heritage is included in this report. This SOHI assesses the concept plan for the Proposal and includes an assessment of archaeological potential for Wahroonga Station (within the SHR curtilage) and the proposed Scouts Hall construction compound.

The Wahroonga Station Upgrade forms part of the TAP, which is an initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure. The Proposal would ensure that Wahroonga Station is accessible to all customers, and portions of the Proposal respect or enhance the heritage significance of Wahroonga Station. This would ensure the continued use of the station as a railway station into the future whilst retaining the State significant elements of the station.

Throughout design development, potential adverse impacts to the significance and fabric of the station have been avoided or minimised. There are no archaeological impacts associated with the Proposal. The Proposal includes additions to the station and minor alterations and the removal of existing elements from Wahroonga Station Railway Group. Direct impacts to elements of the Wahroonga Railway Station Group range from nil to major adverse.

Based on the conclusions of the SOHI, it is recommended:

Recommendation 1: Section 60 application

It is recommended that a Section 60 application is submitted to the Heritage Council of NSW. No work associated with the Proposal should proceed without approval under the *NSW Heritage Act 1977*.

Recommendation 2: Canopies

The detailed design for the proposed canopies including an additional platform canopy for weather protection for the Platform 1 boarding assistance zone (north of the station building) and station entrance canopy, should be developed in consideration of the Sydney Trains *Canopies and Shelters Design Guide for Heritage Stations* (2016). In particular:

New design should enhance the setting and significance of a place. In rare cases, where the station has a significant overall character that has been preserved through time, it may be justifiable to design the new structures as reproductions of the existing ones. In most cases, the appropriate response will be a modern structure with design qualities that are sensitive to the original.

The proposed canopies should aim to reduce impact to significant fabric and the visual impact of the Proposal through recessive materials and sympathetic design. Detailed design should be developed in consultation with a heritage architect, with attention to the location of attachments to significant fabric and the construction methods. Measures should be put in place to protect significant fabric from accidental impact during the construction and installation of the canopies.

Recommendation 3: Protecting significant fabric

To avoid impact to significant fabric during the construction of the Proposal, it is recommended that:

- a. fabric retained from the demolition of the brick parapet should be reused for construction or interpretation where possible
- b. fabric retained from the demolition of the stair trestle should be reused for construction or interpretation where possible
- c. where possible, impacts to landscaping must be limited
- d. protective measures, as determined in consultation with a suitably qualified specialist, must be put in place to protect significant fabric on the platform during the proposed regrading, trenching and construction. The platform surface should be reinstated on completion
- e. protective measures must be put in place to protect significant fabric of the station building. Care must be taken when installing fixtures and fittings to the exterior of the building. This includes the toilet windows and shutters during construction of the new toilets.

Recommendation 4: The addition of station components

The addition of components such as seating, lighting and signage must be consistent with the Sydney Trains and NSW TrainLink *Station Component Guide* (2017) and with the existing seating, lighting and signage at the station.

Recommendation 5: Installation of services

New services should be installed in accordance with the Sydney Trains *Heritage Technical Note: Installation of New Electrical and Data Services at Heritage Sites* (2017). The exact location of services is not yet confirmed. Installation of services should be planned in consultation with an appropriate specialist such as a heritage architect or archaeologist and aim to reduce impact to significant fabric and visual impact. Where possible, services should be installed within established conduits to reduce cumulative impact to significant fabric.

Recommendation 6: Archival record

It is recommended that a photographic archival record of Wahroonga Station is prepared prior to, and at the completion of, construction in accordance with the NSW Heritage Office (former) publication *How to prepare archival records of heritage items* and *Photographic Recording of Heritage Items using Film or Digital Capture*. The photographic archival record should document the condition of Wahroonga Station prior to, and after, the Proposal, the internal configuration of the station building and the setting including the bridge.

Copies of the archival record should be deposited with Heritage NSW Department of Premier and Cabinet (DPC), Sydney Trains Heritage and the local library.

Recommendation 7: Heritage interpretation and public art installations

It is recommended that a heritage interpretation plan for the station is developed and implemented in accordance with the NSW Heritage Office guideline *Interpreting Heritage Places and Items* (2005). The Sydney Trains Draft *Heritage Interpretation Guideline* (July 2018) should also be considered in consultation with Sydney Trains Heritage during preparation and implementation of the heritage interpretation plan.

Recommendation 8: Unexpected archaeological resources

It is unlikely that any archaeological resources would be encountered during construction. However, if unexpected archaeological resources are encountered during construction the TfNSW *Unexpected Heritage Finds Procedure* (2016) must be implemented.

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| Abbreviation | Definition |
|----------------|--|
| CHL | Commonwealth Heritage List |
| CMP | Conservation Management Plan |
| DDA | <i>Disability Discrimination Act 1992 (Commonwealth)</i> |
| DPC | Department of Premier and Cabinet |
| DSAPT | <i>Disability Standards for Accessible Public Transport</i> |
| DUAP | Department of Urban Affairs and Planning (former) |
| EP&A Act | <i>Environment Planning and Assessment Act 1979</i> |
| EPBC Act | <i>Environment Protection and Biodiversity Conservation Act 1999</i> |
| HCA | Heritage Conservation Area |
| ICOMOS | International Council on Monuments and Sites |
| IHO | Interim Heritage Order |
| <i>In situ</i> | Latin, meaning “on site” or “in place” |
| ISCA | Infrastructure Sustainability Council of Australia |
| LEP | Local Environmental Plan |
| LGA | Local Government Area |
| NHL | National Heritage List |
| NLA | National Library of Australia |
| OEH | Office of Environment and Heritage (former) |
| REF | Review of Environmental Factors |
| RNE | Register of the National Estate |
| SHR | State Heritage Register |
| SLNSW | State Library of New South Wales |
| SOHI | Statement of Heritage Impact |
| TAP | Transport Access Program |
| TfNSW | Transport for NSW |
| TGSI | Tactile Ground Surface Indicators |
| UNESCO | United Nations Educational, Scientific and Cultural Organisation |
| WHL | World Heritage List |

1 INTRODUCTION

Transport for NSW (TfNSW) commissioned RPS to prepare a Review of Environmental Factors (REF) for the proposed Wahroonga Station Upgrade (the Proposal) as part of the Transport Access Program (TAP). This Statement of Heritage Impact (SOHI) assesses the impact of the Proposal to the significance of Wahroonga Station, which is included on the State Heritage Register (SHR) and RailCorp Section 170 Heritage and Conservation Register. It is also identified as an item of State significance on the *Ku-ring-gai Local Environmental Plan (LEP) 2015*. This SOHI also recommends measures to avoid or minimise impact, and the approval required under the *NSW Heritage Act 1977*.

1.1 Proposal Area

Wahroonga Station (the Proposal Area) is located in the suburb of Wahroonga in the Ku-ring-gai Local Government Area (LGA) about 20 kilometres north of the Sydney Central Business District (CBD). The Proposal Area also includes the lay down and compound areas within and directly adjacent to the SHR curtilage. The location of the station is shown in Figure 1.1. Compound areas located within and directly adjacent the Proposal Area are shown in Figure 1.2. Additional ancillary locations associated with the Proposal are included in Appendix A.

Wahroonga Station consists of a single island platform and is serviced by the T1 North Shore Line. It is bound by Millewa Avenue to the north and Railway Avenue to the south, with Illoura Avenue / Redleaf Avenue bridge crossing the rail corridor and providing pedestrian access to the station to the east. The Proposal includes work to Wahroonga Station on land owned by RailCorp and managed by Sydney Trains within the station precinct, with work also proposed along the station entrances, which are managed by Ku-ring-gai Council.

1.2 Proposal background

The Wahroonga Station Upgrade forms part of the TAP, which is an initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure. Wahroonga Station has been identified for an accessibility upgrade as it does not meet key requirements of the *Disability Standards for Accessible Public Transport (DSAPT)* or the *Commonwealth Disability Discrimination Act 1992 (DDA)*. The non-compliant access points and stairs to the platform do not facilitate access for people with reduced mobility, parents and carers with prams or customers with luggage. There are no lift facilities and inadequate tactile surfacing to stairs, platforms and interchange facilities.

Separately, Sydney Trains as part of the operator and maintainer responsibilities, had undertaken investigations into the Redleaf Avenue bridge including commissioning a condition assessment report due to the uncertainty of the structural capacity of the bridge and the superstructure elements, drainage and waterproofing of the road deck.

As a result of these investigations, which indicated several issues related to the bridge's condition and longevity, Sydney Trains developed early designs for the refurbishment of the Redleaf Avenue bridge and replacement of the pedestrian walkway structure with a new footbridge, along with repairs to the concrete arch superstructure. The investigations indicated issues related to corrosion of supporting beams and crack/splits in concrete which are not able to be repaired and need to be replaced in the short to mid-term.

TfNSW, in consultation with Sydney Trains, identified an opportunity to incorporate the bridge refurbishment as part of the Wahroonga Station Upgrade scope.

1.3 Key features

The key features of the Proposal are summarised as follows:

- refurbishment of the Redleaf Avenue bridge and replacement of the pedestrian walkway structure with a new footbridge
- a new passenger lift and station entrance to provide access from the Redleaf Avenue bridge to the island platform

- a new walkway at platform level linking the lift to the platform
- a new accessible ramp and pathway to provide access from the station to Wahroonga shopping village
- a proposed interchange zone in Railway Avenue, to provide an accessible parking space, and a zone for taxis and kiss and ride
- a new family accessible toilet and unisex ambulant toilet within the station building
- an additional platform canopy for weather protection on the platform at the boarding assistance zone (north of the station building)
- improvements to station lighting and CCTV to increase safety and security
- improvements to customer information and communication systems, including wayfinding modifications, public address (PA) system upgrade, and new hearing induction loops.

Subject to planning approval, construction is expected to commence in 2020 and take around 24 months to complete.

1.4 Purpose of this report and approach

The purpose of this SOHI is to assess the impact of the Proposal on the significance of Wahroonga Station. This SOHI assesses the impact of the concept plan for the Wahroonga Station Upgrade. The drawings referenced in this SOHI include the *Wahroonga Station Easy Access Upgrade Transport Access Program – Package 2A Architectural*, by Design Inc, dated 25 September 2019. The full list of architectural drawings is included in Table 1.1.

Table 1.1: Architectural drawing list

| Drawing number | Drawing title | Revision number and date |
|------------------------------------|---------------------------------|--------------------------|
| 100 - GENERAL SERIES | | |
| 150270-WAH-AR-DRG-34100 | COVER SHEET & DRAWING LIST | #8 25.09.19 |
| 150270-WAH-AR-DRG-34101 | PROPOSED SITE PLAN | #9 04.10.19 |
| 150270-WAH-AR-DRG-34102 | GRID SETOUT PLAN | #8 25.09.19 |
| 150270-WAH-AR-DRG-34103 | EXISTING & DEMOLITION PLAN | #8 25.09.19 |
| 150270-WAH-AR-DRG-34104 | REDLEAF AVENUE & FOOTBRIDGE | #8 25.09.19 |
| 150270-WAH-AR-DRG-34105 | STATION HERITAGE CURTILAGE PLAN | #3 25.09.19 |
| 150270-WAH-AR-DRG-34106 | PHOTOS | #3 25.09.19 |
| 110 - PLAN SERIES | | |
| 150270-WAH-AR-DRG-34110 | PLATFORM LEVEL SHEET 1 | #9 04.10.19 |
| 150270-WAH-AR-DRG-34111 | PLATFORM LEVEL SHEET 2 | #9 04.10.19 |
| 150270-WAH-AR-DRG-34112 | PLATFORM LEVEL SHEET 3 | #9 04.10.19 |
| 150270-WAH-AR-DRG-34113 | CONCOURSE LEVEL PLAN SHEET 1 | #8 25.09.19 |
| 150270-WAH-AR-DRG-34114 | CONCOURSE LEVEL PLAN SHEET 2 | #8 25.09.19 |
| 120 - ELEVATIONS & SECTIONS SERIES | | |
| 150270-WAH-AR-DRG-34120 | NORTH & SOUTH ELEVATION | #8 25.09.19 |
| 150270-WAH-AR-DRG-34125 | SECTIONS | #8 25.09.19 |
| 140 - STAIR DETAILS | | |
| 150270-WAH-AR-DRG-34140 | BAZ PLATFORM | #8 25.09.19 |
| 150270-WAH-AR-DRG-34141 | BAZ PLATFORM | #8 25.09.19 |

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| 150270-WAH-AR-DRG-34142 | CONCOURSE&FOOTBRIDGE DETAIL | #2 25.09.19 |
| 150 - LIFTS - DETAILS SERIES | | |
| 150270-WAH-AR-DRG-34150 | LIFT | #8 25.09.19 |
| 150270-WAH-AR-DRG-34152 | LIFT | #8 25.09.19 |
| 170 - PLATFORM BUILDING - LAYOUT SERIES | | |
| 150270-WAH-AR-DRG-34170 | PLATFORM BUILDING PLAN | #8 25.09.19 |
| 150270-WAH-AR-DRG-34173 | UNISEX AMBULANT TOILET | #2 25.09.19 |
| 150270-WAH-AR-DRG-34171 | PLATFORM BUILDING | #6 04.10.19 |
| 150270-WAH-AR-DRG-34172 | PLATFORM BUILDING | #9 04.10.19 |
| 190 - 3D MASSING SERIES | | |
| 150270-WAH-AR-DRG-34190 | PERSPECTIVE 1 | #6 04.10.19 |
| 150270-WAH-AR-DRG-34191 | PERSPECTIVE 2 | #5 25.09.19 |
| LANDSCAPE | | |
| 150270-WAH- AR-DRG-34101 | LANDSCAPE PLAN | #6 25.09.19 |

This SOHI has been prepared in accordance with the NSW *Heritage Act 1977* and the *Environmental Planning and Assessment Act 1979*, with reference to *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance* (2013) and associated Practice Notes and Heritage, Department of Premier and Cabinet best practice including *Assessing heritage significance* (Heritage Office 2001) and *Statements of Heritage Impact* (Heritage Office and Department of Urban Affairs and Planning (former) 2002).

This SOHI included an inspection of Wahroonga Station on 17 September 2019. This included an inspection of all proposed areas of work including the station entrance at Redleaf Avenue, platform, station building (interior and exterior) and associated ancillary work areas where viewable from the station or street.

1.5 Limitations

This SOHI is limited to an assessment of non-Aboriginal heritage. No assessment of Aboriginal heritage is included in this report.

This SOHI assesses the concept plan for the Proposal as defined in the drawings identified in Table 1.1. It includes an assessment of archaeological potential for Wahroonga Station (within the SHR curtilage) and the proposed Scouts Hall compound. It is assumed that no subsurface ground disturbance is required at additional proposed construction compounds, crane set-up locations, laydown and storage areas and in relation to the permanent hi-rail pad. If ground disturbance is required, further assessment in relation to archaeological potential is recommended. The inspection was limited to the station including the platform and station building (interior and exterior) and the station entrance. The ancillary work areas were viewed from accessible areas as appropriate.

The statutory context of this SOHI excluded a review of the non-statutory Register of the National Estate.

1.6 Authorship

RPS Heritage Consultant Veronica Norman prepared this SOHI with input from RPS Senior Heritage Consultant Georgia Wright. RPS Senior Heritage Consultant Georgia Wright reviewed this SOHI.

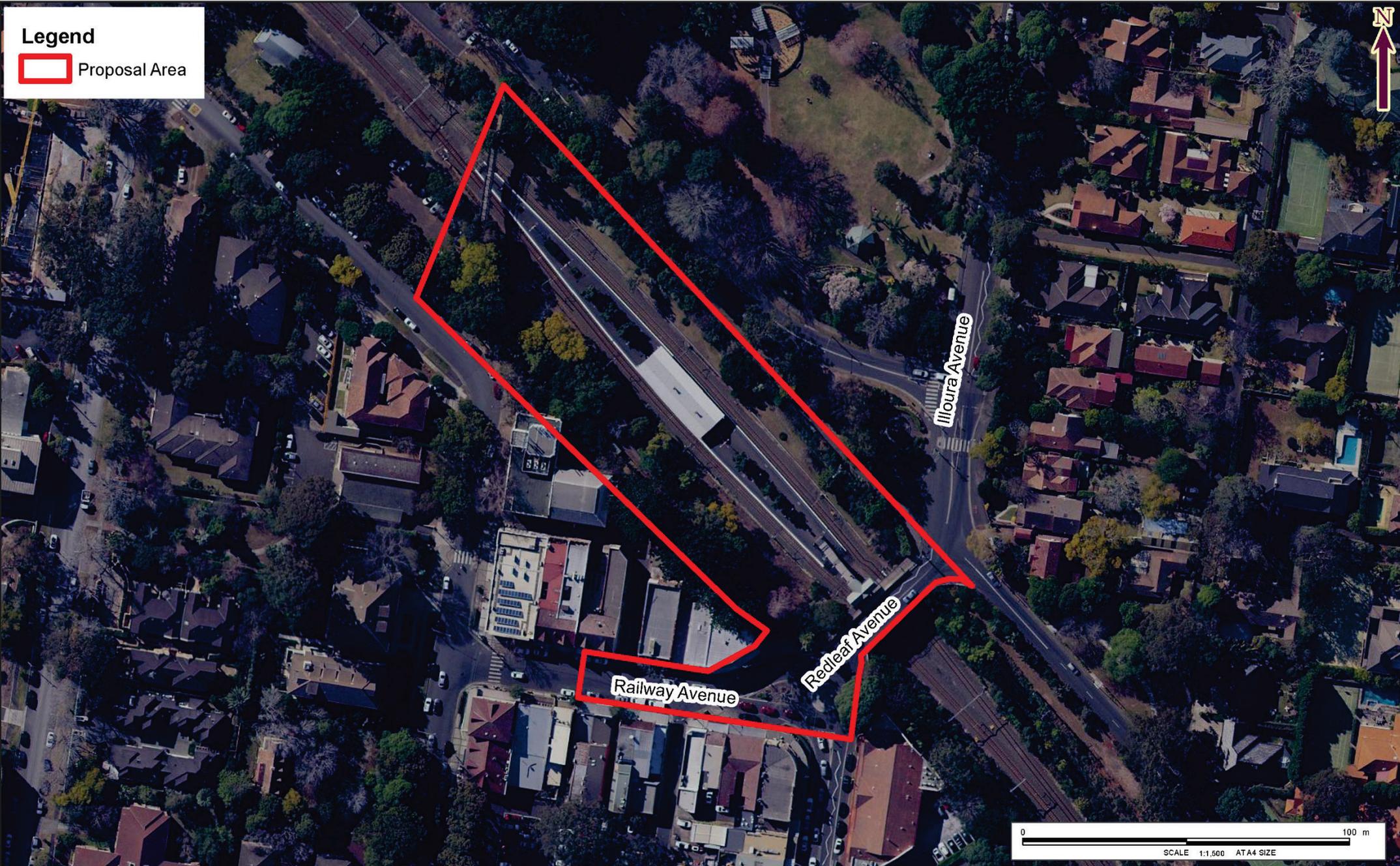


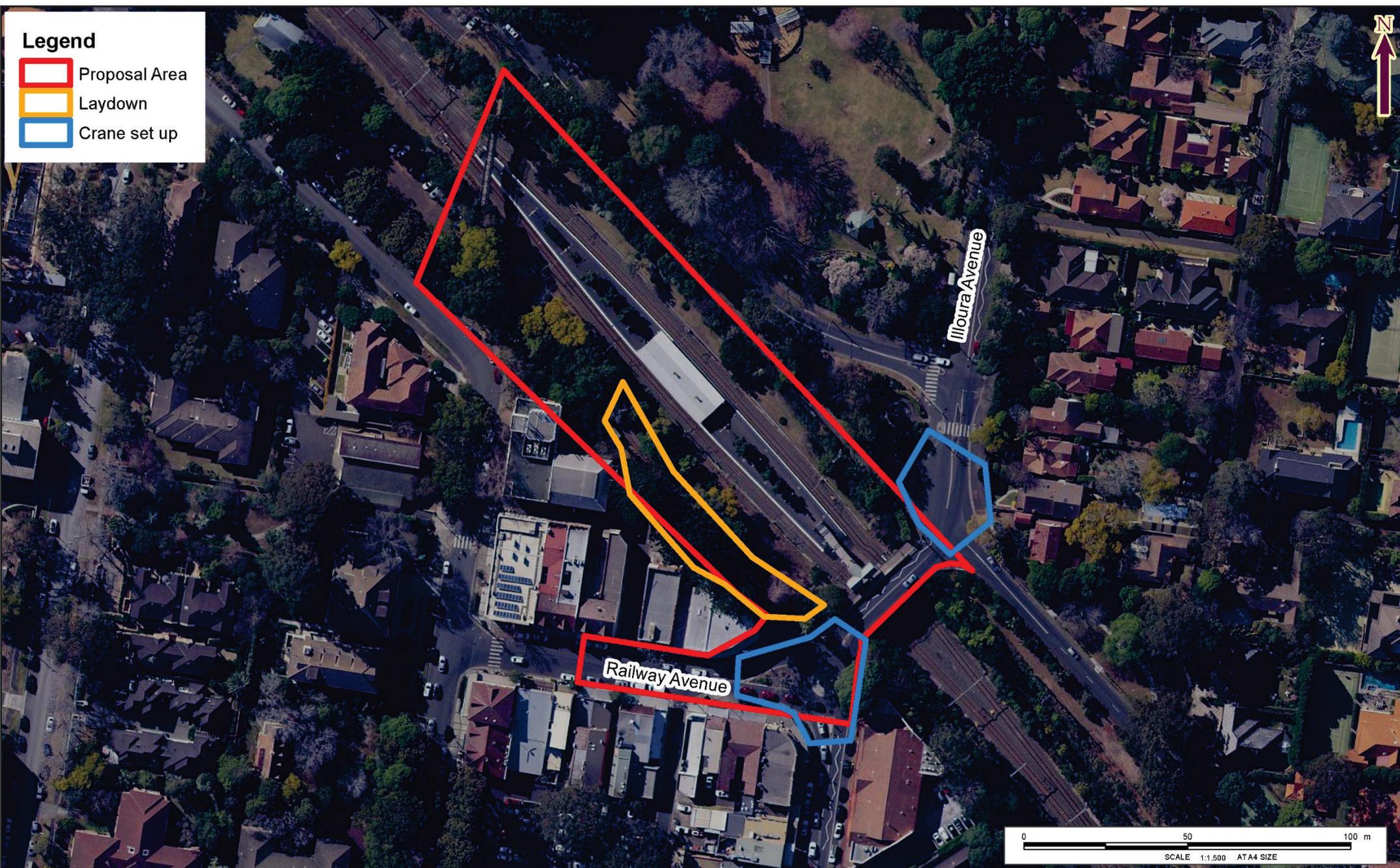
Figure 1.1: Proposal Area

| | | |
|---|---|---|
| LOCATION: WAHROONGA, NSW | Path: N:\Projects\Conics_Sydney\PR138951-TAP3\3 Cultural Heritage REF\2 Wahroonga\GIS\MXD\Fig1_1_proposalarea.mxd | DATUM: GDA94 PROJECTION: MGA Zone 56 |
| PURPOSE: HERITAGE Technician: Veronica Norman Date: 11/11/2019 | VERSION (PLAN BY): | Data Sources: RPS Land and Property 2015 |

CLIENT: SYDNEY TRAINS
JOB REF: PR138951-4

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Legend

- Proposal Area
- Laydown
- Crane set up



Figure 1.2: Proposed areas of work Wahroonga

| | | |
|---|---|---|
| LOCATION: WAHROONGA, NSW | Path: N:\Projects\Conics_Sydney\PR13695-1-TAP3-3 Cultural Heritage REF\2 Wahroonga\GIS\MXD\Fig1_2_areasofwork.mxd | DATUM: GDA84 PROJECTION: MGA Zone 56 |
| PURPOSE: HERITAGE Technician: Veronica.Norman Date: 11/11/2019 | VERSION (PLAN BY): | Data Sources: RPS Land and Property 2015 |

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2 LEGISLATIVE CONTEXT

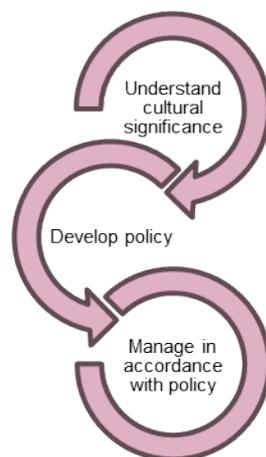
2.1 The Burra Charter

The Australia *ICOMOS Charter for Places of Cultural Significance*, The Burra Charter, 2013 (Burra Charter) provides a best practice standard for managing cultural heritage places in Australia. In December 2004, the NSW Heritage Council recognised and endorsed the Burra Charter as a document that underpins the policies for the conservation of environmental heritage in NSW.

The Burra Charter defines the principles for the conservation of places of cultural significance. The conservation principles contained in the Burra Charter include the conservation and management of places of cultural significance, including the retention of an appropriate setting and related places and related objects which contribute to the cultural significance of places.

The Burra Charter Process is a sequence of assessments, decisions and actions, related to the management of places of cultural significance. The Burra Charter Process is illustrated in Graph 2.1.

Graph 2.1: The Burra Charter Process (Australia ICOMOS Burra Charter)



2.2 World Heritage Convention

The General Conference of UNESCO adopted the Convention Concerning the Protection of World Cultural and National Heritage (World Heritage Convention) on 16 November 1972, and it came into force on 17 December 1975. The World Heritage Convention aims to promote international cooperation to protect places of outstanding cultural significance.

2.2.1 World Heritage List

There are **no places** on the World Heritage List within or near the Proposal Area.

2.3 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the principal environmental Act at a Commonwealth level. It provides for the protection and management of matters of national environmental significance as defined in the Act. Matters of national environmental significance include but are not limited to flora, fauna, ecological communities and heritage places of national and international importance.

In addition, the EPBC Act applies to actions with a significant impact on the environment where the actions affect, or are taken on, Commonwealth land, or are carried out by a Commonwealth agency (even if that significant impact is not on one of the nine matters of 'national environmental significance'). The EPBC Act requires approval from the Minister for actions with a significant impact on places included on the National Heritage List or Commonwealth Heritage List.

2.3.1 National Heritage List

The National Heritage List was established under the EPBC Act to protect places of outstanding significance to Australia.

There are **no places** on the National Heritage List within or near the Proposal Area.

2.3.2 Commonwealth Heritage List

The Commonwealth Heritage List was established under the EPBC Act to protect places owned and managed by Commonwealth agencies.

There are **no places** on the Commonwealth Heritage List within or near the Proposal Area.

2.4 Heritage Act 1977

The NSW *Heritage Act 1977* (the Act) is the principal Act for the management of NSW's environmental heritage. It establishes the SHR and includes provisions for Interim Heritage Orders, Orders to Stop Work and archaeological relics (both on land and underwater within the limits of the State). It also requires government agencies to maintain a Heritage and Conservation Register.

To assist management of the State's environmental heritage, the Act distinguishes between assets of State and local significance:

- State significance refers to significance to the State in relation to the historical, archaeological, architectural, cultural, social, natural or aesthetic value of an item
- Local significance refers to significance to an area in relation to the historical, archaeological, architectural, cultural, social, natural or aesthetic value of an item.

Items may be of State and local significance. Items of local significance may or may not be of significance to the State.

Part 4 Sections 57 to 69 of the Heritage Act address the statutory requirements for items and places listed on the SHR, or which are the subject of an Interim Heritage Order (IHO). Works which include demolition, damage or alteration of a heritage item or place require the approval of the Heritage Council or its delegates. Applications for approval are made in accordance with Section 60 of the Act. Section 60 applications are generally accompanied by a Conservation Management Plan (CMP) or a SOHI.

2.4.1 State Heritage Register

The SHR identifies places and objects of importance to the whole of NSW.

Wahroonga Railway Station Group is included on the SHR (01280).

2.4.2 Section 170 Heritage and Conservation Register

Section 170 of the Act requires government agencies to establish a Heritage and Conservation Register that identifies all assets of environmental heritage that it owns or occupies. Government agencies are required to provide the NSW Heritage Council notice of any intention to remove an asset from a Section 170 Heritage and Conservation Register, transfer ownership of an asset included on a Section 170 Heritage and Conservation Register, cease to occupy an asset on a Section 170 Heritage and Conservation Register or demolish an item included on a Section 170 Heritage and Conservation Register and assets must be maintained with due diligence in accordance with the State-Owned Heritage Management Principles and NSW Heritage Council asset management document. Proposals to alter or demolish assets of State significance must be referred to the NSW Heritage Council.

Wahroonga Railway Station Group is included on the RailCorp Section 170 Heritage and Conservation Register (4801002).

2.5 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) regulates land-use planning and assessment for NSW. The Proposal is being assessed through a Review of Environmental Factors (REF) under Division 5.1 of the EP&A Act (i.e. development without consent, to be determined by TfNSW).

2.5.1 Ku-ring-gai Local Environmental Plan 2015

The *Ku-ring-gai Local Environmental Plan (LEP) 2015* identifies items important to the Ku-ring-gai local government area.

Wahroonga Railway Station Group is included on Schedule 5 of the Ku-ring-gai LEP 2015 (1991).

Wahroonga Station is located within the **Wahroonga Conservation Area** (C1).

Wahroonga Park (I1104) is located to the north of the Proposal Area at 51 Coonanbarra Road. Further, a group of items located to the south of the Proposal Area are included on the Ku-ring-gai LEP 2015 including Commercial Buildings at 11 Railway Avenue (I978), 15 Railway Avenue (I979) and 17 Railway Avenue (I980), Inter-war Shops at 1-5 Railway Avenue (I981) and Federation Queen Anne Style Terrace Shops at 9A-17 Railway Avenue (I982) (Figure 2.1).

The impact to the items in the vicinity of the Proposal is not assessed in this SOHI. This SOHI is limited to an assessment of the impact to items or areas within the SHR curtilage including Wahroonga Station and the Wahroonga Conservation Area.

2.6 Summary

The listings for Wahroonga Station are summarised in Table 2.1, Figure 2.1 and Figure 2.2.

Table 2.1: Wahroonga Station heritage listings

| Item | ID | Register | Significance |
|---|---------|-----------------|--------------|
| Items within the Proposal Area | | | |
| Wahroonga Railway Station Group | 01280 | SHR | State |
| Wahroonga Railway Station Group | 4801002 | S170 | State |
| Wahroonga Railway Station Group | I991 | Ku-ring-gai LEP | State |
| Wahroonga Conservation Area | C1 | Ku-ring-gai LEP | Local |
| Items in the vicinity of the Proposal Area | | | |
| Wahroonga Park | I1104 | Ku-ring-gai LEP | Local |
| Commercial Buildings | I978 | Ku-ring-gai LEP | Local |
| Commercial Buildings | I979 | Ku-ring-gai LEP | Local |
| Commercial Buildings | I980 | Ku-ring-gai LEP | Local |
| Inter-war Shops | I981 | Ku-ring-gai LEP | Local |
| Federation Queen Anne Style Terrace Shops | I982 | Ku-ring-gai LEP | Local |



Figure 2.1: Heritage listed items - Ku-ring-gai LEP 2015
Wahoonga Station

| | | |
|---|--|--|
| LOCATION: HORNSBY, NSW PURPOSE: HERITAGE Technician: Veronica Norman Date: 11/11/2019 | Path: N:\Projects\Conics_Sydney\PR138951 - TAP3\3 Cultural Heritage REF2 VERSION (PLAN BY): | DATUM: GDA94 PROJECTION: MGA Zone 56 Data Sources: RPS Land and Property 2015 |
|---|--|--|

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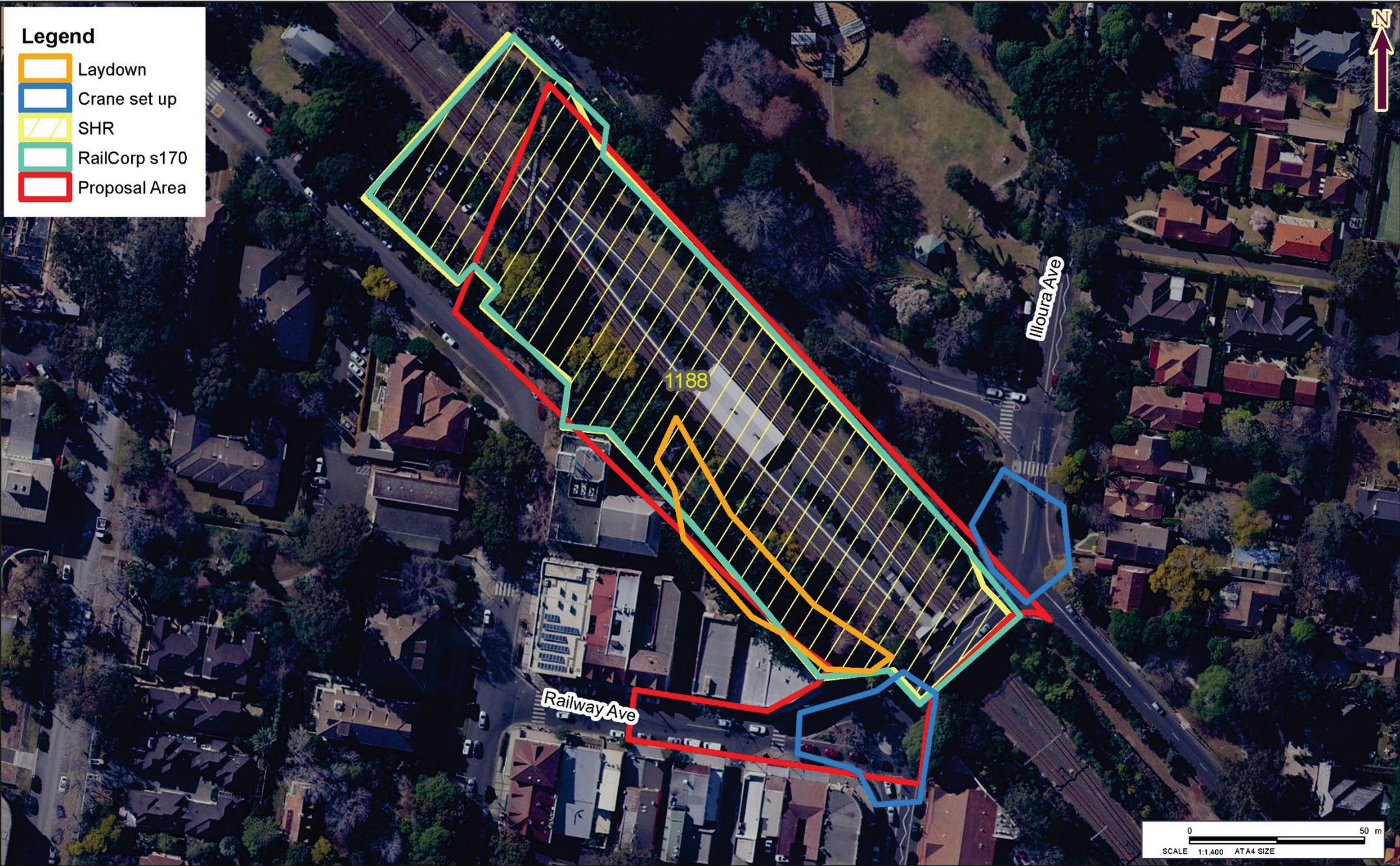


Figure 2.2: Heritage listed items - SHR & S170
Wahroonga Station

LOCATION: **HORNSBY,
NSW**

PURPOSE: HERITAGE
Technician: Veronica Norman Date: 11/11/2019

Path: N:\Projects\Conics_Sydney\PR138951-1-TAP3\3
Cultural Heritage REF2

DATUM: GDA94
PROJECTION: MGA Zone 56

VERSION (PLAN BY):

Data Sources:
RPS
Land and Property 2015

CLIENT: SYDNEY TRAINS
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3 HISTORICAL CONTEXT

3.1 Timeline

An overview of key dates and events relating to Wahroonga Station is provided in Table 3.1.

Table 3.1: Key dates and events

| Date | Event |
|---------|---|
| 1886 | <ul style="list-style-type: none"> Northern line opened |
| 1890 | <ul style="list-style-type: none"> Single track North Shore railway line from Hornsby to St Leonards opened |
| 1891 | <ul style="list-style-type: none"> Goods siding constructed |
| 1895 | <ul style="list-style-type: none"> First Wahroonga complex of shops on Coonanbarra Road |
| c.1906 | <ul style="list-style-type: none"> Existing station building, bridge and pedestrian steps at Redleaf Avenue constructed |
| 1909 | <ul style="list-style-type: none"> Brick arch bridge constructed Line duplicated Warren truss footbridge on Coonanbarra Road |
| c.1910 | <ul style="list-style-type: none"> Steel steps constructed |
| 1927 | <ul style="list-style-type: none"> Small modern retail outlet/footbridge |
| c.1930 | <ul style="list-style-type: none"> Ticket booths added to Wahroonga Station |
| c.1940 | <ul style="list-style-type: none"> Goods siding was removed, and community hall built north west of the station |
| 1993/94 | <ul style="list-style-type: none"> Additions and alterations to Wahroonga Station (including the retail outlet and canopy) |
| 2008 | <ul style="list-style-type: none"> Station Passenger Information boards installed |
| 2009 | <ul style="list-style-type: none"> Scouts Hall north west of Wahroonga Station destroyed by fire |
| 2010 | <ul style="list-style-type: none"> Five fig trees on platform replaced with six Blueberry Ash trees |

3.2 Early settlement 1822 – 1876

Wahroonga, in the Parish of Gordon, derives its name from an Aboriginal word meaning ‘our home’ (Royal Anthropological Society of Australasia in Rediscovering Indigenous Languages 2015). The name ‘Wahroonga’ most likely originated from the Kuringgah (Kuring-Gai) language group. Prior to ‘Wahroonga’, the area was called Pearce’s Corner after timber-getter Aaron Pierce. The Ku-ring-gai area was a rich source of cedar, mahogany, turpentine, ironbark and blue gum (Davies 2010: 158). Once the land was cleared of timber, orchards were established (Rowland 2008).

By 1822, Thomas Hyndes, a convict and later wealthy landowner, held the largest land grant in the Wahroonga area. Local sawyers lived and worked on Hyndes’ land (Rowland 2008), which included 2000 acres (800 hectares) to the east of Lane Cove Road (later Pacific Highway) (Davies 2010:158) (refer to Figure 3.1 and Figure 3.2, approximate Proposal area location shown in red). In 1840, the land was released to John Terry Hughes to whom a deed of grant was made out in 1842.

In 1876 the estate, known as *The Big Island* estate, was subdivided into large portions by a syndicate of politicians and businessmen. The boundaries of this first subdivision laid down the pattern of Wahroonga as it is now known. A portion of the subdivision, now bounded by Stuart Street, Coonanbarra Street, Illoura Avenue and including Wahroonga Station, was occupied by Patrick Noonan and became known as ‘Noonan’s Paddock’.



Figure 3.1: 1835 South Colah Parish Map

| | | |
|--|---|---|
| LOCATION: WAHROONGA, NSW | Path: N:\Projects\Conics_Sydney\PR138951-TAP3\3 Cultural Heritage REF2 Wahroonga\GIS\W\DFig3_1_1835v2.mxd | DATUM: GDA94 PROJECTION: MGA Zone 56 |
| PURPOSE: HERITAGE Technician: Veronica Norman Date: 11/11/2019 | VERSION (PLAN BY): | Data Sources: RPS Land and Property 2015 |

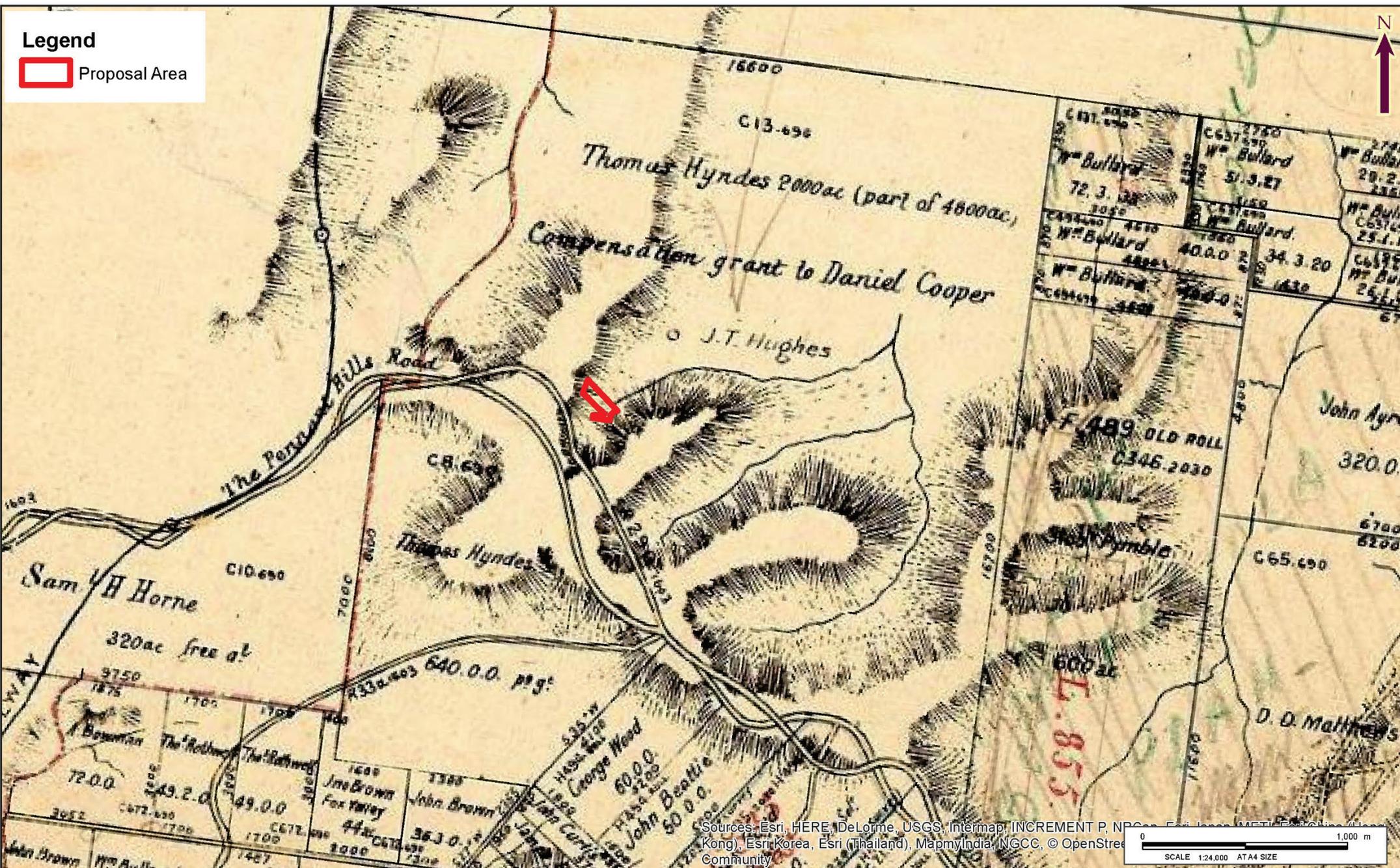


Figure 3.2: 1883 South Colah Parish Map

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NPSS, Esri (Japan), METI, Esri (Korea), Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap Community

| | | |
|---|---|--|
| LOCATION: WAHROONGA, NSW | Path: N:\Projects\Conics_Sydney\PR13695\1-TAP\3\Cultural Heritage REF\2\Wahroonga\GIS\MXD\Fig3_2_1883.mxd | DATUM: GDA94 PROJECTION: MGA Zone 56 |
| PURPOSE: HERITAGE Technician: Veronica.Norman Date: 11/11/2019 | VERSION (PLAN BY): | Data Sources: RPS Land and Property 2015 |

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3.3 The North Shore Line 1883 – 1890

Plans to extend the railway to Wahroonga were discussed in the 1880s (Scobie, cited in OEH 2019a). The railway line was surveyed for the second time in 1883, at which time little development had occurred in the central Wahroonga area.

The single-track North Shore railway line from Hornsby to St Leonards opened on 1 January 1890, however the extension to Milsons Point was opened on 1 May 1893 (Rowland 2008). The railway section between Hornsby and St Leonards was built by E. Pritchard & CO. contractor (Scobie cited in OEH 2019a). The railway ran through Noonan's Paddock and in 1890 the station at Wahroonga was opened.

3.4 Wahroonga Station 1890 – 1920

The railway station at Wahroonga opened on 1 January 1890 was known as Pearce's Corner, though the construction name was Noonan's platform as it was built on the land belonging to Patrick Noonan (Rowland 2008). The name 'Wahroonga' was given to the station in August 1890 (Pollon cited in Rowland 2008). Early subdivision plans show that a level crossing was created at Coonanbarra Road (Plate 3.1). The station was located within two earth cuttings (Sharp 2018: 7).

The *Sydney Morning Herald* described the Pearce's Corner platform on 1 January 1890 as the following:

This platform is 264ft. long by 12ft. wide. A level crossing has also been provided here for Noonan's road and an old cottage utilised for the gatekeeper(Sydney Morning Herald 1 January 1890: 5) .

The station included a brick faced platform measuring 264 feet (80.5 metres) by 12 feet (3.6 metres) wide, exclusive of 15 feet long ramps at each end. The platform width was increased to 15 feet in front of the station building, which was a timber, open fronted waiting shed. The single-pitched roof of the waiting shed sloped towards the railway line (Sharp 2018: 7). The platform and original station building were constructed on the southern side of the single line to the south of a level crossing with then Noonan's Road (now Coonanbarra Road) (Plate 3.2).

Californian desert fan palm trees were planted on either side of the station in October 1901 (Pymble News and Stuart Read cited in OEH 2019a). The first Wahroonga complex of shops on Coonanbarra Road was established in 1895 and was designed by John Sulman. The shops consisted of George Boyne's Railway Stores and McKye's Bakery (Davies 2010, 159) (Plate 3.6).

A 1908 plan (Plate 3.4) details the layout of the original station building after it was expanded in 1895. At the time, the original station building included three rooms, an office for the Station Master, the original 1890 open-fronted general waiting room and a ladies' waiting room and toilet the Sydney end. The structure was 35 feet long by 10 feet wide. Also at the station there was an off-platform combined male toilet and lamp room behind the platform building and an out of shed on the platform approximately 80 feet from the main platform structure in the direction of Hornsby (Sharp 2018: 8). The original station building was relocated to Point Clare near Gosford following the completion of the second station building.

As the railway station was the only parcel of Government land in the area, the railway land was used for a Post Office in 1900 and a Telephone Exchange in 1905. The Post Office was located as a detached structure immediately at the Hornsby end of the platform building but was relocated to the rear of the platform in 1906 to make way for the 1906 station building. The telephone exchange was also located behind the platform building (Plate 3.3). By the time the 1895 building was to be relocated in 1906, a pay public telephone had been installed in on corner of the general waiting room (Sharp 2018: 10).

The station was rebuilt in c.1906 with the platform and timber building being rebuilt with the extant station building, bridge and pedestrian steps at Redleaf Avenue in anticipation of the duplication of the line (Plate 3.7). The original, single-sided platform wall was incorporated into the new island platform in 1906 (Sharp 2018: 7). The 1906 brick building was constructed to the immediate north of the first timber building (Sharp 2018: 16).

The duplicated line was completed in May 1909 and included a bridge which incorporated a footpath along its west side and stair access to the station platform with a two span reinforced concrete arch bridge, brick

REPORT

abutments and piers, brick parapet walls and a concrete deck and asphalt surface (Plate 3.8, Plate 3.9). A 1924 plan of the Redleaf Avenue bridge indicates that the footbridge was intended as a 'temporary' structure (Plate 3.12). The bridge replaced the Coonanbarra Road level crossing at the Hornsby end of the station. Access to the new island platform was via a set of steps from the new bridge (OEH 2019a).

Railway Avenue was constructed to link the new bridge with the existing street network (Australian Museum Consulting 2014: 19).

The station building is a Type 11 brick building. The booking office and station master's office is located in the platform building adjacent to two ticket issuing windows.

In 1891 a goods siding and goods shed were constructed on the western side of the line (OEH 2019b) (Plate 3.11), with a warren truss footbridge added in 1909, on the former Coonanbarra Road level crossing. However, this did not provide access to the station (Plate 3.10).

Landscaped brick walls date from 1909, and in c.1910 plantings were constructed on the platform area and gardens around the station. The typically English landscaping and gardens are one of the most prominent features of Wahroonga Station.

An honour roll was unveiled in December 1918 at the entrance of the railway station; however, it was moved to the current memorial location located to the north east of the station on 28 February 1925 (Hornsby Shire Recollects 2019).

Plate 3.1 Turramurra Heights, Wahroonga Estate 189-? (Source: NLA Call Number MAP Folder 187, LFSP 2907)

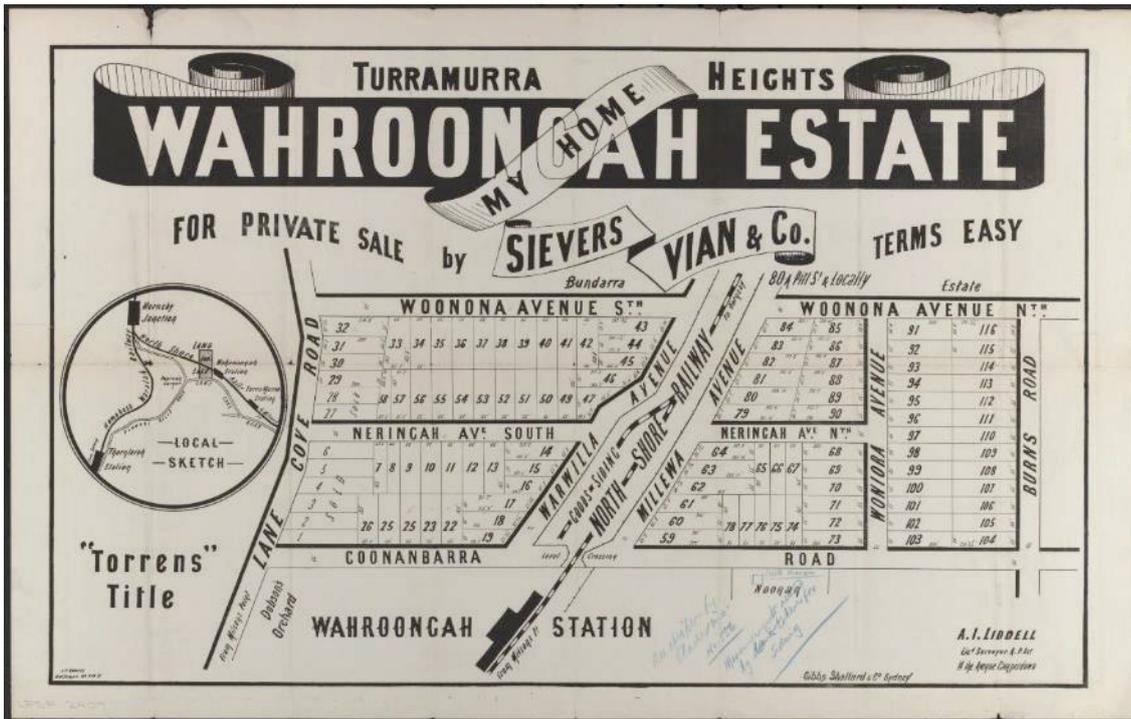


Plate 3.2 Wahroonga, 1900 (Source: SLNSW Call number PXE 692/93-94)



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Plate 3.3 Station Building Wahroonga, 1906 (Source: Sydney Trains)

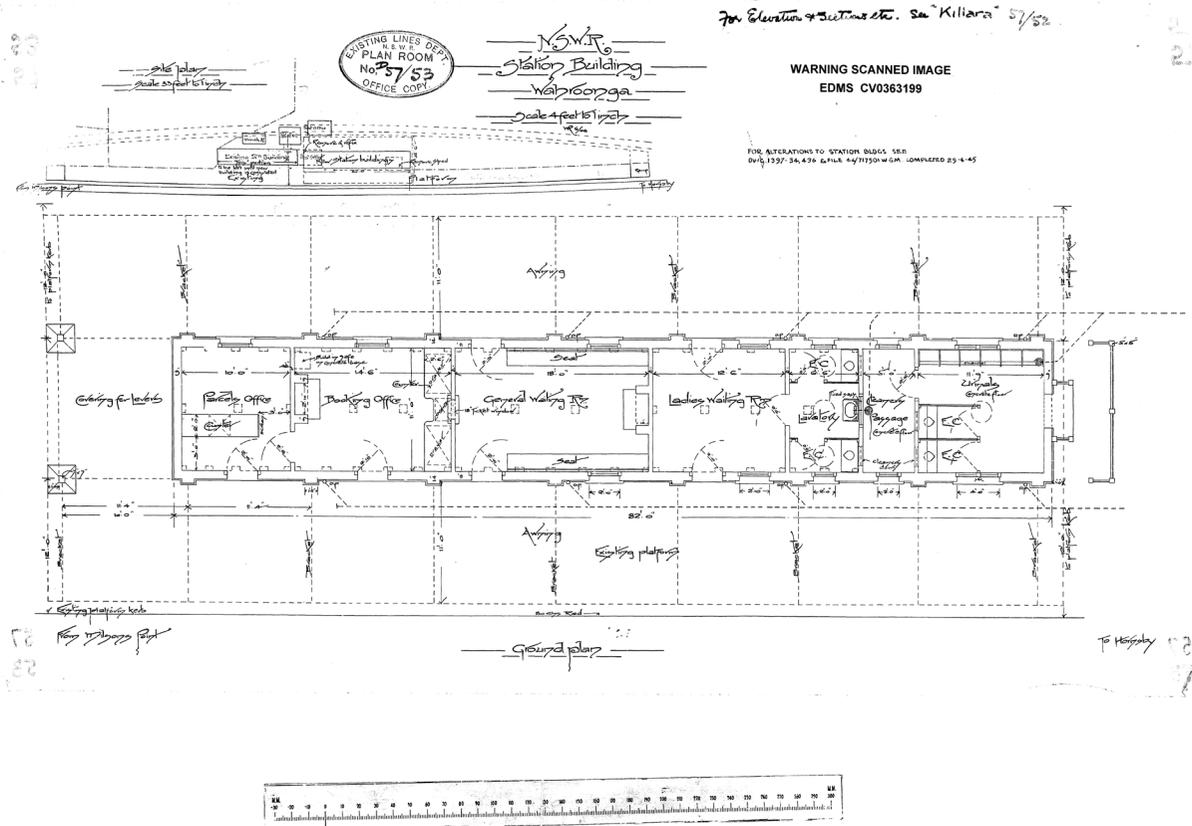


Plate 3.4: Plan 1908 (Source: Sharp 2018)

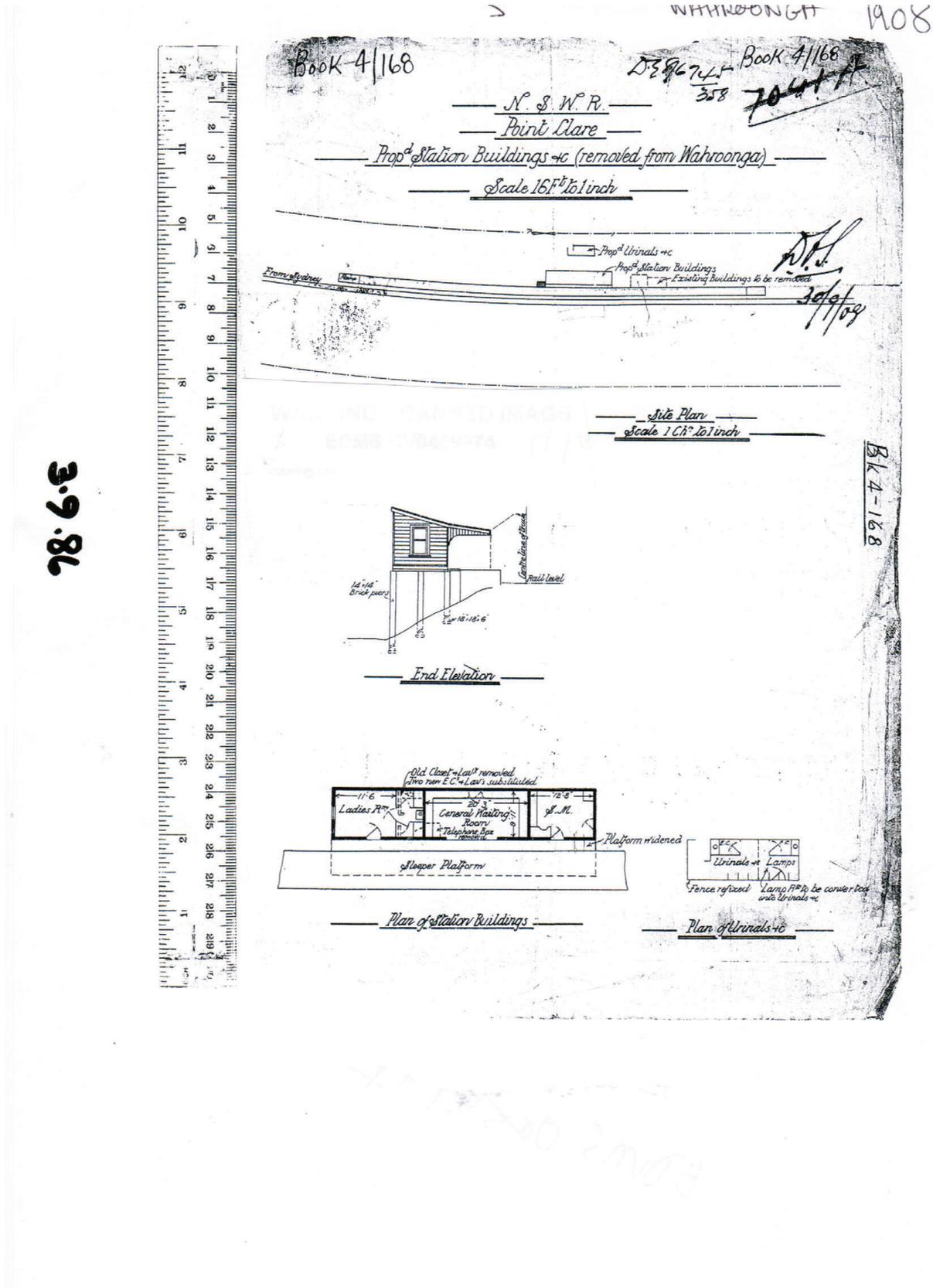


Plate 3.5 'Putting in the Brick Wall of the New Station at Pymble' (Source: Evening News, Saturday 8 May 1909)



Putting in the Brick Wall of the New Station at Pymble.

Plate 3.6 Wahroonga Station Estate - Stuart St, Coonanbarra Rd, Warwilla Ave, Millewa Ave, Railway Ave, 1910 (Source: SLNSW Call Number Z/SP/W1/20)

WAHROONGA STATION

ESTATE

— RIGHT AT —
RAILWAY STATION

Choice Business Sites and Residential Blocks

For Auction Sale on the Ground at 3 O'Clock

SATURDAY 3RD SEPTEMBER 1910

HARDIE & GORMAN

Auctioneers 133 Pitt St

TORRENS TITLE

TERMS

10% deposit, 10% in 3 months without interest and the balance in 12 quarterly payments at 5% interest.

W1/20

DOBBIE & KENNY
Licensed Surveyors A. P. Act
Castlereagh House
Castlereagh St

Wahroonga Post Office

Butcher's Shop

Residence of Walter G. Parish esq.

Note: All measurements subject to Deposited Plan

William Brooker & Co. Pty. Ltd.

Plate 3.7 Wahroonga Railway Station c. 1915 (Source: Hornsby Shire Council, Robert Green Collection)



Plate 3.8: Wahroonga Overbridge 1918 (Source: Sydney Trains)

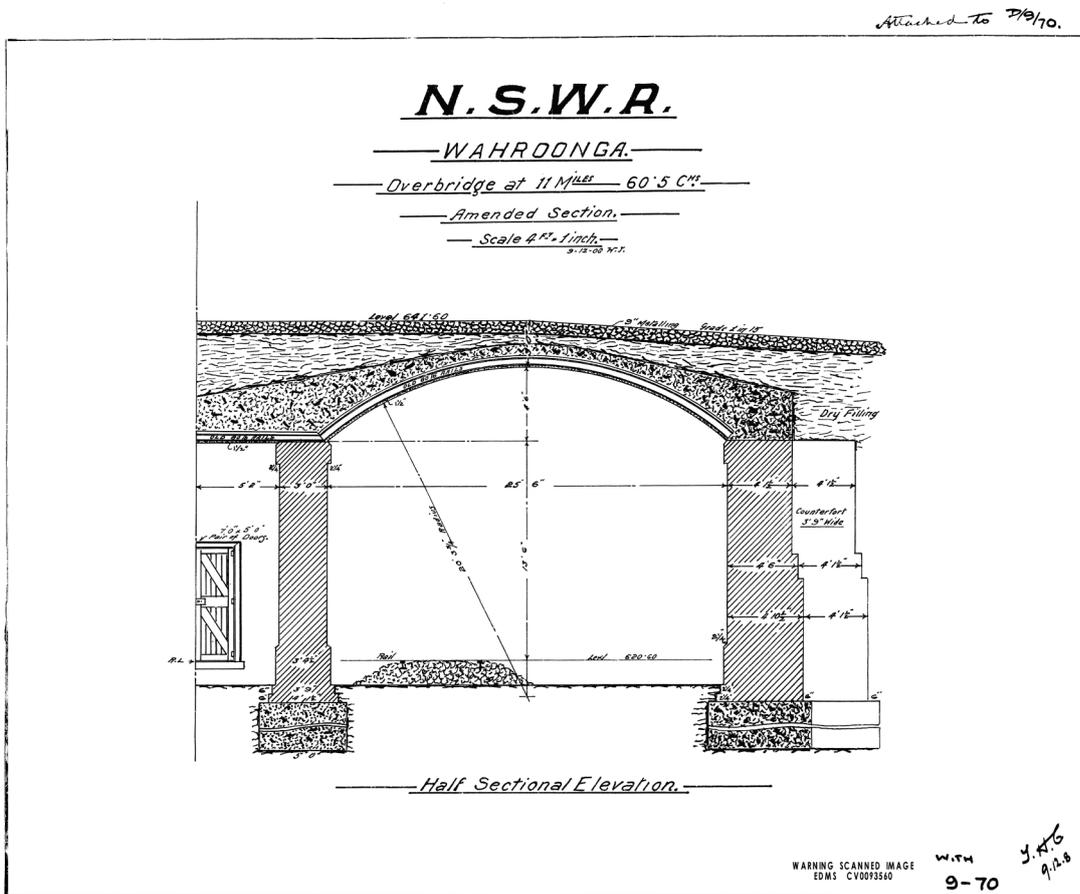


Plate 3.9: Wahroonga Proposed Footbridge Alongside Overbridge, undated (Source: Sydney Trains)

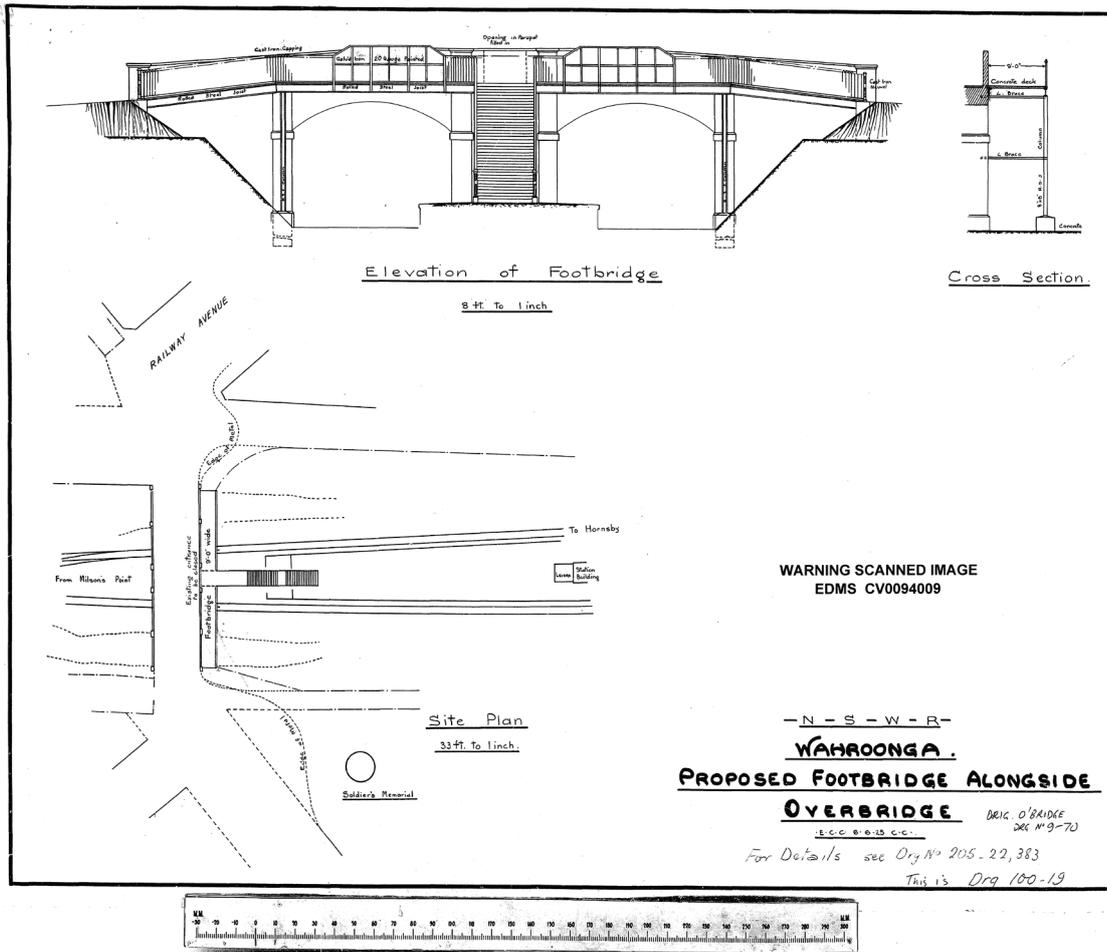


Plate 3.10: Wahroonga, Parish's Sub (Balance of Redleaf Estate) - Coonanbarra Rd, Redleaf Ave, Railway Ave, Lane Cove Rd, 1920 (Source: SLNSW Call Number Z/SP/W1/10)

WAHROONGA
PARISH'S SUB^N
[BALANCE OF REDLEAF ESTATE]

TORRENS TITLE

TERMS
1/5 Deposit
Balance in 1, 2, 3 Years
6% Interest.

Auction Sale on the Ground
SATURDAY
15TH MAY 1920 at 3 PM
Auctioneers
HARDIE & GORMAN
PROP^y LTD.
Ocean House 26 Moore St

M. M^CFADYEN
Local Agent - Wahroonga

Vendor's Solicitors
PARISH & STEPHEN
26 Hunter St Sydney

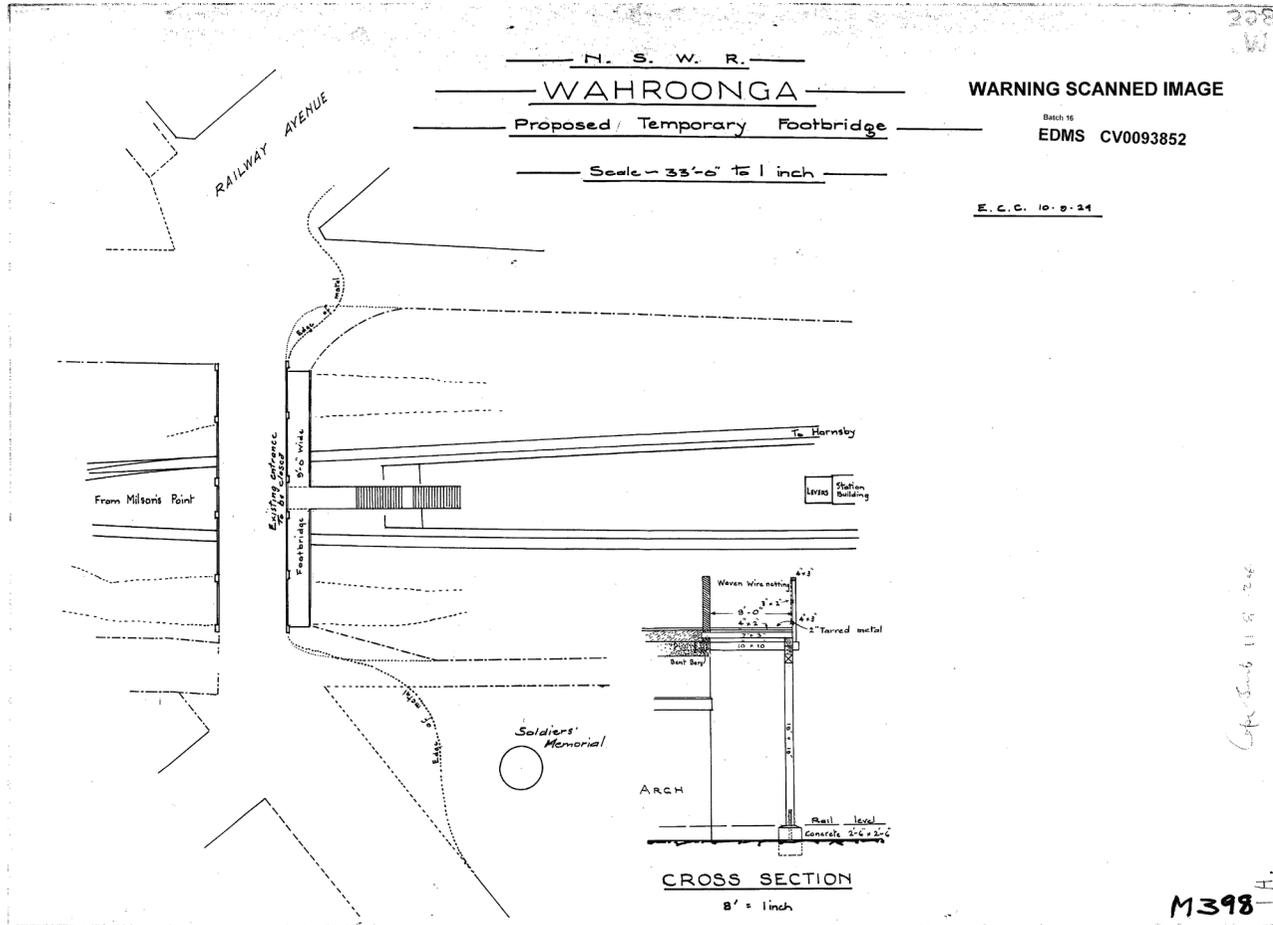
Licensed Surveyors
CHAPMAN & FAVIELL
33 Hunter St Sydney

All measurements are subject to Dep. Plan

F. Cunninghame & Co. Ltd., Litho, Sydney

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Plate 3.12 1924 Wahroonga Proposed Temporary Footbridge plan



3.5 Extension and electrification 1927 – 1943

Train services continued to be steam-hauled on this line until c.1927 when alterations allowed for electrification of the line between Milson's Point and Hornsby (Plate 3.13). Automatic colour light signalling was installed between Lindfield and Hornsby (including Wahroonga) on 8 May 1928. Steam trains were withdrawn in July 1928 (OEH 2019a).

The 1926 Wahroonga Progress Association's Annual Report stated the railway station garden 'for 9 years in succession, with one exception, has gained first prize in the competition for privately maintained railway station gardens' (Ku-Ring-Gai Historical Society cited in OEH 2019a).

In 1927 a new steel and concrete footbridge was constructed alongside the Redleaf Avenue bridge, and the existing footpath on the bridge was closed and reused for a widened road pavement (OEH 2019b). The original stair to the platform was retained and incorporated into the new footbridge. A pair of brick entrance piers were built at the foot of the pedestrian steps with timber covering in the mid-1930s (OEH 2019b).

Two small ticket collecting booths were constructed at the base of the steel stairs in 1938 (OEH 2019b).

Hill's fig trees were planted on the island platform in the 1920s or 1930s, replacing the earlier fan palm trees (OEH 2019a). Shrubs and trees have been planted in the centre line of the platform since the early days of the station (OEH 2019a). The goods yard was no longer extant by the mid-twentieth century (Scobie cited in OEH 2019a), however an aerial from 1943 shows the goods shed to the north west of platform (Plate 3.14).

Plate 3.13: Wahroonga Station, 1938 (Source: SLNSW File Number FL1924305)



Plate 3.14: Wahroonga Station, 1943 (Source: Sixmaps)

3.6 Landscaping, alterations and additions from the 1980s onwards

In 1982 the State Rail Authority sealed the platform with bitumen, which resulted in the death of a fig tree (OEH 2019b) (Plate 3.15). Grounds on the east and west of the tracks are densely planted with a mixture of native and exotic trees and shrubs (City Rail cited in OEH 2019a). Both sides of the rail corridor feature extensive plantings among well maintained lawns, with some low sandstone terraces, large mature trees along the property boundary and smaller shrubs and perennials closer to the track (OEH 2019b).

Traditional style green benches with the station name inscribed were installed in 1993 (OEH 2019b). Additional upgrades in the early 1990s included:

In 1993 substantial works were undertaken to the station including the construction of a canopy at the top of the stairs and a new concession kiosk, new balustrading to the stairs to the platform and a toilet upgrade. The upgrading of the toilets involved the relocation of the women's toilet from beside the central waiting room which had originally been the ladies waiting room. The original doorway to the men's was blocked up and two new opening created. The male toilets were subdivided for male and female. A lunch room and locker room was also created (PTW Architects 2017:34).

In 1999 Wahroonga Station was listed on the SHR. At this time, the whole of the station platform, building, steps and overhead bridge were virtually unchanged from when each element was built (Plate 3.16, Plate 3.17).

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A program to replace and raise the height of the Coonanbarra Road footbridge deck was undertaken in 2001 (OEH 2019b). As part of the warren truss footbridge raising some steel members were replaced and a new central trestle was installed. Station Passenger Information boards were installed in 2008, and the following year the Scouts Hall located on the site of the former siding burnt down (OEH 2019b).

In 2009, despite community protest, the Hill's fig trees on the platform were replaced with blueberry ash as the figs' roots were lifting pavement and causing trip and risk hazards. The platform upgrade included relocation of seats and re-paving of the platform surface (Read cited in OEH 2019a). The Coonanbarra Road footbridge was further refurbished in 2018.

Plate 3.15: Young boy leaning against station name board, waiting for the train at Wahroonga Station, Sydney, New South Wales, 1984 (Source: NLA Call Number PIC P861/799 LOC Box N1 Folder 2)



Plate 3.16: Station Building plan and details 1994 (Source: Sydney Trains)

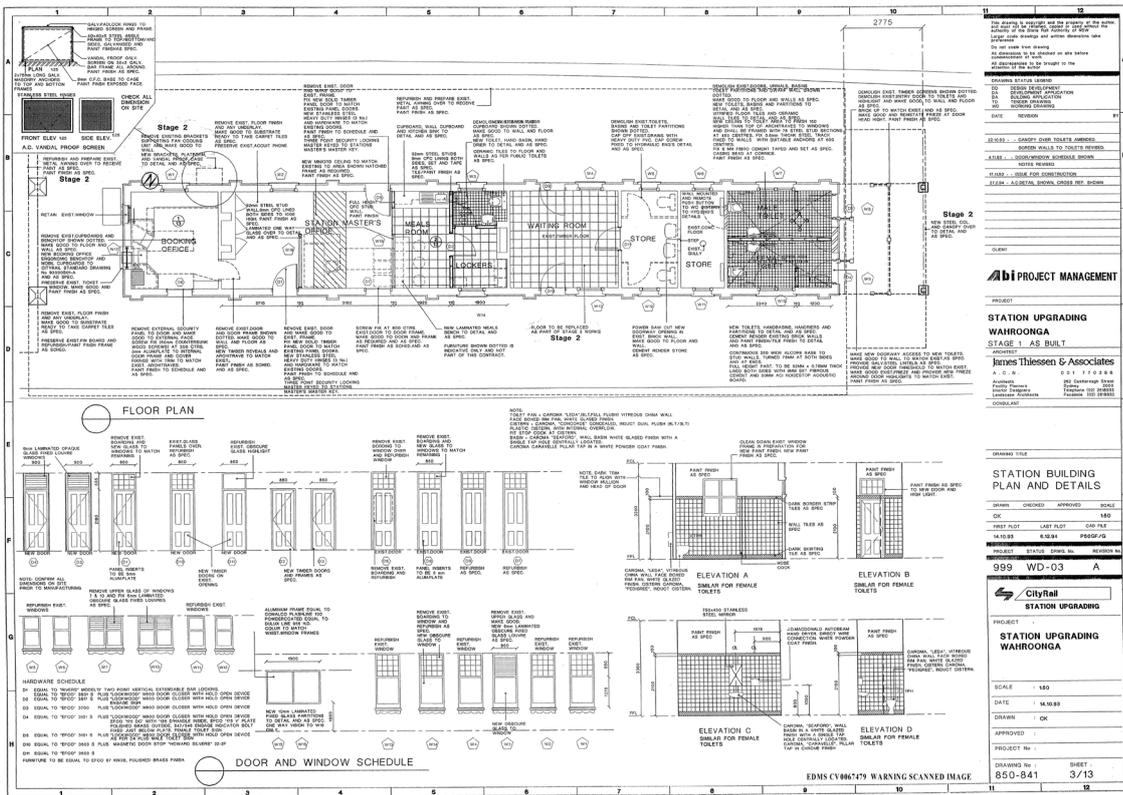
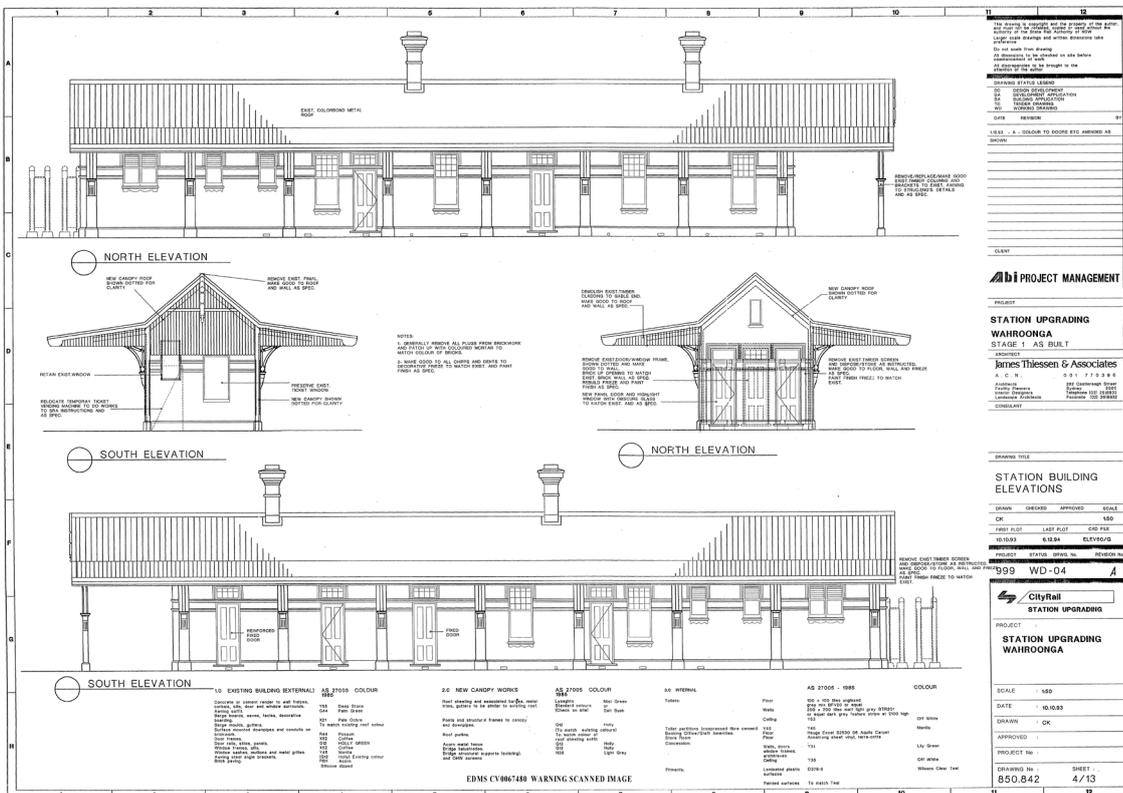


Plate 3.17: Station Building elevations 1994 (Source: Sydney Trains)



4 DESCRIPTION AND PHYSICAL EVIDENCE

A site inspection was conducted on 17 September 2019 by RPS Heritage Consultant Veronica Norman and RPS Senior Heritage Consultant Sarah van der Linde. It included an inspection of all proposed areas of work as well as ancillary areas that were viewed from accessible locations.

4.1 Landscape setting and features

Wahroonga Station is comprised of an island platform and station building in a landscaped setting. It is accessed from the southern end via a steel framed stair leading from the Redleaf Avenue bridge.

Railway Avenue runs approximately east – west and is located to the south of Wahroonga Station and accesses Redleaf Avenue bridge from the south. Railway Avenue features box planters, garden beds and larger trees (Plate 4.1, Plate 4.2).

Illoura Avenue runs approximately north – south and is located to the north of Wahroonga Station and accesses Redleaf Avenue bridge from the north. A war memorial is located to the north of Wahroonga Station, as is Wahroonga Park, a well-manicured public park (Plate 4.3, Plate 4.4).

The southern end the Redleaf Avenue bridge forms the access point to the station and to the north a warren truss footbridge runs from Coonanbarra Road to Warilla Avenue, however it does not access the station. A retail outlet front faces onto Redleaf Avenue bridge, and a red brick parapet divides the footpath from the road. The island platform contains Platform 1 (Up) and Platform 2 (Down), serviced by the 1906 brick platform building. The surrounding landscape is characterised by Federation and Inter-War period housing. Interchange facilities consist of a commuter car park, bus stops, taxi rank and informal kiss and ride zones.

Plate 4.1 View from Railway Avenue to station (RPS 2019)



Plate 4.2 View along Railway Avenue away from south west corner of the roundabout (RPS 2019)



Plate 4.3 View along Illoura Ave from station (RPS 2019)



Plate 4.4 View along Redleaf Avenue Bridge towards station (RPS 2019)



4.2 Wahroonga Station – major group elements

This section discusses elements which may be impacted by the Proposal outlined in Chapter 7.

4.2.1 Railway Avenue

Between the Wahroonga shopping village on Railway Avenue and the Wahroonga Station landscaping, a footpath runs along the southern boundary of the station. The footpath along Railway Avenue rises as it approaches the station access point on the bridge. A garden bed is located along the rear of the shops, adjacent the footpath. Railway Avenue forms a major access route from the public car park to the south of Railway Avenue to the station (Plate 4.5, Plate 4.6).

Plate 4.5 View towards Shopping Village (RPS 2019)



Plate 4.6 Garden bed proposed for removal at rear of Shopping Village (RPS 2019)



4.2.2 Platform 1 (Up) and Platform 2 (Down)

Platform 1 (Up) and Platform 2 (Down) form a convex island platform with asphalt surface and original brick facing (Plate 4.7). Landscaping including bushes and ash trees are located along the platform. Evidence of resurfacing and subsurface utilities can be seen in various locations on the platform. Safety fencing is located on the northern and southern extents of the platform, Wahroonga Station signage and Opal Card readers are located along the platform. The southern end of the platform consists of a concrete slope, edged with brick, down towards the stair trestle and Redleaf Avenue bridge. The platforms face onto the landscaped garden bed surroundings (Plate 4.8, Plate 4.9, Plate 4.10).

Plate 4.7 View towards platform from Redleaf Avenue bridge (RPS 2019)



Plate 4.8 Northern end of platform with warren truss footbridge (RPS 2019)



Plate 4.9 Sloped southern end of platform with brick edging (RPS 2019)



Plate 4.10 Safety fencing at southern end of platform (RPS 2019)



4.2.3 Station building

4.2.3.1 Exterior

Constructed in 1906, the platform building is a good example of a Type 11 (Standard A8-10) and is located on the island platform formed by Platform 1 and Platform 2 (Plate 4.11, Plate 4.12). The Type 11 is typical of the early twentieth century station design for the Northern Line.

The building is centrally located on the platform and is a rectangular brick building with gable roof made of corrugated iron, featuring two chimneys with rendered cornice. A cantilevered awning on either side of the building is supported by curved iron brackets springing from moulded concrete brackets. The roofline extends beyond the southern end of the building to form a sheltered area over the ticket window which is decorated by a timber valance and finial. Walls are tuckpointed red face brick with rendered architraves, sills and string course.

Later alterations to the exterior of the building include wayfinding signage such as platform numbers, indicator boards, lighting, public announcement speakers and safety features such as CCTV. The entrance to the northern end of the station building has also been altered from a single door to two doors with windows above. Safety features also include a sliding grill to cover the toilet doors. At the southern end of the platform a ticketing window has been installed with a ticket machine is located next to the window.

Plate 4.11 Station building – northern elevation (RPS 2019)



Plate 4.12 Station building – southern elevation (RPS 2019)



4.2.3.2 Interior

Inspection of the interior of the platform building was limited to the publicly accessible toilets on the northern extent of the building (Plate 4.13). The toilets include separate male and female toilets which have been updated with modern amenities. A sliding, metal security door has been attached to the northern exterior of the station building. The windows and shutters appear to be original to the building (Plate 4.14).

Plate 4.13 Exterior of female toilet (RPS 2019)



Plate 4.14 Interior window and louvres (RPS 2019)



4.3 Structures

4.3.1 Redleaf Avenue bridge

Redleaf Avenue bridge is a two-span concrete brick arch bridge with steel rail reinforcement and is supported on a brick pier and abutments (Plate 4.15). The bridge is the only pedestrian point of access for Wahroonga Station. The bridge spans two tracks of the North Shore Line and abuts a steel framed walkway and cantilevered retail outlet made of steel with hipped gable roof on the western side of the stairs. The pedestrian concourse on the bridge is separated from the road by a brick parapet (Plate 4.16).

The balustrade has been altered with the added top rail and full sections of balustrade over both tracks have been replaced.

Plate 4.15 Redleaf Avenue bridge (RPS 2019)



Plate 4.16 Brick parapet and footbridge on Redleaf Avenue bridge (RPS 2019)



4.3.2 Steel stairs and ticket booths

Access to the station platform is by a set of stairs descending from the footbridge adjoining the Redleaf Avenue bridge (Plate 4.17). The stairs are steel framed and are in original condition, with knob pattern type newel posts and treads of precast concrete. A rivetted steel trestle structure supports the stairs. The trestles are in a fenced area and are not accessible to the public (Plate 4.18). The trestles are largely intact. The staircase blocks the view of the trestles. At the base of the stairs there are two small ticket collecting booths. These booths are of red brick construction, with a concrete slab roof and are adjoined by an overhead wooden frame. Interpretation relating to Wahroonga Station signage is attached to the booths.

Plate 4.17 Steel stairs and ticket boots (RPS 2019) Plate 4.18 Trestle beneath stairs (RPS 2019)



4.3.3 Warren truss footbridge

A footbridge across the northern end of the platform links Warwilla Avenue and Coonanbarra Road, however it does not provide access to the platform. The footbridge is a steel framed, Warren truss structure with concrete deck and stair treads. Steel framed stairs with star type newel posts lead to the deck. A c.2003 safety fence with arching steel supports has been added to the deck. The footbridge has also had typical freestanding light poles installed.

Plate 4.19 Warren truss footbridge (RPS 2019)



Plate 4.20 Base of warren truss footbridge (RPS 2019)



4.4 Movable heritage

The RailCorp Section 170 Heritage and Conservation Register identifies the following items of movable heritage at Wahroonga Station:

The former Waiting Room contains an original red painted timber and steel station bench (OEH 2019b).

As no works are proposed to the former Waiting Room these items were not inspected.

5 ASSESSMENT OF ARCHAEOLOGICAL POTENTIAL

This assessment of archaeological potential assesses the potential for Wahroonga Station to contain archaeological resources associated with an earlier phase of occupation, activity, or development. It is based on an analysis of available documentary resources and a physical analysis of areas that would be affected by the Proposal, including an understanding of ground disturbance.

The assessment of archaeological potential is limited to an assessment of the potential for archaeological resources within the SHR curtilage. The archaeological potential of the Scouts Hall compound is also assessed as it is understood that minor ground disturbance (removal of 100-150 millimetres of soil) is required for a density graded base (DGB) to be applied and compacted. No ground disturbance is proposed at the additional construction compounds, laydown and storage areas, crane set-up locations or the proposed hi-rail pads.

The level of archaeological potential is assessed as:

- **Low:** The history or the level of ground disturbance indicates that it is unlikely that archaeological resources would be identified. If identified, any archaeological resources are unlikely to be intact.
- **Moderate:** The history or the level of ground disturbance indicates that archaeological resources may be identified. If identified, archaeological resources may be affected or truncated due to ground disturbance.
- **High:** The history indicates that archaeological resources are likely to be identified. Ground disturbance is limited, and archaeological resources are likely to be intact.

5.1 Wahroonga Station (within the SHR curtilage)

Prior to the construction of Wahroonga Station, the land formed part of 2,000 acres leased by Thomas Pinnick Hyndes. There is no recorded development within the area prior to the construction of Wahroonga Station, which commenced in 1890. Due to the impact associated with the cutting for Wahroonga Station, and no documented development within the area prior to the construction of the station, it is unlikely that any archaeological resources associated with the early development of Wahroonga (pre 1890) would be identified.

The station opened on 1 January 1890 and included a platform measuring 264 feet by 12 feet and a station building consisting of a timber, open-fronted waiting shed.

The station building continued to be used during the construction of the 1906 station building. It was then relocated to Point Clare. Despite several major additions to the station including the Redleaf Avenue bridge in 1906, the Section 170 Heritage and Conservation Register listing for Wahroonga Station notes the high degree of integrity, with relatively minor alterations and additions occurring at the station including in relation to the station building. This is confirmed by photographs of the station dating to the c.1915, 1938 and 1945 showing the station. It is unlikely that archaeological resources associated with the 1890 station building would be identified due to the impact associated with the removal of the building for relocation to Point Clare and platform regrading and landscaping.

The 1906 station building plan shows multiple buildings located to the rear of the original station building, including urinals, telephone exchange and post office. The overlay of the 1906 station building plan is based on the location of the existing building; however, it indicates that the buildings would not be located within an area of proposed impact (Figure 5.1). It is therefore unlikely that archaeological resources associated with the buildings would be identified through the Proposal. Further, the potential for archaeological resources associated with the buildings shown on the 1906 station building plan is low due to the level of ground disturbance associated with the duplication of the line in 1909 and the construction of the island platform at Wahroonga Station.

An analysis of the available documentary resources including plans and photographs of the station do not indicate other below ground or platform infrastructure such as a water tank or similar at Wahroonga Station,

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and work at the station including platform regrading and multiple phases of landscaping are well documented, with no unexpected archaeological resources identified.

Due to the impact associated with the cutting for the station, the construction of the station including the 1890 station building, 1906 station building, and other elements such as the Redleaf Avenue bridge, and with consideration of the low level of alterations and high degree of intactness of the 1906 layout of Wahroonga Station, the archaeological potential within the proposed areas of impact within the SHR curtilage is assessed as **low**.



Figure 5.1: 1906 Wahroonga Station plan

| | | |
|---|---|---|
| LOCATION: WAHROONGA, NSW | Path: N:\Projects\Conics_Sydney\PR136951-1-TAP3\3 Cultural Heritage REF\2 Wahroonga\GIS\MXD\Fig5_1_1906.mxd | DATUM: GDA84 PROJECTION: MGA Zone 56 |
| PURPOSE: HERITAGE Technician: Veronica.Norman Date: 19/11/2019 | VERSION (PLAN BY): | Data Sources: RPS Land and Property 2015 |

CLIENT: SYDNEY TRAINS
 JOB REF: PR138951-4

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 Level 13, 255 Pitt Street Sydney, 2001
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5.2 Construction compound (Scouts Hall)

The proposed construction compound (Scouts Hall) is located north west of the station and is associated with the potential for archaeological resources associated with a former siding.

In 1891 a siding loop (including goods shed) was constructed on the Down (western) side of the line at Hornsby. The siding was a section of track branching off the main line used for storing, loading and unloading trains, and allowing rail traffic to pass. While the North Shore line was designed for passenger transport, materials and products were also transported along the line, and ten goods sidings were constructed (Brady 2015:9-10). The loop was converted to a single-ended siding in 1933.

The siding is shown on the 1890s plan (Plate 3.1) and Plate 3.11 to the west of the Coonanbarra Road level crossing. In 1899 the siding is mentioned in *The Cumberland Argus and Fruitgrowers Advocate* as being used to store building materials:

Surely something will soon be done to the Goods Yard at the Station. It is almost impossible for foot traffic except on stilts. The crossing at the station is also in a deplorable state... New buildings are steadily going up all around here. There is a large quantity of building material now coming into the railway goods yard... (The Cumberland Argus and Fruitgrowers Advocate 10 June 1899).

The siding included a goods shed, which is shown on a 1943 aerial photograph (Plate 3.14). It is located beyond the SHR curtilage for Wahroonga Station and the proposed construction compound (Scouts Hall). Within the proposed construction compound, no additional infrastructure shown on the 1943 aerial photograph indicating that the potential for archaeological resources associated with the siding is limited to track and signalling and other infrastructure such as switches.

While the potential for archaeological resources associated with the siding is high, it is unlikely that any archaeological resources would be considered a relic under the *Heritage Act 1977*. Infrastructure such as track, signals or switches would be considered a work.

6 ASSESSMENT OF SIGNIFICANCE

In NSW, significance is assessed against the NSW Heritage Council criteria for assessing cultural and/or natural significance:

- criterion (a): An item is important in the course, or pattern, of NSW's cultural or natural history (of the cultural or natural history of the local area)
- criterion (b): An item has strong or special association with the life or work of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area)
- criterion (c): An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area)
- criterion (d): An item has strong or special association with a community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons
- criterion (e): An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area)
- criterion (f): An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area)
- criterion (g): An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places or cultural or natural environments (or a class of the local area's cultural or natural places or cultural or natural environments).

The Act also distinguishes between items of local and State significance:

- items of local significance demonstrate historical, cultural, social, archaeological, architectural, natural or aesthetic value of significance to an area
- items of State significance are of significance to the State in relation to the historical, cultural, social, archaeological, architectural, natural or aesthetic value of the item.

6.1 Statement of significance

The SHR statement of significance for Wahroonga Railway Station Group is:

Wahroonga station is one of the best island platform buildings on the north shore line. As a group they provide a consistent style of high significance as all are in excellent condition, and display a unity of development rarely seen on the railway system. They are also of interest as they are all island platform structures except for the terminus points such as Lindfield and Gordon where an additional platform is provided. This station contributes an important part as a major transport outlet for residents.

It is sited in a garden setting which was typical of many stations throughout the State and many of which now have largely been removed. This gives the site added significance (OEH 2019a)

The RailCorp Section 170 Heritage and Conservation Register statement of significance for Wahroonga Railway Station Group is:

Wahroonga Railway Station has heritage significance at a state level because it is one of the best preserved and most attractive island platform and station buildings in Metropolitan Sydney. The station and its surroundings are a superb example of standard early 1900s Sydney suburban railway station architecture and design, set among expansive gardens. Both

the station building and its setting make a substantial contribution to the character of the North Shore line, with its homogenous, early twentieth century railway architecture and landscaped settings. Wahroonga Station Group is perhaps the best example on the line due to its integrity and intactness. The station itself retains a high degree of its original spatial integrity, with the relationships between the station building, platform, stairs and footbridge remaining intact.

The impressive gardens associated with the station are historically important as they have been maintained for over 100 years by both local residents and council and represent a continuity of gardening activity at a railway station that is extremely rare in the Sydney Metropolitan network. The gardens represent a sense of corporate pride in the expansion of the railway and the modernisation of passenger transport it afforded in the late nineteenth century and community pride as the winner of numerous garden competitions. The gardens help to maintain the historic setting of the station and evoke a former era of rail travel.

The warren truss footbridge was identified as an item of exceptional heritage significance in the 2016 ‘Railway Footbridges Heritage Conservation Strategy’. It is also one of the few steel riveted warren truss footbridges remaining under the management of Sydney Trains. It is the only known example on a skew trestle. It makes a strong contribution to the State significant Wahroonga Railway Station precinct.

The station footbridge was identified as an item of high heritage significance in the 2016 ‘Railway Footbridges Heritage Conservation Strategy’. The station footbridge and stair are in reasonably intact condition and make a contribution to the State significant Wahroonga Railway Station precinct. The station itself retains a high degree of its original spatial integrity, with the relationships between the station building, platform, stairs and footbridge remaining intact (OEH 2019b).

6.2 Assessment of significance

The assessment of significance according to criteria in the SHR listing for Wahroonga Railway Station Group is presented in Table 6.1. The Section 170 Heritage and Conservation Register assessment of significance for Wahroonga Railway Station Group is presented in Table 6.2.

Table 6.1: Assessment of significance as per SHR listing (OEH 2019a)

| Criteria | Description |
|----------|--|
| f) | This item is assessed as historically rare. This item is assessed as arch. rare. This item is assessed as socially rare. |

Table 6.2: Assessment of significance as per Section 170 Heritage and Conservation Register listing (OEH 2019b)

| Criteria | Description |
|----------|---|
| a) | <p>Wahroonga Railway Station has historical significance at a state level. The impressive gardens associated with the station are historically important as they have been maintained for over 100 years by both local residents and council, and represent a continuity of gardening activity at a railway station that is extremely rare in the Sydney Metropolitan network. The gardens represent a sense of corporate pride in the expansion of the railway and the modernisation of passenger transport it afforded in the late nineteenth century.</p> <p>Like many stations, Wahroonga Station is significant at a local level for the role it played in the settlement of the local area, encouraging rapid subdivision and urban growth.</p> |
| c) | <p>Wahroonga Railway Station has aesthetic significance at a State level, as a highly intact example of an early twentieth century station in a landscaped setting. The station and its surroundings is a superb example of early twentieth century Sydney suburban railway station architecture and design, set amongst gardens of a high standard. The gardens help to maintain the historic setting of the station and evoke a former era of rail travel.</p> <p>Five large fig trees (<i>Ficus microcarpa</i> var. "Hillii") dating from c.1910 are located on the centre line of the island platform and have landmark qualities. Their presence is unique on this line and unusual in a</p> |

railway setting due to the difficulty of maintenance (the trees are scheduled for removal, 2009). The established gardens either side of the station provide an attractive setting for this station and have become a local landmark. The aesthetic significance of the station has not been compromised by the addition of modern shelter structures and lifts, as has often been the case at other North Shore line stations from a similar period.

Both the station building and its setting make a substantial contribution to the character of the North Shore line, with its homogenous, early twentieth century railway architecture and landscaped settings. Wahroonga Station is perhaps the best example on the line due to its integrity and intactness.

The station does not have technical significance as the station buildings and infrastructure are examples of well-documented types from this period with no significant, unusual or innovative design variations or subsequential modifications.

-
- d) Wahroonga Railway Station has social significance at a local level due to the continual involvement of both council and residents in the maintenance of its extensively landscaped setting. The gardens are recorded in 1900 as being developed by railway staff and volunteers from the local community (NSW Railway Budget, 20 Nov. 1899, p.59) and this association has continued to the present day. The Wahroonga station gardens have for over 100 years been an important contributor to the local community's sense of place and have been a source of constant community pride as the winner of numerous garden competitions.
-
- f) Wahroonga Railway Station is considered to be rare at a State level as the only example of railway station landscaping that has been maintained to a high standard, with such a high degree of intactness, for over 100 years in the Metropolitan network. The station retains a high degree of its original spatial integrity, with the relationships between the station building, platform, stairs and footbridge remaining intact.
- The warren truss footbridge at the northern end of the platform is the only structure of its type known to be supported on a skew trestle. The footbridge is also unusual in that it does not permit access to the platform. The former ticket collecting booths at the southern end of the platform are considered to be rare as the best preserved of only two examples on the Northern line (the others being at Waitara).
-
- g) The station building is representative of a high quality of railway station building which can be found elsewhere on the North Shore railway line.
- The warren truss footbridge was identified as an item of exceptional heritage significance in the 2016 'Railway Footbridges Heritage Conservation Strategy'. It is also one of the few steel riveted warren truss footbridges remaining under the management of Sydney Trains. It is the only known example on a skew trestle. It makes a strong contribution to the State significant Wahroonga Railway Station precinct.
- The station footbridge was identified as an item of high heritage significance in the 2016 'Railway Footbridges Heritage Conservation Strategy'. The station footbridge and stair are in reasonably intact condition and make a contribution to the State significant Wahroonga Railway Station precinct. The station itself retains a high degree of its original spatial integrity, with the relationships between the station building, platform, stairs and footbridge remaining intact.
-

6.2.1 Integrity and intactness

The SHR listing (OEH 2019a) does not include a statement of integrity and intactness for Wahroonga Railway Station Group, therefore the Section 170 Heritage and Conservation Register listing statement (OEH 2019a) is included below.

Wahroonga Station and its garden setting are highly intact and have a high degree of integrity, with relatively few changes occurring on the site since the station was first constructed. The station remains almost entirely in its original configuration and has been little changed over the past 100 years (OEH 2019b).

6.2.2 Themes

The following themes in Table 6.3 are identified on the SHR listing for Wahroonga Railway Station Group (OEH 2019a).

Table 6.3: Assessment of significance as per SHR listing (OEH 2019a)

| Australian theme | New South Wales theme | Local theme |
|--|---|--|
| 1. Environment-Tracing the evolution of a continent's special environments | Environment - naturally evolved-Activities associated with the physical surroundings that support human life and influence or shape human cultures. | Gardens |
| 1. Environment-Tracing the evolution of a continent's special environments | Environment - naturally evolved-Activities associated with the physical surroundings that support human life and influence or shape human cultures. | Other open space |
| 1. Environment-Tracing the evolution of a continent's special environments | Environment - naturally evolved-Activities associated with the physical surroundings that support human life and influence or shape human cultures. | Changing the environment |
| 3. Economy-Developing local, regional and national economies | Environment - cultural landscape-Activities associated with the interactions between humans, human societies and the shaping of their physical surroundings | Landscapes and parklands of distinctive styles |
| 3. Economy-Developing local, regional and national economies | Environment - cultural landscape-Activities associated with the interactions between humans, human societies and the shaping of their physical surroundings | Landscapes of urban amenity |
| 3. Economy-Developing local, regional and national economies | Environment - cultural landscape-Activities associated with the interactions between humans, human societies and the shaping of their physical surroundings | Landscapes of institutions - productive and ornamental |
| 3. Economy-Developing local, regional and national economies | Environment - cultural landscape-Activities associated with the interactions between humans, human societies and the shaping of their physical surroundings | Significant tree(s) providing urban amenity |
| 3. Economy-Developing local, regional and national economies | Transport-Activities associated with the moving of people and goods from one place to another, and systems for the provision of such movements | Railway Station |
| 3. Economy-Developing local, regional and national economies | Transport-Activities associated with the moving of people and goods from one place to another, and systems for the provision of such movements | Administering the public railway system |
| 3. Economy-Developing local, regional and national economies | Transport-Activities associated with the moving of people and goods from one place to another, and systems for the provision of such movements | Building and maintaining the public railway system |
| 4. Settlement-Building settlements, towns and cities | Accommodation-Activities associated with the provision of accommodation, and particular types of accommodation – does not include architectural styles – use the theme of Creative Endeavour for such activities. | Building settlements, towns and cities |
| 4. Settlement-Building settlements, towns and cities | Land tenure-Activities and processes for identifying forms of ownership and occupancy of land and water, both Aboriginal and non-Aboriginal | Resuming private lands for public purposes |
| 4. Settlement-Building settlements, towns and cities | Land tenure-Activities and processes for identifying forms of ownership and occupancy of land and water, both Aboriginal and non-Aboriginal | Administering and alienating Crown lands |
| 4. Settlement-Building settlements, towns and cities | Towns, suburbs and villages-Activities associated with creating, planning and managing urban functions, landscapes and lifestyles in towns, suburbs and villages | Role of transport in settlement |
| 4. Settlement-Building settlements, towns and cities | Towns, suburbs and villages-Activities associated with creating, planning and managing urban functions, landscapes and lifestyles in towns, suburbs and villages | Developing suburbia |
| 4. Settlement-Building settlements, towns and cities | Towns, suburbs and villages-Activities associated with creating, planning and managing urban functions, landscapes and lifestyles in towns, suburbs and villages | Nineteenth century Infrastructure |
| 4. Settlement-Building settlements, towns and cities | Towns, suburbs and villages-Activities associated with creating, planning and managing urban functions, landscapes and lifestyles in towns, suburbs and villages | Creating landmark structures and places in suburban settings |
| 4. Settlement-Building settlements, towns and cities | Utilities-Activities associated with the provision of services, especially on a communal basis | Suburban consolidation |

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| | | |
|--|--|---|
| 4. Settlement-Building settlements, towns and cities | Utilities-Activities associated with the provision of services, especially on a communal basis | Public Transport - suburban railway lines |
| 4. Settlement-Building settlements, towns and cities | Utilities-Activities associated with the provision of services, especially on a communal basis | Public Transport - suburban railway lines |
| 4. Settlement-Building settlements, towns and cities | Utilities-Activities associated with the provision of services, especially on a communal basis | Roadways connecting coastal settlements |
| 5. Working-Working | Labour-Activities associated with work practises and organised and unorganised labour | Railway work culture |
| 8. Culture-Developing cultural institutions and ways of life | Leisure-Activities associated with recreation and relaxation | Visiting heritage places |

The following themes in Table 6.4 are identified on the Section 170 Heritage and Conservation Register listing for Wahroonga Railway Station Group (OEH 2019b).

Table 6.4: Assessment of significance as per Section 170 Heritage and Conservation Register listing (OEH 2019b)

| Australian theme | New South Wales theme | Local theme |
|--|--|------------------------------------|
| 3. Economy-Developing local, regional and national economies | Transport-Activities associated with the moving of people and goods from one place to another, and systems for the provision of such movements | Building the railway network- |
| 4. Settlement-Building settlements, towns and cities | Towns, suburbs and villages-Activities associated with creating, planning and managing urban functions, landscapes and lifestyles in towns, suburbs and villages | Impacts of railways on urban form- |
| 8. Culture-Developing cultural institutions and ways of life | Creative endeavour-Activities associated with the production and performance of literary, artistic, architectural and other imaginative, interpretive or inventive works; and/or associated with the production and expression of cultural phenomena; and/or environments that have inspired such creative activities. | Railway gardens- |

6.3 Gradings of significance

The relative significance of elements at Wahroonga Station was assessed in 2015 (Colin Brady Architecture + Planning 2015). The definitions for the gradings of significance are included in Table 6.5 and the assessed level of significance for elements at Wahroonga Station is summarised in Table 5.6.

Table 6.5: Gradings of significance

| Assessed level of significance | Definition |
|--------------------------------|--|
| Exceptional | Rare or outstanding element directly contributing to an items local and State significance |
| High | High degree of original fabric. Demonstrates a key element of the item's significance. Alterations do not detract from significance. |
| Moderate | Altered or modified elements. Elements with little value but which contribute to the overall significance of the item. |
| Little | Alterations detract from significance. Difficult to interpret. |
| Intrusive | Damaging to the item's significance. |

Table 6.6: Assessment of significant elements (Colin Brady Architecture + Planning 2015)

| Significant elements | Alterations | Assessed level of significance |
|--|---|--------------------------------|
| Redleaf Avenue bridge 1908/09 | <ul style="list-style-type: none"> • Modifications for electrification of line 1927 • Construction of attached pedestrian concourse in early 1930s • Additions to upper landing c.2005 | High |
| Stair substructure 1908/09 | <ul style="list-style-type: none"> • Relocation and alteration of balustrade • Extension of structure to support additional area of top landing c.2005 • New soffit due to extension and partial replacement of concourse above | High |
| Platform 1908/09 | <ul style="list-style-type: none"> • 1906-09: Platform extended and reconfigured as island platform in conjunction with duplication of the line • 1920's removal of gas lighting in favour of electrical lighting lamp standards replaced | High |
| Station building | <ul style="list-style-type: none"> • 1906-09: Platform building constructed in conjunction with alteration of platform to island form and duplication of the line • 1920's removal of gas lighting in favour of electrical lighting | High |
| Western railway embankment | <ul style="list-style-type: none"> • Progressive establishment of landscaping from early [c. twentieth century] including detailed terracing from Inter War period 1922-39. | Moderate |
| Southern entry to walkway adjacent to western embankment | <ul style="list-style-type: none"> • Paving and planter of late twentieth century construction | Little |

6.3.1 Review of gradings of significance

This SOHI includes a review of the assessed gradings of significance. The high level of assessed significance of the Redleaf Avenue bridge, station stairs substructure, platform and station building and moderate level of assessed significance of the western railway embankment determined by Colin Brady Architecture + Planning (2015) are appropriate. However, portions of the southern entry to walkway adjacent to western embankment fall within the Wahroonga Conservation Area (Ku-ring-gai LEP 2015). For this reason, the assessed level of significance is considered to be moderate.

7 THE PROPOSAL

The Proposal involves an upgrade of Wahroonga Station as part of the TAP which would improve accessibility and amenity for customers.

7.1.1 Scope of works

Redleaf Avenue bridge refurbishment

Modifications to the Redleaf Avenue bridge would include:

- construction of a new reinforced concrete vehicle deck slab with asphaltic concrete topping, and associated waterproofing and drainage
- protection or relocation of services within the roadway
- new reinforced concrete vehicle crash barriers (to replace existing)
- repairs to the concrete arch superstructure
- relocation or adjustment to services attached to the existing walkway structure or passing over (in aerial configuration)
- replacement of the existing walkway structure with a new footbridge, including a new balustrade and protection screens.
- removal of existing brick parapet and reinstatement with new similar material.

Station access and interchange facilities

Modifications to the station access and interchange facilities would include:

- staged removal of existing station entrance canopy, retail outlet, concourse slab and stair trestle
- a new passenger lift and station entrance with canopy and screens to provide access from the Redleaf Avenue bridge to the island platform
- construction of a new walkway at platform level linking the lift to the platform
- upgrade to the existing station access stairs including structural repairs, painting and new tread nosings
- a new accessible ramp and pathway (and new stairs) to provide access from the station to Wahroonga shopping village and interchange zone
- a proposed interchange zone in Railway Avenue to provide an accessible parking space, and a zone for taxis and kiss and ride. Works may include kerb / footpath adjustments or installation of a mountable kerb, and signage and line marking modifications
- five new bike hoops either adjacent to the War Memorial on Illoura Avenue or near the station entrance off Railway Avenue
- landscaping works and adjustments to wayfinding.

Platform and station building works

- a new family accessible toilet and unisex ambulant toilet within the station building (to replace the existing male/female toilet facilities). This would include:

- the removal of the existing internal walls and fittings
- installation of new fittings, fixtures, finishes, services connections (water, wastewater, electrical, and mechanical services)
- adjustments to the doorways and access provisions (including remote access control)
- construction of an additional platform canopy for weather protection on the platform at the boarding assistance zone (north of the station building)
- improvements to station lighting and CCTV to increase safety and security
- improvements to customer information and communication systems, including public address (PA) system upgrades, new hearing induction loops within the station platforms, and new / adjusted Opal card readers
- new Tactile Ground Surface Indicators (TGSIs) (including along the length of both platform edges).

Ancillary works

The following ancillary works required as part of the upgrade work would include:

- regrading and resurfacing of the platform to provide compliant paths of travel between the lift, boarding assistance zones, family accessible toilet and other facilities on the platforms
- resurfacing of other areas of the platform where impacted by construction activities, including services trenching work
- new stormwater drainage connections from new canopies to the existing stormwater system
- services and utilities protection, adjustments and/or relocations to accommodate the new works
- upgrades to the station power supply to cater for the new lift including
 - adjustment to existing power supply connection points
 - new padmount substation within the rail corridor
 - new underline crossing and cable routes
 - new main switchboard and distribution boards
- modification to overhead wiring attachments to the bridge
- earthing and bonding of electrical equipment and new or modified structures
- fire services upgrade including a new fire detection system
- adjustment to station furniture, rubbish bins, and upgrade or removal of the existing Telstra payphones
- new/upgraded wayfinding signage and other station signage
- adjustments to rail corridor boundary and platform fencing.

Figure 7.1: Proposed plan

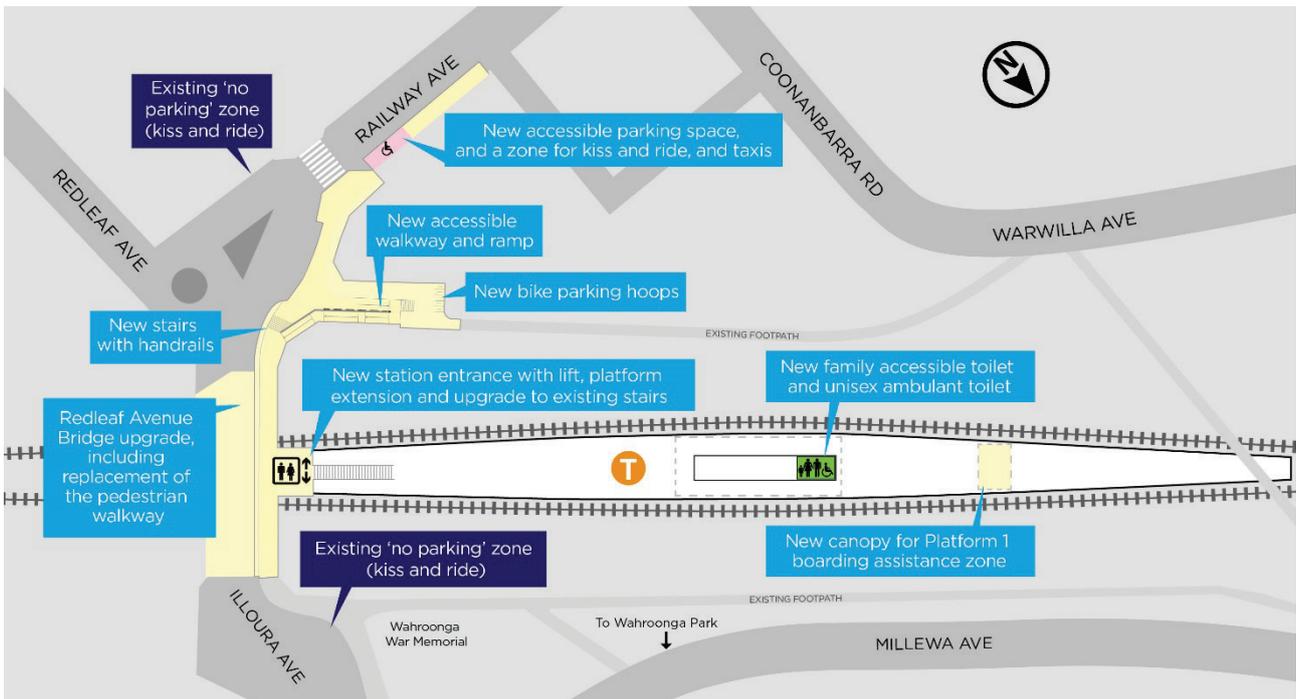


Figure 7.2: Proposed station building plan



7.1.2 Materials and finishes

Materials and finishes for the Proposal have been selected based on the criteria of durability, low maintenance and cost effectiveness, to accord with heritage requirements, to minimise visual impacts, and to be aesthetically pleasing. Consideration has also been given to lifecycle impacts. The lifecycle impacts of a material are calculated by looking at the environmental impacts of materials from the point of extraction, through to transportation, use, operation and end of life.

Subject to detailed design, the Proposal would include the following:

- lower lift shaft – concrete structure with a brick cladding
- upper lift shaft – steel frame with brick base and glazed cladding
- new canopies – metal sheet roofing and timber lined soffit (ceiling)
- concourse safety screens – steel structure and glazed screening
- ramp and footbridge – concrete slab flooring
- footbridge walls – concrete barrier with brick lining on the pedestrian side
- handrails – stainless steel.

The design has been presented to TfNSW's, Design and Sustainability Review Panel for peer review. An Urban Design Plan, including a public domain plan has also been prepared and is to be updated during the development of the design.

Indicative renders of the Proposal are shown in Figure 7.3 to Figure 7.5.

Figure 7.3: View 1 - platform



Figure 7.4: View 2 – Millewa Avenue



Figure 7.5: View 3 – Redleaf Avenue



7.2 Design development

7.2.1 Engineering and environmental constraints

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

Existing structures: the accessibility, placement and integrity of existing structures has been considered during the development of the design – these structures included the existing platform, Redleaf Avenue bridge and associated walkway structure, footpaths, stairs, station building, overhead wiring and associated support structures, seating, light poles, and street car parking.

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

Heritage: Wahroonga Station is listed on the NSW State Heritage Register (SHR 01280), the RailCorp (Sydney Trains) Section 170 Heritage and Conservation Register (4801002) and the heritage schedule of the *Ku-ring-Gai Local Environmental Plan 2015* (1991).

Vegetation: Wahroonga Station is located within an urban environment, with streetscapes and parklands adjacent to the station characterised by a diversity of native and endemic plant species resulting from the suburbs colonial heritage. Wahroonga Park for example, with its botanical landscape aesthetic, comprises of native and exotic feature trees and plant species. Landscaping is also evident in the rail corridor, which is heavily planted with exotic ornamental species.

Construction access: for specific construction activities, construction access would require traffic control in the adjacent streets and the use of a large mobile crane would be required to lift construction materials and equipment to the station from these roadways. During construction works requiring upgrades to the Redleaf Avenue bridge and concourse, partial closure of the bridge would be undertaken where possible to reduce the impact and amount of full bridge closures.

Public access: maintaining pedestrian access across the bridge and to the station, when the station is operational (i.e. not during rail shutdowns). The pedestrian access routes may need to be modified during construction to ensure maintenance of pedestrian access across the bridge and to the platforms.

Future patronage: the Proposal has been designed to accommodate the forecast Sydney Trains patronage growth (an increase of 15 per cent to 2036) and changing travel patterns.

7.3 Construction activities

7.3.1 Work methodology

Subject to approval, construction is expected to commence in 2020 and take around 24 months to complete. The construction methodology would be further developed by the nominated Construction Contractor in consultation with TfNSW.

The proposed construction activities for the Proposal are identified in Table 7.1. This staging is indicative and is based on the current concept design and may change once the detailed design methodology is finalised.

Table 7.1 Indicative construction staging for key activities

| Stage | Activities |
|---------------------------------------|--|
| Site establishment and enabling works | <ul style="list-style-type: none"> establish site compound/s (erect fencing, tree protection zones, site offices, amenities and plant/material storage areas etc) hi-rail pad installation remove vegetation to allow for construction of new ramp and footbridge abutments |

- installation of underline crossing/s for services (under the rail)
- relocate or upgrade services / utilities where required
- install safety barriers, lighting and hoarding around the nominated work zones

Preliminary works - station access (including lift, concourse, footbridge, platform modifications and platform canopy at the boarding assistance zone)

- install temporary structural support for concourse
- staged removal of existing station entrance canopy, retail outlet, concourse slab and trestle
- temporarily fitout with screens and handrails to provide station access
- demolish ramped end of platform and existing fence
- install temporary stairs to maintain construction access to tracks
- underpin the existing trestle structure underneath the concourse stairs
- excavate and pile for lift shaft
- prepare subgrade area and blinding for new walkway
- excavate for platform canopy footings
- temporary removal / reinstatement of platform furniture

Construction works - station access (including lift, concourse, footbridge, platform modifications and platform canopy at the boarding assistance zone)

- install new footbridge piles and reinstate footpath
- install formwork and reinforcement for lift pit and walls
- install steelwork for lift shaft and canopy roofing
- install lift car and motor
- install cladding and glazing to lift shaft
- construct new concourse with canopy and safety screens
- demolish existing walkway structure
- install precast beams and temporary footpath with edge protection
- construct new permanent footpath whilst maintaining pedestrian access (i.e. utilising the roadway as a diversion for temporary access)
- install permanent anti-throw screens along the new footbridge
- remove temporary concourse support structure
- construct new walkway at platform level linking the lift to the platform
- upgrade the stairs and handrails to the platform
- install platform canopy footings, structural steelwork and roofing
- excavate for and install new stormwater routes along the platform
- re-grade/resurface platform
- platform finishing works (line marking, tactiles etc.)

Bridge upgrades (road and arches)

- excavate the existing road deck and subsoil drainage
- construction of a new reinforced concrete vehicle deck slab with asphaltic concrete topping, and associated waterproofing, drainage and line marking
- install new reinforced concrete vehicle crash barriers
- install anti-throw screens on the city side of the road bridge
- repairs to the concrete arch superstructure – saw cutting to existing concrete, abrasive blast cleaning of steelwork, patching and application of primer, epoxy coatings and weatherproof paint

Ramp and stairs installation

- excavate for drainage elements and strip footings
-

| | |
|------------------------|--|
| | <ul style="list-style-type: none">• install new stormwater pits and subsoil drainage elements, followed by backfilling• install footings for ramp and bike hoops• construct new stairs and ramp• install bike hoops• install handrails and balustrades to new ramp |
| Station building works | <ul style="list-style-type: none">• install a temporary toilet on platform• demolish internal walls of existing toilets in station building• install a new dividing wall to create family accessible toilet and unisex ambulant toilet• waterproof and re-tile toilet areas• introduce new internal fixtures and fittings• install mechanical ventilation systems to the toilet areas |
| Interchange works | <ul style="list-style-type: none">• proposed interchange zone on Railway Avenue which may include kerb / footpath adjustments, and signage and line marking modifications |
| Electrical upgrades | <ul style="list-style-type: none">• modify existing fence line for padmount substation• electrical and power supply upgrade works including the installation of the padmount substation on a concrete slab• trenching for new cable routes |
| Site demobilisation | <ul style="list-style-type: none">• civil / lighting works• cutover / commission digital PA / hearing induction loops / TGSI• test and commission CCTV cameras / station systems installation• test and commission new lift / open to public• finishing works including landscaping, fencing and wayfinding• reinstatement of platform furniture• site demobilisation. |

7.3.2 Earthworks

Excavations and earthworks would generally be required for the following:

- construction of the lift shafts
- construction of the pedestrian ramp and stairs to the existing pedestrian walkway structure
- new footbridge and road upgrade works
- localised platform regrading/resurfacing work
- other minor civil works including footings and foundations for structures, drainage / stormwater works, and trenching activities for service adjustments and relocations.

It is estimated that approximately 500 cubic metres of excavated material would be generated from the above activities. Excavated material would be re-used on site where possible or disposed of in accordance with relevant legislative requirements.

7.3.3 Source and quantity of materials

The source and quantity of materials would be determined during the detailed design phase of the Proposal and would consider the requirements of ISCA IS Rating Tool v1.2. Materials would be sourced from local suppliers where practicable. Reuse of existing and recycled materials would be undertaken where practicable.

7.3.4 Temporary ancillary facilities

The following temporary works / facilities would be required during construction:

- temporary toilet/amenities for the customers on the station platform (when existing facilities are not available due to the upgrade works)
- temporary fencing, hoardings, structures and walkways as required to maintain existing safe pedestrian access across the rail corridor and to the platform during construction of the Proposal (to be determined during detailed design and construction phases of the Proposal).

Temporary construction compounds would be required to accommodate a site office, sheds, amenities, laydown and storage area for materials, plant and equipment. A number of areas for the construction compound and staging areas have been proposed on both the northern and southern sides of the rail corridor. These areas nominated for the compounds are on land owned by Sydney Trains. The main construction compound would be required to accommodate a site office, amenities, laydown and storage area for construction plant / equipment and materials.

Furthermore, hi-rail access points (either to be constructed or existing) would be used for track plant and equipment to gain access to the track and traverse to the worksites at Wahroonga Station in rail shutdowns. These include three existing hi-rail access locations near Millewa Avenue on the city side of the Redleaf Avenue bridge, Alexandria Parade in Waitara, and Hornsby Street, Hornsby.

Other worksite areas would be established during the course of the construction period and would be staged to minimise inconvenience to the customers and adjacent public areas. All established worksite areas would include suitable demarcation, hoarding or fencing.

Impacts associated with utilising these areas have been considered in the environmental impact assessment including requirements for any rehabilitation.

8 IMPACT ASSESSMENT

This chapter assesses the impact of the Proposal on Wahroonga Station. The level of impact is assessed in accordance with the definitions in Table 8.1.

Table 8.1: Defining level of impact

| Level of impact | Description |
|------------------|---|
| Major adverse | The Proposal would have a severe, long term and irreversible impact on the item. This includes partial or complete demolition of the item or additions in the vicinity of the item that would impact the visual setting of the item. |
| Moderate adverse | The Proposal would have an adverse impact on the item. This includes removal of an important aspect of the setting or temporary removal of significance elements or fabric. This impact could be reduced through appropriate mitigation measures. |
| Minor adverse | The Proposal would have a minor adverse impact on the item. This may be the result of the action affecting only a minor element or part of the setting. This impact may be temporary or reversible. |
| Nil | The Proposal would not have an impact on the significance of the item or a significant element. |

8.1 Design development

8.1.1 Options assessment and preferred concept design

The development of the design of the proposal included the assessment of several options.

The options considered to address issues associated with the structural condition of the Redleaf Avenue bridge included:

- retention and repair of the main edge beam supporting the footbridge and construction of a new deck which was proposed to be supported on the repaired edge of the beam and by a shelf angle fixed to the face of the road bridge
- demolition of the footbridge with construction of a new concrete footbridge with precast beams and a cast in-situ concrete deck.

Both options required the installation of safety screens to sections of the footbridge. The design development aimed to reduce the visual impact of the Proposal, though the use of an appropriate set back from the track and landscaping, but also ensure that the fabric of the road bridge was not compromised (Mott MacDonald 2019) (Appendix B).

The two options considered for providing an accessible path of travel from the Redleaf Avenue bridge to the platform:

- a new concourse with lift to provide access to the platform (and retention of the existing stairs) with a new canopy extending from the concourse, over the existing stairs connecting to the station building
- a new extended concourse and elevated walkway (with canopy) that would extend from the bridge over the existing stairs connecting to a new lift to provide access to the platform, but which would have adverse heritage impacts due to the introduction of new structures closer to the station building as well as more complex and costlier construction.

Options to provide access from the surrounding streets to the Redleaf Avenue bridge included either one or both lifts at the following locations:

- new lift to provide access from the lower side of Illoura Avenue up to the Redleaf Avenue bridge. A positive of this option was the proximity of the lift to the existing bus stop, this would result in vegetation loss and adverse visual and heritage setting impacts. It would also require the relocation of rail corridor underground services to accommodate the lift installation
- new lift to provide access from the Wahroonga shopping village to the Redleaf Avenue bridge which would require less vegetation removal, address a key pedestrian desire line but was not well connected to the Illoura Avenue bus stop.

A 'do-nothing' option was also considered where existing access to the platforms, station amenities and Redleaf Avenue bridge would remain the same but was not considered feasible, as it would not meet the requirements of the DDA and DSAPT.

A concept design was then developed for the preferred option which was a combination of the following:

- a new concourse and lift from the bridge to the platform, but which was refined to remove the proposed canopy extending over the stairs and connecting to the station building to minimise visual impacts and impact to significant fabric
- providing an accessible path of travel from the Wahroonga shopping village to the bridge but through a less visually intrusive ramp instead of the initially proposed lift (this was as a result of additional investigations that confirmed ground levels).

8.1.2 Summary of the consideration of heritage in design

Overall, the development of the design aimed to avoid or minimise impact to the significance of Wahroonga Station including:

- retention of significant fabric where possible, for example the existing stair structure to the platform is to be retained with upgrades
- minimising changes to the internal station building layout (i.e. only one internal wall is required to be realigned for the upgraded bathroom facilities) and utilising existing window and door openings in the station building
- the materials and finishes for the lift shaft have been selected with consideration for the landscape and setting (e.g. a visually recessive brick facade sympathetic to the station building with glassed upper lift shaft to reduce visual impact)
- the concourse roof canopy and lift have been designed as one elegant and sophisticated pavilion. The canopy adopts a square geometry design which allows for the upper lift shaft to extend through the canopy roofing which helps to reduce overall bulk. The underside of the canopy is also visually softened through a timber-lined ceiling to create a warm-inviting character
- the platform canopy adopts a similar theme to the concourse roof canopy and has been designed to the minimum dimensions required for DDA compliance
- while the existing brick parapet on the bridge separating pedestrian and vehicles needs to be replaced with a concrete support to meet safety standards, a brick finish is proposed to be installed on the pedestrian-side to help maintain the setting of the station and surrounds
- the protection screens across the bridge to be installed with glazing and to the minimum height required to reduce visual impacts.

8.1.3 Demolition of significant fabric

In accordance with *Statements of Heritage Impact* (Heritage Office and DUAP 1996), this section considers the impact of the proposed demolition of significant fabric including:

- portions of the Redleaf Avenue bridge

- platform ramp.

Have all options for retention and adaptive re-use been explored?

The existing footbridge of the Redleaf Avenue bridge has severe structural condition issues including:

- balustrade base corrosion
- primary steel edge beam top flange corrosion
- secondary steel cross beam corrosion, both within the footbridge deck and also where embedded into the brick of the road bridge
- brick cracking to the main road bridge from corrosion of secondary steel cross beams
- concrete cracking in the concrete footbridge deck from corrosion of secondary steel cross beams.

The design development included an assessment of options to maintain and repair the Redleaf Avenue bridge. The options assessed are outlined in the peer review of the proposals for the Wahroonga Station Redleaf Avenue bridge (Mott MacDonald 2019) (Appendix B) and included:

1. retain and repair existing footbridge
2. retain and repair the edge beam with a new deck
3. replace the footbridge structure with clear spans at maximum span
4. replace the footbridge as for Option 3 but introduce additional supports (similar to existing support locations)
5. replace the footbridge with lightweight steel trussed design
6. cantilever the footbridge by extending new concrete road bridge deck beyond the balustrade.

The peer review of the proposals for the Redleaf Avenue bridge (Mott Macdonald 2019) concluded that retention of the existing footbridge of the Redleaf Avenue bridge is not feasible. The consideration of retention and adaptive re-use of original materials in the final designs, in particular the steel trestle, is included as a recommendation of this SOHI. The trestle materials may be suitable for use in interpretation throughout the station.

Can all of the significant elements of the heritage item be kept and any new development be located elsewhere on the site?

The Proposal has lessened the proposed impact on the station building and platform, with major work limited to the Redleaf Avenue bridge and stairs. The spatial integrity of the station is also maintained. The development of the design has ensured that the construction of new structures is undertaken at a distance from the station building and that new construction is as minimally invasive on heritage fabric as possible, for example a canopy that was proposed to extend over the stairs and connect to the station building was removed to minimise visual impact.

Is demolition essential at this time or can it be postponed in case future circumstances make its retention and conservation more feasible?

Demolition is required as the Redleaf Avenue bridge is considered to be approaching the end of its serviceable life. It is unlikely that future circumstances would enable retention and conservation of fabric that is proposed to be demolished at present due to the nature of the existing fabric including the steel trestle, which is embedded within or closely integrated with brickwork or concrete. This is associated with difficulties maintaining significant fabric and with assessing and monitoring the structural condition of the bridge.

Has the advice of a heritage consultant been sought? Have the consultant's recommendations been implemented? If not, why not?

The advice of a heritage consultant has been sought throughout design development and informed the development of the design.

8.2 Impact assessment

8.2.1 Landscape and setting

The Proposal includes a number of works that would directly impact the visual landscape and setting of the station and its surrounds. The installation of the proposed lift linking the Redleaf Avenue bridge and the platform would be the most substantial visual change as part of the Proposal. However, the new lift and entry is consistent with the scale and bulk of the existing concourse structure and has been positioned in the same location. Site specific design that responds to the existing scale and character of the station precinct helps to ameliorate the visual impact to some degree. Once constructed, the proposed lift and canopy structure would form part of the visual setting of the station. The Redleaf Avenue bridge would also be updated and modernised, and the brick parapet would be removed and replaced with a new traffic barrier which may be in contrast with the surrounding streetscape of the Wahroonga Heritage Conservation Area (C1).

The removal of a garden bed and alteration of landscaping behind the Wahroonga shopping village to allow for construction of a new ramp and footbridge abutments would impact the landscaped setting of the station. An arborist report (Allied Tree Consultancy 2019, in prep) has determined that the removal of five trees within the SHR curtilage and one outside the curtilage would be required.

There would also be a number of trees subject to encroachment due to the construction works and may require pruning/trimming.

Much of the proposed work would have a direct visual impact on the station setting. The removal of trees would directly impact the landscaped garden setting of the heritage item, however this would be mitigated through replanting the area where vegetation has been removed with appropriate species. The Redleaf Avenue bridge modifications and removal of vegetation would contrast with the Wahroonga Heritage Conservation Area, which is characterised by Federation and Inter-war buildings and landscaped garden settings. However, the choice of modern materials to separate new elements from old in a visually recessive way, in conjunction with the thoughtful placement of the lift, has mitigated this impact to some degree. Overall, there would be a **moderate adverse impact** to the heritage significance of the station group, and the Wahroonga Conservation Area (Ku-ring-gai LEP 2015).

8.2.2 Redleaf Avenue bridge refurbishment

The Proposal includes the construction of a new reinforced concrete vehicle deck slab, protection or relocation of services within the roadway, new concrete vehicle crash barrier to replace the existing barrier, repairs to the arch superstructure, relocation or adjustment to services, replacement of existing walkway structure with a new footbridge, including a new balustrade and protection screens and removal of existing brick parapet and reinstatement with new material.

The Redleaf Avenue bridge refurbishment includes the removal of significant fabric, including the removal of the post 1935 existing walkway. This would have a direct impact to the station but is required in order to meet safety requirements due to corrosion of existing structural elements. In order to mitigate this impact, the relative importance of the walkway in the context of the broader significance of the station has been considered, and retention of the existing staircase has been prioritised. The proposed concourse will be supported by steel beams, which will be connected to the lift shaft. The concourse will be self-supporting, and no additional loads are imposed on the adjacent bridge structure. While the new footbridge would remove heritage fabric, the Proposal maintains the style and spatial integrity of the bridge while distinguishing between original fabric and new materials, as well as maintain views to and from the station. Further mitigation measures include the careful selection of materials and potential for reuse of original fabric. The curved steel balustrade would be retained where possible and has been incorporated into the walkway protection screen design as an interpretation of the existing walkway construction. These works would have a **minor adverse impact** to the heritage significance of the station group.

8.2.3 Station access and interchange facilities

8.2.3.1 Station access

The Proposal includes the staged removal of existing station entrance canopy, retail outlet, concourse slab and stair trestle. The construction of a new canopy roof will require new stormwater drainage connections from new canopies to the existing stormwater system.

The station access works include the removal of significant fabric, including the 1927 concourse slab and one stair trestle (1909). This would have a direct impact to the station and affect the significance of the station. While the retail outlet is of a sympathetic design to the rest of the station, construction of the item is more recent than the remainder of the station group and the removal of these items is preferable to the removal of earlier fabric, such as the stairs.

To mitigate these impacts the lift shaft will be constructed as adjacent to the existing trestle, as a visual continuation of the item. The painted steel outer edge extension of the canopy creates a thin visual line on all four eaves with particular focus on the visual experience upon approach to the station from the footbridge. The squared canopy geometry at concourse level allows the lift shaft over-run to pop through above and allow a lowered canopy height with reduced bulk. The canopy consists of a small pavilion like structure within a garden setting, and the use of natural timber finishes respect the park-like setting of the station.

The trestle supporting the existing stairs has been recognised as a sacrificial element to be removed in order to proceed with the Proposal. The current design allows for the retention of much of the original fabric of the station, including the station building and stairs as well as maintaining the primary access point to the station. In order to meet DDA requirements, the spatial requirements of a lift and entry and exit to the lift preclude the retention of the trestle. The trestle will be replaced with a new lift structure with safe, more open and direct circulation. These works would have a **minor adverse** impact to the heritage significance of the station group.

8.2.3.2 Proposed lift

The Proposal also includes a new passenger lift to provide access from the Redleaf Avenue bridge to the island platform.

Lift access from the footbridge to the platform is required in order to meet DDA requirements to provide an accessible path of travel. The lift will provide access for people with reduced mobility, parents and carers with prams or customers with luggage. One lift will travel between the station platform and the elevated concourse area. The proposed lift system which is a machine room-less traction lift installation removes the need for a lift motor room and associated access. The lift control panels will be located behind access panels located adjacent to the lift doorway on the highest floor served. The lift shaft and car will be partly glazed to allow visibility of occupants, reduce vandalism and misuse, and provide a safer environment for passengers in general. The lift shaft materials include face brick so as to not contrast with the bridge Redleaf Avenue bridge structure behind the lift at platform level.

While the lift installation would have a direct visual impact to the bridge and platform, it would not require the removal of significant fabric. The removal of significant fabric is associated with station access work as assessed in subsection 7.2.3.1. The overall design philosophy for the proposed lift is based on separating the new elements from the old, minimising bulk and scale as much as practicable, together with careful selection of materials and finishes. Overall, there would be a **minor adverse** impact to the heritage significance of the station group.

8.2.3.3 Stairs

The Proposal also includes the upgrade to the existing station access stairs including structural repairs / painting and new tread nosings. This would have a material effect on state significant fabric, however the impact is considered to be minor in nature and the retention of the stairs maintains the relationship between station building, platform and footbridge. Overall, there would be a **minor adverse** impact to the heritage significance of the station group.

8.2.3.4 Interchange facilities

The Proposal includes a series of works located outside the station boundary for interchange facilities. This includes a new accessible ramp and pathway (and new stairs) to provide access from the station to Wahroonga shopping village and interchange zone, a proposed interchange zone in Railway Avenue to provide an accessible parking space, and a zone for kiss and ride and taxis, five new bike hoops and landscaping works and adjustments to wayfinding.

The impact of the removal of a garden bed within the SHR curtilage to construct the accessible ramp and path is assessed as **moderate adverse** as it would impact the garden setting, which contributes to the overall significance of the station.

With the exception of the removal of the garden bed within the SHR curtilage, the impact associated with the interchange facilities is assessed as **minor positive**, as landscaping is proposed throughout the zone which would further contribute to the garden setting and improve access to the station. This work is proposed outside the SHR curtilage.

8.2.4 Platform and station building works

8.2.4.1 Walkway platform

The Proposal includes the construction of a new walkway at platform level linking the new lift to the platform. This would involve the demolition of the ramped end of the platform and existing fence and construction of new infrastructure.

These works would impact on the significance of the Wahroonga Railway Station Group setting through removal of state significant materials such as the concrete and brick ramped end of the platform, however at present this section of the platform is not accessible to the public and the new walkway platform works would allow for continued use of this space. Overall there would be a **moderate adverse** impact to the heritage significance of the station group.

8.2.4.2 Family accessible toilet and ambulant toilet

The Proposal includes a new family accessible toilet and unisex ambulant toilet to replace the existing toilet facilities, including construction of a dividing wall plus privacy screen in each toilet. This would include the demolition of existing internal walls and fittings that were altered in the 1990s, installation of new fittings, fixtures, finishes, service connections, adjustments to the doorways and access provision. These alterations would have a direct impact to the station building through removal of existing fabric and modification of extant layout, however much of the material to be removed is from a later alteration, including the internal fittings and fixtures. A 1906 station building plan shows that the current arrangement of the extant toilet facilities is a later modification to the building.

To mitigate these impacts the original windows and shutters are being retained, however new doors are required with electronic strike and remote access. The extant doors have been altered from the original single access door. The internal separation lining has been relocated to provide the space requirements for the toilets and no change to the external masonry opening is required. There would be a **minor adverse** impact to the heritage significance of the station group.

8.2.4.3 Platform canopy

The Proposal also includes the construction of an additional platform canopy for weather protection for the boarding assistance zone located to the north of the station building. This would include new stormwater drainage connections from the new canopy to the existing stormwater system.

The canopy would impact visually as a new item on the platform, as well as impact the platform through construction. The canopy has been designed to be as minimal as possible to reduce overall bulk and the underside of the canopy is softened through a timber lining. Additionally, the canopy has been designed to be similar in style to the concourse canopy so as to reduce impacts to the station. The new structures are sympathetically detailed and as a result are materially cohesive with the precinct. The canopy would have a **moderate adverse** impact to the heritage significance of the station.

8.2.4.4 Platform regrading

The Proposal also includes regrading and resurfacing to the platform to provide compliant paths of travel between the lift, boarding assistance zones, the family accessible toilet and other facilities on the platforms, as well as resurfacing of other areas of the platform where impacted by construction activities, including services trenching work.

The platform regrading would directly impact the platform through grading and resurfacing. However, excavating only the modern asphalt surface and avoiding the platform's original brick facing during these works significantly reduces the impact to heritage features of the original brick façade. Overall, there would be a **minor adverse** impact to the heritage significance of the station group.

8.2.5 Ancillary works

The Proposal includes a number of ancillary works designed to improve safety, accessibility and infrastructure across the station. The exact location of all ancillary works is not yet confirmed. Infrastructure across the station should adhere to the Sydney Trains and NSW TrainLink *Station Component Guide* (2017) and the *Sydney Trains Conservation Guide: Railway Station Platform Furnishings* and aim to reduce impact to significant fabric.

8.2.5.1 Signage

Wahroonga Station has already been upgraded with new wayfinding signage for consistency across the Sydney metropolitan rail network. As part of the Proposal, some additional wayfinding and other signage will need to be installed to capture the new accessible features of the station. The installation of new signage around the station would have a **minor adverse** impact on the heritage significance of the station group.

8.2.5.2 Customer facilities

Adjustment to seating, rubbish bins, lighting and other facilities would be carried out along with the installation of new or reinstated TGSIs for the platform, stairways and ramp. These works would involve the removal and replacement of existing facilities, and where necessary the installation of new ones.

The installation or upgrading of these customer facilities would have an **indirect minor positive** visual impact on the heritage significance of the station group as they would reduce the amount of modern facilities around the building, allowing a clear view of the significant fabric.

8.2.5.3 Security, communications and fire services

Improvements to station security and communication systems, including CCTV upgrade, PA system upgrades, additional / adjusted opal card readers and new hearing induction loops would be made. Additionally, the protection or relocation of services and utilities would be undertaken and a fire services upgrade including a new fire detection system.

Where new items would be installed, there would be a direct impact to the fabric and visual appearance of the station complex. However, upgrading existing security, communications and fire services infrastructure would have minimal impact on the station as there would be no alterations to the historic fabric or visual appearance, and would offset the significance of this impact. Overall, there would be **minor adverse** impact to the heritage significance of the station group.

It is understood that this infrastructure would be installed in accordance with the Sydney Trains *Heritage Technical Note: Installation of New Electrical and Data Services at Heritage Sites* (2017).

8.2.5.4 Station power supply

The Proposal includes upgrades to the station power supply to cater for the new lift, including, adjustment to existing power supply connection points, new padmount substation within the rail corridor, new underline crossing and cable routes, new main switchboard and distribution boards, modification to overhead wiring attachments to the bridge and earthing and bonding of electrical equipment and new or modified structures.

Where new items would be installed, there would be a direct impact to the fabric and visual appearance of the station complex, however the installation of new station power supply equipment would form part of the visual landscape of railway infrastructure already present within the station settings. The installation of the new padmount substation is located abutting the northern station fence line in a visually recessive location, however the installation may require the removal of vegetation. Overall, there would be **moderate adverse** impact to the heritage significance of the station group.

It is understood that this infrastructure would be installed in accordance with the Sydney Trains *Heritage Technical Note: Installation of New Electrical and Data Services at Heritage Sites* (2017).

8.2.6 Materials and finishes

Materials and finishes for the Proposal have been selected based on the criteria of durability, low maintenance and cost effectiveness, to accord with heritage requirements, to minimise visual impacts, and to be aesthetically pleasing. Consideration has also been given to lifecycle impacts. The reuse of existing and recycled materials would be undertaken where practicable.

Careful thought has been put into materials, form and colours to ensure a sympathetic architectural addition to the heritage station precinct. The following material selection has been undertaken:

- dark coloured brick to the outer parapet edges of the concourse to match existing brick
- dark coloured brick cladding to the lower 900 millimetres of the lift shaft at concourse level to match existing brick
- dark grey painted steel elements: steel lift shaft, canopy fascia, downpipes and steel posts to the glazed screen, flashings, etc
- the concourse finished floor surface will be brushed concrete
- the concourse and platform canopy roof soffits will be lined in Prodema timber veneer panels to create a warm inviting character.

The materials and finishes proposed within the Proposal would have an indirect visual impact on the heritage significance of the station group. However, separating the new elements from original fabric and careful choice of materials has mitigated this impact to some degree.

8.2.7 Impact associated with laydown and crane set up locations within the SHR curtilage

The Proposal requires the use of temporary construction compounds to accommodate laydown and crane set up locations for works to be carried out. No excavation or vegetation removal would be required in these areas prior to use, however some vegetation trimming may occur. The impact of the temporary ancillary facilities within the SHR curtilage to the heritage significance of the station group would be **nil**.

8.3 Impact to archaeological potential

The Proposal includes ground disturbing works for the lift to connect Redleaf Avenue bridge to the station platform, construction of the pedestrian ramp and stairs to the existing pedestrian walkway structure, new footbridge and road upgrade works and other minor civil works including footing and foundations for structures, drainage / stormwater works, and trenching activities for services adjustments and relocations. It is estimated that up to 500 cubic metres of excavated material would be generated.

Wahroonga Station has been assessed as having low archaeological potential for the areas of proposed impact. There is little evidence of former, demolished buildings and infrastructure within the proposed work areas, and the platform has been resurfaced with asphalt over the years. Therefore, the Proposal would not impact the archaeological potential of the station.

8.4 Summary

Overall the Proposal would have a **moderate adverse impact** to the significance of the SHR Wahroonga Railway Station Group due to the demolition of part of the Redleaf Avenue bridge and the cumulative impact of the other aspects of the Proposal.

The Proposal includes the demolition of part of the Redleaf Avenue bridge, which is located within the SHR curtilage. While the Redleaf Avenue bridge contributes to the overall significance of the station, it is not identified in the SHR statement of significance and is associated with a later phase of the development of the station. Other aspects of the Proposal are associated with a minor or moderate adverse impact; however, overall the Proposal retains significant elements of the station, in addition to the setting.

The impacts to the significance of the SHR Wahroonga Railway Station Group include:

- landscape and setting – moderate adverse
- Redleaf Avenue bridge refurbishment – minor adverse
- station access – minor adverse
- proposed lift – moderate adverse
- stairs – minor adverse
- interchange facilities – minor positive with the exception of the removal of a garden bed within the SHR curtilage which would have a moderate adverse impact on the setting of the station
- walkway platform removal – moderate adverse
- provision of family accessible toilet and ambulant toilet – minor adverse
- platform canopy – moderate adverse
- platform regrading – minor adverse
- signage – minor adverse
- customer facilities – indirect minor positive
- security upgrade – minor adverse
- station supply power – moderate adverse
- construction compound (Scouts Hall) – potential minor adverse impact to archaeological resources
- additional construction compounds, temporary laydown and storage areas and crane-set up locations and temporary hi-rail pads – nil.

8.5 Statement of heritage impact

The Proposal would ensure that Wahroonga Station is accessible to all customers, and portions of the Proposal respect or enhance the significance of the station. The Proposal would ensure the continued use of the station whilst retaining the majority of the State significant elements of the station. The Proposal includes the demolition of the brick parapet and trestle structure, concourse and retail space, demolition of existing walkway, demolition of existing internal wall and fittings of the current male and female toilets inside the station building, and demolition of ramped southern end of the platform and existing fence.

REPORT

Throughout design development, potential adverse impacts to the significance and fabric of the station have been avoided or minimised where possible (also refer to Section 7.1.4 and Section 7.1.5). There are no archaeological impacts associated with the Proposal. The Proposal includes the addition of new elements, alteration and removal of existing elements from the Wahroonga Railway Station Group. Direct impacts to elements of the Wahroonga Railway Station Group range from nil impact to major adverse. Overall, the Proposal is associated with a **moderate adverse impact**.

9 RECOMMENDATIONS AND MITIGATION MEASURES

The following recommendations and mitigation measures have been compiled in accordance with the conclusions of this SOHI, the Heritage Act and in consideration of the following Sydney Trains policies and strategies:

- *Heritage Technical Note: Installation of New Electrical and Data Services at Heritage Sites (2017)*
- *Heritage Platforms Conservation Management Strategy (2015)*
- *Railway Footbridges Heritage Conservation Strategy (2016)*
- *Station Component Guide (2017)*
- *Canopies and Shelters Design Guide for Heritage Stations (2016)*
- *Conservation Guide: Railway Station Platform Furnishings (2012)*

Recommendation 1: Section 60 application

It is recommended that a Section 60 application is submitted to the Heritage Council of NSW. No work associated with the Proposal should proceed without approval under the *NSW Heritage Act 1977*.

Recommendation 2: Canopies

The detailed design for the proposed canopies including an additional platform canopy for weather protection for the Platform 1 boarding assistance zone (north of the station building) and station entrance canopy, should be developed in consideration of the Sydney Trains *Canopies and Shelters Design Guide for Heritage Stations (2016)*. In particular:

New design should enhance the setting and significance of a place. In rare cases, where the station has a significant overall character that has been preserved through time, it may be justifiable to design the new structures as reproductions of the existing ones. In most cases, the appropriate response will be a modern structure with design qualities that are sensitive to the original.

The proposed canopies should aim to reduce impact to significant fabric and the visual impact of the Proposal through recessive materials and sympathetic design. Detailed design should be developed in consultation with a heritage architect, with attention to the location of attachments to significant fabric and the construction methods. Measures should be put in place to protect significant fabric from accidental impact during the construction and installation of the canopies.

Recommendation 3: Protecting significant fabric

To avoid impact to significant fabric during the construction of the Proposal, it is recommended that:

- a. fabric retained from the demolition of the brick parapet should be reused for construction or interpretation where possible
- b. fabric retained from the demolition of the stair trestle should be reused for construction or interpretation where possible
- c. where possible, impacts to landscaping must be limited
- d. protective measures, as determined in consultation with a suitably qualified specialist, must be put in place to protect significant fabric on the platform during the proposed regrading, trenching and construction. The platform surface should be reinstated on completion

- e. protective measures must be put in place to protect significant fabric of the station building. Care must be taken when installing fixtures and fittings to the exterior of the building. This includes the toilet windows and shutters during construction of the new toilets.

Recommendation 4: The addition of station components

The addition of components such as seating, lighting and signage must be consistent with the Sydney Trains and NSW TrainLink *Station Component Guide* (2017) and to the existing seating, lighting and signage at the station.

Recommendation 5: Installation of services

New services should be installed in accordance with the Sydney Trains *Heritage Technical Note: Installation of New Electrical and Data Services at Heritage Sites* (2017). The exact location of services is not yet confirmed. Installation of services should be planned in consultation with an appropriate specialist such as a heritage architect or archaeologist and aim to reduce impact to significant fabric and visual impact. Where possible services should be installed within established conduits to reduce cumulative impact to significant fabric.

Recommendation 6: Archival record

It is recommended that a photographic archival record of Wahroonga Station is prepared prior to, and at the completion of, construction in accordance with the NSW Heritage Office (former) publication *How to prepare archival records of heritage items* and *Photographic Recording of Heritage Items using Film or Digital Capture*. The photographic archival record should document the condition of Wahroonga Station prior to, and after, the Proposal, the internal configuration of the station building and the setting including the bridge.

Copies of the archival record should be deposited with Heritage DPC, Sydney Trains Heritage and the local library.

Recommendation 7: Heritage interpretation and public art installations

It is recommended that a heritage interpretation plan for the station is developed and implemented in accordance with the NSW Heritage Office guideline *Interpreting Heritage Places and Items* (2005). The Sydney Trains Draft *Heritage Interpretation Guideline* (July 2018) should also be considered in consultation with Sydney Trains Heritage during preparation and implementation of the heritage interpretation plan.

Recommendation 8: Unexpected archaeological resources

It is unlikely that any archaeological resources would be encountered during construction. However, if unexpected archaeological resources are encountered during construction the TfNSW *Unexpected Heritage Finds Procedure* (2016) must be implemented.

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Appendix A

Ancillary locations



 Crane set-up locations

 Proposed temporary laydown and storage areas

 Proposed construction compound location

 Potential hi-rail pad location





 Proposed temporary laydown and storage areas

 Potential hi-rail pad location



Appendix B
Wahroonga Station, Redleaf Avenue Overbridge –
Mott Macdonald 2019



Wahroonga Station, Redleaf Avenue Overbridge

Footbridge Proposals. Peer Review

8 November 2019

Issue and revision record

| Revision | Date | Originator | Checker | Approver | Description |
|----------|----------|-----------------|--------------|-----------------|-----------------|
| A | 08/11/19 | Simon Wiltshier | Alison Naimo | Simon Wiltshier | For Information |
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Document reference: 396263 | CR | 03

Information class: Standard

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1 Introduction

We provide the following report on our peer review of proposals for the treatment of the footbridge.

1.1 Background

An upgrade to access facilities is proposed by Transport for New South Wales at Wahroonga Station as part of the ongoing Transport Access Program.

This peer review is specific to proposals for alterations to the footbridge, which is immediately adjacent to the road bridge over the rail line, and is currently structurally connected to the road bridge for support.

An initial schematic design for Sydney Trains was prepared by SMEC. This was taken to a Concept Design stage (70% design stage). This design involved retaining and repairing the main edge beam supporting the footbridge and constructing a new footbridge deck which was proposed to be supported on the repaired edge beam and by a shelf angle fixed to the face of the road bridge.

Subsequently, this Concept Design for the project has been further developed by GHD (with Design Inc as the architectural subconsultant). This design has proposed a different approach, with demolition of the footbridge and construction of a new concrete footbridge with precast beams and a cast in-situ concrete deck.

Both structural approaches include the need to install protection / safety screens to certain sections of the footbridge.

This station complex is listed on the State Heritage Register. The footbridge is not separately listed in the register listing, however is understood to be a potential contributory item due to its age (1927), and it being within the heritage curtilage.

This peer review has been prepared to support the Section 60 Application for the project. This peer review has considered only the footbridge and does not cover remedial works to the road bridge or works to the platform, platform buildings and stairs.

1.2 Site Inspection

A site inspection, with briefing from TfNSW, was carried out on 28th October 2019. The inspection was undertaken from the station platform and from the footbridge and did not include special access provisions to inspect the underside of the footbridge from close range (eg boom hoist). The inspection was however considered to be sufficient for the purposes of this review. Detailed photographs of footbridge condition, carried out by both SMEC and GHD, have been provided to supplement the inspection.

1.3 Documents Reviewed

The following documents have been reviewed:

- Wahroonga Railway Station Group, State Heritage Register Listing
- 70% Detailed Design Drawings by SMEC dated 26/07/19
- 70% Detailed Design Report by SMEC dated 31/07/19

- Defect Mapping Drawings by SMEC dated 31/05/19
- TAP 3 Station Upgrade Structural Drawings by GHD dated 16/08/19 and 26/08/19
- Condition Assessment Report Rev 0 by GHD dated August 2019
- TAP 3 Structural Design Report Rev 2 by GHD dated August 2019
- Memorandum of Review of 70% Documents by GHD undated
- TAP Upgrade Architectural Drawings by DesignInc dated 30/08/19 and 14/10/19
- Various photographs and historical drawings

2 Findings

The existing footbridge has severe structural condition issues.

These include:

- Balustrade base corrosion
- Primary steel edge beam top flange corrosion
- Secondary steel cross beam corrosion, both within the footbridge deck and also where embedded into the brickwork of the road over-bridge
- Brick cracking to the main road over-bridge brickwork from corrosion of secondary steel cross beams
- Concrete cracking in the concrete footbridge deck from corrosion of secondary steel cross beams

Railway infrastructure of this age commonly incorporates steelwork embedded within, or closely integrated with, brickwork or concrete. This has proven to present ongoing maintenance problems and difficulties with assessing and monitoring structural condition. In most cases this is a result of original design that inherently limited the lifespan of the overall structure.

In particular, the existing footbridge incorporates steelwork which is prone to corrosion, being both partially exposed and being inadequately waterproofed where embedded within, or being in contact with, other structure.

The effects of corrosion in the cross beams include:

- Cracking in the deck above the cross beams
- Jacking and cracking to the brick corbels of the main road bridge
- Potential undiscovered structural inadequacy in the cross beams

The effects of corrosion to the main edge beam include:

- Reduction in capacity of the edge beam due to corrosion section loss
- Corrosion jacking to the footbridge slab edge



Footbridge and Road Over-Bridge (TfNSW Photo)

Note the edge beam and the cross beams.

3 Previous Proposals

3.1 The SMEC Proposal

The SMEC proposal sought to maintain and repair the main edge beam. However, the proposal recognised that the cross beams could not feasibly be repaired and retained. This was a reasonable response to maximising the retention of original fabric, however this approach has potential problems.

- The time taken to expose and repair the beam would require extended track possessions.
- The full extent of required repair would not become apparent until the deck was removed, and this then might affect the feasibility of carrying out the work within a track possession.
- The completed work would still incorporate an exposed edge beam, with the ongoing potential for further future corrosion and maintenance problems. The edge beam repair could be detailed to maximise lifespan with careful detailing, however this option would still not be the optimum solution for durability.
- Because of the proposed connection of the inner edge of the footbridge to the road bridge, the proposal relies on the integration of footbridge and road bridge, which has the potential to inhibit maintenance and future works to both bridges.

In situations where heritage fabric has been assessed to have a high level of significance, all reasonable efforts should be put in place to retain that fabric. From review of the heritage listing, and considering the likely contribution of the fabric of the footbridge to the heritage significance of the site, it appears unlikely that the heritage significance of the footbridge fabric would be sufficient to warrant its conservation if it was to the detriment of the overall lifespan and functionality of the road bridge and the station access.

The footbridge (attached to the road bridge) is not separately identified as an element within the heritage listing, although it is within the historic curtilage of the listing.

3.2 The GHD Proposal

GHD considered the 70% Design drawings by SMEC, the condition of the fabric and the constructability issues, and prepared a memorandum which described their findings.

GHD have proposed an alternative which separates the footbridge structure from the road bridge. This has a potential advantage with regard to the long-term conservation of the road bridge. The Heritage Listing specifically recognises the road bridge as significant within the curtilage.

The process of supporting the footbridge off the road bridge, as suggested by SMEC, could be achieved with careful detailing to control risk of damage to the fabric of the road bridge, however independence of the footbridge from the road bridge is preferable.

The GHD proposal however has greater visual bulk. Rather than utilising additional supports to reduce footbridge span to spans similar to those existing, it proposes larger clear spans. This has the advantage of moving supports well back from the rail alignment, which has collision protection benefits.

If additional supports were introduced in the location where the current supports are, they would require collision protection, which would result in a much bulkier design than the current supports.

The aesthetic advantage of reducing the depth of the spans would be outweighed by the mass of the additional support structures.

The overall depth of the GHD precast proposal is expected to be in the order of 800mm to 900 mm (500 to 600mm precast depth plus a 200mm topping slab plus a 100mm high hob to the edge). This is indicated on DRG- 34114.

The current overall depth of steel edge beam and deck is in the order of 560mm. The SMEC proposal included a kerb (Refer Dwg CV-012), which would create an overall structural bulk, by scaling off the drawing, in the order of 780mm.

Consequently, both proposals are likely to involve an increase in structural bulk over and above the current situation. This review recommends that all reasonable efforts are made in detailed structural design to minimise bulk.

4 Options Assessment

The following options have been considered in this review:

4.1 Option 1: Retain and repair existing footbridge, including the deck

This is considered impractical because demolition of the deck would be required to access, inspect, evaluate and repair the existing steelwork. The steel cross beams would still present a threat to the long-term durability of the fabric of the road over-bridge. The footbridge structure would have ongoing durability issues because of the partially exposed, and partially embedded steelwork.

The existing supports would require collision protection, which would have a significant visual impact.

4.2 Options 2: Retain and repair the edge beam with a new deck (The SMEC option)

This is preferable to Option 1, however it has some detailing difficulties and potential maintenance difficulties associated with the connection of the footbridge to the (arguably more important) road bridge. The retained edge beam will continue to be a maintenance issue and may compromise overall lifespan.

This option also has constructability issues in the time afforded by track possessions.

The existing supports would require collision protection, which would have a significant visual impact.

This option does have the advantage of maintaining a similar form to the original structure. The aesthetic quality of the original is however debatable.

Option 3: Replace the footbridge structure with clear spans at maximum span (the GHD option)

4.3 Option 3: Replace the footbridge structure with clear spans at maximum span (The GHD option)

This option has the advantage of separation of footbridge from overbridge, thus avoiding the footbridge structure compromising the fabric of the road over-bridge. It also has constructability advantages within the timeframe of track possessions.

This option has good long-term durability and minimal maintenance requirements. This option does however have more bulk in the spans than the current option, which may have a visual impact. Conversely however the support abutments would be set back from the tracks and would be less visually apparent with potential for concealment with landscaping and vegetation.

It is recommended that consideration be given in detailed design to facilitate an allowance to access and maintain the face of the road over-bridge. Further it is recommended in detailed design that minimisation of structural bulk is considered.

4.4 Option 4: Replace the footbridge as for Option 3 but introduce additional supports (similar to current support locations)

This option has the same advantages as Option 3, however with reduced bulk in the spans. The additional supports would however require collision protection requirements to comply with ASA Standards and, in particular, AS 5100. They would also require headstocks to carry the precast planks.

These collision protection requirements would create significantly greater bulk at the supports. The overall advantage of reducing the depth and bulk of the spans would be outweighed by the greater bulk of the support piers.

Increased track possessions would be needed to install footings, columns and headstocks.

4.5 Option 5: Replace the footbridge with a lightweight steel trussed design

This option can achieve clear spans, could be installed within track possessions and could be designed with reduced visual bulk.

It would however have ongoing maintenance requirements. It would not comply with fire performance requirements as a necessary egress path from the station.

4.6 Option 6: Cantilever the footbridge by extending the new concrete road bridge deck beyond the balustrade.

This option would require dismantling and reconstructing the road bridge brick balustrade and part of the bridge arch itself. The footbridge and the road bridge would not necessarily match regarding levels because of the new disabled access requirements, however this could be accommodated with a step at the balustrade position.

The design would need to incorporate vertical collision loading which would have a significant additional impact on the existing road bridge and may make a cantilever impractical.

This option is likely to have major constructability issues regarding track possession requirements because of in-situ construction over the rail corridor.

This option would require considerable alterations to the road bridge and would be likely to lead to maintenance difficulties with the road bridge in the future.

The road bridge is apparently a more significant contributor to the heritage significance of the site than the footbridge, therefore this would not appear to be a sound proposal from a heritage perspective.

5 The Balustrade

The existing balustrade to the footbridge is partially constructed out of original rivetted steel and has partially been replaced by welded steel to a similar pattern. It is not clear how much of the original balustrade was replaced as a result of deteriorated condition and how much was replaced as a requirement of alterations to the bridge made at the time of the construction of the current concession area.

The balustrade has had an additional top rail added to increase its height. This appears to have been relatively recent work.

The primary condition issue is the extensive, but variable, corrosion to the balustrade bottom rail and to the balustrade base fixings into the deck. In some locations the corrosion has been so severe that the balusters have parted from the bottom rail.

This corrosion appears to relate to an initial design defect which set the bottom rail directly onto the footbridge deck. This detailing precluded maintenance painting to the bottom rail and also trapped moisture at this location.

The new works require the installation of protection / safety screens, however these do not occupy the full extent of the balustrade. The architectural drawings indicate a potential to integrate balustrade and the new screens.

The extent of deterioration to the bottom rail of the existing balustrade and to the lower section of the balusters, coupled with the problem of the bottom rail being prone to ongoing corrosion are considered sufficient to warrant balustrade replacement with a sympathetic but new design. This design should allow to lift the balustrade base out of contact with the deck, and also accommodate the greater height needed for the handrail.

6 Summary

The existing footbridge is approaching the end of its serviceable life. Its service life has been inherently restricted by the original structural design.

Options have been considered and the current Option 3 (the current GHD proposal) achieves the best fit of ongoing functionality with the maintenance of the heritage significance of the site as a whole.

Options 1 and 2 do not achieve full durability and constructability requirements.

Option 4 results in greater overall bulk because of collision protection requirements to the supports, although a reduced depth of main spans would be possible.

Option 5 does not achieve fire safety requirements.

Option 6 would provide a potentially aesthetically sympathetic solution, but it would require significant disturbance to the existing heritage fabric of the road bridge, which is expected to contribute greater heritage significance to the site than the footbridge. This option would also have constructability issues with regard to track possessions and would have difficulty achieving collision loading requirements.

It is recommended that Option 3 (the current GHD proposal) is approved. It is also recommended that, in detailed design, all reasonable efforts are made to minimise the visual bulk of this option. It is further recommended that access to maintain the road bridge is considered in detailed design.

We trust that this review is of assistance. Please contact the undersigned as required for further clarification or input.

Yours faithfully



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Attached. Appendix A. Photographs.

A. Appendix: Photographs



Footbridge from below (TfNSW Photo)



Inner Face of Edge Beam (GHD Photo)

Note top flange corrosion.



Cross Beam at Face of Road Over-Bridge (GHD Photo)

Note cross beam corrosion, particularly at embedded end.



Footpath and Road Over-Bridge (MM Photo)

Note damage to deck edge and corrosion at cross beam embedments



Balustrade Base (MM Photo)

Note proximity of bottom rail to deck and corrosion to bottom rail



Deck Crack Over Cross Beam (MM Photo)

