



# Newcastle Light Rail

Submissions Report

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# Abbreviations

Abbreviation	Definition
<b>AHIMS</b>	Aboriginal Heritage Information Management System
<b>AHIP</b>	Aboriginal heritage impact permit
<b>CBD</b>	central business district
<b>CCTV</b>	closed circuit television
<b>CEMP</b>	construction environmental management plan
<b>CPTED</b>	crime prevention through environmental design
<b>dB</b>	decibels
<b>dB(A)</b>	A-weighted decibels
<b>EPA</b>	Environment Protection Authority
<b>EP&amp;A Act</b>	<i>Environmental Planning and Assessment Act 1979</i>
<b>GHD</b>	GHD Pty Ltd
<b>Infrastructure SEPP</b>	State Environmental Planning Policy (Infrastructure) 2007
<b>ISCA</b>	Infrastructure Sustainability Council of Australia
<b>km/h</b>	kilometres per hour
<b>kVA</b>	kilovolt amperes
<b>LEP</b>	Newcastle Local Environmental Plan 2012
<b>L<sub>ASmax</sub></b>	A-weighted maximum noise level using slow response time
<b>L<sub>Amax</sub></b>	A-weighted maximum noise level using fast response time
<b>mm</b>	millimetres
<b>mm/s</b>	millimetres per second
<b>NUTTP</b>	Newcastle Urban Transformation and Transport Program
<b>OEH</b>	NSW Office of Environment and Heritage
<b>PAD</b>	potential archaeological deposit
<b>REF</b>	review of environmental factors
<b>Roads and Maritime</b>	NSW Roads and Maritime Services
<b>rms</b>	root mean square
<b>SEPP</b>	state environmental planning policy
<b>TfNSW</b>	Transport for NSW

# Glossary

Term	Definition
<b>ballast</b>	Crushed rock, stone etc used to provide a foundation for a road or railway track. It usually provides the bed on which railway sleepers are laid
<b>catenary system</b>	Electric power system for a rail vehicle which uses an overhead contact wire, and its supporting cables and wires
<b>emission</b>	A substance discharged into the air
<b>heritage listed</b>	An item, building or place included on statutory heritage lists maintained by local, State or the Australian Government
<b>level of service</b>	Defined by Austroads as a measure for ranking operating road and intersection conditions, based on factors such as speed, travel time, freedom to manoeuvre, interruptions, comfort and convenience
<b>light rail alignment</b>	The location of the light rail tracks along which the light rail vehicles would operate
<b>mixed running</b>	The light rail alignment is located within the road corridor in a lane which is also used by general road traffic
<b>the proposal</b>	The construction and operation of the Newcastle Light Rail project
<b>the Program</b>	<p>The Newcastle Urban Transformation and Transport Program comprising transport projects including:</p> <ul style="list-style-type: none"> <li>• Wickham Transport Interchange Project</li> <li>• Broadmeadow Station Upgrade Project</li> <li>• Newcastle Light Rail proposal</li> </ul> <p>The Program also includes urban transformation projects including:</p> <ul style="list-style-type: none"> <li>• the development of the disused rail corridor</li> <li>• urban amenity upgrades along the light rail alignment.</li> </ul>
<b>the Program team</b>	<p>The Program team consists of the following agencies:</p> <ul style="list-style-type: none"> <li>• Roads and Maritime Services</li> <li>• Urban Growth NSW</li> <li>• Transport for NSW</li> </ul>
<b>relic</b>	A relic is defined by the NSW <i>Heritage Act 1977</i> as 'any artefact, object or material evidence which relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and which is of State or local heritage significance.'
<b>sensitive receivers</b>	Land uses which are sensitive to potential noise, air and visual impacts, such as residential dwellings, schools and hospitals
<b>segregated running</b>	The light rail alignment is located in its own corridor, which is separate from the road corridor
<b>separated running</b>	The light rail alignment is located within the road corridor in a dedicated lane which is not generally used (except for crossing purposes) by general road traffic
<b>stabling</b>	The act of taking a light rail vehicle out of service and parking it in a siding or stabling facility, usually overnight or longer
<b>study area</b>	The area including and adjacent to the proposal, with the potential to be impacted by proposal activities
<b>submissions report</b>	Used to summarise the issues raised by submissions received in response to public display of the REF, and to provide TfNSW's responses to the issues raised
<b>traction substation</b>	A traction substation is an electrical substation that converts electric power from the form provided by the electricity provider to an appropriate voltage, current type and frequency which can be used to supply the light rail network with power
<b>the former heavy rail corridor</b>	The heavy rail corridor between Wickham Transport Interchange and Newcastle Station - no longer used for heavy rail services
<b>turnout</b>	A junction point where a light rail vehicle could change between two routes/travel directions

# Revitalising Newcastle

## A vision for Newcastle

*Newcastle's place is evolving. There is an opportunity to create an activated city centre and waterfront that attracts people, new enterprise and tourism. The people of Newcastle have said they see great opportunities to build on the strengths of this city, to have better transport, create more job opportunities, provide more high quality public spaces, and bring people back to the city centre.*

The NSW Government has committed to helping create a city where more people want to live, work and play. This is a once in a lifetime opportunity to strengthen Newcastle's position on the regional, national and international stage.

The vision is ambitious, desirable and realistic. Newcastle is already a vibrant and wonderful place to live. The NSW Government is creating a blueprint for something more – a truly great city and has already started the revitalisation through ongoing partnerships with local communities, the Council of the City of Newcastle (Council), businesses and most importantly, individuals. Delivering light rail is the next step.

Transport for NSW proposes to construct and operate a light rail system in the Newcastle city centre between Wickham and Pacific Park. The main features of the proposal are as outlined in the Review of Environmental Factors (REF), which was publicly displayed in April and May 2016.

This reflects our commitment to help Newcastle reach its potential and we look forward to continuing to work with the people of Newcastle to make the vision a reality.

## Investing in Newcastle

To support the vision, the NSW Government has committed more than \$500 million to revitalise Newcastle's city centre, through the Newcastle Urban Transformation and Transport Program (the Program). The Program brings together a number of planning and transport projects that collectively create a revitalised city centre in Newcastle that positions the city as a great place to live, work and play.

Through the Program, a number of improvements have been delivered to better connect the city centre to the harbour and improve the experience of moving around the city. Crossings at Steel Street, Kuwumi Place, Worth Place, Argyle Street, Perkins Street, Wolfe Street and Civic Station have provided community members and visitors easy access across the former rail corridor. Redundant heavy rail infrastructure is being removed and new public spaces created.

The Program and other NSW Government initiatives such as the Transport Access Program, include a variety of transport improvements for Newcastle. These include:

- Construction of the new modern interchange facilities at Wickham.
- Light rail between Wickham Interchange and Pacific Park
- Reconfiguration of roads and intersections to improve traffic flows in and around the city centre.
- Broadmeadow Station upgrades, including the installation of lifts, which will provide a better experience for public transport customers by delivering modern, accessible and secure infrastructure.
- Planning is also underway to improve active transport infrastructure, making it safer and easier to walk and cycle around Newcastle.

Transport for NSW has also taken the next steps toward introducing light rail to the city with the recent order of six light rail vehicles. Light rail will offer superior levels of service, reliability and comfort as well as improved accessibility and urban renewal opportunities. It is considered that the overall opportunity offered by light rail is far superior than other transport modes.

We are also listening to what customers are telling us about service levels and are re-thinking transport in Newcastle. The world's best transport operators have been invited to create Transport for Newcastle to drive better transport services in Newcastle. The new operator will plan and run Newcastle Light Rail, buses, ferries and the interchange in an integrated way. This means public transport will be run in Newcastle, for Novocastrians.

To find out more about Transport for Newcastle and other initiatives underway, visit [yoursay.revitalisingnewcastle.com.au](http://yoursay.revitalisingnewcastle.com.au)

## Working with the local community and key stakeholders

Between June 2014 and May 2016, Transport for NSW in partnership with UrbanGrowth NSW has been consulting with people from across Newcastle to gather their ideas and provide feedback on the revitalisation of Newcastle city centre. The aim was to:

- Ensure that a broad range of community members were reached through the engagement program.
- Ensure that members of the community are well informed about commitments and opportunities for getting involved
- Consult with a range of people in identifying concerns, issues and opportunities to improve and progress the Program
- Involve members of the community and other stakeholders to maximise the benefits for the people of Newcastle and surrounding communities as a result of the delivery of the Program.

Community engagement known as Design Newcastle and Revitalising Newcastle provided the opportunity to gather feedback on people's views and aspirations for Newcastle. While the scope of this engagement program focussed on urban revitalisation, the transport related feedback gathered through this engagement process allowed Transport for NSW to develop and refine the planning of future transport options.

Community information sessions held between April 2016 and May 2016 for the Light Rail REF were the next step, and focussed on providing an opportunity for the community to speak with the project team and provide feedback on the light rail proposal. Online engagement was also offered, with thousands of people engaging through the Revitalising Newcastle website.

There were high levels of participation with over 170 people attending REF information sessions, more than 135 providing feedback using the online social pinpoint tool. This engagement gathered feedback on people's views and aspirations for creating great places linked to new and efficient transport that can activate Hunter and Scott streets and return them to the thriving main streets they once were.

The Program Team is committed to delivering the community's vision for the revitalisation of the city centre. Our plan has and will continue to be informed by feedback from the community, Newcastle City Council, expert planners and architects, government agencies and city renewal experts.

## Feedback

Transport for NSW received 401 submissions in response to the REF display. There was support for the proposal and the benefits that light rail will bring to the revitalisation of Newcastle. There were also some concerns raised relating to:

- alternative alignments for light rail
- impacts of parking
- operation of the light rail
- impacts on businesses during construction
- continuing to talk to local community and stakeholders

## What you have asked us to do

You have also asked us to do more work in other key areas as part of the overall Program for Newcastle. You told us that parking, cycleways and urban design are very important to you, so as part of the Program we are doing more work in these areas. The Program is working with Newcastle City Council to build a shared vision of integrating key transport strategies with the urban environment for Hunter and Scott streets.

The Program will work with our key partners and stakeholders to consider ideas that we received as part of the wider Program engagement.

Some of these issues include:

- Working with Newcastle City Council to prepare a cycleway strategy to ensure we have the right solution for both busy commuters and recreational cyclists.
- Urban design of Hunter and Scott streets to support the delivery of revitalised streetscapes, improved pedestrian amenity, landscaping and wayfinding signage, taking into account safety, functional and operational requirements.
- Complementary road works in the city centre, which will undergo a separate assessment process.

- Activation activities and engaging with the local business community to ensure Newcastle stays open for business during the construction of light rail and to maintain vibrant, activated city spaces.

Transport for NSW will work with key stakeholders including Newcastle City Council and Hunter Development Corporation to prepare a parking strategy to consider how parking is currently used in the city (including zonings, availability, and accessibility), where and what kind of parking is needed, the potential use of 'park and ride' facilities, and demand for parking in the future as part of the light rail proposal.

## We are listening

The views of the community and key stakeholders are shaping the NSW Government's plans to revitalise Newcastle's city centre.

- Transport for NSW is making changes to the proposal as part of the on-going refinement of the continuing design process, taking into account the views of the community and key stakeholders (refer section 6 Design modifications).
- Transport for NSW has conducted additional investigations on land acquisition, noise and heritage issues (refer section 5 Additional investigations and studies).
- Transport for NSW is doing more work on parking
- The Program is doing more work on cycleways, urban design, complementary road works and business engagement.
- The Program is working with Newcastle City Council to build a shared vision of integrating key transport strategies with the urban renewal process for Hunter and Scott streets.

Since the REF went on display, we have done more work on additional investigations and studies which have resulted in a number of modifications to the proposal, including:

- Revised light rail track alignment at Worth Place
- Revised track bed material between Stewart Avenue and Worth Place
- Increased area for stabling and maintenance facilities
- A second track across Stewart Avenue to allow for expansion of the network in the future

- New pedestrian crossing at Cottage Creek
- New Market Street pedestrian crossing across the former heavy rail corridor and removal of the Queens Wharf pedestrian footbridge
- Relocation of the eastern construction compound
- Augmentation of light rail traction power supply

## What to expect in the next six months

- Transport for NSW will work with Newcastle City Council to finalise the preparation of the Parking Strategy.
- As part of the Program we will work with Newcastle City Council to finalise the urban amenity study, which will include recommendation on the best locations for cycleways and form a cycleway strategy for the city.
- The Program Team will finalise the assessment of the complementary road works and provide Novocastrian's with information on what these changes will be.
- Ongoing communication and engagement in preparation of construction of light rail, including establishing a business reference group to help us plan for and minimise disruption to businesses during construction.

## Delivering Light Rail for Newcastle

A Review of Environmental Factors (REF) was prepared to assess the potential environmental impacts of the Newcastle Light Rail proposal, which is a component of the overall Program. This report responds to the feedback received on the light rail proposal during the REF display period.

### Scope of the proposal

The REF, which was displayed between 7 April and 27 May 2016, is a technical document that specifically covers the Newcastle Light Rail proposal. The display period was extended by an additional eight days at the request of Newcastle City Council.

The proposal involves the construction and operation of a light rail system in the Newcastle city centre between Wickham and Pacific Park, and associated changes to the road and bus network along this corridor, including:

- About 2.7 kilometres of light rail track, consisting of approximately 2.5 kilometres of dual track and 180 metres of single track.
- Six light rail stops and associated infrastructure (such as platforms, shelters and lighting) at:
  - Wickham Transport Interchange
  - Honeysuckle
  - Civic
  - Crown Street
  - Market Street
  - Pacific Park.
- A light rail stabling and maintenance facility at the location of the existing Wickham Station.
- Terminus facilities near the Pacific Park stop.
- Ancillary infrastructure, including two new substations, power supply, wiring and utilities.
- Works in the former rail corridor:
  - Removal of the existing Wickham Station buildings, platforms and pedestrian bridge
  - Removal of the pedestrian bridge located over the former rail corridor to the west of Market Street.
- Changes to existing bus stops along Hunter and Scott streets.
- Changes to intersections and the configuration of traffic lanes in a number of locations.

### Role of the REF in the planning process

Preparation of a REF is a key step in the planning process. A REF assesses the environmental impacts of a proposal to determine whether they are likely to be significant under the *Environmental Planning and Assessment Act 1979*, and what mitigation or environmental management measures are required during construction and operation.

Once the REF is placed on public display, submissions are received, considered and responded to in a formal Submissions Report (this document). The REF and Submissions Report together, provide critical information regarding the environmental impacts of the proposal in accordance with section 111 of the *Environmental Planning and Assessment Act 1979* and clause 228 of the *Environmental Planning and Assessment Regulation 2000*, so that a recommendation on whether to proceed with the proposal can be made. If it is determined that the proposal is not likely to significantly affect the environment then Transport for NSW can make a decision about whether to proceed with the proposal.

### REF consultation period

Ensuring local voices are heard and valued is important to us. The REF for the proposal was publicly displayed from 7 April to 27 May 2016. This included an additional eight days at the request of Newcastle City Council, and in response to the high level of public interest in this proposal.

### Purpose of this Submissions Report

This Submissions Report outlines:

- Issues raised in the submissions received while the REF was on display
- Our responses to these issues and the proposed modifications to the Newcastle Light Rail proposal.
- Mitigation measures to be implemented during the construction and operation of the proposal to minimise any potential impacts.
- Further consultation being undertaken to ensure the community and stakeholders can continue to have their say throughout the life of the project.

### What you've told us

A total of 401 submissions were received during public display of the REF from community members, key stakeholders, local businesses and Newcastle City Council.

## What you liked about the proposal

- Light rail is convenient and reliable
- Positive look and design
- Provides opportunities for local businesses
- Make public transport more convenient
- Attract tourists to the city centre
- Better connectivity
- A catalyst for urban renewal and revitalisation of our city-centre
- Will foster further mixed use development
- Reduces the number of cars and encourages the use of public transport
- Better access to the waterfront
- More people living in the city
- A “once in a generation opportunity”
- Support the new Newcastle University campus
- Public transport access to key destinations in Newcastle (Fort Scratchley, Civic precinct, central business district, Newcastle East, the beaches, and baths)
- Positive experience using light rail services in other cities

## What you asked us to think about

- Impacts on parking
- Active transport plans
- The need for light rail in Newcastle
- Usage of light rail in Newcastle
- The length of the route
- Are there enough stops?
- Are the stops in the right places?
- Impact of raised tracks on accessibility, safety and movement
- Separated versus mixed running
- Adequacy of facilities
- Accessibility
- Integration with other modes of transport
- Service frequency
- Ticketing and pricing
- Safety
- Traffic disruption during construction
- Construction impacts on businesses
- Consultation to date
- Heritage impacts
- Urban design and visual amenity
- Noise and vibration

## Additional consultation

The Program is committed to community and stakeholder engagement beyond the planning phase for this proposal. We will work closely with the managing contractor to ensure accurate information on the project is delivered to the community, businesses and stakeholders throughout the life of the project.

We are preparing engagement plans to continue to liaise with key stakeholders and the community during the detailed design, construction, and operational phases of the proposal. This ongoing engagement process will play an important role in reducing any potential impacts and enhancing the benefits of the proposal for all stakeholders.

## Modifications to the proposal

Since the REF went on display, Transport for NSW has further progressed design work with community feedback in mind, and is making the following modifications to the proposal (refer Section 6):

- Revised light rail track alignment at Worth Place – the curves in this section of the route have been eased resulting in a smoother ride for customers. Additional land area not required for light rail will be made available for public use.
- Revised track bed material between Stewart Avenue and Worth Place – instead of using ballast, this section of track will use an embedded track slab similar to Hunter Street. This will improve visual amenity, and allow for open space either side of the light rail track, which may be used for cycling, walking or open space.
- Increased area for stabling and maintenance facilities – the area for stabling and maintenance facilities will be increased.
- Installation of a second track across Stewart Avenue for expansion of the network in the future – a parallel track across Stewart Avenue will avoid a second round of traffic impacts when future network expansion plans are finalised

- New pedestrian crossing at Market Street and removal of the Queens Wharf pedestrian footbridge – a new pedestrian crossing will create better ground level access across the rail corridor. The overhead Queens Wharf pedestrian footbridge will no longer be required and will be removed.
- New pedestrian crossing at Cottage Creek – an additional north/south pedestrian crossing will be installed across the former heavy rail corridor east of Cottage Creek to improve pedestrian access between the Harbour, the western Honeysuckle precinct and Hunter Street.
- Relocation of the eastern construction compound – the compound will be relocated to open up the corridor at the eastern end sooner, for public space or other uses.
- Augmentation of light rail traction power supply – to ensure a reliable power supply for light rail services. This modification will install additional cabling to feed traction substations adjacent to Hunter Street.

In addition, the option to use a **raised light rail track is no longer being considered as part of the proposal design**. Transport for NSW is considering other options for ensuring the safe separation of vehicles and light rail without impacting on pedestrian movement, with the design to be finalised later this year and where required will be subject to further environmental assessment.

These changes enhance the overall design of the proposal, with only minor additional impact, and will be able to be largely managed within the scope of mitigation proposed in the REF. A detailed description and impact assessment of each proposed modification is provided in sections 6.2 to 6.8. Any new mitigation measures required in response to these modifications are identified in section 7.

## Additional investigations

A number of additional design investigations and studies have also been undertaken since the preparation of the REF (refer section 5) and will be incorporated into the proposal. This includes:

- confirmation and refinement of land areas required
- an additional screening assessment of the potential for ground borne noise impacts to occur and
- recommendations for an adaptive re-use study for the reconstruction and/or re-use of specific elements of the heritage listed Wickham Railway Station Group, which is to be removed.

Further investigations in these and others areas will be undertaken as part of the ongoing detailed design and refinement process.

## Next steps

Transport for NSW will review the REF and this Submissions Report and determine whether the requirements under section 111 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and clause 228 of the *Environmental Planning and Assessment Regulation 2000* have been met in particular, considering whether the activity is likely to significantly affect the environment. Appendix B of this submissions report includes consideration of clause 228 for both the proposal described in the REF and the additional investigations and proposed design changes. Transport for NSW will then make a determination as to whether to proceed with the proposal.

Should the proposal be approved, feedback from the community and key stakeholders received throughout the development of the proposal to date, will help inform the next phase of the proposal, and assist to minimise potential impacts during construction and operation.

# 1. Introduction

## 1.1 Background

Newcastle is the second biggest city in NSW and, by 2036, its city centre is expected to accommodate an additional 10,000 jobs and 6,000 homes (Department of Planning and Environment, 2014).

The NSW Government is revitalising the Newcastle city centre. The revitalisation will reinforce the city's role as a 21st century regional centre, unlock the potential of the city centre as a place that can meet the needs of the current and future community, and boost economic activity across the Hunter Region. In 2012, the NSW Government released the *Newcastle Urban Renewal Strategy (NURS)* (Department of Planning and Infrastructure, 2012, updated 2014), a 25 year plan to revitalise Newcastle, reinforce its role as a 21st century regional centre, and provide a framework to create the jobs and homes needed by 2036. The *NURS* identifies transport, access and connectivity as a guiding principle for the urban renewal of Newcastle.

The NSW Government has committed more than \$500 million to revitalise Newcastle's city centre, through the Newcastle Urban Transformation and Transport Program (the Program). The Program brings together a number of planning and transport projects, that collectively create a revitalised city centre in Newcastle making it a great place to live, work and play.

The transport projects being delivered by the Program are an important part of the wider renewal of the Newcastle city centre. The removal of the rail line from the city centre, the construction of the Wickham Transport Interchange, and the introduction of light rail, will reconnect the Newcastle city centre to its waterfront and make it easier to move around. These projects are needed to drive the economic growth and renewal of Newcastle and form part of an integrated land use and transport strategy.

## 1.2 Overview of the proposal

Newcastle Light Rail (the proposal) forms one part of the Program. The Review of Environmental Factors (REF) assesses the construction and operation of a light rail system in the Newcastle city centre between Wickham and Pacific Park, and associated changes to the road and bus network, including:

- About 2.7 kilometres of light rail track, consisting of approximately 2.5 kilometres of dual track and 180 metres of single track.
- Six light rail stops and associated infrastructure (such as platforms, shelters and lighting) at:
  - Wickham Transport Interchange
  - Honeysuckle
  - Civic
  - Crown Street
  - Market Street
  - Pacific Park.
- A light rail stabling and maintenance facility at the location of the existing Wickham Station.
- Terminus facilities near the Pacific Park stop.
- Ancillary infrastructure, including two new substations, power supply, wiring and utilities
- Works in the former rail corridor including:
  - Removal of the existing Wickham Station buildings, platforms and pedestrian bridge
  - Removal of the pedestrian bridge located over the former rail corridor to the west of Market Street.
  - Changes to existing bus stops along Hunter and Scott streets.
  - Changes to intersections and the configuration of traffic lanes in a number of locations.

The proposal is generally located in the former heavy rail corridor ('the former rail corridor') east of the Wickham Transport Interchange to Worth Place, where it will diverge onto Hunter Street and then, Scott Street, terminating near Pacific Park.



Figure 1.1 Location and key features of the proposal

## 1.3 Overview of the REF

### 1.3.1 Need for the proposal

The proposal is an integral part of the Program, which responds to the issues raised in the *Newcastle Urban Renewal Strategy (NURS)* (Department of Planning and Infrastructure, 2012 and updated in 2014).

The *NURS* sets out the strategic direction for Newcastle. As part of the *NURS*, the Program proposes a number of major initiatives that relate to improving access within, and to, Newcastle's City Centre.

The NSW Government has made a number of announcements relating to the transformation of Newcastle, including:

- a new multi-modal transport interchange at Wickham
- light rail between the Wickham interchange and Pacific Park
- the activation of Hunter and Scott streets linked to the delivery of light rail
- the revitalisation of land in the heavy rail corridor, and the delivery of housing and improved public domain including parks, entertainment precincts and public spaces.

The NSW Government has committed to investing more than \$500 million to revitalise Newcastle's city centre through the Program including the Newcastle Light Rail proposal. In the 2016-17 NSW State Budget, \$142 million is committed towards the introduction of light rail.

The Light Rail proposal is an investment in Newcastle that offers the opportunity to create a unique and active modern city centre. It is just one of the projects that will unlock the potential of the city centre. International studies have shown that light rail is a preferable mode in which to move public transport users within an inner city environment. Light rail is permanent, reliable, timely, less likely to be affected by traffic when in a separated land, and provides a smoother, more comfortable ride for passengers without impeding on pedestrian traffic that a heavy rail line imposes.

The proposal, together with other projects in the Program, increases liveability and amenity, and supports community objectives.

### 1.3.2 Key impacts identified in the REF

Environmental investigations were undertaken during the preparation of the REF to assess the potential environmental impacts. Key impacts (positive and negative) during operation and construction of the proposal were described in the REF. It was found that significant environmental impacts are unlikely as a result of the proposal. In summary, the key adverse impacts identified in the REF include the following.

- **Transport and access** – The proposal would require the removal of on-street parking spaces and loading zones. A parking study is being undertaken that will consider current and future demand, availability, zonings and accessibility. This strategy is being prepared in consultation with the Council and local businesses.
- **Noise and vibration** – Operation of the proposal has the potential to impact nearby sensitive receivers. There are a number of design approaches and mitigation measures, which will be implemented to minimise the potential impacts. Feasible and reasonable mitigation measures will be included in the detailed design process.
- **Heritage** – Measures to minimise the potential for impacts to heritage items will be implemented prior to and during construction. Newcastle is a historic town and this heritage has shaped the city into what it is today. The value of this heritage is important and during construction planning we will implement measures to protect listed heritage items and archaeological areas located within and adjoining the proposal.
- **Urban design and visual impacts** – The design of the proposal (particularly the stops) provides an opportunity to reinforce the role of the proposal in the city centre planning and development process. Urban design of Hunter and Scott streets will be undertaken to give form, shape and character to the proposal to support the delivery of revitalised streetscapes, improved pedestrian amenity, landscaping and wayfinding signage. These elements will be developed in consultation with Newcastle City Council as the detailed design is progressed.

- **Social and amenity impacts** – Amenity impacts during construction and operation is likely. A detailed summary of mitigation measures that will be adopted throughout the project to ensure minimal impacts to the community and local businesses are listed in section 17 of the REF.

A suite of management and mitigation measures will be implemented to reduce the potential adverse impacts of the proposal and enhance the benefits. These measures will be incorporated into the construction environmental management plan (CEMP) and sub-plans for the proposal and, where necessary, the future Operator's environmental management system.

### 1.3.3 Statutory compliance

Section 3 of the REF outlines the statutory planning and approvals process for the proposal.

Having regard to the provisions of *State Environmental Planning Policy (Infrastructure) 2007* (the Infrastructure SEPP) the proposal is permissible without development consent and is assessable under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The construction and operation of the proposal would comply with all relevant legislative requirements identified in section 3 of the REF.

### 1.3.4 Conclusions of the REF

There is strong justification for the proposal, as demonstrated by the need and anticipated benefits. The proposal is an important transport initiative that will transform the city centre and is one of the catalysts to support the urban renewal of Newcastle's city centre. The REF concluded that the potential environmental impacts of the proposal are not likely to be significant. Consequently, an environmental impact statement is not required.

## 1.4 Purpose and structure of this report

This Submissions Report has been prepared to:

- summarise and respond to issues raised in submissions.
- report on additional investigations and design developments undertaken following the public display of the REF.
- identify any changes to the proposal and the potential impact of those changes.
- summarise the mitigation measures for the proposal.

The Submissions Report has a number of key sections. These include:

- description of community and stakeholder consultation activities undertaken during the REF preparation and public display period (section 2).
- an overview of the submissions received (section 3).
- responses to issues raised in submissions (section 4).
- details of additional investigations completed (section 5).
- details of proposed design changes to the proposal (section 6)
- updated mitigation and management measures (section 7).
- conclusions to the report (section 8).

## 2. Consultation

### 2.1 Stakeholder and community consultation during REF preparation

A detailed overview of the consultation activities undertaken for the proposal both before and during preparation of the REF was provided in section 4 of the REF. This included an overview of the key issues raised by stakeholders and the community during consultation. This feedback helped shape the proposal and provided evidence to support the benefits of the proposal.

Consultation also occurred with project partners, a number of senior stakeholders from organisations in Newcastle and key industry, business and community groups throughout the strategic planning for the proposal.

The objectives of the consultation were to provide information, gather feedback, and identify potential issues to inform planning and early design.

During the REF preparation, Transport for NSW consulted extensively with Government stakeholders, including Roads and Maritime Services, UrbanGrowth NSW, and Council to confirm various aspects of the proposal, and ensure that the planning and design aligned with future plans and strategies.

A summary of the activities and the tools used to achieve the engagement outcomes are described below in Table 2.1.

**Table 2.1 Stakeholder consultation activities during REF preparation**

Activity	Purpose and detail
<b>Identifying stakeholders</b>	Thorough stakeholder mapping and site visits identified stakeholders within or close to the proposal and those likely to have an interest in the construction and operation of the proposal. This ensured impacted and key stakeholders were provided with the information they required to be fully informed on the proposal.
<b>Community contact and feedback options</b>	<p>Contact mechanisms were established to enable the community and stakeholders to provide feedback and asked us questions about the proposal via:</p> <ul style="list-style-type: none"> <li>project information line: 1800 684 490</li> <li>email: <a href="mailto:projects@transport.nsw.gov.au">projects@transport.nsw.gov.au</a></li> <li>website: <a href="http://www.transport.nsw.gov.au/projects">www.transport.nsw.gov.au/projects</a></li> </ul> <p>These contact details were advertised in all consultation communication material. Contact details, issues raised, and responses provided were recorded in a project-specific consultation database.</p>

### 2.2 Stakeholder and community consultation during public display of the REF

The REF was placed on public display for a period of seven weeks, from 7 April 2016 to 27 May 2016. This included an additional eight days in response to a request from Newcastle City Council and the high level of community interest in this proposal.

During the display period, government agencies, interest groups and organisations, stakeholders and the community were invited to make written submissions. A summary of the engagement activities and tools used to encourage community and stakeholder participation during the public display period is outlined below.

The REF, in its entirety, was available for viewing at the following locations:

- City of Newcastle City Administration Centre, 282 King Street, Newcastle
- Newcastle City Library, Ground Floor, Laman Street Newcastle
- Hamilton Library, 44 James St, Hamilton
- Transport for NSW Newcastle office, ground floor, 239 King Street, Newcastle
- Transport for NSW Community Information Centre, 388 George Street (at the corner of King Street), Sydney.

The REF was also available at: <http://ourtransport.revitalisingnewcastle.com.au/delivering-newcastle-light-rail/documents>

Table 2.2 lists the engagement activities undertaken during the public display period

**Table 2.2** Consultation during public display

Activity	Detail
<b>Community contact and feedback</b>	<p>Contact mechanisms were established to enable the community and stakeholders to provide feedback and ask questions about the proposal via:</p> <ul style="list-style-type: none"> <li>project information line: 1800 684 490</li> <li>email: <a href="mailto:projects@transport.nsw.gov.au">projects@transport.nsw.gov.au</a></li> <li>website: <a href="http://www.transport.nsw.gov.au/projects">www.transport.nsw.gov.au/projects</a></li> </ul> <p>All contacts were recorded in a consultation database.</p>
<b>Website</b>	<p>Information about the public display of the REF was included on the Revitalising Newcastle and Transport for NSW websites.</p>
<b>Social Pinpoint</b>	<p>A Social Pinpoint database was set up to receive community submissions on the project. Social Pinpoint provided online community engagement to allow users to publicly post feedback, concerns and ideas related to the proposal.</p> <p>A link to the database was on the project website and in all written materials.</p>
<b>Brochure and magnet to business owners</b>	<p>A one-page brochure and a fridge magnet with contact details was hand delivered to businesses near the proposal in Hunter and Scott streets. During distribution, the project team members took the opportunity to provided details about the proposal to business owners, landowners and managers.</p>
<b>Letter box drop</b>	<p>A four-page information brochure providing an overview of the proposal and the details of the public display process was letter box dropped to over 7,000 households and properties in the suburbs of Newcastle, Newcastle East, Newcastle West and The Hill.</p>

Activity	Detail
<b>Station handouts</b>	A four-page information brochure providing an overview of the proposal and the details of the public display process was handed out at Hamilton, Broadmeadow, Cardiff, Warabrook, and Waratah stations, during the morning (6am to 9am) and afternoon (3pm to 7pm) peak periods, on 26 and 28 April and 3 and 5 May.
<b>Advertisement</b>	Advertisements were placed in The Newcastle Herald on Saturday 9, 16, 23 and 30 April 2016, to provide information about the display locations and information sessions.
<b>Community information sessions</b>	<p>Community information sessions were held at the following locations, dates and times:</p> <ul style="list-style-type: none"> <li>• Thursday 14 April 2016, 4pm to 7pm, Newcastle East</li> <li>• Thursday 28 April 2016, 4pm to 7pm, Newcastle</li> <li>• Saturday 30 April 2016, 10am to 2pm, Newcastle</li> <li>• Saturday 14 May 2016, 1pm to 4pm, Newcastle.</li> </ul> <p>Members of the project team were also available to provide further information and answer questions at the two following pop-up stalls:</p> <ul style="list-style-type: none"> <li>• Saturday 7 May 2016, 8am to 2pm Clocktower Markets – Beaumont Street, Hamilton</li> <li>• Thursday 12 May 2016, 4pm – 8pm Marketown Shopping Centre – Steel Street, Newcastle</li> </ul> <p>The community information sessions provided residents and interested community members the opportunity to talk directly to the light rail project team. Project team members from various technical disciplines (e.g. design, REF and technical specialists) were in attendance at each session to clarify the information presented in the REF and listen to and consider any suggestions or concerns raised by members of the community in relation to the proposal. Community members who attended the sessions were encouraged to make a formal submission on the proposal via submission forms provided at the sessions and through the website. Feedback received at the sessions has been considered in this report.</p> <p>Attendee numbers ranged from around 40 to 55 at each session with over 170 community members in total attending the REF information sessions.</p>

## 2.3 Future Consultation

The Program Team is committed to community and stakeholder engagement beyond the planning phase and through detailed design, construction and commissioning of the Newcastle Light Rail proposal. The Program Team will work closely with the light rail contractor to ensure the delivery of accurate information on the proposal to the community, businesses and stakeholders throughout construction.

Should the proposal proceed, targeted consultation and communication activities will include:

- meetings
- briefings
- forums
- letters
- newsletters/notifications
- advertising campaigns
- signage
- regular updates on the Revitalising Newcastle website and via social media.

The NSW Government understands that business continuity is important, and will work with businesses to understand their requirements during construction and operation of the Newcastle Light Rail. On top of the above activities, the Program Team will investigate options for business and precinct activation activities to attract people into these areas during construction.

Consultation activities will ensure that:

- The community and stakeholders have a high level of awareness of all activities and construction related changes associated with construction of the project.
- Ideas and feedback from the community are readily available and encouraged.
- Accurate and accessible information is available, including regular updates via websites, meetings, newsletters, notifications, advertisements and project signage.
- Timely responses are given to issues and concerns raised by businesses and the community, and construction impacts on businesses and residents are effectively resolved. A project information line, 24-hour emergency response line, and email address will be available, and dedicated engagement managers will provide advice and assistance throughout the construction and operation of the proposal.

# 3. Overview of submissions

## 3.1 Overview

Transport for NSW received submissions from government agencies, project partners, special interest groups, peak bodies, businesses and the community during the public display of the REF. A total of 401 submissions were received. Multiple submissions or Social Pinpoint comments from the same person were counted as one submission. The 401 submissions comprised:

- 226 submissions from community members provided in writing or via email
- 136 submissions from community members provided via Social Pinpoint
- seven submissions from industry or professional organisations
- seven submissions from community groups
- 22 submissions from businesses
- three submissions from local government.

Each submission was given a submission number and was categorised according to the key issues raised.

Comments received via Social Pinpoint were considered to be a submission.

All written submissions received during the public display period were recorded in a consultation database. Submissions were individually numbered, contact details recorded, and key issues identified in each submission were added to the database.

## 3.2 Summary of issues raised

A breakdown of the key issues raised in submissions is provided in Table 3.1. Since most submissions raised more than one issue, the number of issues identified is greater than the total number of submissions received.

**Table 3.1** Overview of key issues raised in submissions

Key issue category	Sub-issue Description	Number of submissions identifying issue	Percentage of submissions identifying issue
<b>Proposal need and justification</b>	Benefits, support and objections to the proposal	95	23.7%
	Demand, viability and economic justification	110	27.4%
	Role of the proposal in the urban renewal process	37	9.2%
	Other need and justification issues	8	2.0%
<b>Alternatives and options</b>	Alternatives to light rail as a whole	34	8.5%
	Alternative alignments and location options	223	55.6%
	Alternative start/finish and stop locations	39	9.7%
	Other alternatives and options	4	1.0%
<b>Proposal design/features</b>	Design levels, heights of the rails	60	15.0%
	Corridor design, mixed vs separated running lanes	64	16.0%
	Facilities, stops, stabling	29	7.2%
	Consideration of local conditions and requirements	8	2.0%
	Other design issues/queries	10	2.5%

Key issue category	Sub-issue Description	Number of submissions identifying issue	Percentage of submissions identifying issue
<b>Operation of the proposal</b>	Accessibility, disabled access	31	7.7%
	Integration with other forms of public transport, footpaths and cycleways	87	21.7%
	Light rail services, vehicle operation	42	10.5%
	Safety issues	27	6.7%
	Other operational issues	7	1.7%
<b>Construction</b>	General construction queries	7	1.7%
<b>Consultation and communication</b>	Consultation process and activities	39	9.7%
	Consultation adequacy, transparency, and availability of information	23	5.7%
	Other consultation issues	2	0.5%
<b>Assessment and approvals</b>	Assessment and approvals	26	6.5%
<b>Traffic, transport and access impacts</b>	Loss of parking	128	31.9%
	Construction impacts	14	3.5%
	Operation impacts - traffic and the road network	111	27.7%
	Operation impacts - access	33	8.2%
	Operation impacts - public transport, pedestrians and cyclists	30	7.5%
<b>Socio-economic/business impacts</b>	Construction impacts	12	3.0%
	Operation impacts - impacts on the community	28	7.0%
	Operation impacts - impacts on businesses	65	16.2%
<b>Heritage impacts</b>	Impacts to Aboriginal heritage	4	1.0%
	Impacts to listed heritage items	21	5.2%
	Other heritage impacts	4	1.0%
<b>Urban design and visual impacts</b>	Urban design impacts	17	4.2%
	Other visual impacts	5	1.2%
<b>Other environmental impacts</b>	Biodiversity, parkland and tree impacts	19	4.7%
	Electromagnetic radiation	6	1.5%
	Remediation	1	0.2%
	Noise and vibration	13	3.2%
	Land use and property	23	5.7%
	Sustainability, greenhouse gases and climate change	4	1.0%
	Other environmental impacts	5	1.2%

Key issue category	Sub-issue Description	Number of submissions identifying issue	Percentage of submissions identifying issue
<b>Outside scope of this project/assessment</b>	Extensions to the light rail as proposed, larger system	73	18.2%
	Truncation of the heavy rail line	55	13.7%
	Wickham Transport Interchange	37	9.2%
	Other public transport issues	58	14.5%
	Other issues	62	15.5%

# 4. Response to submissions

This chapter details the issues raised in submissions received during the public display of the REF and Transport for NSW's detailed responses. The information below also indicates where changes have been made to the design or delivery of the proposal or where further investigations to consider issues are being conducted based on feedback.

## 4.1 Need and justification

### Summary of issues

#### Support and benefits

#### Demand and viability

#### Role of the proposal in the renewal/revitalisation of the city centre

### 4.1.1 Support and benefits

#### *Summary of issues raised:*

Support for and benefits of the proposal identified in submissions include:

- Light rail is convenient and reliable
- Positive look and design
- Provides opportunities for local businesses
- Makes public transport more convenient
- Attract tourists to the city centre
- Better connectivity
- A catalyst for urban renewal and revitalise our city-centre
- Will foster further mixed use development
- Reduces the number of cars and encourage the use of public transport
- Better access to the waterfront
- More people living in the city
- A “once in a generation opportunity”
- Supports the new Newcastle University campus
- Public transport access to key destinations in Newcastle (Fort Scratchley, Civic precinct, central business district, Newcastle East, the beaches, and baths)
- Positive experience using light rail services in other cities

#### *Response:*

Transport for NSW is committed to engaging with the community and stakeholders, and thanks the community and stakeholders for submissions in support of the proposal.

The community has been clear about their vision and aspirations for Newcastle, and Transport for NSW heard that Novocastrians are proud of their city and want to see it revitalised. People pointed to the natural beauty of the city centre – its heritage buildings, world-class harbour and beautiful beaches. The community and key stakeholders also said the city was once a thriving place that would benefit from attracting more people to live, work, play and study.

Newcastle Light Rail is part of the Program, which aims to strengthen connections between the city and the waterfront, create new jobs, provide more public space and amenity and deliver better transport.

During the REF public display, Transport for NSW listened to what the community and stakeholders said about wanting better transport solutions for Newcastle and are committed to delivering on these promises.

Submissions regarding support for the proposal are noted. Light rail is a proposal that will be a catalyst for urban renewal, reduce the number of cars in the city centre and makes public transport more convenient.

### 4.1.2 Demand and viability

#### *Summary of issues raised:*

- Whether there is sufficient demand for light rail in Newcastle and whether light rail in Newcastle will be economically viable.
- Whether customers will use light rail, given the following potential barriers:
  - Lack of parking at the beginning of the route, and no ability to ‘park and ride’,
  - Preferences of Newcastle residents to drive private cars and not catch public transport,
  - The need to transfer between different modes of public transport,
  - The short length of the route.
- Whether the proposal offers value for money.
- Concerns that the money allocated is not enough compared to the money allocated for light rail in Sydney.

*Response:*

Both the *NURS* and Council's vision for Newcastle is for more people to call the city centre home. This is already becoming apparent with more people now living in the city centre and new and exciting housing developments being completed. To support more people living in the city centre, better transport options are required.

Demand and viability have been important considerations throughout the development of the proposal. There is a need to respond to the forecast growth in population, residential development, and employment in Newcastle's city centre.

The proposal is part of the NSW Government's response to cater for this growth. The proposal has been developed with careful regard to planning principles, influences and drivers necessary to ensure the successful operation of a light rail system. The REF detailed the benefits of the proposal, including:

- *customer benefits* — improved and more reliable journeys for public transport users, a net reduction in congestion and accident costs for private vehicle users, and improved travel times and amenity for pedestrians
- *wider economic benefits* — through opportunities for urban renewal and revitalisation
- *broader community benefits* — through a reduction in environmental and health externalities such as air pollution and noise
- *operating benefits* — delivering a savings in existing transport operator costs

The potential socio-economic benefits of the proposal include:

- Employment for up to 100 people in peak periods during construction of the proposal, and around 60 people during operation.
- Businesses providing convenient retail/food service in the vicinity of Hunter and Scott streets may experience an increase in customers during construction.
- Revitalisation of the city centre by providing opportunities for better connections to the waterfront and through the city centre.

- A greater number of stops and easier access to and within the city centre, which benefits residents, workers, tourism and recreational visitors.
- Long term benefits for some businesses near light rail stops, which may experience increases in patronage as a result of people using light rail.

Investigations to offset parking lost in and around Hunter Street are underway and depending on the outcome of the study, replacement parking will be considered.

These investigations are not only looking at the number of spaces, but also the best location for the spaces. Since the introduction of the corridor pedestrian crossings, anecdotal evidence suggests parking patterns and preferences have changed. It is important to remember we want to encourage greater public transport use and reduce the city's heavy reliance on cars. A high capacity light rail system will help cut city centre congestion and provide a frequent, reliable and comfortable travel option through the city centre. Building a modern light rail system will not only improve the city centre's urban amenity, it will also ensure the city can accommodate future population growth rather than end up in gridlock.

The introduction of light rail will require some passengers to interchange or transfer from other modes of transport (e.g. bus, car, walking, cycling, or heavy rail) onto light rail. For those customers travelling on the existing heavy rail service, they will be required to transfer to light rail at the Wickham Transport Interchange

In September 2016, a \$2 'transfer discount' will come into effect every time customers change modes of transport within an hour, as part of the same journey. Child/Youth, Concession or Senior/Pensioner Opal card customers will get a 'transfer discount' of \$1. This will encourage customers to take the most efficient journey to their destination.

We also need to acknowledge that the current public transport network in Newcastle is not working. Only 13 per cent of peak hour trips to and from the Newcastle city centre are currently undertaken by public transport.

Internationally and in Australia, many light rail systems operate with changes in travel modes. Interchanges can also create opportunities for local businesses and public transport customers to interact. Overall, it is anticipated that the improved reliability of the light rail system would provide a significant benefit for public transport users.

### 4.1.3 Role of the proposal in the renewal/revitalisation of the city centre

#### *Summary of issues raised:*

- Whether the proposal is compatible with the proposed renewal activities in Newcastle.
- That the proposal will not assist the renewal process.
- Concerns about future urban development

#### *Response:*

The Newcastle Light Rail proposal is a key component of the Program. The light rail proposal is not only compatible with the urban renewal program, it will be a catalyst for revitalisation in the city centre, allowing for better connections between the city and the waterfront, delivering better transport and servicing key activation hubs for a more vibrant city centre.

People are already realising the benefits of being able to quickly move between the city centre and the waterfront, with a number of improvements already delivered including crossings at Steel Street, Kuwumi Place, Worth Place, Argyle Street, Perkins Street, Wolfe Street and Civic Station. These crossings now allow for easy pedestrian and cyclist access across the former rail corridor.

The NSW Government has seen renewed excitement and investment in the city centre. Light rail will continue to encourage investment in Newcastle – reviving Hunter and Scott streets and bringing people back into the city centre.

Urban Growth NSW has lodged the planning proposal for the former heavy rail corridor with Newcastle City Council, laying the first foundations for the rezoning of land to connect the city to its waterfront and drive jobs, tourism and economic growth in the harbour city.

UrbanGrowth NSW's planning proposal covers an area of approximately 4.25 hectares from Worth Place to Newcastle Station and consists of a combination of recreational, tourism and mixed uses. This does not include the western end of the former heavy rail corridor from Wickham Transport Interchange to Worth Place, which will be used for light rail.

Further information on the planning proposal is available at [yoursay.revitalisingnewcastle.com.au](http://yoursay.revitalisingnewcastle.com.au)

UrbanGrowth NSW's planning proposal provides an opportunity to enhance Hunter and Scott streets and make them vibrant once more. The Program team is working with Newcastle City Council to build a shared vision of integrating key transport strategies with the urban environment for Hunter and Scott streets.

The Program Team are now an integrated project unit including Transport for NSW, Urban Growth and Roads and Maritime Services to ensure transport and renewal objectives are intertwined.

## 4.2 Alternatives and options

### Summary of issues

#### Alternatives to light rail

#### Alternative alignments, start, end and terminus locations

#### Alternative number of stops, stop locations, spacing of stops

#### Is Wickham Station the best location for the maintenance and stabling facility?

### 4.2.1 Alternatives to light rail

#### *Summary of issues raised:*

- Whether alternatives to light rail should be considered, including a Maglev system, buses, heavy rail, road upgrades, an active transport network, skytrain.
- Whether light rail would be needed if a comprehensive and integrated upgrade to public transport was delivered instead.

*Response:*

As part of the strategic assessment for the proposal, Transport for NSW looked at what transport solution would be best suited to address transport issues in Newcastle's city centre. Light rail was determined to be the best solution as it provides a modern, efficient transport system that also offers a number of additional benefits in terms of the revitalisation of the Newcastle city centre.

International cities have shown that light rail is a preferable mode in which to move public transport users within an inner city environment. Light rail is permanent, reliable, less likely to be affected by traffic when in a separated lane and provides a smoother, more comfortable ride for passengers. Light rail has delivered transformation and renewal to city centres around the world — attracting investment and boosting economic activity.

Light rail stops provide activation hubs, such as those proposed at Civic and Market Street. Bus stops do not provide the same opportunities to support city destination and place making.

Light rail is just one part of the transport improvements for Newcastle. A number of transport-oriented projects are underway to revitalise Newcastle including the construction of the new modern interchange facilities at Wickham and the upgrade of Broadmeadow Station. To support light rail, some roads and intersections in the city will be reconfigured and upgraded to improve traffic flows efficiency in the city centre. These works will be subject to a separate assessment process. Planning is also underway as part of the Program to improve active transport infrastructure, making it safer and easier to walk and cycle around Newcastle.

To ensure the best possible integrated system is delivered for Novocastrians, the world's best transport operators have been invited to create Transport for Newcastle, one major operator to plan and run Newcastle Light Rail, buses, ferries and interchange, delivering better service for customers.

#### 4.2.2 Alternative alignments, start, end and terminus locations

*Summary of issues raised:*

- Whether the light rail route should follow the old heavy rail corridor to avoid impacts on Hunter and Scott streets and to reduce the cost of the proposal.
- Whether light rail should follow an alternate route (for example along Hunter Street Mall, looping around Pacific Park, closer to beaches, along Wharf Street or travelling underground).
- Whether the start of the route, end of the route and/or terminus should be relocated (for example to Telford Street adjacent to Pacific Park, Hamilton, or Woodville Junction).

*Response:*

The Newcastle Light Rail route was announced in 2014. In February and March 2014, extensive consultation was undertaken with residents, customers, community groups and other Hunter stakeholders on the best route option for light rail in Newcastle. This consultation revealed Newcastle residents and businesses supported light rail and want access to the waterfront, more public domain and the option to extend the light rail in the future.

Many routes were considered during the assessment process for the proposal, including options similar to many suggested in submissions. Route options were assessed in terms of transport benefits, urban renewal benefits, capital and operating costs, impacts during construction and operation, and feedback from community and stakeholder groups.

Best practice planning principles indicate that a light rail route should have minimal turns and take the topography, geography and other constraints within the built environment into account, to allow faster journey times and a better customer experience.

The assessment looked at what transport mode would work best for Newcastle and customers, the role light rail will play in the revitalisation of Newcastle's city centre, integration with other forms of public transport, and opportunities for future expansion of the route. Case studies of other successful light rail systems in Australia and overseas were also assessed.

The route selected for the proposal serves the city centre, placing customers as close as possible to shops and services on Newcastle's main street. It will provide easy access to important destinations such as the new university campus and law building, and will deliver customers directly to local businesses, supporting the local economy.

Light rail will activate Hunter and Scott streets, creating vibrant future retail and commercial precincts and take more people where they want to go. It does not affect the Hunter Street Mall and future redevelopment plans for wide footpaths, outdoor dining, café and retail activity.

The route also:

- allows for the realisation of urban renewal and transformation opportunities in the former rail corridor, together with key public domain upgrades, to improve north-south connectivity across the corridor.
- enables the light rail to pass directly through the civic precinct.
- encourages people to use public transport in the Newcastle city centre by providing ready, immediate and highly visible points of access.
- does not impact directly on Pacific Park.

The route selected for the proposal seeks to balance the needs of a number of requirements, whilst also responding to the overall benefits that the route has on the urban revitalisation of Newcastle.

Constructing light rail in the former heavy rail corridor does not facilitate the points noted above and is contrary to the overall urban transformation objectives for Newcastle.

### 4.2.3 Alternative number of stops, stop locations, spacing of stops

#### *Summary of issues raised:*

- Whether stops should be at alternate locations.
- Whether more stops are needed or whether there should be a shorter distance between stops.

#### *Response:*

Twenty-eight potential light rail stop locations were identified and a comprehensive assessment process was applied, which included consultation with stakeholders. The location, design and layout of the six light rail stops was also informed by a number of functional and urban design requirements, including interchange function, safety requirements, accessibility, integration with the existing public domain and minimising traffic impacts. During the design process, a number of the stop locations were changed based on the feedback received from Newcastle City Council.

The selected stops were carefully planned to maximise the customer experience, support network connectivity and integrate with the broad program of urban revitalisation work underway in Newcastle. Each light rail stop is a major attractor, encouraging activation hubs around key destinations like Civic Square and Market Place.

Light rail stops range from 450 metres to 600 metres apart to take advantage of activation points. The distance between light rail stops is similar to bus stops, which are around 450 metres apart on average. The light rail route will include six stops, significantly improving access for transport users when compared to the two stops offered by the previous heavy rail system.

The design of the stops will be fully compliant with the *Disability Discrimination Act 1992* and will provide better accessibility for elderly and less mobile passengers. The location and distance between stops offers significantly more options than heavy rail and places people where they want to travel.

The approach to selecting the location and configuration of stops for the light rail proposal is described in section 5.4 of the REF.

#### 4.2.4 Is Wickham Station the best location for the maintenance and stabling facility

##### *Summary of issue raised:*

- Whether Wickham Station is the best location for the proposed maintenance and stabling facility.

##### *Response:*

Wickham Station was selected as the best location for the light rail maintenance and stabling facility following a thorough multi-criteria assessment. Locating the facility at this site was identified as the preferred option, based on functional, project cost, and land use considerations. The location at Wickham avoided impacts to the State heritage listed Newcastle Station, and provided opportunities for the adaptive re-use of Newcastle Station and surrounding land by the Program.

The architectural form of the building will consider the visual amenity of the area and the surrounding community. The facility will be used for overnight stabling of the light rail vehicles, operations and light maintenance work.

The stabling facility will be approximately 12 metres high and 20 metres wide with offices and a commercial entrance fronting Stewart Avenue. The facility is located mainly within the former rail corridor and the existing footprint of Wickham Station with only a small incursion into Station Street (northern side). Additional details on the facility will be provided to the community as the design is progressed.

The proposed location of the maintenance and stabling facility is shown in Figure 6.2 of this report.

Feedback on the design of the stabling and maintenance facility will be taken into consideration during detailed design including the need for the building to be in keeping with its heritage context and setting.

During consultation with the community, people told us they see great opportunities to build on the strengths of the city centre, but that the city's heritage and character should be respected as part of revitalisation activities.

### 4.3 Design and features

#### Summary of issues

##### Height of light rail tracks

##### Corridor design, mixed vs separated running

##### Facilities at light rail stops and the transport interchange at Wickham

##### Design based on local conditions, not Sydney

##### Light rail vehicles

##### Incorporating active transport

##### Other design issues/queries

#### 4.3.1 Height of light rail tracks

##### *Summary of issues raised:*

- Whether the rails will be elevated above the road surface, which could provide a barrier to movement and impact on accessibility, traffic movement, pedestrian safety, passing trade, and availability of space for other uses.
- Whether the light rail corridor and stop platforms would be located at a different height to the surroundings causing pedestrians to have to negotiate steps and various heights differences.

##### *Response:*

The introduction of light rail in Newcastle will open up the waterfront to the city centre and improve the experience of moving around the city.

Accessibility has been a critical element in the design process balanced against other issues, such as safety and flooding, and operability of the light rail system.

To maintain acceptable levels of traffic safety, engineering measures are necessary to promote separation of different types of vehicles, including light rail vehicles from other obstacles.

Transport for NSW has taken on-board concerns raised in submissions and a raised track is no longer being considered as part of the proposal design. Transport for NSW is now considering other options for ensuring the safe separation of vehicles and light rail, such as rumble strips, reflectors or line marking that would not impeded pedestrian movement across the proposal.

Access to light rail vehicles, stops and access across light rail tracks will comply with the *Disability Discrimination Act 1992*, the Disability Standards for Accessible Public Transport 2002 and Australian Standard (AS) 1428.1-2009 Design for Access and Mobility.

### 4.3.2 Corridor design, mixed vs separated running

#### *Summary of issues raised:*

- Whether separating corridors for different forms of transport uses (separated running) will impact accessibility, pose a barrier to movement, and impact urban design/form, urban renewal opportunities or parking.
- Whether the design should allow sharing the light rail alignment with other vehicles, pedestrians, and cyclists (mixed running).
- Concerns about safety issues associated with both separated and mixed running.
- Whether Hunter Street is wide enough for separated running and parking.
- Concerns about the functionality of Scott Street with light rail operating in the street.

#### *Response:*

The Program aims to strengthen connections between the city and the waterfront, provide more public space and amenity and deliver better transport solutions. Working closely with Newcastle City Council, the vision of an activated city centre and waterfront that attracts people, new enterprises and tourism is being realised.

To realise this vision, consideration of the alignment for the proposal was critical and the route was subject to a rigorous assessment process. The assessment process took into consideration a number of criteria including:

- operational reliability and transit time
- road traffic operations and footprint
- visual impacts and urban amenity
- pedestrian access and safety
- environmental impacts
- safety (including rail and road safety requirements and standards)
- future proofing and cost

Discussions with key stakeholders also informed the assessment process.

The REF details the preferred alignment option is for light rail to operate in isolation from road traffic in the former rail corridor to Worth Place, then run in a dedicated lane along Hunter Street, and then share a lane with traffic along only a short section in Scott Street.

This solution balances a variety of considerations including providing opportunities for increasing activity on Hunter and Scott streets, managing safety, delivering urban amenity and limiting the number of lost car parking spaces.

Some feedback was received during the public display of the REF; those received were concerned with visual amenity of Hunter Street, loss of parking and safety.

Separated running in Hunter Street minimises the loss of parking. Mixed running would result in greater loss of parking near stops and intersections. To maintain an acceptable level of safety to light rail customers, pedestrians and other road users, traffic would not be allowed to drive through light rail stop locations or on light rail tracks through intersections. Travel lanes would also need to be diverted around the light rail stops and intersections. In order to minimise the risk posed by cars weaving between lanes prior to and after light rail stops and intersections, further parking would need to be removed to provide a satisfactory level of safety.

Separated running also ensures service reliability. Cars turning or queuing on tracks will not influence the operation of the proposal. This will be important during peak hours and customers can be delivered to their destination or connection with other services with minimal delay.

Safety has always been a key priority in the development of the proposal.

- There are five signalised intersections with right turns on Hunter Street, which increases the chance of vehicles disrupting light rail services, and also increases safety risks.
- As Hunter Street is busier than Scott Street, separated running reduces risk by minimising the number of interactions between light rail vehicles and other road and pedestrian users. In reducing the number of interactions, the risk is significantly reduced.
- Scott Street is narrow and mixed running is the only feasible option that allows both two-way traffic and two light rail tracks. The width of the road does not allow for separated running. This section of Scott Street has significantly lower traffic volumes compared with other sections of the light rail route. Measures such as restricted turning and speed zone controls are being considered to manage road and pedestrian safety in the area. To mitigate any potential risks, parking and light rail stops in this section have also been removed.

A comprehensive education campaign including signs and information will be delivered to the community to educate drivers. Achieving good urban amenity outcomes along Hunter Street is one of the NSW Government's key goals, this can still be achieved with Light Rail.

To address urban amenity and to give confidence that urban amenity can be achieved alongside separated running, the Program team have commissioned urban designers who have previously worked in Newcastle on the Hunter Street Revitalisation Strategy (Council 2010). The designers, JMD Design, will work with the Program team and Newcastle City Council on the urban design of Hunter and Scott streets to give form, shape, and character to the neighbourhood surrounding the proposal. The scope for this work will include the street and public space along Hunter and Scott streets between Worth Place and Pacific Park.

The design will seek to balance the priorities of pedestrians, cyclists, public transport, vehicles and parking, taking into account the safety, functional and operational requirements of the proposal.

The vision aims to transform Hunter and Scott streets as a series of destinations and public spaces. The Program team will continue to work with key stakeholders to identify the best outcomes to meet this vision and provide a revitalised thriving city centre. The urban amenity work will be the subject of a separate environmental assessment and approval process.

### 4.3.3 Facilities at light rail stops and the transport interchange at Wickham

#### *Summary of issue raised:*

- Whether facilities such as covered waiting areas, storage or locker facilities (including for bicycles), toilets, and non-slip surfaces will be provided at light rail stops, and whether 24-hour staffing will be provided at interchanges.

#### *Response:*

Light rail stops will be located at activation hubs, and will be planned with good urban design principles in mind. The design of light rail stops will consider safety, accessibility, interchange function, integration with public domain and the need to minimise traffic impacts.

Features that may be located at the stops include:

- wayfinding signage, including dynamic and static passenger information
- canopies to provide shade/weather protection
- closed circuit television (CCTV) and a 'help point' integrated with other platform based services and the operations centre
- handrails, bins and seating
- a control cabinet about 1.5 metres high

The interchange at Wickham includes toilet facilities, bike racks and lockers.

All light rail stops and interchanges will be fully compliant with the *Disability Discrimination Act 1992* and light rail stop surfaces will be non-slip in accordance with current legislation and Australian Standards, making it easier for people with impaired mobility to use the system.

#### 4.3.4 Design based on local conditions, not Sydney

##### *Summary of issues raised:*

Whether the proposal has been developed with an understanding of local conditions and requirements, or whether the proposal is based on Sydney traffic, transport, and pedestrian behaviours, requirements and needs.

##### *Response:*

This proposal is about meeting the needs of Newcastle and Novocastrians now and into the future. Engagement with local stakeholders and local studies have influenced and informed decision making every step of the way.

A detailed process of design development and evaluation has been undertaken to define the proposal and to ensure the proposal meets the needs of Newcastle and its people. Detailed traffic modelling and pedestrian counts were conducted in Newcastle using industry best practice to determine local impacts. Details of the studies undertaken are outlined in Section 8 of the REF.

Decision-making and the design of Newcastle Light Rail has been based on local data and international best practice and experience. The design process has also been informed by best practice from other light rail systems interstate (including systems in operation, under construction and planned in Melbourne, Adelaide, the Gold Coast, and Sydney) and other light rail systems in inner city areas overseas (including in North America, Europe, and Dubai).

Transport for NSW does take learnings from the City and South East Light Rail project in Sydney, but it is made up of a separate team and is Newcastle based relying on local staff expertise.

#### 4.3.5 Light rail vehicles

##### *Summary of issues raised:*

- Whether the light rail vehicles that will be used will also be suitable for future extensions (including possible extension to the airport).
- Whether light rail vehicles will be 'off the shelf' or whether local businesses will have the opportunity to manufacture the vehicles.

##### *Response:*

A fleet of six new vehicles is on order from the company which supplied Sydney's Inner West Light Rail, proven in Australian conditions. These vehicles have proven technology, ensure the best value and best possible service, and allow us to have vehicles on the tracks faster. It also provides for lower ongoing maintenance costs and reliability of parts.

The brand new modern fleet will offer a high level of comfort and convenience for passengers, with capacity to carry up to 600 customers per hour each way. The light rail vehicles will be compliant with the *Disability Discrimination Act 1992*, including designated seating for elderly and less mobile passengers and spaces for wheelchairs.

Newcastle is a beach city and surfing is an institutional way of life for many Novocastrians. Listening to the feedback provided, spaces for surfboards will be provided on all light rail vehicles.

Similar to current policy, bicycles will be allowed on light rail vehicles subject to availability of space. Bicycles would not be able to block doors or passageways, nor can they be ridden on light rail vehicles or on stop platforms.

The light rail vehicles will meet the functional and operational needs of any future expansion of the network as will the installation of the second parallel track across Stewart Ave.

### 4.3.6 Incorporating active transport

#### *Summary of issue raised:*

- Cycleways and pedestrian footpaths should form part of the design/the proposal and not be an afterthought.

#### *Response:*

Active transport including cycling is important to the overall vision for the city centre. The NSW Government is committed to enhancing the cycling network in Newcastle city and is working with Newcastle City Council to assess options and deliver new cycleways where they are needed.

Through consultation with cyclists and the community, they have told us that they are interested in:

- providing more open space adjacent to Scott Street for that allows easy movement from the city to the harbour
- options for cycleways that suit the needs of commuter cyclists, families and recreational cyclists
- options to improve the experience of walking along Hunter Street

The Program team is working with Newcastle City Council to prepare a cycleway strategy to ensure we have the right solution for both busy commuters and recreational cyclists. Cycleways and pedestrian links are currently being designed and, include the provision of a dedicated east-west cycleway along King Street. This cycleway will be subject to separate environmental assessment and approval. The cycleway strategy will also consider the urban renewal plans for Hunter and Scott streets.

### 4.3.7 Other design issues/queries

#### *Summary of issue raised:*

- Will there be an overpass over Hunter and King streets?

#### *Response:*

No, pedestrian bridges are not required at proposed locations in Hunter or King Streets. Unlike heavy rail, light rail vehicles are designed to be pedestrian friendly and people can interact safely at road level.

People with disabilities and those with impaired mobility will also benefit by being able to cross in locations previously inaccessible. Light rail will provide greater access for the people of Newcastle, opening up the city centre to the waterfront.

#### *Summary of issue raised:*

- Please confirm the location of the turnout from the former rail corridor to Hunter Street at Worth Place.

#### *Response:*

The route enters the former rail corridor just to the east of the existing Wickham Station buildings and travels within the former rail corridor to Worth Place. At Worth Place, the route leaves the former rail corridor and enters Hunter Street at a proposed new road intersection. New pedestrian facilities and landscaping will also be designed for this location.

Figure 6.1 in this report shows the indicative location of the proposed turn out location.

#### *Summary of issue raised:*

- Rationale for using overhead wiring

#### *Response:*

Four different options were considered for providing power to light rail vehicles, including a bridle wire system, a catenary system, a hybrid of both bridle and catenary, and a 'wire free' option using electromagnetic induction and a ground level power system.

The preferred option selected was the bridle wire system, which involves a short, relatively simple and cost effective overhead wiring system. Wire systems have generally proven more reliable and bridle wire systems today are quite discreet.



**Figure 4.1** Artists impression of light rail

*Summary of issue raised:*

- The interactive maps appear different to the fly through released previously.

*Response:*

Transport for NSW has prepared visualisations and fly through presentations to assist community members in understanding how the light rail might look and how it will operate. The visualisations and maps are meant to provide an overview of the proposal only and are not fully developed as detailed design has just commenced. The design of the proposal will continue to evolve and may vary from the video and other material released. We will continue to keep the community updated on the proposal and provide early and thorough information as we progress through the stages of the proposal.

*Summary of issue raised:*

Concerns that having 600 metres of ballasted track between Wickham and Worth Place would prevent any north south connectivity/access through this part of the rail corridor, and that ballasted track in this section does not align with the aims of the renewal strategy.

*Response:*

Feedback received during the public display period is continuing to shape the design of the light rail. We have taken feedback on board about the ballasted track and the design of the proposal has been revised. Transport for NSW has revised the design of the track bed between Stewart Avenue and Worth Place and this is discussed in more detail in section 6.3 of this report. Ballast will no longer be used and this section of track will have an embedded track slab similar to that proposed for Hunter Street.

The embedded track slab provides an opportunity to improve visual amenity, and allow for open space either side of the light rail track, which may be used for cycling, walking or landscaped open space.

## 4.4 Operation

### Summary of issues

#### Accessibility

#### Integration with other forms of public transport, footpaths and cycleways

#### Light Rail Services

#### Ticketing

#### Safety

#### Other operational issues/queries

### 4.4.1 Accessibility

#### Summary of issues raised:

- Whether light rail stops and vehicles will be accessible for those with limited mobility, and how those with limited mobility will cross the light rail tracks.
- Concerns regarding the distance between stops and services such as Centrelink.
- Whether the proposal meets the needs of local and visiting Aboriginal communities.

#### Response:

A key focus is ensuring the new light rail system will be accessible for all members of the Newcastle community as well as tourists and visitors. Light rail vehicles and stops will be fully compliant with the *Disability Discrimination Act 1992*, and will also facilitate easy access and travel for passengers with prams and strollers.

The design of the light rail stops has incorporated a number of features to provide accessibility for mobility impaired passengers, including provision of level access. Light rail vehicles will include low floors and designated spaces for wheelchairs and seats for elderly or less mobile passengers.

Selection of the stop locations was carefully planned to maximise the customer experience and support network connectivity. Stops range from between 450 metres to 600 metres apart to take advantage of the activation hubs they have been designed to cater for, including people with wheelchairs or disabilities.

A comprehensive communication plan will be developed prior to operation of the proposal to assist the community in understanding how to use light rail. The strategy will recognise the needs of a wide range of stakeholders and users, including those who speak languages other than English. The plan will recognise the needs of a range of potential stakeholders and users of the proposal, including Aboriginal and Torres Strait Islander communities in the Newcastle region.

#### Summary of issue raised:

- How will light rail integrate with other road users, including other forms of public transport, pedestrians and cyclists.

#### Response:

Light Rail is just one component of the NSW Government's plans to improve public transport in Newcastle. With light rail on the way, there is an opportunity to completely re-think the transport network in Newcastle to support jobs, growth, and urban renewal in the city centre.

For Newcastle to reach its potential, the NSW Government has called on experienced operators to create Transport for Newcastle, a sole operator that will create a modern and connected system that links light rail with frequent and reliable buses, ferries and trains.

This will be public transport run in Newcastle, for Novocastrians.

By drawing on the innovation of the private sector, we have the opportunity to re-design the transport network in Newcastle to ensure it provides better connections to key parts of the city where people work, play and study. We want to move to a model that considers the whole travel experience in Newcastle, including buses, walking, cycling, trains, light rail and ferries.

Under this new model, the operator will be solely focused on how each mode can work together as part of an integrated network to deliver the transport services the people of Newcastle actually want. That means running the service frequencies that meet demand and making using public transport more attractive and convenient, making interchanging more simple and taking people where they want to go.

After years of declining public transport patronage in Newcastle, the new operator will have a contract with Transport for NSW that will include incentives to grow patronage. We will also set minimum service standards and key performance indicators and will continue to set fares, but the selected operator will be given a level of autonomy to plan and run services.

Fares for light rail will be controlled by the NSW Government, and Newcastle Light Rail will be integrated with the public transport network and the Opal fare structure.

Objectives of the Program include improving the experience of being in and moving around the city, and integrating urban transformation with new, efficient transport to activate Hunter and Scott streets and return them to thriving areas. The Wickham Transport Interchange will provide for a seamless transition from heavy rail to light rail across one combined platform, allowing users to easily transfer between the two modes.

The Program team is working with Newcastle City Council to prepare a cycleway strategy to ensure we have the right solution for both busy commuters and recreational cyclists. Cycleways and pedestrian links are currently being considered in conjunction with the proposal, including provision of a dedicated east-west cycleway along King Street. This strategy will also consider the urban renewal plans for Hunter and Scott streets.

#### 4.4.2 Light rail services

##### *Summary of issues raised:*

- Whether the frequency of light rail services will offer adequate service, when services will operate, and whether services will run outside 'peak hours' (particularly during evening hours when people might be visiting restaurants and the theatre, for example).
- Concerns that a service 'every ten minutes' would not be frequent enough during peak times, and that traffic congestion could impact the operation of light rail.
- Concerns that transferring to light rail from another mode of public transport will increase journey time.
- Whether light rail would be slower than current bus services, with fewer stops.

##### *Response:*

The brand new, modern light rail vehicle fleet will offer frequent services and a high level of comfort and convenience for Newcastle passengers. The light rail fleet will have capacity to carry up to 600 customers per hour each way.

It is expected that the travel time from Wickham Transport Interchange to Pacific Park, including customers boarding and alighting, will be around 12 minutes. Light rail services will run from 5am and finish at 1am. Between 7am to 7pm, services will run every 10 minutes on weekdays and every 15 minutes on weekends and outside of peak times.

The new operating model – Transport for Newcastle – will also provide greater flexibility by running service frequencies that meets demand, making public transport more attractive and convenient including making sure interchanging more simple. The new operator will be given a level of autonomy to plan and run services, but will operate under a contract with Transport for NSW, who will set minimum service standards and provide key incentives, including to grow patronage. This means the new operator will have a financial incentive to make public transport easier and more convenient to use.

Light rail will offer superior levels of service, reliability and comfort as well as improved accessibility and urban renewal opportunities. It is considered that the overall opportunity offered by light rail is far superior to other transport modes.

#### 4.4.3 Ticketing

##### *Summary of issues raised:*

- How will light rail fares be set and how will light rail fares integrate with other public transport trips?
- Concerns that at least two fares would be required to travel to/from the city centre via public transport and that the total cost would be greater than the current cost to travel via one form of public transport (such as by bus). Concerns that the operation of light rail should be cheaper than travelling by car.

*Response:*

Light rail fares will be controlled by the NSW Government. Newcastle Light Rail will be integrated with the public transport network and the Opal fare structure.

Public transport fares are regularly reviewed by the Independent Pricing and Regulatory Tribunal (IPART) and a determination based on the review is provided by the NSW Government. In May 2016, IPART recommended a maximum increase that can be applied across all fares and a package of fare reforms designed to improve public transport efficiency, encourage greater use of public transport, and minimise impacts on customers. The review was informed by over 1,200 submissions throughout the consultation period.

More information on the review and recommendations can be found on IPART's website: [ipart.nsw.gov.au](http://ipart.nsw.gov.au)

Customers will use an Opal card to travel on light rail in Newcastle by simply tapping on at an Opal card reader at the start of a trip and tapping off when alighting.

The Opal system will automatically calculate your fare and deduct it from the value stored on your Opal card.

There will be a range of Opal products available for use, including single use Opal, Opal Child/Youth card, Opal Senior/Pensioner card and Opal Concession card.

Listening to feedback on the costs of public transport, the NSW Government has acknowledged that the current Opal fare structure is expensive for people who change modes, and is introducing a \$2 'transfer discount' every time customers change modes of transport within an hour as part of the same journey. Child/Youth, Concession or Senior/Pensioner Opal card customers will get a 'transfer discount' of \$1. The discount will come into effect in September 2016, well before the Newcastle Light Rail is operational, and will encourage customers to take the most efficient journey to their destination.

**4.4.4 Safety***Summary of issues raised:*

- Concerns about the safety of other road users, including pedestrians, cyclists and motorists.
- Concerns with pedestrian safety on Hunter Street between Worth Place and Auckland Street, and near Perkins Street where the clear zone to the pedestrian footpath is reduced.
- Concerns the proposal will bring moving vehicles and physical barriers close to pedestrians and footpaths.
- Concerns that alighting from the light rail would be dangerous because of traffic movement, particularly in Scott Street, and at times when vehicle and pedestrian traffic is heavy/congested.

*Response:*

Safety is a top priority. From day one and throughout the design of the proposal, safety has been considered and integrated into the process and was one of the key assessment criteria when developing the proposal. Safety must be in line with legislative and regulatory guidelines, which include the safety of all road users: cars, pedestrians, motorcyclists and cyclists.

One of the key outcomes of the proposal is to ensure customers are safe at and around stops, on-board light rail vehicles, and when boarding and when alighting vehicles. This is one of the key reasons separated running was selected for sections of the route where there are higher road vehicle volumes.

Light rail stops will be well lit and located in highly visible locations. Passive and active security systems will include closed circuit television (CCTV) cameras, lighting, emergency telephone/help points and warning signs at each stop.

Light rail vehicles will operate within road speeds except in the section of the route that lies within a dedicated corridor where it will run faster. In the shared and mixed running sections of the route, light rail vehicle drivers will be required to give due consideration to other vehicles, cyclists and pedestrians.

A road safety audit of the design that was assessed in the REF has been completed and throughout the development of the proposal further detailed safety reviews and road safety audits will be undertaken to identify mitigation measures to reduce the risk of collisions during operation. The Program team will also conduct a widespread and targeted education program to inform the public about safely interacting with the new light rail network when operational.

Roads and Maritime Services and Newcastle City Council, as the road owners, have a legislative responsibility to consider the detailed design and the results of the safety audits prior to construction commencing.

#### 4.4.5 Other operational issues/queries

##### *Summary of issue raised:*

- Whether passengers will be able to take bikes on the light rail vehicles

##### *Response:*

Similar to current policy on travelling with bicycles, bicycles will be allowed on light rail vehicles, subject to availability of space. Bicycles would not be able to block doors or passageways, nor can they be ridden on light rail vehicles or on stop platforms.

Newcastle is a beach city and surfing is an institutional way of life for many Novocastrians, listening to the feedback provided, spaces for surfboards will be provided on all light rail vehicles.

##### *Summary of issue raised:*

- How will garbage trucks will operate in Hunter and Scott streets

##### *Response:*

Garbage trucks will be able to operate in a similar manner as they do currently by emptying garbage bins from the kerbside road lanes. The stopping pattern of light rail vehicles is not expected to cause inconvenience or disruption to garbage trucks.

##### *Summary of issue raised:*

- Whether it will still be possible to close the road for events such as fun runs

##### *Response:*

Yes. With the revitalisation of Newcastle, more and more events are likely to be held within the city centre. Light rail will encourage people to travel by public transport and will support special events, not hinder them.

If necessary, it would still be possible to close the roads used by light rail for fun runs or other community events. Events that require road closures or temporary suspension of public transport services will be managed in the same way they are today, and light rail services may need to be supplemented with bus services.

##### *Summary of issue raised:*

The light rail track between the stabling yard and the first stop will need to be available for early commissioning prior to mid 2018 to ensure vehicles, systems and the track interface is ready

The views of the community and key stakeholders are shaping the NSW Government's plans to revitalise Newcastle's city centre. All design related feedback in submissions has been responded to in this report and will be considered during the continued detailed design of the proposal.

## 4.5 Consultation

### Summary of issues

#### Consultation process and activities

#### Consultation adequacy, transparency, and availability of information

#### Calls for all submissions to be made public

#### Requests for further consultation

#### Consultation with the community regarding urban renewal and other city centre redevelopments

#### Information on the operation of light rail

### 4.5.1 Consultation process and activities

#### *Summary of issues raised:*

- Queries about how feedback will be taken into account.
- Concerns that not all questions were answered at consultation sessions and that not all people with an interest in the proposal (including business owners) have been consulted.
- Concerns that the community has not been asked whether they want light rail.
- Concerns that feedback will not be taken into account in decision making

#### *Response:*

The NSW Government is listening to the community and plans to improve transport in Newcastle have been informed by feedback from the public, Newcastle City Council, expert planners and architects, government agencies, city renewal experts and other stakeholders.

The REF is a key step in the planning process. The REF for Newcastle Light Rail was placed on public display for a period of seven weeks, from 7 April 2016 to 27 May 2016. This included an additional eight days at the request of Newcastle City Council. Members of the public were invited to have their say on the REF and make submissions during this period.

We acknowledge that some of the questions asked at consultation sessions were unable to be answered on the spot, including some that were highly technical in nature, about matters that are yet to be resolved through the design process or were about issues outside the scope of the proposal. In these instances, the person asking the question was encouraged to make a submission or send an email to request the information from a member of the project team.

Submissions received during the display period have been considered by Transport for NSW and work has also started with Newcastle City Council on the urban amenity and, cycling strategies. The Program team is also progressing the parking strategy as part of the proposal.

REF submissions represent an important part of the suite of information that will be considered in making a determination on the proposal and will continue to inform the detailed design of the proposal.

This report outlines issues raised in submissions, responses to these issues and the modifications being made to the proposal, as well as mitigation measures to minimise potential impacts that will need to be implemented during construction and operation.

Each submission received was allocated a unique submission number, and each individual, group or agency that made a submission will be notified of where in the submissions report they can find a response to their submission.

The Program team is preparing comprehensive engagement plans that will outline how we will continue to liaise with local businesses, key stakeholders and the community during the detailed design, construction, and operational phases of the proposal. This ongoing engagement process will play an important role in reducing any potential impacts and enhancing the benefits of the proposal for all stakeholders.

### 4.5.2 Consultation adequacy, transparency, and availability of information

#### *Summary of issues raised:*

- Whether the level and amount of consultation and level of transparency has been adequate and concerns that the REF and other project material was not widely available.
- Concerns that the government has not released relevant studies, supporting and background documentation for scrutiny. Some submissions requested that all existing and future documents, and contracts that the government enters into, should be released to the public, and that further information on the proposal should be provided.
- Concerns that the consultation with Council has been inadequate, and that Council's needs, preferences and concerns have not been taken into account in the design.

*Response:*

The NSW Government is committed to genuine engagement with stakeholders and the wider community to inform transport decisions for Newcastle. As outlined in section 2, a comprehensive community consultation program was implemented leading up to and during the REF public display period.

The REF for Newcastle Light Rail was placed on public display for a period of seven weeks, from 7 April 2016 to 27 May 2016. This included an additional eight days in response to a request from Newcastle City Council.

Following the public release of the REF, members of the community and stakeholders were encouraged to make a formal submission. Engagement activities undertaken during the display period included:

- Encouraging the public to make submissions via the Revitalising Newcastle and Transport for NSW websites and Social Pinpoint (an online community engagement tool)
- A four-page information brochure providing an overview of the proposal and the details of the public display process. Brochures were distributed to businesses in the area, 7,000 households and properties in the suburbs of Newcastle, Newcastle East, Newcastle West and The Hill, and were handed out at Hamilton, Broadmeadow, Cardiff, Warabrook, and Waratah stations,
- Advertisements were placed in The Newcastle Herald on Saturday 9, 16, 23 and 30 April, to provide information about the display locations and information sessions.
- Two pop-up stalls and four information sessions were held to provide the public with opportunities to speak with the project team, discuss issues and concerns and provide feedback on the REF.
- Transport for NSW advertised the five locations where the REF was available in hard copy, and also published the REF online.

Where Transport for NSW has not been able to provide the information requested (such as where it would potentially compromise the commercial confidentiality of the proposal) an explanation has been provided.

As outlined in section 2, consultation occurred throughout the strategic planning and development phase of the proposal with a number of senior stakeholders from organisations located in Newcastle (including Council, peak bodies and associations, and government agencies). This feedback has informed the development of the proposal and a number of the changes already implemented. The Program team will continue to work with Newcastle City Council in the development of the urban amenity and cycleway strategies to ensure the vision of an activated city is realised and Transport for NSW will progress the parking strategy as part of the proposal.

Transport for NSW is committed to continuing community and stakeholder engagement on the proposal and will work closely with key project partners to ensure the consistent delivery of accurate information on the proposal to the community, local businesses and stakeholders throughout the life of the proposal.

### 4.5.3 Calls for all submissions to be made public

#### *Summary of issue raised:*

- Calls for all submissions to be made public.

#### *Response:*

Transport for NSW released the Newcastle Light Rail REF in its entirety, along with associated technical papers, to seek feedback from the public, engage in open dialogue, and as part of our commitment to transparency.

When the REF was released and submissions were called for, stakeholders and community members were not advised that their submissions and contact details may be made public.

For privacy reasons, Transport for NSW is unable to publish REF submissions. However, those who made submissions are welcome to publish them.

#### 4.5.4 Requests for further consultation

##### *Summary of issue raised:*

- Interest in continuing to receive information and being kept informed about the proposal, including queries about how people could continue to be involved.

##### *Response:*

The Program team is committed to ongoing engagement with the community and stakeholders during detailed design, construction and operation of the proposal.

Transport for NSW will develop a Community and Stakeholder Engagement Plan and a Business Activation Strategy.

The Community and Stakeholder Engagement Plan will ensure:

- the community and stakeholders have a high level of awareness of all processes and activities associated with the proposal
- accurate information is made available in an effective and timely manner
- a timely response is given to issues and concerns raised by stakeholders and the community.

The Program team will continue to provide project newsletters, regular web and social media updates, media advertising, regular meetings, forums and information sessions. The 24-hour hotline and contact email addresses are open now and will continue throughout the construction period.

Transport for NSW team will also work with stakeholders to minimise disruption and ensure Newcastle remains open for business throughout construction. A Business Activation Strategy will be developed to ensure that disruption to businesses is minimised and visitors are still attracted to the city during construction. This ongoing engagement process will play an important role in reducing any potential impacts

#### 4.5.5 Consultation with the community regarding urban renewal and other city centre redevelopments

##### *Summary of issue raised:*

- Requests for wider consultation in relation to urban renewal plans in the city centre, including information on the various projects planned or underway, and a request to be consulted and involved in these activities.

##### *Response:*

Community and businesses will have an opportunity later this year to contribute ideas to the design of two major revitalisation precincts adjacent to Newcastle and Civic stations as part of ongoing engagement led by UrbanGrowth NSW as part of the Program.

Interested members of the public can refer to the Revitalising Newcastle website for updates on community consultation regarding urban renewal plans at [yoursay.revitalisingnewcastle.com.au](http://yoursay.revitalisingnewcastle.com.au)

This website will provide information about ways to be involved in future discussions. For specific information requests, community members and stakeholders are encouraged to send an email to [info@revitalisingnewcastle.com.au](mailto:info@revitalisingnewcastle.com.au) or call 1800 359 545.

#### 4.5.6 Information on the operation of light rail

##### *Summary of issue raised:*

- Requests for more information and community education in relation to how the light rail will operate, how people can use it, and how it would integrate with other forms of transport.

##### *Response:*

Light rail will create an easy transport option for customers to move around the Newcastle city centre and will connect the city with the waterfront. The NSW Government understands that the proposal will be more attractive for customers if they have easy access to information about how to use the service.

Details on how to use the light rail service and education material for other road users on how to safely interact with the new light rail system will be provided as the project develops. As construction reaches the final stages, Transport for NSW will provide and promote comprehensive information about using the service. Information will be made available in a number of ways, including print, radio and online. Refer to Section 4.4.1 where the integration of other transport services is described.

## 4.6 Construction

### Summary of issues

#### When construction is planned to commence

#### Construction impacts on businesses

### 4.6.1 When construction is planned to commence

#### *Summary of issue raised:*

- Queries regarding when construction is planned to commence.

#### *Response:*

Work has already started to inform the detailed design. Geotechnical investigations commenced early this year with construction expected to start in late 2016 once a managing contractor has been appointed.

Light rail is expected to be operational in 2019.

The Program team will continue to keep local businesses and the community updated as work progresses.

### 4.6.2 Construction impacts on businesses

#### *Summary of issue raised:*

- Concerns about the timing of construction and whether it will impact the busiest times for businesses.

#### *Response:*

The construction program for the introduction of light rail in Newcastle will be undertaken in stages to minimise the amount of time businesses are impacted by construction activities. The proposed construction methodology is for a progressive construction area which moves along the light rail alignment where impacts on any one precinct would only be for a few months at a time.

While it will not be possible to ensure access is maintained at all times, the Program team will work directly with individual premises to ensure advance notice of likely impacts and assistance in arranging suitable access during construction to avoid major inconvenience. More detailed information about expected construction impacts and timing will be provided when the managing contractor is appointed.

A range of management strategies will be implemented to reduce the broader impacts of the proposal through the city centre. These include a Construction Traffic, Transport and Access Management Plan and precinct liaison managers who will work directly with businesses to minimise the impacts of construction.

Precinct liaison managers will provide businesses with personalised advice and assistance to ensure they have access to the right information at the right time. The Program team will also use a suite of tools to keep businesses up-to-date on developments including: meetings, briefings, forums, letters, newsletters, advertising campaigns, signage and access to our project info line and 24-hour construction response line. Specific communication and advertising campaigns will explain road and bus route changes. Updates on traffic changes will be provided ahead of time and throughout the construction period.

The NSW Government has appointed a locally based Newcastle Coordinator General to ensure the city continues to thrive during construction of the proposal.

The NSW Government is committed to keeping Newcastle open for business during the construction of light rail. We will look at the specific needs of businesses in Newcastle, and learn from the successful activation activities undertaken in Sydney to minimise construction impacts on businesses. We will work with the local business community and Newcastle City Council to ensure Newcastle stays open for business during construction to enable vibrant activated city spaces.

## 4.7 Assessment and approvals

### Summary of issues

#### REF adequacy and scope of assessment

#### Decision making

### 4.7.1 REF adequacy and scope of assessment

#### *Summary of issues raised:*

- Whether the REF is an adequate form of assessment, and whether all impacts have been fully assessed.
- Concerns there is a need for further assessment and management plans and that there were mistakes or inaccuracies in the REF

#### *Response:*

Careful consideration was given to the environmental context of the proposal site, the statutory requirements, and the potential impacts of the proposal. Under state planning legislation, an environmental impact statement (EIS) is required for an activity that is likely to significantly impact the environment or threatened species, ecological communities or their habitats.

After assessing the environmental impacts of the proposal in accordance with section 111 of the EP&A Act and Clause 228 of the *Environmental Planning and Assessment Regulation 2000*, Transport for NSW concluded that a significant impact to the environment was not likely and as such the preparation of an environmental impact statement was not required and the proposal could be determined under Part 5 of the *Environmental Planning and Assessment Act 1979*.

The REF investigated a broad range of potential impacts of construction and operation of the light rail in detail, including traffic, transport and access, urban design and visual amenity, heritage, social impacts, noise and vibration and socio-economic considerations.

The REF acknowledges that the proposal has the potential for a number of impacts, and recommends measures to minimise these impacts.

The REF assesses the environmental impacts of the proposal, making sure that the proposal is not likely to have significant impact on the environment. Ensuring construction impacts on the community are minimised is a high priority for Transport for NSW.

The REF has been completed by experienced professionals in accordance with all relevant environmental and planning legislation and other relevant procedures and guidelines required by government agencies. The REF concluded that the impacts of the proposal were unlikely to be significant.

As part of its determination process, Transport for NSW will consider the findings of the REF, specialist studies, REF submissions and any other relevant information or issues, and will make a determination regarding the proposal, including whether any of the impacts are likely to be significant.

Where additional impacts are anticipated, these will be subject to separate environmental assessment. Transport for NSW assessed the impacts of parking in the REF and will prepare a parking strategy that considers offsetting the loss of parking.

The Program is already working with Newcastle City Council investigating and preparing strategies regarding cycleways, urban design and complementary roadworks.

Transport for NSW will continue to liaise with stakeholders to ensure that further opportunities for input into the process are provided.

## 4.7.2 Decision making

### *Summary of issue raised:*

- Concerns that decisions are being made in Sydney not Newcastle

### *Response:*

This proposal is about meeting the needs of Newcastle into the future. Engagement with local stakeholders and local studies have influenced and informed decision making every step of the way.

A detailed process of evaluation and design has been undertaken during the development of the proposal to ensure it meets the needs of Newcastle and its people.

The community has been very clear that they want locally-based decision making about transport in Newcastle, and with this in mind, the NSW Government has appointed a Newcastle Coordinator General to ensure the city continues to thrive during planning and construction.

A new local team with staff seconded from multiple NSW Government agencies, has been set up to oversee the Program and ensure projects are delivered in a coordinated way.

The development of the REF was completed by locally-based companies and included technical studies, field investigations and consultation with the community. These studies and community feedback have helped shape the decisions on the proposal.

Decision-making has been based on local data, and international best practice. Detailed traffic modelling and pedestrian counts were conducted in Newcastle to determine local impacts and feedback provided by local stakeholders including Councils, peak industry bodies and government agencies have informed the proposal.

With the creation of Transport for Newcastle – one major operator will plan and run Newcastle Light Rail, buses, ferries and interchanges, public transport will be run in Newcastle, for Novocastrians.

## 4.8 Traffic, transport and access impacts

### Summary of issues

#### Impact on parking

#### Construction impacts on traffic flow

#### Operational impacts – traffic on Hunter and Scott streets

#### Operational impacts – other streets and the road network in general

#### Operational impacts – how the roads will operate with light rail

#### Operational impacts – emergency vehicles

#### Operation impacts – access to businesses and loading zones

#### Operation impacts – access to private residences

#### Access to and around the city centre

#### Disabled access

#### Impact on buses

#### Impact on taxis

#### Other traffic, transport and access issues/queries

### 4.8.1 Impact on parking

#### *Summary of issues raised:*

- Concerns about the impact of the proposal on existing on-street parking, particularly along Hunter Street.
- Concerns about the impacts on residents in Newcastle East, local businesses, Council revenue, and parking requirements for the new law courts and University development.
- Suggestions were made regarding options to replace the parking spaces that would be lost, particularly in relation to parking at the Wickham Transport Interchange.
- Confirmation about where spaces would be lost was sought by some submissions.

*Response:*

Figure 8.3 in the REF shows the location and number of parking spaces that will need to be removed along the light rail route. It is estimated that 267 spaces would need to be removed and 83 will change to 'no stopping' at peak times. This is less than previously estimated if mixed running was adopted in Hunter Street.

Transport for NSW is working with Council to develop a comprehensive strategy that looks at ways to offset this reduction in parking spaces in and around Hunter Street, minimising inconvenience. Ensuring access to disabled parking will be a priority.

It is important to remember that to make Newcastle a truly great city, we want to encourage greater public transport use and reduce the city's heavy reliance on cars by providing a modern light rail system. We are creating an integrated transport system that encourages people to transition to greater public transport use with less reliance on parking. This will not only improve the city centre's urban amenity but also ensure Newcastle can accommodate future population growth rather than increased traffic congestion.

The parking strategy will consider how parking is currently used in the city centre (including zonings, availability, and accessibility), where and what kind of parking is needed, the potential use of 'park and ride' facilities, and demand for parking in the future.

Feedback from the community and stakeholders on loss of parking has been diverse and a number of suggestions regarding issues such as replacement locations, "park and ride" options and timed parking have been provided. These issues, as well as parking requirements for the new law courts and Newcastle University will be considered as part of the parking strategy.

**4.8.2 Construction impacts on traffic flow***Summary of issue raised:*

- Concerns about the impact of construction on traffic flow, including the potential for congestion.

*Response:*

Building new infrastructure in established areas like Newcastle city centre will be difficult. To understand the impacts of construction on traffic, detailed traffic studies have been undertaken. This level of detail provides us with the knowledge to minimise construction traffic impacts by undertaking construction in stages and ensuring that key intersections and roads remain open as much as possible.

The construction program for the introduction of light rail in Newcastle will involve a progressive construction area moving along the light rail alignment. Impacts on any one precinct will only be for a few months at a time. Detour routes, hours of disruption and traffic management plans will be developed for each stage of construction to minimise the impact on businesses and residents.

Once appointed, the managing contractor for the proposal will develop detailed construction management plans in consultation with businesses and residents.

If there are substantial changes from the construction methodology outlined in the REF, additional traffic modelling and other impact assessment may be required to help understand benefits or mitigate any potential impacts of the proposal.

The Program team will continue to provide information and consult with affected business and residents as construction draws closer.

### 4.8.3 Operational impacts – traffic on Hunter and Scott streets

#### *Summary of issue raised:*

- Concerns about how the operation of light rail will impact on the operation of Hunter and Scott streets, including traffic flow, traffic congestion and the potential for cars to be blocked by light rail vehicles.

#### *Response:*

Introducing light rail is expected to result in lower levels of vehicle traffic on Hunter and Scott streets and local road networks in the city centre. Light rail will also improve public transport reliability, and reduce private vehicle trips in the city centre as people shift onto public transport.

The proposal involves light rail running in the centre of the road in Hunter Street between Worth Place and Scott Street, with a trafficable road lane outside of the light rail tracks on each side of the road. For about 500 metres between Scott Street to Pacific Park stop, the light rail will share its lane with private vehicles, due to the narrow road space in this section of the route.

Traffic modelling shows that more motorists will choose to use King Street in response to light rail running on Hunter Street. While this will help avoid additional congestion in the morning peak, traffic modelling currently indicates that there could be some additional congestion in the evening peak.

The Program team is currently developing a suite of additional road works that would complement the introduction of light rail and provide improved traffic conditions well into the future. The proposed road works will be subject to a separate approvals process.

### 4.8.4 Operation impacts – other streets and the road network in general

#### *Summary of issues raised:*

Concerns about how the operation of light rail will impact the road network in general, including the potential for delays on other streets as a result of the redistribution of traffic from Hunter and Scott streets.

Suggestions regarding measures to improve the flow of traffic, including road extensions across the former rail corridor, and making some streets one-way.

#### *Response:*

Traffic modelling suggests there will be some traffic impacts from the introduction of light rail, however traffic flows in the city centre will remain at acceptable levels.

The development of the proposal has been assessed in line with the Guide to NSW Guidelines for Traffic Generating Developments (RTA 2002), which sets the accepted standard for assessment of traffic impacts for network changes.

Assessment of the required road works to support introduction of light rail is ongoing. The road works required complement the introduction of light rail in the city centre will undergo an additional assessment process to ensure enhanced transparency for the community.

Over the next few months, and once the managing contractor has been appointed, Transport for NSW will engage and consult stakeholders affected by light rail construction and provide further information regarding access and road closures.

As a part of the design process, and in line with best practice, independent road safety audits will be completed progressively to verify that proposed mitigation measures are adequate, and to make recommendations on any additional or alternative mitigation measures needed to manage road safety risks.

### 4.8.5 Operational impacts – how the roads will operate with light rail

#### *Summary of issue raised:*

- Concerns about how the proposal would integrate with other road traffic and how the roads would operate with light rail.

#### *Response:*

Introduction of light rail will result in some changes to current traffic conditions. Over the alignment of the light rail, traffic will interact differently.

On Hunter Street, light rail will be separated from other road traffic, travelling in its own lane, which will be delineated by roadway markings. Private vehicles will only be able to use the light rail lane at intersections and to access properties. This will reduce risks to road users that might otherwise arise from road vehicles weaving in and out of the light rail lane between stops and intersections.

On Scott Street, light rail will share road lanes with vehicles and operate in a mixed running environment. This is possible because traffic volumes in Scott Street are significantly lower and other safety measures such as removing parking and slower speed zones will be implemented.

An information and education program will be developed and implemented to advise road users of the changed traffic conditions with the introduction of the proposal.

#### 4.8.6 Operational impacts – emergency vehicles

##### *Summary of issue raised:*

- Concerns that light rail in Hunter and Scott streets would impact on access for emergency vehicles.

##### *Response:*

Access for emergency vehicles will be maintained at all times during operation of the proposal via vehicle traffic lanes along the route. Emergency service vehicles will also be allowed to move onto the light rail tracks when necessary.

Prior to construction, Transport for NSW will consult with local emergency services and work with them to ensure the movement of emergency vehicles is not impeded through work sites. These arrangements will be detailed in traffic management plans for each construction area.

Consultation will be undertaken with emergency services both before construction and during detailed design to ensure that any specific requirements or issues are identified and included in the final design and operation of light rail.

#### 4.8.7 Operation impacts – access to businesses and loading zones

##### *Summary of issues raised:*

- Whether access to businesses will be impacted, and how access arrangements will work.
- Concerns about the impact of the loss of loading zones on businesses.
- Queries about how businesses would receive deliveries and/or how customers would pick up purchases from businesses.

##### *Response:*

During construction, property access will be maintained wherever possible to minimise the impact to local residents and businesses. From time to time, diversions and management measures will be required and Transport for NSW will work closely with affected property owners/operators and tenants to minimise disruption.

The Program team is committed to working with businesses throughout the life of the light rail project to ensure access issues can be resolved.

To ensure businesses have access to the right information at the right time:

- dedicated community engagement managers will provide personalised advice and assistance
- regular forums and newsletters will keep businesses up-to-date on developments,
- specific communication and advertising campaigns will explain road impacts and bus route changes – updates on traffic changes will be provided ahead of time and throughout the project
- signage around construction sites will include directions to businesses,
- a 24-hour construction hotline will allow businesses to contact project teams with any concerns
- we will work closely with businesses to minimise the impact of construction on deliveries and services
- the construction schedule will be designed to minimise the amount of time spent in each area of the route.

The Program team will look at the specific needs of businesses in Newcastle, and learn from the successful activation activities undertaken in Sydney, to minimise construction impacts on businesses.

In the Sydney city centre, an activation strategy has been developed to attract visitors during construction. Construction work is scheduled outside core retail hours whenever possible, and every opportunity within the construction schedule has been used to minimise the time occupied in any one zone.

Transport for NSW will introduce similar activation activities in Newcastle's city centre and continually engage with the local business community to develop an activation strategy that is designed for the local environment to ensure Newcastle stays open for business during construction.

#### 4.8.8 Operation impacts – access to private residences

##### *Summary of issue raised:*

- Whether access to private residential properties will be impacted, particularly along and around Scott Street and around light rail stops.

##### *Response:*

Potential impacts on resident's driveways at stop locations will be further investigated as detailed design progresses. At this stage, no major impacts are anticipated. Where possible, adjustments will be made to enable existing residential accesses to be maintained or alternative arrangements agreed with the property owners.

#### 4.8.9 Access to and around the city centre

##### *Summary of issues raised:*

- Whether access to and within the city centre will be impacted due to the operation of light rail, the location of light rail stops, reduced traffic lanes and reduced parking, particularly to popular destinations and recreational areas
- Concern the proposal will cut off access to the city and beaches, deterring visitors and students.

##### *Response:*

The Program aims to strengthen connections between the city and the waterfront. Light rail will be one of the key activators for bringing people back into the city and improving the experience of being in and moving around the city and the beaches.

Light rail was chosen because it allows for connectivity and does not cut off access – unlike heavy rail.

The stop locations have been carefully planned around activation points within the city to maximise the customer experience, support network connectivity and integrate with the broader program of urban renewal underway in Newcastle by enabling access to retail and recreational points of interest.

People are already realising the benefits of being able to move quickly between the city centre and the waterfront, with a number of improvements already delivered including crossings at Steel Street, Kuwumi Place, Worth Place, Argyle Street, Perkins Street, Wolfe Street and Civic Station. These crossings already allow for easy pedestrian and cyclist access across the former rail corridor.

Transport for NSW is working with Newcastle City Council to identify ways to offset a reduction in parking in and around Hunter Street to minimise inconvenience.

Ensuring access to disabled parking will be a priority.

The parking strategy will consider how parking is currently used in the city centre (including zonings, availability, and accessibility), where and what kind of parking is needed, the potential use of 'park and ride' facilities, and demand for parking in the future.

#### 4.8.10 Disabled access

##### *Summary of issue raised:*

- Concerns about impacts on access for people with a disability, including the loss of disabled parking spaces, and access for disabled people to specialists on Scott Street.

*Response:*

A key focus is ensuring the new light rail system will be accessible by all members of the community. Access to light rail vehicles, stops and across light rail tracks will be fully compliant with the *Disability Discrimination Act 1992*, the Disability Standards for Accessible Public Transport 2002 and Australian Standard (AS) 1428.1-2009 Design for access and mobility.

Transport for NSW understands the importance of providing adequate parking for people with disabilities and is already looking into ways to offset a reduction in parking in and around Hunter Street. Should any disabled parking spaces be lost as a result of the proposal, we will prioritise replacement of these car spaces and work closely with Newcastle City Council to determine suitable locations within the city.

**4.8.11 Impact on buses***Summary of issues raised:*

- Concerns that the operation of the proposal would impact on the operation of buses.
- Concerns that relocated bus routes and bus stops are not addressed in the REF, and that the future location of bus routes should be incorporated into the traffic study.
- Concerns that current public transport users will stop coming in to Newcastle.

*Response:*

Light rail will be a new addition to the transport network but it is only part of the solution. The NSW Government wants to move to a model that considers the whole travel experience in Newcastle, including buses, walking, cycling, trains, light rail and ferries.

Under this model, Transport for Newcastle, will be solely focused on how each mode can work together as part of an integrated network to deliver the transport services the people of Newcastle actually want. That means running the service frequencies that meet demand, ensuring public transport is a more attractive and convenient, making sure interchanging is simple and taking people where they actually want to go.

The new operator will have financial incentives to increase patronage – which means there is a strong motivator to improve services for locals.

The NSW Government's vision for Newcastle is an activated city and waterfront that attracts people, businesses and tourism, and encourages innovative and enterprising industries to thrive. The introduction of light rail in Newcastle presents an opportunity to build on the strengths of the city and bring people back to the city centre.

**4.8.12 Impact on taxis***Summary of issue raised:*

- Concerns that the operation of the proposal would impact on taxis.

*Response:*

The traffic and transport assessment in the REF specifically addressed issues relevant to taxi operators. As a key transport stakeholder, taxi operators and the NSW Taxi Council will be consulted on proposed changes during construction and operation of the proposal.

**4.8.13 Other traffic, transport and access issues/queries***Summary of issue raised:*

- Request for more details of proposed road improvements, specifically Stewart Avenue and King Street precincts.

*Response:*

Transport for NSW is currently developing a suite of additional roadworks that would complement the implementation of light rail and provide improved traffic conditions well into the future. The proposed works would be subject to a separate planning approvals process. More information will be provided later this year.

*Summary of issue raised:*

- Enhance capacity for traffic travelling in a southerly direction along Hannell Street, wanting to turn left into Honeysuckle Drive by extending the turn left lane.

*Response:*

Transport for NSW is currently developing a suite of additional road works that would complement the implementation of light rail and provide improved traffic conditions well into the future.

We will take this feedback into consideration as we progress with the design and assessment.

*Summary of issue raised:*

- Need for more integrated transport planning that includes all modes and services areas in and around the light rail.

*Response:*

Light rail will be a new addition to the transport network but it is only part of the solution. The NSW Government wants to move to a model that considers the whole travel experience in Newcastle, including buses, walking, cycling, trains, light rail and ferries.

With the creation of Transport for Newcastle, one major operator will plan and run Newcastle Light Rail, buses, ferries and interchanges, public transport will be run in Newcastle, for Novocastrians.

## 4.9 Socio-economic issues, community and business impacts

### Summary of issues

#### Operation impacts on businesses and the community

##### 4.9.1 Operation impacts on businesses and the community

*Summary of issues raised:*

- Concerned about the impact of light rail and its operation on businesses.
- Concerns about the impact on businesses if customers cannot park near their business.

- Concerns that changes to pedestrian crossings would impact on the ability of customers to reach local businesses.
- Concerns the proposal will discourage people from going into the city centre.
- Calls for a business survey to be undertaken to fully understand business requirements and the impacts of the proposal.
- Concerned about the impact of light rail and its operation on the amenity of residents and the community.
- Concerns that the REF has not adequately assessed the potential for community and social impacts.

*Response:*

The introduction of light rail in Newcastle is part of the Program, which is delivering a range of initiatives to bring people back to the city centre, help grow new jobs in the city centre, create great places linked to new transport, create an economically sustainable public domain and community assets and preserve and enhance heritage and culture.

Businesses in the city centre will benefit from urban renewal initiatives to bring vibrancy back to Newcastle's city centre and generate community and economic activity.

In addition to the light rail, additional pedestrian walkways have been proposed which will connect businesses with potential clients and customers from the waterfront side of the heavy rail line. New light rail infrastructure and light rail stops at activation hubs will mean local businesses may benefit from increased foot traffic near their premises.

As the proposal progresses, Transport for NSW will implement a comprehensive Community and Stakeholder Engagement Plan that will detail how we engage with local businesses on the best way to keep Newcastle open for business

The vision for Newcastle is an activated city and waterfront that attracts people, new enterprises and tourism. The Program will stimulate investment to create jobs, attract innovative industries, higher education and a range of businesses to the city centre. The Program will enable Newcastle to have a mix of public space retail, commercial and residential uses.

International studies have shown that light rail is a preferable mode in which to move public transport users within an inner city environment. When operating separately from traffic, light rail is reliable, timely, less likely to be affected by traffic and provides a smoother, more comfortable ride for passengers. Light rail has delivered transformation and renewal to city centres around the world — attracting investment and boosting economic activity.

Light rail will drive change in the Newcastle city centre, while respecting the local heritage and character. Through light rail, the community can benefit from improved amenity, including enhanced urban design, activation hubs, entertainment precincts, new open space and improved public domain with more pedestrian and vehicle connections.

## 4.10 Heritage impacts

### Summary of issues

#### Impacts to Aboriginal heritage

#### Impacts to non-Aboriginal heritage

#### Other heritage issues

### 4.10.1 Impacts to Aboriginal heritage

#### *Summary of issue raised:*

- The need to identify and protect Aboriginal heritage during construction and operation.

#### *Response:*

Consultation with local Aboriginal stakeholders was carried out during the investigations for the proposal and is ongoing. Transport for NSW will continue to work with Aboriginal stakeholders throughout the construction of the proposal.

A detailed assessment of potential impacts on Aboriginal heritage is included in section 11 of the REF. The assessment was carried out in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010)

The assessment noted four Aboriginal sites previously recorded within the proposal site. No previously unrecorded sites were identified during the assessment.

During construction, excavation may impact on Aboriginal artefacts. As such, an Aboriginal Heritage Impact Permit (AHIP) is being sought from the NSW Office of Environment and Heritage prior to any ground disturbance works. The AHIP application will be prepared with the involvement of Aboriginal stakeholders, including undertaking site inspections with all Registered Aboriginal parties.

Once determined, the recommendations of the AHIP will be incorporated into the CEMP and operational procedures for the proposal to protect Aboriginal heritage during construction and operation.

### 4.10.2 Impacts to non-Aboriginal heritage

#### *Summary of issues raised:*

- Concerns about the impact of the proposal on heritage, and the need to recognise the heritage and historical significance of the area.
- Concerns that heritage buildings along the route would be impacted by constant traffic movement, and vibration.
- Concerns about the impact of the light rail stop located in front of the heritage listed buildings near Pacific Park (the Stationmasters' cottage, the former Newcastle East Police Station, Coutts Sailors Home, and the Joy Cummings centre).
- Concerns about the impacts of the proposal on Wickham station, including a request to consider alternatives to removing the buildings, and concerns that the heritage of the station has been disregarded.
- Concerns about the impacts of the proposal on Wickham Station, including suggested future uses of the station, and the impacts of the proposal on the heritage value of the rail corridor and Civic Station.

**Response:**

Newcastle has a rich history and is one of Australia's oldest and most endearing cities, with a blend of both old and new architecture. In our discussions with the community, people have pointed to the natural beauty of the city centre – its heritage buildings, world-class harbour and beautiful beaches. The community has told us that while Novocastrians are proud of their city and want to see it revitalised, the city's heritage and character should be respected as part of the revitalisation.

To preserve and enhance the heritage and culture, these features have been incorporated into the objectives of the proposal, to ensure the unique heritage and character of the city centre is respected, maintained and enhanced through revitalisation.

A detailed heritage assessment is included in section 10 of the REF. The assessment addressed impacts on items and areas listed under local, state and national legislation, as well as the potential for impacts on items or areas that are not currently listed or known.

An application for approval under the *Heritage Act 1977* to undertake proposal works within the listed archaeological sites will be lodged with the NSW Heritage Division. Once determined, the recommendations of the approval will be incorporated into the CEMP and operational procedures for the proposal to protect heritage during construction and operation.

**Wickham Station**

Wickham Station was selected as the best location for the light rail maintenance and stabling facility following a thorough multi-criteria assessment. Locating the facility at this site was identified as the preferred option, based on functional, project cost, and land use considerations. The architectural form of the building will consider the visual amenity of the area and the surrounding community. The facility will be used for overnight stabling of the light rail vehicles, operations and light maintenance work.

The stabling facility will be approximately 12 metres high and 20 metres wide with offices and a commercial entrance fronting Stewart Avenue. The facility is located mainly within the former heavy rail corridor and within the existing footprint of Wickham Station with only a small incursion into Station Street (northern side). Additional details on the facility will be provided to the community as the design is progressed.

Feedback on the design of the stabling and maintenance facility will be taken into consideration during detailed design.

During consultation with the community, people told us they see great opportunities to build on the strengths of the city centre, but that the city's heritage and character should be respected as part of revitalisation activities.

The location at Wickham avoided impacts to the State heritage listed Newcastle Station, and provided opportunities for the adaptive re-use of Newcastle Station and surrounding land.

The possibility for reuse, archival recording and future interpretation of the heritage values of the Wickham Station will be further investigated during the detailed design process. This is discussed in more detail in section 5.4 of the report.

**Heritage listed buildings near the Pacific Park stop**

The development of the proposal has been sympathetic to surrounding heritage items. Transport for NSW understands the significant value of these items and will ensure they are protected through a number of methods, including:

- ongoing consultation with Newcastle City Council and other key stakeholders
- seeking approvals for work required under relevant legislation and guidelines
- preparation of a heritage management plan
- heritage inductions for all employees and contractors

### Vibration impacts on heritage listed buildings

The statement of heritage impact in the REF also identified the potential for impacts to some heritage structures due to vibration generated during construction activities. Potential impacts will be minimised by adopting the recommended minimum offset distances for specified plant items, monitoring vibration levels at potentially affected structures where necessary, and responding appropriately to the results of monitoring. These measures will be included in the CEMP.

#### 4.10.3 Other heritage issues

##### *Summary of issues raised:*

- Queries about how the city's heritage and culture can be preserved and enhanced when urban transformation is also being encouraged (including higher density mixed use office, residential and commercial projects along the route).
- The need to revitalise and protect old buildings along Hunter, Scott and King streets.

##### *Response:*

One of the stated objectives of the Program is to respect, maintain and enhance the unique heritage and character of the city centre through revitalisation. In discussions with the community, people have pointed to the natural beauty of the city centre – its heritage buildings, world-class harbour and beautiful beaches. The community has told us that while Novocastrians are proud of their city and want to see it revitalised, the city's heritage and character should be respected as part of the revitalisation.

Hunter Street features some of Newcastle's best heritage buildings and offers a mix of shops, cafes, restaurants and other local businesses. Once Newcastle's main street, Hunter Street has experienced a decline in recent years. The community has told us they want to see Hunter Street reinstated as a thriving main street where people can shop and enjoy cultural and leisure activities, improved connections between the city centre and the waterfront, and respectful repurposing of heritage buildings. The light rail provides an opportunity to activate key precincts along Hunter St and reinvigorate the urban amenity by providing modern and efficient public transport as close as possible to residences and businesses.

The Program team will continue to seek input to future plans for the city centre and will consult with local business and the community to gain valuable feedback as we progress with the revitalisation of Newcastle. Transport for NSW will ensure that it minimise impacts on heritage during construction and operation by incorporating restrictions and requirements into the CEMP and operational procedures.

## 4.11 Urban design

### Summary of issues

#### Urban design impacts

#### Visual impacts of proposal features

#### 4.11.1 Urban design impacts

##### *Summary of issues raised:*

- Whether the proposal will respond to future planning in terms of Council's urban design strategy for the city centre and the need to consider overall urban design outcomes for the city centre.
- Concerns that the proposal for separated running is inconsistent with Council's preferred urban design outcomes for Hunter Street.
- Concerns regarding the consistency of the proposal with the city centre overall
- Concerns that the REF does not adequately demonstrate how the proposal will improve amenity along Hunter Street.
- The design of the proposal needs to take into consideration the other urban renewal initiatives that will be vital to the success of the proposal, such as those that would increase pedestrian traffic and provide opportunities for outdoor dining.
- Suggestions the proposal should not compromise pedestrian amenity and it should improve the qualities and value of the streetscape.
- Concerns that the REF does not address the cumulative impacts of the proposal, particularly in relation to urban design and urban renewal.

*Response:*

The current urban design for the proposal has been developed in line with the following principles:

- take the *Hunter Street Revitalisation Final Strategic Framework* (City of Newcastle, 2010) and *Newcastle 2030* (City of Newcastle, 2013) into account,
- recognise the significance of the project area in the Newcastle city centre urban renewal process,
- respect, maintain and enhance Newcastle's culture and heritage,
- enhance the immediate and broader urban context,
- provide for an activated public domain, improved transport opportunities and pedestrian connectivity to existing and proposed local precincts,
- consider the principles and strategies of the *NURS*.

Community engagement undertaken by UrbanGrowth NSW since 2014, has shown a high level of support for urban renewal.

The NSW Government has made a number of announcements relating to the transformation of Newcastle, including the activation of Hunter and Scott streets linked to the delivery of light rail and the revitalisation of land in the heavy rail corridor. Community and businesses will also have an opportunity later this year to contribute ideas to the design of two major revitalisation precincts adjacent to Newcastle and Civic Stations.

The community provided their views on the future of Newcastle late last year, and expressed a preference for light rail to be delivered with shared cycle and pedestrian paths. Through ongoing consultation, the community has also told us that they are interested in:

- providing more open space adjacent to Scott Street that allows easy movement from the city to the harbour
- options for cycleways that suit the needs of commuter cyclists, families and recreational cyclists
- options to improve the experience of walking along Hunter Street.

Detailed design for streetscape works will be informed by consultation with stakeholders and the community, and will address pedestrian amenity and Council's urban design objectives for the city centre.

Through a competitive tender process, the Program team has appointed JMD Design to prepare the Hunter and Scott streets Urban Design Concept. JMD Design has thorough knowledge of Newcastle city centre having been commissioned by the Department of Planning and Infrastructure to prepare the Hunter Street Revitalisation Strategy in 2012.

As the successful tenderer, JMD Design will now work to provide innovative building-to-building design solutions focused on the vision for Hunter and Scott streets, as shared by the Program and Newcastle City Council.

The vision aims to transform Hunter and Scott streets to a series of destinations and public spaces. The scope of work for the urban design concept will include the street and public space along Hunter and Scott streets between Worth Place and Pacific Park. Importantly, the design will seek to balance the priorities of pedestrians, cyclists, public transport, vehicles and parking.

The Program team will continue to work with key stakeholders to identify the best outcomes to meet this vision and provide a revitalised thriving city centre.

Over the next three months, JMD Design will work with key agencies and Newcastle City Council to identify urban design opportunities that meet the objectives of the Program. The final Hunter and Scott streets Urban Design Concept will be used to guide the detailed design for light rail.

#### 4.11.2 Visual impacts of proposal features

##### *Summary of issues raised:*

- Concerns about the visual appearance of the proposal, including the visual impact of overhead wiring and concerns about the visual impact of the proposal on safety (including barriers, railings, fences, walls etc).
- Suggested a need to consider underground wiring or wireless technology to mitigate visual impacts.

*Response:*

Transport for NSW understands that visual amenity is important to the community and stakeholders. One of the core objectives for the Program is that the revitalisation activities must respect, maintain and enhance the unique heritage and character of Newcastle's city centre.

The REF for the proposal requires that the urban design must:

- integrate with the surrounding urban form
- minimise the potential for visual impacts
- respect the character and amenity of the surrounding area
- involve appropriate design features, materials and treatments
- achieve the urban design objectives of the *NURS*, the Program and *Newcastle 2030*.

The detailed design of the proposal will take into account stakeholder and community views, operational requirements, best practice from other light rail systems, as well as engineering and environmental considerations. The final Hunter and Scott streets Urban Design Concept will be used to guide the detailed design for light rail.

The visual amenity of the proposal on the streetscape have been considered across all areas of the proposal. For example, the selected wiring option, the bridle wire system, involves a relatively simple overhead wiring that is quite discreet compared to the infrastructure and large fencing required for heavy rail.

In addition to consideration of visual amenity, the safety of pedestrians, motorists and public transport customers along the proposal route is a priority.

## 4.12 Other environmental impacts

### Summary of issues

#### Biodiversity, parkland and tree impacts

#### Electromagnetic radiation

#### Remediation/contamination

#### Noise and vibration impacts

#### Greenhouse gases and climate issues

#### Other environmental issues/queries

### 4.12.1 Biodiversity, parkland and tree impacts

#### Summary of issues raised:

- Concerns about the loss of street trees and how street trees will be protected during construction
- Concerns about loss of parkland, including impacts on Civic Park to widen King Street, and loss of trees at Town Hall. The trees at the opposite end of the park have already been removed by Council.
- Concerns about the loss of the green corridor that was promised.

#### Response:

Tree removal is avoided wherever possible. Where tree removal is unavoidable, trees subject to removal will be replaced in accordance with the Transport for NSW's Vegetation Offset Guide (2012) and in consultation with Newcastle City Council.

Protection of trees during construction will be undertaken in line with relevant Australian Standards. A clearly marked or fenced exclusion zone will be put up around all trees to ensure vehicles, materials and equipment are not stored or parked within the drip line of trees.

Assessment of the roadworks, which will complement the introduction of light rail, is ongoing. The roadworks will undergo a separate planning and assessment process later this year to ensure enhanced transparency for the community.

Construction of the proposal will require the removal of about 20 street trees and shrubs near Wickham Station (both north and south of the station) and one street tree in the median of Worth Place. This impact was assessed in the REF. These trees are unlikely to represent important fauna foraging habitat. All other street trees along Hunter and Scott streets will be retained.

UrbanGrowth NSW took four opportunities for the former rail corridor to the community in 2015. The consultation was about asking the community what they wanted to see in the corridor and how they wanted it to be achieved.

In line with UrbanGrowth NSW's six objectives (including a new one added after the consultation as a commitment to enhance and preserve heritage), the 'Revitalising Newcastle Engagement Outcomes Report' reflected the community's desire to see both green space and a revitalised city centre through new residential, commercial and retail opportunities.

This feedback informed the planning proposal, which was lodged in July 2016 with Newcastle City Council. To achieve what the community said it wanted for the corridor, the proposal suggests over 50 percent of the corridor as public domain and open space (tourist and recreation zoning), with the remaining proposed as mixed use.

#### 4.12.2 Electromagnetic radiation

##### *Summary of issue raised:*

- Concerns about the potential for the proposal (particularly the wiring) to generate electromagnetic radiation at a level that would generate health impacts for the community, light rail passengers, and surrounding residents, and would impact on the environmental and wildlife.

##### *Response:*

Light rail customers will not face a health risk from electromagnetic fields. The light rail system will be designed to comply with Australian and international standards, minimising the potential risk associated with electromagnetic fields exposure. Light rail vehicles will comply with internationally recognised standards for electromagnetic compatibility.

Due the smaller nature of a light rail vehicle (compared to heavy rail carriages), they generate much lower electromagnetic fields.

#### 4.12.3 Remediation/contamination

##### *Summary of issue raised:*

- A query about responsibility for remediation of land that has been subject to pollution from coal, grease, diesel and hydrocarbons.

##### *Response:*

To help prepare for construction of the proposal, Transport for NSW has engaged a construction contractor to undertake corridor clearing works. The works have included the removal of redundant rail, sleepers, overhead wiring stanchions, ballast and signalling equipment. The work also includes remediation and testing of spoil to ensure material is disposed of safely in accordance with NSW Environment Protection Authority requirements.

#### 4.12.4 Noise and vibration impacts

##### *Summary of issues raised:*

- Concerns that the REF has not assessed the potential for noise impacts in sufficient detail.
- Concerns about impacts to apartments along the route between Perkins and Pacific streets.
- Concerns about noise for pedestrians and other users and visitors to the city centre.
- Concerns about impacts to residents around the Interchange and the former rail corridor.
- Concerns with the location of the final stop and its proximity to residents, including aged care residents at 70 Scott Street located at street level opposite the stop.

##### *Response:*

Ensuring potential noise and vibration is managed within acceptable levels has informed the development of the proposal to date. A team of technical experts conducted noise and vibration assessments in line with assessments undertaken on other state significant light rail projects including the Inner West Light Rail Extension and the Sydney Light Rail project.

The REF identifies locations where noise exceedances are currently predicted during the day and night time. This may include some residents adjacent to the section of track between Bellevue Street and Worth Place and a few locations between Perkins Street and the Pacific Park stop. No operational noise exceedances are predicted near Wickham Transport Interchange.

The REF provides a list of measures to mitigate the impacts of noise and these include noise barriers, measures to reduce friction and rail noise, window glazing and façade treatments where feasible and reasonable. During detailed design, measures to reduce noise impacts will be further developed, including for noise that may result from customers boarding and alighting vehicles. Transport for NSW will continue to engage with impacted business and residents as the detailed design progresses through construction to minimise environmental impacts.

#### 4.12.5 Land use and property impacts

##### *Summary of issue raised:*

- Concern about land use and property impacts.

##### *Response:*

The proposal will be implemented almost entirely within the existing road corridor and areas of the former rail corridor, as a result, there will be limited need for land acquisition and property impacts. Table 6.6 of the REF provided details of the proposed property acquisition required. Section 5 provides updated information on land acquisition matters as a result of ongoing design development and refinement.

#### 4.12.6 Greenhouse gases and climate issues

##### *Summary of issues raised:*

- Suggestions a greenhouse gas assessment needs to include the impact of stopping/starting traffic as the REF did not cover environmental pollutants by stopping and starting traffic.
- Suggestions to consider carbon footprints and the use of renewable energy.

##### *Response:*

Transport for NSW's Carbon Estimate and Reporting Tool helps to measure and report on greenhouse gas emissions in line with the *NSW Sustainable Design Guidelines*. Environmental issues raised in submissions will be considered under Transport for NSW's *Sustainability Strategy*.

The *NSW Sustainable Design Guidelines* introduce initiatives to improve the sustainability performance of transport infrastructure and reinforce Transport for NSW's ongoing commitment to sustainability. Issues such as lifecycle analysis and carbon footprints will be considered during the detailed design of the project. The use of renewable energy on relevant components, facilities and operations will also be considered.

#### 4.12.7 Other environmental impacts

##### *Summary of issue raised:*

- The amount of excavated material seems to be 'on the low side'.

##### *Response:*

The excavated material, as set out in the REF, is an estimate only based on the current design. Once the managing contractor is appointed and the construction methodology and detailed design progresses, the excavation quantities will be confirmed to ensure the impact was adequately assessed.

##### *Summary of issue raised:*

- Concerns about impacts to Civic Park as a result of the proposed road widening, and concerns that impacting Civic Park would be 'illogical' because it would feed into a narrow road section east of Darby Street.

##### *Response:*

Transport for NSW is currently developing a suite of additional road works that would complement the implementation of light rail and provide improved traffic conditions well into the future. The proposed road works will be subject to a separate planning approvals process later this year.

*Summary of issue raised:*

- Concerns about dust and other emissions caused by light rail vehicles.

*Response:*

The REF addressed the potential air quality impact of the proposal and provides a list of mitigation measures that have been successfully applied on other similar light rail projects. As the light rail will be electrically-powered and would operate at relatively low speeds, air quality issues are not expected to be of concern.

## 4.13 Submissions outside the scope of the proposal

### Summary of issues

#### Extensions to the light rail as proposed, providing a more extensive light rail system

##### Wickham Transport Interchange

##### Other public transport issues

##### Truncation/future uses of the heavy rail line

##### Other out of scope issues

### 4.13.1 Extensions to the light rail as proposed, providing a more extensive light rail system

*Summary of issues raised:*

- Suggestions that the light rail route should be extended, and that the proposal should only be developed as part of a much larger light rail network.
- Suggestions as to potential locations and destinations for extensions to the light rail network.
- Concerns were raised about the availability of funding for future extensions.

*Response:*

With the introduction of light rail, the idea of possible network extensions are also being considered as part of long term transport planning for Newcastle. While there are many ideas for potential extensions to light rail, these must be grounded in evidence-based planning, based on customer needs and demand, engineering feasibility, and the integration of transport and land use.

In parallel with the release of the REF, Transport for NSW invited feedback from the community on a number of potential light rail network extensions. A discussion paper was published on the Revitalising Newcastle website outlining the potential corridors being investigated and technical issues and opportunities. Feedback received will inform future planning strategies for extending light rail.

An important starting point for considering a future light rail network is to review existing bus networks and better understand where potential transport demand exists.

As part of this planning, the NSW Government will work with the new integrated transport service provider, Transport for Newcastle, to identify how existing services can be improved and what opportunities there are in the longer term for the extension of light rail services.

Wider consultation with the community is also critical to understand any impacts on existing public transport customers. When the new integrated services operator is appointed, the NSW Government will work with key stakeholders, including Council, businesses and the community to assess future corridors. Transport for NSW now propose to install a second parallel track across Stewart Avenue to ensure that future expansion plans can be more easily accommodated.

### 4.13.2 Wickham Transport Interchange

*Summary of issues raised:*

- Concerns with the location selected for the Wickham Transport Interchange.
- Concerns with the appearance and design, and the facilities that would be provided.

*Response:*

Newcastle's new transport interchange at Wickham has received planning approval, and work began on the new interchange following truncation of the heavy rail line on 26 December 2014. Work on this important project is progressing well.

Further information on the interchange project, including the status of the project and design proposals, is available at <http://www.transport.nsw.gov.au/projects-wickham-transport-interchange>.

### 4.13.3 Other public transport issues

#### *Summary of issue raised:*

- Concerns about public transport in Newcastle, including general concerns about its adequacy, levels of service, future planning, service locations, and suggestions for improvement.

#### *Response:*

The current transport system in Newcastle isn't working. Public transport patronage has dropped and service levels are below standard. Only 13 per cent of peak hour trips to and from the Newcastle city centre are currently undertaken by public transport.

With the population in Newcastle growing and the city centre undergoing a transformation, we need to look at a different approach to make public transport a more attractive option. Light rail will be a new addition to the network, but it is only part of the solution.

For Newcastle to reach its potential, the NSW Government will support Newcastle by creating a modern and connected system that links light rail with frequent and reliable buses, ferries and trains. Transport operators from across the world have been invited to establish Transport for Newcastle - an integrated operator of Newcastle Light Rail, buses and ferried, focussed on customer service and growing patronage.

This will be public transport run in Newcastle, for Novocastrians.

By drawing on the innovation of the private sector, we have the opportunity to re-design the transport network in Newcastle to ensure it provides better connections to key parts of the city where people work, play and study. We want to move to a model that considers the whole travel experience in Newcastle, including buses, walking, cycling, trains, light rail and ferries.

After years of declining public transport patronage in Newcastle, the new operator will have a contract with Transport for NSW that will include incentives to grow patronage. We will also set minimum service standards and key performance indicators and will continue to set fares, but the selected operator will be given a level of autonomy to plan and run services.

### 4.13.4 Truncation/future uses of the heavy rail line

#### *Summary of issues raised:*

- Concerns about removal of heavy rail services to the city centre, and the impacts of its removal
- Requests to reinstate heavy rail services rather than undertake the proposal
- Future use of the heavy rail corridor, Newcastle and Civic stations
- The urban renewal area will be sold to high rise developers

#### *Response:*

The decision to truncate the heavy rail line was made in 2014 and this was confirmed via an Act of Parliament in 2015. Since this time, the Program team have been working with the community and stakeholders in Newcastle to help make Newcastle a modern vibrant city.

A planning proposal for Newcastle's former heavy rail corridor has been lodged with Newcastle City Council, laying the first foundations for the rezoning of surplus land to connect the city to its waterfront and drive jobs, tourism and economic growth in the harbour city.

The rezoning of the former railway corridor from railway infrastructure will allow new open space and improved public domain with more pedestrian and vehicle connections and increase links between the city and the waterfront.

The proposal covers an area of approximately 4.25 hectares from Worth Place to Newcastle Station. This does not include the western end of the corridor from Wickham Transport Interchange to Worth Place, which will be used for the light rail.

### 4.13.5 Other out of scope issues

#### *Summary of issue raised:*

- Future planning for the Newcastle Urban Transformation and Transport Program, including the need for a comprehensive masterplan

#### *Response:*

UrbanGrowth NSW is leading the Program, with an investment of more than \$500 million by the NSW Government to deliver light rail, improve the public domain and revitalise the city centre.

Revitalising the Newcastle city centre is a joint effort between the NSW Government and Newcastle City Council. The role of Transport for NSW's part of the Program is to deliver a safe, modern and efficient transport system for the city. Roads and Maritime Services, the Hunter Development Corporation and the Department of Planning and Environment are also involved, to ensure that the revitalisation is aligned with other work to renew Newcastle. This collaborative approach, with ideas and feedback from the community, urban planners, architects and city renewal experts, will ensure the best outcomes for the city now and into the future.

#### *Summary of issue raised:*

- How will Council's Parking Code be changed in relation to on-site parking, and how will approvals be assessed in relation to on-site parking requirements

#### *Response:*

Transport for NSW are working with key stakeholders including Newcastle City Council and Hunter Development Corporation to prepare a Parking Strategy to consider how parking is currently used in the city (including zonings, availability, and accessibility), where and what kind of parking is needed, the potential use of 'park and ride' facilities, and demand for parking in the future.

More information will be provided later this year.

#### *Summary of issue raised:*

- No plans are provided for infrastructure upgrades, more open space, Newcastle Station redevelopment, more services such as schools, another post office, upgrade of Civic Square etc.

#### *Response:*

These issues are outside the scope of the light rail proposal. The light rail proposal and the Program will be a catalyst for revitalisation in the city centre, allowing for better connections between the city and the waterfront, delivering better transport and servicing key activation hubs for a more vibrant city centre. This will encourage investment in Newcastle – reviving Hunter and Scott streets and bringing people back into the city centre by creating unique new destinations. Increased provision of a range of infrastructure and services will be another key result of this process.

# 5. Additional investigations and studies

## 5.1 Overview

A number of additional investigations and studies have been undertaken since the preparation of the REF, which build upon those undertaken during preparation of the REF.

The purpose of this section is to provide a summary of the key information arising from these studies and their impact on the proposal. Any new or altered mitigation measures resulting from these additional investigations are included in section 7.

## 5.2 Proposed land acquisition

As we progress with the design development, the land area required for the proposal has been further refined and quantified. Areas of proposed land acquisition were previously outlined in section 6.4.4 of the REF (refer Table 6.6). Table 5.1 provides updated details of proposed land areas to be acquired for the project.

**Table 5.1** Proposed land acquisition

Site address	Site ref	Ownership	Existing use	Proposed use/ proposal feature	Acquisition type	Acquisition area (approx) (m <sup>2</sup> )
18 Honeysuckle Drive	Lot 2000 DP 1145678 (part)	Hunter Development Corporation	Vacant land	Stabling and maintenance facility	Strip	3,871
540 Hunter Street (near Worth Place)	Lot 2 DP 1037267 (part)	Hunter Development Corporation	Vacant land	Light rail route (Worth Place turnout)	Full	831
538 Hunter Street (near Worth Place)	Lot 1 DP 1037267	Private	Vacant land	Light rail route (Worth Place turnout)	Full	432
Scott Street (between Crown and Bolton streets)	Road (part)	(assumed Council)	Road	Light Rail route	Strip	3,320

Source: Transport for NSW

## 5.3 Ground borne noise screening assessment

The operational noise and vibration assessment completed for the REF stated that:

‘Ground borne noise is generally only considered a potential issue where noise levels are higher than the airborne noise levels such as for underground railways. As there are no underground sections of light rail associated with the proposal, the risk of potential adverse ground borne noise impacts is considered low. Ground borne noise impacts on potentially sensitive receivers will be identified and assessed if necessary during detailed design’ (p29).

To further inform the design, a screening assessment was undertaken for at-risk receivers adjacent to the alignment (PBA 2016).

The internal ground borne noise trigger levels in the *Rail Infrastructure Noise Guideline* (EPA 2013) are shown below in Table 5.2.

Table 5.2 Ground-borne noise trigger levels

Sensitive land use	Time of day	Internal noise trigger levels, dB(A)
Residential	Day (7 am-10 pm)	Development increases existing rail noise levels by 3 dB(A) or more And resulting rail noise levels exceed 40 L <sub>ASmax</sub>
	Night (10 pm-7 am)	35 L <sub>ASmax</sub>
Schools, educational institutions, places of worship	When in use	40 to 45 L <sub>ASmax</sub>

Source EPA 2013

Ground borne noise levels within residential apartments closest to the track were estimated based on the following assumptions:

- vibration level of 0.08mm/s or 70VdB ref 2.54x10<sup>-5</sup> mm/s
- -10VdB for coupling loss to building foundation
- -2VdB for floor-floor attenuation
- +6VdB assuming room resonances may exist
- -35dB vibration to noise correction assuming typical vibration peak lies between 30Hz to 60Hz, assuming sandy sub-soils.

Predicted vibration levels outside the buildings are presented in Table 5.3.

Table 5.3 Ground borne noise screening assessment results

Description	Type	Distance centre rail to closest edge of building	Assumed speed profile	Predicted vibration level mm/s rms	FTA * Criteria mm/s rms	Compliance
25 Bellevue Street	Residential	10m	40 km/h	0.08	0.10	Yes
Hunter Radiology - 710 Hunter Street	Critical area - medical	25m	40 km/h	0.04	0.05	Yes
Hunter New England Health Centre - 670 Hunter Street	Critical area - medical	20m	40 km/h	0.05	0.05	Marginal
36 Honeysuckle Drive	Commercial	10m	40 km/h	0.08	0.14	Yes
28 Honeysuckle Drive	Commercial	10m	40 km/h	0.08	0.14	Yes
12 Beresford Street	Residential	10m	40 km/h	0.08	0.10	Yes
25 Beresford Street	Residential	10m	40 km/h	0.08	0.10	Yes

Source: PBA June 2016

\*The criteria for operational vibration are derived from the U.S. Department of Transportation Federal Transit Administration (FTA). The criteria are rms velocities in mm/s. The NSW Department of Environment and Conservation criteria (vibration dose value criteria in m/s<sup>1.75</sup>) is also applicable, however as it has been determined to be less stringent, can be considered to be achieved if compliance with the FTA is achieved.

Based on the noise screening assessment results and the assumptions listed above including the vibration to noise correction, the assessment has highlighted that ground borne noise levels of approximately 30dBA are predicted at the closest sensitive receiver from the pass by of a light rail vehicle.

Ground borne noise levels are therefore expected to comply with the 35dBA criteria listed in the *Rail Infrastructure Noise Guideline* (EPA, 2013).

We understand that noise can be a potential issue for nearby receivers and we will conduct operational noise monitoring within six months of the proposal commencing operation, to assess compliance against operational noise criteria. If the results indicate that operational noise levels are significantly higher than those modelled, investigation of additional acoustic treatment would be investigated and discussed with the affected receiver.

#### 5.4 Comparative significance of Wickham Railway Station Group

Wickham Railway Station Group, including the Wickham Railway Station and Signal Box, is listed in Sydney Train's Section 170 Heritage and Conservation Register as a locally significant heritage item.

The light rail proposal would result in the removal of all of the fabric of the Wickham Railway Station and Wickham Signal Box and will require a change to the Section 170 Register.

An analysis of the Wickham Railway Station Group was undertaken to understand the comparative significance of the items relative to other remaining stations and the impact of their potential removal. The findings of the study have also been used to develop a framework for the proposed collection and reuse of the most important items. The full report is provided in Appendix A.

An adaptive reuse study will also be undertaken and will include options for reusing the building in its present location, or a list of elements to be salvaged and reused at an alternate location. The study will include the strategy and design of a retained sample of the Wickham Railway Station Group. The items/features to be reconstructed/adaptively re-used include:

- reconstruction of a 10 metre by 10 metre section of the southern platform building (with re-used materials/features)
- control panel and console from Wickham Signal Box
- the original ticket window, desk and safe.

The purpose of the reconstruction is to preserve the sense of place associated with the Wickham Railway Station along with its movable heritage items. This reconstructed portion of the station is to be re-installed in a publically accessible area and as close as possible to the original station. The adaptive reuse study will include:

- a designated location for the reconstructed portion of the station
- architectural design plans for the reconstruction
- an itemised inventory of material to be salvaged for reuse (from insitu) prior to demolition
- quantities of additional material (including bricks) to be salvaged for reuse (from out of situ) during demolition
- detailed demolition plan
- detailed re-installation plan including signage for interpretation.

As part of the truncation of the Newcastle rail line in 2014 an architectural and movable heritage study was carried out. Any additions to this study will be made prior to construction of the proposal.

# 6. Design modifications

## 6.1 Overview

Since the REF was displayed, the proposal design has developed and the following modifications are being proposed to enhance the overall design and operation of the proposal:

- a revised light rail track alignment at Worth Place
- a revised track bed between Stewart Avenue and Worth Place
- an increased area for stabling and maintenance facilities
- a second light rail track to be installed across Stewart Avenue
- a new pedestrian crossing at Cottage Creek
- removal of the Queens Wharf pedestrian footbridge and a new pedestrian footpath across the former heavy rail corridor at Market Street
- relocation of the eastern construction compound
- an augmented light rail traction power supply

These changes would result in only a minor additional environmental impact and are able to be successfully managed within the scope of mitigation already proposed in the REF.

The only proposed change to mitigation measures is to reduce the extent of the eastern construction compound by 15 metres to avoid encroachment on the western boundary of the Section 170 Register curtilage of the Newcastle Railway Station Group (SRA28).

A detailed description and assessment of the potential impacts of each proposed modification is provided in sections 6.2 to 6.8. Any new mitigation measures required in response to the proposed modifications are identified in section 7.

## 6.2 Revised light rail track alignment at Worth Place

### 6.2.1 Description of modification

The light rail track alignment at Worth Place is proposed to be adjusted to provide a smoother ride for customers and result in less maintenance.

The design of the light rail alignment in the REF used a 30 metre radius curve at Worth Place to avoid impacts on the land to the west of the alignment owned by Hunter Development Corporation. Following agreement with Hunter Development Corporation, the revised alignment now passes through this land and uses a larger, 48 metre radius curves. Unused land will be made available for public use following further investigation.

The modification will result in the following benefits:

- a more comfortable ride for passengers
- light rail vehicles will be able to travel at a higher speed through the curve
- reduced likelihood of wheel squeal which may reduce noise impacts to local businesses and residents
- better visibility between the proposal and road users
- a better road intersection arrangement at Worth Place
- release of surplus land for public space or development
- lower maintenance cost resulting from reduced wear to both the light rail vehicle wheels and the track

The alignment proposed in the REF and the revised alignment are shown in Figure 6.1.

## 6.2.2 Assessment of impacts

### Heritage

#### Aboriginal Heritage

No registered Aboriginal sites or sensitive archaeological zones are located within the area of the proposed realigned track area. Borehole assessments throughout the area have shown that the uppermost 700 millimetres of soils are disturbed and therefore the proposed revised track alignment would have minimal to no impact on unidentified Aboriginal sites.

Historic maps of the area show the harbour shoreline transecting Worth Place indicating the area was likely prone to inundation and therefore unlikely to have been a regular Aboriginal camp location.

No additional mitigation measures are required for Aboriginal heritage.

#### Historic built heritage

While no heritage items will be directly impacted by the proposed track realignment, the modification moves the proposed track closer to the locally listed Former Police Station (I420) at 558 Hunter Street, which lies approximately 10 metres to the south west of the proposed realigned track. The former Emporium Building (I419) is also located approximately 45 metres south west of the alignment.

Although the Former Police Station is located at a safe distance to avoid direct damage, the area will be cordoned off to avoid inadvertent damage and vibration monitoring will be conducted during construction to avoid potential damage.

#### Historic archaeological heritage

No listed historic archaeological sites are located within the proposed track realignment area.

The modification moves the light rail alignment an additional 10 metres away from the former Mortuary Station, and therefore will not have a negative impact on the site. The Mortuary Station was constructed in 1883 and used to transport mourners to the newly constructed Sandgate Cemetery. It was demolished in 1933.

There is also potential for the alignment to impact the foundations of buildings potentially dating to the 1850s, located on the northern side of Hunter Street at Worth Place. Monitoring of these buildings would be included in the heritage management plan recommended in the REF and therefore no additional mitigation measures are required.

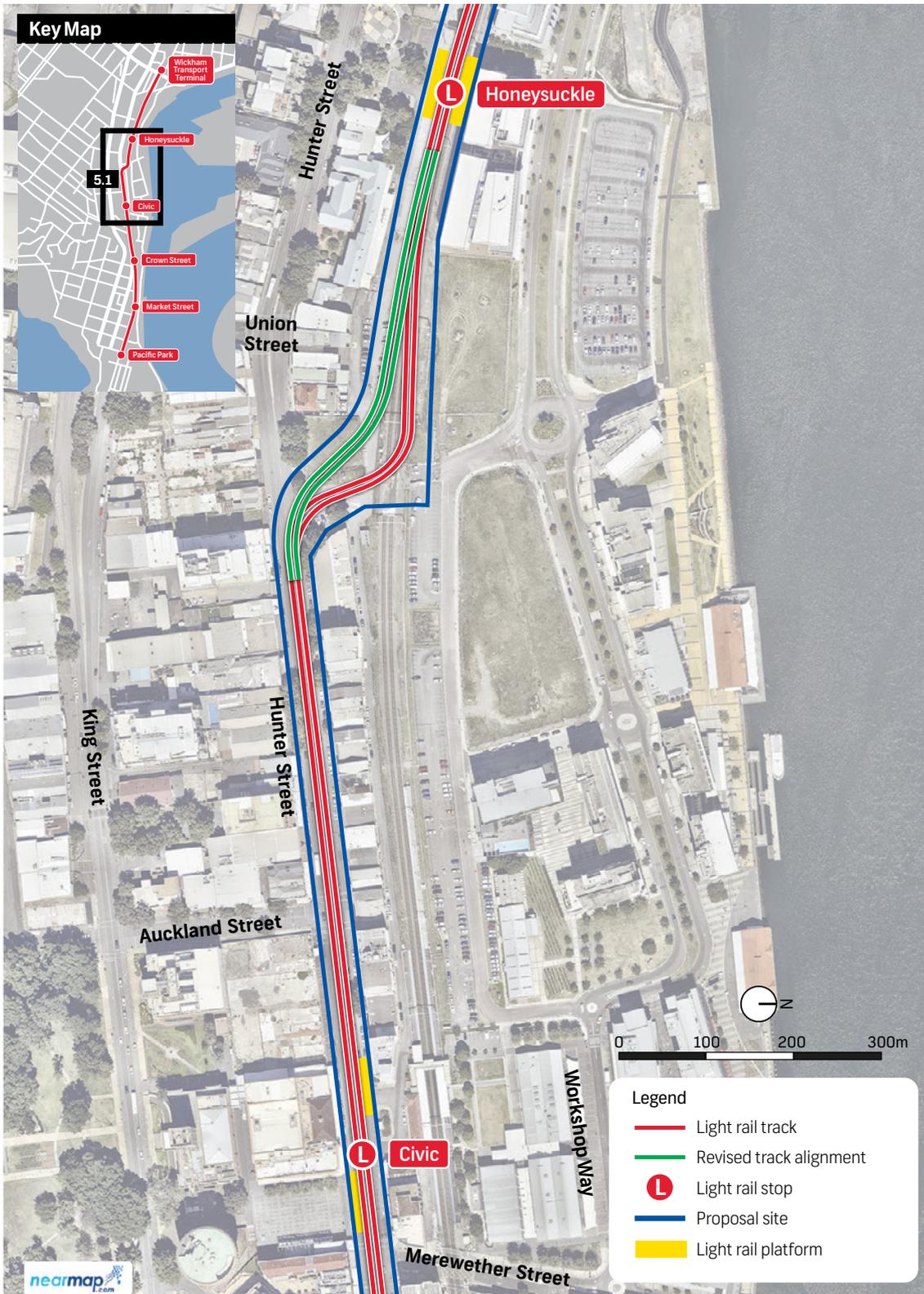


Figure 6.1 Revised track alignment at Worth Place

## Noise

### Operational noise

The operational noise impacts of the revised track alignment have been assessed in conjunction with the revised track bed material proposed between Stewart Avenue and Worth Place. The revised noise impact prediction results are provided in section 6.3.

### Construction noise

The construction noise impacts for the proposed design change would be negligible when compared to those predicted in the REF. No further mitigation is therefore required.

### 6.2.3 Mitigation measures

No further mitigation is required for Aboriginal heritage, construction and operational noise.

The Former Police Station (1420) will be cordoned off prior to works commencing to avoid inadvertent damage and vibration monitoring will be conducted. Monitoring of this site/area and appropriate management of the 1850s buildings on the northern side of Hunter Street will be included in the cultural heritage management plan recommended in the REF.

## 6.3 Revised track bed material between Stewart Avenue and Worth Place

### 6.3.1 Description of modification

Instead of using ballast, this section of track will use an embedded track slab similar to Hunter Street. This will improve visual amenity, and allow for open space either side of the light rail track, which may be used for cycling, walking or recreation. Through the design process, the Program team will continue to work on how we can improve this section of the route to improve the amenity for the community.

Previously, the track bed within the former heavy rail corridor between Stewart Avenue and Worth Place was designed to align with the heavy rail track and existing ballast to minimise civil works, including rebuilding of the subgrade (which may require the importing of engineered fill). It also minimised impacts to redundant services that remain in the ground following the removal of the heavy rail infrastructure (including gantries, overhead wiring, and signals).

However, ballasted track is more appropriate in a heavy rail alignment where it is separated from public spaces.

A change to an embedded concrete track slab was identified at the following locations:

- from the Wickham Transport Interchange to Cottage Creek (adjacent to Beresford Street (east))
- the road crossing at Steel Street and adjacent pedestrian crossings
- Honeysuckle Stop and adjacent pedestrian crossings
- the curves at Worth Place where the rail corridor enters the pedestrian streetscape.

If embedded concrete track slab were only installed in these locations, it would result in 12 transitions from concrete track slab to ballasted track. This would mean that transition trackform would have to be installed at each transition point to ensure a smooth ride. It would also increase the cost of maintenance as the ballast at the transition point would have to be tamped manually.

As such, and in line with feedback received from the community, an embedded concreted track slab is proposed for the entire section between Stewart Avenue and Worth Place.

The use of a concrete track slab will enable better integration into future urban design plans for the area as it allows urban amenity improvements such as public spaces, cycle ways and pedestrian access. This change will deliver the following benefits:

- improved urban amenity outcome
- improved constructability and reduced construction costs
- reduced frequency of maintenance and lower whole of life costs
- no additional driver and training requirements

### 6.3.2 Assessment of impacts

#### Heritage

##### Aboriginal heritage

The proposed works travel through an area of Aboriginal archaeological sensitivity and two surface artefact sites (AHIMS#38-4-1803, AHIMS38-4-1805) registered in the Aboriginal heritage information management system (AHIMS). Registered Aboriginal sites have been located in and surrounding the rail corridor. Due to the depth of the proposed soil disturbance works however, it is considered unlikely that intact soil horizons, in which these sites are located, would be impacted.

##### Historic built heritage

No additional mitigation is required as the mitigation measures proposed in the REF adequately address the impacts.

The proposed works are within the curtilage of one Section 170 Register listed heritage item (Wickham Railway Station) and in close proximity to two locally listed items. The proposed works could occur between the station buildings and not directly impact the fabric of the buildings. Therefore, the proposed design change is unlikely to result in a higher heritage impact than previously assessed in the REF.

The locally listed Newcastle Technical College (1496) is located approximately 10 metres south and the Former Police Station (420) approximately 20 metres south of the proposed works. The works will not directly impact on the fabric of these buildings and would not have a higher heritage impact than previously assessed in the REF.

No additional mitigation is required as the mitigation measures proposed in the REF adequately address the potential for impacts.

##### Historic archaeological heritage

The proposed works run adjacent to the Government Farm Archaeological Site, the former Cottage Creek Cemetery and the former Honeysuckle Station site.

Due to the depth of previous disturbances, evidence relating to the Government Farm Archaeological Site has likely already been destroyed by the construction of the heavy rail line. The depth of construction for the proposed concrete track slab is therefore likely to encounter only disturbed soil horizons.

Human bone and coffin fragments have been located at the former Cottage Creek Cemetery site from a depth of 1.25 metres. As the depth of ground disturbance for the proposed concrete slab is assumed to be 600 millimetres, construction would not impact on this site.

The former Honeysuckle Railway was demolished in 1938 and the footings remain on the surface adjacent to the rail corridor. Although outside the construction footprint, there is a moderate possibility of indirect damage as the footings are located at surface level. These will be cordoned off during construction works to avoid inadvertent damage.

#### Noise

##### Operational noise

The operational noise model described in Technical Paper 2 of the REF was updated with the design modifications including the revised track alignment at Worth Place and the proposed embedded concrete track slab and revised noise impact predictions undertaken.

A track correction of +2.5 dB was used to account for the increase in noise level associated with embedded rail compared to a typical ballasted trackform.

The predicted noise levels during operation for noise catchment areas 1, 2 and 3 (between Stewart Avenue and Worth Place) are summarised in Table 6.1.

The table shows a number of exceedances during the daytime and night time are predicted, consistent with the REF. The only changes compared to the REF occur in noise catchment area (NCA) 2. During the daytime period, two less exceedances are predicted while two additional exceedances are predicted in  $L_{Amax}$  noise levels. There is no change to the number of predicted exceedances during the night time or in NCA 1 and 3 as a result of the proposed design changes.

Table 6.1 Airborne operational noise levels at receivers in NCA 1, 2 and 3 dB(A)

Receiver			Light rail operations - range of noise levels			Number of exceedances		
NCA	Receiver type	Number of Receivers	L <sub>Aeq</sub> Day	L <sub>Aeq</sub> Night	L <sub>Amax</sub>	Day	Night	Maximum noise levels (residential only)
NCA1	Residential	16	25 to 45	20 to 40	44 to 67	0	0	0
	Commercial	19	26 to 50	21 to 46	45 to 67	0	0	0
	Industrial	19	25 to 43	21 to 38	44 to 55	0	0	0
NCA2	Residential	17	34 to 70	29 to 65	53 to 95	2	10	6
	Commercial	59	30 to 64	25 to 60	48 to 88	0	0	0
	Hospital	2	40 to 40	35 to 35	61 to 61	0	0	0
NCA3	Residential	29	33 to 62	28 to 57	47 to 84	1	5	1
	Commercial	94	31 to 64	26 to 60	42 to 89	0	0	0
	Hospital	8	58 to 61	53 to 57	75 to 83	8	0	0
	Educational/ Worship	7	55 to 62	50 to 58	72 to 83	7	0	0

Note: NCA - noise catchment area. Refer Figure 9.1 of the REF

Further investigation of airborne noise impacts will be undertaken in conjunction with the ongoing design process and mitigation measures implemented at those locations where exceedances of the adopted criteria are identified. No mitigation additional to that proposed in the REF is required.

### Construction traffic

The modification will likely result in the following changes to construction activities:

- removal of existing track ballast (where not already removed)
- excavation of subgrade to the depth required by the concrete track bed
- construction of the new concrete track bed.

This change in volume of truck movements as a result of the modification is very small compared to the existing road capacity and is not expected to result in an observable change in road network performance.

It is estimated that the change in track bed material will require the removal of approximately 5,000 cubic metres of ballast and spoil which will be replaced with concrete. This will result in approximately 900 additional semi-trailers for ballast and spoil removal and about 450 concrete delivery truck movements (at an assumed six cubic metres per truck).

It is estimated that approximately 20 linear metres of track construction can be completed per day. This translates to about 12 trucks per day for the excavation process and 12 trucks per day for the construction process.

Assuming concurrent excavation and construction, this would equate to about two additional trucks per hour which is negligible.

### 6.3.3 Mitigation measures

No additional mitigation is required for the Government Farm Archaeological Site or the Cottage Creek Cemetery as mitigation measures already identified in the REF are considered adequate.

The former Honeysuckle Station site will be cordoned off during work to avoid inadvertent damage and will be included in the heritage management plan outlined in the REF.

Further investigations and impact predictions will be conducted regarding operational noise in conjunction with the ongoing design process. No further mitigation is required for operational noise.

## 6.4 Increased area for stabling and maintenance facilities and second track across Stewart Avenue

### 6.4.1 Description of modification

As a result of further design development and operational advice, the depot layout shown in Figure 6.18 of the REF has been refined. The following changes are proposed:

- The footprint of the depot is to be expanded to include the existing Station Street situated north of Wickham Station. Station Street will be realigned further north to accommodate the increase in depot footprint.
- An additional siding track will be included in the depot to provide greater flexibility for the light rail vehicle maintenance personnel.
- An additional exit onto the light rail alignment will be provided at Cottage Creek, which increases operational flexibility and reliability.

The people of Newcastle have also made it clear that they want to see light rail extended in the future and less traffic disruption caused by construction. While plans for future light rail extensions form part of the long term planning for Newcastle's transport system, we are already taking steps to ensure the future proofing of light rail is enabled.

A second light rail track across Stewart Avenue is proposed to be installed immediately south of the single track crossing shown in the REF. The additional track will not be connected to the light rail network until it is required in the future. Installing the second track early will minimise future disruption to traffic using Stewart Avenue.

The revised location and configuration of the stabling and maintenance facility and the proposed second track are shown in Figure 6.2.

## 6.4.2 Assessment of impacts

### Heritage

#### Aboriginal heritage (surface and subsurface)

There are three Aboriginal sites (AHIMS#38-4-1222, AHIMS#38-4-1223 and AHIMS#38-4-1716) and an area of Aboriginal archaeological sensitivity in the area of the proposed works.

Subsurface disturbance to a depth of one to two metres is necessary for construction of the Wickham stabling and maintenance facility. This will potentially impact on the area of Aboriginal archaeological sensitivity. The movement of vehicles and plant may also impact two of the three Aboriginal sites (AHIMS#38-4-1222 and AHIMS#38-4-1223).

Salvage of the objects associated with AHIMS#38-4-1716 was completed on 13 March 2015 in accordance with the approval issued for that work (AHIP C-892). Therefore there will be no impact on this site. The remaining two objects will be salvaged prior to works commencing, as already identified in previous assessments.

The installation of the second track across Stewart Avenue is unlikely to impact on Aboriginal heritage.

The potential for impacts in these areas and to the identified sites have been assessed in the heritage assessment undertaken in the REF and therefore no additional mitigation is required.

#### Historic built heritage

Wickham Railway Station (I683) and Signal Box (I684) are listed under the Newcastle Local Environment Plan 2012 (LEP). Both of these items are also included in Transport for NSW's Section 170 Register as the Wickham Railway Station Group (SRA45). These items were identified for removal in the REF. The proposed design modification therefore will not result in an additional impact on these heritage items.

#### Historic archaeological heritage

Historic archaeological material has not been identified in the area. Accordingly, there are no impacts likely and no additional mitigation measures required as a result of the proposed design modification.

### Traffic

The additional two stabling tracks within the depot will marginally increase construction duration but is unlikely to result in an increase in daily vehicle trips to the site during construction or operation.

The installation of the second track across Stewart Avenue will not affect traffic and transport operations as the construction is proposed to be undertaken overnight or on a weekend. If possible, the two tracks will be installed concurrently to minimise disruption to traffic. The second track will not be connected to the operational network and is for use at a future point in time only.

The relocation of the vehicle access point along Honeysuckle Drive will increase construction traffic marginally. The timing of the road construction activity in relation to the maintenance area is not yet finalised. However even in the worst case scenario, the proposed change would have a negligible impact due to a small increase in additional vehicles (less than 10 expected) per hour during the AM peak.

### Construction noise

Based on the available information, the construction noise assessment undertaken as part of the REF is representative of the expected impacts associated with the construction of the revised depot and stabling area. Construction noise and vibration mitigation measures presented in the REF noise and vibration assessment are applicable.

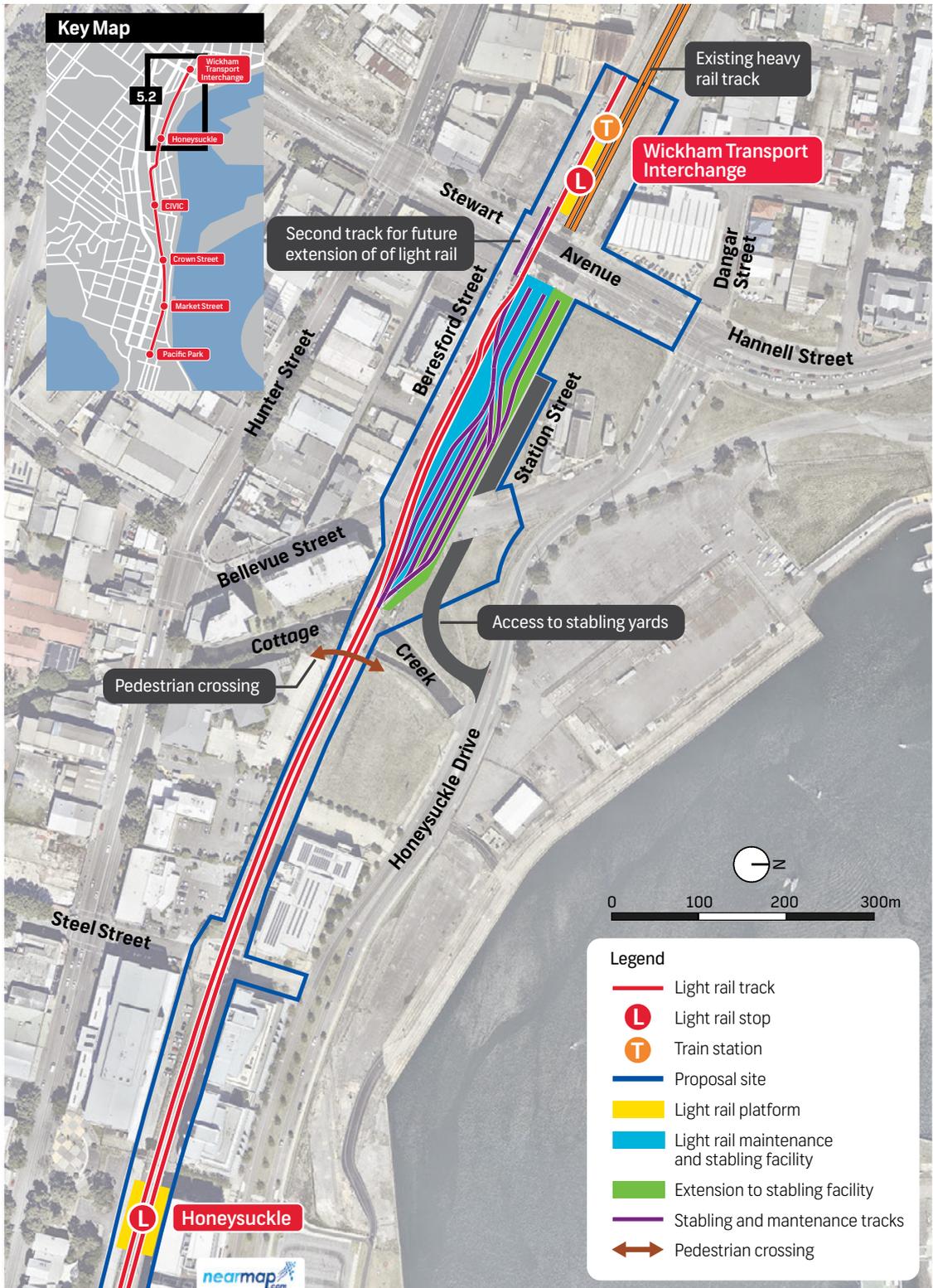


Figure 6.2 Increased area for stabling and maintenance facilities and second track across Stewart Avenue and Cottage Creek pedestrian crossing

### Operational noise

The increased area within the depot has resulted in an increase in separation between the maintenance and stabling tracks. Additional track length and curves have also been added and may result in a change in noise emissions. The REF noise model was therefore updated with the new track configuration and revised noise impact predictions completed.

As predicted in the REF, receivers in NCA1, NCA2, and NCA3 that are closest to the depot and stabling area are most likely to be affected from noise, particularly where operations occur during the night time period.  $L_{Amax}$  noise level predictions also indicate possible sleep disturbance impacts in NCA2.

During the night time period, an additional two residential receivers in NCA1 and NCA2 are predicted to be affected by noise levels above the relevant criteria. During the evening period, an additional three residential receivers and one residential receiver in NCA 2 and NCA 3 respectively would be affected. In NCA 3, the Hunter Radiology medical facility which was predicted to exceed the noise criteria in the REF now demonstrates compliance.

Overall, no new or additional mitigation is required because the level of impact is comparable to the REF, and the further design studies and mitigation measures outlined in the REF will also be applied to these newly affected locations.

The additional second track across Stewart Avenue will not be connected to the light rail network at this time. Prior to its use in the future, additional operational noise impact assessment may be required.

### 6.4.3 Mitigation measures

No additional heritage, traffic or operational noise mitigation measures are required as a result of the proposed design modification.

## 6.5 New pedestrian crossing at Cottage Creek

### 6.5.1 Description of modification

A new north/south pedestrian crossing across the former heavy rail corridor is proposed to improve pedestrian access to the western Honeysuckle precinct.

The crossing will be located on the eastern side of Cottage Creek (refer to Figure 6.2) and link to a walkway connecting to Hunter Street at 710 Hunter Street. The walkway will enable access between Honeysuckle Drive and Hunter Street approximately midway between Steel Street and Stewart Avenue.

### 6.5.2 Assessment of impacts

#### Heritage

#### Aboriginal heritage (surface and subsurface)

There are no identifiable risks of harm to Aboriginal objects or sites within the area of the proposed pedestrian crossing.

No registered Aboriginal sites or sensitive archaeological zones are located within the area of the proposed pedestrian crossing. Historic Parish maps show the natural creek line of Cottage Creek and the point where it joins the harbour and indicate that the area was likely prone to inundation and therefore unlikely to have been used as a camp area for past Aboriginal people.

#### Historic built heritage

A remnant rail bridge located at the northern end of the proposed pedestrian crossing spans the two arms of Cottage Creek. The rail bridge is not listed and further assessment is required to identify its heritage significance. The current design of the pedestrian crossing does not impact on this rail bridge. However it will be cordoned off during works to prevent inadvertent impact.

#### Historic archaeological heritage

The Cottage Creek Cemetery is located in close proximity to the proposed pedestrian bridge. To avoid potential inadvertent impact on the cemetery, monitoring would be conducted during the works as for other works locations outlined in the REF.

There is no evidence that built structures associated with the rail bridge cross into the proposed area of works and therefore impacts are considered unlikely.

#### *Construction noise and vibration*

An assessment of the potential construction noise impacts is presented in Table 6.2.

Noise levels due to construction activities are predicted to exceed noise management levels consistent with predictions for construction noise in the REF. Mitigation measures for construction noise for other activities and in other locations were recommended in the REF and would also be applied to the proposed works area to reduce impacts.

The potential impacts of vibration caused by construction activities have been assessed with consideration to structural damage and human comfort criteria. Based on the safe working distances for human comfort, when high vibration generating activities occur within 66 metres of adjacent buildings, potentially impacted residents would be informed through the community and stakeholder engagement plan of the nature of the works, duration, project manager contact details and other information.

The expected magnitude of ground vibration would not cause damage to heritage structures if the construction equipment operates at distances greater than 30 metres from the structures. In the event that high vibration generating activities are proposed to occur within this distance, a more detailed analysis of the potential vibration impacts would be undertaken. Any sites in the vicinity of these works would be added to the construction noise and vibration management plan for the proposal.

#### **6.5.3 Mitigation measures**

The pedestrian bridge is in close proximity to two spans of a remnant rail bridge; these spans will be cordoned off during works. This would be included in the heritage management plan outlined in the REF.

No additional traffic construction noise and vibration mitigation measures are required for the works relative to those outlined in the REF.

## **6.6 New Market Street pedestrian crossing and removal of the Queens Wharf pedestrian footbridge**

### **6.6.1 Description of modification**

The Queens Wharf pedestrian footbridge commences in the Hunter Street Mall and provides a pedestrian link between the mall and Queens Wharf over the former heavy rail corridor, Scott Street and Wharf Road. The Scott Street stair access to the pedestrian footbridge and one of the footbridge piers conflicts with the alignment of the proposal and therefore needs to be removed.

A new at-grade pedestrian crossing is proposed across the former heavy rail corridor immediately adjacent to Market Street and west of the Queens Wharf pedestrian footbridge. The crossing will provide open public space that links directly with the Market Street light rail stop on Scott Street.

### **6.6.2 Assessment of impacts**

#### *Heritage*

#### **Aboriginal heritage (surface and subsurface)**

There is considered to be a low potential for Aboriginal objects to be encountered as a result of the proposed works.

There are no surface Aboriginal objects in this area.

However there is potential for subsurface Aboriginal objects in areas with natural soil profiles as there is a nearby subsurface Aboriginal site (AHIMS#38-4-0796).

Subsurface works will involve the demolition of ground structures and footings to depths of approximately 500 millimetres. As the construction of these same items will have already disturbed the ground surface, it is unlikely there will be in-situ Aboriginal objects remaining.

### Historic built heritage

The proposed demolition works are in close proximity to the State Heritage Register listed Newcastle Railway Station Additional Group (SHR1212), and built heritage in this area is also listed on Transport for NSW's Section 170 Register (SRA28). The Newcastle Signal Box and the southern wall of Newcastle Railway Station, which are both part of these listings, are directly adjacent to the area of proposed works (less than two metres for the signal box and less than three metres for the southern wall).

The signal box and the southern wall have the potential to be inadvertently damaged during demolition works and will be cordoned off and included in the cultural heritage management plan included in the REF.

### Historic archaeological heritage

There is no historical archaeological material associated with this area. Accordingly, there are no additional mitigation measures required as a result of this proposed design modification.

### Construction noise and vibration

Table 6.2 presents the predicted construction noise levels associated with a number of design modifications. These include:

- Cottage Creek pedestrian crossing
- Queens Wharf footbridge removal and pedestrian crossing
- eastern construction compound relocation
- augmentation of light rail traction power supply.

Predicted noise levels have been based on continuous operation of the loudest noise source identified for each activity. Predictions are therefore considered to represent the highest potential noise impacts and are therefore considered to be conservative. The noise levels predicted will typically be short-term, lasting for the duration of the construction period or activity when works are conducted in the vicinity of each receiver.

The construction activities have been assessed against out-of-hours noise criteria to provide a worst case indication of potential impacts assuming some of these activities take place outside of standard working hours such as cable installation under the roadway and demolition of the Queens Wharf pedestrian footbridge. Most activities will not take place outside of standard working hours so the assessment is likely to be inherently conservative. Once a construction contractor is appointed and the specifics of the construction methodology and out-of-hours construction work are known, a more detailed assessment would be undertaken as necessary.

Noise levels generated due to construction activities are predicted to exceed noise management levels at a number of locations consistent with predictions in the REF. Noise sensitive non-residential receivers including educational, medical and places of worship are also located in many of the NCAs. The noise predictions indicate that these non-residential construction noise management levels are likely to be exceeded at times during construction. As for the REF assessment, mitigation measures have been documented based on assumed building envelope acoustic performance, however additional and/or specific measures would be confirmed at the detailed design stage.

While construction works will be transient and would affect individual receivers for a limited time only, certain activities, in particular cable installation, and the Queens Wharf pedestrian bridge removal have the potential to exceed the standard working hours noise criteria at the nearest sensitive receivers. It is also likely that work outside of standard working hours noise will generate exceedances in nearby NCAs. The highly noise affected level of 75 dB(A), which is applicable for day and night time works, may also be exceeded for residences located in NCA 6 for Market Street pedestrian crossing works, Queens Wharf footbridge removal and electrical cabling works. Cabling works are anticipated to exceed the highly affected noise level for residential receivers on Darby Street and Tyrrell Street.

Overall, the construction noise levels predicted for these proposed design modifications are generally consistent with levels predicted at other locations in the REF, and therefore the measures provided in the REF noise and vibration assessment are sufficient to mitigate these additional potential impacts.

The potential impacts of vibration caused by construction activities have been assessed with consideration to structural damage and human comfort criteria. Based on the safe working distances for human comfort, when high vibration generating activities occur within 66 metres of adjacent buildings, potentially impacted residents would be informed through the community and stakeholder engagement plan of the nature of the works, duration, project manager contact details and other information.

The expected magnitude of ground vibration will not cause damage to heritage structures if the assessed equipment operates at distances greater than 30 metres from the structures. In the event that high vibration generating activities are proposed to occur within this distance, a more detailed analysis of the potential vibration impacts would be undertaken. These sites would be added to the construction noise and vibration management plan for the proposal.

#### *Pedestrian traffic during construction*

The Queens Wharf pedestrian footbridge will be removed and an at-grade crossing immediately to the west would be constructed. It is proposed that the new crossing will be installed as soon as planning approval is received with the removal of the overhead bridge conducted subsequently as part of the light rail works. While no inconvenience to pedestrians is expected, an alternative path between the Hunter Street Mall and Queens Wharf is also available via the at-grade crossing at Wolfe Street. No additional mitigation is therefore required.

### **6.6.3 Mitigation measures**

No additional mitigation is required for heritage, noise and vibration or pedestrian traffic impacts. The additional heritage sites would be protected in accordance with the existing provisions of the REF report and the heritage management plan.

## **6.7 Relocation of eastern construction compound**

### **6.7.1 Description of modification**

Bringing forward the benefits and commencing the urban renewal process as early as possible are key considerations identified in feedback from the community. By relocating the eastern construction compound as proposed, it will open up the eastern end of the former rail corridor for renewal sooner and allows construction of the proposed pedestrian crossing at Market Street (refer section 6.5 above).

The revised location of the compound is to the west of the location shown in the REF in Figure 7.5 and would occupy a section of the former heavy rail corridor broadly between Brown Street and Wolfe Street. The REF site and revised location of the compound is shown in Figure 6.3.

### **6.7.2 Assessment of impacts**

#### *Heritage*

#### **Aboriginal heritage (surface and subsurface)**

No additional mitigation is required for Aboriginal heritage for the proposed design modification.

No registered surface Aboriginal sites are located in the proposed revised area for the compound. A registered subsurface site (potential archaeological deposit (PAD) AHIMS# 38-4-0796) lies approximately 35 metres to the south of the compound area and the area has subsurface archaeological sensitivity. As the compound will be above ground and confined by fencing, there is no risk of impact to subsurface Aboriginal objects.

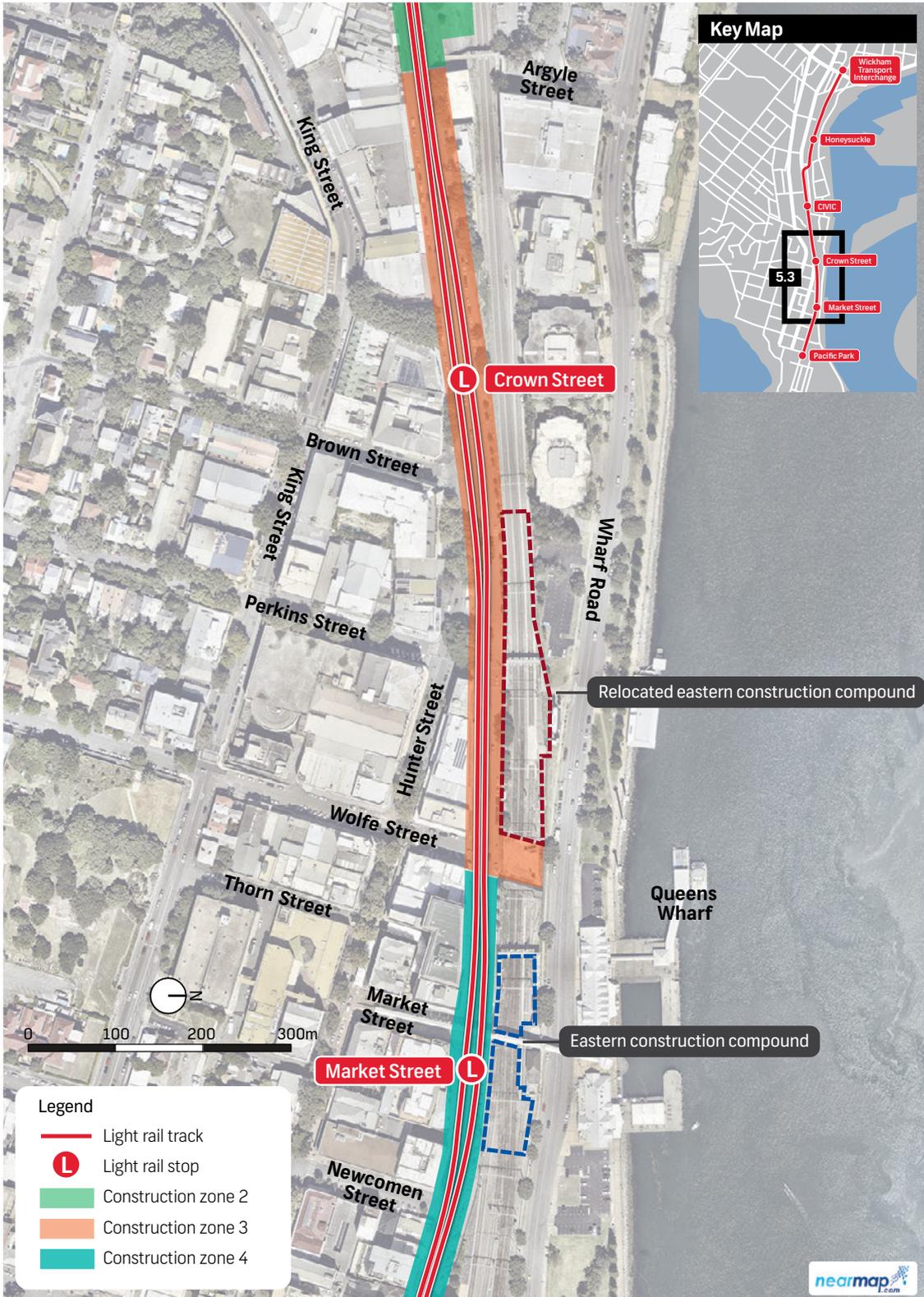


Figure 6.3 Revised location of the eastern construction compound

### Historic built heritage

The eastern section of the construction compound boundary extends approximately 15 metres into the curtilage of the Section 170 Register listed Newcastle Railway Station Group (SRA28). The curtilage of the remains of AA Co. Bridge and Fence (I415) are also within 10 metres of the compound area, but the actual built remains of this bridge are opposite Crown Street and approximately 100 metres west of the compound.

The proposed construction compound will impact on the Section 170 Register curtilage of the Newcastle Railway Station Group (SRA28), but not on the built heritage item. To mitigate this potential impact, the eastern boundary of the compound area would be reduced by 15 metres.

There are five other items within 15 metres of the compound, mainly on the southern side of Scott Street. There is no identified risk of direct impact to these heritage items as a result of the compound, however the compound site would result in a minor, temporary visual impact to these heritage items if unmitigated.

### Historic archaeological heritage

No registered or identified historic archaeological areas lie in the revised location for the construction compound. As the compound will be confined by fencing and above ground, there is no risk of impacting unidentified subsurface deposits.

### Construction noise

An assessment of the potential construction noise impacts is presented in Table 6.2.

Noise levels due to construction activities are predicted to exceed noise management levels consistent with predictions for construction noise in the REF. Mitigation measures for construction noise for other activities and in other locations were recommended in the REF and would also be applied to the proposed works area to reduce impacts.

The potential impacts of vibration caused by construction activities have been assessed with consideration to structural damage and human comfort criteria. Based on the safe working distances for human comfort, when high vibration generating activities occur within 66 metres of adjacent buildings, potentially impacted residents would be informed through the community and stakeholder engagement plan of the nature of the works, duration, project manager contact details and other information.

The expected magnitude of ground vibration would not cause damage to heritage structures if the construction equipment operates at distances greater than 30 metres from the structures. In the event that high vibration generating activities are proposed to occur within this distance, a more detailed analysis of the potential vibration impacts would be undertaken. Any sites in the vicinity of these works would be added to the construction noise and vibration management plan for the proposal.

### 6.7.3 Mitigation measures

No additional mitigation measures are required for Aboriginal heritage or historical archaeology.

The eastern boundary of the compound would be moved west by 15 metres to avoid encroachment on the Section 170 Register curtilage of the Newcastle Railway Station Group (SRA28).

The compound would be fenced to prevent inadvertent impact to the AA Co Bridge and Fence (I415). Screening of compound would be erected to reduce visual impact to nearby built heritage items.

No additional mitigation for construction noise or vibration is required for this proposed modification.

## 6.8 Augmentation of light rail traction power supply

### 6.8.1 Description on modification

To improve reliability and secure electricity supply for the proposal, Ausgrid have identified the need to upgrade the power supply. A high voltage underground cable will be installed beneath the road surface, south from an existing substation in Tyrrell Street under the eastern carriageway of Darby Street and across Hunter Street to the light rail substations – a total distance of approximately 500 metres.

Two 150 millimetre diameter ducts will be installed in the roadway. Within each duct, three cables approximately 30 millimetres in diameter will be installed. The load rating of each cable would be approximately 100 kVA. The cables will be buried approximately 600 millimetres beneath the road surface. Figure 6.4 shows the proposed route of the cables as well as the corrected location of the two light rail substations within the former heavy rail corridor. The two substations will be located approximately 75 metres north of the location shown on Figure 6.3 of the REF, which was a typographical error in the REF document.

### 6.8.2 Assessment of impacts

#### *Heritage*

#### **Aboriginal heritage (surface and subsurface)**

Three registered Aboriginal sites are located within one kilometre of the proposed works. These include two PADs and an artefact site (AHIMS number unspecified), but no surface Aboriginal heritage sites are within the proposed cable route.

The northern end of the proposed cable route at Hunter Street partially lies in an area of archaeological sensitivity.

#### **Historic built heritage**

The proposed cable route passes in close proximity to eleven locally listed heritage items. No State Heritage Register items are within 50 metres of the proposed cable route.

The cable route to the western substation passes through the AA Co Bridge and Fence (I415) curtilage, but will not affect the material fabric of the built structures in this area.

To reduce the potential for impacts, locally listed items within 15 metres of the cable route will require vibration monitoring. The cable route to the western substation that is within the AA Co Bridge and Fence (I415) curtilage would be clearly demarcated to ensure there is no impact to this built heritage item.

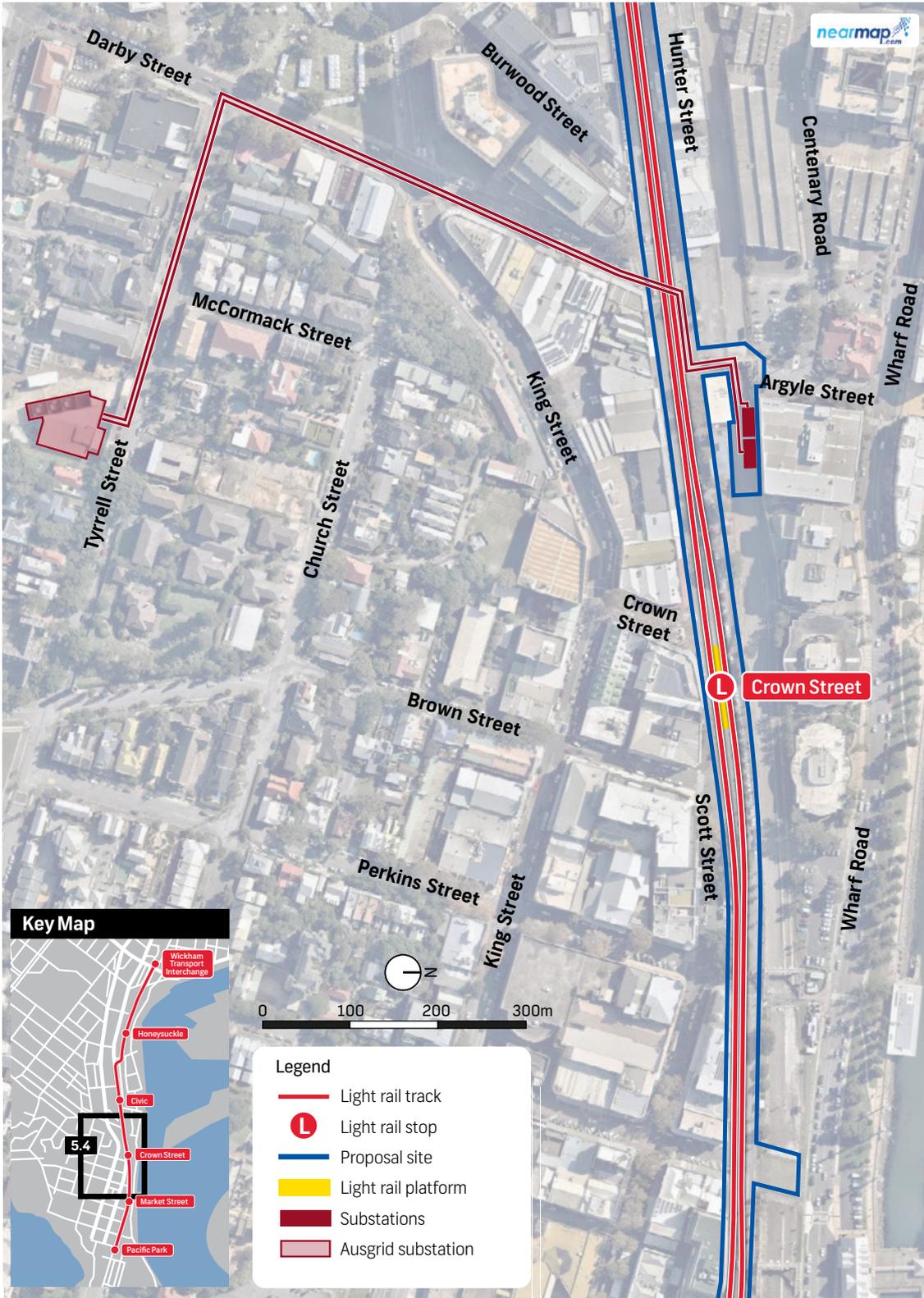


Figure 6.4 Augmentation of light rail traction power supply

### Historic archaeological heritage

No identified archaeological areas lie within the proposed cable route and thus the proposed design modification will not impact known archaeological sites.

### Construction noise and vibration

Table 6.2 presents the predicted construction noise levels associated with a number of design modifications. These include:

- Cottage Creek pedestrian crossing
- Queens Wharf footbridge removal and pedestrian crossing
- eastern construction compound relocation
- augmentation of light rail traction power supply

Predicted noise levels have been based on continuous operation of the loudest noise source identified for each activity. Predictions are therefore considered to represent the highest potential noise impacts and are therefore considered to be conservative. The noise levels predicted will typically be short-term, lasting for the duration of the construction period or activity when works are conducted in the vicinity of each receiver.

The construction activities have been assessed against out-of-hours noise criteria to provide a worst case indication of potential impacts assuming some of these activities take place outside of standard working hours such as cable installation under the roadway and demolition of the Queens Wharf pedestrian footbridge. Most activities will not take place outside of standard working hours eg pedestrian crossings so the assessment is likely to be inherently conservative. Once a construction contractor is appointed and the specifics of the construction methodology and out-of-hours construction work are known, a more detailed assessment would be undertaken as necessary.

Noise levels generated due to construction activities are predicted to exceed noise management levels at a number of locations consistent with predictions in the REF. Noise sensitive non-residential receivers including educational, medical and places of worship are also located in many of the NCAs. The noise predictions indicate that these non-residential construction noise management levels are likely to be exceeded at times during construction. As for the REF assessment, mitigation measures have been documented based on assumed building envelope acoustic performance, however additional and/or specific measures would be confirmed at the detailed design stage.

While construction works will be transient and would affect individual receivers for a limited time only, certain activities, in particular cable installation, and the Queens Wharf pedestrian bridge removal have the potential to exceed the standard working hours noise criteria at the nearest sensitive receivers. It is also likely that work outside of standard working hours noise will generate exceedances in nearby NCAs. The highly noise affected level of 75 dB(A), which is applicable for day and night time works, may also be exceeded for residences located in NCA6 for Market Street pedestrian crossing works, Queens Wharf footbridge removal and electrical cabling works. Cabling works are anticipated to exceed the highly affected noise level for residential receivers on Darby Street and Tyrrell Street.

The Newcastle Early Leaning Centre on Darby Street and the Newcastle Hebrew Congregation on Tyrrell Street are anticipated to be affected by external noise levels up to 98 and 84 dBA respectively when cabling works are directly adjacent to these receivers.

Additionally, the occupant of the building at 49 Darby Street would be consulted during detailed design to identify whether the building contains studios or other especially sensitive areas that may be affected by the proposed cabling works. Additional mitigation measures would be implemented if appropriate.

Overall, the construction noise levels predicted for these proposed design modifications are generally consistent with levels predicted at other locations in the REF, and therefore the measures provided in the REF noise and vibration assessment are sufficient to mitigate these additional potential impacts.

Once details of the requirements for construction activities outside of standard construction hours are confirmed, a detailed assessment will be undertaken to determine compliance with out of hours noise management levels and sleep disturbance criteria. This will be completed prior to those works commencing.

The potential impacts of vibration caused by construction activities have been assessed with consideration to structural damage and human comfort criteria. Based on the safe working distances for human comfort, when high vibration generating activities occur within 66 metres of adjacent buildings, potentially impacted residents would be informed through the community and stakeholder engagement plan of the nature of the works, duration, project manager contact details and other information.

The expected magnitude of ground vibration will not cause damage to heritage structures if the assessed equipment operates at distances greater than 30 metres from the structures. In the event that high vibration generating activities are proposed to occur within this distance, a more detailed analysis of the potential vibration impacts would be undertaken. These sites would be added to the construction noise and vibration management plan for the proposal.

### *Construction traffic*

Darby Street is a two lane, two-way road north of Hunter Street and becomes a three lane road north of King Street. Typically, parking is provided on one or both sides. Tyrrell Street is a two lane, two-way road with parking on both sides.

The timing of the proposed works relative to the wider light rail construction works will be finalised once the managing contractor has been engaged, and the work will need to be completed prior to light rail operation. The electrical cable installation works will be of relatively short duration, compared to light rail works, and is a standard construction activity for Ausgrid workers. Traffic management activities required for the works would be included in the construction traffic, transport and access management plan, which will be prepared and approved prior to works commencing. Traffic management options would include temporary, half road closure or traffic detours with temporary full road closure. Some components of the works such as at the Hunter Street intersection may need to be undertaken at night to reduce the potential for impacts/traffic disruption and to integrate with other works at the same location by light rail.

Any necessary detours or road closures will be notified to affected residents as part of the community and stakeholder engagement plan. Some disruption to property access may be required, however would be discussed in advance with affected businesses and residents.

### **6.8.3 Mitigation measures**

No further mitigation beyond those measures already outlined in the REF is required for heritage, construction noise or construction traffic.

To reduce the potential for impacts, locally listed items within 15 metres of the cable route will require vibration monitoring. The cable route to the western substation that is within the AA Co Bridge and Fence (I415) curtilage would be clearly demarcated to ensure there is no inadvertent impact to this built heritage item.

Table 6.2 Predicted construction noise levels at residential receivers  $L_{eq}$  (15min) dB(A)

NCA	Range of construction noise levels					Construction Period	Management Level	Range of potential exceedance of noise management levels across receivers in the NCA				
	Cottage Creek crossing	Queens Wharf footbridge	Market Street crossing	Eastern construction compound	Electrical cable			Cottage Creek crossing	Queens Wharf footbridge	Market Street crossing	Eastern construction compound	Electrical cable
NCA1	24 to 47	16 to 35	16 to 35	0 to 18	15 to 36	Highly Affected	75	-	-	-	-	-
						Standard Hours	50	-	-	-	-	-
						OOHW P1	45	0 to 2	-	-	-	-
						OOHW P2	43	0 to 4	-	-	-	-
NCA2	42 to 71	20 to 42	20 to 42	5 to 25	18 to 42	Highly Affected	75	-	-	-	-	-
						Standard Hours	61	0 to 10	-	-	-	-
						OOHW P1	54	0 to 17	-	-	-	-
						OOHW P2	47	0 to 24	-	-	-	-
NCA3	20 to 63	26 to 44	26 to 44	9 to 30	25 to 54	Highly Affected	75	-	-	-	-	-
						Standard Hours	69	-	-	-	-	-
						OOHW P1	60	0 to 3	-	-	-	-
						OOHW P2	48	0 to 15	-	-	-	0 to 6
NCA4	20 to 31	40 to 45	41 to 55	24 to 38	42 to 60	Highly Affected	75	-	-	-	-	-
						Standard Hours	68	-	-	-	-	-
						OOHW P1	61	-	-	-	-	-
						OOHW P2	52	-	-	0 to 3	-	0 to 8
NCA5	11 to 25	34 to 72	34 to 72	20 to 52	37 to 100	Highly Affected	75	-	-	-	-	0 to 25
						Standard Hours	67	-	0 to 5	0 to 5	-	0 to 33
						OOHW P1	60	-	0 to 12	0 to 12	-	0 to 40
						OOHW P2	55	-	0 to 17	0 to 17	-	0 to 45
NCA6	7 to 25	38 to 85	68 to 96	39 to 69	28 to 66	Highly Affected	75	-	0 to 10	0 to 21	-	-
						Standard Hours	67	-	0 to 18	1 to 29	0 to 2	-
						OOHW P1	60	-	0 to 25	8 to 36	0 to 9	0 to 6
						OOHW P2	54	-	0 to 31	14 to 42	0 to 15	0 to 12
NCA7	0 to 9	25 to 51	36 to 72	18 to 53	22 to 35	Highly Affected	75	-	-	-	-	-
						Standard Hours	65	-	-	0 to 7	-	-
						OOHW P1	60	-	-	0 to 12	-	-
						OOHW P2	57	-	-	0 to 15	-	-

NCA	Range of construction noise levels					Construction Period	Management Level	Range of potential exceedance of noise management levels across receivers in the NCA				
	Cottage Creek crossing	Queens Wharf footbridge	Market Street crossing	Eastern construction compound	Electrical cable			Cottage Creek crossing	Queens Wharf footbridge	Market Street crossing	Eastern construction compound	Electrical cable
NCA8	-	23 to 43	33 to 62	16 to 49	18 to 39	Highly Affected	75	-	-	-	-	-
						Standard Hours	58	-	-	0 to 4	-	-
						OOHW P1	52	-	-	0 to 10	-	-
						OOHW P2	47	-	-	0 to 15	0 to 2	-
Darby Street/ Tyrrell Street					65 to 102	Highly Affected	75					0 to 27
						Standard Hours	58					7 to 44
						OOHW P1	52					13 to 50
						OOHW P2	47					18 to 55

OOHW P1 - Out of hours works Period 1 - Monday to Friday: 6pm to 10pm, Saturday 7am to 8am and 1pm to 10pm, Sunday and public holidays 8am to 6pm  
 OOHW P2 - Out of hours works Period 2 - Monday to Friday: 10pm to 7am, Saturday 10pm to 8am, Sunday and public holidays 6pm to 7am

### 6.9 Summary

An assessment of the environmental impacts of the proposed design modifications detailed in this section has been undertaken.

These modifications would enhance the overall design of the proposal, without any material additional impact, so they will be managed largely within the scope of the mitigation already proposed in the REF.

One additional mitigation measure will be implemented to reduce the eastern extent of the proposed eastern construction compound by 15 metres to avoid impact on the curtilage of the Newcastle Railway Station Group (SRA28).

The following additional considerations will be included within the mitigation framework specified in the REF:

- Additional fencing around heritage items will be required during construction at:
  - the heritage railway tracks at Cottage Creek
  - Newcastle Signal Box
  - southern wall of the Newcastle Station (near Market Street)
  - Honeysuckle Station (former) site
  - Former Newcastle Police Station
  - AA Co Bridge and Fence (1415)
- The eastern construction compound would be screened to reduce visual impacts.
- Archaeological monitoring would be undertaken for the proposed pedestrian crossing at Cottage Creek
- Locally listed items within safe working distances for vibration will require vibration monitoring.

Appendix B of this submissions report includes consideration of clause 228 of the *Environmental Planning and Assessment Regulations 2000* for both the proposal described in the REF and the additional investigations and proposed design changes outlined in this submissions report.

## 7. Summary of mitigation measures

Environmental management for the proposal will be carried out as detailed in the REF. A CEMP will be prepared to include all specific environmental mitigation measures identified in the REF and this Submissions Report. More information about the CEMP can be found in Table 16.1 in the REF.

Table 7.1, 7.2 and Table 7.3 below outline the revised set of mitigation measures for the proposal. This list includes any changes to mitigation measures in response to submissions received during the public display period as well as changes as a result of the proposed design modifications or additional investigations undertaken after the REF display was complete. New mitigation measures are shown in **blue and bold** text. Removal of mitigation measures (or text removed from measures) is shown in ~~strikethrough~~ text.

Note: allocated numbers may vary from the REF to account for newly inserted or deleted entries.

**Table 7.1 Mitigation measures for detailed design/pre-construction**

No.	Issue	Mitigation measure
<b>A1</b>	<b>Traffic, transport and access</b>	
A1.1	Parking and loading zones	<ul style="list-style-type: none"> <li>A parking strategy would be prepared prior to construction to review options to mitigate the loss of on-street parking and loading zones. The review would include both existing on-street and off-street parking locations as well as the opportunities provided by new or proposed developments or Government-owned land close to the proposal. The review would:               <ul style="list-style-type: none"> <li>be undertaken in accordance with the objectives and requirements of the NURS and the Program, and relevant transport and parking strategies and policies</li> <li>involve an audit of the use of existing spaces including turnover</li> <li>include an assessment of the potential options and identification of a preferred option/s.</li> <li>be undertaken in consultation with relevant stakeholders, including surrounding businesses/organisations and Council</li> <li><b>include consideration of any opportunities to establish a 'park and ride' facility in conjunction with the proposal.</b></li> </ul> </li> </ul>
A1.2	Cycleways	<ul style="list-style-type: none"> <li>A cycleway strategy would be prepared prior to construction to review options available to support the provision of a dedicated east-west cycleway, potentially replacing the existing cycleway along King Street. The review would include assessment of potential options and identification of a preferred option/s, and would be undertaken in consultation with relevant stakeholders, including Council, Roads and Maritime and local cyclist groups.</li> </ul>
A1.3	Other roadworks	<ul style="list-style-type: none"> <li>The agreed package of measures to complement the introduction of the proposal; remove existing pinch points in the road network; and ensure traffic continues to move freely and efficiently during construction and operation, would be determined in consultation with Council.</li> </ul>
<b>A1.4</b>	<b>Equity of access</b>	<ul style="list-style-type: none"> <li><b>The proposal, including access to vehicles, stops and across light rail tracks, would be designed and operated to comply with the Disability Discrimination Act 1992, the Disability Standards for Accessible Public Transport 2002 and Australian Standard (AS) 1428.1-2009 Design for access and mobility.</b></li> </ul>

No.	Issue	Mitigation measure
<b>A2 Noise and vibration</b>		
A2.1	Reasonable and feasible noise mitigation	<ul style="list-style-type: none"> <li>The predicted noise and vibration levels, and the required noise and vibration mitigation measures, would be confirmed during the detailed design phase. Reasonable and feasible mitigation would be implemented to reduce exceedances associated with the operation of the proposal.</li> </ul>
A2.2		<ul style="list-style-type: none"> <li>Further design work and iterative noise modelling would be undertaken as the design progresses to identify reasonable and feasible mitigation measures for operational noise. This would involve consideration of the measures summarised in Table 9.11 of the REF. The final form of the mitigation measures would be determined during detailed design.</li> </ul>
A2.3		<ul style="list-style-type: none"> <li>Where exceedances of other non-residential sensitive receiver noise levels have been predicted, this would be verified in the detailed design stage, including further investigation of the façade performance of these receivers.</li> </ul>
A2.4	Track design	<ul style="list-style-type: none"> <li>The final track design and associated operational ground borne noise and vibration mitigation measures would be addressed in the detailed design of the track. More detailed investigations would be conducted including measurement of existing internal and external noise and vibration levels, including ground borne noise and vibration levels due to the existing road traffic. These investigations would inform the required design in these locations and confirm the appropriateness of the ground borne operational noise design goals.</li> </ul>
A2.5	Stabling and maintenance facility	<ul style="list-style-type: none"> <li>Further design work and iterative noise modelling would be undertaken as the design progresses to identify reasonable and feasible mitigation measures that would reduce exceedances from stationary noise sources including from the stabling and maintenance facility. The design of the stabling and maintenance facility and associated mechanical equipment would include noise mitigation measures (as required) to comply with the <i>Industrial Noise Policy</i> (EPA, 2000) criteria at the nearest noise sensitive receivers. This would involve consideration of the measures summarised in Table 9.12 of the REF. The final form of the mitigation measures would be determined during detailed design.</li> </ul>
A2.6	Substations	<ul style="list-style-type: none"> <li>The operational noise from the substations would be controlled by inclusion of appropriate mitigation, such as shielding or enclosures, and specification of equipment selection, to comply with the <i>Industrial Noise Policy</i> at all locations.</li> </ul>
A2.7	PA systems	<ul style="list-style-type: none"> <li>The detailed design of public address systems at the light rail stops would include noise mitigation measures to minimise potential noise impacts at the nearest receptors to the stops to comply with the <i>Industrial Noise Policy</i> at all locations.</li> </ul>

No.	Issue	Mitigation measure
<b>A3 Heritage</b>		
A3.1	Non-Aboriginal heritage – general	<ul style="list-style-type: none"> <li>Detailed design of the proposal would be sympathetic to the surrounding heritage items/elements and the significance of the Newcastle City Centre Heritage Conservation Area.</li> <li><b>The extent of the eastern construction compound would be reduced by 15 metres to avoid encroachment on the western boundary of the Section 170 Register curtilage of the Newcastle Railway Station Group (SRA28).</b></li> </ul>
A3.2	Archaeological areas	<ul style="list-style-type: none"> <li>Pre-construction requirements in relation to the archaeological areas are provided in section 10.4.1 of the REF.</li> </ul>
A3.3	Heritage approvals and notification	<ul style="list-style-type: none"> <li>Consultation would be undertaken with Council in accordance with the requirements of clause 14 of the Infrastructure SEPP in relation to the removal of Wickham Station.</li> </ul>
A3.4		<ul style="list-style-type: none"> <li>The Heritage Division would be informed in writing at least 14 days before removal of the buildings associated with Wickham Station.</li> </ul>
A3.5		<ul style="list-style-type: none"> <li>The Statement of Heritage Impact would be provided to Sydney Trains in relation to potential impacts on the items listed on their section 170 register.</li> </ul>
A3.6		<ul style="list-style-type: none"> <li>An exception application would be made and approval received under section 139(4) of the <i>Heritage Act 1977</i> prior to construction in archaeological areas 1 and 4 (exception type S139(1C)) and 2, 3 and 5 (exception type S139(1B)).</li> </ul>
A3.7		<ul style="list-style-type: none"> <li>Approval would be sought under section 140 of the <i>Heritage Act 1977</i> to impact on the footings of the former Honeysuckle Station in archaeological area 3. Approval would be received prior to any excavation work commencing in this area.</li> </ul>
A3.8	Wickham Station	<ul style="list-style-type: none"> <li>Full archival recording of Wickham Station and the associated buildings would be undertaken prior to removal of any structures.</li> </ul>
A3.9		<ul style="list-style-type: none"> <li>A heritage interpretation plan would be developed, consistent with Interpreting Heritage Places and Items Guidelines (NSW Heritage Office, 2005) to provide the strategies for communicating information on the history of the station.</li> </ul>
A3.10		<ul style="list-style-type: none"> <li><b>An adaptive reuse study would be undertaken to determine the viability of reuse of buildings associated with Wickham Station. The reuse study would be based upon the comparative significance report completed and any comment from Sydney Trains.</b></li> </ul>
A3.11		<ul style="list-style-type: none"> <li>Materials salvaged from the structures would be reused where appropriate in accordance with the heritage interpretation plan.</li> </ul>

No.	Issue	Mitigation measure
A3.12	Aboriginal heritage approvals	<ul style="list-style-type: none"> <li>An application for an AHIP would be made under section 90A of the <i>National Parks and Wildlife Act 1974</i>. The AHIP would be sought for the land and associated objects within the boundaries of the proposal and specified Aboriginal sites and objects contained within the listed sites. The AHIP would be prepared and submitted in consultation with relevant Aboriginal stakeholders, as required under the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010). This consultation has commenced.</li> </ul>
A3.13		<ul style="list-style-type: none"> <li>The AHIP would include mitigation by performing archaeological salvage for nominated sites. Archaeological salvage would be completed prior to any activities which may harm Aboriginal objects at these locations. The archaeological salvage activities would be undertaken in accordance with the methodology developed in consultation with Aboriginal stakeholders.</li> </ul>
<b>A4 Landscape character and visual</b>		
A4.1	Urban design	<ul style="list-style-type: none"> <li>The detailed design of all structures would involve consideration of appropriate design features, materials and treatments to ensure that the proposal: <ul style="list-style-type: none"> <li>integrates with the surrounding and proposed urban form</li> <li>achieves the urban design objectives of the NURS, the Program and <i>Newcastle 2030</i></li> <li>minimises the potential for visual impacts</li> <li>respects the character and amenity of the surrounding area.</li> </ul> </li> </ul>
A4.2	Urban design and landscaping strategy	<ul style="list-style-type: none"> <li>An urban design and landscaping strategy would be prepared as part of the detailed design. The strategy would consider: <ul style="list-style-type: none"> <li>Use of a high quality landscape buffers (with street trees and planting) where practicable along the corridor to help integrate the infrastructure with the context and improve the visual experience of passengers. The design of the landscape buffers would be undertaken in consultation with Council and other stakeholders.</li> <li>Strategic use of materials that blend, enhance and/or complement existing surfaces and improve visual coherence of the proposal and its context.</li> <li>Options to help make the overhead wire/catenary system appear as an integrated part of the public domain.</li> <li>The opportunity to combine several above- ground street elements (lighting, traffic signals etc.) on common use poles to reduce visual clutter.</li> <li>The use of materials, finishes, colour schemes and maintenance procedures including graffiti control for new walls, barriers and fences.</li> <li>Strategic location of signage to maintain sensitive sight lines and avoid unnecessary intrusion into receptors' views, and to enhance legibility of the broader context.</li> <li>The design of barriers (railings, fences or walls) required for safety to complement the existing visual environment.</li> <li>The heritage significance of the Newcastle City Centre Heritage Conservation Area.</li> <li>The <i>NSW Sustainable Design Guidelines</i> (TfNSW, 2014a).</li> <li>Safety and security requirements, including crime prevention through environmental design (CPTED) requirements.</li> </ul> </li> </ul>

No.	Issue	Mitigation measure
A4.3	Lighting	<ul style="list-style-type: none"> <li>Lighting for the proposal would be designed in accordance with <i>AS 4282 Control of the Obtrusive Effects of Outdoor Lighting</i>. Lighting would be designed to minimise light spill into adjoining areas.</li> </ul>
A4.4	Community involvement	<ul style="list-style-type: none"> <li>Opportunities for community involvement in mitigating visual impacts during construction and operation would be explored in consultation with Council.</li> </ul>
A4.5	Design review	<ul style="list-style-type: none"> <li>Transport for NSW's Sustainable Design Review Panel would review the detailed design.</li> </ul>
<b>A5 Socio-economic</b>		
A5.1	Parking	<ul style="list-style-type: none"> <li>Options to mitigate the reduction in availability of on-street parking and loading zones would be considered as detailed in sections 8.4 and 13.4.1 of the REF. Consideration of the options would include a review of opportunities to retain on-street disabled parking and/or prioritise parking for the disabled.</li> </ul>
A5.2	Business and organisation management plan <b>activation strategy</b>	<ul style="list-style-type: none"> <li>A business and organisation management plan <b>activation strategy</b> would be developed by Transport for NSW in consultation with affected stakeholders to understand and manage impacts to businesses and organisations in the vicinity of the proposal. The strategy would: <ul style="list-style-type: none"> <li>address construction and operation</li> <li>be developed in consultation with the Council, businesses, and local organisations and service providers</li> <li>take into account other developments and proposals in the city centre</li> <li>include access management plans which would establish existing servicing and delivery requirements and identify alternative routes and requirements</li> <li>identify strategies to maintain emergency access at all times</li> <li>take into account special events planned in and around the city centre during the construction period.</li> </ul> </li> </ul>
A5.3	Consultation	<ul style="list-style-type: none"> <li>As described in section 13.4.1 of the REF, key stakeholders (including local businesses and the community) would continue to be consulted regarding the potential impacts of the proposal. Where practicable, measures to address these impacts would be incorporated into the design.</li> </ul>
A5.4		<ul style="list-style-type: none"> <li>Transport for NSW would continue to work with relevant stakeholders including Council to identify opportunities to integrate the design of the proposal with other city centre renewal activities, to improve access to local community services, and further enhance the public domain along the proposal.</li> </ul>
A5.5	CPTED	<ul style="list-style-type: none"> <li>The detailed design of the proposal would take into account CPTED principles, particularly in relation to the stops and the stabling and maintenance facility. The design would incorporate features to maintain the safety of passengers, employees and the general public. Stops would be designed to be safe and attractive places to wait for services and would (where feasible and appropriate) incorporate LED lighting technology, emergency calling capabilities and CCTV.</li> </ul>

No.	Issue	Mitigation measure
A5.6	Local employment opportunities	<ul style="list-style-type: none"> <li>Partnership opportunities would be investigated with local employment agencies to identify opportunities to generate local employment benefits consistent with the <i>NSW Sustainable Design Guidelines</i> (TfNSW, 2014).</li> </ul>
<b>A6 Land use and property</b>		
A6.1	Consistency with the Program	<ul style="list-style-type: none"> <li>Transport for NSW would consult with key stakeholders as outlined in chapter 4 to ensure the proposal continues to be designed to achieve consistency with the initiatives proposed by the NURS and the Program.</li> </ul>
A6.2	Acquisitions	<ul style="list-style-type: none"> <li>All acquisitions would be undertaken in consultation with landowners and in accordance with the requirements of the <i>Crown Lands Act 1989</i> and the <i>Land Acquisition (Just Terms Compensation) Act 1991</i>.</li> </ul>
<b>A7 Hydrology and water quality</b>		
A7.1	Water quality	<ul style="list-style-type: none"> <li>The proposal would be designed to ensure there is minimal potential for water quality impacts as a result of the operation of the proposal. Bunding would be incorporated into the design to contain any chemical spills or leaks from the stabling and maintenance facility and substation sites.</li> </ul>
A7.2	Flooding	<ul style="list-style-type: none"> <li>The proposal would be designed to ensure compliance with the <i>Floodplain Development Manual</i> (DIPNR, 2005) which includes a requirement to not increase flood levels above existing levels.</li> </ul>
A7.3	Drainage	<ul style="list-style-type: none"> <li>All track drainage would be designed to meet relevant Transport for NSW standards and the requirements of Australian Rainfall and Runoff (Engineers Australia, 1999).</li> </ul>
<b>A8 Geology and soils</b>		
A8.1	Mine subsidence	<ul style="list-style-type: none"> <li>Further geotechnical assessment would be undertaken during detailed design to confirm and assess the location and condition of former mine workings and sub-grade conditions.</li> </ul>
A8.2		<ul style="list-style-type: none"> <li>Those aspects of the proposal located within the Newcastle Mine Subsidence District would be designed in accordance with any requirements provided by the Mine Subsidence Board.</li> </ul>
<b>A9 Services and utilities</b>		
A9.1	Impacts to services and utilities	<ul style="list-style-type: none"> <li>Detailed survey and consultation with service providers would be undertaken to accurately locate services.</li> </ul>
A9.2		<ul style="list-style-type: none"> <li>The detailed design of the proposal would seek to minimise the need for service and utility relocations.</li> </ul>
A9.3		<ul style="list-style-type: none"> <li>The need for, and proposed relocation of any utilities would be determined in consultation with service providers.</li> </ul>
<b>A10 Waste and resources</b>		
A10.1	Waste and resources	<ul style="list-style-type: none"> <li>Procurement would endeavour to use materials and products with a recycled content where that material or product is cost and performance effective.</li> </ul>

No.	Issue	Mitigation measure
<b>A11 Sustainability and climate change</b>		
A11.1	Sustainability	<ul style="list-style-type: none"> <li>Design of the proposal would be undertaken in accordance with the <i>NSW Sustainable Design Guidelines</i> (V3.0, TfNSW, 2014). Initiatives recommended by the sustainability assessment to achieve a rating level of 'gold' would be implemented.</li> </ul>
A11.2		<ul style="list-style-type: none"> <li>The detailed design of the proposal would aim to achieve an 'excellent' rating using the ISCA infrastructure sustainability rating tool.</li> </ul>
A11.3		<ul style="list-style-type: none"> <li>The feasibility of using renewable energy for the proposal would be investigated.</li> </ul>
A11.4		<ul style="list-style-type: none"> <li>The sustainability initiatives would be regularly reviewed, updated and implemented throughout the design development phases.</li> </ul>
A11.5		<ul style="list-style-type: none"> <li>The feasibility of using grassed tracks along sections of the alignment would be investigated.</li> </ul>
A11.6	Climate change	<ul style="list-style-type: none"> <li>A climate change risk assessment would be developed during detailed design</li> </ul>
A11.7		<ul style="list-style-type: none"> <li>A carbon foot printing exercise, compliant with ISO 14064 Part 2 (Greenhouse gases – project level), would be undertaken in accordance with Transport for NSW's Carbon and Energy Reporting Tool and the <i>NSW Sustainable Design Guidelines</i>. The carbon footprint would be used to inform decision-making in design and construction. Standard carbon coefficient values would be used for construction material and fuel usage.</li> </ul>
A11.8	Greenhouse gases	<ul style="list-style-type: none"> <li>Opportunities to reduce operational greenhouse gas emissions would be investigated during detailed design. These would include the initiatives documented in the sustainability assessment.</li> </ul>
A11.9		<ul style="list-style-type: none"> <li>The feasibility of using renewable energy for the construction of the proposal would be investigated.</li> </ul>
<b>A12 Hazards and risks</b>		
A12.1	Safety	<ul style="list-style-type: none"> <li>The proposal would continue to be designed with adequate consideration given to achieving high levels of safety for customers, employees and the general community.</li> </ul>
<b>A13 Cumulative impacts</b>		
A13.1	Cumulative impacts	<ul style="list-style-type: none"> <li>The potential for cumulative impacts would be further considered as the proposal methodology develops and as further information regarding the location and timing of other potential developments is released.</li> </ul>
A13.2	Consultation	<ul style="list-style-type: none"> <li>Transport for NSW would consult with the proponents of other major projects in the area (including internally) to develop strategies to address potential cumulative traffic and transport and noise impacts.</li> </ul>

No.	Issue	Mitigation measure
<b>A14 Consultation and communication</b>		
A14.1	Community and Stakeholder Engagement Plan	<ul style="list-style-type: none"> <li>A Community and Stakeholder Engagement Plan would be prepared and implemented to guide the approach to consultation during design, construction and operation stages.</li> </ul>
A14.2		<ul style="list-style-type: none"> <li>The Community and Stakeholder Engagement Plan would incorporate the consultation requirements provided for by mitigation measures A4.4, A5.2, A5.3, A5.4, A13.2, B1.1, B3.1 and C3.1.</li> </ul>

Table 7.2 Mitigation measures for construction

No.	Issue	Mitigation measure
<b>B1 Environmental management</b>		
B1.1	CEMP	<ul style="list-style-type: none"> <li>A CEMP will be prepared and implemented as described in chapter 16 of the REF. The CEMP will include the sub-plans and measures detailed in Table 16.1 of the REF.</li> </ul>
<b>B2 Heritage</b>		
B2.1	Non-Aboriginal heritage	<ul style="list-style-type: none"> <li>Requirements in relation to construction in each of the archaeological areas are provided in section 10.4.2 of the REF.</li> </ul>
<b>B3 Traffic and transport</b>		
B3.1	Consultation	<ul style="list-style-type: none"> <li>Consultation with relevant stakeholders will be undertaken regularly to facilitate the efficient delivery of the works and to minimise congestion and inconvenience to road users.</li> <li>Stakeholders will include contractors on adjacent work sites (particularly the Wickham Transport Interchange) and others such as Council, bus operators, Roads and Maritime, emergency services, affected businesses, and other relevant organisations such as the University of Newcastle and major employers in the city centre.</li> </ul>
<b>B4 Noise and vibration</b>		
B4.1	Additional mitigation measures	<ul style="list-style-type: none"> <li>When noise and vibration limits are predicted to be exceeded, mitigation measures documented in the <i>Construction Noise Strategy</i> (TfNSW, 2012) will be adopted where feasible and reasonable, as specified in Technical Paper 2.</li> <li>When noise and/or vibration levels are predicted to exceed acceptable levels after implementation of the standard mitigation measures specified by the noise and vibration management plan, the relevant additional mitigation measures detailed in the <i>Construction Noise Strategy</i> will be considered.</li> </ul>
B4.2	Working hours	<ul style="list-style-type: none"> <li>Where possible, work generating high noise and/or vibration levels will be undertaken during standard daytime working hours. Work undertaken outside of standard hours will require adequate justification and will typically require additional mitigation measures in accordance with the <i>Construction Noise Strategy</i> (TfNSW, 2012).</li> </ul>
B4.3		<ul style="list-style-type: none"> <li>If out of hours works are required, the procedures outlined in section 9.5.2 of the REF will be implemented.</li> </ul>

No.	Issue	Mitigation measure
<b>B5 Socio-economic impacts</b>		
B5.1	Access	<ul style="list-style-type: none"> <li>Access to local businesses, community services and social infrastructure will be in accordance with the business and organisation management plan <b>activation strategy</b> (prepared prior to construction). If necessary, alternative access arrangements will be developed in consultation with relevant stakeholders.</li> </ul>
<b>B6 Other issues</b>		
B6.1	Hydrology, water quality and groundwater	<ul style="list-style-type: none"> <li>Road and rail stormwater drainage will be reinstated as required, in accordance with Council and/or Roads and Maritime requirements.</li> </ul>
B6.2	Sustainability and climate change	<ul style="list-style-type: none"> <li>Construction of the proposal will be undertaken in accordance with the <i>NSW Sustainable Design Guidelines</i>. The sustainability initiatives will be regularly reviewed, updated and implemented throughout the construction program.</li> </ul>
B6.3		<ul style="list-style-type: none"> <li>Regular sustainability reporting (and corrective action where necessary) will be undertaken during construction to demonstrate the incorporation of sustainability considerations.</li> </ul>
B6.4	Cumulative impacts	<ul style="list-style-type: none"> <li>Works will be scheduled to minimise the potential for cumulative impacts with other projects in the surrounding area.</li> </ul>

Table 7.3 Mitigation measures for operation

No.	Issue	Mitigation measure
<b>C1 Noise and vibration</b>		
C1.1	Operational management procedures	<ul style="list-style-type: none"> <li>The following would be included in the Operator's environmental management procedures: <ul style="list-style-type: none"> <li>Transformers, rectifiers and other electrical equipment on site would be well maintained and operated according to specifications.</li> <li>Operational noise monitoring would be undertaken <b>within six months of operation commencement and</b> at regular periods to assess compliance against operational noise criteria listed in section 9.5.3 of the REF.</li> <li>If the results of monitoring indicate that operational noise levels are significantly higher than those modelled for the REF, options to mitigate the noise impacts would be investigated.</li> <li>Maintenance operations would be scheduled during the day.</li> <li>Any noise complaints would be managed in accordance with Transport for NSW's complaints management procedure.</li> </ul> </li> </ul>
<b>C2 Visual amenity</b>		
C2.1	Maintenance	<ul style="list-style-type: none"> <li>Ongoing maintenance, service and infrastructure upgrades would consider the urban design objectives of the NURS and the Program, where relevant.</li> </ul>

No.	Issue	Mitigation measure
<b>C3 Socio-economic impacts</b>		
C3.1	Communication	<ul style="list-style-type: none"> <li>An operations communication plan would be designed <b>developed</b> and implemented prior to the commencement of operation to provide information about light rail operation. Information would be made available at each stop and key locations in the city centre, and would also be made available in languages other than English. <b>This will include information about how light rail would operate, how people can use it, how it would integrate with other forms of transport, and on safety issues associated with using and moving around light rail vehicles.</b></li> </ul>
<b>C4 Other issues</b>		
C4.1	Hydrology, water quality and groundwater	<ul style="list-style-type: none"> <li>Operational protocols would be developed by the operator to ensure customer safety and protect infrastructure and light rail vehicles in the event of flooding.</li> </ul>
C4.2	Erosion	<ul style="list-style-type: none"> <li>During any maintenance work where soils are exposed, sediment and erosion control devices would be installed in accordance with <i>Managing Urban Stormwater: Soils and Construction</i> (Landcom, 2004).</li> </ul>
C4.3	Contamination and hazardous materials	<ul style="list-style-type: none"> <li>The proposal would be managed in accordance with the operator's environmental management system.</li> <li>The operator's environmental management procedures would include hazardous materials handling and management procedures to minimise the potential for impacts associated with and chemical spills and leaks. These would include procedures for managing spills, and the refuelling and maintenance of vehicles/equipment. These procedures would adequately address activities at the stabling and maintenance facility, as well as other general maintenance of infrastructure associated with the proposal.</li> </ul>
C4.4	Flora and fauna	<ul style="list-style-type: none"> <li>Operational procedures would be developed to manage any offset plantings, if required.</li> </ul>
C4.5	Air quality	<ul style="list-style-type: none"> <li>All light rail vehicles would be regularly maintained to ensure efficient operation.</li> <li>Street sweeping of the alignment would be undertaken regularly and in the event of any excessive build-up of material.</li> <li>Maintenance service vehicles and equipment would be maintained and operated in accordance with the manufacturers requirements.</li> </ul>
C4.6	Waste and resources	<ul style="list-style-type: none"> <li>The proposal would be managed in accordance with the operator's environmental management system and the <i>Waste Classification Guidelines</i> (EPA, 2014).</li> </ul>
C4.7	Sustainability and climate change	<ul style="list-style-type: none"> <li>The sustainability initiatives would be regularly reviewed, updated and implemented throughout operation.</li> </ul>
C4.8		<ul style="list-style-type: none"> <li>Transport for NSW would aim to offset 100 per cent of operational electricity emissions through the purchase of accredited renewable energy suppliers.</li> </ul>

No.	Issue	Mitigation measure
C4.9	Hazards and risks/safety	<ul style="list-style-type: none"> <li>A targeted community safety campaign would be implemented to raise awareness in relation to the operation of the proposal. The safety campaign, which would be undertaken in the lead up to the opening and during operation, would focus on raising awareness and promoting safe behaviours at stops, in the separated and mixed running areas, and at key crossings.</li> </ul>
C4.10		<ul style="list-style-type: none"> <li>The operator's management system would include a comprehensive safety management strategy and incident and emergency response plans.</li> </ul>

# 8. Conclusion

## 8.1 Summary

The Newcastle Light Rail REF included a comprehensive assessment of the likely environmental impacts as a result of the proposal. Potential impacts were identified and addressed in the REF and mitigation measures have been recommended where appropriate.

The REF was placed on public display from 7 April to 27 May 2016. This included additional time at the request of Newcastle City Council.

A total of 401 submissions were received which included 362 submissions from the community, seven submissions from peak industry bodies, 22 business groups, seven community groups and three submissions from local government. This Submissions Report has documented and considered the submissions received and has outlined Transport for NSW's response.

Since the REF went on display, we have done more work on additional investigations and studies, which have resulted in a number of modifications to the proposal, including:

- revised light rail track alignment at Worth Place
- revised track bed material between Stewart Avenue and Worth Place
- increased area for stabling and maintenance facilities including a second track across Stewart Avenue
- new pedestrian crossing at Cottage Creek
- new Market Street pedestrian crossing and removal of the Queens Wharf pedestrian footbridge
- relocation of the eastern construction compound
- augmentation of light rail traction power supply

Transport for NSW is also doing more investigation in key areas that you said were important, like the preparation of a Parking Strategy. The Program is also preparing a cycling strategy with Newcastle City Council. The Program team will continue to work with stakeholders, local business and the community as the urban revitalisation plans start to take shape and form the future of Newcastle.

## 8.2 Next steps

Transport for NSW will review the REF and this Submissions Report and determine whether the requirements under Part 5 of the EP&A Act have been met. Transport for NSW will then make a determination as to whether to proceed with the Newcastle Light Rail proposal.

Should the proposal proceed, feedback from the community and key stakeholders received throughout the development of the proposal, will help inform the detailed design phase, and help minimise potential impacts during construction and operation.

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# Appendix A – Wickham Station comparative significance assessment





# Wickham Railway Station Group

## Comparative Significance Assessment

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We have prepared this report for the sole purposes of GHD on behalf of TfNSW (“**Client**”) for the specific purpose of only for which it is supplied (“**Purpose**”). This report is strictly limited to the purpose and the facts and matters stated in it; it does not apply directly or indirectly and will not be used for any other application, purpose, use or matter.

In preparing this report we have made certain assumptions. We have assumed that all information and documents provided to us by the Client or as a result of a specific request or enquiry were complete, accurate and up-to-date. Where we have obtained information from a government register or database, we have assumed that the information is accurate. Where an assumption has been made, we have not made any independent investigations with respect to the matters the subject of that assumption. We are not aware of any reason why any of the assumptions are incorrect.

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## Executive Summary

GHD Pty Ltd (GHD) on behalf of Transport for NSW (TfNSW) has requested RPS to prepare additional information on the comparative significance of the Wickham Railway Station Group and the heritage impact of its proposed removal as part of the Newcastle Light Rail project (the proposal).

The information in this report will be integrated into the Submissions Report for the Newcastle Light Rail proposal.

Wickham Railway Station Group, including the Wickham Railway Station and Signal Box, is listed in Sydney Train's 170 heritage and conservation register as a locally significant heritage item. Wickham Railway Station (I683) and Wickham Signal Box (I684) are also listed in Schedule 5 of the Newcastle Local Environmental Plan (LEP) 2012 as locally significant heritage items. Wickham Railway Station Group is located within the Newcastle City Centre Heritage Conservation Area (C4, Newcastle LEP 2012). For ease of reference, this report refers to the railway station and signal box as the Wickham Railway Station Group, but uses the terms Wickham Railway Station and Wickham Signal Box when referring to these items separately.

The light rail proposal will remove all of the fabric of the Wickham Railway Station including the platforms, railway buildings, overhead footbridge, as well as the interior fixtures and furniture. In addition, the fabric of the Wickham Signal Box, interior fixtures and furniture will also be removed. The impacts of the proposed removal of this item was included as part of the *Newcastle Light Rail Historical Archaeological Assessment and Statement of Heritage Impact* (RPS 2015) which was part of the REF.

A comparative analysis of the Wickham Railway Station Group was subsequently undertaken to understand the significance of individual items to guide the mitigation process including their potential recovery and reuse.

The character of the Wickham Railway Station buildings is determined by their stripped Federation style which was common during the interwar period. Wickham Station is a 'Type 11' station design of which there are 60 such other station buildings recorded on Sydney Trains' s. 170 heritage and conservation register. An analysis of the listings shows that there are 20 railway stations described as having 'Type 11' buildings and thus the stripped Federation style of Wickham Railway Station is well represented in railway stations elsewhere.

The comparative analysis of heritage-listed signal boxes shows that there are more representative and significant extant signal boxes than at Wickham with the signal boxes at Newcastle, Hamilton and Islington being state significant. Compared with other heritage listed signal boxes, the built structure of the Wickham Signal Box is not significant in terms of design or aesthetics and there are better examples.

The proposed removal of the Wickham Railway Station Group will result in a major impact on the heritage items themselves but only a minor impact on the values of the Newcastle City Centre Heritage Conservation Area.

The mitigation to be undertaken includes an: archival recording, heritage interpretation strategy and an adaptive reuse study.

The following management recommendations and mitigation measures are formulated with consideration of all available information and in accordance with relevant legislation:

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### **Recommendation 1 – Consultation**

In accordance with Cl.14 of the *State Environmental Planning Policy (Infrastructure) 2007* Transport for NSW is to consult with Newcastle City Council prior to the proposed removal.

Transport for NSW is to consult with Sydney Trains in relation to the proposed removals, and ensure that requirements for notification to the Heritage Council under Cl.170A of the *Heritage Act 1977* are met.

### **Recommendation 2 – Archival Recording**

Archival recording of the moveable heritage associated with Wickham Signal Box is to be undertaken prior to removal works. The existing archival recording for Wickham Railway Station and Signal Box is to be supplemented to include the Wickham Signal Box, Building 1 - Room 4 (Platform 1) and Building 4 (Platform 2). The existing archival recording is to be updated to include measured drawings, elevations and plans of the structures and 3D scanning is to be considered as a method for undertaking this recording for reasons of accuracy and efficiency.

### **Recommendation 3 – Heritage Interpretation Strategy**

Concurrent with removal works, a heritage interpretation strategy is to be prepared for the built structures associated with Wickham Railway Station and Signal Box, as well as the Wickham Signal Box.

### **Recommendation 4 – Adaptive Reuse Study**

An adaptive reuse study is to be undertaken which will be guided by the significance value of the Wickham Railway Station Group. It is to include an architectural plan and designated location for the reconstruction of part of the station, an itemised inventory of material and features to be removed in-situ prior to the demolition and materials to be salvaged from demolished material, details on storage of materials, a demolition plan, a timeline and custodianship for the salvaged material and a detailed re-installation plan for the reconstruction, including signage.

## 1.0 Introduction and Background

GHD Pty Ltd (GHD) on behalf of Transport for NSW has requested RPS to prepare additional information on the comparative significance of the Wickham Railway Station Group and the likely impact of proposed removal works.

Wickham Railway Station Group, including the Wickham Railway Station and Signal Box, is listed in Sydney Trains' s.170 heritage and conservation register as a locally significant heritage item. Wickham Railway Station (I683) and Wickham Signal Box (I684) are also listed in Schedule 5 of the Newcastle Local Environmental Plan (LEP) 2012 as locally significant heritage items. Wickham Railway Station Group is located within the Newcastle City Centre Heritage Conservation Area (C4, Newcastle LEP 2012). For ease of reference, this report refers to the railway station and signal box as the Wickham Railway Station Group, but uses the terms Wickham Railway Station and Wickham Signal Box when referring to these items separately.

The information in this report will be integrated into the Submissions Report for the Newcastle Light Rail proposal.

The information in this report will be integrated into the *Newcastle Light Rail Historical Archaeological Assessment and Statement of Heritage Impact* (RPS 2015), which will inform a Review of Environmental Factors (REF) for the Newcastle Light Rail project (the proposal) in accordance with the provisions of Part 5 of the *Environmental Planning and Assessment Act 1979* (the EP&A Act).

### 1.1 The Proposal

The proposal as outlined in the *Newcastle Light Rail Historical Archaeological Assessment and Statement of Heritage Impact* (RPS 2015) and included in the REF, is for the removal of all structures associated with the Wickham Railway Station Group. The removal of the group will enable the redevelopment of the area for the Wickham Maintenance and Stabling Facility. Alternative options were considered and are documented in Section 6.1 of this report.

### 1.2 Purpose of the Assessment

The purpose of this assessment is to provide additional detail on the significance of Wickham Railway Station Group to address gaps in previous assessments and in order to guide the future design and mitigation process for important historical items. The additional information includes a comparative analysis and documentation of removal design options considered.

### 1.3 Authorship

This report has been prepared by RPS Senior Heritage Consultant Laraine Nelson and reviewed by Tessa Boer-Mah, Newcastle Cultural Heritage Manager and Senior Built Heritage Specialist, Joanne McAuley. Additional review has been undertaken by Greg Marshall of GHD and Erin Williams of RPS.

## 2.0 Wickham Railway Station Group

In 1857, the railway was opened in the Newcastle area when a line was opened from Honeysuckle Point (near present-day Civic Station) to East Maitland. By the 1870s, the Great Northern Railway had been extended further up the Hunter Valley and into Murrurundi.

Wickham Railway Station Group is located on the Newcastle railway line between Station and Beresford Streets in Wickham, a suburb of Newcastle. Wickham Railway Station opened on 9 February 1936. It was constructed in a stripped Federation style. The main station buildings completed in 1936 were built adjacent to the signal box that had been built in 1928. Wickham Railway Station comprises two roadside platforms on either side of a double track of the Newcastle railway line to accommodate Up and Down traffic, with deep awning structures attached to single storey, brick buildings. The station buildings are constructed of dark face brickwork and are relatively austere in detail, with simple timber framed windows and doors. The awnings are supported by simple cantilevered curved cast iron brackets. A two storey signal box of brick, timber and fibro construction with tile roof was built at the Newcastle-end of the Down platform in 1965, replacing the original 1928-built signal box. A footbridge was added to the station complex circa 1992.

The original Wickham Signal Box was constructed in 1928 as part of the Great Northern Railway, and was one of the busiest junctions in the state. The original signal box was in use for 37 years and its 1965 replacement remained in use until the late 20th century. The 1965 Wickham Signal Box was Australia's first television equipped level crossing (SHI 2170917). The closed circuit television link between the Hannell Street-Beresford Street level crossing and the Wickham Signal Box was in use from 19 May 1966. A set of modern electric half-boom barriers and flashing lights replaced the original mechanical boom barriers (SHI 4801045), and the crossing ceased to be used after the installation of the Stewart Avenue level crossing in the early 2000s.

### 2.1 Heritage Listings

Wickham Railway Station Group is listed as a locally significant heritage item in Sydney Trains' s.170 heritage and conservation register (SHI 4801045). The s.170 listing includes:

- Station buildings, Platform 1 – Type 11 (1936).
- Station buildings, Platform 2 – Type 11 (1936).
- Signal box, Type O (1966).
- Platforms (1936).
- Footbridge (c.1992).
- Moveable items
  - » Original ticket window/desk.
  - » Timber desk.
  - » Safe.
  - » Signal box – interior contents/equipment.
- Landscape features including plantings of bottle brush, umbrella tree, silky oak and Chinese tallowwood on the western side of the Up line.

A description of the s.170 listing including significance assessment is included in the NSW State Heritage Inventory (SHI 4801045).

Wickham Railway Station (I683) and Wickham Signal Box (I684) are listed as locally significant heritage items in Schedule 5 of the Newcastle LEP 2012. A brief description of each item is included in the NSW State Heritage Inventory (SHI 2170918 and SHI 2170917).

Wickham Railway Station Group is located within the Newcastle City Centre Heritage Conservation Area (C4, Newcastle LEP 2012). The statement of significance for the Conservation Area states:

*The Newcastle City Centre Heritage Conservation Area is significant on many levels. The assemblage of commercial and civic buildings is a powerful reminder of the city's rich history and its many phases of development. The number of historic buildings surviving is quite remarkable for a city of this size, with a number of pre-1840s buildings surviving (Rose Cottage, c1830, Newcomen Club, 1830, Parts of James Fletcher Hospital). All of these are associated with the city's penal heritage. It is also known to be a city with a rich archaeological record of national significance, for its potential to yield information about the early convict settlement and early industrial activities. The city area is known to have been a place of contact between colonists and the indigenous population, who owned the land on the southern shores of the Hunter river. This evidence is available in historical accounts and in the archaeological record surviving beneath the modern city. The high numbers of commercial and civic buildings of the 19th and 20th centuries gives the city a historic character which is notable and allows an understanding of the importance of the city as a place of commerce, governance and city building. The historical foundation of the city was the discovery and exploitation of coal with good shipping access via a safe and navigable harbour. The town's layout by Surveyor General Henry Dangar in 1828 is still visible in the city's streets, and is an element of historical value. (SHI 2173904)*

## 3.0 Visual Inspection

The visual inspection of Wickham Railway Station Group focused on areas which had not been previously documented.

### 3.1 Gap Analysis

A gap analysis was undertaken of the following documents in order to inform this assessment:

- *Archival recording - Wickham Railway Station* (Urbis 2014a);
- *Heritage Impact Statement – Wickham Railway Station* (Urbis 2014b);
- *Moveable Heritage Report and Inventory Wickham Railway Station* (Urbis 2014c);
- *Heritage Impact Statement – Wickham Transport Interchange* (Urbis 2014d);
- *Entry for the s.170 Register - Wickham Railway Station* (SHI 4801045).

Due to access being unavailable during the previous work, the following information was not included in the Urbis reports (Urbis 2014a; Urbis 2014b; Urbis 2014d):

- Description or photographs of the interior of the Wickham Railway Station buildings:
  - » Building 1 (Room 4, Platform 1),
  - » Building 4 (Platform 2); and
- Description or photographs of the interior of Building 2 (Wickham Signal Box).

To address the gaps in the descriptions of the buildings and interiors, a visual inspection of these rooms (**Figure 1**) was undertaken by Laraine Nelson (23 November 2015) as documented in **Appendix 1**.

The archival recording report did not appear to include measured drawings, elevations or plans of the structures (Urbis 2014a). This will be undertaken as part of the mitigation measures.

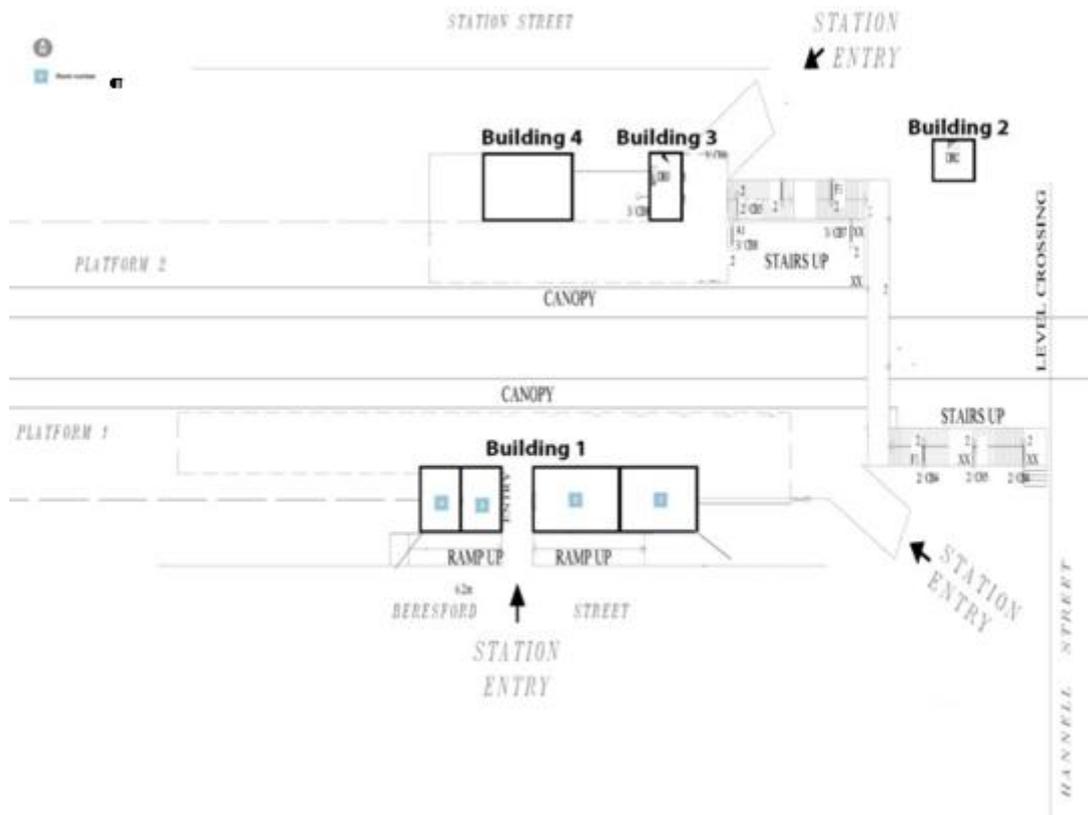


Figure 1 Schematic of Wickham Railway Station Rooms and areas not accessed (Urbis 2014a: Appendix A)

## 3.2 Visual Inspection Results

The aim of the visual inspection was to address gaps in the previous reports on the Wickham Railway Station Group as discussed in section 3.1. It included an inspection of Railway Station Building 1 (Room 4, Platform 1), Building 4 (Platform 2) and Building 2 (Wickham Signal Box).

### 3.2.1 Building 1: Room 4 (Platform 1)

Room 4 of Building 1 was the Men's Rest Room for Wickham Railway Station and contained two cubicles and a small room, most likely used for storage (Plates 1 and 2). All fittings including the wall tiles were of a later period than the construction date, assumed 1980s, and were considered to have no heritage significance. The Women's Rest Room abutted the eastern wall of the Men's Rest Room (Plates 3 and 4).

### 3.2.2 Building 4 (Platform 2)

Building 4 (Platform 2) was on the northern side of the railway line (Plate 5). The interior was made up of two interconnected rooms which had been cleared of furniture. The westernmost room had a standard size external door to the platform and a window on the western side (Plate 6). The adjoining room had two external timber roller doors, one to the street and the other to the station platform (Plates 7 and 8). The doors indicated that the room was used for the receipt and despatch of goods and parcels.

### 3.2.3 Building 2 (Signal Box)

The Wickham Signal Box was a two storey brick structure with a tiled roof (Plates 9 and 10). Only the first floor of the Signal Box was accessible at the time of the visual inspection. The ground floor was locked and a

key not available. Discussions with Paul Dunn (Assistant Area Manager, Signal Box Operations Newcastle Region, Sydney Trains) indicated the ground floor was the relay room with the contents limited to associated electrical signalling equipment. This description is supported by the *Newcastle Signal Boxes Heritage Assessment* (Love 2002:19).

Love (2002:19) described the first floor interior operating level of the Wickham Signal Box as containing a small local control panel that, prior to the closure of this segment of the line, serviced the Stewart Avenue level crossing to the west and the Merewether Street level crossing to the east. It also serviced the Hannell Street level crossing prior to the closure of that crossing in the late 1980s or early 1990s.

The following is an extract from Love (2002:19).

*The operating level (upper floor) contains a relatively small local control panel which features a track diagram with a number of miniature McKenzie & Holland rotary switches suitably mounted for ease of operation for up and down signals near the station. Desks, telephones and closed circuit TV screens, and other equipment necessary for the remote operation of the level crossing boom barriers and warning lights are contained within the signal box. The interior of the Signal Box is lined and painted in light Pastel colours, with a white ceiling. As noted above, sliding, timber-framed windows [were] used permitting natural lighting, visibility and good ventilation. Access to the operating floor is via an external staircase at the Sydney-end of the signal box.*

An inspection of the Wickham Signal Box on 23 November 2015 supported the above description. The control panel and the console were still in place and appeared to be the original with the date, August 1965, clearly visible (Plate 11). The console housing the panel also appeared original, constructed of steel with some minor modifications, such as a laminate top (Plates 11 to 17). The levers and dials appeared consistent with the age of the console. Mr Dunn advised that the camera and bank of six monitors that were part of the Wickham Signal Box were removed by Sydney Trains sometime after December 2014.

There were no other items of furniture or equipment on the operating level which were considered to be associated with the 1965 installation of the signal box, and no other movable heritage items considered to be of heritage significance (Plate 18).

## 4.0 Comparative Analysis

A desktop assessment has been made of interwar and Type 11 railway stations, and heritage listed signal boxes in NSW (refer Appendix 2, 3 and 4). This data has been used to inform the comparative significance assessment.

### 4.1 Discussion

The character of the Wickham Railway Station buildings is determined by their stripped Federation style. Wickham Station is a 'Type 11' station design (SHI 4801045). The station is of brick and timber construction featuring a cantilevered awning with cast iron corbels that covers the platform.

A list of railway stations built in the interwar period was compiled using information in the *Inter-War Railway Stations in NSW* undertaken on behalf of NSW State Rail Authority-Rail Estate (Humphries and Ellsmore 2002) (**Appendix 2**). The table in **Appendix 2** lists 60 railway stations recorded on Sydney Trains' s. 170 heritage and conservation register as having the major buildings constructed during the interwar period or, described as being of interwar design (constructed in the period 1915 through to 1939). An analysis of the listings shows that there are 20 railway stations described as having 'Type 11' buildings (**Appendix 2**) (including Wickham Railway Station). The majority of Type 11 buildings are still extant (18 of 19 buildings, excluding Wickham) and thus the stripped Federation style of Wickham Railway Station is well represented in railway stations elsewhere (**Appendix 3**).

The study on interwar railway stations in NSW (Humphries and Ellsmore 2002) identified a group of railway stations which were representative of the interwar period based on the following characteristics:

- they demonstrated changes that were taking place in architecture during that period;
- they reflected State Rail Authority's response to social change and internal administrative change during a period of great social upheaval (World War I, World War II and the Great Depression); and
- a number were excellent examples of Functionalist style and some of the key characteristics of Art Deco style in a public setting (Humphries and Ellsmore 2002: Executive Summary).

Wickham Railway Station was not included in the group as being representative of the interwar period.

A review of heritage listed signal boxes in NSW was compiled using information from the NSW Heritage Inventory (**Appendix 4**). The comparative analysis of signal boxes shows that there are more representative and significant extant signal boxes (**Appendix 4**). The signal boxes at Newcastle, Hamilton and Islington are state significant. Compared with other heritage listed signal boxes, the built structure of the Wickham Signal Box is not significant in terms of design or aesthetics and there are better examples.

The control panel (and console) is part of the movable heritage of Wickham Signal Box and is its most significant feature.

## 5.0 Significance Assessment

Consistent with the Burra Charter, before making decisions about the future of a heritage item it is first necessary to understand its heritage significance and the values it embodies. The following section contains an assessment of the heritage significance of Wickham Railway Station Group using the NSW state significance heritage criteria as contained within the *Heritage Act 1977* and explained in *Assessing Heritage Significance* (NSW Heritage Office 2001). Consideration is also given to the integrity and intactness of the Wickham Railway Station Group.

### 5.1 Significance assessment

With reference to the State Heritage Inventory entries for Wickham Railway Station Group, Wickham Railway Station and Wickham Signal Box; and previous significance assessments as detailed in Love (2002) and Urbis (2014c), we assess the significance of Wickham Railway Station Group as follows.

#### 5.1.1 Historical significance (SHR criterion A) – An item is important in the course, or pattern of NSW’s cultural history (or the cultural or natural history of the local area)

Wickham Railway Station was constructed much later than most neighbouring stations, and the station demonstrates the increasing urban development in Newcastle during the first few decades of the twentieth century. Wickham Signal Box was constructed in 1965 to replace an earlier signal box. The newer structure continued a long-standing use, however, the replacement and severely reduced functions during the past few years mean that it has a low degree of historic significance at a local level. The control panel and console within the Wickham Signal Box is historically significant as Australia’s first television equipped level crossing. Wickham Railway Station Group meets this criterion at a local level.

#### 5.1.2 Associative significance (SHR criterion B) – An item has strong or special association with the life or works of a person, or a group of persons, of importance in NSW’s cultural or natural history

There is no evidence to suggest that Wickham Railway Station Group has a strong or special association with the life or works of a person, or group of persons, of importance in NSW or Newcastle’s history. It is noted that H.W. Bourne was recorded as a Signal and Telegraph Engineer, however, no further information has been found to suggest that he was locally important. Wickham Railway Station Group is not considered to meet this criterion.

#### 5.1.3 Aesthetic/technical significance (SHR criterion C) – An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement

Wickham Railway Station Group is an example of a small railway station dating from the 1930s with simple and traditional materials and details. While many railway stations constructed during this period were designed in a contemporary interwar style, Wickham Railway Station Group is unusual in that it was constructed with a stripped Federation character. The footbridge and signal box are not considered to contribute to the aesthetic significance of the Group. The control panel and console in Wickham Signal Box has technical significance as a tangible reminder of Australia’s first television equipped level crossing. Wickham Railway Station Group is considered to meet this criterion at a local level.

#### **5.1.4 Social significance (SHR criterion D) – An item has a strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons**

Wickham Railway Station Group has the potential to contribute to the Newcastle community's sense of place, and can provide a connection to the local community's history. The railway precinct at Wickham provided a reliable source of employment for many local families, however, operations have been substantially reduced in recent years. Wickham Railway Station Group is considered to meet this criterion at a local level.

#### **5.1.5 Research potential (SHR criterion E) – An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history**

The technical functions, operations and equipment at Wickham Railway Station Group are considerably reduced from their original state. The closure of the railway line between Hamilton and Newcastle Stations in December 2014 has left the Group redundant. Wickham Railway Station Group has little potential to yield information that would further contribute to an understanding of NSW's cultural, industrial, and railways history. Wickham Railway Station Group is not considered to meet this criterion.

#### **5.1.6 Rarity (SHR 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)**

The 1930s station buildings at Wickham Railway Station Group are unusual for their time, in that they were not designed in a contemporary interwar style, rather, they employed a stripped Federation style. Despite this, the buildings are not a remarkable example of the style, and stripped Federation railway buildings are not particularly rare. The control panel and console at Wickham Station Box is not particularly rare, and there are other examples of similar panels from that era, however, it is widely regarded as being the first of its type. The Wickham Railway Station Group is considered to meet this criterion at a local level.

#### **5.1.7 Representativeness (SHR criterion G) – An item is important in demonstrating the principal characteristics of a class of NSW's (or the local area's) cultural or natural places; or cultural or natural environments**

Wickham Signal Box is a late example of this type of free-standing signal box, and is not particularly remarkable. The control panel and console is representative of the technology in use in the 1960s, and the styling and presentation of the panel is consistent with the era. The platforms are representative of railway structures from the late nineteenth century to 1930s, but are not outstanding examples of their type. The railway station is unusual for its architectural style. Wickham Railway Station Group is considered to meet this criterion at a local level.

#### **5.1.8 Integrity and intactness**

With regard to integrity and intactness in heritage terms, the form and fabric of Wickham Railway Station Group has been partially compromised. The Group has been subject to incremental upgrades through the years, including the construction of a new footbridge in the 1990s, and substantial changes to the external fabric of the Wickham Signal Box. Televisions and cameras have been removed from the control panel and console. The Wickham Railway Station platform buildings remain largely intact.

## **5.2 Statement of Significance**

Wickham Railway Station Group is historically significant as an indicator of increasing urban development in the Newcastle urban area. The Wickham Station Box was constructed in the 1960s to replace an earlier

signal box; the new station box was fitted with Australia's first television equipped level crossing. The control panel and console has technical significance as a tangible reminder of this milestone. The Station buildings were constructed in a stripped Federation style, which was unusual at the time, when contemporaneous buildings were being constructed in a contemporary interwar style. Despite this, the buildings are not a remarkable example of the stripped Federation style, and this style of railway buildings is not particularly rare.

Wickham Railway Station Group provided a reliable source of employment for many local families, and the site has the potential to contribute to the community's sense of place.

The control panel and console in Wickham Signal Box is representative of the technology in use in the 1960s, and the styling and presentation of the panel is consistent with the era.

The form and fabric of Wickham Railway Station Group has been partially compromised. The Group has been subject to incremental upgrades through the years, including the construction of a new footbridge in the 1990s, and substantial changes to the external fabric of the Wickham Signal Box. Televisions and cameras have been removed from the control panel and console. The Wickham Railway Station platform buildings remain largely intact.

The fabric of the Station Group dating from the 1990s is considered to be of negligible heritage significance.

### 5.3 Summary of Contribution of Elements

In determining the likely impact of the proposal on the heritage significance of Wickham Railway Station Group and the Newcastle City Centre Heritage Conservation Area, an assessment of the relative significance of the fabric and features which make up the site is useful. The gradings of significance employed adhere to Heritage Division standards set out in *Assessing Heritage Significance* (2001). Similarly, it is helpful to clearly identify those components and attributes of the site which embody heritage significance. The table below ranks the relative significance and integrity of the component parts of Wickham Railway Station Group (Table 1).

**Table 1 Relative heritage significance of the components and attributes of Wickham Railway Station Group**

Component/attribute	Integrity of fabric	Assessed significance
Station building, Platform 1	Good integrity	Local significance
Station building, Platform 2	Good integrity	Local significance
Signal box	Low integrity	Local significance
Platforms	Good integrity	Local significance
Footbridge	Good integrity	Negligible significance
Moveable items including control panel and console	Good integrity	Local significance
Landscape features	Good integrity	Local significance
Location/landscape setting	N/A	Local significance
Function	N/A	Local significance

## 6.0 Impact Assessment

### 6.1 Removal Options Considered

The proposed removal of Wickham Railway Station and Signal Box arises from the need to construct the Maintenance and Stabling Facility for the new light rail system. The desired location for the Maintenance and Stabling Facility is adjacent to the light right route between Wickham and Newcastle Stations. The facility needs to have capacity for the maintenance of at least two vehicles and stabling of five light rail vehicles. Owing to the shape and size of the facility required, the only two locations which meet these requirements are areas at either Wickham Station or at Newcastle Station. An option analysis was documented in the *Newcastle Light Rail Draft Scoping Design Report - Volume 1* (Aurecon and Parsons Brinckerhoff 2014) which is summarised below. The sites are shown in Figure 2.

#### 6.1.1 Newcastle Bus Interchange (B1)

This option was to place the Maintenance and Stabling Facility to the north of the Newcastle Railway Station buildings at the current Newcastle Bus Interchange. This option would have resulted in the loss of that transport infrastructure and, being within the State Heritage Register Newcastle Railway Station curtilage, would have a negative impact on the heritage value of this state significant group.

#### 6.1.2 Newcastle Yard (B2)

This option would have been located in the existing rail yard west of the platforms and within the area of the Newcastle Railway Station and Newcastle Railway Station Additional Group curtilage, both included on the State Heritage Register. This option would have a negative impact on the state significant heritage values of these items.

#### 6.1.3 Newcastle Railway Station (B3)

This option was to stable the light rail vehicles between platforms 3 and 4 of the existing Newcastle Railway Station. The maintenance building under this proposal would have been along the western end of platforms 2 and 3 and thus would have required the removal of that portion of the platforms. The option would have a negative impact on the heritage values of the state significant Newcastle Railway Station included on the State Heritage Register.

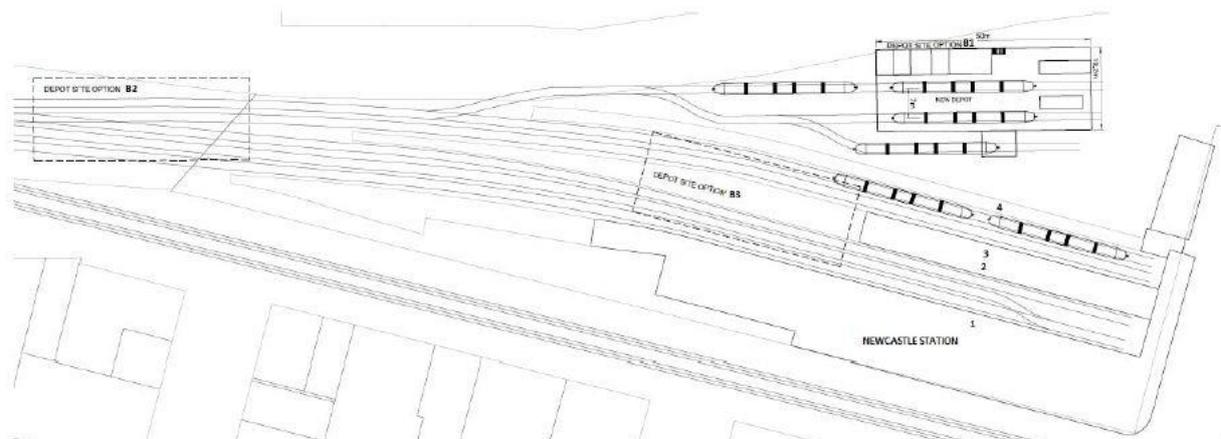


Figure 2 Options Considered at Newcastle Railway Station

### 6.1.4 Wickham Railway Station Group (the current proposal)

The proposed Maintenance and Stabling Facility at Wickham Station will involve the maintenance and stabling of light rail vehicles on the eastern portion of Wickham Station (and include the Signal Box location). The maintenance facility is proposed between Stewart Avenue and will encompass the western section of the Wickham Station platforms. This option requires the removal of all structures associated with the Wickham Railway Station Group including platforms, buildings, overbridge, Signal Box and other associated infrastructure.

The elevation and location of the Wickham Maintenance and Stabling Facility is less prone to flooding than some of the other options considered. It also is not affected by significant mine subsidence. The levels of noise, light spill and visual amenity arising from the Maintenance and Stabling Facility are similar to the levels already present at Wickham Station. The current site proposed for the Maintenance and Stabling Facility was also considered preferable in comparison to the other options as they involved locating the new facilities within the area of the state significant Newcastle Railway Station and Newcastle Railway Station Additional Group. Those options would all have had a negative impact on the heritage values of Newcastle Railway Station and Newcastle Railway Station Additional Group and, in the instance of Newcastle Bus Interchange remove the use of those facilities from the transport network (Aurecon and Parsons Brinckerhoff 2014).

The current site proposed for the Maintenance and Stabling Facility is the option which best meets the required technical and operational criteria, as well as having the lowest level of heritage impact. The selection of the current proposed site for the facility is the most feasible option with regard to technical, operational and heritage considerations.

The partial retention of all or some structures at Wickham Railway Station was considered, however is not feasible due to the area of land required and the operational arrangement of the infrastructure for the Maintenance and Stabling Facility.

## 6.2 Impact Assessment

This section identifies the structures and movable heritage items to be removed at Wickham Railway Station Group and the likely level of impact on the heritage significance of the site, and the heritage significance of the Newcastle City Centre Heritage Conservation Area.

### 6.2.1 Wickham Railway Station Group

The proposal will remove all structures associated with Wickham Railway Station including the platforms, railway buildings, overhead footbridge, as well as the interior fixtures and furniture. The platforms and railway buildings are assessed to have local heritage significance. The footbridge constructed c.1992 is considered to have negligible heritage value. The character of Wickham Railway Station is determined by its stripped Federation style, and as outlined in the comparative analysis, there are many other examples of this style such that the structures do not demonstrate rarity value. The Wickham Railway Station platforms and buildings have been assessed as having local significance and they embody historic, aesthetic and social heritage values. The removal of these structures will have a major impact on the local heritage item. Measures to help mitigate and manage that impact are outlined in section 7.0.

The proposal will remove the Wickham Signal Box building, as well as the interior fixtures, equipment and furniture. The building and movable heritage of the Wickham Signal Box are assessed to have local heritage significance. As outlined in the comparative analysis, the Signal Box building has been modified since its installation c.1965 and there are several other more representative examples of signal boxes which are extant in the local area. The control panel and console, as part of Australia's first television equipped level

crossing, is the only item of movable heritage identified within the Signal Box considered to have local significance. It is representative and rare in a local context. The removal of the built structures and movable heritage of the Wickham Signal Box will have a major impact on this item. Measures to help mitigate and manage that impact are outlined in the following section.

### **6.2.2 Newcastle City Centre Heritage Conservation Area**

Newcastle City Centre Heritage Conservation Area is significant for a number of reasons, and particularly its assemblage of commercial and civic buildings (SHI 2173904). Wickham Railway Station Group is in the conservation area and thus contributes to its character. However, the Wickham Railway Station Group is not unique and does not play a major and recognisable role in the streetscape of the Conservation Area. Unlike some of the other precincts in the Conservation Area, Wickham Railway Station Group is not in an appreciable cluster of heritage buildings and thus does not play an important role in the character of the Wickham area. The Wickham Railway Station Group is not state significant and therefore its contribution to the Conservation Area is not as important as other buildings. The removal of this item will have a negative, but minor overall impact on the heritage significance of the Newcastle City Centre Heritage Conservation Area.

## 7.0 Mitigation and Management

The proposed removal of the Wickham Railway Station will have a major impact on the significance of this item but only a minor impact on the values of the Newcastle City Centre Heritage Conservation Area.

The mitigation to be undertaken includes an: archival recording, heritage interpretation strategy and an adaptive reuse study. These are detailed below.

### 7.1 Archival Recording

Archival recording of the moveable heritage associated with Wickham Signal Box is to be undertaken prior to removal works. The existing archival recording for Wickham Railway Station and Signal Box is to be supplemented to include the Wickham Signal Box, Building 1 - Room 4 (Platform 1) and Building 4 (Platform 2). The existing archival recording is to be updated to include measured drawings, elevations and plans of the structures and 3D scanning is to be considered as a method for undertaking this recording for reasons of accuracy and efficiency, as well as interpretation.

### 7.2 Heritage Interpretation Strategy

A heritage interpretation strategy is to be prepared for the built structures associated with Wickham Railway Station and Signal Box, as well as the Wickham Signal Box control panel. The interpretation strategy is to include a comprehensive history of the station, as well as research into televised crossings, their operation and changes in work practices as a result of the introduced technology. Oral history options are to be explored particularly in relation to the operation of the televised crossing. It is to include an analysis of the engineering significance of the televised crossing. Research into H.W. Bourne whose name is recorded on the control panel associated with the signal box. Identification of key themes and stories associated with the station, policies for interpretation and an implementation plan.

A heritage interpretation strategy is to provide information to the community regarding Wickham Railway Station and the operation of the signal crossing. The interpretation strategy is to also consider the use of digital media (websites, apps and augmented reality) for delivery of interpretative content to the wider community.

### 7.3 Adaptive Reuse Study

The adaptive reuse study will be guided by the significance of Wickham Railway Station Groups which is locally significant for its Newcastle Local Environmental Plan (LEP) 2012. The Wickham Railway Station Group is locally significant for its historic associations, aesthetics/technical and social values.

Wickham Railway Station has historic significance as it demonstrates increasing urban development in Newcastle during the first few decades of the 20<sup>th</sup> century.

The aesthetic significance of Wickham is associated with the station buildings and are an example of a small railway station dating to the 1930s constructed in a stripped Federation character. The control panel and console in Wickham Signal box has technical significance as a tangible reminder of Australia's first television equipped level crossing. The signal box building itself does not contribute to the aesthetic significance of the site. The pedestrian overbridge (constructed circa 1992) does not contribute to the aesthetic significance of the site.

Its social significance derives from its association to the Newcastle community's sense of place and can provide a connection to the local community's history.

The significant features of the Wickham Railway Station Group is its stripped Federation character, its movable heritage (control panel and console from Wickham Signal box, the original ticket window, desk and safe).

The adaptive reuse study will include the strategy and design for the adaptive reuse of a sample of the Wickham Railway Station Group which is indicative of its stripped Federation character and includes its movable heritage items.

The items/features to be reconstructed/adaptively reused include:

- Reconstruction of a 10 metre by 10 metre section of the southern platform building (with reused materials/features)
- The original ticket window, desk and safe
- Control panel and console from Wickham Signal box

The 10 metre by 10 metre section of the southern platform building is to include awning section with two cast iron brackets and column bases (Plate 21). Doorway leading to hall for ticket window, window and bench. The original ticket window are to be extracted for re-installation in the hall and the desk and safe are to be extracted for re-installation in the ticket booth (Plate 22, Plate 23 and Plate 24). Timber valences for awning edging to be extracted and re-installed along exposed edges of awning (Plate 25). Bricks from demolished station to be reused in the reconstruction. The pitch of the roof and awning to be reconstructed in the reuse (Plate 25) colour bond roof sheeting may be replaced with like for like colour bond roof sheeting. Extraction of control panel and console (Plate 26) prior to demolition with re-installation in the reconstruction.

The purpose of the reconstruction is to preserve the sense of place associated with the Wickham Railway Station along with its movable heritage items. This reconstructed portion of the station is to be re-installed in a publically accessible area and as close as possible to the original station, but noting that the priority is for it to be publically accessible. The adaptive reuse study will need to include:

- A designated location for the reconstructed portion of the station;
- Architecturally designed plans for the reconstruction;
- An itemised inventory of material to be removed from in-situ prior to demolition;
- Quantities of additional material (including bricks) for the reconstruction to be removed from out of situ during demolition;
- Storage and conservation plan for materials to be stored, along with a details of a specified storage location;
- Detailed demolition plan;
- A project timeline which outlines the timeframes for the removal, storage and re-installation of materials and reconstruction, as well as custodianship of salvaged materials; and
- Detailed re-installation plan including signage for interpretation.

The adaptive reuse study team will include the following specialties: heritage, architecture, civil engineering and demolition experts.

The adaptive reuse study will be in addition to the archival recording and the heritage interpretation study already committed to in the REF.

## 8.0 Recommendations

This report has considered the significance of the Wickham Railway Station and Signal Box and the nature and scale of likely heritage impacts resulting from the proposed removal of these items.

The proposal will remove the platforms, railway buildings, overhead footbridge, as well as the interior fixtures and furniture at Wickham Railway Station, as well as the removal of the Wickham Signal Box building, interior fixtures and furniture. The proposed removal will have a major impact on the heritage items themselves but only a minor impact on the values of the Newcastle City Centre Heritage Conservation Area.

The following management recommendations and mitigation measures will help to mitigate and manage the impacts to Wickham Railway Station Group. There will nevertheless be a residual negative heritage impact.

The removal of the built structures associated with Wickham Railway Station Group will have an impact on the historic, aesthetic and social significance of this local heritage place. Mitigation of the loss of aesthetic value can be provided by undertaking a full archival recording of the built structures of Wickham Railway Station Group. A preliminary archival recording has already been undertaken (Urbis 2014a), however it is to be updated to include the Wickham Signal Box, Building 1 - Room 4 (Platform 1) and Building 4 (Platform 2). The existing archival recording is to be updated to include measured drawings, elevations and plans of the structures and 3D scanning is to be considered as a method for undertaking this recording for reasons of accuracy and efficiency.

The removal of the control panel (and console) as part of the first television equipped crossing will have an impact on the historic, associative, aesthetic, social and rarity values embodied by this movable heritage item.

The mitigation to be undertaken includes an: archival recording, heritage interpretation strategy and an adaptive reuse study.

The following management recommendations and mitigation measures are formulated with consideration of all available information and in accordance with relevant legislation:

### **Recommendation 1 – Consultation**

In accordance with Cl.14 of the *State Environmental Planning Policy (Infrastructure) 2007* Transport for NSW is to consult with Newcastle City Council prior to the proposed removal.

Transport for NSW is to consult with Sydney Trains in relation to the proposed removals, and ensure that requirements for notification to the Heritage Council under Cl.170A of the *Heritage Act 1977* are met.

### **Recommendation 2 – Archival Recording**

Archival recording of the moveable heritage associated with Wickham Signal Box is to be undertaken prior to removal works. The existing archival recording for Wickham Railway Station and Signal Box is to be supplemented to include the Wickham Signal Box, Building 1 - Room 4 (Platform 1) and Building 4 (Platform 2). The existing archival recording is to be updated to include measured drawings, elevations and plans of the structures and 3D scanning is to be considered as a method for undertaking this recording for reasons of accuracy and efficiency.

**Recommendation 3 – Heritage Interpretation Strategy**

Concurrent with removal works, a heritage interpretation strategy is to be prepared for the built structures associated with Wickham Railway Station and Signal Box, as well as the Wickham Signal Box.

**Recommendation 4 – Adaptive Reuse Study**

An adaptive reuse study is to be undertaken which will be guided by the significance value of the Wickham Railway Station Group. It is to include an architectural plan and designated location for the reconstruction of part of the station, an itemised inventory of material and features to be removed in-situ prior to the demolition and materials to be salvaged from demolished material, details on storage of materials, a demolition plan, a timeline and custodianship for the salvaged material and a detailed re-installation plan for the reconstruction, including signage.

## 9.0 References

- Aurecon, and Parsons Brinckerhoff. 2014. "Newcastle Light Rail Draft Scoping Design Report - Volume 1." Report to Transport for New South Wales.
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- . 2014c. "Wickham Railway Station Moveable Heritage Report and Inventory."
- . 2014d. "Wickham Transport Interchange Heritage Impact Statement."

# Appendix I

## Plates

# Building I, Room 4 (Platform I)



**Plate 1** Looking south to Building 1, Room 4 (Platform 1)



**Plate 2** Men's Rest Room



**Plate 3** Women's Rest Room showing window and door fittings



**Plate 4** Women's Rest Room

## Building 4 (Platform 2)



Plate 5 Looking south to Building 4



Plate 6 Interior Room 1



Plate 7 Interior Room 2 (platform side)



Plate 8 Interior Room 2 (road side)

# Wickham Railway Station Signal Box



Plate 9 Looking north to Signal Box



Plate 10 Looking south west to Signal Box



Plate 11 Local control panel showing date



Plate 12 Local control panel



Plate 13 Local control panel console



Plate 14 Local control panel



Plate 15 Local control panel – internal



Plate 16 Local control panel – rear of console



Plate 17 Local control panel console – side view

Plate 19



Plate 18 Example of other furniture in Signal Box

Plate 20

# Adaptive Reuse



Plate 21 Sample Section to be retained



Plate 22 Desk below ticket window



Plate 23 Ticket Window (Source Urbis 2014)



Plate 24 Safe



Plate 25 Timber valences (top left), pitch of roof (middle ground)



Plate 26 Control Panel and Consol

## Appendix 2

### Comparative Summary of Interwar Railway Stations in NSW

## Interwar Railway Stations in NSW (extract from: Sydney Trains' s.I 70 Register)

Note: Station in ***Bold Italics*** have Type 11 Buildings

Station name	Construction Year/s	Buildings and Structures	Notes	Plate (Source: State Heritage Inventory)
<b><i>Banksia (Rockdale)</i></b>	1906 - 1923	<b>Platform 1 building (1923) type 11</b> <b>Platform 4 building (1923) type 11</b> Platforms: Island platform (1906); two perimeter platforms (1923) Pedestrian subway, steps, booking office (1923)	Banksia Railway Station is of aesthetic significance for its 1906 Platform 2/3 building, 1923 Platform 1 and 4 buildings, and 1923 pedestrian subway, ticket office and retaining walls, as intact representative railway station structures of their periods. The platform buildings illustrate the gradual change in style of station buildings in the early 20th century.	
Bardwell Park	1931	Platform Building (1931) type 13 Platform (1931) Entry stair structure (1931) Overbridge, Hartill Law Avenue (1931)	Bardwell Park Railway Station is of aesthetic significance as an example of a small interwar period suburban railway building matching other East Hills line railway station buildings in design and style. The building is very austere in style, with Inter War Art Deco style touches (for example decorative brick strapwork detail to parapets) and is competently executed, exhibiting fine workmanship in its brickwork.	
Berala	1924	Platform Building, Platform 1-2 (Type 18) (1924) Booking Office, Platform 1-2 (c.1930s) Platform 1-2, (1924) Pedestrian Subway, (1924) Canopy, (modern)	The station complex with its elevated platform, visible platform buildings and street level subway is a recognisable feature in the area. Berala Railway Station has local aesthetic significance as an example of a 1920s extended rafter railway station building with its steep gable roof and extended rafter awnings.	
Beverly Hills	1930-31	Platform Building (1931) (Type 13) Platform (1931) King Georges Road Overbridge (1931) Stairs, lift and platform canopy (2007)	Beverly Hills Railway Station platform building is of aesthetic significance as an example of a small interwar period suburban railway station platform building matching other East Hills line platform buildings in design and style.	

Station name	Construction Year/s	Buildings and Structures	Notes	Plate (Source: State Heritage Inventory)
Bexley North	1931-1948	Platform Building (1931, 1948) (Type 13) Island Platform (1931) Platform entry stairs (modern) Overbridge (1929, modern)	Bexley North Railway Station is of aesthetic significance as an example of a small interwar period suburban railway building matching other East Hills line railway station buildings in design and style. The building is very austere in style, with Inter War Art Deco style touches (for example brick detailing to parapets) and is competently executed, exhibiting fine workmanship in its brickwork.	
Bomaderry	1893-1946	Platform building (1946) Goods shed (1893, 1944) Jib Crane (1934) Turntable (1914) Platform (1934, 1946) Signals	The Bomaderry Railway Station 1946 platform building is of State aesthetic significance as one of the finest representative examples of an interwar Functionalist style Railway building in the state. It is particularly noteworthy for its use of curved elements, such as the projecting bay and awning.	
<b>Bulli</b>	Initial 1887 Later 1923	<b>Platform 1 building (1923) (Type 11)</b> Out of room (1923) Platform 2 building (1887) (Type 4, third class) Platform 1 (1923) Platform 2 (1887) Movable heritage - various - 1923 Waiting room and ticket office signs attached to Platform 1 building	Bulli Railway Station is of aesthetic significance for its 1887 and 1923 platform buildings, which demonstrate changing railway station architecture over this period. The 1887 Platform 2 building at Bulli is one of the best examples of an 1880s weatherboard third class station building surviving on the Illawarra line (other examples at Albion Park, Dapto and Thirroul). The 1923 brick platform building is a good representative example of a Federation period railway station building, of a type and construction material which is common on the Illawarra line.	
Caringbah	1937-1939	Platform building (1939) (Type 13) Stairs (1939) Kiosk on Platform (1994) Platform (1939) Platform Canopies (1994)	The Caringbah Railway Station platform building is of aesthetic significance as a fine example of an interwar Functionalist style station building, similar to other original 1939 Cronulla line platform buildings in design and style. The platform building is of aesthetic significance as part of a cohesive (in design and construction) set of Cronulla line suburban station buildings.	

Station name	Construction Year/s	Buildings and Structures	Notes	Plate (Source: State Heritage Inventory)
<b>Carramar</b>	1924, 1928, 2009	<p><b>BUILDINGS</b>  <b>Platform Building (Type 11) (1924)</b>            Booking Office (1938)</p> <p><b>STRUCTURES</b>            Platform 1-2, (1924)            Pedestrian subway &amp; stairs, (1924, extended 2009)</p>	Carramar Railway Station has local aesthetic significance with its 1920s island platform building which retains characteristic features of this type of station building namely the linear form, gable roof and integrated awnings. The 1930s booking office, though altered, demonstrates a shift in the style from earlier railway platform buildings. The buildings and subway characterise the type of construction and architectural style employed in early 20th century railway station buildings in the Sydney region.	
Casino	1930-1947	<p>Station Building and RRR (1930)            Platform (1930)            Signal Box (1946)            Roundhouse (1928), and associated buildings</p>	The station building is one of the largest type A8 station buildings in NSW and is a good example of its type with some variations from the standard design. Principal elements within the precinct include the coal loader, which is unique in NSW, and the roundhouse, one of 7 remaining in NSW.	
<b>Chester Hill</b>	1924, later modifications	<p><b>Platform Building, (Type 11) (1924)</b>            Platform 1-2, (1924)            Canopies, (c. 1980s; c.1999)            Chester Hill Road Overbridge, (1924; extended south c2010)</p>	Chester Hill Railway Station has local aesthetic significance with its 1920s 'initial island' platform building which retains characteristic features of this type of station building, namely the linear form, gable roof and integrated awnings. In effect the form, fabric and detailing of this building characterises the type of construction and architectural style employed in early 20th century railway station buildings in the Sydney region.	
Civic	1935-1937	<p>Station Building, type 13 (1937)            Platform Shelter, (1937)            Platforms, (1937)            Footbridge, (1937)            Forecourt (potential archaeological site)</p>	Civic Railway Station is of moderate aesthetic significance at a local level, associated with the station building and footbridge. The station buildings and footbridge, are good examples of interwar railway domestic style in regional NSW, which uses simple and traditional materials of multi-coloured brickwork and tiles to create aesthetic interest. It represents the NSW Railway's experimentation with new forms of architecture during the interwar period.	

Station name	Construction Year/s	Buildings and Structures	Notes	Plate (Source: State Heritage Inventory)
Clyde	1950-1959	Station Buildings - Platform 1/2 Building, type 13, island building, brick (c1959) - Platform 3/4 Building, type 13, island building, brick with refreshment room (c1959) - Platform 5 Building, non standard, brick (c1959)	Clyde Railway Station is of aesthetic significance as an example of a larger post-war period railway Functionalist style station in an urban setting. The buildings are noted for their use of finely detailed bonded brickwork and parapets, strong horizontal and curved planes and cantilevered steel awnings. The station buildings are further noted for their cohesiveness as a group of railway Functionalist station buildings.	
<b>Condobolin</b>	1898 -1935	<b>Station Building - type 11, brick (1935)</b> and Platform ; Barracks Building - precast concrete drop slab (1921) ; Circular Water Tank on brick base ; Jib Crane and Loading Bank opposite the barracks on the Down side ; Water Column at the country end of the station platform	The station building is a representative example of a standard early 20th century station building.	
Coniston	1941-1941	Booking office (1941) Platform buildings (1941) (Type 13) - two identical brick platform buildings Platforms (1941)	Coniston Railway Station is of aesthetic significance as a representative group of 1941 interwar Functionalist style railway station buildings, with stylistic similarities to the suburban railway stations built for the Cronulla line in 1939.	
Cringila	1940-1941	Platform building (1941) Type 13, brick Platform (1941) Footbridge and stairs (1941,1958) (Note: the majority of the footbridge lies outside Sydney Trains property).	Cringila Railway Station platform building is of aesthetic significance as a good example of an interwar Functionalist style railway station.	
Cronulla	1939	Platform buildings and Structures (south to north): - Freestanding brick wall with platform awning and brick ticket booth/entry building (1939, awning reconstructed 2011) - Brick ticket booth/entry building (1939) - Main Platform building (1939) Type 13 Platform (1939)	Cronulla Railway Station is of state aesthetic significance as a collection of outstanding interwar functionalist railway station buildings and structures considered to be the finest in the NSW railway network. The buildings are noted for their use of dichromatic brickwork, parapeted roofs, curved corners, strong horizontal planes, stepped steel awnings, complex brickwork, decorative features and complex geometric massing.	

Station name	Construction Year/s	Buildings and Structures	Notes	Plate (Source: State Heritage Inventory)
Croydon	1892-1927	Platform Buildings, Platform 1/2 - (Type 13) (1941) <b>Platform Buildings, Platform 3/4 - (Type 11) (1926)</b> Platform Buildings, Platform 5 - (Type 10) (1891) Overhead Booking Office, Platforms: Platform 1/2, (1892) - Platform 3, (1892) - Platform 4, (1923) - Platform 5, (1926)	Croydon Railway Station has aesthetic significance with its 1890s 'Standard Eddy' building which has been altered in terms of its relocation from a typical island platform to a wayside platform, but still retains characteristic features of this type of station building namely the cantilevered awnings with wide fascia. The 1920s 'initial island' platform building were altered internally but retains a linear form, gable roof and integrated awnings.	
Denistone	1937	Former Booking Office, Type 19 (1937) Station Building (Conveniences Building), Type 13 (1937) Station Building (Shelter Shed), Type 13 (1937) Platforms (1937) Retaining Walls (1937) Overbridge (1937) Footbridge (1937)	Denistone Railway Station has aesthetic significance as an example of an austere, domestic-scale, interwar railway station in near original condition. Very limited change has occurred on this site since the station was opened in 1937. The shelter shed and conveniences building are particularly notable for their use of face brickwork, severe design and atypical features within the context of extant interwar stations on the network.	
Doonside	1944 -1955	Station Building- Platform 1/2, type 13 (1955) Station Building- Platform 3/4, type 13 (1955)	Doonside Railway Station has aesthetic significance as an example of a small railway Stripped Functionalist station in an urban setting. The buildings are very simply detailed with limited ornamentation representing economic policies of the time.	
Dulwich Hill	1895-1935	Platform building, Platforms 1/2 (Type 13) (1935) Overhead Booking Office, (1935) Platforms 1/2, (1935) Overbridge, (c.1930, c.1975)	The overhead booking office, the access stairs and 'Railway Eclectic' style platform buildings have local aesthetic and technical significance as examples of the particular design and style of these structures erected by the NSW Railways between the 1920s and the 1950s. The overhead booking office is a particularly intact example of its type.	

Station name	Construction Year/s	Buildings and Structures	Notes	Plate (Source: State Heritage Inventory)
Dungog	1911-1944	Station building (c1944) Platform	Dungog railway station is of high aesthetic significance as a good example of the interwar Functionalist style applied to a railway station building in a rural setting. The building is distinguished by fine decorative brickwork, detailed parapets, strong horizontal planes and wide steel awnings. The station building is a compact and complete example of Interwar Functionalist railway architecture.	
<i>Flemington</i>	1924	<b>Platform buildings, Platform 1/2 (Type 11) (1924)</b> <b>Platform buildings, Platform 3/4 (Type 11) (1924)</b> Overhead Booking Office, (1924) Signal Box, (1929) Canopies, (pre 2001) Platforms: Platform 1/2, (1924), Platform 3/4, (1924) Station footbridge & stairs, (1924)	Flemington Railway Station has local aesthetic significance with its 1920s initial island platform buildings which have typical features of other such buildings in the Sydney Metropolitan Region. In addition the booking office and footbridge, although much altered from their original forms, are recognisable features of the station precinct from The Crescent. Despite extensive modifications, the overhead booking office continues to have aesthetic significance as part of a cohesive group of standard Federation period railway station structures, representative of urban station design in the 1920s.	
Granville	1950-1960	- type 13, island buildings brick, Platform 1 & Platform 2 (1950's) - type 13, island buildings brick with refreshment room, Platform 3/4 (1950's) Overhead Booking Office and Footbridge - (c.1950, modern modifications) Parcels office - on separate platform to parcels loop off up main (c1951) Substation (1929, c1956)	Granville Railway Station is of high aesthetic significance as an example of larger post-war period railway Functionalist style station buildings in an urban setting. The buildings are noted for their use of finely detailed bonded brickwork and parapets, strong horizontal and curved planes and cantilevered steel awnings. The station buildings are cohesive as a group of railway Functionalist station buildings. However, the addition of steel canopies over the platforms has reduced their aesthetic and visual qualities as well as integrity.	
Griffith	1916-1937	Station Building - type 13, second side building brick (1935).  Signal Box - elevated fibro (1937). Turntable (1916)	Griffith railway station has aesthetic significance as a good example of an Interwar station building in regional NSW. The building displays many typical stylistic elements of similar station buildings constructed during this period throughout NSW.	

Station name	Construction Year/s	Buildings and Structures	Notes	Plate (Source: State Heritage Inventory)
GyMEA	1937-1939	Platform building (1939) (Type 13) Platform (1939) GyMEA Bay Road overbridge (1939) Footbridge, stairs, lift, canopies (1995) Platform canopy (1995)	Functionalist station building, similar to other original 1939 Cronulla line platform buildings in design and style. It is of aesthetic significance as part of a cohesive (in design and construction) set of Cronulla line station buildings. The building is noted for its use of dichromatic brickwork, stepped parapeted roof, strong horizontal planes, steel framed awning windows, and cantilevered awnings.	
Ivanhoe	1925	Station Building - type 12, concrete drop panel standard AC3 (1925) ; Platform - concrete ; Signal Box - type K, concrete drop panel on platform (1926) Water Tank (1925)	The small station building has aesthetic significance as a standard concrete drop slab station building of the 1920s. Concrete drop slab construction.	
Kingsgrove	1931-1947	Platform Building (1931, 1947-48) (Type 13) Platform (1931) Concrete stairs (2002), overhead entry building and lift shaft (2003) Platform Canopies (2003) Kingsgrove Road Overbridge (c. 1990s)	Kingsgrove Railway Station is of aesthetic significance as an example of a small interwar period suburban railway station with a platform building matching other East Hills line railway station buildings in design and style. The building is very austere in style, with Inter War Art Deco style touches (for example decorative brick detail to parapets) and is competently executed, exhibiting fine workmanship in its brickwork. The building is noted for its use of monochromatic brickwork, stepped parapets, irregular fenestration and engaged piers.	
Leeton	1920-22	Station Building - type 12, standard 'AC5' precast concrete (1922)	The station building is significant as a good example of a large standard precast concrete station building constructed in NSW in the 1920s. Pre-cast concrete construction.	
<i>Lindfield</i>	1890-1926	<b>Station Building, Platform 2/3 - type 11 (c.1900)</b> <b>Station Building, Platform 1 - type 11 (c.1922)</b> Signalling Hut, end of Platform 1, (c.1926) Platforms (1900, 1922) Steel Platform Shelters (modern) Footbridge (c.1922) Moveable	Aesthetic significance at a local level. The station retains a good grouping of early twentieth century railway buildings within their original setting. Evokes a former age of travel and makes a significant contribution to the character of the North Shore line with its homogenous, early 20th century railway architecture and landscaped settings. This significance is embodied in the visual grouping of the Platform 1 and Platform 2/3 station buildings, platforms, footbridge and signalling hut. The station contains a variety of railway building	

Station name	Construction Year/s	Buildings and Structures	Notes	Plate (Source: State Heritage Inventory)
			types and the Platform 2/3 building has particular aesthetic qualities. The aesthetic significance of the place has been diminished by current (2009) works to the station buildings and footbridge.	
<b>Lithgow</b>	1924-1925	<b>Station Building - type 11, island building, brick (1925)</b> Former Booking/Parcels office & Goods lift tower - timber (1925) Station Master's residence - 6 Railway Parade (c.1880) Hayley Street Footbridge and Overhead Booking Office (1993) Island platform - brick faced (1925) Old Station Platform - levelled rock face (1877) Eskbank Street Overbridge (1924)	The Lithgow Railway Station Group is of aesthetic significance as it comprises a number of buildings that are individually good examples of their type. The station building is a good example of the standard island building style with a sympathetic addition to one end and features typical characteristic elements of the Federation design railway building. The weatherboard overhead booking and parcels office building and the goods lift tower display both aesthetic and technical achievements in design and construction. Although it is unclear it appears that the original lift may still be in use	
Menindee		Station Buildings - type 13, timber and fibro building (c.1942) Platform Goods Shed - small metal sheet clad building on platform	The station building is significant as a good example of a simple Interwar Functionalist station building and is the only surviving example of its type in NSW. It is particularly noteworthy for its unusual construction materials (timber and asbestos cement sheeting rather than the more typical brick) and for its platform awning.	
Milsons Point	1928-1932	Platform office and shelter, (1932) Platform faces, (1932) Subway entrances, (1932) Concourse, (1932) Walls and abutments, (1932) Burton Street Underbridge, (1932)	Milsons Point Station has aesthetic significance for its retention of the original design's decorative features such as the Alfred Street awning, Alfred Street light fittings and cream and maroon tiling on the platform access stairs. The use of reinforced concrete for the construction of the station building is an early example of this construction technique on a large scale.	
Miranda	1938-1939	Platform building (1939) (Type 13) Platform (1939) Entry structure, canopies (1985) Moveable items: Rollover timber indicator boards	Miranda Railway Station platform building is of aesthetic significance as a good example of an interwar functionalist station building, similar to other original 1939 Cronulla line suburban platform buildings in design and style. It is of aesthetic significance as part of a cohesive (in design and construction) set of Cronulla line suburban railway station	

Station name	Construction Year/s	Buildings and Structures	Notes	Plate (Source: State Heritage Inventory)
			buildings, representative of a NSW Railways adaptation of this architectural style.	
<b>Moree</b>	1904-1929	<b>Railway Refreshment Room - type 11 (1929)</b> ; Platform (1904) ; RRR (1929)	The remaining station building at Moree is aesthetically significant as an early 1900s railway building, although having no particular specific aesthetic or technical significance. The remaining station building at Moree is a brick island platform building, which was later used as refreshment room. It has a gable corrugated iron roof with bracketed awnings on both sides on cement corbels, and a corbelled chimney at one end. Internally the building has been modified a number of times.	
Morisset	1880-	Station Building and Signal Box, Platform 2 - type 13 (1938) Waiting Room, Platform 1 (c1980) Station Master's Residence, type 6 (standard J2) (1880s) Gatekeeper's Residence, type 5 (standard J1) (1880s)	Morisset Railway Station has aesthetic significance at a local level. Morisset Railway Station is a good example of a 1930s railway station building with incorporated signal box, with simple detailing typical of this period. It is a good example of a 20th century 'Domestic' Station as identified in the Interwar Stations Study (Humphries & Ellsmore, 2002), representing the railways first experimentation with new architectural forms and demonstrates the transition from available domestic models to specific railway architecture in the early decades of the 20th century with new architectural forms and philosophies.	
<b>Mortdale</b>	1922-1980	<b>Platform building (1922) (Type 11)</b> Island Platform (1922) Ellen Street underbridge (1922) Footbridge (c 2004) Platform Canopies (modern)	The 1922 platform building, platform and the Ellen Street brick arched underbridge are of aesthetic significance as good examples of NSW Railways station architecture and bridge design of this period. The 1922 platform building is a representative example of Federation Queen Anne influenced railway station architecture, and is a standard NSW Railways platform building design used during the 1910s and 1920s. The Ellen Street underbridge is of aesthetic/technical significance as the brick arch construction of the bridge is representative of a standard NSW railway bridge design used in the 1920s. The Ellen Street brick arch was one of the last of this type built.	

Station name	Construction Year/s	Buildings and Structures	Notes	Plate (Source: State Heritage Inventory)
Narwee	1931-	Platform Building (1931) (Type 13) Booking Office Building (1984) Platform (1931) Platform Canopies (2007) Pedestrian subway (1931)	Narwee Railway Station is of aesthetic significance as an example of a small interwar period suburban railway with its 1931 platform and platform building matching other East Hills line railway stations in design and style. The platform building is very austere in style, with Inter War Art Deco style touches (for example brick strapwork detail to parapets) and is competently executed, exhibiting fine workmanship in its brickwork. The platform building is noted for its use of monochromatic brickwork, stepped parapets, irregular fenestration and engaged piers.	
<b>Newtown</b>	1892-	Overhead Booking Office & Concourse, (Type 19) (1892) <b>Platform Building, Platform 1/2- Type 11 (1927)</b>  STRUCTURES Platform 1/2, (1927) Platform Canopies & Stair, (1990s) King Street Overbridge, (1892/1927)	Newtown Railway Station has aesthetic significance with its 1890s overhead booking office which has characteristic features of this type of station building namely the use of brick for construction, the smaller size of the building and its location above the platforms on the King Street overbridge. The 1920s 'initial island' platform building is a typical but altered example of this type of station building, as the replacement of its original roof with a new roof with a gentler pitch has resulted in a single gable roof without the typical integrated awnings.	
Padstow	1925-1931	Platform building (1931) (Type 13) Island Platform (1931) Platform Canopies (2003) Overhead Booking Office/Footbridge/Shops (2003) Memorial Drive Overbridge (1931, 2010)	Padstow Railway Station is of local aesthetic significance as an example of a small interwar period suburban railway building matching other East Hills line station buildings. The building is very austere in style, with interwar Art Deco style touches (for example 3 projecting vertical lines of decorative brickwork to parapets) and is competently executed, exhibiting fine workmanship in its brickwork.	
Panania	1925-1931	Platform Building (1931) (Type 13) Platform (1931) Footbridge (1931) Concrete reversing ramps off streets to north and south (c.1970s) Concrete location hut (c. 1931)	Panania Railway Station is of aesthetic significance as an example of a small Inter War period suburban railway building matching other East Hills line station buildings in design and style. The building is very austere in style, with Inter War Art Deco style touches (for example decorative brick detail to parapets) and is competently executed, exhibiting fine workmanship in its brickwork. The building is noted for its original use of monochromatic brickwork, stepped parapets, irregular fenestration and engaged piers.	

Station name	Construction Year/s	Buildings and Structures	Notes	Plate (Source: State Heritage Inventory)
Parramatta	1859-1947	Station Buildings: - Platform 1, type 13, second island/side platform building (1940-2) - Platforms 2/3, type 3, second class building (1885) - Platform 4, type 3, second class building (1859) Parcels Office - Platform 4, painted brick (1924, 1938, 1947) Signal Box - on platform elevated brick EL, type E, type BB interlocking machine (1885)	<p>Parramatta Railway Station has high aesthetic significance with the railway platforms built over a range of historical periods and showing a wide range of architectural styles from the Victorian Free Classical Style of the original 1859 station building; the late Victorian style of the 1880s station building and signal box; the Functionalist style of the 1942 Countrylink building.</p> <p>The 1942 Countrylink building is aesthetically and technically distinctive as an excellent example of an interwar functionalist style passenger buildings to be constructed along the Sydney suburban rail network.</p>	
<b>Petersham</b>		Platform Building, Terminus Street (Type 5) (1885, 1954) <b>Platform Building, Platform 1/2 (Type 11) (1926)</b> Signal Box, (1927) Platforms: Platform 1/2, (1926) - Platform to Terminus St Building, (1885) Canopy, modern Footbridge, (1883) Pedestrian Subway and entrances, (1891)	<p>Petersham Railway Station has State aesthetic significance with its 1880s 'first class station building' displaying complicated roof forms, large symmetrical plan and awnings supported on cast iron columns. The 1920s 'initial island' platform building is significant with its design showing linear form, gable roof and integrated awnings. The 1880s footbridge with stairs leading down the platforms and streets has been altered considerably in terms of the recasting of the concrete stairs and deck and installation of new handrails and balustrades.</p>	
<b>Regents Park</b>	1922-1924	<b>Platform building, Platform 1/2 (Type 11) (1924)</b> Former Overhead Booking & Parcels Office, (c.1920) Platform 1-/2, (1924) Canopies, (1999) Footbridge, (1922, 1999)	<p>Regents Park Railway Station has local aesthetic significance with its 1920s 'initial island' platform building which has retained characteristic features of this design of station building, namely the linear form, gable roof and integrated awnings. The 1920s footbridge with stairs leading down the platform and street has been altered considerably in terms of the replacement of the timber deck and stairs with in-situ concrete, modern steel handrails, and modern awnings. In effect the form, fabric and detailing of the platform building and footbridge characterises the type of construction and architectural style employed in early 20th century railway station buildings in the Sydney region.</p>	

Station name	Construction Year/s	Buildings and Structures	Notes	Plate (Source: State Heritage Inventory)
Revesby	1931-1931	Platform Building (1931) (Type 13) Platform 1/2 (1931) Platform 3 (2008) Platform Canopy Platform 3 (2008) Footbridge, lifts, steps (2007)	Revesby Railway Station's 1931 platform building is of aesthetic significance as an example of a small interwar period suburban railway building matching other East Hills line railway station buildings in design and style. The building is very austere in style, with interwar Art Deco style touches (for example decorative brick detail to parapets) and is competently executed, exhibiting fine workmanship in its brickwork. The building is noted for its use of monochromatic brickwork, stepped parapets, irregular fenestration and engaged piers.	
Riverwood	1925-1931	Platform Building (1931) (Type 13) Island Platform (1931) Footbridge, lifts (2004) Platform Canopies (2003)	Riverwood Railway Station is of aesthetic significance as an example of a small interwar period suburban railway building matching other East Hills line station buildings in design and style. The building is very austere in style, with interwar Art Deco style touches and is competently executed, exhibiting fine workmanship in its brickwork. The building is noted for its use of monochromatic brickwork, stepped parapets, irregular fenestration and engaged piers.	
Rooty Hill	1943-1944	Platform 1/2 Station Building - brick, type 13 (1943) Platform 3/4 Station Building - brick, type 13 (1943) Signal Box (including parcels and booking offices)- (type H) incorporated into station building (1943) 2 x Island Platforms - concrete face (c1943)	Rooty Hill Station platform buildings are of aesthetic significance as examples of mid-sized interwar railway functionalist style station buildings in an urban setting. The buildings are noted for their use of finely detailed face brickwork, complex geometric massing, single pitch roofs, detailed fenestration and use of glass bricks. The station buildings form a cohesive group of interwar functionalist station buildings and represent the economic policies of the time.	
<b>Sefton</b>	1924	<b>Platform building, Platform 1/2- Type 11(1924)</b> Platform 1/2, (1924) Canopy, modern Footbridge, (1923, altered; extended c2010)	Sefton Railway Station has local aesthetic significance with its 1920s 'initial island' platform building which has characteristic features of this type of station building in the Sydney Metropolitan Region, namely the linear form, gable roof and integrated awnings.	

Station name	Construction Year/s	Buildings and Structures	Notes	Plate (Source: State Heritage Inventory)
Strathfield	1927	A substantial number of buildings and structures dating from 1927. There were further additions, alterations in 1944 and 1994.	Strathfield Railway Station is of significance as it is a large junction railway station complex and, although having had some alterations and additions, retains a stylistic coherence across its buildings dating essentially from 1927. The platform buildings, which sit as separate structures beneath the canopies, are simple but elegant rectangular brick buildings crowned by a simplified classical cornice.	
Sutherland	1939-1995	Platform 1 Building (1939) type 13 Out of Room (1939) Platform 1 Platform 2/3 Building (1939) type 13 Platform canopies (1992) ; Platforms (2) Former tramway office (1911) Footbridge structure, Stair railings & newel posts (1939) Moveable items (1939) Archaeological remains of tramway.	Sutherland Railway Station is of aesthetic significance for its 1939 interwar functionalist style platform buildings and Out-of-room, which are good representative examples of the style. The 1911 former tramway office is of aesthetic significance as a modest example of the Federation Queen Anne style.	
<b>Sydenham</b>	1884-1962	Platform 1: - Waiting shed (1925) - Parcels office (1962) Platform 2/3 Building (1884) (type 4) Platform 4/5 Building (1884) (type 3) <b>Platform 6 Building (1925) (type 11)</b> Overhead Booking Office (2012) Footbridge & Platform canopy/ies (1986) Gleeson Ave Overbridge (c. 1920s) Footbridge and stairs (2012) Brick Perimeter Walls (1925) Platforms: Platforms 1 and 6: (1925) - Platforms 2/3 and 4/5 (1884)	The Sydenham Railway Station platform buildings are of aesthetic significance as fine examples of railway platform building design from 1884 to 1962. The platform awnings demonstrate the range of awnings used on railway buildings from the small original awning of two bays on the No 2/3 Platform building to the addition of cantilevered awnings on the rear of the buildings. The 1884 platform buildings are of aesthetic significance as good representative examples of their type and the later island platforms illustrates the contrast in styles and philosophy between the different periods of construction. The 1914 footbridge structure and stairs are of aesthetic significance as a representative haunched beam footbridge manufactured by Dorman Long & Co engineers.	
<b>Taree</b>	1929	<b>Station Building, type 11 (1929)</b> Platform Refreshment Rooms (1929) Weighbridge Goods Shed	The Taree railway station and refreshment room buildings contribute to the townscape of Taree as substantial, interwar, brick and timber buildings with cantilevered awnings, double hung timber sash windows, timber doors with transom windows and Federation period finials.	

Station name	Construction Year/s	Buildings and Structures	Notes	Plate (Source: State Heritage Inventory)
Turrella	1925-1931	Platform Building (1931) (type 13) Platform (1931) Overbridge and stairs (2001)	Turrella Railway Station is of aesthetic significance as an example of a small interwar period suburban railway building matching other East Hills line railway station buildings in design and style. The building is very austere in style, with interwar Art Deco style touches (for example brick strapwork detail to parapets).	
<b>Villawood</b>	1924-1979	<b>Platform Building, (Type 11) (1924)</b> Booking Office, (1979) Platform 1/2, (1924) Pedestrian Footbridge & Stairs, (1924) Safe (green). Wooden roll-over indicator boards.	Villawood Railway Station has local aesthetic significance with its 1920s initial island platform building which has characteristic features of this type of station building namely the linear form, gable roof and integrated awnings. The form, fabric and detailing of this building characterises the type of construction and architectural style employed in early 20th century railway station buildings in the Sydney region.	
<b>Wickham Railway Station</b>	1936	<b>Station Building, Platform 1 - type 11 (1936)</b> <b>Station Buildings, Platform 2 - type 11 (1936)</b> Signal Box, type O (1966)  STRUCTURES Platforms (1936) Footbridge (c.1992)	The site has aesthetic significance at a local level, associated with the station buildings. The buildings are an example of a small railway station dating from the 1930s, with simple and traditional materials and details. While many railway stations constructed during this period were designed in a contemporary interwar architectural style, Wickham Railway Station is unusual in that it was constructed with a stripped Federation character. The footbridge and signal box do not contribute to the aesthetic significance of the site.	
Wiley Park	1938	Platform building, Platform 1- (Type 13) (1938) Platform building, Platform 2- (Type 13) (1938) Overhead Booking Office, (1938) Platforms 1 and 2, (1938) Footbridge, (1938)	Wiley Park Railway Station has local aesthetic significance with its railway domestic style 1930s buildings located on Platform 1 and 2. The building on Platform 2 has characteristic features of this type of station building, namely a hipped roof and domestic proportions. The overhead booking office dating from 1930s has been altered but it retains significance with its the weatherboard construction and location on the footbridge.	
Willow Tree	1877-1927	Station Building, type 12, (c1927)	The Willow Tree station building has aesthetic value as an intact and attractive, concrete drop slab building featuring double pavilions; a verandah; cantilevered platform awning, and timber windows and doors.	

Station name	Construction Year/s	Buildings and Structures	Notes	Plate (Source: State Heritage Inventory)
Wollongong	1887-1923	<b>Platform 1 Building (1923) (type 11)</b> <b>Platform 1 Refreshment room (1926)</b> Platform 2 Brick sheds (c. 1970s) ;Platform 2 Building (1887) (type 4) ;Platform 2 Refreshment room (1890) ;Train Crew Building (c. 1950s) ;Platforms (x2)	The Wollongong Railway Station platform buildings are of aesthetic significance as fine examples of railway station buildings, including the Victorian Italianate style 1887 3rd class brick platform building, and 1890 refreshment room on Platform 2, and the Federation Queen Anne style influenced 1923 brick platform building and 1926 refreshment room on Platform 1.	
Woolooware	1938-1939	Platform building (1939) (type 13) Platform (1939, 2009) Footbridge/entry structure, stair, lift (2009)	Woolooware Railway Station platform building is of aesthetic significance as a good example of an interwar functionalist station building, part of a cohesive (in design and construction) set of Cronulla line suburban station buildings built from Sutherland to Woolooware, and demonstrative of NSW Railways adaptation of this architectural style.	
Yennora	1927-1955	Platform building, Platform 2 (c.2007) Platform building, Platform 1- (Type 15) (1970s) Platform building, Platform 1- (Type 7) (1934) Booking Office, Platform 1 (c.1934)  STRUCTURES Platforms 1 and 2, (1927) Footbridge, (c.1995) Canopies, (c.2007)	The two small timber structures dating from the 1930s on Platform 1 are not regarded as having a sufficient degree of aesthetic or technical quality to be considered as having local significance in this criterion.	

## Appendix 3

### List of Extant Type I I stripped Federation style buildings

## List of Extant Type 11 stripped Federation style buildings

Station name	Construction Year/s	Buildings and Structures	Status	Plate (Source: State Heritage Inventory)
<b><i>Banksia (Rockdale)</i></b>	1906 - 1923	<p><b>Platform 1 building (1923) type 11</b>  <b>Platform 4 building (1923) type 11</b>            Platforms: Island platform (1906); two perimeter platforms (1923)            Pedestrian subway, steps, booking office (1923)</p>	Extant	
<b><i>Bulli</i></b>	Initial 1887 Later 1923	<p><b>Platform 1 building (1923) (Type 11)</b>            Out of room (1923)            Platform 2 building (1887) (Type 4, third class)            Platform 1 (1923) Platform 2 (1887)            Movable heritage - various            - 1923 Waiting room and ticket office signs attached to Platform 1 building</p>	Extant	
<b><i>Carramar</i></b>	1924, 1928, 2009	<p><b>BUILDINGS</b>  <b>Platform Building (Type 11) (1924)</b>            Booking Office (1938)</p> <p><b>STRUCTURES</b>            Platform 1-2, (1924)            Pedestrian subway &amp; stairs, (1924, extended 2009)</p>	Extant	
<b><i>Chester Hill</i></b>	1924, later modifications	<p><b>Platform Building, (Type 11) (1924)</b>            Platform 1-2, (1924)            Canopies, (c. 1980s; c.1999)            Chester Hill Road Overbridge, (1924; extended south c2010)</p>	Extant	

Station name	Construction Year/s	Buildings and Structures	Status	Plate (Source: State Heritage Inventory)
<b>Condobolin</b>	1898 -1935	<b>Station Building - type 11, brick (1935)</b> and Platform ; Barracks Building - precast concrete drop slab (1921) ; Circular Water Tank on brick base ; Jib Crane and Loading Bank opposite the barracks on the Down side ; Water Column at the country end of the station platform	Extant	
<b>Croydon</b>	1892-1927	Platform Buildings, Platform 1/2 - (Type 13) (1941) <b>Platform Buildings, Platform 3/4 - (Type 11) (1926)</b> Platform Buildings, Platform 5 - (Type 10) (1891) Overhead Booking Office, Platforms: Platform 1/2, (1892) - Platform 3, (1892) - Platform 4, (1923) - Platform 5, (1926)	Extant	
<b>Flemington</b>	1924	<b>Platform buildings, Platform 1/2 (Type 11) (1924)</b> <b>Platform buildings, Platform 3/4 (Type 11) (1924)</b> Overhead Booking Office, (1924) Signal Box, (1929) Canopies, (pre 2001) Platforms: Platform 1/2, (1924), Platform 3/4, (1924) Station footbridge & stairs, (1924)	Extant	
<b>Lindfield</b>	1890-1926	<b>Station Building, Platform 2/3 - type 11 (c.1900)</b> <b>Station Building, Platform 1 - type 11 (c.1922)</b> Signalling Hut, end of Platform 1, (c.1926) Platforms (1900, 1922) Steel Platform Shelters (modern) Footbridge (c.1922) Moveable	Extant	
<b>Lithgow</b>	1924-1925	<b>Station Building - type 11, island building, brick (1925)</b> Former Booking/Parcels office & Goods lift tower - timber (1925) Station Master's residence - 6 Railway Parade (c.1880) Hayley Street Footbridge and Overhead Booking Office (1993) Island platform - brick faced (1925) Old Station Platform - levelled rock face (1877) Eskbank Street Overbridge (1924)	Extant	

Station name	Construction Year/s	Buildings and Structures	Status	Plate (Source: State Heritage Inventory)
<b>Moree</b>	1904-1929	<b>Railway Refreshment Room - type 11 (1929)</b> ; Platform (1904) ; RRR (1929)	Extant	
<b>Mortdale</b>	1922-1980	<b>Platform building (1922) (Type 11)</b> Island Platform (1922) Ellen Street underbridge (1922) Footbridge (c 2004) Platform Canopies (modern)	Extant	
<b>Newtown</b>	1892-	Overhead Booking Office & Concourse, (Type 19) (1892) <b>Platform Building, Platform 1/2- Type 11 (1927)</b>  STRUCTURES Platform 1/2, (1927) Platform Canopies & Stair, (1990s) King Street Overbridge, (1892/1927)	Demolished	
<b>Petersham</b>		Platform Building, Terminus Street (Type 5) (1885, 1954) <b>Platform Building, Platform 1/2 (Type 11) (1926)</b> Signal Box, (1927) Platforms: Platform 1/2, (1926) - Platform to Terminus St Building, (1885) Canopy, modern Footbridge, (1883) Pedestrian Subway and entrances, (1891)	Extant	
<b>Regents Park</b>	1922-1924	<b>Platform building, Platform 1/2 (Type 11) (1924)</b> Former Overhead Booking & Parcels Office, (c.1920) Platform 1-/2, (1924) Canopies, (1999) Footbridge, (1922, 1999)	Extant	

Station name	Construction Year/s	Buildings and Structures	Status	Plate (Source: State Heritage Inventory)
<b>Sefton</b>	1924	<b>Platform building, Platform 1/2- Type 11(1924)</b> Platform 1/2, (1924) Canopy, modern Footbridge, (1923, altered; extended c2010)	Extant	
<b>Sydenham</b>	1884-1962	Platform 1: - Waiting shed (1925) - Parcels office (1962) Platform 2/3 Building (1884) (type 4) Platform 4/5 Building (1884) (type 3) <b>Platform 6 Building (1925) (type 11)</b> Overhead Booking Office (2012) Footbridge & Platform canopy/ies (1986) Gleeson Ave Overbridge (c. 1920s) Footbridge and stairs (2012) Brick Perimeter Walls (1925) Platforms: Platforms 1 and 6: (1925) - Platforms 2/3 and 4/5 (1884)	Extant	
<b>Taree</b>	1929	<b>Station Building, type 11 (1929)</b> Platform Refreshment Rooms (1929) Weighbridge Goods Shed	Extant	
<b>Villawood</b>	1924-1979	<b>Platform Building, (Type 11) (1924)</b> Booking Office, (1979) Platform 1/2, (1924) Pedestrian Footbridge & Stairs, (1924) Safe (green). Wooden roll-over indicator boards.	Extant	
<b>Wollongong</b>	1887-1923	<b>Platform 1 Building (1923) (type 11)</b> <b>Platform 1 Refreshment room (1926)</b> Platform 2 Brick sheds (c. 1970s) ;Platform 2 Building (1887) (type 4) ;Platform 2 Refreshment room (1890) ;Train Crew Building (c. 1950s) ;Platforms (x2)	Extant	

# Appendix 4

## Comparative Analysis of Signal Boxes

## Signal Boxes Comparative Analysis (extracts from Railway Signal Boxes in the Newcastle Area. An assessment of cultural significance)

Station name	Construction Year/s	Buildings	Notes	Plate
Newcastle	1936	Brick and weatherboard two storey signal box with tiled hip roof	<p>The signal box is built on the down side of the main lines, approximately two hundred yards from the Sydney-end of Newcastle platform. It is built between the main running lines (on the approach to Newcastle terminus) and Scott Street / Wharf Road, a road which skirts Newcastle harbour and parallels the railway. Newcastle Signal Box was built in 1936, and although having some design characteristics of other signal boxes of the same period, it is the only signal box to feature the combination of a tiled, hip roof and a power operated signal frame.</p> <p>Assessed as having State Significance.</p>	
Wickham	1965-1966	Brick two storey signal box	<p>In the 1965 period, the original Wickham Signal Box was closed and a remodelled and more modern structure was built around the original box. The appearance of the 'new' Wickham Signal Box is far removed from the appearance of the original 'Standard' design.</p> <p>Assessed as having Local Significance.</p>	

Station name	Construction Year/s	Buildings	Notes	Plate
Hamilton	1916	Two storey signal box	<p>Hamilton Junction Signal Box was built as a 'Mechanical' signal box, meaning that operation of signals, pointwork and other functions was carried out by use of large, manually operated signal levers which in turn operated signals and points by means of steel cables and metal rodding respectively. Hamilton Junction Signal Box was built on 26 June 1898 replacing an earlier signal box which was built on 22 February 1888. This particular signal box was built as a 'Standard Signal Box' the main construction periods of which was between 1881 and 1916. Some of these types of standard box, of which there were more than 80 built in the state, featured weatherboard construction and corrugated iron roof sheeting (or corrugated asbestos cement sheeting) with gabled roof, but this variant featured all brick construction.</p> <p>Assessed as having State Significance.</p>	 <p>Source: <a href="#">NSW Signal Boxes. NSW Rail Net</a></p>
Woodville Junction	1938	Two storey signal box	<p>Woodville Junction Signal Box was built as a 'Mechanical' signal box, meaning that operation of signals, pointwork and other functions was carried out by use of large, manually operated signal levers which in turn operated signals and points by means of cables and metal rodding respectively. Woodville Junction Signal Box was built on 3 July 1938 replacing an earlier signal box which was built in December 1889. This particular style of signal box was built during the 1935-1947 period, with construction featuring the ground floor / lower level of brickwork, the operating level constructed of timber frame, clad with flat fibro sheeting, with a roof of corrugated fibro sheeting. Seven of this type were built.</p> <p>Assessed as having Local Significance.</p>	 <p>Source: <a href="#">NSW Signal Boxes. NSW Rail Net</a></p>

Station name	Construction Year/s	Buildings	Notes	Plate
Islington	1938	Two storey signal box	<p>Islington Junction Signal Box was built in April 1938, one of eight of similar designs to be erected in the state. Generally speaking, this two storey signal box design featured a lower or ground level of brickwork (sheeted in fibro), with flat asbestos wall sheeting (on a timber frame) on the upper floor and corrugated fibro sheeting on the roof. Islington Junction Signal Box was built as a 'Mechanical' signal box, meaning that control of signals, pointwork and other functions were carried out 'mechanically' using manually operated levers which in turn operate rodding, wires and pulleys.</p> <p>Assessed as having State Significance.</p>	 <p>Source: <a href="#">NSW Signal Boxes. NSW Rail Net</a></p>



# Appendix B – Clause 228 considerations

Clause 228 factor	Summary of results	Potential impact
(a) Any environmental impact on a community	<p>The proposal has the potential to result in a range of amenity related impacts in the vicinity of the works during construction. These impacts would be managed through the implementation of appropriate measures in the CEMP.</p> <p>The main potential for long-term environmental impacts on a community relate to noise associated with operation. These potential impacts would need to be further investigated and mitigated as appropriate during the detailed design phase.</p>	<p>Short-term – a range of amenity impacts to be managed by the CEMP</p> <p>Long-term – noise to be mitigated by the design of the proposal</p>
(b) Any transformation of a locality	The proposal would be predominantly located on land zoned for transport infrastructure in an area in which rail infrastructure and roads are already located. It would not result in the transformation of this locality.	None
(c) Any environmental impact on the ecosystems of the locality	No environmental impact on ecosystems has been predicted.	None
(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality	The proposal would not result in any reduction of these qualities or values.	None
(e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations	<p>The proposal would require the removal of the locally listed Wickham Station. The proposal site also crosses a number of archaeologically sensitive areas which would need to be managed in accordance with the mitigation measures.</p> <p>The proposal site is located in the vicinity of a number of heritage items. The main potential for impacts during construction would be as a result of vibration impacts, which would be managed through the implementation of appropriate measures in the CEMP.</p> <p>Measures are provided to mitigate the potential heritage impacts. The detailed design of the proposal would take into account the heritage significance of the study area, and the location of the proposal site in the Newcastle Heritage Conservation Area. No long-term impacts on heritage are predicted.</p>	<p>Short-term – vibration impacts to be managed by the CEMP, potential for other impacts to be managed by the implementation of mitigation measures.</p> <p>Long-term – none</p>
(f) Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i> )	No impacts on protected fauna within the meaning of the <i>National Parks and Wildlife Act 1974</i> are predicted.	None
(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air	The proposal would not endanger any species of plant, animal or other form of life.	None

Clause 228 factor	Summary of results	Potential impact
(h) Any long-term effects on the environment	Other than the introduction of new structures in the landscape, the proposal would not have any long-term impacts on the environment. Potential noise impacts are considered under (a) above.	None
(i) Any degradation of the quality of the environment	The proposal has the potential to result in minor impacts to environmental quality during the construction period. These impacts would be managed through the implementation of mitigation measures. No long-term impacts to the quality of the environment are predicted. Potential noise impacts are considered under (a) above.	Short-term – minor negative Long-term – none
(j) Any risk to the safety of the environment	The construction of the proposal is not considered to result in any risk to the safety of the environment. Safety in the vicinity of the proposal site would be managed by the construction contractor(s). Safety has also been considered throughout the design development to date and will continue during detailed design, particularly the safety of all road users and customers of light rail.	None
(k) Any reduction in the range of beneficial uses of the environment	The proposal would not result in any reduction in the range of beneficial uses of the environment.	None
(l) Any pollution of the environment	The proposal has the potential to result in minor short-term erosion and air quality impacts during construction. These impacts would be managed through the implementation of the proposal environmental management plan. Operation of the proposal would not produce any additional emissions and no long-term pollution impacts are predicted. Potential noise impacts are considered under (a) above.	Short-term – minor negative Long-term – none
(m) Any environmental problems associated with the disposal of waste	Waste created during construction would be removed from site and recycled where possible.	None
(n) Any increased demands on resources (natural or otherwise) that are, or are likely to become in short supply	The proposal would not increase the demand on any resources that are or are likely to become in short supply.	None
(o) Any cumulative environmental effect with other existing or likely future activities	Construction of the proposal would need to be managed to ensure that the potential for cumulative impacts with other NUTTP projects, particularly the construction of the Wickham Transport Interchange, is minimised.  In the long term, light rail in conjunction with other initiatives by UrbanGrowth NSW is expected to facilitate the transformation of the CBD to a place where people come to live, work and visit.	Short-term – potential impacts to be managed by the CEMP, and in consultation with relevant agencies with respect to other NUTTP projects.  Long-term – beneficial

Clause 228 factor	Summary of results	Potential impact
<p>(p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions</p>	<p>Coastal inundation associated with king tides and coastal processes occurs to a limited degree around Maryville, Wickham, Stockton and Carrington. Although the Newcastle city centre (including the proposal site) is largely protected from coastal inundation, the combination of heavy rainfall events and high coastal water can exacerbate flood levels. The proposal however would not exacerbate any of these existing conditions.</p>	<p>Long term - the potential for flooding to be considered in the design of the proposal.</p>

