



Transport
Roads & Maritime
Services

NEWCASTLE INNER CITY BYPASS, RANKIN PARK TO JESMOND

State Significant Infrastructure Application Report

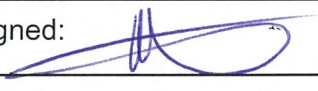
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Executive summary

Introduction and need

Roads and Maritime Services (Roads and Maritime) is seeking approval to construct the fifth and final section of the Newcastle Inner City Bypass between Rankin Park and Jesmond (the project).

The project involves building a 3.4 kilometre (km) four-lane divided road with:

- A grade-separated interchange with Lookout Road and McCaffrey Drive at the southern connection
- Bridge structures along the route to provide drainage, fauna movements and bushwalker access
- Potential for a connection to the rear of the John Hunter Hospital
- A grade-separated interchange at the northern connection with the existing Newcastle Road to Shortland section of the bypass.

The project would provide traffic relief to the surrounding road network and improve traffic flows across the western suburbs of Newcastle. The road network surrounding the project currently suffers from traffic congestion and delays at key intersections. These issues are likely to worsen in the future as traffic volumes increase.

Planning and assessment process

Roads and Maritime has formed the opinion that the project would be likely to significantly affect the environment and require the preparation of an environmental impact statement under the *Environmental Planning and Assessment Act 1979* (EP&A Act). Accordingly, the project is State Significant Infrastructure under Part 5.1 of the EP&A Act. Approval from the Minister for Planning is therefore required for the project.

Proposed scope of the environmental impact statement

The outcomes of preliminary environmental investigations undertaken during development of the project have identified the key environmental issues which will require further detailed assessment and may require project-specific impact mitigation measures. These issues are:

- Biodiversity
- Traffic and access
- Noise and vibration
- Socio-economic, property and land use
- Urban design, landscape character and visual impact.

A number of other environmental issues have also been identified. These issues are outlined within this report and are considered to be of lesser consequence taking into consideration the project scope, the existing environment and the implementation of standard management and safeguard measures.

This report supports an application under Section 115X of the EP&A Act to carry out State Significant Infrastructure. It aims to assist the formulation of environmental assessment requirements by the Secretary under Section 115Y of the EP&A Act.

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Abbreviations and glossary

ABS	Australian Bureau of Statistics
AHD	Annual Height Datum
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
AS	Australian Standard
ASS	Acid Sulfate Soil
Awabakal LALC	Awabakal Local Aboriginal Land Council
BBAM	BioBanking Assessment Methodology
BCAM	Biodiversity Certification Assessment Methodology
BCR	Benefit Cost Ratio
CEMP	Construction Environmental Management Plan
cm	centimetre
CMA	Catchment Management Authority
DECC	Department of Environment and Climate Change
DECCW	Department of Environment, Climate Change and Water (former)
DEWHA	Department of the Environment, Water, Heritage and the Arts (former)
DMR	Department of Mineral Resources
DoE	Department of the Environment
DPI	Department of Primary Industries
DP&E	Department of Planning and Environment
DUAP	Department of Urban Affairs and Planning
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
ENMM	Environmental Noise Management Manual
EPA	Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPL	Environment Protection Licence
ESD	Ecologically sustainable development. Development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased.
FBA	Framework for Biodiversity Assessment
GDEs	Groundwater Dependent Ecosystems
Heritage Act	Heritage Act 1977 (NSW)
ha	Hectares
HW23	State Highway 23
Hz	Hertz
ICNG	Interim Construction Noise Guideline
ICOMOS	International Council on Monuments and Sites
ISEPP	State Environmental Planning Policy (Infrastructure) 2007
km	kilometre

km/hr	kilometre per hour
LEP	Local Environmental Plan
LGA	Local Government Area
LHCCREMS	Lower Hunter and Central Coast Regional Environmental Management Strategy
m	metre
MNES	Matters of national environmental significance. Refers to the nine matters
MR	Main Road
NCC	Newcastle City Council
Noxious Weeds Act	Noxious Weeds Act 1993 (NSW)
NOW	NSW Office of Water
NPI	National Pollutant Inventory
NPW Act	National Parks and Wildlife Act 1974 (NSW)
NPWS	National Parks and Wildlife Service
NT Act	Native Title Act 1993 (NSW)
NSW	New South Wales
OEH	Office of Environment and Heritage
PACHCI	Procedure for Aboriginal Cultural Heritage Consultation and Investigation
PADs	Potential Archaeological Deposits
PEI	Preliminary Environmental Investigation
PoEO Act	Protection of the Environment Operations Act 1997
PPV	Peak Particle Velocity
Roads Act	Roads Act 1993 (NSW)
RBL	Relative Background Noise Level
REF	Review of Environmental Factors
REP	Regional Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act.
RNP	NSW Road Noise Policy
Roads and Maritime	Roads and Maritime Services
SEPP	State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act
SEPP 19	State Environmental Planning Policy No.19 – Bushland in Urban Areas
SEPP 44	State Environmental Planning Policy No.44 – Koala Habitat Protection
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities
SIS	Species Impact Statement
SOHI	Statement of Heritage Impacts
SRD SEPP	State Environmental Planning Policy (State and Regional Development) 2011
SSI	State Significant Infrastructure
TSC Act	Threatened Species Conservation Act 1995
VDV	Vibration Dose Values
WONS	Weeds of National Significance
WM Act	Water Management Act 2000 (NSW)
WSP	Water Sharing Plan

1 Introduction

1.1 Overview of the project

Roads and Maritime Services (Roads and Maritime) is seeking approval to construct the fifth and final section of the Newcastle Inner City Bypass between Rankin Park and Jesmond (the project).

The project would involve the construction of a new 3.4 kilometre (km) four-lane dual carriageway highway between the intersection of McCaffrey Drive and Lookout Road, New Lambton Heights and the intersection of Newcastle Road and Main Road at Jesmond. The project is located within the Newcastle Local Government Area (LGA), about 11 km west of the Newcastle Central Business District and about 160 km north of Sydney, NSW (refer to Figure 1.1).

The project corridor would likely be largely contained within an area zoned as infrastructure in the Newcastle City Councils Local Environmental Plan 2012 (Newcastle LEP 2012). Key features of the project are shown on Figure 1.2 and include:

- A grade-separated interchange with Lookout Road and McCaffrey Drive at the southern connection
- Bridge structures along the route to provide drainage, fauna movements and bushwalker access
- Potential for a connection to the rear of the John Hunter Hospital
- A grade-separated interchange at the northern connection with the existing Newcastle Road to Shortland section of the bypass.

The project would finalise construction of the Newcastle Inner City Bypass, which provides improved traffic flows across the western suburbs of Newcastle and connects key regional destinations such as Bennetts Green, Charlestown and Jesmond shopping centres, John Hunter Hospital, Newcastle University and the Pacific Highway.

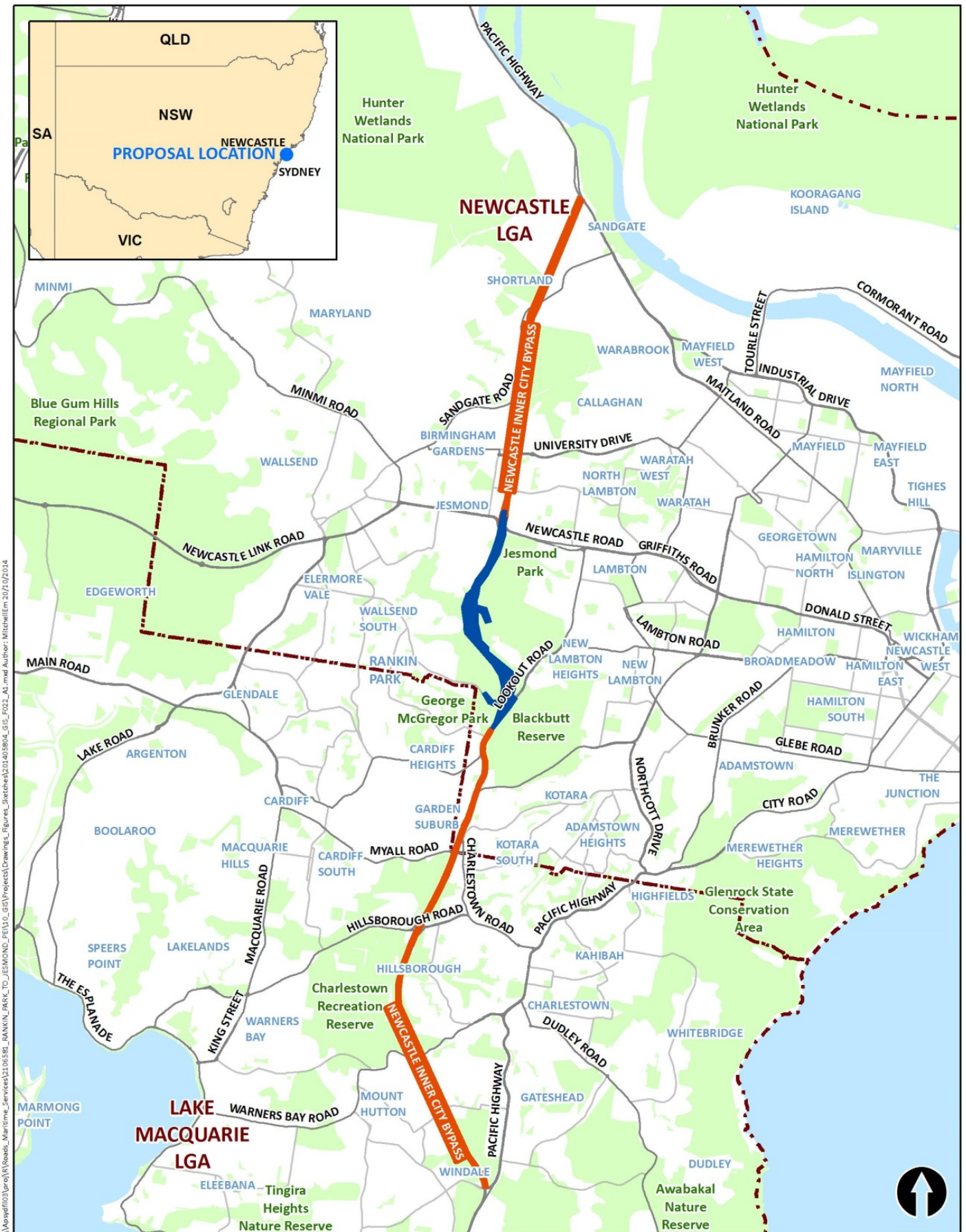
1.2 Purpose of this report

Roads and Maritime has prepared this application report to support a State significant infrastructure application under section 115X of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

Roads and Maritime has formed the opinion that the project would be likely to significantly affect the environment and would require an environmental impact statement to be obtained under Part 5 of the EP&A Act. The project does not require development consent under Part 4 of the EP&A Act. The project falls under clause 1, Schedule 3 of State Environmental Planning Policy (State and Regional Development) 2011.

In addition, Roads and Maritime requests the Minister for Planning and Environment to specifically declare that the project is State significant infrastructure (SSI) under section 115U (4) of the EP&A Act.

The requirements of clause 192 of the *Environmental Planning and Assessment Regulation 2000* for applications seeking approval of the Minister for Planning to carry out State significant infrastructure are addressed in Appendix A to this report.



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- Major road
- Road
- Proposal corridor
- Newcastle Inner City Bypass
- Local government area
- National Parks and Wildlife Service Estate and bushland reserves

Figure 1.1
Locality plan

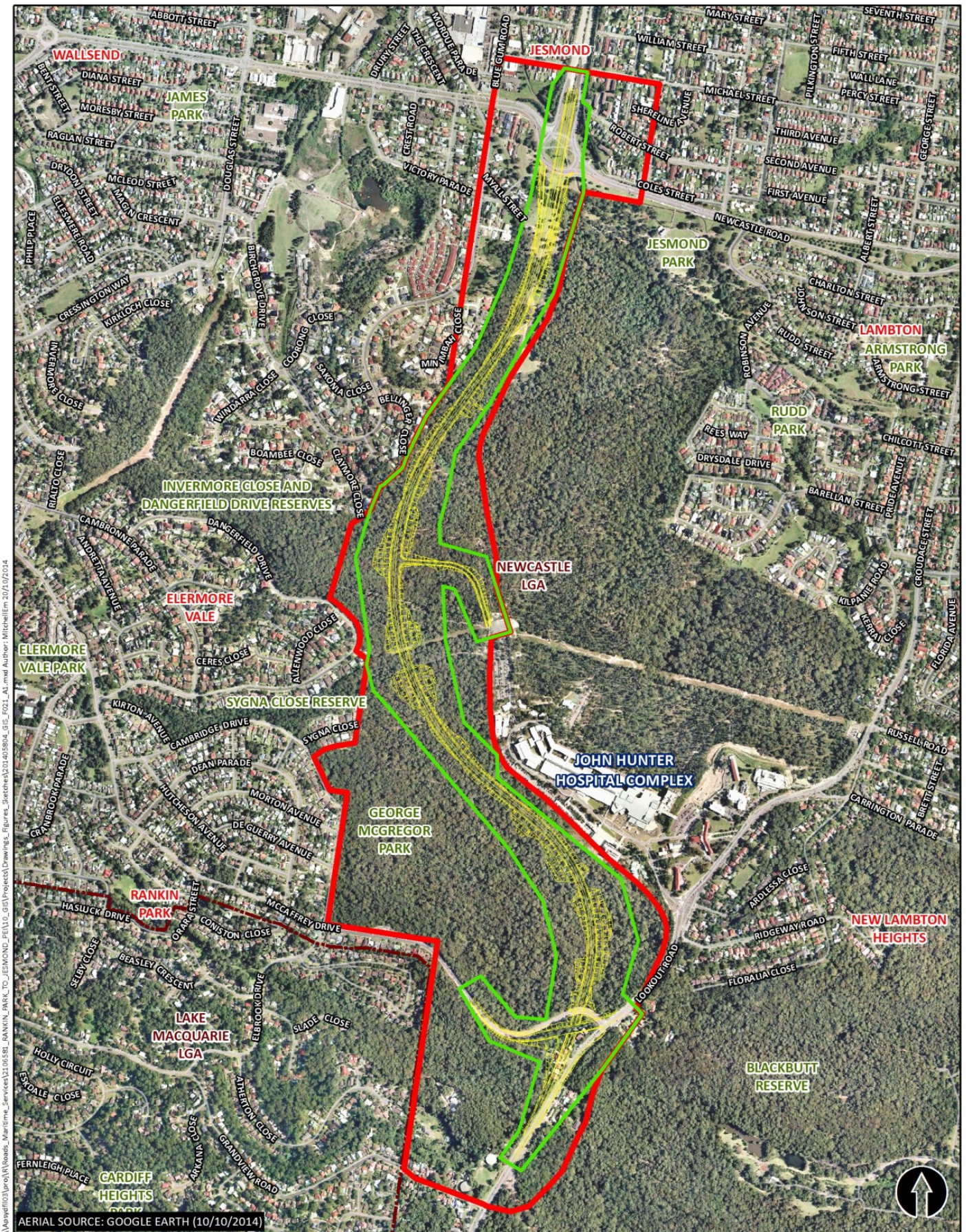


Figure 1.2
Proposal overview

The purpose of this application report is to assist the formulation of environmental assessment requirements by the Secretary under section 115Y of the EP&A Act. The application report does the following:

- Describes the project
- Considers the potential environmental issues for the project
- Identifies key environmental issues for the project
- Identifies the proposed scope of the environmental assessment and proposed further assessments.

The application report and Secretary's environmental assessment requirements (SEARs) would inform the preparation of an environmental impact statement for the project. The form and content of the environmental impact statement would be in accordance with clauses 6 and 7 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000.

2 Background

2.1 Strategic context and project need

The Newcastle Inner City Bypass (known as State Highway 23, HW23) is part of Roads and Maritime's long-term strategy to provide an orbital road within Newcastle's road network. The bypass was first planned in the 1950s and incorporated into the Northumberland County Planning Scheme in 1957.

Sections of the Newcastle Inner City Bypass have opened progressively since the early 1980s as outlined in Table 2.1.

Table 2.1 Newcastle Inner City Bypass sections

Section	Route	Length	Status
A	Charlestown Bypass	6.0 km	Completed in 2003
B	Kotara Heights to Rankin Park	2.4 km	Completed in 1983
C	Rankin Park to Jesmond	3.4 km	Currently being planned (subject of this report)
D	Jesmond to Shortland	3.2 km	Completed in 1993
E	Shortland to Sandgate	2.3 km	Completed in 2014

These five sections of the Newcastle Inner City Bypass are shown on Figure 2.1 below.

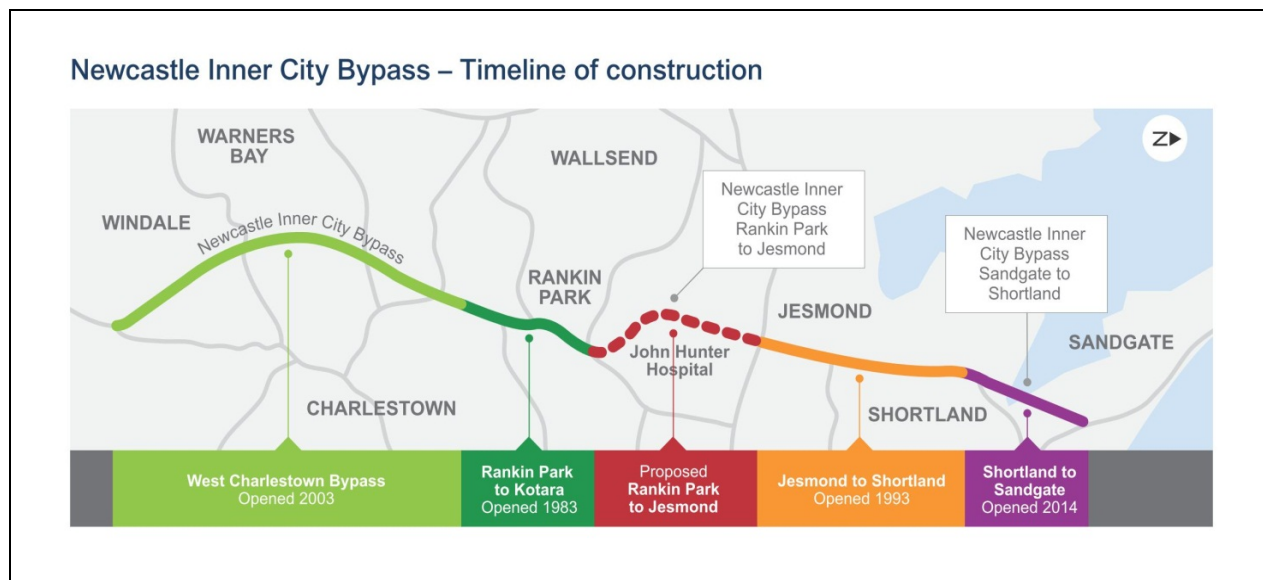


Figure 2.1 Newcastle Inner City Bypass

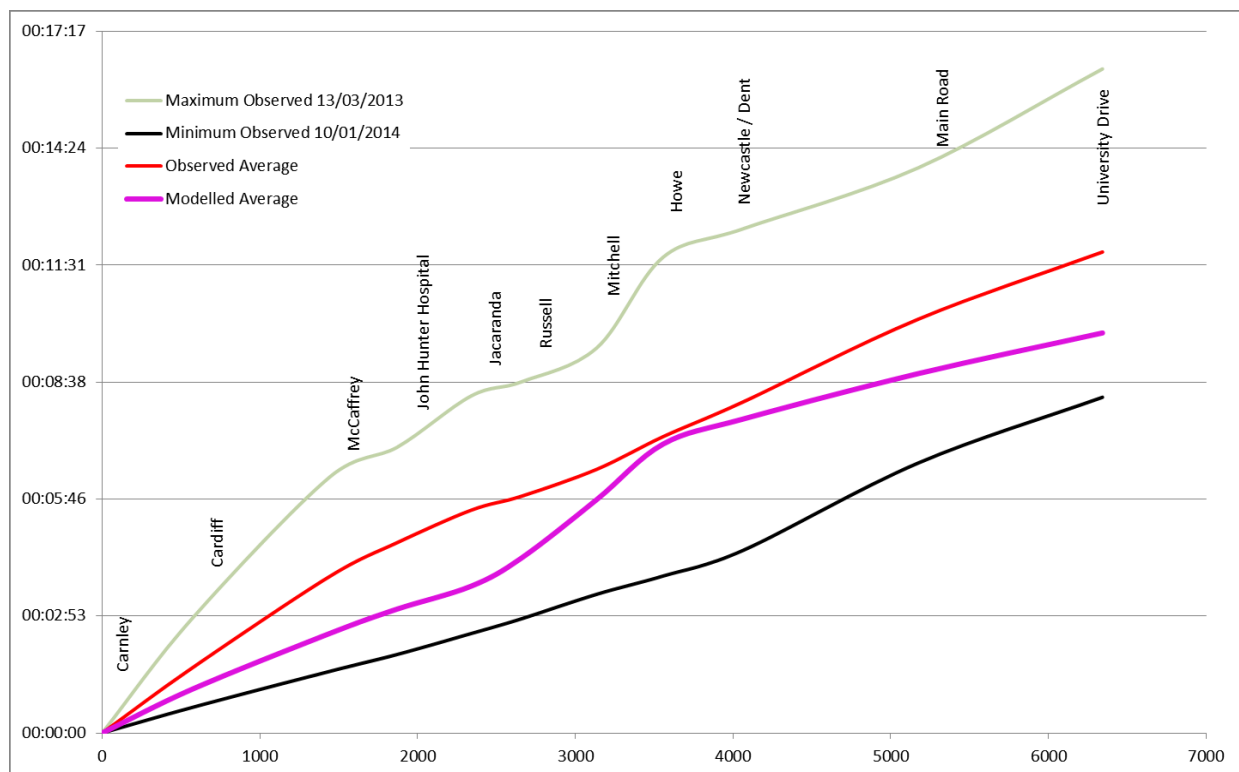
Construction of the project would finalise the Newcastle Inner City Bypass and provide traffic relief to the surrounding road network, in particular the existing route of Lookout Road, Croudace Street and Newcastle Road.

The road network surrounding the project currently suffers from traffic congestion and delays at key intersections. These issues are likely to worsen in the future as traffic volumes increase, with

existing traffic volumes along this route currently in the order of 40,000 to 60,000 vehicles per day . The construction of the Rankin Park to Jesmond section would provide free flow north-south travel conditions and bypass 11 sets of traffic control signals along the existing route.

The risk of maintaining the current configuration of the network is increased congestion and the costs to the community of that congestion.

A preliminary traffic study has been undertaken for the project (AECOM 2014). Figure 2.2 from this study shows that at present the northbound travel time from Rankin Park to Jesmond varies from about eight to 16 minutes, which is a variance in the order of eight minutes. This variance is due to the number of signalised intersections along the corridor and the delays associated with these signals.



Source: AECOM 2014

Figure 2.2 Travel time surveys and modelled average

Roads and Maritime's Lower Hunter Traffic Model (LHTM) identified that the traffic within the study area would increase from about 27,000 trips during the AM peak in 2016 to about 31,500 trips in 2031. This equates to a traffic growth rate of about 1.0 per cent per annum along the route.

Based on 1.0 per cent per annum traffic growth, preliminary traffic modelling has been undertaken to analyse forecast travel times data between south of McCaffrey Drive and south of University Drive for the 2019 and 2029 'do nothing' traffic models. The results of this modelling is provided in Table 2.2.

Table 2.2 Preliminary traffic modelling findings

Travel surveys	AM Peak Hour Travel Time (minutes)
	Northbound
2014 modelled average travel time	8:46
2019 modelled average travel time – do nothing	11:49
2019 modelled average travel time with bypass	2:54 (-8:55)
2029 modelled average travel time – do nothing	12:40
2029 modelled average travel time – with bypass	2:55 (-9:45)

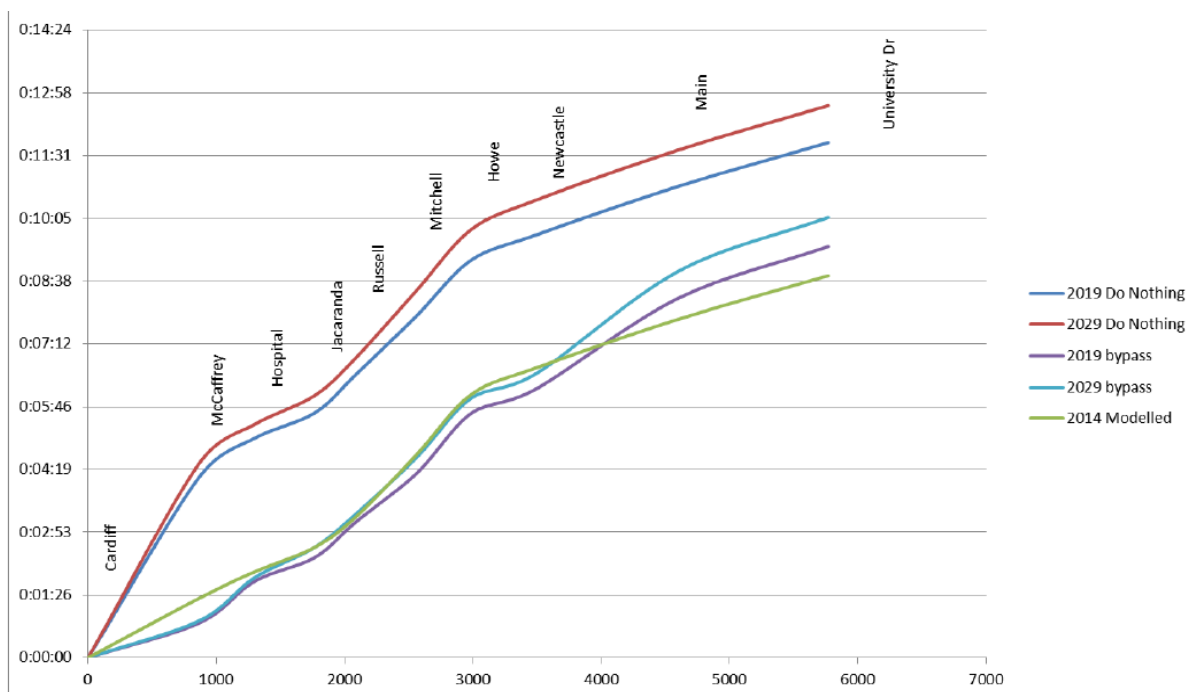
Source: AECOM 2014

Table 2.2 shows that without the proposed project, northbound travel times during the AM peak will increase significantly by 2029, by a magnitude of approximately four minutes. This represents an increase of about 45 per cent, when compared to current conditions.

The travel time data presented in Table 2.2 shows that with virtually free flowing conditions along the bypass, travel times from south of McCaffrey Drive to University Drive would reduce by about 75 per cent in 2019 and 77 per cent in 2029, as the route bypasses up to eleven sets of traffic signals.

The preliminary traffic modelling confirms the effectiveness of the bypass in reducing travel times as shown in Table 2.2.

Even when comparing the travel times of vehicles on the non-bypass route, between McCaffrey Drive and University Drive, the bypass provides improved travel time conditions, as evidenced by the travel time comparison shown in Figure 2.3.



Source: AECOM, 2014

Figure 2.3 Travel time comparison for 2019 and 2029

2.1.1 Relevant strategies and plans

The project is consistent with the following relevant strategic plans:

- *NSW State Infrastructure Strategy 2012* – The project would support the Strategy's transport goals by finalising the construction of a regional highway and improving efficiency of traffic movements within Newcastle.
- *NSW State Plan 2021* – The project would support the Plan's transport and safety goals by relieving traffic congestion on the existing Lookout Road, Croudace Street and Newcastle Road route. The project would also create a new travel route with fewer intersections and more consistent speed zones than current transport routes through the area.
- *NSW Long Term Transport Master Plan* – The project would meet the objectives of the Long Term Transport Master Plan by creating a safer travel environment for users of the surrounding road network.

2.2 Project objectives

The project has the following key objectives:

- Provide continuity of the Newcastle Inner City Bypass between Bennetts Green and Sandgate
- Reduce travel times and the level of congestion on the existing route and the Newcastle Inner City Bypass
- Provide traffic relief on the surrounding road network.

In so doing, it is intended to (i) provide value for money, (ii) improve road safety and (iii) minimise impacts on the natural and built environment.

2.3 Selection of the preferred project

The bypass was first planned in the 1950s and incorporated into the Northumberland County Planning Scheme in 1957.

In 1985, an EIS was completed for the Rankin Park to Jesmond section. The assessment investigated various route options to integrate with John Hunter Hospital. The preferred route corridor was updated in the Local Environment Plan for Newcastle City Council.

In 2006 Roads and Maritime completed a route options study for the project. This study investigated four route options (refer to Figure 2.4) and identified a preferred option, which is the subject of this SSI application report (refer to Figure 1.2).

The preferred route was displayed for community comment in 2007 (refer to Section 2.4). The preferred option was subsequently finalised and the preferred route corridor updated in Newcastle City Council's Local Environmental Plan 2012 (Newcastle LEP 2012) as shown on Figure 1.2.

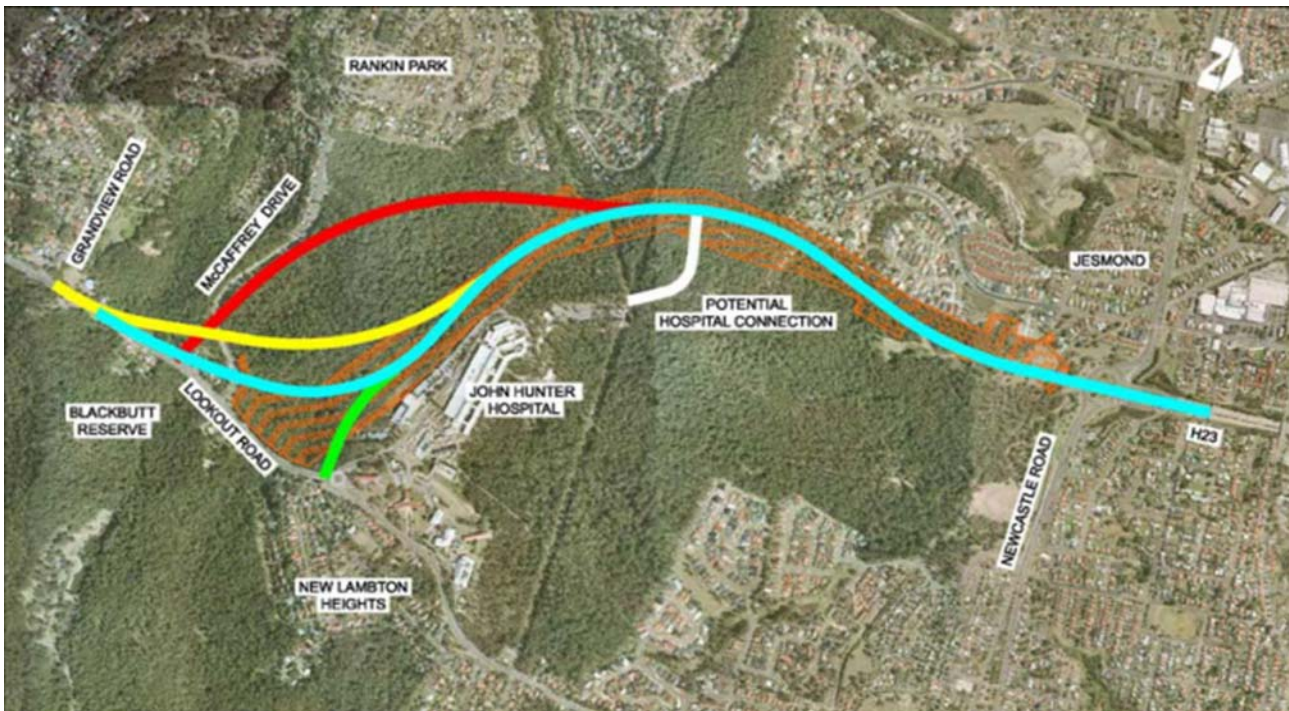


Figure 2.4 Four route options (Connell Wagner 2007)

The preferred option was considered to provide the best overall balance between functional, geotechnical, engineering and economic consideration as it was considered to:

- Provide the greatest benefits from a traffic management perspective, with a major southern connection interchange incorporating the existing McCaffrey Drive intersection
- Minimise severance of the bushland corridor with an easterly sweep of the deep valley area between McCaffrey Drive and the John Hunter Hospital
- Minimise impact on George McGregor Park
- Minimise risk associated with mine subsidence areas
- Minimise deviation from existing LEP route corridor
- Provide the highest Benefit Cost Ratio (BCR).

2.4 Community involvement in selection of a preferred option

The preferred route was displayed for comment in 2007. A submissions report was prepared by the Roads and Maritime in 2008 to document submissions from the public display (RTA 2008). A total of 38 submissions were received from the community and the following stakeholders:

- Local Member for Parliament
- Local resident group
- Hunter Environmental Lobby Inc.
- Milton Cain Christian Democratic Party
- New Lambton Residents Association
- Lake Macquarie City Council
- Hunter New England Area Health Service
- National Parks Association of NSW
- Hunter International Sport Centre Trust.

The project received a number of submissions of support, while other submissions raised concerns, including:

- Private property acquisition and compensation
- Impacts to biodiversity
- Assessment of environmental impacts
- Removal of bushwalking and mountain biking tracks within the study area
- Proposed interchange design of the project and McCaffrey Drive/Lookout Road
- Proposed intersection design of the project and John Hunter Hospital.

These submissions were used to inform and develop the strategic design for the project. The strategic design will be reviewed and developed further throughout the environmental assessment process and will be used to determine the concept design and preferred route, which would be presented in the project EIS.

2.5 Ongoing consultation

Further consultation with the community and relevant stakeholders will be undertaken throughout development of the project. In particular the community would be encouraged to provide feedback on the concept design and the environment assessment. A community and stakeholder engagement plan has been prepared for the project. A review of the relevant state and commonwealth government agencies and external stakeholders that may need to be consulted with as part of the project was undertaken. These include:

- Transport for NSW
- Department of Planning and Environment (DP&E)
- NSW Office of Environment and Heritage (OEHS)
- Department of Primary Industries (DPI)
- Department of the Environment (DoE)
- National Parks and Wildlife Service (NPWS)
- NSW Office of Water (NOW)
- Newcastle City Council (NCC)
- NSW Health Infrastructure
- Hunter New England Local Health District
- Fire and Rescue NSW
- NSW Rural Fire Services
- Hunter Water Corporation
- Energy Australia
- Ausgrid
- Jemena
- Emergency services
- Hunter Environmental Lobby Inc.
- New Lambton Residents Association
- Lake Macquarie City Council
- Local Aboriginal Land Councils and other Aboriginal groups as applicable
- Native Title Claimants as applicable
- Affected residents and other commercial businesses.

3 Project description

3.1 The project

The project would involve the construction of a new 3.4 km four-lane dual carriageway highway between the intersection of McCaffrey Drive and Lookout Road, Rankin Park and the intersection of Newcastle Road and Main Road at Jesmond (refer to Figure 1.1).

Key features of the project are shown on Figure 1.2 and include:

- *Roadway* – the new roadway would consist of two lanes in each direction, separated by a median along the length of the project. The roadway would be constructed on large cut and fill embankments which would be required due to the steeply undulating terrain.
- *Interchanges* – a northern and a southern interchange would be constructed at either end of the project, to enable connections with the existing sections of the Newcastle Inner City Bypass and key arterial roads such as Newcastle Road, McCaffrey Drive and Lookout Road.

Construction of the interchanges would involve modification of the existing intersections of Lookout Road and McCaffrey Drive and Newcastle Road and the existing Jesmond to Shortland section of the Newcastle Inner City Bypass. A potential western connection to the rear of the John Hunter Hospital would also be investigated during further design studies, in conjunction with NSW Health Infrastructure.

- *Bridge structures* – bridges may be constructed to provide for access and fauna movements. The location and design of these structures would be confirmed in the EIS.

A conceptual overview of the project was developed based on the strategic design and is shown in Figure 3.1.

The strategic design for the project will be refined as part of the environmental assessment and concept design phase of the project to determine the preferred design. The preferred design would be presented in the EIS.



Figure 3.1 Conceptual view of the strategic design as displayed in 2007, which will be refined as part of the environmental assessment and concept design phase (Roads and Maritime 2014)

3.2 Ancillary works

Ancillary works would be required to enable the construction of the project. The type and extent of ancillary works required would depend on the construction methodology and construction techniques chosen by the construction contractor.

Ancillary works associated with the project could include:

- Demolition of houses and other structures
- Public utility adjustments, relocation and protection
- Establishment of construction site compounds and stockpiles
- Installation of temporary noise barriers, sediment and erosion control measures and other environmental controls
- Installation of road signs and traffic controls
- Construction of temporary access roads and car parks
- Installation of construction site offices, staff amenities and equipment storage areas
- Construction of hardstand areas
- Use of concrete batching plant(s)
- Mine subsidence remediation works.

The location and size of ancillary construction facilities would be developed as part of the preferred concept design and reflected in the EIS. In determination of these facilities, existing land use activities, potential environmental impacts and amenity impacts on the surrounding community would be taken into account.

4 Key environmental issues

4.1 Overview

The outcomes of the preliminary environmental investigations undertaken for the project to date have identified a number of key environmental issues relating to both its construction and operation. Key environmental issues are those that may have high or moderate impacts (actual or perceived) and assessment is necessary to determine the level of potential impact and to develop appropriate measures to mitigate and manage the impacts. These issues are:

- Biodiversity
- Traffic and access
- Noise and vibration
- Socio-economic, property and land use
- Urban design, landscape character and visual impact.

These key environmental issues require detailed assessment during preparation of an environmental impact statement for the project and may require project-specific impact mitigation measures.

Other environmental issues have also been identified. These include:

- Hydrology and flooding
- Soils and water, contamination and mine subsidence
- Aboriginal Heritage
- Non-Aboriginal heritage
- Air quality
- Resource management and waste minimisation
- Greenhouse gas and climate change
- Hazards and risk.

These issues are outlined in more detail in Section 5 and are considered likely to be of lesser consequence taking into consideration the project scope, the existing environment and the implementation of standard management and safeguard measures. It is expected that these other environment issues would not likely be key issues; however the potential impact of these other environmental issues would be assessed further in any future environmental impact statement for the project.

4.2 Biodiversity

4.2.1 Overview

The study area (as shown in Figure 4.1) is located in the Sydney Basin Bioregion and is surrounded by urban development, however it is wholly contained within a large remnant of good quality native vegetation owned by Roads and Maritime, Newcastle City Council (NCC) and Hunter New England Health, and is surrounded by a number of parks and reserves. The study area also adjoins a large urban bushland reserve area, Blackbutt Reserve (refer to Figure 1.2). The total extent of native vegetation within the study area is about 122 hectares (ha).

The vegetation within the study area provides good quality habitat for a number of threatened flora and fauna species. Minor disturbances present within the area include fire access, walking and mountain bike tracks and minor weed invasion within the creek lines and gullies typically dominated by the weed *Lantana camara*. Edge effects from the John Hunter Hospital complex are currently having an impact upon the study area, these include asset protection zones, which involves removal of understorey vegetation and fire trails which surround the hospital for bushfire protection.

Biodiversity investigations were undertaken within the study area during July, August, September, October and November 2014. These included:

- Review of previous studies undertaken in the study area
- Searches of threatened species databases to determine the likelihood of threatened species occurring within a 10 km radius of the study area
- Targeted surveys for threatened species known from the study area. or within a 10 km radius of the study area.

The following sections discuss the findings of these investigations.

Vegetation communities

Vegetation communities were identified within the study area through field surveys and analysis of regional vegetation mapping (LHCCREMS 2003) and are described in Table 4.1 and shown on Figure 4.1.

Table 4.1 Identified vegetation communities (Parsons Brinckerhoff 2014)

Vegetation Community (Parsons Brinckerhoff 2014)	Endangered Ecological Community listed under the TSC Act ²
HU631 Spotted Gum – Grey Ironbark open forest – atypical variant	No
HU631 Spotted Gum – Grey Ironbark open forest – <i>Eucalyptus fergusonii</i> variant	No
HU629 Spotted Gum – Broad-leaved Ironbark Grassy Open Forest	Possibly – equivalent to Lower Hunter Spotted Gum Ironbark Forest
HU621 Smooth-barked Apple – Red Bloodwood open forest	No
HU622 Smooth-barked Apple – Sydney Peppermint – Turpentine open forest	No
HU637 Sydney Blue Gum – White Mahogany shrubby tall open forest – <i>Eucalyptus acmenoides</i> variant ¹	No
HU637 Sydney Blue Gum – White Mahogany shrubby tall open forest – atypical variant	No
Planted Vegetation	No
Exotic Vegetation	No

(1) This variant contained no *Eucalyptus saligna* (Sydney Blue Gum) it varied in the dominant canopy species was *Eucalyptus acmenoides* (White Mahogany) and *Syncarpia glomulifera* (Turpentine).

(2) *Threatened Species Conservation Act 1995* (NSW)

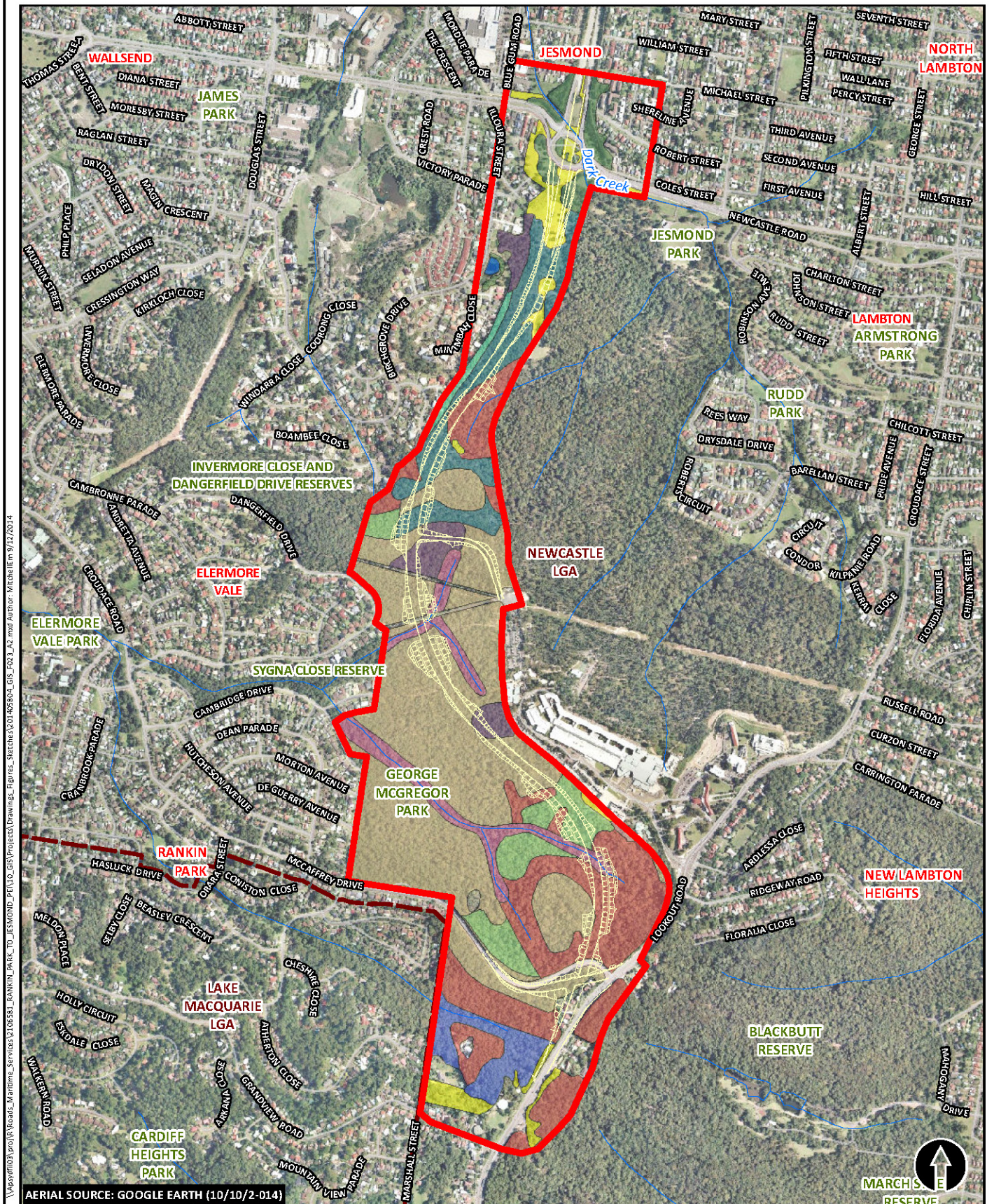
Vegetation communities within the study area are in reasonably good condition, due to the limited history of disturbance and intact connectivity to reserves and parklands to the east. This connectivity has been dissected by Lookout Road which fragments the larger areas of bushland to

the east and west of the study area. Exotic vegetation is more likely to occur within the northern section adjoining Jesmond Park and Newcastle Road, and a transmission easement which crosses the study area to the north of John Hunter Hospital.

Preliminary assessment of the study area (Parsons Brinckerhoff 2014) has identified the potential for the EEC Lower Hunter Spotted Gum Ironbark Forest to be present. Further assessment is warranted to confirm the presence of this community within the study area.

None of the remaining vegetation communities likely to occur within the study area are likely to be nationally or state listed EECs.

No endangered populations are considered likely to occur within the study area.



- | | | | |
|--|---|---|---|
| <ul style="list-style-type: none"> Local roads Creek lines Road design Study area Local government area | <p>Vegetation communities</p> <ul style="list-style-type: none"> Dam Exotic vegetation HU621 - Smooth-barked Apple - Red Bloodwood open forest HU622 - Smooth-barked Apple - Sydney Peppermint - Turpentine heathy open forest Potential HU629 - Spotted Gum - Broad-leaved Ironbark grassy open forest (EEC) | <ul style="list-style-type: none"> Potential HU629 - Spotted Gum - Broad-leaved Ironbark grassy open forest - Canopy only (EEC) HU631 - Spotted Gum - Grey Ironbark open forest - atypical variant HU631 - Spotted Gum - Grey Ironbark open forest - Eucalyptus fergusonii variant | <ul style="list-style-type: none"> HU631 - Spotted Gum - Grey Ironbark open forest - Canopy only HU637 - Sydney Blue Gum - White Mahogany shrubby tall open forest - atypical variant HU637 - Sydney Blue Gum - White Mahogany tall open forest - Syncarpia glomulifera variant Planted and parkland vegetation |
|--|---|---|---|

Figure 4.1
Vegetation communities
(Parsons Brinckerhoff 2014)

Fauna habitats

The suitability, size and configuration of fauna habitats within the study area correlates broadly with the vegetation communities described above. These habitats include (but are not necessarily limited to) those detailed in Table 4.2.

Table 4.2 Identified fauna habitats

Fauna habitat	Corresponding vegetation community	Potential habitat for threatened fauna species
Dry forest	Spotted Gum – Grey Ironbark open forest – atypical variant, Spotted Gum – Grey Ironbark open forest – <i>Eucalyptus fergusonii</i> variant, Spotted Gum – Broad-leaved Ironbark Grassy Open Forest, Smooth-barked Apple – Red Bloodwood open forest, Smooth-barked Apple – Sydney Peppermint – Turpentine open forest	Powerful Owl and other large forest owls; Squirrel Glider; micro bats
Wet forest	Sydney Blue Gum – White Mahogany shrubby tall open forest – atypical variant, Sydney Blue Gum – White Mahogany shrubby tall open forest – <i>Eucalyptus acmenoides</i> variant	Powerful Owl and other large forest owls; Squirrel Glider; micro bats
Aquatic habitat	Constructed Dam	–
Cleared land with scattered trees	Exotic Vegetation and Planted Vegetation	–

Due to the diversity and relatively large extent of fauna habitats in the study area, it is considered likely that such areas would provide a range of foraging substrates, nesting opportunities and shelter locations for a large variety of fauna, including threatened species. Umwelt (2006a) reported large numbers of hollow-bearing trees within the study area which would provide habitat for a range of arboreal species, nesting opportunities for birds and roosting habitat for microbats.

A detailed survey for hollow-bearing trees was undertaken within the study area in 2014 (Parsons Brinckerhoff 2014), with particular regard to hollows potentially suitable for the Powerful Owl (*Ninox strenua*). Aquatic habitats within the study area are largely restricted to several ephemeral drainage lines that dissect the study area, including Dark Creek and Ironbark Creek that occur in the north and south of the study area respectively. These streams are likely to be commensurate with a Class 3 or Class 4 waterway (Fairfull and Witheridge 2003).

Fauna habitats are likely to be degraded in areas adjacent to nearby road infrastructure, residential premises and the existing John Hunter Hospital complex, as these areas are likely to be subject to varying historical and contemporary disturbance regimes.

Overall, the majority of fauna habitat within the study area is likely to be in good condition, providing potential habitat for a variety of fauna species with habitats likely providing a diverse native understorey, canopy connectivity, tree hollows and other important fauna habitat attributes.

Habitat connectivity and wildlife corridors

Wildlife corridors are generally links of native vegetation that join two or more areas of similar habitat, and are critical for sustaining ecological processes, such as provision for animal movement and the maintenance of viable populations.

Habitat in the study area is largely intact and forms part of a large isolated patch of remnant bushland surrounded by broad scale urban development, including the John Hunter Hospital complex. This remnant patch includes Blackbutt Reserve which is separated from the study area's eastern boundary by Lookout Road.

Blackbutt Reserve contains known habitat for a number of threatened species listed under the TSC Act, including a locally significant Grey-headed Flying Fox camp and breeding sites for the Powerful Owl (Umwelt 2006a). Connectivity between the study area and Blackbutt Reserve for these mobile species provides a larger area of foraging habitat. To the west the study area has fragmented connectivity to Blue Gum Regional Park and areas of native bushland adjoining the Newcastle Link Road. North of the study area the suburbs of Jesmond and the University of Newcastle separate the bushland from large wetland habitats associated with the Hunter River Estuary (including the Hunter Wetlands National Park). To the north-east, the suburbs of Waratah and Mayfield separate the study area from the South arm of the Hunter River in which Kooragang Island estuarine habitats such as mangroves, saltmarsh and wetlands are located. To the south of the study area is fragmented urban bushland of Charlestown Recreation Reserve and Tingira Heights Nature Reserve, and the large expanse of Lake Macquarie.

Threatened species of flora

Of the flora species identified by database searches, 24 threatened species of flora have the potential to occur within the study area. Of these, six are considered to have moderate to high likelihood of occurring in the study area (refer to Table 4.3).

Table 4.3 Threatened species of plant likely to occur in the study area

Scientific name	Common name	Status		Likelihood of occurrence ³
		TSC Act ¹	EPBC Act ²	
<i>Caladenia tessellata</i>	Thick-lipped Spider Orchid	E1	V	Moderate
<i>Callistemon linearifolius</i>	Netted Bottlebrush	V	V	Moderate
<i>Cryptostylis hunteriana</i>	Leafless Tongue Orchid	V	V	Moderate
<i>Diuris praecox</i>	Rough Double Tail	V	V	Moderate
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Small-flower Grevillea	V	V	Recorded (Parsons Brinckerhoff, 2014)
<i>Rutidosia heterogama</i>	Heath Wrinklewort	V	V	Moderate
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	E1	V	Potential record (Parsons Brinckerhoff, 2014)
<i>Tetradlea juncea</i>	Black-eyed Susan	V	V	Recorded (Umwelt 2006) and Parsons Brinckerhoff 2014

(1) Listed as Vulnerable (V) or Endangered (E1) under the TSC Act.

(2) Listed as Vulnerable (V) under the EPBC Act.

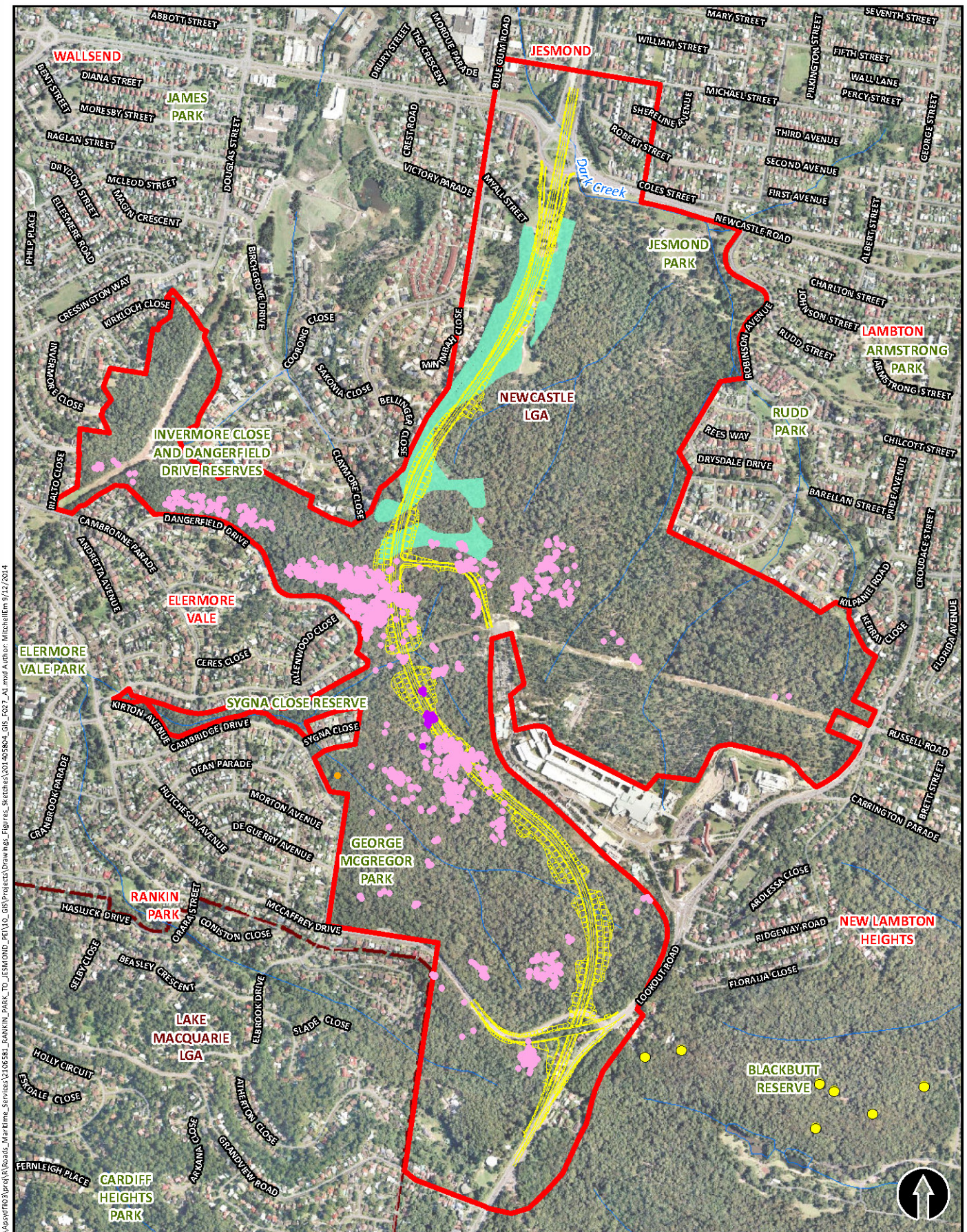
(3) Please refer to Appendix C for likelihood of occurrence assessments

(4) Survey techniques as per *Environment Protection and Biodiversity Conservation Act 1999* referral guidelines for the vulnerable Black-eyed Susan *Tetradlea juncea* (2011).

Field surveys (Parsons Brinckerhoff 2014) recorded three threatened flora species as occurring in the study area:

- *Grevillea parviflora* subsp. *parviflora*
- *Tetralthea juncea* (Black-eyed Susan)
- *Syzygium paniculatum* (Magenta Lilly Pilly)

Extensive parallel transect surveys were undertaken for these species within the study area and the surrounding bushland. These surveys found approximately 8,000 *Tetralthea juncea* clumps, which are shown on Figure 4.2. Approximately 107 stems of *Grevillea parviflora* subsp. *parviflora* were found, along with eight individual *Syzygium paniculatum*. These are also shown on Figure 4.2.



Source: NSW OEH BioNet Atlas of NSW Wildlife accurate to +/- 1km (9 July 2014). Aerial from Google Earth (10/10/2014)

- Local roads
- Road design
- Creek lines
- Threatened flora study area
- Local government area
- Threatened flora species**
 - Grevillea parviflora* subsp. *parviflora*
 - Tetratheca juncea*
 - Potential *Syzygium paniculatum*

- Tetratheca juncea* (NSW OEH BioNet Database records 2014)
- Potential Lower Hunter Spotted Gum Ironbark forest (EEC - TSC Act)

0 200 400 600 m

Figure 4.2
Threatened flora and endangered community
(Parsons Brinckerhoff Aug-Sept 2014)

Threatened species of fauna

Twenty-two fauna species were considered to have moderate or higher likelihood of occurring in the study area following a review of wildlife databases. These species are outlined in Table 4.4.

Table 4.4 Threatened species of animal likely to occur in the study area

Scientific name	Common name	Status		Likelihood of occurrence ³
		TSC Act ¹	EPBC Act ²	
Birds				
<i>Anthochaera phrygia</i> (syn. <i>Xanthomyza phrygia</i>)	Regent Honeyeater	CE	EM	Moderate
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V		Moderate
<i>Calyptorhynchus lathami</i>	Glossy Black-cockatoo	V		Moderate
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V		Moderate
<i>Hieraaetus morphnoides</i>	Little Eagle	V		Moderate
<i>Lathamus discolor</i>	Swift Parrot	E	E	Moderate
<i>Ninox strenua</i>	Powerful Owl	V		Recorded (Parson Brinckerhoff 2014, Umwelt 2006a)
<i>Tyto novaehollandiae novaehollandiae</i>	Masked Owl (southern mainland)	V		Moderate
<i>Tyto tenebricosa</i>	Sooty Owl	V		Moderate
Mammals				
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	Moderate
<i>Dasyurus maculatus maculatus</i>	Spotted-tailed Quoll	V	E	Moderate
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V		Moderate
<i>Micronomus norfolkensis</i>	Eastern Freetail-bat	V		Recorded (Umwelt 2006a)
<i>Miniopterus australis</i>	Little Bent-wing Bat	V		Recorded (Umwelt 2006a)
<i>Miniopterus schreibersii oceanensis</i>	Eastern Bent-wing Bat	V		Recorded (Umwelt 2006a)
<i>Petaurus norfolcensis</i>	Squirrel Glider	V		Recorded (Parsons Brinckerhoff 2014)
<i>Myotis macropus</i>	Southern Myotis	V		Moderate
<i>Phascolarctos cinereus</i>	Koala	V	V	Moderate

Scientific name	Common name	Status		Likelihood of occurrence ³
		TSC Act ¹	EPBC Act ²	
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	Recorded (Umwelt 2006a)
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail Bat	V		Recorded (Umwelt 2006a)
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V		Recorded (Umwelt 2006a)

(1) Listed as Vulnerable (V), Endangered (E1) or Critically Endangered (CE) under the TSC Act.

(2) Listed as Vulnerable (V), Endangered (E) and or Migratory (M) under the EPBC Act.

(3) Please refer to Appendix C of the PEI (Parsons Brinckerhoff 2014) for likelihood of occurrence assessments.

Eight of these threatened fauna species, including the Powerful Owl, Eastern Freetail-bat, Little Bent-wing Bat, Eastern Bent-wing Bat, Grey-headed Flying-fox, Yellow-bellied Sheath-tail Bat, Greater Broad-nosed Bat and Squirrel Glider have been recorded within the study area (Umwelt 2006a, Parsons Brinckerhoff 2014).

Targeted surveys for the Powerful Owl (listed as vulnerable under the TSC Act) (Parsons Brinckerhoff 2014) confirmed that a local pair was utilising bushland within the proposed roadway alignment as regular roosting habitat, although no active breeding site was identified. Based on consecutive day and night observations, multiple roost sites, the presence of the female and observations of breeding behaviour, it was considered highly likely that the pair were breeding in close proximity to the project.

Migratory species

Migratory species are protected under international agreements to which Australia are a signatory, including JAMBA, CAMBA, RoKAMBA and the Bonn Convention on the Conservation of Migratory Species of Wild Animals. Migratory species are considered matters of national environmental significance (MNES) and are protected under the EPBC Act.

Seven migratory species are considered to have a moderate or greater likelihood of occurrence in the study area, on at least an intermittent basis (refer to Table 4.5).

Table 4.5 Migratory birds likely to occur in the study area

Scientific name	Common name	Likelihood of occurrence ¹
<i>Apus pacificus</i>	Fork-tailed Swift	Moderate
<i>Haliaeetus leucogaster</i>	White-bellied Sea-eagle	Moderate
<i>Hirundapus caudacutus</i>	White-throated Needletail	Moderate
<i>Merops ornatus</i>	Rainbow Bee-eater	Moderate
<i>Monarcha melanopsis</i>	Black-faced Monarch	Moderate
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	Moderate
<i>Rhipidura rufifrons</i>	Rufous Fantail	Moderate

(1) Please refer to Appendix C of the PEI (Parsons Brinckerhoff 2014) for likelihood of occurrence assessments.

4.2.2 Summary of issues

The construction of the project is likely to have the following impacts:

- Based on the strategic design, loss of about 19ha of native vegetation (including potential impacts on one potential endangered ecological community) and habitat for fauna including threatened fauna
- Direct loss of individual threatened flora species, including potential loss of flora species that are considered unable to withstand loss namely the Small-flower Grevillea (*Grevillea parviflora subsp. parviflora*)
- Weed and pest invasion
- Construction impacts on waterways and aquatic habitat.

Once the project is operating, it is likely to have the following impacts:

- Habitat fragmentation, isolation and barrier effects, which may limit or impede ecological processes
- Potential environmental impact of noise on wildlife
- Changed hydrology.

Avoiding and minimising impacts

- To avoid and minimise the effects of habitat fragmentation, the preferred route option (strategic design) aligns to the edges of the bushland reserve at the interface of existing anthropogenic disturbance, including Lookout Road, the John Hunter Hospital complex and residential areas in the north-west of the project.

During the environmental impact assessment process, further opportunities to avoid and minimise impacts to areas of ecological value will be investigated. This process will include options for connectivity structures.

4.2.3 Proposed further assessments

The Biodiversity Assessment Report will be prepared in accordance with the Framework for Biodiversity Assessment (FBA) (OEH 2014b) and the Biodiversity Offsets Policy for Major Projects (OEH 2014c) by a person accredited in accordance with Section 142B(1)(c) of the TSC Act.

Should offsets be required, a Biodiversity Offsetting strategy will also be prepared.

4.3 Traffic and access

4.3.1 Overview

Traffic volumes

Traffic volumes along the existing route of Lookout Road, Croudace Street and Newcastle Road are in the order of 40,000 to 60,000 vehicles per day. The nearest available traffic counts relevant to the project are from Lookout Road, New Lambton Heights (Station ID 05204) in 2014 and are provided in Table 4.6 below.

Table 4.6 2014 average daily traffic volumes Lookout Road

Station ID	Road name	Location description	Direction	All days	Weekdays	Weekends
05204	Lookout Road	New Lambton Heights, North of Ridgeway Road	Northbound	20,486	22,313	15,919
			Southbound	20,241	21,966	15,927

The road network surrounding the project currently suffers from traffic congestion with Lookout Road, Croudace Street and Newcastle Road being a highly used thoroughfare. There are 11 sets of existing traffic signals on Lookout Road/Croudace Street/Newcastle Road from the McCaffrey Drive intersection to the Newcastle Road intersection, 16 uncontrolled intersections with local roads and a large number of driveways to private properties which reduce traffic speed below the 60 km/hr speed limit and contribute to traffic congestion. There is also a public school located on Croudace Street with 40 km/hr school zones in place during peak hours. Existing speed limits on the surrounding road network are detailed below:

- Lookout Road – 60 km/hr, 70 km/hr
- Croudace Street – 60 km/hr
- McCaffrey Drive – 60 km/hr
- Newcastle Road – 70 km/hr
- Local residential streets are generally 50 km/hr.

Crash history

The road network surrounding the study area is subject to a high number of crashes. From 2008 to 2014 there have been 365 crashes recorded on the surrounding road network (Roads and Maritime 2014b). The majority of crashes were rear-end, which typically occur at a higher rate in congested traffic. The project is expected to improve road safety as a result of improved traffic flow, and will be investigated further during design studies.

Pedestrian and cyclist use

The study area is currently used by recreational users including bushwalkers and cyclists. A paved, off-road cycleway crosses the northern extent of the study area, linking the suburbs of Jesmond and Lambton. A branch of this path extends to the John Hunter Hospital to the east of the study area. Footpaths are available for pedestrian use on roads such as Lookout Road and McCaffrey Drive. Cyclists are able to use the 2 to 2.5 m shoulders on the existing sections of the Newcastle Inner City Bypass.

Newcastle City Council's 'Newcastle Cycling Strategy and Action Plan 2013' (Newcastle City Council 2013) identifies proposed off-road and on-road cycling routes within the study area (refer to Figure 4.3).

Public transport

Roads within the study area are used by the following public transport services:

- Newcastle Buses: Route 100 – this bus service travels between Jesmond and Charlestown, along Newcastle Road and Lookout Road/Croudace Street, and services John Hunter Hospital via its main entrance.

- Newcastle Buses: Route 224 – this service travels between Wallsend and Newcastle by Kotara, and services John Hunter Hospital. This service travels along McCaffrey Drive and Lookout Road to the John Hunter Hospital.
- Newcastle Buses: Route 222, which travels between Wallsend and Newcastle and services John Hunter Hospital. This service travels along Lookout Road/Croudace Street.
- Newcastle Buses: Routes 230 and 235, which travel between Jesmond and Newcastle along Newcastle Road and Croudace Street (Route 235) to its intersection with Howe Street.
- Newcastle Buses: Route 363, which travels between Warners Bay and Newcastle and services John Hunter Hospital. This service travels along Lookout Road.
- The John Hunter Hospital is a key bus stop and is identified as a ‘timing point’ by Newcastle Buses.

4.3.2 Summary of issues

Construction

Due to the location of the project in a bushland area, construction of the majority of the project is unlikely to cause substantial disruption to the local traffic network. However traffic disruptions would occur during works associated with modification of the intersections of the Newcastle Inner City Bypass with both Newcastle Road and McCaffrey Drive.



-  Local roads
 Road design
 Local government area
- Cycling routes**
 On road - existing route
 On road - proposed route
 Off road - existing route
 Off road - proposed route

Figure 4.3
Cycling routes

Access routes to construction areas also have the potential to create localised traffic disruptions and potential restrictions to property access. Access to key parts of the proposed alignment are available from several public roads, such as Dangerfield Drive, Elmore Vale and Bellinghen Close, Wallsend.

Construction of the project would require ancillary facilities which may include, but not be limited to, stockpiles, compounds and concrete batching facilities. The location of the project in a bushland area and adjacent to several reserves provides an opportunity for these facilities to be located away from public roads, thereby minimising traffic disruptions.

Construction activities would disrupt the activities of recreational bushwalkers and cyclists.

Operation

During operation, the project is likely to result in a reduction of congestion on the surrounding road network and the local and regional communities would benefit from improvements to travel times, traffic congestion and road safety. It should be noted however, that there is a potential for the project to result in redistribution of travel patterns in the area and this may impact on parts of the surrounding road network.

Development of the project would also create an opportunity for rearrangement of bus routes to reduce travel times between areas north and south of Newcastle.

Once constructed, the project would cause the permanent dislocation of a number of informal bushwalking and mountain bike trails, although bridge structures would provide for crossings of the roadway as shown on Figure 1.2. The paved cycleway between Jesmond and Lambton would also be severed if a suitable crossing was not included in the project design.

4.3.3 Proposed further assessments

A detailed traffic and access assessment would be prepared to provide (as a minimum):

- An overview of the construction phase impacts, including likely construction traffic volumes, peak volume periods, haulage routes, construction parking requirements and locations, temporary changes to accesses
- Existing traffic volumes and likely changes to the volumes over time with the project operational
- Identification of the existing road network and proposed changes to the operational network
- Existing and proposed permanent changes to property accesses
- Assessment of operational traffic impacts including an assessment of existing volumes and patterns against forecast with the project
- Assessment of impacts on road users including motorists, public transport, pedestrian and cyclists
- Road safety analysis
- Recommendations for appropriate traffic and access management and mitigation measures for both construction and operation phases.

4.4 Noise and vibration

4.4.1 Overview

Areas adjacent to the project generally consist of urban residential environments with dominant noise sources being road traffic. Key existing noise sources in these areas include major roads, such as Newcastle Road, McCaffrey Drive and Lookout Road.

The majority of receivers potentially affected by the project (about 600 m from the project) are located to the west. These receivers are generally located in residential areas that are only open to local traffic and hence, background noise levels in these locations are expected to be low.

Key receivers potentially affected by noise from the project include:

- John Hunter Hospital complex (immediately adjacent to the east of the project).
- Residential areas:
 - ▶ Jesmond/New Lambton: areas to the north of Newcastle Road
 - ▶ Wallsend: areas to the west of the project
 - ▶ Elmore Vale: areas to the west of the project
 - ▶ Rankin Park: properties located on Lookout Road and McCaffrey Drive
- John Hunter Bed and Breakfast (about 150 m east of the project)
- Blue Gum Apartments Jesmond (about 20 m to the west of the project)
- New Lambton Heights Infants School (about 250 m to the south of the project)
- Stockland Jesmond Shopping complex (about 250 m to the north-west of the project)
- Jesmond Public School (about 200 m to the north-east of the project)
- Hotel Jesmond (about 220 m to the west of the project, on Newcastle Road)
- Jesmond Executive Villas (about 120 m to the west the intersection of Newcastle Road and the existing bypass).

4.4.2 Summary of issues

Construction

Construction of the project has the potential for the following noise and vibration related impacts:

- Noise-generating construction activities may affect residential and non-residential sensitive receivers to varying degrees. The level of impact from construction works experienced by receivers would depend on the proximity to the works, the types of activities, the duration of activities, the existing noise level and the time of day the work is being carried out.
- Any works undertaken outside of standard construction hours may affect residential and non-residential sensitive receivers. There may be a need for out of hours works in order to minimise other impacts and/or for safety considerations.
- Increases in road traffic noise levels due to construction traffic activity.
- Potential vibration impacts need to be assessed for nearby buildings and other structures due to small offset distances between the works and sensitive receiver locations in some locations.

Operation

- Operation of a new section of highway in an area adjacent to a number of sensitive receivers may result in road traffic noise and vibration impacts.

4.4.3 Proposed further assessments

A detailed noise and vibration assessment would be prepared to provide (as a minimum):

- Identification of all residential and non-residential sensitive receivers
- Identification of existing background noise levels at representative locations in the surrounding area using attended and unattended noise monitoring equipment
- Identification of project specific noise and vibration criteria
- Predicted levels of traffic noise at all receiver locations at year of opening and 10 years after opening for the “build” and “no build” scenarios
- Predicted levels of construction noise and vibration for potentially affected receivers
- Analysis of options and recommendations for reasonable traffic noise mitigation and construction noise and vibration mitigation where exceedances of the project noise and vibration goals are predicted
- Identification of out of hours work required during construction works and future works
- Recommendations for appropriate noise and vibration management and mitigation measures for both construction and operation phases.

The assessment would be undertaken in accordance with the following policies:

- Department of Environment, Climate Change and Water (DECCW) 2011, NSW Road Noise Policy.
- Department of Environment and Climate Change (DECC) Interim Construction Noise Guidelines (ICNG) (DECC 2009b).
- Roads and Maritime Services, 2001, Environmental Noise Management Manual, Sydney (RTA 2001).
- Department of Environment and Conservation (DEC) Assessing Vibration: A technical Guideline (DEC 2006).

4.5 Socio-economic, property and land use

4.5.1 Overview

The Newcastle LGA is located in the Lower Hunter Region of NSW and covers an area of 187 square km. The population for Newcastle LGA was 154,896 in 2012, with a projected annual population growth rate of 0.7 per cent to 180,643 people in 2036.

The project is located in the western suburbs of Newcastle, specifically Rankin Park, Jesmond, Elmore Vale and Wallsend. These suburbs had a population of 22,551 at the time of the 2011 census and an average age of 37.5 years (ABS 2011).

The suburbs surrounding the project generally consist of large, low-density residential areas with dispersed commercial and light-industrial businesses located on major roads such as Newcastle Road. Shopping centres operated by Stockland and Westfield are located at Blue Gum Road, Jesmond (300 m to the north-west of the project) and Northcott Drive, Kotara (2 km to the south-east of the project), respectively. The Wallsend Business District is located about 3 km to the

north-west of the project. This area contains a number of businesses, including a Stockland Shopping Centre and a number of community facilities. Other suburban business districts are located at New Lambton, Waratah, Broadmeadow and Adamstown to the east of the project.

The John Hunter Hospital is located immediately to the east of the project and may be linked to the project through a proposed connection as shown on Figure 1.2. The John Hunter Hospital is the main hospital for the Hunter Region and Northern NSW. It is also the main teaching hospital for the University of Newcastle.

Several schools are located in the area surrounding the project, including New Lambton Heights Infants School, which is located about 250 m to the south of the project.

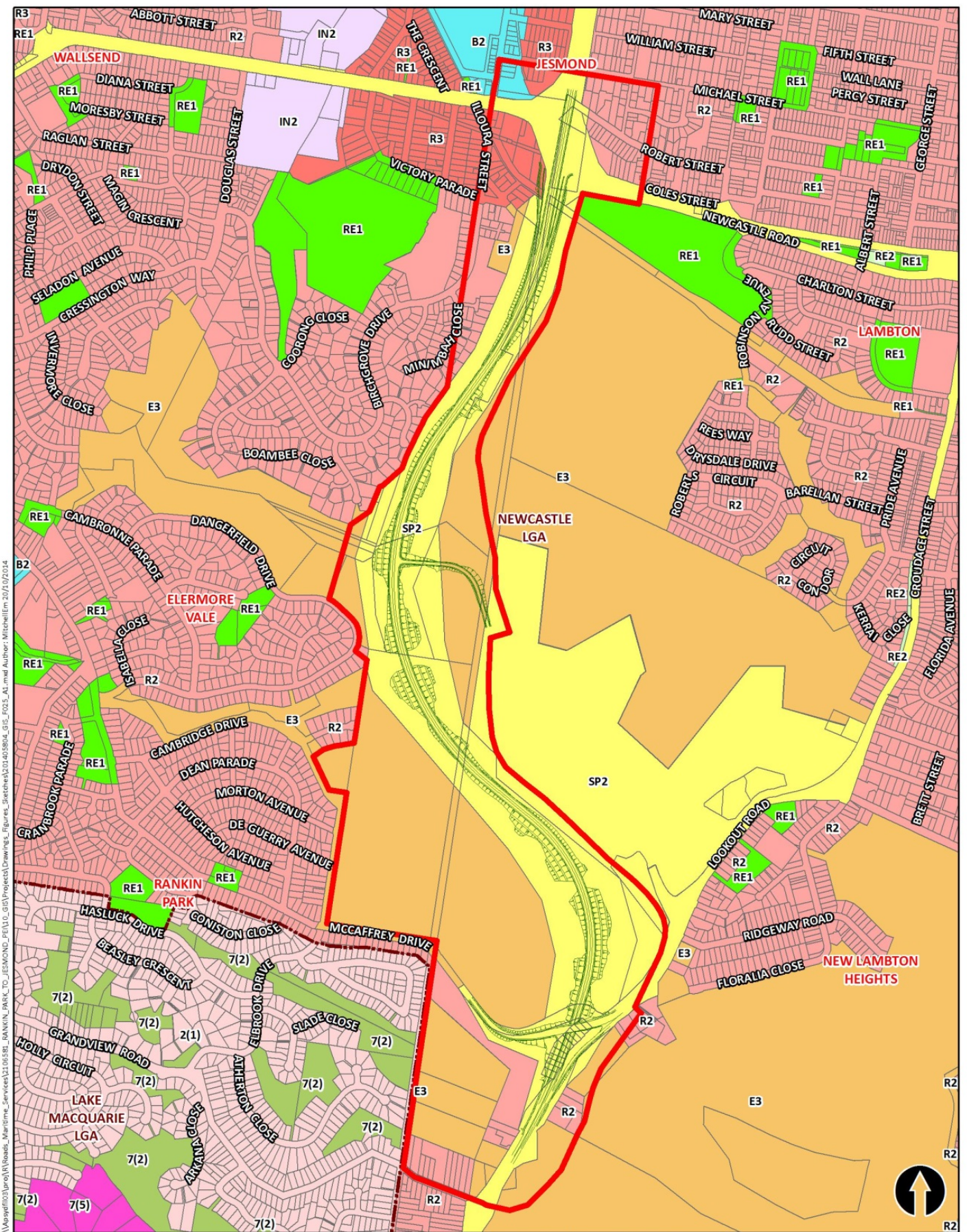
Several businesses are located within the northern extent of study area including Jesmond Executive Villas (Newcastle Road), Jesmond Hungry Jacks (Blue Gum Road) and part of the Jesmond Stockland Shopping Centre (Blue Gum Road). Several other businesses are located on the existing route of Lookout Road, Croudace Street and Newcastle Road, including Quix/Mobil Service Station (Croudace Street), and Allegra Hair Skin Body (Croudace Street).

A paved, off-road pedestrian/cycleway operated by Newcastle City Council runs through the study area to the south of Jesmond Park which is part of a pedestrian/cycleway linking Lambton to Jesmond and Wallsend. A paved extension to this path runs to the south of Jesmond Park to John Hunter Hospital, outside the study area.

A number of fire trails, and informal mountain bike tracks and bush walking tracks were observed within the study area during preliminary environmental investigations undertaken for the project. It appears that no organised use of these facilities occurs and that they are used intermittently by local residents.

Newcastle City Council's 'Newcastle Cycling Strategy and Action Plan 2013' (Newcastle City Council 2013) identifies proposed off-road and on-road cycling routes within the study area (shown in Figure 4.3).

Land use zones for the study area are shown on Figure 4.4. Land within the proposed alignment is owned by Roads and Maritime, Newcastle City Council, Hunter New England Health and private owners. Adjacent land parcels are privately owned, bushland reserves and open space (refer to Figure 4.5). There is also a Crown Road known as Marshall Street (unformed) from McCaffrey Drive, Rankin Park to Newcastle Road, Jesmond running north-south through the corridor.



Source: NSW Crown Copyright - Planning and Environment; Newcastle Local Environmental Plan 2012; Lake Macquarie Local Environmental Plan 2004

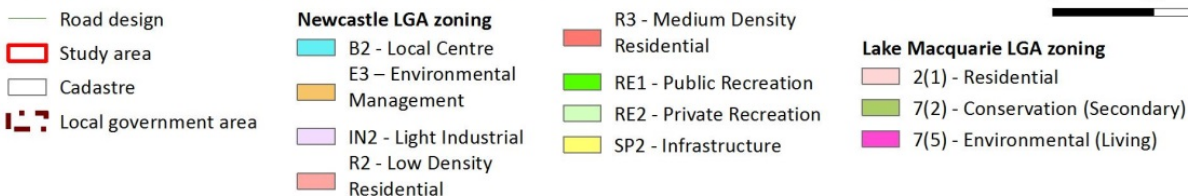


Figure 4.4
Zoning

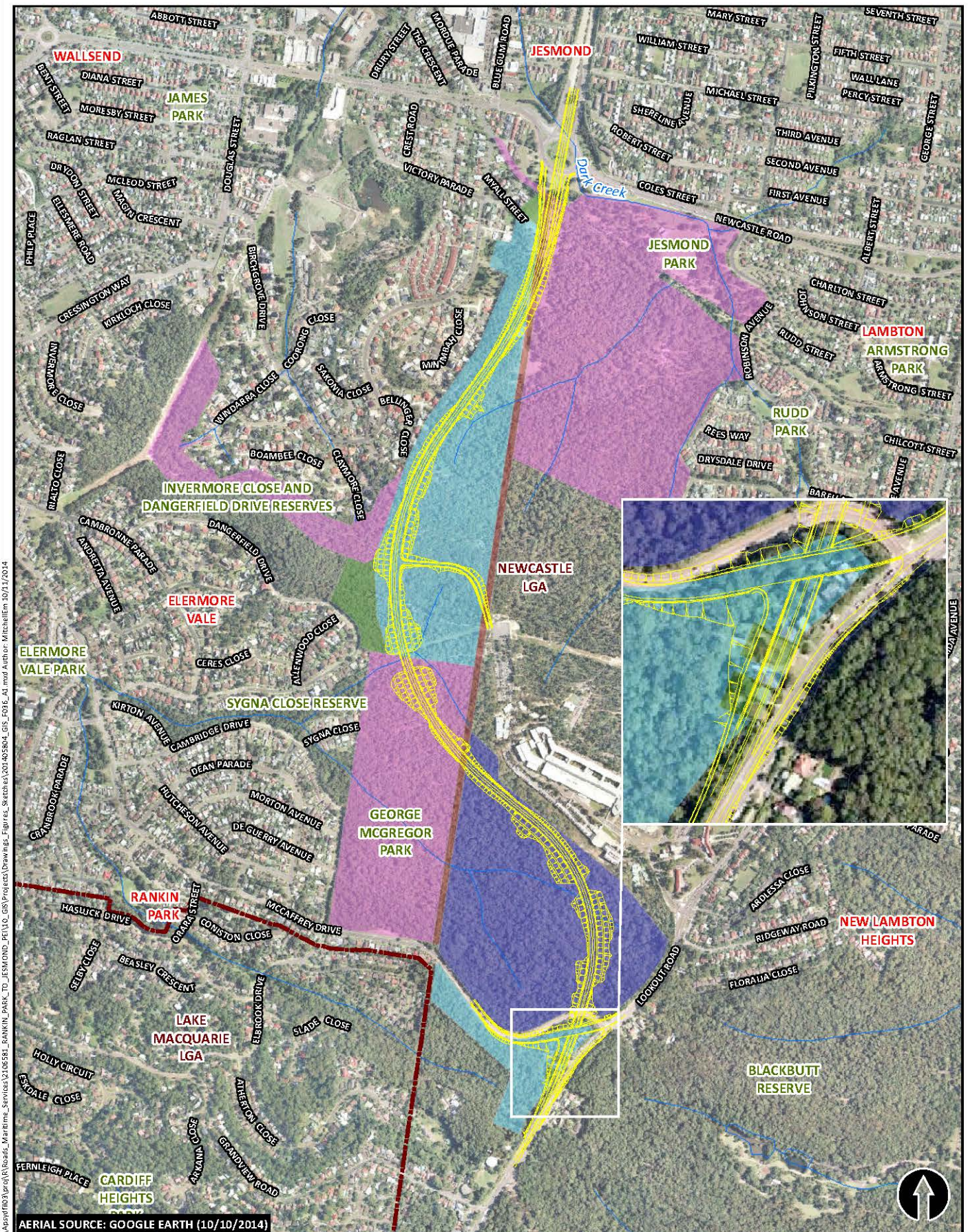


Figure 4.5
Land ownership

4.5.2 Summary of issues

The project would complete the main road transport corridor between north and south Newcastle. As the majority of transport within Newcastle occurs via road, it is expected that the project would create substantial benefits to the residents of surrounding suburbs and the overall regional population through improvements to travel times, traffic congestion and road safety.

Construction

- The project may require minor adjustments to the existing road corridor as defined in the Newcastle LEP 2012.
- Potential access restrictions to local businesses, organisations and residents, during the construction period.
- Some acquisition of private land and land held by Newcastle City Council and Hunter-New England Health is likely to be required for the project.
- The southern section of the project may require acquisition of residential properties to allow for construction of the interchange proposed with McCaffrey Drive.
- The local visual amenity may be impacted by the presence of construction machinery, materials, stockpiles, compound sites and exposed surfaces.

Operation

- Improved traffic flows for local, regional and interstate road users.
- The project would divide a large remnant bushland area, reducing the area available for bushwalkers and bike riders who use the study area recreationally.
- The proposed roadway would sever the existing off-road cycleway located to the south of Jesmond Park and a number of informal off-road tracks within the study area. Removing access to these routes may affect connectivity between surrounding suburbs and the John Hunter Hospital.
- Changes to traffic patterns may reduce patronage of nearby businesses.
- Long-term reduction of visual amenity of the surrounding area.

4.5.3 Proposed further assessments

An assessment of socio-economic, property and land use impacts will be undertaken for the construction and operation of the project. The assessment will investigate and identify:

- The socio-economic conditions and values of the area surrounding the project, including existing community and recreation facilities, community service providers, businesses, land uses and land use access arrangements relevant to the project.
- Property acquisition requirements.
- Potential direct and indirect impacts of the project, including:
 - ▶ Changes to population and demography
 - ▶ Land use changes
 - ▶ Local amenity changes
 - ▶ Access and connectivity changes
 - ▶ Impacts on property
 - ▶ Impacts on local businesses
 - ▶ Impacts on social and recreational infrastructure
 - ▶ Impacts on community values.

- Feasible and reasonable project-specific measures to avoid, manage or mitigate identified impacts and changes, and to maximise benefits.

4.6 Urban design, landscape character and visual impacts

4.6.1 Overview

Landscape character

Several distinct landscape character types and visual catchments occur within and adjacent to the study area, each defined by factors such as built form, natural form and adjacent land use types. Key landscape features occurring in the study area include:

- *Topography* – the landscape of the study area is very undulating and the study area is characterised by a series of prominent ridgelines and deep gullies.
- *Vegetation* – the study area is dominated by naturally occurring native vegetation. This vegetation includes communities such as Coast Plains Smooth-barked Apple Woodland and Coast Foothills Spotted Gum-Ironbark Forest (a potential EEC).
- *Land use* – the majority of the study area consists of vacant bushland. Adjoining land uses include the John Hunter Hospital, Lookout Road, Newcastle Road and residential suburbs such as Wallsend, Elernmore Vale, Rankin Park and Jesmond.
- *Built features* – the study area contains few built features, although it is surrounded by residential suburbs, parklands and arterial roads. The John Hunter Hospital is the dominant built development within the surrounding area which is located on a ridgeline that traverses the study area and is visible from a number of locations in the surrounding area.

Visibility

The project would traverse a bushland environment surrounded by varied urban-residential areas and John Hunter Hospital. The project would be screened from some locations through a combination of topography and vegetation. This would include some residential areas surrounding the study area that would be shielded from the project by intervening topography.

Visual catchments refer to areas which the project would potentially be visible from. Key visual catchments that may be affected by the project include:

- *John Hunter Hospital* – views of the project would be likely from the main and western carparks, Ronald McDonald House, Hunter Medical Research Institute and the main hospital buildings.
- *Jesmond Park and Newcastle Road* – the project may disrupt views of bushland areas available from parts of Jesmond Park and a small section of Newcastle Road.
- *Residential areas located immediately to the west* – views of the project may be available to residences located to the west, particularly views of elevated structures such as bridges or noise barriers (if installed).
- *Parks located in residential areas to the west* – views of the project may be available to parks located to the west, such as Dangerfield Drive Reserve, Sygna Close Reserve and George McGregor Park.

The project may be visible to motorists, local residents and users of local parks, and users of John Hunter Hospital. The project may also cause limited visual disturbances to elevated parts of surrounding suburbs, such as North Lambton, Elmore Vale and Wallsend.

4.6.2 Summary of issues

Construction

Construction of the project has the potential for the following urban design and visual related impacts, particularly to the adjoining visual catchments:

- Visual impacts associated with construction activities, site/compounds including machinery, temporary structures and physical impacts on existing public open space and use of land
- The visual amenity for road users on the adjoining road network would be impacted during construction, particularly along McCaffrey Drive, Newcastle Road and Lookout Road
- Removal of vegetation planting along the adjoining road network to facilitate construction may cause visual impacts to motorists and adjoining residents and businesses.

Operation

- *Landscape character* – the project would change the landscape character of a portion of the study area from bushland to a major arterial road. The project is not expected to significantly change the character of the surrounding area as it is highly urbanised and contains a number of roadways, including existing sections of the Newcastle Inner City Bypass. The key visual impacts of the project would occur to receivers located in close proximity and as such, have the potential to be managed through sensitive urban design or screening
- *Visual impacts* – operation of the project has the potential for the following urban design and visual related impacts:
 - ▶ Visual impact of new infrastructure on existing views from residences and surrounding development, including visibility of new road infrastructure, bridges, retaining walls, ramps, gantries, and signs
 - ▶ Landscape character and visual impact associated with disturbed areas remaining following construction that are not incorporated into the project
 - ▶ The existing vegetation and natural visual screens are of important value within the visual catchment around the study area and would be retained wherever possible
 - ▶ Impact to existing pedestrian and cycle pathways adjacent to or within the proposed route corridor.

The implementation of landscape treatments, landscaping and revegetation of disturbed areas as part of the project would improve the views experienced by users of the new road, and road users on the adjoining road network.

4.6.3 Proposed further assessments

A detailed landscape character and visual impact assessment would be prepared to provide (as a minimum):

- Further analysis of the landscape character types and visual catchments

- Development of an urban design strategy to mitigate landscape character and visual impacts to be integrated with the overall design of the project, including structures and landscape design outcomes
- Determination of the significance of impacts during construction and operational phases
- Identification of appropriate management, mitigation and safeguard measures.

The assessment would be undertaken in accordance with the Roads and Maritime *Environmental Impact Assessment Practice Note: Guideline for Landscape Character and Visual Impact Assessment* (Roads and Maritime 2008).

5 Other environmental issues

5.1 Overview

Other environmental issues discussed in this section below are considered to be likely of lesser consequence than the key issues described in Section 4, taking into account the scope of the project, the existing environment and the implementation of standard and best practice management and mitigation measures. It is considered unlikely that these would be key issues for the project; however, further assessment would be undertaken as part of the environmental impact statement for the project. Any environmental management and safeguard measures required to minimise and mitigate these impacts would be documented as part of the environmental impact statement.

5.2 Hydrology and flooding

5.2.1 Overview

The study area is located within the Lower Hunter River Catchment and covers parts of the Ironbark Creek sub-catchment, Dark Creek sub-catchment and the Throsby, Styx and Cottage Creeks sub-catchments. These sub-catchments include a number of named and unnamed creek lines. These creeks and any small drainage lines occurring in the vicinity of the study area drain to Ironbark Creek, which drains to the Hunter River at Hexham, about 8 km to the north of the project. The Hunter Estuary Wetlands are located about 5 km to the north of the project.

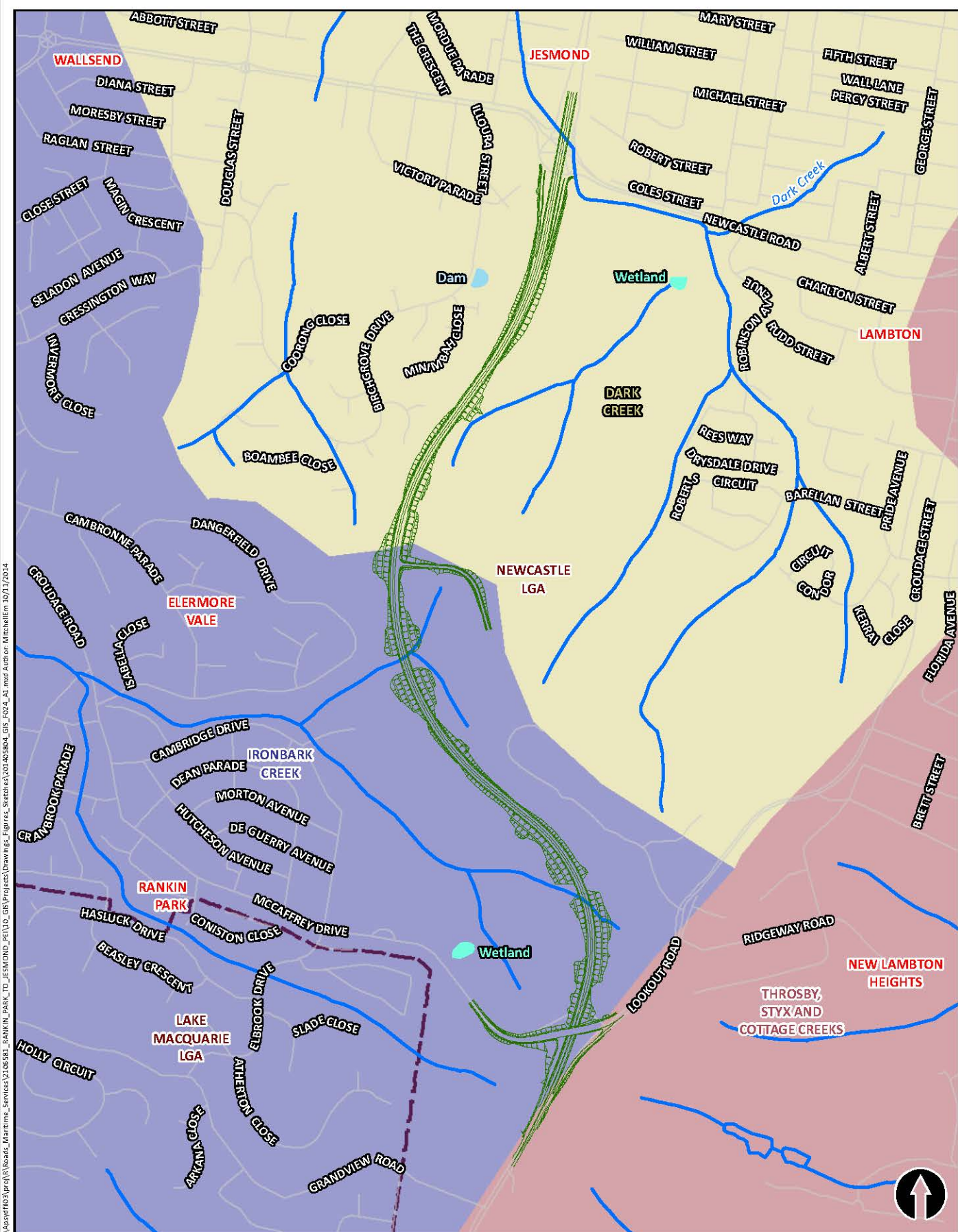
The key drainage feature of the study area is the ridge line on which the John Hunter Hospital is located, which runs roughly north-west across the study` area. The majority of the project is located on this ridgeline and therefore is high in elevation within the catchment. As such, there are no major watercourses present and the only upstream development is the John Hunter Hospital complex.

Catchment areas to the north-east of the ridge drain to several small creek lines in the study area, including Dark Creek. These appear to drain to a small wetland area located to the south of Jesmond Park, draining to concrete lined stormwater channels running adjacent to Newcastle Road and through Jesmond Park. These channels drain to Ironbark Creek to the north of the study area.

Catchment areas to the south-west of the ridge drain to Ironbark Creek or its tributaries. A man-made stormwater catchment basin located to the east of Birchgrove Drive also appears to capture some flows from within the study area. The proposed roadway traverses Dark Creek and several tributaries of Ironbark Creek. Several sections of these creeks were observed during a site inspection and appear to be either shallow, ephemeral depressions or more defined creeks, containing shallow pools and minor flows.

Previous inspections within the study area (RTA 2006) identified 'springs' on and below sloped areas, indicating that groundwater may discharge in some locations within the study area. A small wetland area potentially fed by ground water was observed during field surveys in the south-west of the study area, near McCaffrey Drive (refer to Figure 5.1).

Flood mapping undertaken for Newcastle City Council (BMT WMB 2012) shows that Dark Creek and its tributaries is subject to minor flooding (1 per cent Annual Exceedance Probability), which extends beneath the proposed route corridor in the northern portion of the study area.



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- Local roads
- Road design
- Local government area
- Creek lines
- Dam
- Wetland (indicative location)
- Dark Creek catchment
- Ironbark Creek catchment
- Throsby, Styx and Cottage Creek catchment

Figure 5.1
Drainage

5.2.2 Summary of issues

Construction

- Construction activities would potentially cause hydrological impacts to local creek lines, both directly through construction and indirectly through changes to catchment areas and hydrological flow regimes. Such changes could result in increased or reduced flows within downstream creeks and changes to flood behaviour.
- The project may remove a small section of an unnamed tributary of Ironbark Creek located near McCaffrey Drive. It is likely that the project would also remove sections of unmapped drainage lines that were observed within the study area.
- The project may also be affected by groundwater discharge, which could reduce ground stability or lead to issues with drainage and waterlogging.
- Run-off from construction areas could contain sediments, contaminants from spills and accidents, and litter.
- Potential flooding impacts may affect the northern portion of the study area and could affect construction works through inundation.
- The project would require the use of water during construction, for construction processes and to minimise dust impacts. Any water used in this process would need to be contained and prevented from entering surrounding waterways and stormwater drains.

Operation

- Potential obstruction to flood flows as a result of new road and ancillary infrastructure.
- Hydrological changes in creeks resulting from an increase in hard stand area as well as increased input to adjoining creeks.
- Potential flooding impacts as a result of increased hard stand creating increased run-off into the surrounding area.

5.2.3 Proposed further assessments

A detailed water quality and hydrology assessment would be prepared to provide (as a minimum):

- Identification of sensitive surface and groundwater receiving environments, including groundwater dependant ecosystems
- Assessment of erosion and sediment impacts during construction and operation
- Assessment of impacts on groundwater and groundwater receiving environments
- Identification of feasible and reasonable management and mitigation measures to prevent water pollution, and details of the proposed stormwater management measures to contain pollutants. These measures would take into consideration the Managing Urban Stormwater: Soils and Construction (The Blue Book) (Landcom 2004) publications.

5.2.4 Management and safeguard measures

Hydrology and flooding issues are commonly encountered on Roads and Maritime road projects and can be managed and mitigated through the implementation of standard management and

safeguard measures, which would be informed by the further assessment identified above and detailed in the environmental impact statement for the project. These would include:

- Undertaking hydrology and flood modelling during the detailed design phase, to incorporate these considerations in the project design
- Construction sediment and erosion control plans and construction spill emergency procedures would be implemented as part of the construction environmental management plan (CEMP) for the project.

5.3 Soils and water, contamination and mine subsidence

5.3.1 Overview

Geology

The geology of the study area is documented by the Newcastle Coalfield Regional 1:100,000 Geology Map (Hawley, Glen and Baker 1995).

The underlying geology of the study area comprises Permian coals, tuffs, conglomerates, sandstones and shales of the Newcastle Coal Measures. The Newcastle Coal Measures consist of a basal formation overlain by four subgroups, including:

- Waratah sandstone – cross-laminated grey brown sandstone at the base
- Lambton subgroup – coal, sandstone, shale, minor conglomerate
- Adamstown subgroup – massive conglomerate, tuff, coal and shale
- Boolaroo subgroup – irregular coal seams, tuff, sandstone and shale.

A small extent of the study area in the north is also underlain by the Tomago Coal Measures, which comprise shale, mudstone, sandstone, coal, tuff and clay (Matthei 1995).

Mining history

The study area is located within the Newcastle Mine Subsidence District and the project would require approval under Section 15 of the *Mine Subsidence Compensation Act 1961*. Previous geotechnical studies undertaken within the study area (DMR 1985, RTA 2006) determined that the study area has previously been undermined by coal mining operations from the former Lambton Colliery. These studies determined that surface evidence of mining within the study area was minimal. Known sites of adits, drifts and vertical shafts in the area were inspected and all were found to have been infilled. Lambton Colliery was located in the suburb of Lambton to the south-east of the study area.

Within the study area, this mine extracted coal from both the Borehole and Victoria Tunnel Seams. Records of underground workings within these seams indicate that within the study area and surrounds, board and pillar and total extraction mining methods were used. First workings in this area occurred between 1890 and 1895, with areas of total extraction being mined between 1912 and 1935.

Landform

The landform and topography within and adjacent to the study area ranges from gently undulating hills with broad and rounded crests and ridges in the northern portion of the proposed alignment to

steep gullies and grades in the south. The project would traverse this landform in a general north-west to south-east direction, and would comprise cut and fill batters at various locations along the proposed road edge, pavement and bridges.

A 120 m elevation difference exists between Lookout Road (130 m Australian Height Datum, AHD) and Newcastle Road (10 m AHD), with a 70 m natural surface drop from Lookout Road at the southern end of the route length. Gradients on existing adjacent roads such as Lookout Road and Croudace Street are up to 12 per cent.

Steep grades up to 10 per cent are expected to be required for the proposed roadway, exacerbating risks associated with stormwater control and erosion. This would also require substantial cut/fill works.

Soils and erosion hazard

The Soil Landscapes of the Newcastle 1:100 000 Sheet Map (Matthei 1995), identifies that soils of the study area are primarily of the Killingworth (erosional) soil landscape.

Other soil landscapes that fall within the study area include:

- *Residual Beresfield soil landscape* – Qualities and limitations of this soil landscape include a high foundation hazard, water erosion hazard, seasonal waterlogging and high run-on on localised lower slopes, highly acidic soils and low fertility. This soil landscape is within a mine subsidence district.
- *Erosional Killingworth soil landscape* – Limitations of this soil landscape include water erosion hazard, seasonal waterlogging on lower slopes and localised high run-on, foundation hazard, shallow soils and rock outcrops.
- *Erosion Killingworth (Variant A) soil landscape* – Limitations include water erosion hazard and localised high run-on, steep slopes, mass movement hazard, shallow soils, rock outcrops and foundation hazard.
- *Colluvial Cedar Hill soil landscape* – This soil landscape is affected by mass movement and is a high mass movement hazard, high foundation hazard, acidic soil type, characterised by steep slopes and within a mine subsidence district.
- *Erosional Gateshead soil landscape* – Limitations of this soil landscape include localised steep slopes and shallow soils, high run-on and seasonal waterlogging (lower slopes), high surface water erosion and strong acidity.

Acid Sulfate Soils

The study area is not mapped as having identified risk of acid sulfate soil (ASS) occurrence (DLWC 1998). ASS mapping prepared by Newcastle City Council shows the study area as Class 5 land, which is the lowest risk class for ASS.

Contaminated land

A search of the OEH contaminated land record of notices was undertaken on 30 June 2014 (OEH 2014e). The search returned 19 sites recorded within the Newcastle LGA. The project is not located near any of these sites.

A review of historical aerial photography was undertaken for the project for 1954 and 1979. A review of this aerial photography and reviews of a former EIS undertaken within the study area in the 1980s (DMR 1985) did not identify any former land uses that may have contributed to contamination within the area. However, the former EIS found that the study area may have contained former surface facilities associated with coal mining, such as shafts, drifts and adits. There is potential for mining activities to have resulted in land contamination in these areas.

The project would include works within parts of existing road reserves. In this context, the occurrence of elevated lead levels attributable to lead petrol emissions is possible, along with other contaminated material associated with road developments.

5.3.2 Summary of issues

Subsidence

Subsidence impacts may affect the project and must be considered further during the design phase. Infrastructure associated with the project that may potentially be affected by subsidence impacts include bridges, retaining walls and major cuts, general road assets such as pavements, culverts, verges, kerbs, drainage and services.

Subsidence impacts may include the following:

- Surface cracking
- Mass ground movements
- Slope instability and erosion
- Ponding and changes in stream alignment
- Depressurisation of groundwater aquifers.

Soils, landform and geology

Soil types in the study area are expected to have a generally high erosion hazard which would increase the potential for erosion and sedimentation during the construction phase. This issue would be exacerbated by the steep gradients present along the proposed roadway, which could result in increased velocity of run-off water during rain events and an increased risk of erosion and sedimentation of downstream environments.

Contamination of the local waterways from the road surface run-off could cause impacts to aquatic biodiversity and riparian areas in downstream environments, including the Hunter River and Hunter Estuary Wetlands.

Contamination

There would be potential for disturbance of undiscovered existing land contamination and potential for groundwater contamination if construction activity intersects groundwater.

Acid sulfate soils

ASS are not expected to be encountered by the project.

5.3.3 Proposed further assessments

An assessment of impacts on soils and water quality would be undertaken, including:

- Geotechnical investigations to characterise existing soil geotechnical conditions and mine subsidence issues within the study area
- Identify and assess any potential land contamination based on further analysis of aerial photography and land property information
- Assess erosion and sedimentation impacts associated with the project
- Identify measures to manage any potential impacts, including the need for preparation of a soil and water management plan for the construction phase.

5.3.4 Management and safeguard measures

Soil, contamination and water quality issues are commonly encountered on Roads and Maritime road projects and can be managed and mitigated through the implementation of standard management and safeguard measures, which would be informed by the further assessment identified above and detailed in the environmental impact statement for the project. These would include:

- A remedial action plan would be prepared in accordance with relevant EPA guidelines, if it is necessary to address contamination
- Construction sediment and erosion control plans and construction spill emergency procedures would be implemented as part of the CEMP for the project.

5.4 Aboriginal cultural heritage

5.4.1 Overview

The Awabakal and Worimi peoples are recognised and acknowledged as the traditional custodians of the land and waters of the Newcastle area. The study area is situated within the boundary of the Awabakal Local Aboriginal Land Council (LALC).

The study area traverses land that has mostly been unmodified and contains a large area of remnant uncleared bushland. This area has the potential to contain items of Aboriginal heritage and cultural values. Archaeological investigations were undertaken within the study area by Brayshaw and Associates in 1984. An Aboriginal Archaeological Survey and Assessment was also undertaken by Umwelt Australia (2006a) during route selection studies for the project. Surveys of the study area were undertaken in 2004 and 2005 with representatives of Awabakal LALC.

These investigations did not identify any Aboriginal heritage sites or potential archaeological deposits (PADs) within the area likely to be affected by the project. It was concluded that while Aboriginal people are likely to have used the area, they are likely to have done so from camps located along the shores of the nearby estuarine areas. The lack of major watercourses in the study area is likely to reduce the likelihood of previous occupation of the area. Predictive modelling undertaken for this assessment determined that:

- Aboriginal people are likely to have used the study area for food gathering and to travel through, however the presence of campsites is unlikely due to the lack of significant water sources

- Due to the lack of appropriate sandstone bedrock platforms, axe grinding grooves are unlikely to occur in the study area
- Previous clearing in the study area is likely to have removed any scarred trees that may have been present
- Any artefacts occurring in the area are likely to have been isolated finds or small scatters discarded by Aboriginal people during transient use of the area.

As outlined in the Umwelt report, the Aboriginal cultural heritage significance of the study area was assessed by Aboriginal representatives as low, although the Awabakal LALC have noted that 'The Awabakal people of Newcastle still have strong ties with this country'.

An extensive search of the AHIMS database (OEH 2014d) was undertaken on 9 July 2014 identified two items previously recorded in a bushland area, about 300 m to the south-east of the project.

A search of the National Native Title Tribunal Register was received for the study area on 29 July 2014 for the PEI. One native title claim is registered within the study area (NC2013/002). This claim has been made by the Awabakal and Guringai People.

5.4.2 Potential impacts

Construction

- Direct impact to Aboriginal cultural heritage sites or artefacts is considered low. However, the absence of any archaeological records within the study area does not necessarily reflect the absence of artefacts across the site. It is considered possible that previously unidentified Aboriginal cultural heritage sites or artefacts may exist within the study area. Due to the undulating landscape of the study area, there may be localised places of cultural practice that have not been discovered yet.
- The cultural value of the study area to Aboriginal people has not been determined to date. Aboriginal Cultural Heritage can only be determined by Aboriginal people. The study area could be important to Aboriginal people as it is one of few remaining undeveloped areas within Newcastle and could provide a link to cultural resources that have become scarce. If it has importance then construction activities have the potential to impact on these values.

Operation

- Operational phase impacts to Aboriginal heritage are not expected.

5.4.3 Proposed further assessment

Further assessment and development of the impacts on Aboriginal cultural heritage would be undertaken. This would investigate, but not be limited to, the following:

- Further investigating the potential for areas of Aboriginal Cultural significance in the area of the project
- Consultation with the local Aboriginal community, including the Awabakal LALC
- Determining the cultural value of the study area to Aboriginal people

- Undertake investigations (where required) in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010), Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (DECC, 2010) and the Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) (Roads and Maritime 2011).
- Assessment of the potential impacts on archaeological and cultural heritage values.
- The development of management measures to identify opportunities to minimise impacts on Aboriginal heritage.

5.4.4 Management and safeguard measures

Aboriginal heritage issues are commonly encountered on Roads and Maritime road projects and can be managed and mitigated through the implementation of standard management and safeguard measures, which would be informed by the further assessment identified above and detailed in the environmental impact statement for the project. These would include:

- In the event of an unexpected find of an Aboriginal heritage item (or suspected item), work would cease in the affected area and the *Roads and Maritime Unexpected Archaeological Finds Procedure* (RTA 2011b) would be implemented.

5.5 Non-Aboriginal heritage

5.5.1 Overview

Site inspections and reviews of previous heritage studies undertaken within the study area (DMR 1985, Umwelt Australia 2006b) found that limited development has occurred within the study area. It is likely that the area was historically used for agriculture and therefore undiscovered heritage relics may be located in the area. However, previous surveys of the area (DMR 1985, Umwelt Australia 2006b) found limited evidence of any potential heritage sites.

A search of the following heritage registers, databases and schedules were undertaken in June 2014, to identify heritage items in or proximate to the study area:

- Australian Heritage Database (Department of the Environment 2014b)
- The State Heritage Register (OEH 2014e)
- The State Heritage Inventory (OEH 2014f)
- Roads and Maritime Heritage and Conservation Register (RMS 2014c)
- Schedule 5 of the Newcastle LEP 2012
- The National Heritage List (Department of the Environment 2014c).

Five heritage sites were identified within the vicinity of the study area. One heritage site is located within the study area – the Marquis of Midlothian Hotel (42 Robert Street, Jesmond).

Sites identified within and in the vicinity of the study area are discussed further below and are identified in Table 5.1 and shown on Figure 5.2.

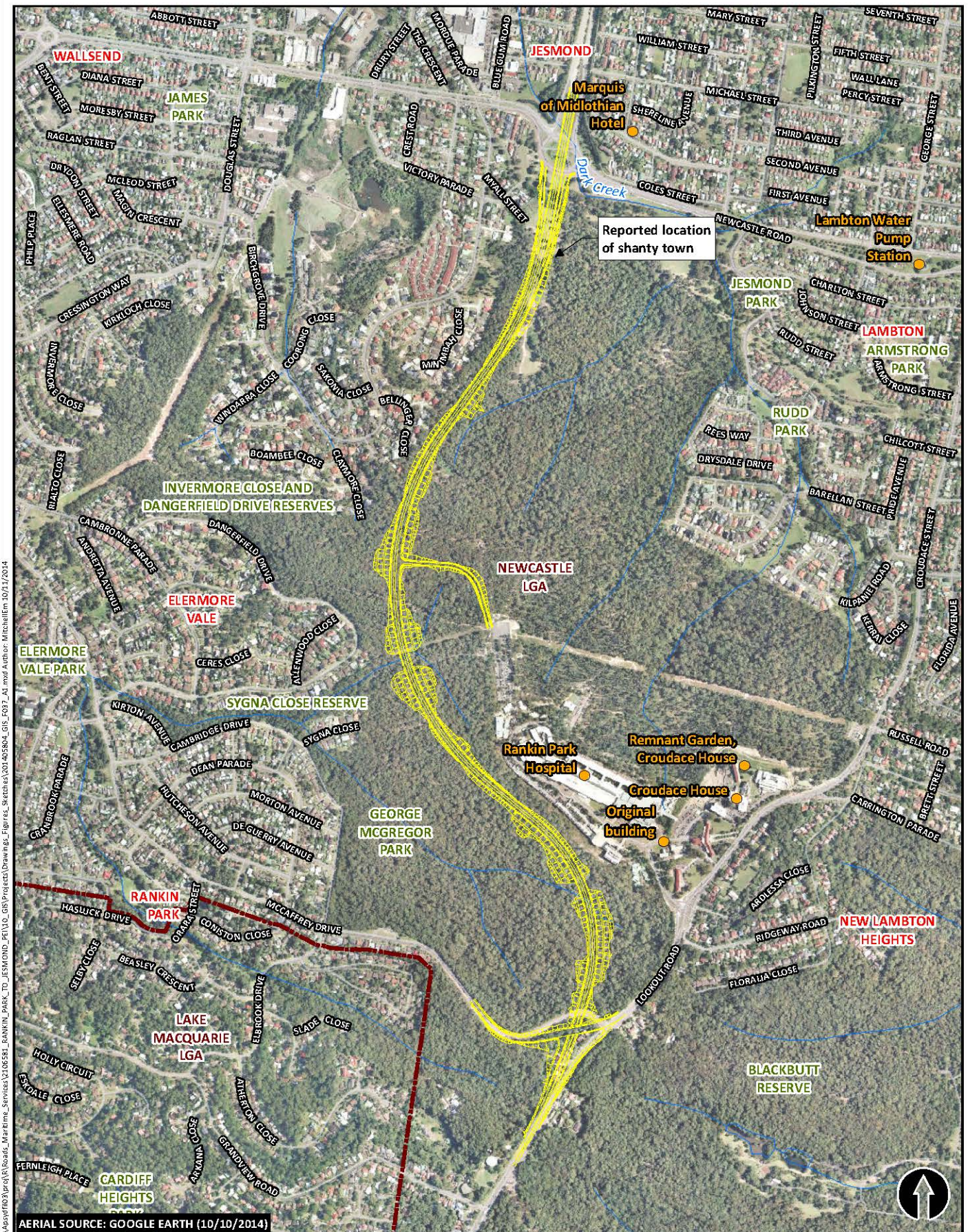


Figure 5.2
Non-Aboriginal heritage sites

Table 5.1 Heritage items

Heritage item	Address	Proximity to study area	Listing and significance
Croudace House and Garden	14 Lookout Road, New Lambton Heights	400 m to the east (within John Hunter Hospital)	• Australian Heritage Database¹ • Newcastle LEP 2012²
Lambton Water Pump Station	Lot 2 Newcastle Road, Lambton, NSW	1 km to the east	• Newcastle LEP 2012²
Original building	Lambton Road, New Lambton, NSW	50 m to the east (within John Hunter Hospital)	• Newcastle LEP 2012² • Dept of Health s170 register³
Rankin Park Hospital	2 Lookout Road, New Lambton Heights, NSW	100 m to the east (within John Hunter Hospital)	• Newcastle LEP 2012²
Remnant Garden, Croudace House	2, 14 and 20 Lookout Road, New Lambton Heights, NSW	300 m to the east (within John Hunter Hospital)	• Newcastle LEP 2012²
Marquis of Midlothian Hotel	42 Robert Street, Jesmond, NSW	Within study area, 150 m to the east of the existing Newcastle Inner City Bypass – Shortland to Sandgate	• Newcastle LEP 2012²

(1) Australian Heritage database – indicative place

(2) Local significance - Newcastle LEP

(3) Regional significance – s170 register

A review of historical aerial photography found that a number of shed-like buildings were located within the study area during 1954, in an area south of the current Newcastle Road/Newcastle Inner City Bypass intersection. Anecdotal reports indicate that these structures were associated with a former shanty town, known as 'Hollywood' built during the Great Depression (early 1930s) and removed sometime in the 1950s (Ray 2008). The structures appear to have been removed by 1979. A site inspection of this area in July 2014 found evidence of previous disturbance, such as tree clearing and the presence of exotic trees that are likely to have been planted.

Development with the John Hunter Hospital complex commenced in the mid-1800s with construction of buildings associated with Lambton Colliery, including heritage listed buildings such as Croudace House. The site was known as Rankin Park Hospital until major redevelopment occurred in the 1980s and the John Hunter Hospital opened in 1991.

5.5.2 Summary of issues

Construction

- There are no known heritage sites likely to be directly impacted by the project, although the area immediately to the south of the intersection of Newcastle Road and the existing Newcastle Inner City Bypass may contain previously undiscovered heritage relics from the former 'Hollywood' shanty town. There is potential for these sites to be disturbed and or damaged / destroyed during construction of the project. The Marquis of Midlothian Hotel is located within the study area on Robert Street, Jesmond, although direct impacts to this site would not occur.

- Several heritage sites are located within relatively close proximity of potential construction works, including sites located within John Hunter Hospital and the Marquis of Midlothian Hotel (refer to Table 5.1). There is potential for these sites to be affected by indirect construction impacts such as vibration.

Operation

- Operational phase impacts are not predicted.

5.5.3 Proposed further assessments

A detailed non-Aboriginal heritage assessment would be prepared to provide (as a minimum):

- A description of the existing non-Aboriginal heritage and archaeological heritage values relevant to the project.
- The suspected site of the former 'Hollywood' shanty town would be further investigated from a historical perspective and to identify potential archaeological remains and impacts.
- Identification of non-Aboriginal heritage items that may be directly or indirectly impacted by the project.
- Assessment of the significance of heritage items that would be potentially impacted in accordance with the *Burra Charter* (Australia ICOMOS, 1999), *NSW Heritage Manual* (OEH 2001) and the *Statement of Heritage Impact* (Heritage Office and DUAP 2002).

In the event that the project is predicted to result in impacts to non-Aboriginal heritage, Statements of Heritage Impact (SOHI) would be required. The SOHI would be conducted in accordance with the guidelines for SOHI (NSW Heritage Office 2002).

- Documentation of consultation if required under the *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP) if impacts to any heritage items listed under the Newcastle Local Environmental Plan (LEP) 2012 are predicted.

5.5.4 Management and safeguard measures

Non-Aboriginal heritage issues are commonly encountered on Roads and Maritime road projects and can be managed and mitigated through the implementation of standard management and safeguard measures, which would be informed by the further assessment identified above and detailed in the environmental impact statement for the project. These would include:

- In the event of an unexpected find of a Non-Aboriginal heritage item (or suspected item), work would cease in the affected area and the Roads and Maritime Senior Regional Environmental Officer would be contacted immediately.

5.6 Air quality

5.6.1 Overview

The project is located in bushland environment, but is surrounded by a number of sensitive receivers that are discussed in more detail in Section 4.3.1.

The project is surrounded by a highly urbanised environment and located in the City of Newcastle, which contains significant industrial activities. A search of the National Pollutant Inventory (NPI) (Department of the Environment 2014d) was undertaken for the suburb of Rankin Park (postcode 2287) as part of preliminary environmental investigations for the project.

NPI indicates that the existing air quality in the vicinity of the project is primarily influenced by emissions from motor vehicles and household related activities such as lawn mowing and barbeques, with a total of 77 substances identified. Other sources of emissions in the locality include service stations, electricity generation, architectural surface coatings, domestic/commercial solvents and aerosols and other particulates from the nearby Summer Hill Renewable Energy Facility at Wallsend, NSW. The daily air quality is likely to be influenced by the prevailing weather and climatic conditions, bushfires and other natural factors such as pollen.

The closest OEH air quality monitoring station is located at the Newcastle City Council swimming pool, on Frances Street, Wallsend, NSW, and monitors O₃, NO, NO₂, NO_x, TEOM – PM₁₀, TEOM – PM_{2.5} and SO₂ levels. Regional air quality in the Lower Hunter is typically as good as or better than, air quality in Sydney and the Illawarra (OEH 2012).

5.6.2 Potential impacts

Construction

- During construction, the local air quality may be reduced, resulting in impacts to nearby residents and businesses. The main sources of air emissions during construction are likely to include dust generated from earthworks and emissions from construction plant and equipment.

The amount of dust generated typically depends on the type of soil and the activities being carried out. As the majority of the study area is located within the Killingworth (erosional) soil landscape (refer to Section 4.5) which is expected to have a high erosion hazard, it is expected that earthworks would potentially generate dust. The main contributors of dust are expected to include dozers, excavators, scrapers and wind erosion. Emissions from construction plant and equipment may temporarily decrease the local air quality. However, these impacts would be temporary and isolated to the immediate construction area.

Operation

- During operations, the project could improve air quality along the existing Lookout Road/Croudace Street travel route as it would remove a substantial number of vehicles from this route. The project would also result in increased travel speed and efficiency for vehicles travelling between the northern and southern parts of Newcastle and this would have an overall effect of reducing exhaust emissions.

5.6.3 Proposed further assessment

Further assessment and development of the potential air quality impacts would be undertaken. This would investigate, but not be limited to, the following:

- Nearby residences and other sensitive receivers and the potential for impacts from construction dust generating activities and construction vehicle emissions.

5.6.4 Management and safeguard measures

The potential for air quality impacts on Roads and Maritime road projects is common and can be managed through the development of management plans and appropriate consideration of air quality issues during detailed design. Roads and Maritime will detail the management measures and safeguards to be implemented during construction in the environmental impact statement. Safeguards would include the implementation of appropriate dust control measures during construction.

5.7 Resource management and waste minimisation

5.7.1 Overview

The construction of the project has the potential to generate substantial waste materials. Significant quantities of waste materials such as green waste, litter and road infrastructure materials would be generated as part of construction activities. These materials would be collected for off-site disposal at a suitable location by the responsible maintenance contractor.

The project is also likely to require large cut and fill activities and may require importation and/or disposal of large quantities of fill materials.

5.7.2 Potential impacts

Construction

- The project would require construction resources and manufactured items during the construction stage. These may include but not limited to:
 - ▶ Water and fuel
 - ▶ Fill material (eg rock, sand, gravel, sandstone, brick)
 - ▶ Timber and steel
 - ▶ Soil and plant species (for landscaped areas)
 - ▶ Composite materials
 - ▶ Manufacturers items (eg poles, pipes, cables, signs)
 - ▶ Roadbase materials, concrete and asphalt.
- Construction of the project is likely to generate waste materials such as:
 - ▶ Excavated materials
 - ▶ Excess concrete
 - ▶ Green waste
 - ▶ Contaminated/unsuitable soils
 - ▶ Fuels, oils, liquids and chemicals
 - ▶ Gross pollutants and putrescible waste
 - ▶ General construction waste.

5.7.3 Proposed further assessment

The resource and waste management impacts of the project will be assessed. The assessment will:

- Identify waste streams generated during the construction stage of the project
- Assess waste management impacts associated with the construction activity
- Identify feasible and reasonable management options for spoil reuse and disposal, construction waste management procedures and mitigation measures.

5.7.4 Management and safeguard measures

Resource and waste management issues are commonly encountered on Roads and Maritime road projects and can be managed and mitigated through the implementation of standard management and safeguard measures, which will be detailed in the environmental impact statement. These would include the following measures:

- Construction waste management would follow the waste hierarchy principles of avoid, reduce, reuse, recycle, recover, treat and dispose.
- All generated wastes would be managed and disposed of in accordance with relevant State legislation and government policies including the *Waste Avoidance and Resource Recovery Act 2001*, the *Waste Avoidance and Resource Recovery Strategy 2007* (DECC, 2007) and the NSW Government's *Waste Reduction and Purchasing Policy*. The *Waste Classification Guidelines* (DECCW 2009) would also be used to classify the different types of waste.
- Waste materials would be transported to and from the site by covered trucks where possible.
- A waste register would be maintained for the site. It would detail the types of waste collected, amounts, date/time and details of disposal.
- The construction contractor would be required to re-use materials where feasible, including material collected on site.
- Solid waste materials awaiting disposal would be appropriately contained and stored in a manner that would ensure they do not escape into the environment.
- Training in waste minimisation principles and measures would be provided as part of site inductions.

5.8 Greenhouse gas and climate change

5.8.1 Overview

Climate change impacts for the Hunter Region have been reviewed by the former Department of Environment, Climate Change and Water (now OEH) (2010), which found:

- By 2050, the climate is virtually certain to be hotter, with a likely decrease in rainfall in winter and an increase in rainfall in spring, summer and autumn.
- Run-off and stream flow are likely to increase in summer and autumn and decrease in spring and winter.

- Sea level is virtually certain to keep rising and, coupled with increased flooding, is likely to pose and increased risk to property and infrastructure.
- Soil erosion is likely to increase on steeper slopes in upper catchments.

5.8.2 Potential impacts

Construction

- Impacts related to greenhouse gas emissions associated with the project would mainly relate to selection of pavement materials and emissions from construction plant and equipment.
- Impacts related to altered weather patterns as a result of climate change may include increased rainfall in summer months and warmer temperatures in winter months. This may increase the potential for erosion and sedimentation of soils during construction works.

Operation

- An increased road surface area and more intense rainfall events would lead to an increase in stormwater runoff in the study area.

5.8.3 Proposed further assessment

The further assessment will include:

- A greenhouse gas assessment as defined by the Roads and Maritime Greenhouse Gas Protocol.
- A climate change risk assessment based on Draft Australian Standard (DR AS 5334) Climate change adaptation for settlements and infrastructure, AS/NZS ISO 31000:2009 Risk management – Principles and guidelines and ISO/IEC 31010:2009 Risk management – Risk assessment techniques.
- An identification of feasible and reasonable opportunities and mitigation measures that may be implemented to reduce greenhouse gas emissions associated with construction of the project, and adaptation options to respond to the identified climate risks associated with its operation.

5.8.4 Management and safeguard measures

Greenhouse gas and climate change issues are commonly encountered on Roads and Maritime road projects and can be managed and mitigated through the implementation of standard management and safeguard measures, which Roads and Maritime would detail in the environmental impact statement. These would include:

- Incorporating climate change considerations into the project design
- Minimising vegetation clearance wherever possible
- Minimising waste and re-using materials wherever possible
- Reducing construction transport requirements through use of local staff, resources, suppliers, and landfills wherever possible.

5.9 Hazards and risks

5.9.1 Overview

The project is located in a large bushland area, which is defined as a bushfire prone area under bushfire mapping prepared by Newcastle City Council (refer to Figure 5.3). The study area is covered by a network of fire trails that aid with management of bushfires and bushfire hazard reduction.

5.9.2 Summary of issues

Construction

- The project has the potential to increase bushfire risk in the study area and surrounding areas by increasing use of the area. Bushfire risk would be increased during the construction period, when plant operation and use of fuels and chemicals would increase the risk of accidental bushfire ignition.
- Construction of the project would create a substantial bushfire buffer between residential areas in Elernmore Vale and Wallsend and bushland areas to the east. This would reduce the risk of bushfire to these areas.

Operation

- The potential bushfire risk associated with the project would be a long-term issue and may become significant if appropriate maintenance is not undertaken. However, the project is not expected to be a significant bushfire hazard due to the implementation of appropriate maintenance activities, and any environmental risk associated with this issue is considered to be moderate.

5.9.3 Proposed further assessments

A bushfire risk assessment would be prepared to provide (as a minimum):

- Further assessment of bushfire risks. This should include consultation with relevant fire authorities and consideration of statutory requirements, such as relevant requirements of the *Rural Fires Act 1997*.
- Bushfire management and minimisation measures for both construction and operational phases.

5.9.4 Management and safeguard measures

Hazard and risk issues are commonly encountered on Roads and Maritime road projects and can be managed and mitigated through the implementation of standard management and safeguard measures, which Roads and Maritime would detail in the environmental impact statement. These would include:

- Including Incident Management Plan in the CEMP for the project.
- Liaising with emergency services such as the Rural Fire Service and Fire and Rescue NSW to ensure access is maintained throughout the study area during the construction period.

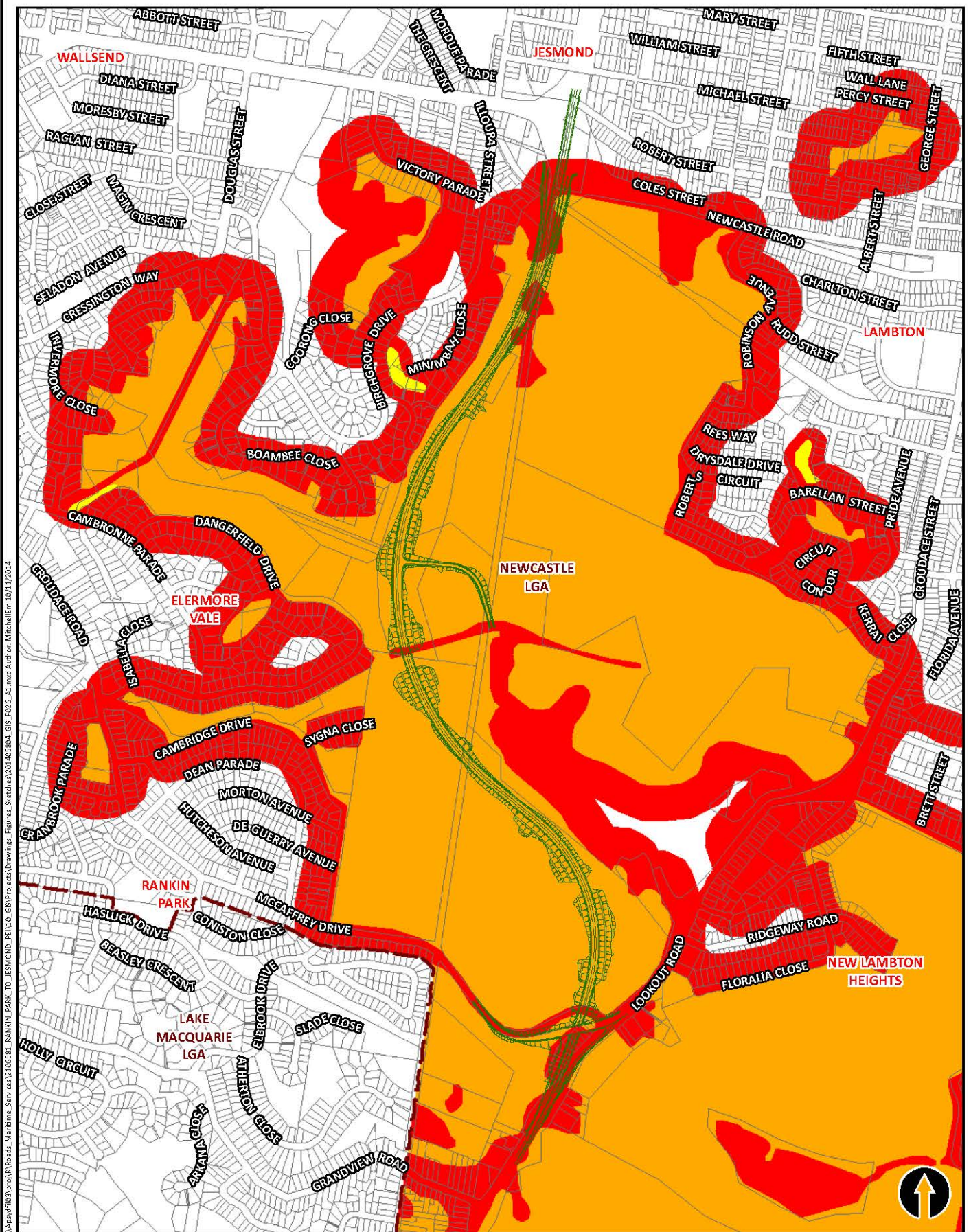


Figure 5.3
Bushfire prone land

6 Conclusion

Roads and Maritime is seeking approval to construct and operate the Newcastle Inner City Bypass, Rankin Park to Jesmond (the project). Roads and Maritime has formed the opinion that the impacts of the Newcastle Inner City Bypass, Rankin Park to Jesmond would be likely to significantly affect the environment and require the preparation of an environmental impact statement under the EP&A Act. Accordingly, the project is State significant infrastructure under Part 5.1 of the EP&A Act. Approval from the Minister for Planning is required for the project.

The key environmental issues identified for the project include:

- Biodiversity
- Traffic and access
- Noise and vibration
- Socio-economic, property and land use
- Urban design, landscape character and visual impact.

The other environmental issues for the project include:

- Hydrology and flooding
- Soils and water, contamination and mine subsidence
- Aboriginal Heritage
- Non-Aboriginal heritage
- Air quality
- Resource management and waste minimisation
- Greenhouse gas and climate change
- Hazards and risk.

The environmental impact statement will include the following:

- A detailed description of the project including its components, benefits, construction activities and potential staging
- A comprehensive assessment of the potential impacts on the key issues including a description of the existing environment, assessment of potential direct and indirect and construction, operation and staging impacts
- Description of measures to be implemented to avoid, minimise, managed, mitigate, offset and/or monitor the potential impacts
- Identify and address issues raised by stakeholders.

7 References

- AECOM 2014, Preliminary Traffic Study: Newcastle Inner City Bypass – Rankin Park to Jesmond.
- Australia ICOMOS 2013, The Burra Charter, The Australia ICOMOS Charter to Places of Cultural Significance.
- Australian Weeds Committee 2014, *Weeds of National Significance*, viewed 11 July 2014 <http://www.weeds.org.au/WoNS/>.
- Connell Wagner 2007, Rankin Park to Jesmond Route Selection Study Highway 23 – Newcastle Inner City Bypass.
- Cropper, SC 1993, *Management of Endangered Plants*, CSIRO Australia, Melbourne.
- Department of Environment and Conservation (DEC) 2006, *Assessing Vibration: a technical guideline*. February 2006.
- Department of Environment and Climate Change (DECC) 2007, *NSW Waste Avoidance and Resource Recovery Strategy 2007*.
- Department of Environment Climate Change (DECC) 2009a, BioBanking Assessment Methodology and Credit Calculator Operational Manual.
- Department of Environment Climate Change (DECC) 2009b, *Interim Construction Noise Guideline*, Sydney South.
- Department of Environment, Climate Change and Water (DECCW) (now OEH) 2009, *Waste Classification Guidelines Part 1: Classifying Waste*. Sydney South.
- Department of Environment, Climate Change and Water (DECCW) (now OEH) 2010, *NSW Climate Impact Profile*, Sydney South.
- Department of Environment, Climate Change and Water (DECCW) (now OEH) 2011, *NSW Road Noise Policy*, Sydney South.
- Department of Land and Water Conservation (DLWC) 1998, *Acid Sulfate Soil Risk Maps*. March 1998.
- Department of the Environment (DoE) 2014a, *Protected Matters Search Tool*, <http://www.environment.gov.au/erin/ert/epbc/index.html>.
- Department of the Environment (DoE) 2014b, *Australian Heritage Database*, accessed July 2014, <http://www.environment.gov.au/heritage/ahdb/>.
- Department of the Environment (DoE) 2014c, *National Heritage List*, accessed July 2014, <http://www.environment.gov.au/topics/heritage/heritage-places>.
- Department of the Environment (DoE) 2014d, *National Pollutant Inventory*, accessed July 2014, <http://www.npi.gov.au/>.

- Department of Main Roads (DMR) 1985, State Highway 23, Section: Lookout Road to Newcastle Road Environmental Impact Statement.
- Department of Primary Industries (DPI) 2014a, *Fishing and Aquaculture, Threatened Listed Aquatic species and Communities Geographic Search by CMA*, accessed 18 July 2014, http://pas.dpi.nsw.gov.au/Species/Species_byRegionResult.aspx?Region=Hunter/Central+Rivers
- Department of Primary Industries (DPI) 2014b, *Fishing and Aquaculture Threatened & protected species records viewer*, accessed 9 July 2014, <http://www.dpi.nsw.gov.au/fisheries/species-protection/records/viewer>.
- *Environmental Planning Assessment Act 1979*, accessed July 2014, <http://www.legislation.nsw.gov.au/maintop/view/inforce/act+203+1979+cd+0+N>.
- *Environment Protection and Biodiversity Conservation Act 1999*, accessed July 2014, http://www.austlii.edu.au/au/legis/cth/consol_act/epabca1999588/.
- Department of Sustainability Environment Water Population and Communities 2011 (SEWPaC), *Environment Protection and Biodiversity Conservation Act 1999 referral guidelines for the vulnerable black-eyed susan, Tetratheca juncea*, Barton, ACT.
- Fairfull and Witheridge 2003, *Why do Fish need to Cross the Road? Fish Passage Requirements for Waterway Crossings*. NSW Fisheries, Cronulla.
- Hawley S.P, Glen R.A and Baker C.J 1995, *Newcastle Coalfield Regional Geology 1:100 000, 1st edition*. Geological Survey of New South Wales, Sydney.
- Landcom 2004, *Managing Urban Stormwater: Soils and Construction – Volume 1*, 4th Edition.
- Lower Hunter and Central Coast Regional Environmental Management Strategy (LHCCREMS) 2003, *Lower Hunter Central Coast Extant Vegetation Community Map*, Lower Hunter and Central Coast.
- Matthei 1995, *Soil Landscapes of the Newcastle 1:100 000 Sheet Map*.
- Newcastle City Council (NCC) undated, Newcastle City Council website, accessed July 2013, <http://www.newcastle.nsw.gov.au/>
- Newcastle City Council (NCC) 2005, *Green Corridors and Landscape Precincts Plan*. Implementing the Newcastle Green Spaces Strategy. July 2005.
- Newcastle City Council 2013, *Newcastle Cycling Strategy and Action Plan*. March 2012.
- Newcastle Local Environmental Plan (LEP) 2012, accessed July 2014, http://www.newcastle.nsw.gov.au/building_and_planning/planning_controls/lep_2012.
- NSW Government 2011, *NSW 2021: A plan to make NSW Number One* <http://www.2021.nsw.gov.au/>.
- NSW Government 2012a, *NSW Government State Infrastructure Strategy* <http://www.nsw.gov.au/state-infrastructure-strategy>.

- NSW Government 2012b, *NSW Long Term Transport Master Plan*
<http://www.transport.nsw.gov.au/content/nsw-long-term-transport-master-plan>.
- NSW Heritage Office, Department of Urban Affairs and Planning (DUAP) 2002, *NSW Heritage Manual - Statements of Heritage Impact*, Sydney.
- Office of Environment and Heritage (OEH) 2001, *NSW Heritage Manual*.
- Office of Environment and Heritage (OEH) 2012, Lower Hunter Ambient Air Quality Review of Available Data.
- Office of Environment and Heritage (OEH) 2014a, *BioNet the Atlas of NSW Wildlife Database Search*,
http://www.environment.nsw.gov.au/atlaspublicapp/UI_Modules/ATLAS_/AtlasSearch.aspx.
- Office of Environment and Heritage (OEH) 2014b, *Framework for Biodiversity Assessment*.
- Office of Environment and Heritage (OEH) 2014c, NSW Biodiversity Offsets Policy for Major Projects.
- Office of the Environment and Heritage (OEH) 2014d, *Aboriginal Heritage Information Management System (AHIMS)*, accessed July 2014.
<http://www.environment.nsw.gov.au/awssapp/login.aspx>.
- Office of the Environment and Heritage (OEH) 2014e, NSW State Heritage Register, accessed July 2014, <http://www.environment.nsw.gov.au/heritageapp/heritagesearch.aspx>.
- Office of the Environment and Heritage (OEH) 2014f, NSW State Heritage Inventory, accessed July 2014, <http://www.environment.nsw.gov.au/heritageapp/heritagesearch.aspx>.
- Office of Environment and Heritage (OEH) 2014g, Contaminated Land Record accessed July 2014. <http://www.environment.nsw.gov.au/prclmapp/searchregister.aspx>.
- Office of Environment and Heritage (OEH) 2014h, *Threatened Species Characteristics by CMA* accessed April 2014 <http://www.environment.nsw.gov.au/biobanking/publicconsult.htm>
- Parsons Brinckerhoff 2014, Newcastle Inner City Bypass, Rankin Park to Jesmond Preliminary Environmental Investigation.
- Ray, G (2008) 'Say Goodbye to Hollywood', Newcastle Herald, 19 January 2008.
- Roads and Maritime Services (RMS) 2008, Environmental Impact Assessment Guidance Note – Guidelines for Landscape Character and Visual Impact Assessment.
- Roads and Maritime Services (RMS) 2011, Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI).
- Roads and Maritime Services (RMS) 2012, Standard Management Procedure Unexpected Archaeological Finds.
- Roads and Maritime Services (RMS) 2013, Guideline for the Management of Contamination.
- Roads and Maritime Services (RMS) 2014a, *Average Daily Traffic Volumes Lookout Road*.

- Roads and Maritime Services (RMS) 2014b, Newcastle Inner City Bypass – Rankin Park to Jesmond – Crash Data.
- Roads and Maritime Services (RMS) 2014c, Heritage and conservation register for the Hunter Region, accessed July 2014
<http://www.rms.nsw.gov.au/cgibin/index.cgi?fuseaction=heritage.show&id=hunter>.
- Royal Botanic Gardens 2013, *Plantnet - The Plant Information Network System of Botanic Gardens Trust*, <http://plantnet.rbgsyd.nsw.gov.au/search/spatial.htm>
- Roads and Traffic Authority (RTA) 2001, *Environmental Noise Management Manual*.
- Roads and Traffic Authority (RTA) 2006, *H23 Rankin Park to Jesmond geotechnical Issues*. Prepared by the RTA Hunter Region Geotechnical Services Division. November 2006.3
- Roads and Traffic Authority (RTA) 2008, Newcastle Inner City Bypass Rankin Park to Jesmond Submissions Report. March 2008.
- Steele 2005, Preliminary Aboriginal Archaeological Survey and Assessment, Proposed Upgrade of State Highway SH23, Shortland to Sandgate New South Wales. Prepared for the NSW Roads and Traffic Authority, December 2005.
- Umwelt Environmental Consultants 2006a, *Ecological Constraints for a Proposed New Route for State Highway 23 between Rankin Park and Jesmond*. An unpublished Report prepared for the Roads and Traffic Authority, February 2006.
- Umwelt Environmental Consultants 2006b, Non-Indigenous Heritage – Preliminary Assessment of the Proposed State Highway 23 Realignment from Rankin Park to Jesmond, NSW. April 2006.

Appendix A

Requirements of the Environmental Planning
and Assessment Regulation 2000

Requirements of the Environmental Planning and Assessment Regulation 2000

Clause 192 of the *Environmental Planning and Assessment Regulation 2000* requires that an application for approval of the Minister to carry out State significant infrastructure must include:

- Details of any approval that would, but for section 115ZG of the Act, be required for the carrying out of the State significant infrastructure, and
- Details of any authorisations that must be given under section 115ZH of the Act if the application is approved, and
- A statement as to the basis on which the proposed infrastructure is State significant infrastructure, including, if relevant, the capital investment value of the proposed infrastructure.

Approvals that would otherwise apply

Approvals that may be required to carry out the SSI, if not for section 115ZG of the EP&A Act, include:

- A water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the Water Management Act 2000.

Authorisations if the application is approved

Authorisations that may be required for the project under section 115ZH of the EP&A Act include:

- An approval under section 15 of the Mine Subsidence Compensation Act 1961
- An environment protection licence under Chapter 3 of the Protection of the Environment Operations Act 1997
- A consent under section 138 of the Roads Act 1993.

State significant infrastructure statement

Clause 14(1) of State Environmental Planning Policy (State and Regional Development) 2011 provides that development is declared to be State significant infrastructure pursuant to section 115U(2) of the Act if it is permissible without development consent under Part 4 of the Act under a State environmental planning policy; and is specified in the categories of development in Schedule 3.

State Environmental Planning Policy (Infrastructure) (ISEPP) permits development for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent. As the Newcastle Inner City Bypass – Rankin Park to Jesmond project is for a road and road infrastructure facilities, and is to be carried out by Roads and Maritime, the project is permissible without development consent under Part 4 of the EP&A Act.

Schedule 3 of State Environmental Planning Policy (State and Regional Development) 2011 provides that general public authority activities for infrastructure or other development that (but for Part 5.1 of the EP&A Act and within the meaning of Part 5 of the Act) would be an activity for which the proponent is also the determining authority, and would, in the opinion of the proponent, require an environmental impact statement to be obtained under the EP&A Act.

For the Newcastle Inner City Bypass – Rankin Park to Jesmond project, Roads and Maritime has formed the opinion that the impact of the project on: biodiversity; traffic and access; noise and vibration; socio-economic; property and land use; and urban design, landscape character and visual impact would be likely to significantly affect the environment and would require an environmental impact statement to be obtained under Section 112 of the EP&A Act.

On this basis the project is State significant infrastructure. Approval from the Minister for Planning and Infrastructure is required under section 115W of the EP&A Act.