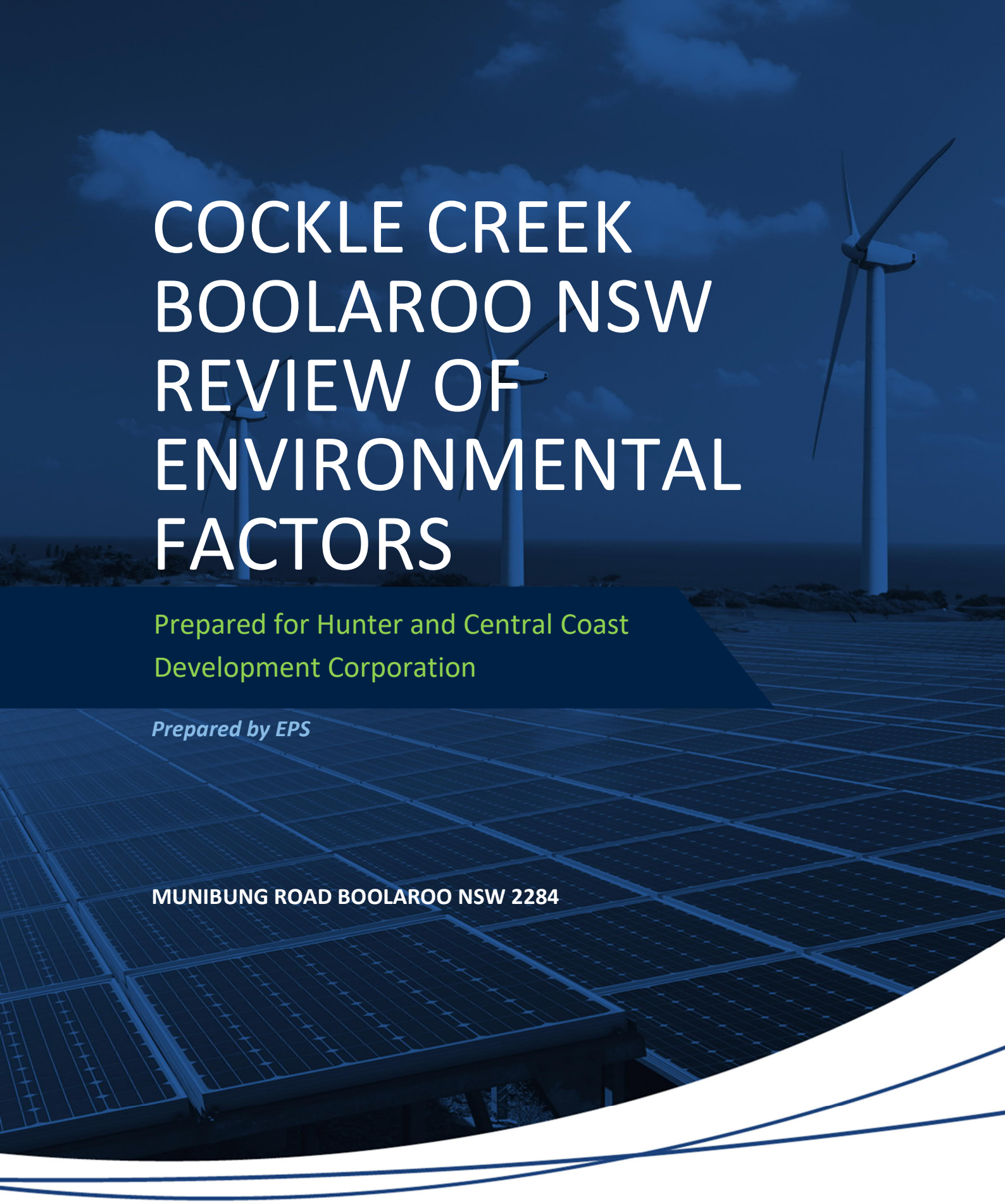

COCKLE CREEK BOOLAROO NSW REVIEW OF ENVIRONMENTAL FACTORS

Prepared for Hunter and Central Coast Development Corporation

Prepared by EPS

MUNIBUNG ROAD BOOLAROO NSW 2284

EPS

Reference No. 11488 October 2020

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Quality Assurance & Version Control Table				
Project	Cockle Creek Boolaroo Review of Environmental Factors (REF)			
Client	Hunter & Central Coast Development Corporation (HCCDC)			
Rev No.	**Date**	**Our Reference**	**Author**	**Reviewer**
V01	14/08/2020	20200803_11488_Cockle Creek REF_V01	S. Duffy	A. Tipper
V02	06/10/2020	20200803_11488_Cockle Creek REF_V02	S.Duffy	A.Tipper
V03	14/10/2020	20201014_11488_Cockle Creek REF_V03	S.Duffy	A.Tipper
Checked by	A. Tipper			
Approved by	S. Duffy			
EPS	Hunter 9 Yacaaba Street, Nelson Bay NSW 2315 (02) 4981 1600	Sydney Level 33, 264 George Street, Sydney NSW 2000 (02) 9258 1985		
Website	www.enviroproperty.com.au			

I, Valentina Misevska, Chief Executive of the Hunter and Central Coast Development Corporation, have examined and considered the Cockle Creek Boolaroo NSW Review of Environmental Factors in accordance with the provisions of s5.5 of the *Environmental Planning and Assessment Act 1979* and the *State Environmental Planning Policy (Infrastructure) 2007* and determine that the proposed development may be carried out as development without consent, subject to compliance with the conditions to manage environmental impacts outlined within the REF.

Signature

19/10/2020

Date

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EXECUTIVE SUMMARY

CONTEXT OF THE PROPOSAL

HCCDC is established by the *Growth Centres (Development Corporations) Act 1974* as an NSW Government Agency. HCCDC is responsible for promoting, co-ordinating, managing and securing the orderly and economic development of its land within the local government areas of Central Coast, Cessnock, Dungog, Lake Macquarie, Maitland, Mid-Coast, Muswellbrook, Newcastle, Port Stephens, Singleton and Upper Hunter Shire.

HCCDC owns and manages part of the Cockle Creek Precinct land (the site). The site is located at 13A Main Road, Boolaroo NSW 2284 between Cockle Creek in the west and Munibung Hill in the east and is positioned approximately 13km south west of Newcastle and 1km north of the existing Boolaroo and Speers Point townships. The site is bounded by First Street in the south, T.C Frith Avenue in the west, the Main Northern Railway line in the north and the base of Munibung Hill in the east.

In August 2019, Parliament passed legislation to transfer the site into HCCDC ownership. This action guarantees the ongoing required environmental management of parts of the un-remediated areas of the site into perpetuity and will unlock the economic opportunities for the remediated areas of the site and for the benefit of the local community and region.

HCCDC role is to manage the divestment of the remediated areas of the site for the future use as a commercial, light industrial and housing centre in the region and manage the divestment of the un-remediated areas of the site to the Government's Waste Assets Management Corporation (WAMC) who are and will continue to manage the environmental requirements of the un-remediated land with regulatory oversight from the NSW Environment Protection Authority.

To drive economic growth in the local community and region, HCCDC is facilitating the redevelopment of the site in accordance with the Lake Macquarie City Councils (LMCC) 09/03/20 Local Strategic Planning Statement and the planning controls specific for the site including LMCC DCP 2014 Part 12 – Area Plans – 12.15 Pasminco.

The proposal is a vital component for the future redevelopment of the site's employment lands and effective operation of the site.

THE PROPOSAL

The proposal involves the construction and operation of road, traffic controls, sewer, water, stormwater, electrical infrastructure and associated infrastructure in the location shown on the indicative proposal plans attached as Appendix 1.

CONSTRUCTION TIMEFRAME

The proposal is forecast to start at the beginning of 2021 and finish mid-2021. The proposal will likely be constructed in stages and take approximately 16 – 20 weeks to complete.

STATUTORY AND PLANNING FRAMEWORK

Under the *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP) HCCDC as a public authority may carry out defined infrastructure works described under the Infrastructure SEPP without consent (subject to preconditions, if applicable) on its own land and other land. HCCDC's proposal falls within the following Infrastructure SEPP categories: roads and traffic, electricity transmission or distribution, sewerage systems, stormwater management systems, telecommunications and other communication facilities and water supply systems.

HCCDC is both the proponent of the proposal (i.e. the body proposing to carry out the proposal) and the public authority determining authority. HCCDC must comply with the legal provisions relating to both. This means that HCCDC can both prepare and review any environmental assessment document required under Part 5 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

HCCDC has completed this Review of Environmental Factors (REF) to consider the potential impacts and benefits of the construction and operation of road, traffic controls, sewer, water, stormwater, electrical infrastructure, and associated infrastructure (the proposal) on the site.

The REF has been prepared in accordance with the provisions of Part 5 of the EP&A Act and will be used to assist HCCDC to examine and take into account all matters affecting or likely to affect the environment by reason of the proposed activity, and to determine whether an Environmental Impact Statement is required. Feedback from key stakeholders will be considered when HCCDC makes the determination.

COMMUNITY AND STAKEHOLDER CONSULTATION

Community and stakeholder consultation for the proposal is being undertaken and will continue until the proposal is completed to minimise any impacts during the construction phase.

ENVIRONMENTAL IMPACT ASSESSMENT

An environmental assessment has been completed to consider whether the proposal is likely to significantly affect the environment. The assessment included assessment of soils and geology, hydrology, water quality and flooding, ecology, noise and vibration, air quality, non-Indigenous heritage, Aboriginal heritage, visual amenity, traffic and access, services and utilities, land uses, waste and resources and cumulative and consequential impacts.

This REF identified the proposal would have potential beneficial environmental impacts with the water, sewer, road and utility/services upgrades facilitating the future sustainable economic growth in the locality for the benefit of the City of Lake Macquarie.

This REF identified the key potential environmental adverse impacts associated with the proposal were:

- Traffic and access impacts during construction; and
- Noise and vibration emissions during construction.

The adverse impacts are confined to the construction period which is expected to be short term and within manageable limits. The adverse impacts would also be mitigated by construction management strategies implemented via a Construction Environmental Management Plan (CEMP) that would include specific plans for applicable environmental issues e.g.:

- Soil and Water Management Plan, including an acid sulphate soil management sub-plan, an erosion and sediment control sub-plan and groundwater and flood management sub-plan;
- Noise and Vibration Management Plan;
- Traffic Management Plan;
- Communication Management Plan; and
- Utility/Services Management Plan.

Based on the assessment of the proposal, and the mitigation measures proposed, the proposal is not likely to significantly affect the environment and therefore does not require the preparation of an Environmental Impact Statement (EIS).

REF CONCLUSION

In accordance with the requirements of Part 5 of the EP&A Act and the EP&A Regulation the proposal has been fully assessed. Based on the assessment of the proposal, and the mitigation measures proposed, the proposal is not likely to significantly affect the environment and therefore does not require the preparation of an Environmental Impact Statement (EIS).

This REF includes an assessment of whether the proposal is likely to have a significant impact to matters of national environmental significance under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The proposal is not likely to have a significant impact on matters of national environmental significance and therefore referral to the Commonwealth Government under the EPBC Act would not be required.

As defined by the *Biodiversity Conservation Act 2016* the proposal is not expected to have significant impacts on threatened species, populations, ecological communities or their habitats consequently a species impact statement is not required.

As defined by the *National Parks and Wildlife Act 1974* the proposal is not expected to harm Aboriginal objects or declared Aboriginal places consequently there is no requirement for an Aboriginal Heritage Impact Permit to commence the proposal's works.

1. INTRODUCTION

HCCDC is established by the *Growth Centres (Development Corporations) Act 1974* as an NSW Government Agency. HCCDC is responsible for promoting, co-ordinating, managing and securing the orderly and economic development of its land within the local government areas of Central Coast, Cessnock, Dungog, Lake Macquarie, Maitland, Mid-Coast, Muswellbrook, Newcastle, Port Stephens, Singleton and Upper Hunter Shire.

HCCDC owns and manages part of the Cockle Creek Precinct land (the site). The site is located at 13A Main Road, Boolaroo NSW 2284 between Cockle Creek in the west and Munibung Hill in the east and is positioned approximately 13km south west of Newcastle and 1km north of the existing Boolaroo and Speers Point townships. The site is bounded by First Street in the south, T.C Frith Avenue in the west, the Main Northern Railway line in the north and the base of Munibung Hill in the east.

In August 2019, Parliament passed legislation to transfer the site into HCCDC ownership. This action guarantees the ongoing required environmental management of parts of the un-remediated areas of the site into perpetuity and will unlock the economic opportunities for the remediated areas of the site and for the benefit of the local community and region.

HCCDC role is to manage the divestment of the remediated areas of the site for the future use as a commercial, light industrial and housing centre in the region and manage the divestment of the un-remediated areas of the site to the Government's Waste Assets Management Corporation (WAMC) who are and will continue to manage the environmental requirements of the un-remediated land with regulatory oversight from the NSW Environment Protection Authority.

The proposal is a vital component for the future redevelopment of the site's employment lands and effective operation of the site.

1.1. PROPOSAL IDENTIFICATION

The proposal involves the physical road/intersection upgrade works to Munibung Road and Hague Road, and new road and intersection works for the internal connection road with associated upgrades of services/utilities in the road reserves. Key features of the proposal presented in the indicative plans attached as Appendix 1 include but are not limited to:

- A Bunnings/Costco and Munibung Road signalised intersection, including adjustments to the existing Bunnings driveway;
- A T intersection for Hague Road and Munibung Road;
- Minor modifications and adjustment within existing Munibung Road;

- A realignment and widening of the existing Hague Road;
- A roundabout at southern end of Hague Rd including additional legs to support future development;
- An internal road connection between the roundabout at southern end of Hague Road and the Bunnings/Costco and Munibung Road signalised intersection, including entry points to development lots;
- Modified and adjusted footpaths along Munibung Road and new internal roadworks to accommodate pedestrians and/or cyclists;
- Adjustments to parking lanes;
- Clearing, demolition and civil earthworks;
- Modifications to existing road pavements;
- New road pavement works;
- Installation of a Heritage Interpretation Sign, at the main entry point to the site from the roundabout on T.C. Frith Avenue and Main Road and Munibung Road.
- Utility extensions and/or relocations along Munibung Road and the new roads to service development blocks of land (e.g. water, sewer, gas, electricity, telecommunication services, etc);
- New stormwater infrastructure to suit new and adjusted roadworks;
- Ancillary works including kerb and guttering for the length of the new roads, signs, line marking, landscaping and environmental protection works;
- Temporary ancillary facilities including site compounds and stockpile sites; and
- Temporary diversion and traffic control as required.

The proposal has been assessed in relation to the following two defined areas:

- **Study area:** This is the area specifically considered for on-the-ground assessments (e.g. ecology and heritage) and REF.
- **Disturbance area:** This is the area which will be directly physically impacted on by the proposal.

Further detail on each of these areas is provided below.

Study area

The Study area considered as part of the on-the-ground investigations into relevant environmental attributes for this REF is identified in Figure 1-1. Photographs of the Study area are shown in Appendix 2.

Disturbance area

Works for the proposal are primarily confined to disturbance areas i.e. the development footprint plus any anticipated ancillary construction impacts. The development footprint disturbance area is located within the Study area and is identified in Figure 1-1. An indicative

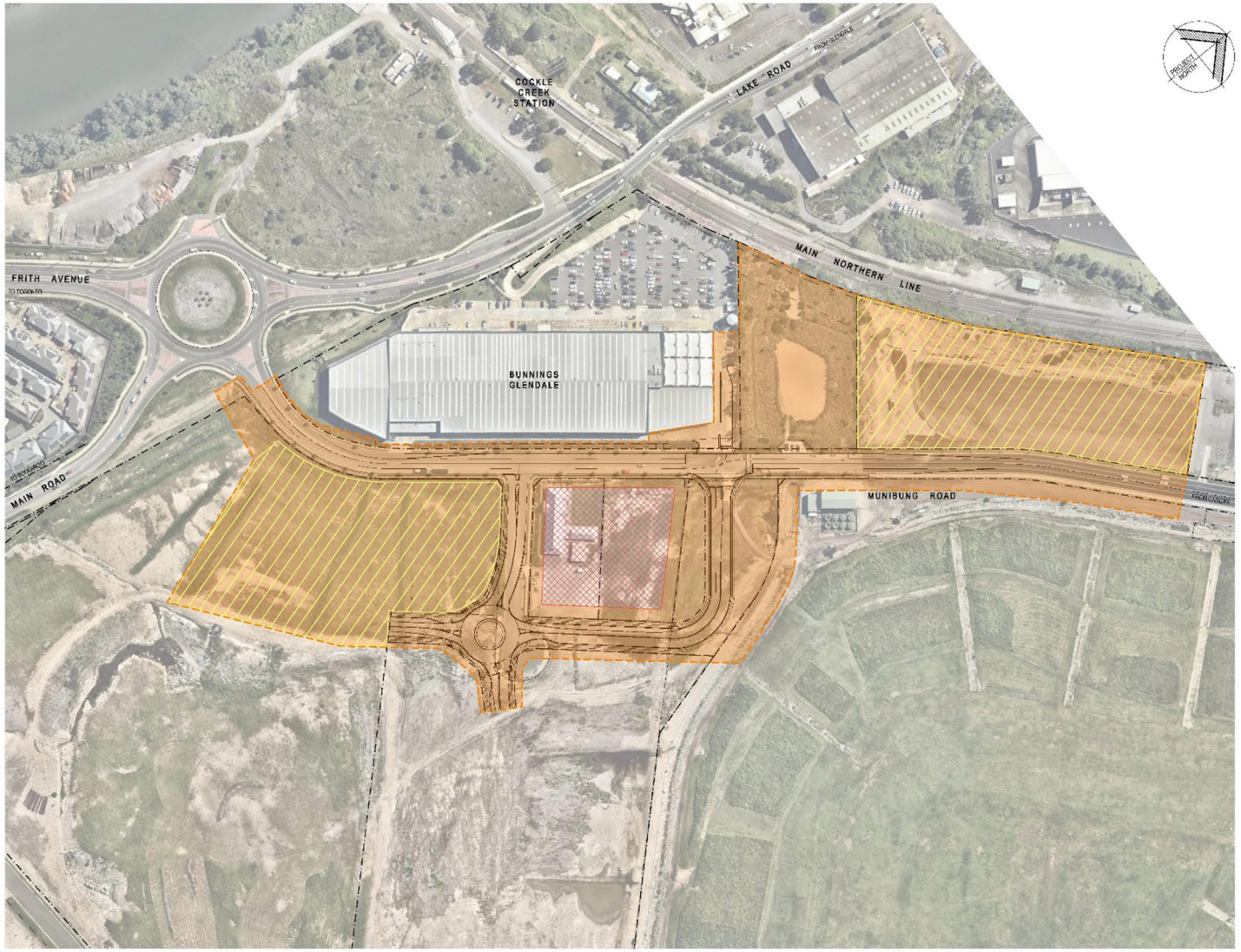
proposed area of works plan is shown in Figure 1-2. Photographs of the Disturbance area are shown in Appendix 2.

Figure 1-1 Location map

EPS

Date: 09/10/2020
Author: ES
Reviewer: SD
Job Ref/Ver: V02/11488

Figure 1-2: Area of Works Plan



PROPOSED AREA OF WORKS PLAN
SCALE 1:1250

Lindsay Dynan

Sydney | Perth | Newcastle | Central Coast

PROJECT
MUNIBUNG ROAD INTERSECTION WORKS
COCKLE CREEK REDEVELOPMENT
BOOLAROO, NSW

CLIENT
HUNTER & CENTRAL COAST
DEVELOPMENT CORPORATION

THIS DRAWING CONTAINS COLOURED INFORMATION C M Y

LEGEND

- EXTENT OF PROPOSED WORKS AREA DIRECTLY IMPACTED BY PROPOSAL, INCLUDES TOTAL PROPOSED FOOTPRINT, ANCILLARY SITES AND ANY OTHER AREAS THAT WOULD BE TEMPORARILY DISTURBED
- EXTENT OF ANCILLARY AREA USED FOR CONTRACT COMPOUNDS AND STAGING
- EXTENT OF EXCLUDED ZONE
- EXISTING FENCE LINE
- BOUNDARY LINE
- EASEMENT LINE

REV | DATE | DESCRIPTION | DRN | APP

PROPOSED AREA OF WORKS PLAN

DRAWING STATUS: DRAFT COPY
SIZE: A1
DRAWN: J.Fraser
DESIGNED: J.Fraser
APPROVED: B.Rodgers
SCALE: 1:1250
DRAWING No: 16444-MU-SK_0011
REVISION: A

NOT FOR CONSTRUCTION

PLOTTED: 21/10/2020 12:21 PM

1.2. PURPOSE OF THE REPORT

EPS prepared this REF on behalf of HCCDC. For the purposes of these works, HCCDC is the proponent and the determining authority under Part 5 of the EP&A Act.

The purpose of the REF is to describe the proposal, to document the likely impacts of the proposal on the environment, and to detail protective measures to be implemented.

The description of the proposed work and associated environmental impacts have been undertaken in the context of clause 228 of the *Environmental Planning and Assessment Regulation 2000*, the factors in 'Is an EIS Required? Best Practice Guidelines for Part 5 of the Environmental Planning and Assessment Act 1979' (DUAP, 1995/1996), the *Biodiversity Conservation Act 2016* (BC Act), the *Fisheries Management Act 1994* (FM Act), and the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The REF responds to and helps to fulfil the Section 5.5 EP&A Act requirements i.e. HCCDC as the determining authority must examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The REF findings will be considered by the HCCDC as the determining authority when assessing:

- Whether the proposal is likely to have a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning under Part 5.1 of the EP&A Act;
- The significance of any impact on threatened species as defined by the BC Act and/or FM Act, in section 1.7 of the EP&A Act and therefore the requirement for a Species Impact Statement;
- The significance of any impact on nationally listed biodiversity matters under the EPBC Act, including whether there is a real possibility that the activity may threaten long-term survival of these matters, and whether offsets are required and able to be secured; and
- The potential for the proposal to significantly impact any other matters of national environmental significance or Commonwealth land and the need, subject to the EPBC Act strategic assessment approval, to make a referral to the Australian Government Department of Agriculture, Water and the Environment for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.

2. PROPOSAL NEED AND JUSTIFICATION

2.1. OBJECTIVES OF THE PROPOSAL

The proposal's primary objectives are to provide essential infrastructure and services to enable the development of approximately 20ha of land on the site that has been recently rezoned by LMCC and DPI&E by Planning Proposal PP_2019_LAKEM_006_00 to enable specialised retail premises and other commercial uses that require a large floor area and to improve Bunning's Munibung Rd access.

2.2. OPTIONS CONSIDERED

Options considered included an alternative location for the proposal and the 'do nothing' option. These options are described in the following sections.

2.2.1. Alternative Location

The proposal includes but is not limited to road, traffic, water, sewer and drainage infrastructure works. The proposal's location is dictated by LMCC's and DPI&E's recent rezoning of approximately 20ha of land on the site to enable regionally significant specialised retail premises and other commercial uses that require a large floor area which were not possible under the previous zoning. The proposal's primary purpose is to provide the essential infrastructure and services to enable the development of this recently rezoned land.

The proposal's location is determined by the location of the rezoned land on the site and the existing Bunning's Munibung Rd access position.

2.2.2. Do Nothing

This option involves essential infrastructure and services. The 'do nothing' option does not provide sufficient infrastructure and services to develop approximately 20ha of employment land and does not improve Bunning's Munibung Rd access.

2.3. PREFERRED OPTION JUSTIFICATION

The proposal is the preferred option for the following reasons:

- HCCDC is established by the Growth Centres Act as an NSW Government Agency. Section 7(1) of the Growth Centres Act makes HCCDC responsible for promoting, co-ordinating, managing and securing the orderly and economic development of the site;
- HCCDC role is to manage the divestment of the remediated areas of the site for the future use as a commercial, light industrial and housing centre in the region and manage the divestment of the un-remediated areas of the site to the Government's Waste Assets Management Corporation (WAMC) who are and will continue to manage the environmental requirements of the un-remediated land with regulatory oversight from the NSW Environment Protection Authority. The proposal is consistent with HCCDC'S general powers prescribed by section 8(1) of the Growth Centres Act;
- To drive economic growth in the region, HCCDC is pursuing the development of approximately 20ha of land on the site that has been recently rezoned by LMCC and DPI&E by Planning Proposal PP_2019_LAKEM_006_00 to enable specialised retail premises and other commercial uses that require a large floor area;
- Costco has recently lodged DA/1166/2020 for the development of a Costco wholesale and retail warehouse and service station on part of the rezoned land. The development application indicates the Costco development will generate approximately $44,689,386 of capital investment, significant construction jobs and 250 equivalent full-time jobs plus a further indirect or flow-on jobs elsewhere in the local economy;
- The proposal provides essential infrastructure and services including road, traffic, water, sewer and drainage infrastructure works required for the Costco development and development of the remaining site's employment lands consequently generating much-needed employment opportunities for the growing population in the north west sector of the City of Lake Macquarie;
- The proposal reflects relevant economic, environmental and social considerations. The majority of the proposal will either improve existing infrastructure and services in the same location or locate new infrastructure and services e.g. underground to facilitate the orderly and economic use of the employment lands and the site. The proposal will ensure the infrastructure and services are sufficiently protected to provide for the future development of the employment lands and the site. The proposal is consistent with the protection of the existing natural environment;
- The proposal is consistent and supports the aims and objects set out in the LMCC DCP 2014 Part 12 – Area Plans – 12.15 Pasminco for the redevelopment of the former Pasminco Cockle Creek Smelter land and the former Incitec Pivot Fertilizer site; and
- The proposed signalised intersection at the Bunning's Munibung Rd access location will reduce the potential for conflicts associated with vehicles entering or exiting Bunnings via Munibung Rd and will provide ongoing improvements to the overall level of road safety at this location.

3. DESCRIPTION OF THE PROPOSAL

3.1. SCOPE OF CONSTRUCTION ACTIVITIES

The proposal's construction activities are primarily located in the disturbance area shown identified in Figure 1-1.

Table 3-1 provides key elements of the construction activities likely required for the proposal.

Table 3-1: Construction activities for the proposal

Key Elements	Description
Pre-construction, construction and restoration physical works	The works includes (but are not limited to) the following key elements: • Site establishment including compounds/lay down areas; • Vegetation and topsoil stripping; • Trench excavation; • Dewatering of open trench, if necessary; • Construction of a water infrastructure; • Construction of sewer infrastructure; • Full width new construction and or upgrade of roads to council minimum standard subsoil drainage, footpath formation and drainage; • Changes to the Munibung Road/ Hague Road intersection/s to council minimum standard; • Construction and installation of a signalised intersection; • Signage and line marking to council's minimum standard; • Construction of and changes to pathways and footpaths; • Construction of and changes to roadside furniture and safety devices; • Construction of and changes to stormwater infrastructure including, kerbs, gutters, drainage pipelines, stormwater pits, gross pollutant trap; • Construction of and changes to communications utilities including cabling and conduits; • Construction of and changes to electrical utilities including cabling; • Installation of heritage interpretation works; • Removal of excavated material if not suitable for re-use; and • Restoration of the works area.
Plant and Equipment	The plant and equipment required includes (but are not limited to) the following: • Excavators; • Tipper trucks; • Light vehicles; • Flat-bed delivery trucks; • Service vehicles; • Mobile cranes; • Rollers; • Skid steers; • Water carts;

Key Elements	Description
	• Jackhammers; • Generators; • Pressure testing equipment; • Compactor; • Concrete agitators (or similar); • Concrete pumps; • Concrete saws; • Air compressors; • Mobile lighting; and • Various hand tools and small machinery.
Construction workforce	Up to approximately 30 full time equivalents for the duration of the works. The appointed contractor will determine the number of workers.
Construction period	Construction works could commence the beginning of 2021. Construction works will take approximately 16 -20 weeks.
Construction hours	Construction would generally occur during the standard working hours set out in the Interim Construction Noise Guideline (DECC, 2009): • Mondays to Fridays between 7am and 6pm. • Saturdays between 8am and 1pm. • No work would normally occur on Sundays or public holidays. Construction may be required outside the recommended standard hours to install/construct public infrastructure. The *Environmental Planning and Assessment (COVID-19 Development – Construction Work Days) Order 2020* is now in place and will continue until the COVID-19 pandemic is over, or the advice of NSW Health changes. The Order permits construction sites to operate on weekends and public holidays.
Traffic Management & Access	The appointed contractor will prepare a Construction Traffic, Transport and Access Management Plan in consultation with relevant stakeholders and in accordance with relevant standards as part of the CEMP. The plan would provide information on traffic flow, vehicle moments, site access and parking arrangements during construction, and the measures to minimise the impacts on the relevant road network.
Public Utilities	Existing public utilities/services exist in the vicinity of the works. It will be the contractor's responsibility to locate all services prior to commencement of works.
Operation & Maintenance	The relevant infrastructure authority will be responsible for the ongoing maintenance and operational obligations, including fault rectification in accordance with the terms of their operating license.

The order and timing of the construction activities is not finalised. The order and timing of the construction activities will be finalised with relevant stakeholders and the appointed construction contractor.

3.2. MANAGING CONSTRUCTION ACTIVITIES

A Construction Management Environmental Plan (CEMP) is required for the construction phase of this proposal. It will be prepared by the construction contractor prior to commencement of construction, incorporating relevant mitigation measures outlined in this REF.

3.3. OPERATIONAL REQUIREMENTS

Following completion of the roads including intersection upgrades and associated infrastructure works in accordance with relevant requirements/standards the roads the associated infrastructure works will be dedicated to LMCC. LMCC will be responsible for the ongoing maintenance and operational obligations.

Following completion of the services/utilities infrastructure when the installation is assessed as operational, the infrastructure will become the property of the relevant infrastructure authorities supported by any necessary easements (if any). The relevant infrastructure authority will be responsible for the ongoing maintenance and operational obligations, including fault rectification in accordance with relevant legislative requirements.

4. STATUTORY FRAMEWORK

The following Acts and Regulations are considered relevant to the proposal, are outlined in the sections below.

4.1. ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 AND THE GROWTH CENTRES (DEVELOPMENT CORPORATIONS) ACT 1974

The EP&A Act establishes the framework for assessment of environmental impacts and determining planning approvals for development in NSW. It also provides for the creation and implementation of State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs) which impact permissibility.

The *Growth Centres (Development Corporations) Act 1974* section 4(5) stipulates Hunter and Central Coast Development Corporation (HCCDC) as an NSW Government Agency. The *Interpretation Act 1987* section 13A classifies an NSW Government Agency as a statutory body representing the Crown. The EP&A Act section 1.4 definition of a public authority includes a statutory body representing the Crown.

Under the Infrastructure SEPP, HCCDC as a public authority may carry out defined infrastructure works described under the Infrastructure SEPP without consent (subject to preconditions, if any) on the Study area and other land.

Although the proposal does not require consent under Part 4 of the EP&A Act the proposal must be assessed under Part 5 of the EP&A Act subject to certain exceptions e.g. exempt development and Biodiversity certification, which do not apply to the proposal.

A precondition to the operation of Part 5 of the EP&A Act is the proposal must fall within the definition of an activity in section 5.1 of the EPA Act. An activity means:

(a) the use of land, and
(b) the subdivision of land, and
(c) the erection of a building, and
(d) the carrying out of a work, and
(e)the demolition of a building or work, and
(f) any other act, matter or thing referred to in section 3.14 that is prescribed by the regulations for the purposes of this definition,
but does not include:
(g) any act, matter or thing for which development consent under Part 4 is required or has been obtained, or

(h) any act matter or thing that is prohibited under an environmental planning instrument, or
(i) exempt development, or
(j) development carried out in compliance with a development control order, or
(k) any development of a class or description that is prescribed by the regulations for the purposes of this definition.

HCCDC can utilise Part 5 of the EP&A Act because the proposal falls within the definition of an activity. HCCDC as the determining, authority before proceeding with an activity or granting approval to the activity, must consider the environmental impact of that activity. Section 5.5 of the EP&A Act specifies how assessment of environmental impact is to be completed.

Under section 5.5 of the EP&A Act, HCCDC must examine and consider to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity. Clause 228 of the *Environmental Planning & Assessment Regulation 2000* list the factors that HCCDC must consider when judging the likely impact of an activity on the environment. This REF is provided to HCCDC to comply with its statutory obligations.

Under Part 5 of the EP&A Act an Environmental Impact Statement (EIS) in only required if HCCDC, as the determining authority, forms the view that the activity which it is considering is likely to significantly affect the environment (section 5.7 of the EP&A Act).

4.2. STATE ENVIRONMENTAL PLANNING POLICIES

4.2.1. State Environmental Planning Policy (Infrastructure) 2007

The aim of Infrastructure SEPP is to facilitate the effective delivery of infrastructure across NSW (section 2, Infrastructure SEPP).

Section 8 ('Relationship to other environmental planning instruments') of the Infrastructure SEPP provides that if there is an inconsistency between the Infrastructure SEPP and any other environmental planning instrument, the Infrastructure SEPP prevails to the extent of the inconsistency.

Under the Infrastructure SEPP HCCDC as a public authority may carry out defined infrastructure works described under the Infrastructure SEPP without consent (subject to preconditions, if applicable). HCCDC's proposal falls within the following Infrastructure SEPP categories:

- Part 3 - Development controls, Division 17 - Roads and traffic, Subdivision 1 - Roads and roads infrastructure facilities, Clause 94(1): "*Development for the purpose of a road or*

road infrastructure facilities may be carried out by or on behalf of a public authority without consent on any land……"

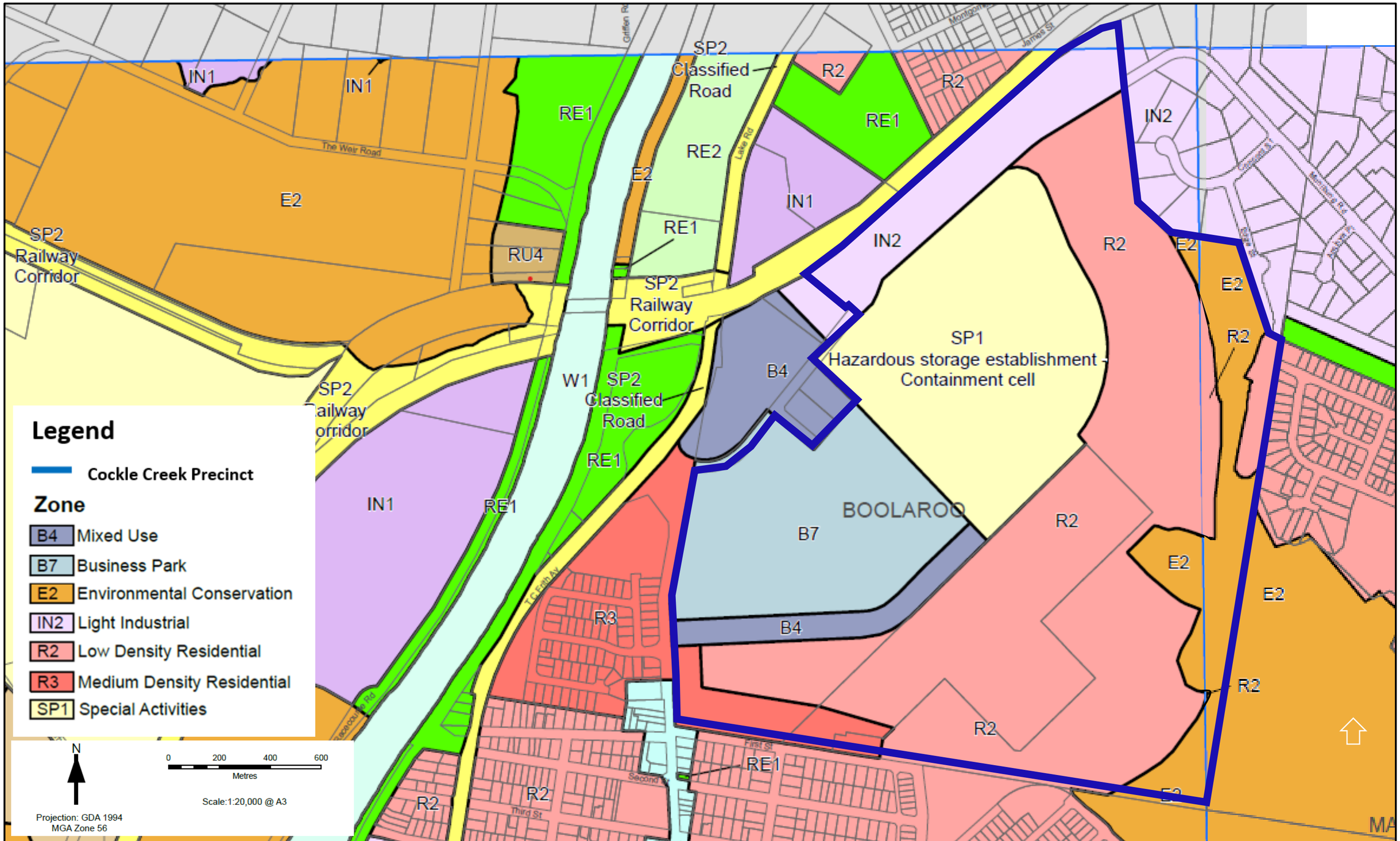
- Part 3 - Development controls, Division 5 - Electricity transmission or distribution, Subdivision 1 - Electricity transmission or distribution networks, Clause 41: "*Development for the purpose of an electricity transmission or distribution network may be carried out by or on behalf of an electricity supply authority or public authority without consent on any land……"*
- Part 3 - Development controls, Division 18 - Sewerage systems, Clause 106(3B): "*Development for the purpose of sewage reticulation systems may be carried out without consent on any land in the prescribed circumstances."*
- Part 3 - Development controls, Division 20 - stormwater management systems, Clause 111(1): "*Development for the purpose of stormwater management systems may be carried out by or on behalf of a public authority without consent on any land."*
- Part 3 - Development controls, Division 21 - Telecommunications and other communication facilities, Clause 114(1): "*Development for the purposes of telecommunications facilities (including radio facilities) may be carried out by a public authority without consent on any land."*
- Part 3 - Development controls, Division 24 - Water supply systems, Clause 125(1): "*Development for the purpose of water reticulation systems may be carried out by or on behalf of a public authority without consent on any land."*

While HCCDC may carry out defined infrastructure works without consent the infrastructure SEPP precludes HCCDC from carrying out the development in particular circumstances unless HCCDC has provided written notice of the intention to carry out the development (together with a scope of works) to the relevant authority and taken into consideration any response to the notice that is received from the relevant authority within 21 days after the notice is given. Further information is provided in Section 5.2.

4.3. LOCAL ENVIRONMENTAL PLANS

4.3.1. Lake Macquarie Local Environmental Plan 2014

The *Lake Macquarie Local Environmental Plan 2014* (LMLEP 2014) applies to the Study area. As shown in Figure 4-1, the proposal is located on land zoned B4 Mixed Use, SP1 Special Activities and B7 Business Park.



EPS

Figure 4-1 Land Zoning Map

Date: 07/10/2020
Author: ES
Reviewer: SD
Job Ref/Ver: 11488/V02

Clause 1.9(1) of the LMLEP 2014 states:

"This Plan is subject to the provisions of any State environmental planning policy that prevails over this Plan as provided by section 3.28 of the Act."

Clause 5.12(1) of the LMLEP 2014 states:

"This Plan does not restrict or prohibit, or enable the restriction or prohibition of, the carrying out of any development, by or on behalf of a public authority, that is permitted to be carried out with or without development consent, or that is exempt development, under State Environmental Planning Policy (Infrastructure) 2007."

Development consent for the proposal under the LMLEP 2014 is not required because the proposal is permitted without consent pursuant to the Infrastructure SEPP.

The REF has considered applicable factors stipulated in the LMLEP 2014.

4.3.2. Lake Macquarie Development Control Plan 2014

Lake Macquarie Development Control Plan 2014 (LMDCP 2014) applies to the Study area. The LMDCP 2014 provides detailed planning and design guidelines to support the planning controls in the LMDCP 2014. The LMDCP 2014 describes how to go about a land use and provides additional development controls and standards for addressing and managing issues at a local level and provides information to meet Council requirements for sustainable, quality development.

The LMDCP 2014 Part 12.15 – Pasminco is a plan to guide the redevelopment of the former Pasminco Cockle Creek Smelter site and former Incitec Pivot Fertilizer site (Pasminco land). The plan envisages the Pasminco land will be redeveloped to provide residential and employment areas on the Pasminco land and applies specific development controls to the Pasminco land. The redevelopment of the Pasminco land, that includes the Study area, requires infrastructure and services, such as water, sewer, stormwater, power, telephone lines, gas and roads be provided. LMCC is updating the LMDCP 2014 Part 12.15 to reflect the recent rezoning of approximately 20ha of land on the site by Planning Proposal PP_2019_LAKEM_006_00 to enable specialised retail premises and other commercial uses that require a large floor area.

The proposal is generally consistent with the LMDCP 2014 general development controls and the LMDCP 2014 Part 12.15 development controls.

4.4. STATE AND COMMONWEALTH LEGISLATION

4.4.1. Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides for the protection of the environment, especially those aspects of the environment that are matters of National Environmental Significance (NES). Under the EPBC Act, actions that have, or are likely to have a significant impact on a NES require approval from the Australian Government Minister for the Environment (the Minister). The likely impact on the nine NES protected under the EPBC Act are outlined in the Umwelt's ecological due diligence assessment in Appendix 3.

The ecological due diligence assessment attached as Appendix 3 found the proposal is unlikely to have a significant impact on threatened biodiversity and as such a Species Impact Statement or a referral to the Commonwealth under the EPBC Act is not required.

Further information is provided in Section 6.3.

4.4.2. Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) identifies threatened species, populations, endangered ecological communities, critical habitats and key threatening processes. The BC Act establishes a framework to avoid, minimise and offset the impacts of proposed development and land use change on biodiversity.

Clause 7.8 of the BC Act states:

> *(1) This section applies to environmental assessment under Part 5 of the* Environmental Planning and Assessment Act 1979*.*
>
> *(2) For the purposes of Part 5 of the* Environmental Planning and Assessment Act 1979*, an activity is to be regarded as an activity likely to significantly affect the environment if it is likely to significantly affect threatened species.*
>
> *(3) In that case, the environmental impact statement under Part 5 of the* Environmental Planning and Assessment Act 1979 *is to include or be accompanied by:*
>
> > *(a) a species impact statement, or*
> >
> > *(b) if the proponent so elects—a biodiversity development assessment report.*
>
> *(4) If the likely significant effect on threatened species is the only likely significant effect on the environment, an environmental impact statement may be dispensed with and Part 5 of the* Environmental Planning and Assessment Act 1979 *applies as if references to an environmental impact statement were references to a species impact statement or biodiversity development assessment report.*

As defined by the *Biodiversity Conservation Act 2016,* the ecological due diligence assessment attached as Appendix 3 found the proposal is not expected to have significant impacts on threatened species, populations, ecological, communities or their habitats consequently a Species Impact Statement is not required.

Further information is provided in Section 6.3.

4.4.3. Protection of the Environment Operations Act 1997

The object of the Act is to achieve the protection, restoration and enhancement of the quality of the NSW environment. There is a broad allocation of responsibilities under the Act between the Environmental Protection authority (EPA), local councils and other public authorities. The EPA is made the regulatory authority for:

- activities listed in Schedule 1 to the Act and the premises where they are carried out;
- activities carried out by a State or public authority; and
- other activities in relation to which a licence regulating water pollution is issued.

In nearly all other cases, the regulatory authority is the relevant local council.

No licences/approvals are required for the works under the POEO Act.

No further consideration of the Act is required.

4.4.4. Water Act 1912 and Water Management Act 2000

The taking of water and its subsequent use has historically been managed through a licensing framework under the *Water Act 1912*. This licensing framework is transitioning to a new licensing and approval framework under the *Water Management Act 2000* (WM Act).

This transition occurs for particular water sources when a water sharing plan which applies to those water sources commences. This transition process is largely complete. The *Water Act 1912* can still apply to:

- take water from a river, lake or aquifer;
- capture rainfall run-off;
- construct and use a work for the purpose of water conservation, irrigation, water supply or drainage;
- sink a bore, well or excavation which may connect with an aquifer - known as aquifer interference activities; and
- dispose of water.

The proposal will include excavation works. Groundwater may be intercepted, and dewatering required. If groundwater is intercepted and dewatering required, it is unlikely that it would exceed the stipulated amount of 3 ML/year and therefore the need for a licence under Part 5 of the *Water Act 1912.*

No further consideration of the Act is required.

4.4.5. Hunter Water Act 1991

The Hunter Water Corporation (HWC) is owned by the NSW Government. The *Hunter Water Act 1991* and *State-Owned Corporations Act 1989* established HWC and sets out HWC's principal functions including providing drinking water, wastewater, recycled water and some stormwater services across the Lower Hunter including the City of Lake Macquarie.

HWC is a water supply authority. Where any development or engineering works are to be undertaken, the owner or developer is responsible for ensuring the water supply authority's assets are considered.

An owner or developer must make satisfactory arrangements for the provision of services to the new development, which may also involve payment of water and/or sewer developer contributions. To identify the appropriate arrangements, the developer must apply for a section 50 certificate under Section 49 of the *Hunter Water Act 1991*.

The proposal does include a requirement for water supply works under the Hunter Water Act 1991. A section 50 approval under the *Hunter Water Act 1991* for works is required.

4.4.6. Waste Avoidance and Resource Recovery Act 2001

The *Waste Avoidance and Resource Recovery Act 2001* (WARR Act) promotes waste avoidance and resource recovery in New South Wales.

Under this Act, the resource management hierarchy principles in order of priority are:

- avoidance of unnecessary resource consumption;
- resource recovery (including reuse, reprocessing, recycling and energy recovery); and
- disposal.

HCCDC is committed to ensuring responsible management of waste and the reuse of such waste through appropriate measures, in accordance with the resource management hierarchy principles.

No further consideration of the Act is required.

4.4.7. Roads Act 1993

The *Roads Act 1993* makes provisions with respect to public roads. Under this Act, approval is required for works within a public road reserve including but not limited to road pavement works, kerb and gutter, footway works, footpath, vehicular access crossing (other than for single dwellings or garages and with no structures in road reserve) and drainage works within road reserve.

A Section 138 approval/s under the *Roads Act 1993* is required for the proposed road works and possibly under boring works beneath Munibung Road to allow a sewer main to be provided to the industrial zoned land on the western side to Munibung Road.

4.4.8. Heritage Act 1977

The *Heritage Act 1977* (Heritage Act) aims to conserve the environmental heritage in NSW. Under this Act, environmental heritage is defined as including buildings, works, relics or places which are of historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance to the State.

The State Heritage Register (SHR) was established under Section 22 of the Heritage Act and is a list of places and objects of particular importance to the people of NSW, including archaeological sites. Listing on the SHR controls activities such as alteration, damage, demolition, and development. The former laboratory building, located in the Study area, is listed under the SHR as: Former laboratory building on the former Pasminco site (SHR #1910597).

Approval under section 57(1) for works to a place, building, work, relic, moveable object, precinct, or land listed on the State Heritage Register. The form of the application is specified by section 60. Section 57(2) provides that an exemption from the approval requirements of section 57(1) can be sought in certain circumstances. An excavation permit is required under sections 139(1) and (2) to disturb or excavate any land containing or likely to contain a relic. The form of the application is specified by section 140. Section 139(4) provides that exceptions from the approval requirements of sections 139(1) and (2) can be sought in certain circumstances.

For the proposal's works a Heritage impact statement is attached as Appendix 4. The assessment indicates:

- An approval under s60 of the Heritage Act is not required prior to works commencing; and
- The excavation for the road/water/sewer infrastructure adjacent to the former laboratory building can proceed with caution;

Further information is provided in Section 6.6.

4.4.9. National Parks and Wildlife Act 1974

Under the *National Parks and Wildlife Act 1974* (NPW Act), approval is required to knowingly destroy, deface, damage or knowingly cause or permit, the destruction of, or damage to, an Aboriginal object or Aboriginal place.

An Aboriginal archaeological due diligence assessment including a search of the Aboriginal Heritage Information Management System (AHIMS), is attached as Appendix 5. The assessment indicates:

- An Aboriginal Heritage Impact Permit is not required prior to the works commencing; and
- A heritage induction should be provided to all on-site personnel undertaking ground disturbing works so that they understand their obligations to report an unlikely discovery of archaeological material and their obligations under the NPW Act.

Further information is provided in Section 6.7.

4.4.10. Biosecurity Act 2015

The *Biosecurity Act 2015* (Biosecurity Act) has replaced the *Noxious Weed Act 1993* and all noxious weeds are now regulated by the Biosecurity Act. Noxious weeds are renamed as priority weeds and are now regulated with a general biosecurity duty to prevent, eliminate or minimize any biosecurity risk they may pose. These weeds reduce diversity of native plant and animal species. The Biosecurity Act is implemented and enforced by the Local Control Area for the Local Government Area (LGA).

Weeds would be managed and disposed of in accordance with the requirements of the Biosecurity Act and regulation.

Further information is provided in Section 6.3.

4.5. SUMMARY OF APPROVAL REQUIRMENTS

Table 4-1 provides a summary of the likely approvals/licences. The construction contractor's final construction plans may trigger the requirement for additional approvals and licences.

Table 4-1: Summary of required approvals/licences

Act	Approval Requirement	Relevance to the Proposal
Roads Act 1993	Approval under sections 138 for works in a public road reserve.	The proposal involves road works and possibly under boring Munibung Road to allow a sewer main to be provided to the industrial zoned land on the western side to Munibung Rd.
Hunter Water Act 1991	Apply for a section 50 certificate under Section 49 of the Hunter Water Act 1991.	HWC is the water supply under the *Hunter Water Act 1991*. The proposal includes the installation of new water and sewer infrastructure, alterations to existing water and sewer infrastructure and connection into existing water and sewer infrastructure.

5. STAKEHOLDER AND COMMUNITY CONSULTATION

5.1. CONSULTATION PRIOR TO THE REF PREPARATION

Consultation during the proposal's planning and design has been carried out by HCCDC and/or its consultants and has included:

- Discussions/consultation with Bunnings;
- Discussions/consultation with LMCC;
- Discussions/consultation with HWC;
- Discussions/consultation with Roads and Maritime Services (RMS) and Transport for New South Wales (TfNSW); and
- Discussions/consultation with other applicable utility/service providers.

HCCDC and/or its consultants will continue liaising with the relevant utility/service providers and relevant stakeholders.

5.2. INFRASTRUCTURE SEPP REQUIREMENTS

HCCDC's Infrastructure SEPP Part 2 General: Division 1 Consultation requirements are evaluated in Appendix 7. The assessment concludes:

Section 13 Consultation with councils — development with impacts on council-related infrastructure or services

HCCDC is required to give written notice under Section 13 of the intention to carry out the development (together with a scope of works) to LMCC because the proposal involves the excavation of the surface of, or a footpath adjacent to, a road for which LMCC is the road authority under the *Roads Act 1993*.

Section 14 Consultation with councils — development with impacts on local heritage

HCCDC is not required to give a separate written notice of the intention to carry out the development (together with a scope of works) to LMCC because HCCDC requires an approval from LMCC to carry out the road infrastructure works.

Section 15 Consultation with councils — development with impacts on flood liable land

HCDCC is not required to give separate written notice of the intention to carry out the development (together with a scope of works) to LMCC because the Study area is not flood liable land and HCCDC requires an approval from LMCC to carry out the road infrastructure works.

Section 16 Consultation with public authorities other than councils

HCDCC is required to give written notice of the intention to carry out the development (together with a scope of works) to the Mine Subsidence Board because the proposal on land in a mine subsidence district within the meaning of the *Coal Mine Subsidence Compensation Act 2017*.

5.3. POST DETERMINATION CONSULTATION

Should HCDCC proceed with the proposal, consultation with relevant stakeholders would be ongoing in the lead up to, and during, construction. The consultation activities would ensure that:

- Relevant stakeholders have a high level of awareness of all processes and activities associated with the proposal;
- Accurate and accessible information is made available;
- A timely response is given to issues and concerns raised by stakeholders; and
- Feedback from the stakeholders is encouraged.

Construction communication measures could include a 24-hour construction information telephone line and email address, targeted consultation methods (such as letters, notifications, signage and face-to-face communications) and the HCDCC website including updates on the progress of the proposal.

A construction communication management plan would be prepared as part of the Construction Environmental Management Plan (CEMP) including a detailed list of the measures that would be implemented during construction to communicate with and respond to stakeholders.

6. ENVIRONMENTAL ASSESSMENT

The environmental assessment is for the proposal's construction phase and operation phase.

Clause 228 of the EP&A Reg 2000 lists, for the purposes of Part 5 of the EP&A Act, the factors to be taken into account when considering the likely impact of an activity on the environment. Appendix 8 considers the potential impacts of the proposal against these factors.

6.1. SOILS AND GEOLOGY

6.1.1. Existing Environment

Geology

The Study area is underlain by the late Permian Aged Boolaroo Subgroup of the Newcastle Coal Measures. This typically comprises sandstone, siltstone, shales conglomerates, coal and tuff.

Acid Sulfate Soils

The proposal is located on land mapped as 'Class 5' Acid Sulfate Soils (ASS). Class 5 relates to works within 500 metres of adjacent Class 1, 2, 3 or 4 land which is likely to lower the water table below one metre AHD on adjacent Class 1, 2, 3 or 4 land. Class 5 has the lowest risk for Acid Sulfate Soils.

Contamination

After years of remediation work to produce multiple site audit statements declaring the development land remediated and suitable for various urban uses, HCCDC recently received EPA confirmation that Remediation Order 23008 was lifted across the site. For the site's areas being managed pursuant to the approved EMPs, the EPA has replaced the remediation order with a section 28 ongoing management order under the *Contaminated Land Management Act 1997*.

The Study area has been remediated and is suitable for the proposal.

6.1.2. Impact Assessment

The proposal's construction works will require ground disturbance and exposure of soil consequently there is potential for soil erosion and sediment transport during the construction period. Areas subject to disturbance by excavation and trenching will be subject to ongoing potential erosion until they are stabilised.

Under Clause 7.1(2) of the LMLEP 2014, 'Class 5' ASS applies to: *"Works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum and by which the watertable is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land".* The construction works may be required within 500 metres of adjacent Class 2 land however will not result in alterations to the long-term level of the watertable.

Excavation may disturb contaminated soils and hazardous materials present in soil. If inadequately managed, the disturbance of any areas of contamination has the potential to impact on human health and the natural environment.

The proposal's operation works are likely confined to infrequent and limited maintenance of the proposal's infrastructure and services consequently the potential to adversely impact the Study area's and surrounding locality's soils and geology during the proposal's operation is minimal.

6.1.3. Mitigation Measures

Reasonable and feasible mitigation measures should be implemented to manage and mitigate potential erosion and sedimentation adverse impacts by construction works and operation works and potential adverse impacts on human health and the natural environment from disturbance of contaminated soils and or hazardous material. Mitigation measure could include:

- A Soil and Water Management Plan, including an Acid Sulphate Soil Management sub-plan and an Erosion and Sediment Control (ESCP) sub-plan (prepared in accordance with Landcom's (2004) Managing Urban: Stormwater Soils and Construction), be prepared as part of the Construction Environmental Management Plan (CEMP);
- The ESCP will include appropriate sediment controls for wherever soil disturbance that could result in sediment run-off takes place;
- Erosion and sediment controls will be established prior to the commencement of construction and remain in place until the surface has been stabilised;
- Sediment controls will be placed at the entry points to any culverts and stormwater channels to prevent sediment entering the stormwater system;
- Erosion and sediment control devices will be regularly checked and maintained to ensure the remain effective for the duration of the construction period;
- Stabilisation by revegetation for disturbed areas will occur as soon as practicable within after completion of construction;
- Restoration following the completion of the works will aim to be as close as possible to the pre-works state;
- The road will be swept where it becomes dirty from tracking dirt, which will be minimised where possible;
- An 'unexpected finds protocol' would be prepared to assist with the identification, reporting, assessment, management, health and safety implications, remediation,

and/or disposal (at an appropriately licensed facility) of any potentially contaminated soil and/or water; and

- In the event that indicators of contamination are encountered during construction (such as odours or visually contaminated materials), work in the affected area would cease immediately, and the procedures detailed in the unexpected finds protocol would be implemented.

The implementation of the mitigation measures will ensure the potential adverse impact on the soil and geology of the Study area and surrounding locality by the proposal's construction works and operation works is minimal.

6.2. HYDROLOGY, WATER QUALITY & FLOODING

6.2.1. Existing Environment

The site is contained in the Munibung Hill catchment area and all drainage in the immediate local area is towards Cockle Creek from the Munibung Hill Watershed. Previous site studies indicate groundwater on the site occurs in two aquifer systems, a shallow unconfined aquifer and a deeper aquifer in fractured bedrock.

The disturbance area comprises vacant pervious land allowing for rainwater infiltration and impervious road pavement with rainwater managed by on-site stormwater controls to ensure stormwater flows and stormwater quality.

The Study area is not flood liable.

6.2.2. Impact Assessment

The proposal's construction works in the disturbance area will not alter the alignment of drainage lines of any existing dams or creeks, and it is not anticipated to impact surrounding water bodies.

Blockages within the stormwater system in the disturbance area could potentially affect stormwater levels upstream and downstream. If inadequately managed, construction can result in temporary impacts to the behaviour of local surface water systems.

Construction of the proposal will involve disturbance of the ground surface. The main potential impacts to water quality relate to soil disturbance and runoff during construction. Pollutants such as sediment, soil nutrients and construction waste have the potential to mobilise and enter the stormwater system particularly during high rainfall events.

Potential impacts associated with increased sediment loading include increased turbidity and an increased potential for the transport of contaminants bound to sediment particles. The transportation of contaminated soil from the construction sites could also affect water quality if any contaminants escape containment measures.

Water quality impacts could also potentially occur during construction as a result of contamination by fuel or chemical spills from construction vehicles.

The under-bored sewer main beneath Munibung Road to allow a sewer main to be provided to the industrial zoned land on the western side to Munibung Road could intercept groundwater. If groundwater inflow/seepage is encountered during excavation dewatering would be required.

The proposal's operation works are likely confined to infrequent and limited maintenance of the proposal's infrastructure consequently the potential to adversely impact the soils, hydrology and water quality of the Study area and surrounding locality during the proposal's operation is minimal.

6.2.3. Mitigation Measures

Reasonable and feasible mitigation measures should be implemented to manage and mitigate potential adverse impacts on the hydrology, waterways and flooding by construction works and operation works. Mitigation measure could include:

- A Soil and Water Management Plan, including a Groundwater Management sub-plan and Erosion and Sediment Control sub-plan (prepared in accordance with Landcom's (2004) Managing Urban: Stormwater Soils and Construction) would be prepared as part of the CEMP;
- A Contamination and Hazardous Materials Plan would be prepared as part of the CEMP;
- Fuels and chemicals will be stored and transported in accordance with the Australian Standard AS 1940-2004: The Storage and Handling of Flammable and Combustible Liquids and the *Dangerous Goods Act 1975*;
- The ground surface will be reinstated progressively;
- Refuelling, fuel decanting and vehicle maintenance work will take place off-site where possible;
- Chemicals, fuels and waste will not be stored or collected for disposal within or adjacent to drainage lines, waterbodies or unsealed surfaces;
- A 'spill kit' will be kept onsite at all times to be used in the event of a chemical or fuel spill;
- Access to site will be contained to approved construction works area or access tracks/roads to minimise site disturbance;
- Erosion will be limited using slit fences and socks to manage runoff fetches and velocities; and

- Silt fences, straw bales, turf strips and other sediment filters will be located downstream of disturbed areas.

Construction works and operation works are unlikely to adversely impact any nearby surface water, waterways or groundwater.

6.3. ECOLOGY

6.3.1. Existing Environment

Previous heavy industrial uses and more recently site remediation activities have removed the majority of the native vegetation from Study area. Site remediation activities included removing most of the site's contaminated soil to bedrock and placing the contaminated soil in the containment cell. As a result of the remediation activities the Study area has no remaining significant vegetation.

6.3.2. Impact Assessment

An ecological due diligence assessment attached as Appendix 3 found the Study area does not support natural biodiversity values while the proposal:

- Is unlikely to impact directly on potential habitat for threatened species;
- Will not clear any native vegetation;
- Will not fragment any wildlife corridors; and
- Will not impact on areas of outstanding biodiversity values.

The ecological due diligence assessment found the proposal is unlikely to have a significant impact on threatened biodiversity and as such a Species Impact Statement or a referral to the Commonwealth under the EPBC Act is not required.

6.3.3. Mitigation Measures

The ecological due diligence assessment has limited recommendations. The following mitigation measures are proposed:

- Implementation of a weed management control protocol. All equipment, vehicles and machinery wheels and tracks of excavators and other tracked machinery should be cleaned so that they are completely free of soil, seeds and plant material before entering the study area to prevent the introduction of further exotic plant species and pathogens; and
- All topsoil from the exotic grassland and exotic vegetation assemblages should be disposed of offsite.

6.4. NOISE AND VIBRATION

6.4.1. Existing Environment

The existing primary noise and vibration sources in the disturbance area are road traffic and pedestrian noise emanating from Munibung Road, the Bunnings site and Hague Road.

6.4.2. Impact Assessment

The proposal's construction works requires the use of heavy and light machinery/tools which can generate noise and vibration levels at nearby receptors. At any location, the potential impacts may vary greatly depending on factors such as the proximity of receivers, the duration of works, the magnitude of the noise levels, the time at which the construction is undertaken, and the character of the noise or vibration emissions.

The proposal's construction noise emissions in the disturbance area could be high during parts of the construction phase.

The proposal's construction vibration emissions in the disturbance area are likely to be:

- Impulsive e.g. occasional dropping of heavy equipment occasional loading and unloading;
- Intermittent e.g. construction activity, jack hammers; and
- Continuous e.g. use of heavy machinery.

There is a noise and vibration sensitive receiver in the Study area i.e. the former laboratory building listed under the SHR. There are no other noise or vibration sensitive receivers e.g. residences, schools, childcare centres, aged-care facilities, hospitals, precision laboratories or operating theatres in the Study area.

There are noise and vibration sensitive receivers in the surrounding locality e.g. the Bunderra residential estate located south of the roundabout at the intersection of T.C Frith Avenue/Main Road/Munibung Road.

Without mitigation measures it is likely the construction activities in the disturbance area will generate noise at levels that could potentially adversely impact nearby sensitive receivers located in the surrounding locality e.g. the Bunderra residential estate. The noise impacts would only be experienced during the construction phase.

It is unlikely the construction activities in the disturbance area will generate vibration at levels with the potential to adversely impact non-residential receivers and sensitive receivers located in the Study area and/or surrounding locality. Specifically, it is unlikely the

construction activities will generate vibration at levels with the potential to adversely impact the former laboratory building listed under the SHR or the Bunderra residential estate.

While construction works would generally occur during the standard working hours set out in the Interim Construction Noise Guideline (DECC, 2009) i.e. Mondays to Fridays between 7am and 6pm, Saturdays between 8am and 1pm and no work occurring on Sundays or public holidays, it may be sensible for some construction activities in disturbance area including the installation /construction of the public infrastructure to be undertaken outside the prescribed hours to shorten the length of the construction.

The proposal's operation works are likely confined to infrequent and limited maintenance of the proposal's infrastructure consequently the potential to adversely impact the Study area's or surrounding locality's noise and vibration amenity during the proposal's operation is minimal.

6.4.3. Mitigation Measures

Reasonable and feasible mitigation measures should be implemented to manage and mitigate potential adverse noise and vibration impacts. Mitigation measure could include:

- Noise and Vibration Management Plan be prepared as part of the CEMP;
- Ensuring all equipment complies with relevant standards/guidelines including the Interim Construction Noise Guideline 2009;
- Machinery and vehicles will be turned off when not in use or throttled down to a minimum;
- Construction completed within the shortest possible time;
- Construction works taking place in accordance with the standard working hours set out in the Interim Construction Noise Guideline (DECC, 2009) i.e. Monday to Friday, 7am to 6m and Saturday at 8am to 1pm;
- Construction works taking place outside standard working hours, set out in the Interim Construction Noise Guideline (DECC, 2009), to comply with the requirements for works outside standard working hours set out in the Interim Construction Noise Guideline (DECC, 2009);
- Undertake an out of hours noise assessment of the construction works to inform/identify construction works that may be possible during out of standard working hours timeframes as set out in the Interim Construction Noise Guideline (DECC, 2009);
- Use of noisy equipment and construction work to be scheduled to occur between the hours of 9am and 4pm, where possible;
- Construction activities would be undertaken in accordance with relevant standards and guidelines including AS2436-1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites;
- All equipment will be maintained regularly and effectively;

- All equipment with potential to create high levels of noise will only be used in conjunction with noise control;
- Noise monitoring may be used if complaints regarding excessive noise use are received and impacts will be assessed against the Interim Construction Noise Guidelines (DECC 2009);
- If noise limits are found to exceed the established guideline values, then operations would be modified and measures such temporary noise barriers would be implemented;
- Mitigation impacts of the proposed works would be undertaken in accordance with the qualitative assessment guidelines of the Interim Construction Noise Guidelines (DECC 2009) such as community notification of the works, operating plant in a quiet and efficient manner, involving workers in minimising noise and a procedure of handling complaints in accordance with these guidelines;
- Controlling vibration at the source including: choosing alternative, lower-impact equipment, or methods wherever possible; scheduling the use of vibration-causing equipment, such as jackhammers, at the least sensitive time of day; routing, operating or locating high vibration sources as far away from sensitive areas as possible; sequencing operations so that vibration causing activities do not occur simultaneously isolating the equipment causing the vibration on resilient mounts;
- Informing identified stakeholders, including potentially impacted tenants, in the Study area, of the potential impacts, the time periods over which these will occur and the proposed mitigation measures that will be employed to minimise the impacts; and
- Notice of works provided to identified stakeholders prior to the commencement construction.

The mitigation measures are designed to minimise adverse impacts on the Study area's and surrounding locality's receivers from airborne noise, ground-borne noise and vibration generated during the proposals' construction.

The potential long-term adverse noise and vibration impacts from the proposal's construction on the Study area and surrounding locality is low because of the limited construction time frame.

6.5. AIR QUALITY

6.5.1. Existing Environment

Air quality in the Lake Macquarie City Council LGA is generally good and meets the national standards but can from time to time be impacted by dust from coal-fired power station emissions, dust from coal haulage and pollution from other industry sources. The general findings are considered to be representative of ambient air quality in the Study area.

6.5.2. Impact Assessment

Air quality impacts associated with proposal's construction works would mainly result from dust generated during excavation in the construction phase. Other dust sources may be produced by material handling activities associated with movement of construction vehicles on unsealed surfaces. Wind erosion of uncompacted surfaces, such as stockpiled material, could also cause localised emissions of dust.

Dust has the potential to impact on the amenity of people using local facilities, occupying nearby properties or passing the proposal's site (such as workers and pedestrians/cyclists). Due to the low to medium intensity of construction, the small amount of required earthworks, and the relatively short duration of construction works the potential for adverse dust impacts is considered to be minimal.

The operation of construction plant, machinery and vehicles may also lead to short term increases in exhaust emissions in parts of the Study area and the surrounding locality however, these impacts are relatively minor due to the limited number of construction vehicles for the proposal's works and other surrounding locality influences on air quality such as car traffic movements in the local area transport network.

The proposal's operation works are likely confined to infrequent and limited maintenance of the proposal's infrastructure consequently the potential to adversely impact the Study area's surrounding locality air quality during the proposal's operation is minimal.

6.5.3. Mitigation Measures

Reasonable and feasible mitigation measures should be implemented to manage and mitigate potential adverse air quality impacts. Mitigation measure could include:

- All vehicles to be fitted with approved exhaust systems to maintain exhaust emissions within acceptable standards;
- Machinery and vehicles will not be left running or idling when not in use;
- Odours or air pollutant complaints will be dealt with promptly and the source will be eliminated wherever practicable;
- All loads of excavated material, soil, fill and other erodible matter that are transported to or from the work site will be kept covered at all times during transportation and will remain covered until they are unloaded either for use at the worksite, reuse or disposal at a licensed waste disposal facility;
- Areas that have been disturbed by construction works will be rehabilitated progressively; and
- Monitor all work sites, general work areas and stockpiles for dust generation and watering down or covering affected areas in the event of windy conditions.

The potential long-term adverse air quality impacts from the proposal on the Study area and surrounding locality is low because the proposal is small in size and the construction time limited.

6.6. NON-INDIGENOUS HERITAGE

6.6.1. Existing Environment

An Heritage Impact Statement including the results of a search of the State Heritage Inventory is attached as Appendix 4. The search identified the following four heritage items in the vicinity of the proposal:

- Great Northern Railway Line or Main Northern Line
- Seaham, West Wallsend, Fairley and Killingworth Railway
- Former laboratory building on the former Pasminco site; and
- Speers Point Steam Tram line.

The former laboratory building is adjacent to the Disturbance area. Previous heritage assessment works for the former laboratory building, supporting previous development applications for the site include;

- Graham Brooks and Associates Pty Ltd Conservation Management Plan (CMP) and Statement of Heritage Impact report (SOHI) in 2009;
- Carste Studio Pty Ltd SOHI review in 2011, Carste Studio Pty Ltd SOHI in 2013 and a 2014 addendum; and
- John Carr Heritage Design SOHI in 2016.

6.6.2. Impact Assessment

The proposed works are primarily at ground level and below ground and will occur outside the lot housing the former laboratory building. There will be a temporary minor visual impact during construction while the infrastructure pipes are being laid and a permanent very minor visual impact as a result of the altering and construction of the adjoining new road infrastructure including Hague Road and Munibung Road alterations.

The Heritage Impact Statement attached as Appendix 4 identified no likely physical or visual impacts to the identified heritage items and overall the potential heritage impacts of the proposed works are assessed as negligible at most.

The potential vibration impacts and mitigation measures have been identified and discussed in Section 6.4.

The proposed heritage interpretation works are consistent and supports the heritage aims and objects set out in the LMCC DCP 2014 Part 12 – Area Plans – 12.15 Pasminco for the redevelopment of the former Pasminco Cockle Creek Smelter land and the former Incitec Pivot Fertilizer site.

6.6.3. Mitigation Measures

The Heritage Impact Statement attached as Appendix 4 indicates:

- An approval under s60 of the Heritage Act is not required prior to works commencing; and
- The excavation for the road/water/sewer infrastructure adjacent to the former laboratory building can proceed with caution.

6.7. ABORIGINAL HERITAGE

6.7.1. Existing Environment

Previous Aboriginal heritage assessments across the site including studies conducted by Umwelt in 2004 found that due to extensive past uses and heavy disturbance of the site particular the area occupied by the main smelter specifically by activities such as land filling, dam construction, industrial development, earthworks and soil erosion the potential for encountering artefacts during excavation is significantly reduced.

No earlier unrecorded Aboriginal sites were located during the previous survey work, even though historical records indicate that Munibung Hill was important to Aboriginal people and was the location of several stone arrangements. No flaked or ground stone artifacts were observed.

Subsequent site remediation activities included removing most of the site's contaminated soil to bedrock and placing the contaminated soil in the containment cell further reducing the potential for encountering artefacts during excavation.

6.7.2. Impact Assessment

An Aboriginal archaeological due diligence assessment including a search of the Aboriginal Heritage Information Management System (AHIMS) is attached as Appendix 5. The proposed works will occur in the Study area that has been significantly disturbed through a range of factors including historical use and remediation works and consequently assessed as having negligible Aboriginal archaeological potential.

6.7.3. Mitigation Measures

The assessment indicates:

- A heritage induction is to be provided to all on-site personnel undertaking ground disturbing works so that they understand their obligations to report the discovery of archaeological material and their obligations under the NPW Act.

6.8. VISUAL AMENITY

6.8.1. Existing Environment

The site is brownfield vacant land. Previous heavy industrial uses and more recently site remediation activities have removed the majority of the native vegetation from the areas proposed for urban development.

The Study area visual environment includes Munibung Road and Hague Road infrastructure, Bunnings building/infrastructure, the containment cell including a water treatment plant and vacant urban land.

6.8.2. Impact Assessment

The proposal would generate temporary visual impacts during the construction period. These impacts would be experienced by visual receivers (people attending the site or Bunnings, pedestrians, cyclists, motorists and local workers) in the vicinity of the construction works. During construction, visible elements would include work sites, machinery and equipment, fencing, soil stockpiles, waste materials and partially constructed structures.

The potential visual impact of the proposal would depend on the nature and intensity of the construction works. The change in the visual environment would generally be experienced from a relative short distance. Visual impacts would also be more significant at locations where receivers have an unscreened view of the proposal works. However, the impacts would be temporary and limited to the construction period.

Post construction restoration works will return the disturbance areas as close to possible to its pre-construction works condition.

There will be negligible visual impact during the operation period for the majority of the proposal's elements in the disturbance area because the elements are either upgrades to the existing elements or new elements such as traffic lights and sewer vent are consistent with local road reserve infrastructure and urban development.

The proposed heritage interpretation works are consistent and supports the heritage aims and objects set out in the LMCC DCP 2014 Part 12 – Area Plans – 12.15 Pasminco for the

redevelopment of the former Pasminco Cockle Creek Smelter land and the former Incitec Pivot Fertilizer site.

6.8.3. Mitigation Measures

Reasonable and feasible mitigation measures should be implemented to manage and mitigate any potential adverse impacts on the existing visual amenity. Mitigation measure could include:

- Ensuring the construction work site is maintained in an orderly manner;
- All vehicles, construction equipment, materials and refuse relating to the works to be removed from the site, following completion of the works; and
- Following completion of the proposed works, work sites will be restored as close to their original condition as possible.

The potential for long-term adverse visual impacts by the proposal on Study area and surrounding locality are considered low because of the limited construction time frame and the disturbance areas being restored, as practicable, to their pre-construction condition.

6.9. TRAFFIC AND ACCESS

6.9.1. Existing Environment

LMCC is the roads authority for all public roads (both classified and unclassified) within the Study area. The RMS is the roads authority for T.C Frith Avenue.

The main access into the site is from the roundabout at the intersection of T.C Frith Avenue/Main Road/Munibung Road. Access onto the site is from Main Road, Munibung Road and Hague Road. The site can also be accessed off Macquarie Road via Munibung Road.

HCCDC traffic consultants have carried out recent Traffic Impact Assessments for the development of approximately 20ha of land on the site that has been recently rezoned by LMCC and DPI&E by Planning Proposal PP_2019_LAKEM_006_00 to enable specialised retail premises and other commercial uses that require a large floor area. The proposal provides essential infrastructure and services including road and traffic infrastructure works required for the development of the approximately 20ha of land.

6.9.2. Impact Assessment

A Traffic and Transport Impact assessment (TIA) is attached as Appendix 6. The TIA provides assessment of existing transport conditions, as well as construction and operational impacts

associated with the proposed road infrastructure and associated works required to facilitate future transport requirements in the Study area and surrounding area.

The proposal's construction works will require a number of heavy vehicles and a number of light vehicles.

Construction heavy and light vehicle movements would be distributed across the construction phase and be managed in accordance with a Construction Traffic, Transport and Access Management Plan to minimise the potential for impacts on the existing Study area and surrounding locality roads and transport network, and to ensure adequate levels of safety.

Overall, the total numbers of heavy and light vehicle movements on roads in the surrounding locality during construction would be low compared to the overall traffic volumes on the surrounding locality roads. Construction vehicle generation would not result in a substantial impact on surrounding locality road capacity or the road network overall.

Construction works and consequently construction traffic movements would commence after all relevant approvals are obtained, and will likely include the following alterations to part of Study area's existing traffic arrangements:

- Construction vehicles accessing the disturbance areas via either the roundabout at the intersection of T.C Frith Avenue/Main Road/Munibung Road or off Macquarie Road via Munibung Road;
- Changes to traffic and bus movements through and across the disturbance area;
- Part of Munibung Road adjacent to Bunnings and Hague Road being partially closed for a period of approximately 16 -20 weeks;
- Alteration of existing pedestrian access in the disturbance area;
- During the partial closure of part of Munibung Road Study area traffic may need to access the Study area via alternative access points;
- During the partial closure of Munibung Road Study area pedestrians may need to access the Study area via alternative access points; and
- Installation of environmental and traffic controls in accordance with the CEMP and any conditions of approval for the proposal.

The construction traffic methodology will be developed by the appointed construction contractor.

The alterations to part of Study area's existing traffic arrangements for the likely construction traffic are expected to adversely impact Bunning's customers and people using Munibung Road for the limited construction phase.

The road/traffic infrastructure works including signalised and roundabout intersection works are designed to meet LMCC's and TfNSW requirements consequently improving this part of the Study area's traffic flows and safety.

The proposal's operation works are likely confined to infrequent and limited maintenance of the proposal's road/traffic infrastructure consequently the potential to adversely impact the Study area's and the surrounding locality traffic and access arrangements during the proposal's operation is minimal.

6.9.3. Mitigation Measures

Reasonable and feasible mitigation measures should be implemented to manage and mitigate any potential adverse impacts on the existing traffic and access arrangements. The TIA attached as Appendix 6 recommends mitigation measures during construction. Mitigation measures could include:

- A Traffic Management Plan be prepared as part of the CEMP, prior to commencement of construction;
- Consultation with relevant stakeholders to facilitate the efficient delivery of the works and to minimise congestion and inconvenience to road users. Stakeholders would include Council, Bunnings and other relevant organisations;
- A construction communication management plan would be prepared as part of the CEMP including a detailed list of the measures that would be implemented during construction to communicate with and respond to the community;
- Construction completed within the shortest possible time;
- Construction of road/traffic works during periods of low traffic volumes on Munibung Road and Hague Road e.g. at night;
- Appropriate exclusion barriers, signage and site supervision will be employed at all times to ensure that the work site is controlled, and that authorised vehicles and pedestrians are excluded from the works area;
- All measures will be undertaken to ensure that the proposal does not significantly reduce road capacity or disturb traffic flows; and
- A complaints register will be maintained by the contractor, and complaints will be responded to in a timely fashion.

The potential for long-term adverse traffic and access impacts by the proposal are considered low because of the limited construction time frame. The TIA attached as Appendix 6 asserts no mitigation measures are necessary once the construction works are completed and the roads are operational.

The road/traffic infrastructure works including signalised and roundabout intersection works are designed to meet LMCC's and Transport for New South Wales (TfNSW) requirements consequently improving this part of the Study area's traffic flows and safety.

6.10. SERVICES AND UTILITIES

6.10.1. Existing Environment

Utility investigation was undertaken as part of HCCDC's consultants design of the infrastructure.

Infrastructure and services within the proposal's Disturbance area are identified in the indicative proposal plans attached as Appendix 1.

6.10.2. Impact Assessment

The construction works in the disturbance area has the potential to impact existing services and infrastructure including gas, electrical, water, wastewater, stormwater and communications. All services (including pits and surface features) within and/or crossing the construction site would need to be protected and/or relocated.

There may be some short-term interruptions to services during construction owing to the need to divert services.

Short-term interruptions to services during construction could impact Study area and surrounding locality users of the services.

Impacts would be minimised by ensuring that the contractor undertakes investigations to locate all underground services in the vicinity of the construction site prior to construction commencing. Consultation with service providers would also be undertaken to minimise the potential for impacts, to coordinate any service relocations, and ensure access to utilities is preserved for any future maintenance activities.

The proposal's operation works are likely confined to infrequent and limited maintenance of the proposal's infrastructure consequently the potential to adversely impact the Study area's surrounding locality's services and utilities during the proposal's operation is minimal.

6.10.3. Mitigation Measures

Reasonable and feasible mitigation measures should be implemented to manage and mitigate any potential adverse impacts on existing land services and utilities. Mitigation Measures could include:

- A CEMP including a detailed list of the measures that would be implemented during construction to communicate with and respond to the community;

- Consultation with relevant stakeholders to facilitate the efficient delivery of the works and to minimise congestion and inconvenience to road users. Stakeholders would include Council, Bunnings and other relevant organisations;
- Construction completed within the shortest possible time;
- Possibly construction in the disturbance area during low traffic volumes on Munibung Road and Hague Road e.g. at night;
- A Services Management Plan to provide specific measures to minimise impacts to services during construction;
- A Dial Before You Dig search must be completed prior to commencement of construction;
- Engage in consultation with companies that have services crossing or in close proximity to the proposed works;
- Detailed survey and consultation with service providers would be undertaken to accurately locate services;
- The detailed design of the proposal would seek to minimise the need for service and utility relocations;
- The need for location of any utilities would be determined in consultation with service providers;
- Ensuring exposed underground services are protected prior to undertaking any bulk excavation or mechanical operations; and
- Staff will be briefed on the existence, location and nature of other utility services.

The potential for long-term adverse impacts on the Study area's and surrounding locality's services and utilities are considered low because of the short construction time frame.

The installation and upgrading of services and utilities will improve the site's long-term land services and utilities.

6.11. LAND USES

6.11.1. Existing Environment

The disturbance area is predominately occupied by the existing Munibung Rd and Hague Rd road reserve infrastructure and adjacent vacant land.

The land uses bordering the disturbance area includes Bunnings, a containment cell including water treatment plant, the old lab building on its own lot and vacant land.

6.11.2. Future Land Uses

To drive economic growth in the region, HCCDC is pursuing the development of approximately 20ha of land on the site that has been recently rezoned by LMCC and DPI&E by Planning

Proposal PP_2019_LAKEM_006_00 to enable specialised retail premises and other commercial uses that require a large floor area.

The proposal provides essential infrastructure and services including road, traffic, water, sewer and drainage infrastructure works required for the development of the site's employment lands consequently generating much-needed employment opportunities for the growing population in the north west sector of the City of Lake Macquarie.

6.11.3. Impact Assessment

Impacts on the land uses in the disturbance area would be limited to temporary use of land for construction activities including the presence of construction equipment, plant, vehicles and fenced work sites along the work sites. During construction, the use of the land would change from its present uses to a construction site.

After construction works are completed the land use in the disturbance area will predominantly return to their post construction land uses as practicable.

The impact of the construction works in the disturbance area are expected to be primarily limited to Bunning's customers and people using Munibung Road. In general, there would be changes to the movement patterns for vehicles, pedestrians, cyclists and bus users around the disturbance area during construction.

The proposal will facilitate the future redevelopment of approximately 20ha of land on the site that has been recently rezoned by LMCC and DPI&E by Planning Proposal PP_2019_LAKEM_006_00 to enable specialised retail premises and other commercial uses that require a large floor area and is in accordance with HCCDC vision and the site's planning strategy/controls.

During the proposal's operation phase the Study area's land uses will return to their post construction environment as far as practicable.

6.11.4. Mitigation Measures

Reasonable and feasible mitigation measures should be implemented to manage and mitigate any potential adverse impacts on land use. Mitigation Measures could include:

- A Traffic Management Plan will be prepared as part of the CEMP, prior to commencement of construction;
- The Construction Environmental Management Plan (CEMP) will include communication protocols; and

- Consultation with relevant stakeholders to facilitate the efficient delivery of the works and to minimise congestion and inconvenience to road users. Stakeholders would include Council, Bunnings and other relevant organisations.

In the long term the proposal is not anticipated to adversely impact the Study area's or surrounding locality's land uses. Any impacts will be minor and limited to the construction phase.

6.12. WASTE AND RESOURCES

6.12.1. Legislative requirement

HCCDC is committed to ensuring responsible management of waste and the reuse of such waste through appropriate measures, in accordance with the resource management hierarchy principles embodied in the WARR Act. The resource management hierarchy principles in order of priority as outlined in the WARR Act are:

- avoidance of unnecessary resource consumption;
- resource recovery (including reuse, reprocessing, recycling and energy recovery); and
- disposal.

By adopting the above principles, HCCDC encourages the most efficient use of resources and reduces cost and environmental harm in accordance with the principles of ecologically sustainable development.

6.12.2. Impact Assessment

The proposal's construction involves the use of a number of resources, including:

- resources associated with the operation of construction plant and equipment (fuel and electricity);
- construction water (for concrete mixing and dust suppression)
- fill required to meet design levels;
- concrete and paving materials;
- materials required for the supporting infrastructure; and
- landscaping.

The resources required are not currently limited in availability. However, materials such as metal and fuel are non-renewable and would be used conservatively. Excess spoil, not suitable for reuse, would be disposed of in accordance with safeguards and mitigation measures and management measures would assist in minimising the amount of resources required for construction.

Construction would have the potential to generate the following wastes:

- spoil from excavation;
- surplus concrete, asphalt, bricks and materials;
- roadside and materials;
- utility adjustments - such as electrical cabling from installation of wiring;
- possible industrial waste such as lubricating oils, hydraulic fluids and cleaning agents;
- vegetation;
- wastewater;
- general litter, including glass, plastic, metal and paper waste; and
- redundant erosion and sediment controls.

Potentially contaminated material and/or hazardous spoil and materials may also be encountered during construction.

Careful planning of construction activities would ensure that the volume of surplus materials is minimised, and disposal is undertaken in accordance with relevant guidelines and legislation. The potential to reuse materials will be investigated.

The proposal would generate greenhouse gas emissions through the operation of plant and machinery during construction. Overall, greenhouse gas emissions resulting from construction would be low.

Only a small quantity of waste would be generated during the proposal's operation. This would mainly relate to maintenance and repair activities. wastes would include wastewater, oils, cleaning agents, and landscaping maintenance wastes.

6.12.3. Mitigation Measures

Reasonable and feasible mitigation measures should be implemented to manage and mitigate any potential adverse impacts caused by the proposal's waste generation and use of resources. Mitigation Measures could include:

- Efficient reuse or removal of all waste from the work area;
- Waste is to be disposed of according to waste disposal safeguards including the POEO Act, WARR Act and the NSW EPA Waste Classification Guidelines;
- Appropriate capture vessels will be used to collect any fuel, lubricant or hydraulic fluid spillages and the contaminant materials will be disposed of at a licensed waste depot
- Green waste from the proposed vegetation clearing will be either chipped for reuse, retained for rehabilitation, mulched and spread immediately after the trench has been covered to prevent encroachment by weed species and minimise erosion, or removed from site and transported to a waste facility licensed to accept green waste;

- Excess spoil will be tested and disposed of at an approved facility licenced to receive the material;
- The Contractor will ensure that staff have up-to-date training in use of emergency spill kits as well as ensuring staff carry these with them on-site;
- The Contractor will ensure that staff are familiar with the correct procedure for storing contaminated or hazardous waste and ensuring that staff remove their own personal rubbish from site daily; and
- On completion of the construction works, the site will be returned as close as possible to its pre-construction position, including ensuring all waste, equipment and machinery has been removed from onsite.

Waste generated during the construction period will be appropriately managed in accordance with the above mitigation measures.

6.13. OTHER ENVIRONMENTAL CONSIDERATIONS

No other environmental factors are considered pertinent to the proposal's works. If other relevant environmental factors are identified during the REF assessment process they will be assessed and subsequently considered for inclusion in the CEMP.

6.14. CUMULATIVE AND CONSEQUENTIAL IMPACTS

6.14.1. Existing Environment

The impacts caused by this proposal need to be considered in combination with impacts of other development projects adjoining the Study area and within the surrounding locality.

Development projects with the potential for cumulative impacts with the proposal are considered to be developments of a similar nature and size as the proposal adjoining the Study area and within the surrounding locality.

6.14.2. Impact Assessment

There is currently one proposed development project of a similar nature and size as the proposal located adjacent to the Study area with the potential for cumulative impacts on the Study area and/or the surrounding locality.

The development is the proposed Costco wholesale and retail warehouse and service station project (Costco) located on land adjoining the Study area's eastern boundary. The Costco Development Application DA/1166/2020 is being assessed by LMCC. Depending on the LMCC's timeframe for assessing and approving the Costco Development Application DA/1166/2020 there is the potential for the Costco construction activities to correspond with some or all of the proposal's construction activities.

The key cumulative and consequential potential environmental adverse impacts associated with the proposal's construction activities and Costco's construction activities are:

- Traffic and access impacts;
- Dust emissions; and
- Noise and vibration emissions.

6.14.3. Mitigation Measures

Prior to the commencement of construction works the appointed contractor will determine if there are development projects of a similar nature and size as the proposal either located within the Study area or the surrounding locality with the potential for cumulative impacts on the Study area or the surrounding locality and if so implement suitable mitigation measures required to offset potential adverse cumulative impacts on the Study area and/or the surrounding locality.

7. SUMMARY OF MITIGATION MEASURES

Details of the environmental mitigation measures for the impacts as outlined in the assessment section above, are outlined below in Table 7-1.

Table 7-1: Summary of mitigation measures

Aspect	Mitigation Measure	Timing	Responsibility
Soil and Geology	A Soil and Water Management Plan, including an Acid Sulphate Soil Management sub-plan and an Erosion and Sediment Control (ESCP) sub-plan (prepared in accordance with Landcom's (2004) Managing Urban: Stormwater Soils and Construction), be prepared as part of the Construction Environmental Management Plan (CEMP).	Pre-construction	Construction Contractor
Soil and Geology	The ESCP will include appropriate sediment controls for wherever soil disturbance that could result in sediment run-off takes place.	Construction	Construction Contractor
Soil and Geology	Erosion and sediment controls will be established prior to the commencement of construction and remain in place until the surface has been stabilised.	Construction	Construction Contractor
Soil and Geology	Sediment controls will be placed at the entry points to any culverts and stormwater channels to prevent sediment entering the stormwater system.	Construction	Construction Contractor
Soil and Geology	Erosion and sediment control devices will be regularly checked and maintained to ensure the remain effective for the duration of the construction period.	Construction	Construction Contractor
Soil and Geology	Stabilisation by revegetation for disturbed areas will occur as soon as practicable within after completion of construction.	Construction	Construction Contractor
Soil and Geology	Restoration following the completion of the works will aim to be as close as possible to the pre-works state.	Construction	Construction Contractor
Soil and Geology	The road will be swept where it becomes dirty from tracking dirt, which will be minimised where possible.	Construction	Construction Contractor
Soil and Geology	An 'unexpected finds protocol' would be prepared to assist with the identification, reporting, assessment, management, health and safety implications, remediation, and/or disposal (at an appropriately licensed facility) of any potentially contaminated soil and/or water.	Pre-construction	Construction Contractor
Soil and Geology	In the event that indicators of contamination are encountered during construction (such as odours or visually contaminated materials), work in the affected area would cease immediately, and the procedures detailed in	Construction	Construction Contractor

Aspect	Mitigation Measure	Timing	Responsibility
	the unexpected finds protocol would be implemented.		
Hydrology, Water and Water Quality	A Soil and Water Management Plan, including a Groundwater Management sub-plan and Erosion and Sediment Control sub-plan (prepared in accordance with Landcom's (2004) Managing Urban: Stormwater Soils and Construction) would be prepared as part of the CEMP.	Pre-construction	Construction Contractor
Hydrology, Water and Water Quality	A Contamination and Hazardous Materials Plan would be prepared as part of the CEMP.	Pre-construction	Construction Contractor
Hydrology, Water and Water Quality	Fuels and chemicals will be stored and transported in accordance with the Australian Standard AS 1940-2004: The Storage and Handling of Flammable and Combustible Liquids and the Dangerous Goods Act 1975.	Construction	Construction Contractor
Hydrology, Water and Water Quality	The ground surface will be reinstated progressively.	Construction	Construction Contractor
Hydrology, Water and Water Quality	Refuelling, fuel decanting and vehicle maintenance work will take place off-site where possible.		
Hydrology, Water and Water Quality	Chemicals, fuels and waste will not be stored or collected for disposal within or adjacent to drainage lines, waterbodies or unsealed surfaces.	Construction	Construction Contractor
Hydrology, Water and Water Quality	A 'spill kit' will be kept onsite at all times to be used in the event of a chemical or fuel spill.	Construction	Construction Contractor
Hydrology, Water and Water Quality	Access to site will be contained to approved construction works area or access tracks to minimise site disturbance.	Construction	Construction Contractor
Hydrology, Water and Water Quality	Erosion will be limited using slit fences and socks to manage runoff fetches and velocities.	Construction	Construction Contractor
Hydrology, Water and Water Quality	Silt fences, straw bales, turf strips and other sediment filters will be located downstream of disturbed areas.	Construction	Construction Contractor
Ecology	Implementation of a weed management control protocol. All equipment, vehicles and machinery wheels and tracks of excavators and other tracked machinery should be cleaned so that they are completely free of soil, seeds and plant material before entering the study area to prevent the introduction of further exotic plant species and pathogens.	Construction	Construction Contractor
Ecology	All topsoil from the exotic grassland and exotic vegetation assemblages should be disposed of offsite.	Construction	Construction Contractor

Aspect	Mitigation Measure	Timing	Responsibility
Noise and Vibration	Noise and Vibration Management Plan be prepared as part of the CEMP.	Pre-construction	Construction Contractor
Noise and Vibration	Ensuring all equipment complies with the Interim Construction Noise Guideline 2009.	Construction	Construction Contractor
Noise and Vibration	Machinery and vehicles will be turned off when not in use or throttled down to a minimum.	Construction	Construction Contractor
Noise and Vibration	Construction completed within the shortest possible time.	Construction	Construction Contractor
Noise and Vibration	Construction in the disturbance area during periods of low use if possible.	Construction	Construction Contractor
Noise and Vibration	Construction works taking place between the hours: Monday to Friday, 7am to 6m and Saturday at 8am to 1pm.	Construction	Construction Contractor
Noise and Vibration	Identified noisy construction works to take place outside the standard working hours set out in the Interim Construction Noise Guideline (DECC, 2009).	Construction	Construction Contractor
Noise and Vibration	Use of noisy equipment and construction work will be scheduled to occur between the hours of 9am and 4pm, where possible.	Construction	Construction Contractor
Noise and Vibration	Construction activities undertaken in accordance with AS2436-1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites.	Construction	Construction Contractor
Noise and Vibration	All equipment will be maintained regularly and effectively.	Construction	Construction Contractor
Noise and Vibration	All equipment with potential to create high levels of noise will only be used in conjunction with noise control.	Construction	Construction Contractor
Noise and Vibration	Noise monitoring may be used if complaints regarding excessive noise use are received and impacts will be assessed against the Interim Construction Noise Guidelines (DECC 2009).	Construction	Construction Contractor
Noise and Vibration	If noise limits are found to exceed the established guideline values, then operations would be modified and measures such temporary noise barriers would be implemented.	Construction	Construction Contractor
Noise and Vibration	Mitigation impacts of the proposed works would be undertaken in accordance with the qualitative assessment guidelines of the Interim Construction Noise Guidelines (DECC 2009) such as community notification of the works, operating plant in a quiet and efficient manner, involving workers in minimising noise	Construction	Construction Contractor

Aspect	Mitigation Measure	Timing	Responsibility
	and a procedure of handling complaints in accordance with these guidelines.		
Noise and Vibration	Controlling vibration at the source including: choosing alternative, lower-impact equipment, or methods wherever possible; scheduling the use of vibration-causing equipment, such as jackhammers, at the least sensitive time of day; routing, operating or locating high vibration sources as far away from sensitive areas as possible; sequencing operations so that vibration causing activities do not occur simultaneously isolating the equipment causing the vibration on resilient mounts.	Construction	Construction Contractor
Noise and Vibration	Informing identified stakeholders of the potential impacts, the time periods over which these will occur and the proposed mitigation measures that will be employed to minimise the impacts.	Pre-construction	HCCDC/ Construction Contractor
Noise and Vibration	Notice of works provided to identified stakeholders prior to the commencement construction.	Pre-construction	HCCDC/ Construction Contractor
Air Quality	All vehicles to be fitted with approved exhaust systems to maintain exhaust emissions within acceptable standards.	Construction	Construction Contractor
Air Quality	Machinery and vehicles will not be left running or idling when not in use.	Construction	Construction Contractor
Air Quality	Odours or air pollutant complaints will be dealt with promptly and the source will be eliminated wherever practicable.	Construction	Construction Contractor
Air Quality	All loads of excavated material, soil, fill and other erodible matter that are transported to or from the work site will be kept covered at all times during transportation and will remain covered until they are unloaded either for use at the worksite, reuse or disposal at a licensed waste disposal facility.	Construction	Construction Contractor
Air Quality	Areas that have been disturbed by construction works will be rehabilitated progressively.	Construction	Construction Contractor
Air Quality	Monitor all work sites, general work areas and stockpiles for dust generation and watering down or covering affected areas in the event of windy conditions.	Construction	Construction Contractor
Non-Indigenous Heritage	A heritage induction is to be provided to all on-site personnel undertaking ground disturbing works so that they understand their obligations to report the discovery of archaeological material and their obligations under the Heritage Act 1977.	Construction	Construction Contractor

Aspect	Mitigation Measure	Timing	Responsibility
Visual Amenity	Ensuring the construction work site is maintained in an orderly manner.	Construction	Construction Contractor
Visual Amenity	All vehicles, construction equipment, materials and refuse relating to the works to be removed from the site, following completion of the works.	Construction	Construction Contractor
Visual Amenity	Following completion of the proposed works, work sites will be restored as close to their original condition as possible.	Construction	Construction Contractor
Traffic and Access	A Traffic Management Plan will be prepared as part of the CEMP, prior to commencement of construction.	Pre-construction	Construction Contractor
Traffic and Access	Consultation with relevant stakeholders to facilitate the efficient delivery of the works and to minimise congestion and inconvenience to road users.	Pre-construction	HCCDC/ Construction Contractor
Traffic and Access	A construction communication management plan would be prepared as part of the CEMP including a detailed list of the measures that would be implemented during construction to communicate with and respond to the community.	Pre-construction	HCCDC/ Construction Contractor
Traffic and Access	Construction completed within the shortest possible time.	Construction	Construction Contractor
Traffic and Access	Possibly construction in the disturbance area during periods of low use.	Construction	Construction Contractor
Traffic and Access	Appropriate exclusion barriers, signage and site supervision will be employed at all times to ensure that the work site is controlled, and that authorised vehicles and pedestrians are excluded from the works area.	Construction	Construction Contractor
Traffic and Access	All measures will be undertaken to ensure that the proposal does not significantly reduce road capacity or disturb traffic flows.	Construction	Construction Contractor
Traffic and Access	A complaints register will be maintained by the contractor, and complaints will be responded to in a timely fashion.	Construction	Construction Contractor
Services and Utilities	A CEMP including a detailed list of the measures that would be implemented during construction to communicate with and respond to the community.	Construction	Construction Contractor
Services and Utilities	Consultation with relevant stakeholders to facilitate the efficient delivery of the works and to minimise congestion and inconvenience to road users.	Construction	Construction Contractor
Services and Utilities	Construction completed within the shortest possible time.	Construction	Construction Contractor

Aspect	Mitigation Measure	Timing	Responsibility
Services and Utilities	Possibly construction in the disturbance area during periods of low use.	Construction	Construction Contractor
Services and Utilities	A Services Management Plan to provide specific measures to minimise impacts to services during construction.	Pre-construction	Construction Contractor
Services and Utilities	A Dial Before You Dig search must be completed prior to commencement of construction.	Pre-construction	Construction Contractor
Services and Utilities	Engage in consultation with companies that have services crossing or in close proximity to the proposed works.	Pre-construction	HCCDC/ Construction Contractor
Services and Utilities	Detailed survey and consultation with service providers would be undertaken to accurately locate services.	Pre-construction	HCCDC/ Construction Contractor
Services and Utilities	The detailed design of the proposal would seek to minimise the need for service and utility relocations.	Pre-construction	HCCDC
Services and Utilities	The need for location of any utilities would be determined in consultation with service providers.	Pre-construction	HCCDC/ Construction Contractor
Services and Utilities	Ensuring exposed underground services are protected prior to undertaking any bulk excavation or mechanical operations.	Construction	Construction Contractor
Services and Utilities	Staff will be briefed on the existence, location and nature of other utility services.	Construction	Construction Contractor
Land Uses	A Traffic Management Plan will be prepared as part of the CEMP, prior to commencement of construction.	Pre-construction	Construction Contractor
Land Uses	The Construction Environmental Management Plan (CEMP) will include communication protocol.	Pre-construction	Construction Contractor
Land Uses	Consultation with relevant stakeholders to facilitate the efficient delivery of the works and to minimise congestion and inconvenience to road users.	Pre-construction	HCCDC/ Construction Contractor
Waste and Resources	Efficient reuse or removal of all waste from the work area.	Construction	Construction Contractor
Waste and Resources	Waste is to be disposed of according to waste disposal safeguards including the POEO Act, WARR Act and the NSW EPA Waste Classification Guidelines.	Construction	Construction Contractor
Waste and Resources	Appropriate capture vessels will be used to collect any fuel, lubricant or hydraulic fluid spillages and the contaminant materials will be disposed of at a licensed waste depot.	Construction	Construction Contractor
Waste and Resources	Green waste from the proposed vegetation clearing will be either chipped for reuse, retained for rehabilitation, mulched and	Construction	Construction Contractor

Aspect	Mitigation Measure	Timing	Responsibility
	spread immediately after the trench has been covered to prevent encroachment by weed species and minimise erosion, or removed from site and transported to a waste facility licensed to accept green waste.		
Waste and Resources	Excess spoil will be tested and disposed of at an approved facility licenced to receive the material.	Construction	Construction Contractor
Waste and Resources	The Contractor will ensure that staff have up-to-date training in use of emergency spill kits as well as ensuring staff carry these with them on-site.	Construction	Construction Contractor
Waste and Resources	The Contractor will ensure that staff are familiar with the correct procedure for storing contaminated or hazardous waste and ensuring that staff remove their own personal rubbish from site daily.	Construction	Construction Contractor
Waste and Resources	On completion of the construction works, the site will be returned as close as possible to its pre-construction position, including ensuring all waste, equipment and machinery has been removed from onsite.	Construction	Construction Contractor
Other Environmental Considerations	Prior to the commencement of construction works the appointed contractor will determine if there are development projects of a similar nature and size as the proposal either located within the Study area or the surrounding locality with the potential for cumulative impacts on the Study area or the surrounding locality and if so implement suitable mitigation measures required to offset potential adverse cumulative impacts on the Study area and/or the surrounding locality.	Pre-construction	Construction Contractor

8. CONCLUSION

In accordance with the requirements of Part 5 of the EP&A Act and the EP&A Regulation the proposal has been fully assessed. Based on the assessment the proposal is not likely to significantly affect the environment and therefore does not require the preparation of an Environmental Impact Statement (EIS).

The REF includes an assessment of whether the proposal is likely to have a significant impact to matters of national environmental significance under the EPBC Act. The proposal is not likely to have a significant impact on matters of national environmental significance and therefore referral to the Commonwealth Government under the EPBC Act is not required.

As defined by the Biodiversity Conservation Act 2016 the proposal is not expected to have significant impacts on threatened species, populations, ecological communities or their habitats consequently a species impact statement is not required.

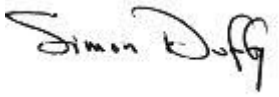
The water, sewer, road, traffic and services upgrades will facilitate the future sustainable economic growth in the Site for the benefit of the Lake Macquarie City Council LGA.

This conclusion has taken into consideration the principals of Ecologically Sustainable Development.

The proposal's scope is preliminary and based on the information provided by HCCDC. The proposal will be refined as the proposal's design progresses in consultation with relevant stakeholders. Any substantive changes to the proposal may require subsequent environmental impact assessment.

9. DECLARATION

This Review of Environmental Factors provides a true and fair review of the activity in relation to its likely impact on the environment. It addresses to the fullest extent possible, all the factors listed in Clause 228 of the *Environmental Planning and Assessment Regulation 2000* (as amended) and the *Commonwealth Environmental Protection and Biodiversity Conservation Act 1999* (as amended).

Signed: 

Name: Simon Duffy

Position: Project Manager

Date: 14/10/2020

10. REFERENCES

Department of Environment and Climate Change, (NSW) Interim Construction Noise Guideline (2009).

Department of Environment, Climate Change and Water, (NSW) Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (2010).

Department of Environment, Climate Change and Water, (NSW) Interim Construction Noise Guideline accessed at:
http://www.environment.nsw.gov.au/resoaurces/noise/09406cnginfo.pdf (2009)

Environmental Protection Authority (NSW) Waste Classifying Guidelines (2014).

Environmental Protection Authority (NSW) Noise Policy for Industry (2017).

Umwelt Heritage Due Diligence Assessment (2020).

Umwelt Fauna and Flora assessment (2020).

Reports prepared for or in relation to the remediation of the former Pasminco Cockle Creek Smelter land and the former Incitec Pivot Fertilizer site Pasminco site Boolaroo NSW.

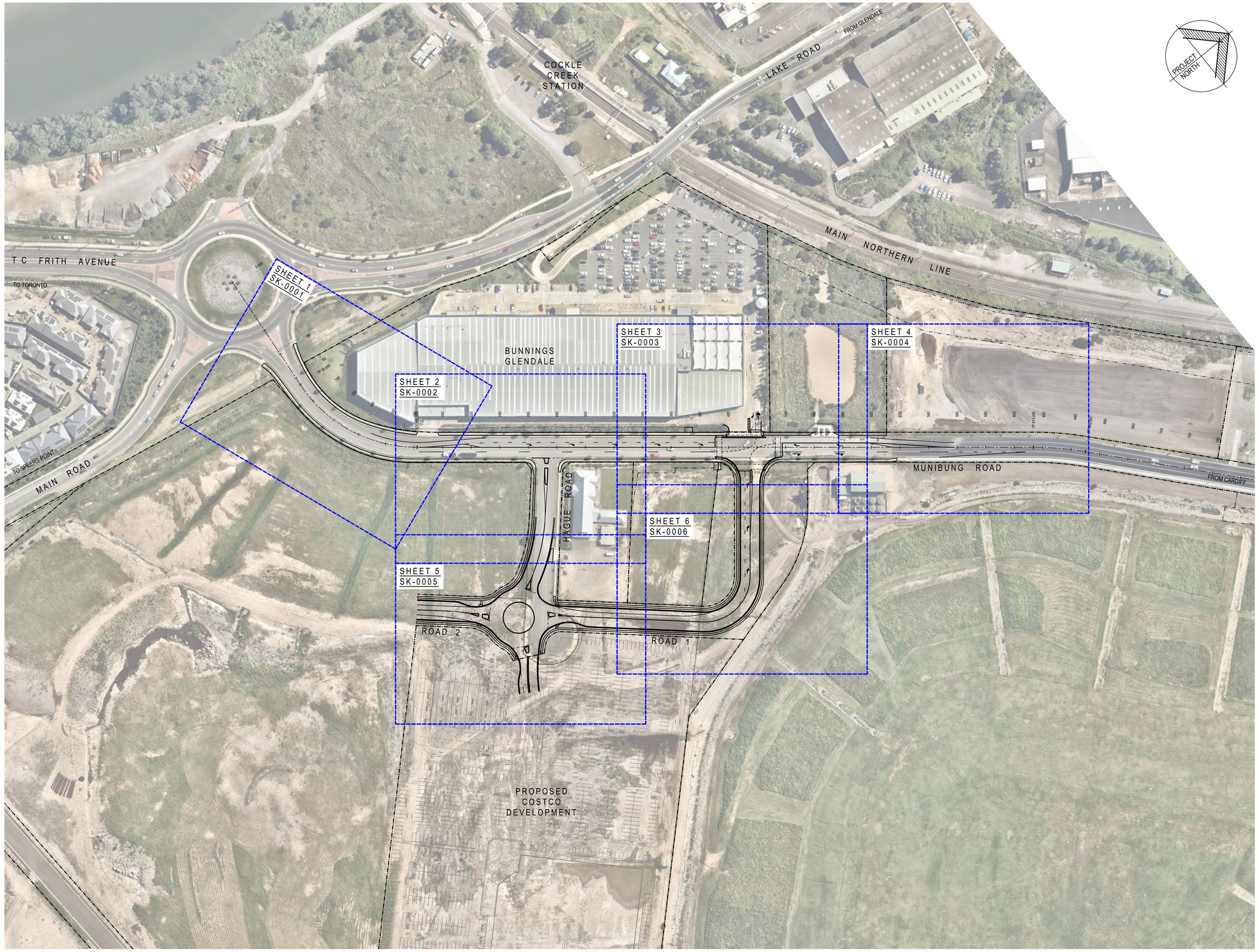
Reports prepared for or in relation to previous development applications for the former Pasminco Cockle Creek Smelter land and the former Incitec Pivot Fertilizer site Boolaroo NSW.

APPENDIX 1

INDICATIVE PROPOSAL PLANS

October 2020

EPS



PROJECT NORTH

Lindsay Dynan

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PROJECT
MUNIBUNG ROAD INTERSECTION WORKS
COCKLE CREEK REDEVELOPMENT
BOOLAROO, NSW

CLIENT
HUNTER & CENTRAL COAST
DEVELOPMENT CORPORATION

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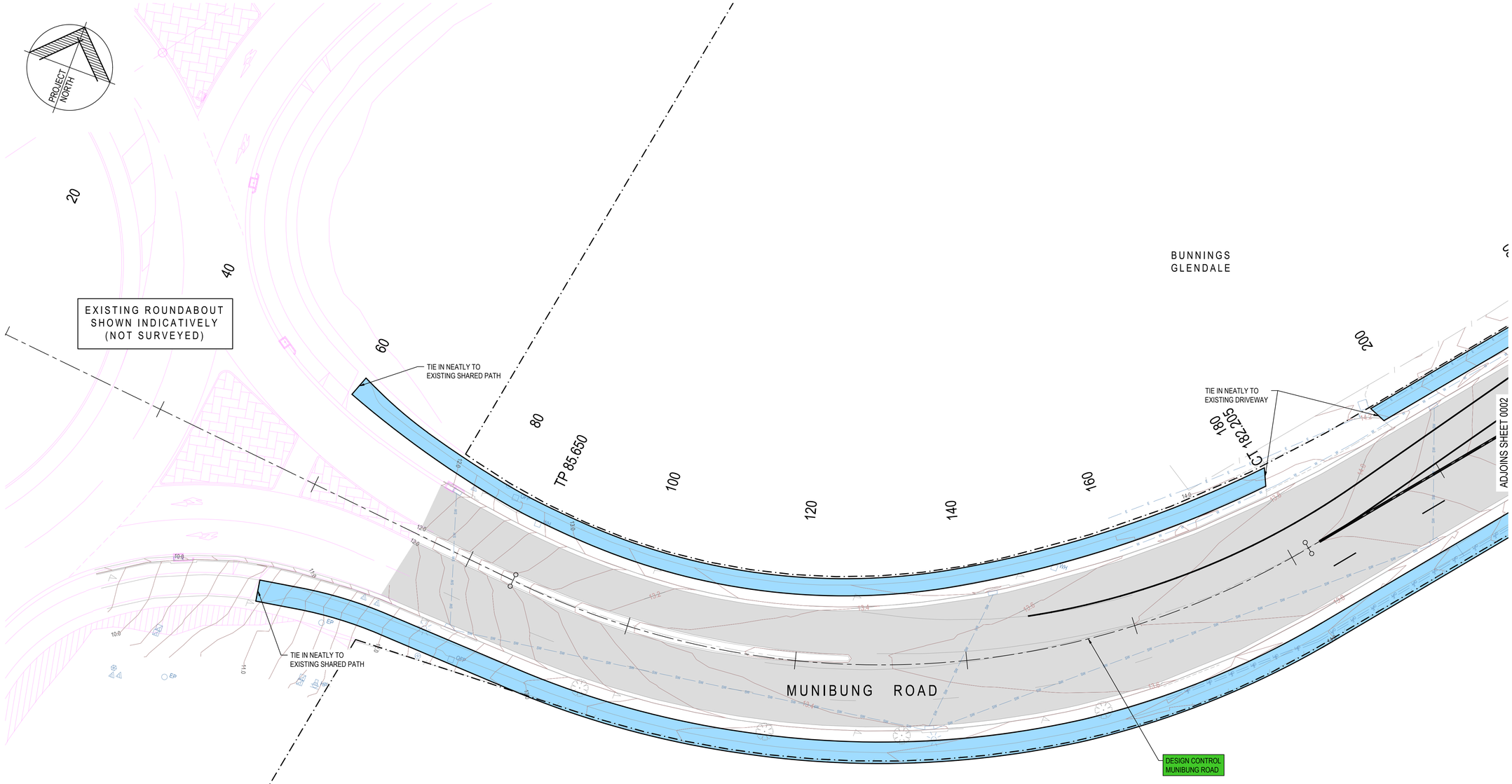

CONCEPT PLAN

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COCKLE CREEK REDEVELOPMENT
BOOLAROO, NSW

CLIENT

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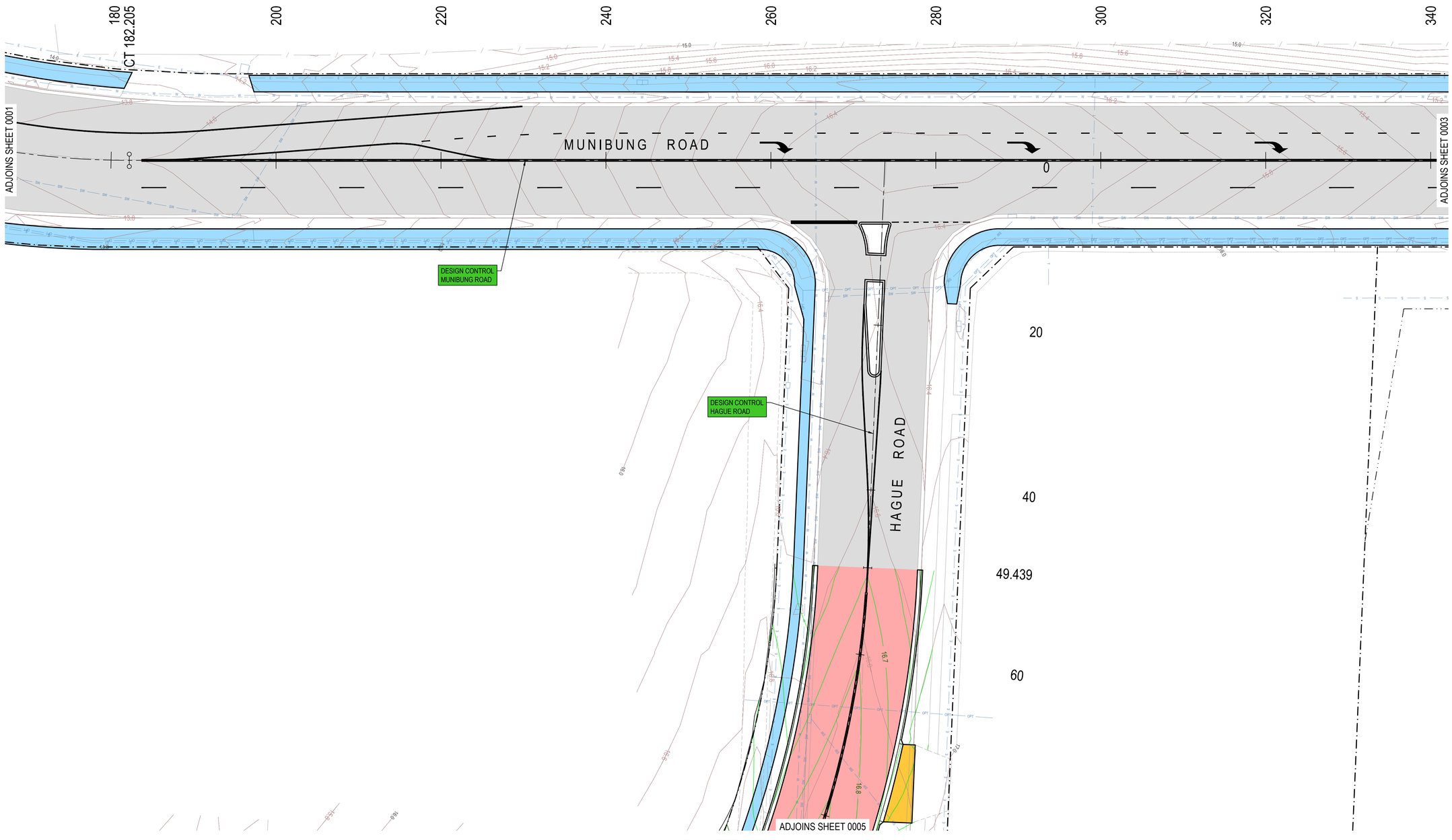

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PROJECT
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COCKLE CREEK REDEVELOPMENT
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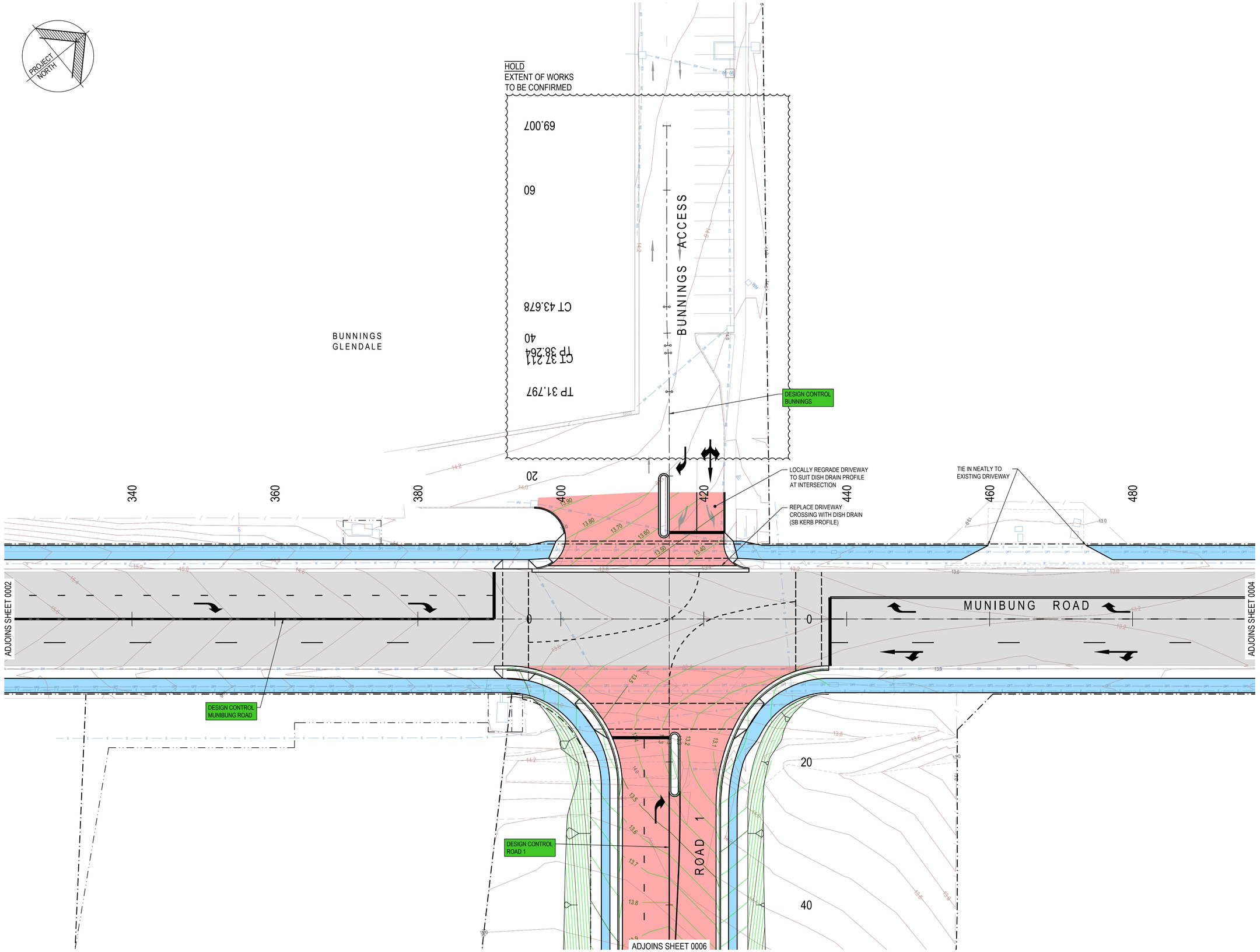

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MUNIBUNG ROAD INTERSECTION WORKS
COCKLE CREEK REDEVELOPMENT
BOOLAROO, NSW

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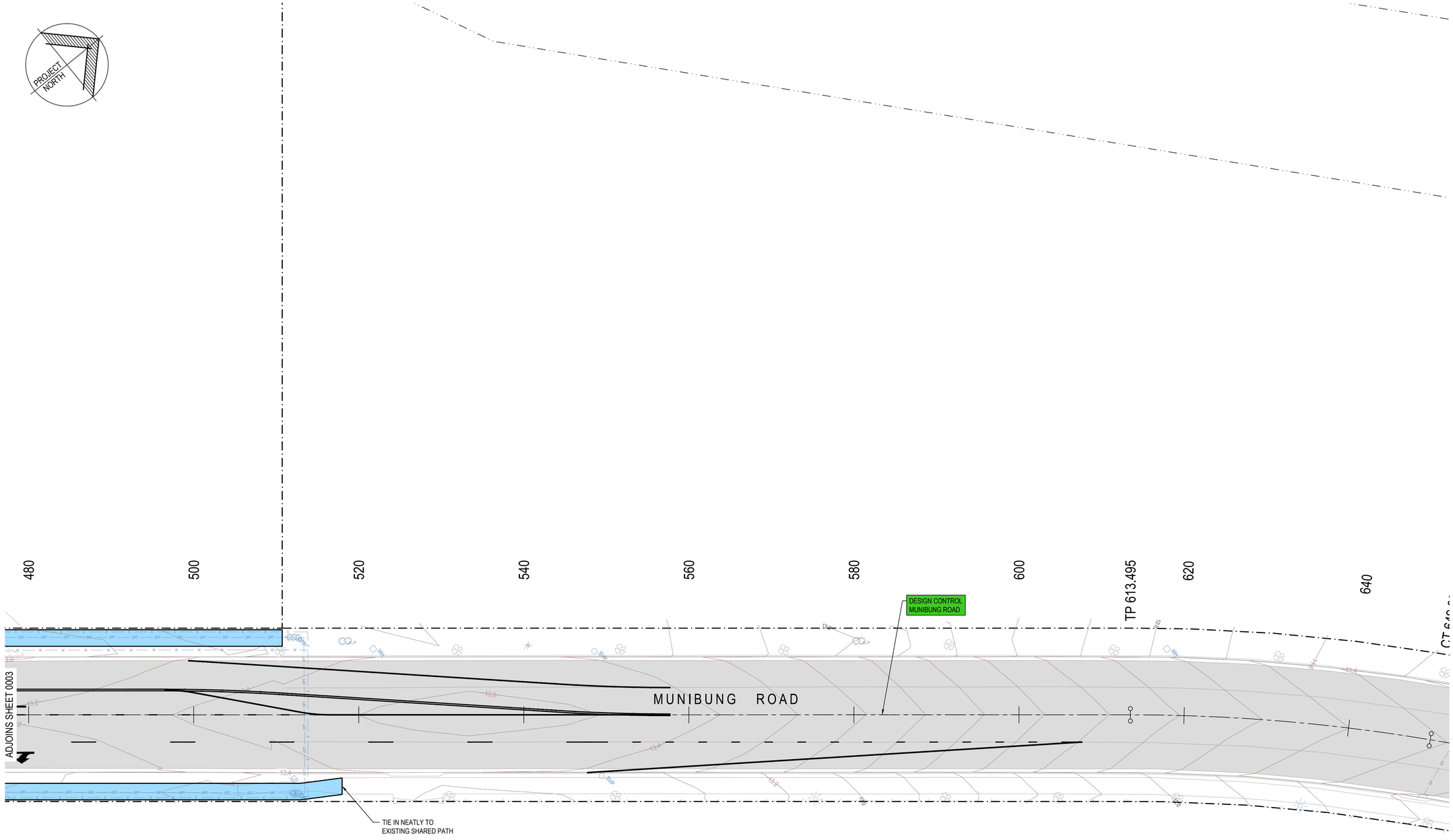

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PROJECT

MUNIBUNG ROAD INTERSECTION WORKS
COCKLE CREEK REDEVELOPMENT
BOOLAROO, NSW

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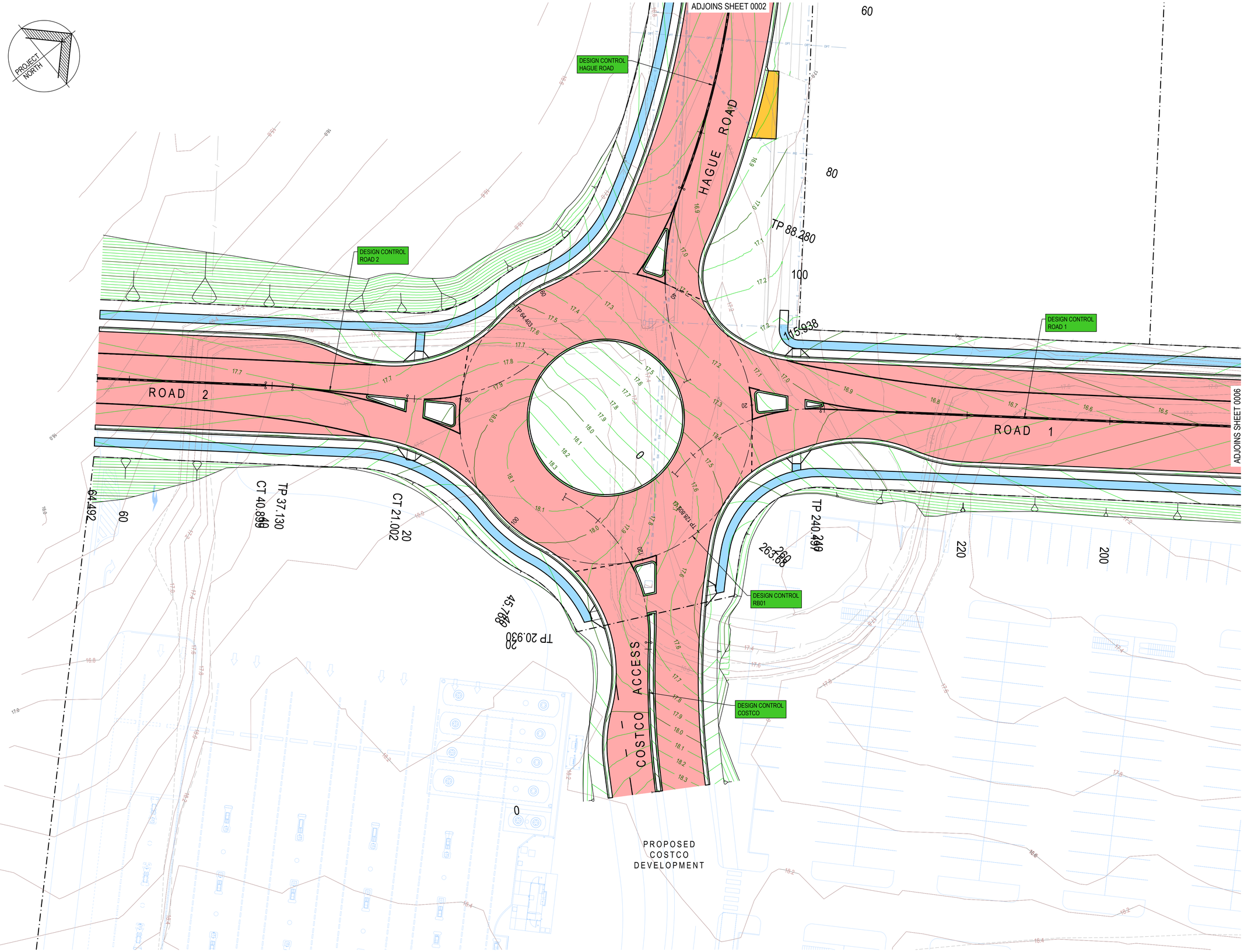

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COCKLE CREEK REDEVELOPMENT
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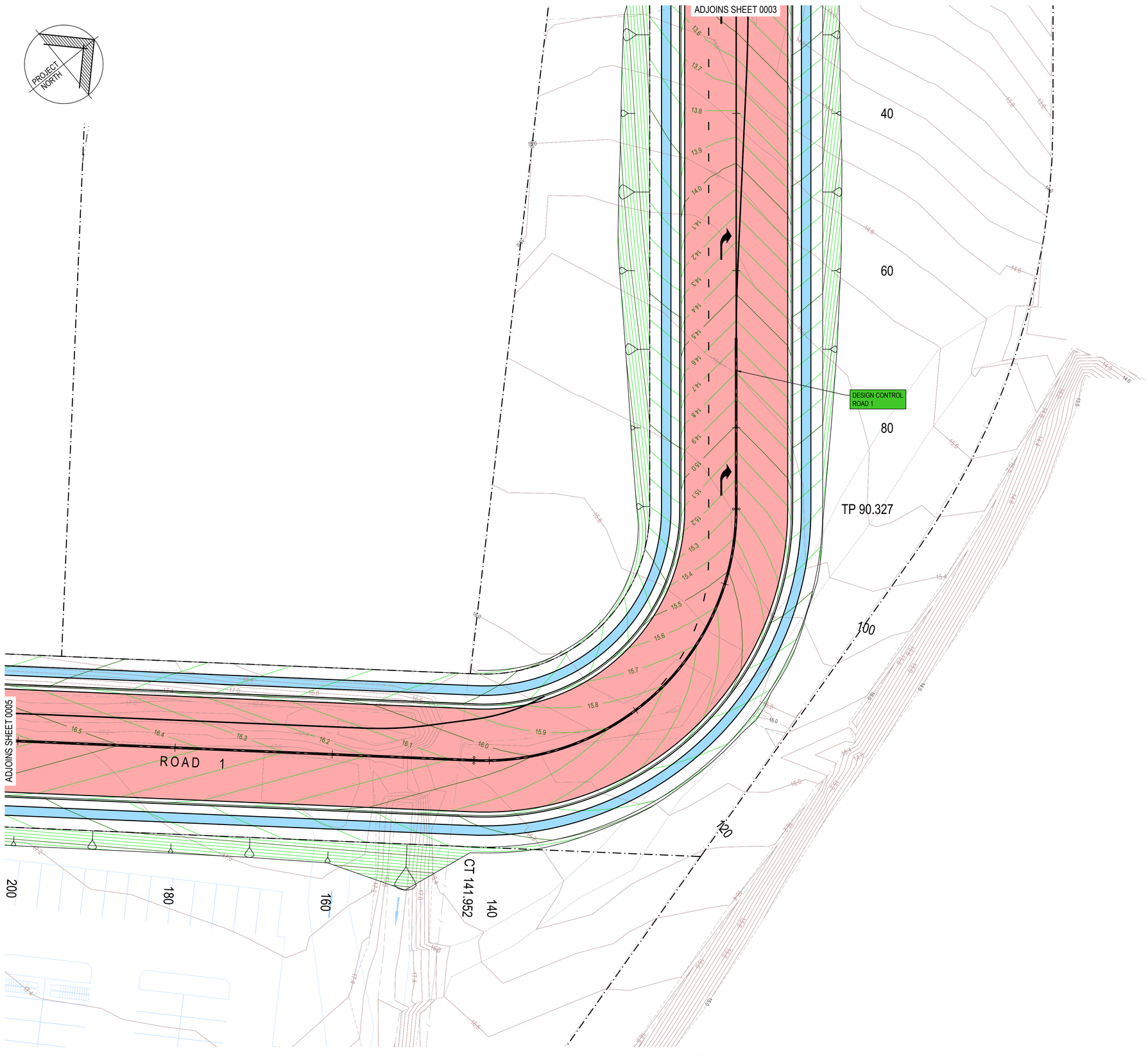

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PROJECT
MUNIBUNG ROAD INTERSECTION WORKS
COCKLE CREEK REDEVELOPMENT
BOOLAROO, NSW

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APPENDIX 2

PHOTOGRAPHS OF THE STUDY AREA

View from end of Hague Rd looking west towards Munibung Rd with the Bunnings building and former Laboratory building in the photo.

View from end of Hague Rd looking northeast towards the Containment Cell across area of land for the new road.

View from the approximate position of the corner of the new road adjacent to the Containment Cell boundary looking west towards the Munibung Rd access/egress to Bunnings with the Bunnings building in the photo.

View from the approximate position of the new road/Munibung Rd signalised intersection looking west onto Munibung Rd and at the Munibung Rd access/egress to Bunnings with the Bunnings building in the photo.

View from the approximate position of the new road/Munibung Rd signalised intersection looking north east along Munibung Rd.

View from the approximate position of the new road/Munibung Rd signalised intersection looking south west along Munibung Rd with the Bunnings building and the former Laboratory building in the photo.

View from Hague Rd/Munibung Rd intersection looking south west along Munibung Rd with the Bunnings building in the photo.

View from Hague Rd/Munibung Rd intersection looking north east along Munibung Rd with the Bunnings building and corner of the former Laboratory building in the photo.

View from Hague Rd/Munibung Rd intersection looking east along Hague Rd with the former Laboratory building in the photo.

APPENDIX 3

ECOLOGICAL DUE DILIGENCE ASSESSMENT

October 2020

EPS

umwelt
Environmental & Social Consultants

Inspired People
Dedicated Team
Quality Outcomes

Our Ref: 20119/R02/BH/NB/06102020

6 October 2020

Jacob Whiting
A/Development Manager
Hunter & Central Coast Development Corporation

E| Jacob.whiting@hccdc.nsw.gov.au

Dear Jacob

Re: Ecological Due Diligence Assessment (Desktop): Proposed new intersection and access road off Munibung Road, Boolaroo, NSW

The document presents the results of an ecological due diligence assessment for a proposed new intersection and access road off Munibung Road in the suburb of Boolaroo, NSW (hereafter the proposal area) (**Attachment 1**).

The proposal is subject to assessment under Part 5, Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Hunter and Central Coast Development Corporation (HCCDC) are preparing a Review of Environmental Factors (REF) to assess the environmental impacts of the proposal. Umwelt (Australia) Pty Limited (Umwelt) have been engaged by HCCDC to undertake a desktop due diligence assessment to identify potential impacts on biodiversity values in the proposal area with a focus on threatened entities as listed under the under the *Biodiversity Conservation Act 2016* (BC Act), *Fisheries Management Act 1994* (FM Act) and the *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act).

1.0 Background and Activity Description

Hunter Central Coast Development Corporation (HCCDC) proposes the construction and operation of road, sewer, water, stormwater, electrical infrastructure and associated infrastructure (the proposal) as specified and positioned in the indicative plans attached as Attachment B in the original consultation letter dated 13 August.

The proposal is primarily on land at 13A Main Road, Boolaroo NSW 2284, in the City of Lake Macquarie, commonly referred to as the Cockle Creek site (formerly Pasminco). The proposal would support the release and development of the lots within the site.

The general location of the proposed road work is shown in **Plate 1**. The full extent of the proposed work area including ancillary facility locations are shown in **Attachment 1**.

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Umwelt (Australia) Pty Limited
ABN 18 059 519 041

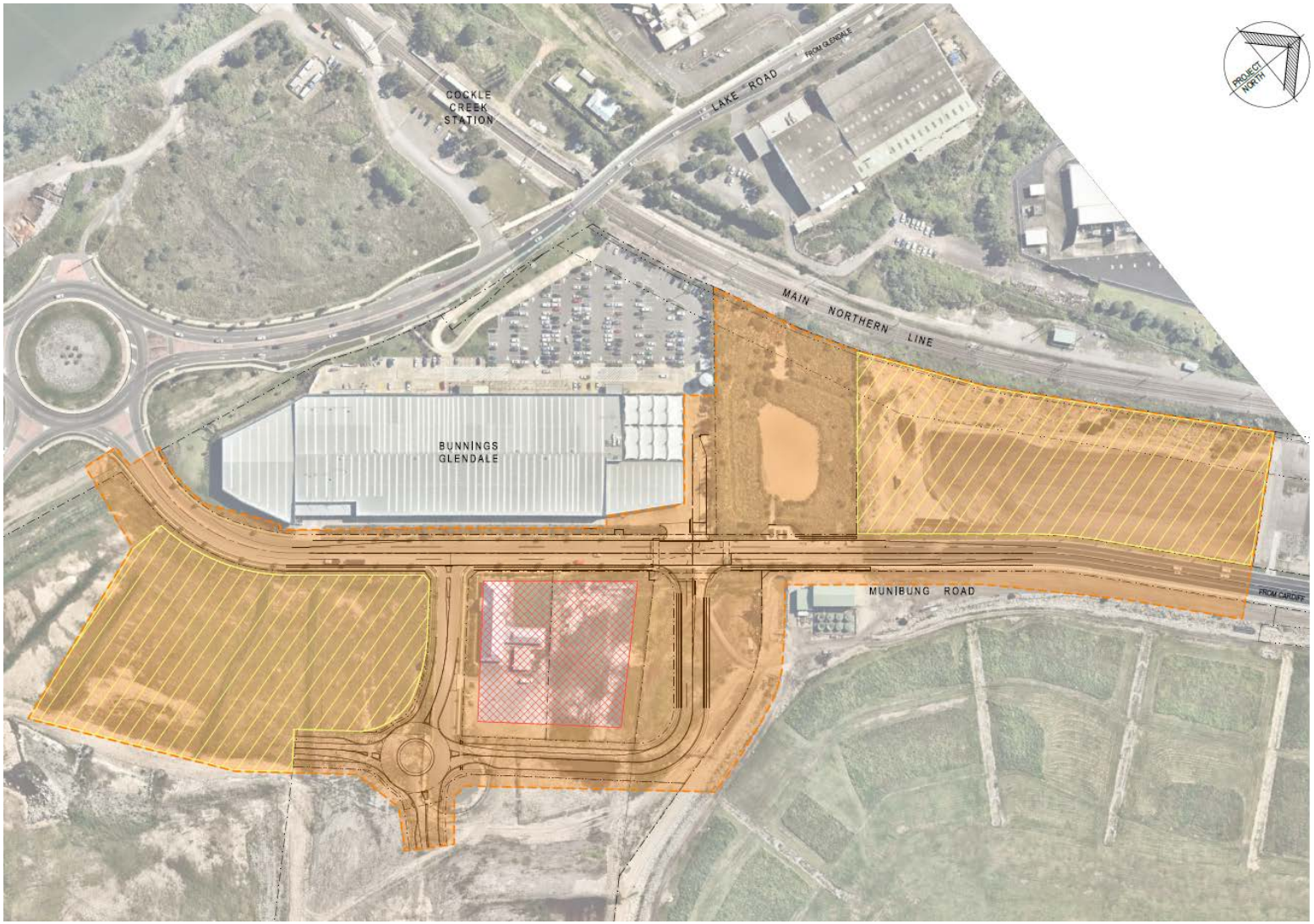

Plate 1 - Extent of proposed works area directly impacted by proposal (orange)

Ancillary areas used for compounds and staging are shown as yellow hatching and excluded zones are shown in red hatching

Key features of the proposal presented in the indicative plans attached as **Attachment 1** include but are not limited to:

- A Bunnings/Costco and Munibung Rd signalised intersection, including adjustments to the existing Bunnings driveway
- A T intersection for Hague Rd and Munibung Rd
- Minor modifications and adjustment within existing Munibung Rd
- A realignment and widening of the existing Hague Rd
- A roundabout at southern end of Hague Rd including additional legs to support future development
- An internal road connection between the roundabout at southern end of Hague Rd and the Bunnings/Costco and Munibung Road signalised intersection, including entry points to development lots
- Modified and adjusted footpaths along Munibung Rd and new internal roadworks to accommodate pedestrians and/or cyclists
- Adjustments to parking lanes
- Clearing, demolition and civil earthworks
- Modifications to existing road pavements
- New road pavement works
- Installation of a Heritage Interpretation Sign, at the main entry point to the site from the roundabout on T.C. Frith Avenue and Main Road and Munibung Road.
- Utility extensions and/or relocations along Munibung Road and the new roads to service development blocks (e.g. water, sewer, gas, electricity, telecommunication services, etc)
- New stormwater infrastructure to suit new and adjusted roadworks
- Ancillary works including kerb and guttering for the length of the new roads, signs, line marking, landscaping and environmental protection works
- Temporary ancillary facilities including site compounds and stockpile sites.
- Temporary diversion and traffic control as required.

The construction of the road extensions and alterations will necessitate extensive sub-surface works to occur throughout much of the proposed proposal area.

The current proposal area, in its entirety, has a history of high disturbance due to the activities of the smelter, extensive remediation of the site since 2003 and construction of Munibung Road (**Plate 2**).

Plate 2 - 2015 image showing the extensively disturbed landscape of the proposal area

©Nearmap 2020

2.0 Methodology

The biodiversity assessment is based on a desktop review of existing information.

2.1 Database Searches and Literature Review

Database searches were completed to identify those threatened and migratory species, endangered populations, TECs (or their habitats) that could potentially occur within the proposal area. The database searches for the proposal area included a 10 kilometre (km) radius search of the Department of Planning, Industry and Environment (DPIE) Atlas of NSW Wildlife Database (**Attachment 2**) (DPIE 2020a) and the Commonwealth Department of Agriculture, Water and Environment (DAWE) Protected Matters Search Tool (PMST) (**Attachment 3**) (DAWE 2020).

The Atlas of NSW Wildlife Database search for the proposal area identified 39 threatened fauna (not including marine species), eight threatened flora species and 12 migratory species (**Attachment 2**). The PMST predicts the following matters of national environmental significance in the proposal area:

- No world heritage properties
- No national heritage places
- One wetland of international importance, being the Hunter Estuary Wetlands. This site occurs in the estuary of the Hunter River. None of the wetlands in the receiving environment are identified as a Ramsar wetland of International Significance
- Three listed threatened ecological communities. None of these communities occur in the proposal area
- 77 listed threatened species being 48 threatened fauna species and 22 threatened flora species

- 62 listed migratory species (**Attachment 3**).

The most relevant vegetation mapping for the proposal area was the State Vegetation Type Map - Greater Hunter (DPIE 2019). According to this regional mapping product, the proposal area was expected to contain no native vegetation.

3.0 Assessment of Biodiversity Values

From desktop assessment and understanding the history of the proposal area it is understood that there is no native vegetation within the proposal area (DPIE 2019a). Vegetation that exists in the proposal area has been established as part of remediation activities post closure of the smelter and includes grassland and habitats associated with the constructed detention basin. Landscaping has been established along Munibung Road and along Hague Road.

Mitchell landscape soil mapping identifies the soil landscape of the proposal area as Gosford - Cooranbong Coastal Slopes (DPIE 2019b), however the Soil Condition Monitoring Mapping of the area identified approximately half of the proposal area occurring on the Mining Rehabilitation mapping unit (DPIE 2019c).

The proposal area occurs within the catchment of Cockle Creek with no natural watercourses in the proposal area. A constructed surface water drain occurs to the east of the proposal area and drains into the detention basin to east of Bunnings, between Bunnings and the proposed ancillary site (refer to **Attachment 1**). The banks of the detention basin appear to have been planted with native emergent aquatic vegetation. The detention basin drains to the north of the railway along a modified watercourse that discharges into Cockle Creek about 560 m downstream of the railway. Cockle Creek flows into Lake Macquarie about two kilometres downstream of the proposal area. In this area the banks of Cockle Creek support a fringe of mangrove forests with coastal floodplain wetland communities to the west of Cockle Creek.

Cockle Creek is key fish habitat as mapped by DPI Fisheries (https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0007/634327/LakeMacquarie.pdf, accessed 17 August 2020).

Fisheries NSW Spatial Data Portal (https://webmap.industry.nsw.gov.au/Html5Viewer/index.html?viewer=Fisheries_Data_Portal, accessed 17 August 2020) identifies Cockle Creek as fair freshwater fish habitat and does not provide habitat for threatened freshwater species as listed under the FM Act. Threatened sharks have been recorded in in the open waters of Lake Macquarie. The seagrass *Posidonia australis* Endangered Population in Port Hacking, Botany Bay, Sydney Harbour, Pittwater, Brisbane Waters and Lake Macquarie (NSW) has been mapped in Belmont, Swan Bay and Swansea in southern Lake Macquarie but is not mapped in northern Lake Macquarie.

The proposal area occurs within the land application area for State Environmental Planning Policy (Coastal Management) 2018. A review of online mapping (https://webmap.environment.nsw.gov.au/PlanningHtml5Viewer/?viewer=SEPP_CoastalManagement, accessed 17 August 2020) identifies that the proposal area does not occur in the mapped area of coastal wetland or proximity area for coastal wetlands. The nearest coastal wetlands occur to the west of Cockle Creek about 440 metres (m) to the north west of the proposal area and about 880 m to the south west of the proposal area.

The proposal area occurs within the land application area for State Environmental Planning Policy (Koala Habitat Protection) 2019. A review of online mapping (https://webmap.environment.nsw.gov.au/Html5Viewer291/index.html?viewer=KoalaSEPP.htm5, accessed 17 August 2020) identifies that within Lot 599 the trees along First Street Boolaroo are mapped as koala development application area however the majority of the lot, including the proposal area, is not mapped as koala development application area or site investigations area. There are no Bionet

records of the koala within 2.5 km of the proposal area. As the proposal area does not support any native vegetation that may provide habitat suitable for the koala and there is no evidence of generational persistence of the koala in the immediate environs, the proposal area is unlikely to provide habitat suitable for the koala.

The results from the Bionet Atlas search (**Attachment 2**) show no records of threatened flora or fauna within the proposal area. Habitat value of the proposal area is minimal given that the area is either rehabilitated developed land or non-native/planted vegetation. The emergent vegetation and open water in the detention basin may provide habitat for amphibians and water birds. Reinforced concrete culverts under Munibung Road and the railway may provide roosting habitat for microbats.

Threatened species, either occurring in the broader area or listed in the PMST search, identified as having the potential to roost in the constructed habitats in culverts in the proposal area include:

- Southern Myotis (*Myotis macropus*)
- Large bent-winged bat (*Miniopterus orianae oceanensis*)
- Little bent-winged bat (*Miniopterus australis*)
- Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*)
- Large-eared Pied Bat (*Chalinolobus dwyeri*).

The green and golden bell frog (*Litoria aurea*) while not recorded within the locality has been recorded in wetlands in the Hunter River estuary and is known to occupy constructed wetlands. Given the absence of records in the locality and lack of connectivity of habitats there is a low likelihood that this species may occur in habitats in the proposal area.

4.0 Summary of the Desktop Assessment

The desktop assessment has established that the proposal area does not support natural biodiversity values. The site plans and description of works (**Attachment 1**) indicate that the proposal will not further fragment or clear existing native vegetation.

The proposal area does support a constructed detention basin and culverts that may provide habitat for some threatened species known to occur in the locality. The green and golden bell frog was identified as having a low likelihood of occurring in the constructed wetland in the detention pond located east of the Bunnings facility. The site plans (**Attachment 1**) and description of works indicate that the detention basin will not be impacted or changed as part of the proposal. With adequate water and sediment/erosion controls, any potential indirect impacts on habitat values in the detention basin can be mitigated. If the proposal scope is to change further assessment may be needed.

The proposal is located in close proximity to Cockle Creek, and associated wetlands of existing biodiversity and coastal management value. The site plans (**Attachment 1**) and description of works indicate that there will be no direct impacts to these wetlands and with adequate water and sediment/erosion controls, any potential indirect impacts can be mitigated.

The threatened microbats identified as having the potential to occur in the proposal area may use an existing culvert within the proposal area. The site plans (**Attachment 1**) and description of works indicate that this culvert will not be impacted or changed as part of the development activities. If the proposal scope is to change further assessment may be needed included an inspection of the culvert and an assessment of the significance of the impact of the proposal on microbats and their habitat.

In summary, the proposal as shown in the site plans (**Attachment 1**) and described in **Section 1.0**, is unlikely to impact directly on potential habitat for threatened species. The proposal will not clear any native vegetation, fragment any wildlife corridors or impact on areas of outstanding biodiversity values. If the proposal scope is to change further assessment may be needed.

Kind regards

Naomi Buchhorn
Principal Ecologist

5.0 References

Department of Agriculture Water and the Environment (DAWE) 2020, Protected Matters Search Tool (PMST). Available at: http://www.environment.gov.au/webgis-framework/apps/pmst/pmst.jsf. Accessed August 2020.

Department of Planning, Industry and Environment (DPIE) 2019a. Greater Hunter Vegetation Mapping. Accessed August 2020.

Department of Planning, Industry and Environment (DPIE) 2019b. NSW (Mitchell) Landscapes - version 3.1. Accessed August 2020.

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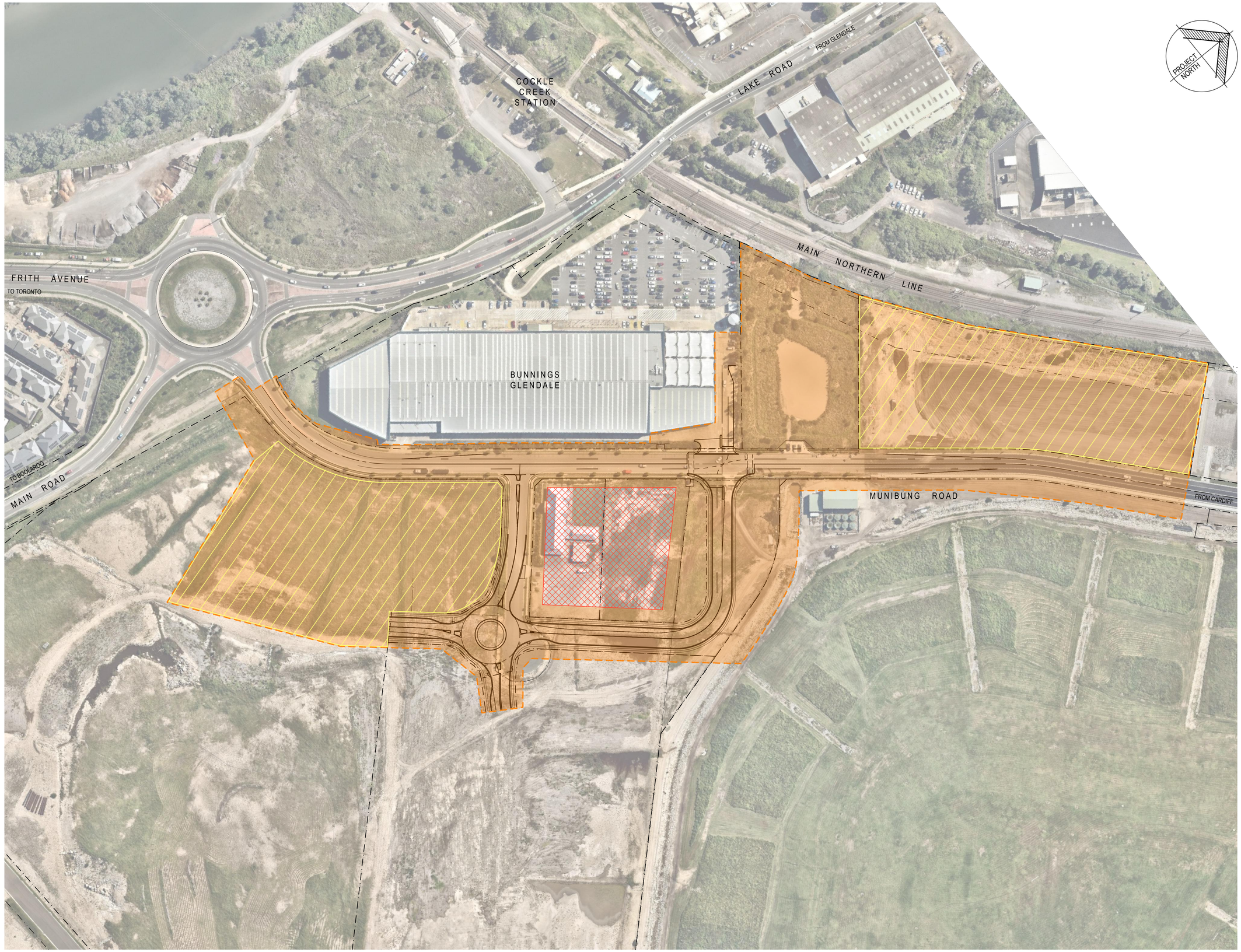
Department of Planning Industry and Environment 2020a, BioNet Atlas of NSW Wildlife, accessed August 2020.

Department of Planning Industry and Environment 2020a, Biodiversity Values Map and Threshold tool. https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap Accessed August 2020

ATTACHMENT 1

Site Plan



PROPOSED AREA OF WORKS PLAN
SCALE 1:1250

Lindsay Dynan

Sydney | Perth | Newcastle | Central Coast

PROJECT
MUNIBUNG ROAD INTERSECTION WORKS
COCKLE CREEK REDEVELOPMENT
BOOLAROO, NSW

CLIENT
HUNTER & CENTRAL COAST
DEVELOPMENT CORPORATION

THIS DRAWING CONTAINS COLOURED INFORMATION C M Y

LEGEND

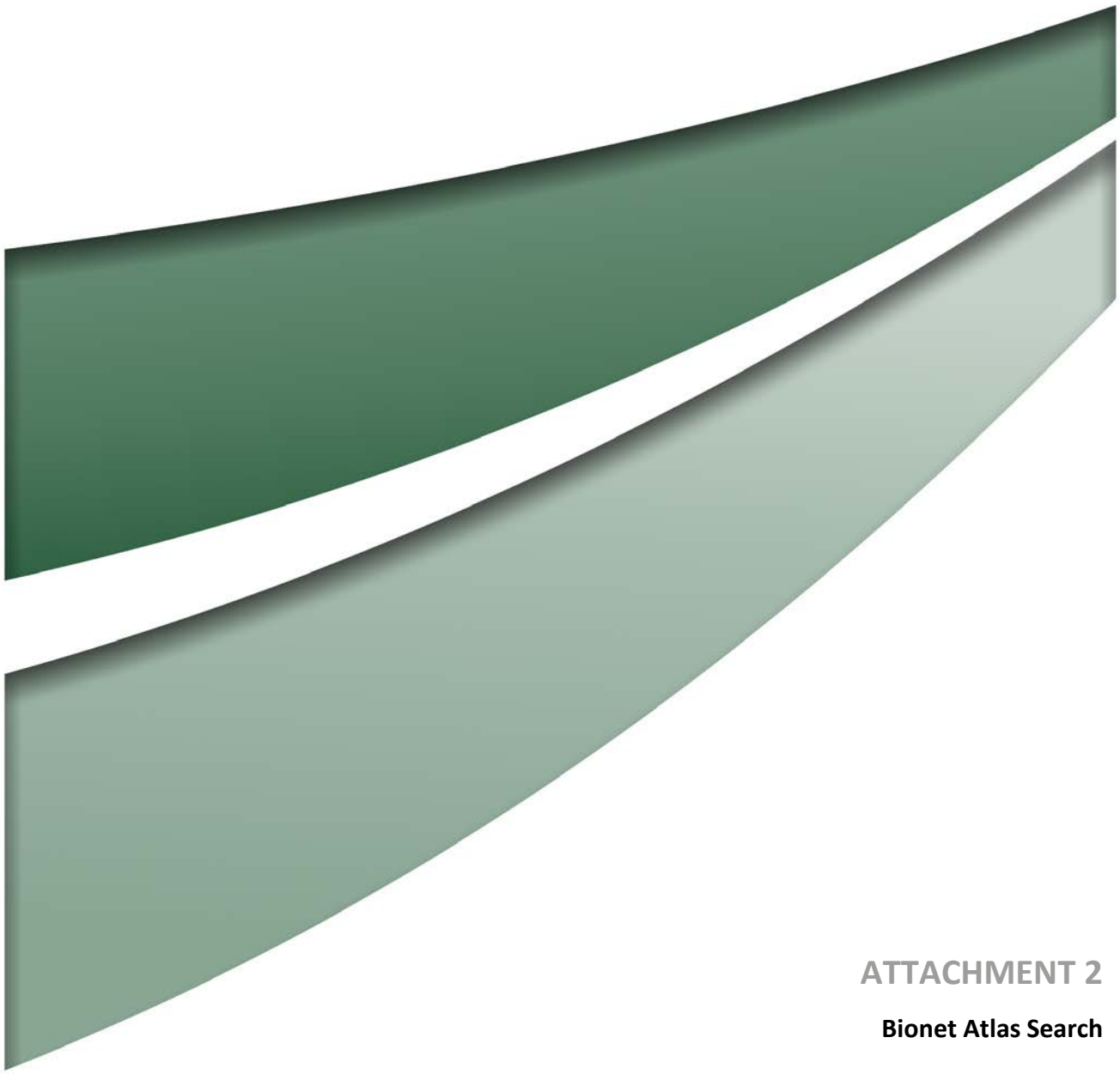
- EXTENT OF PROPOSED WORKS AREA DIRECTLY IMPACTED BY PROPOSAL, INCLUDES TOTAL PROPOSED FOOTPRINT, ANCILLARY SITES AND ANY OTHER AREAS THAT WOULD BE TEMPORARILY DISTURBED
- EXTENT OF ANCILLARY AREA USED FOR CONTRACT COMPOUNDS AND STAGING
- EXTENT OF EXCLUDED ZONE
- EXISTING FENCE LINE
- BOUNDARY LINE
- EASEMENT LINE

REV	DATE	DESCRIPTION	DRN	APP
A	17/08/20	ISSUED FOR INFORMATION	I.J.	B.R.

TITLE
PROPOSED AREA OF WORKS PLAN

DOCUMENT STATUS			SHEET SIZE
DRAFT COPY			A1
DRAWN	DESIGNED	APPROVED	SCALE
J.Fraser	J.Fraser	B.Rodgers	1:1250
DOCUMENT No.			REVISION
16444-MU-SK_0011			A

NOT FOR CONSTRUCTION



ATTACHMENT 2

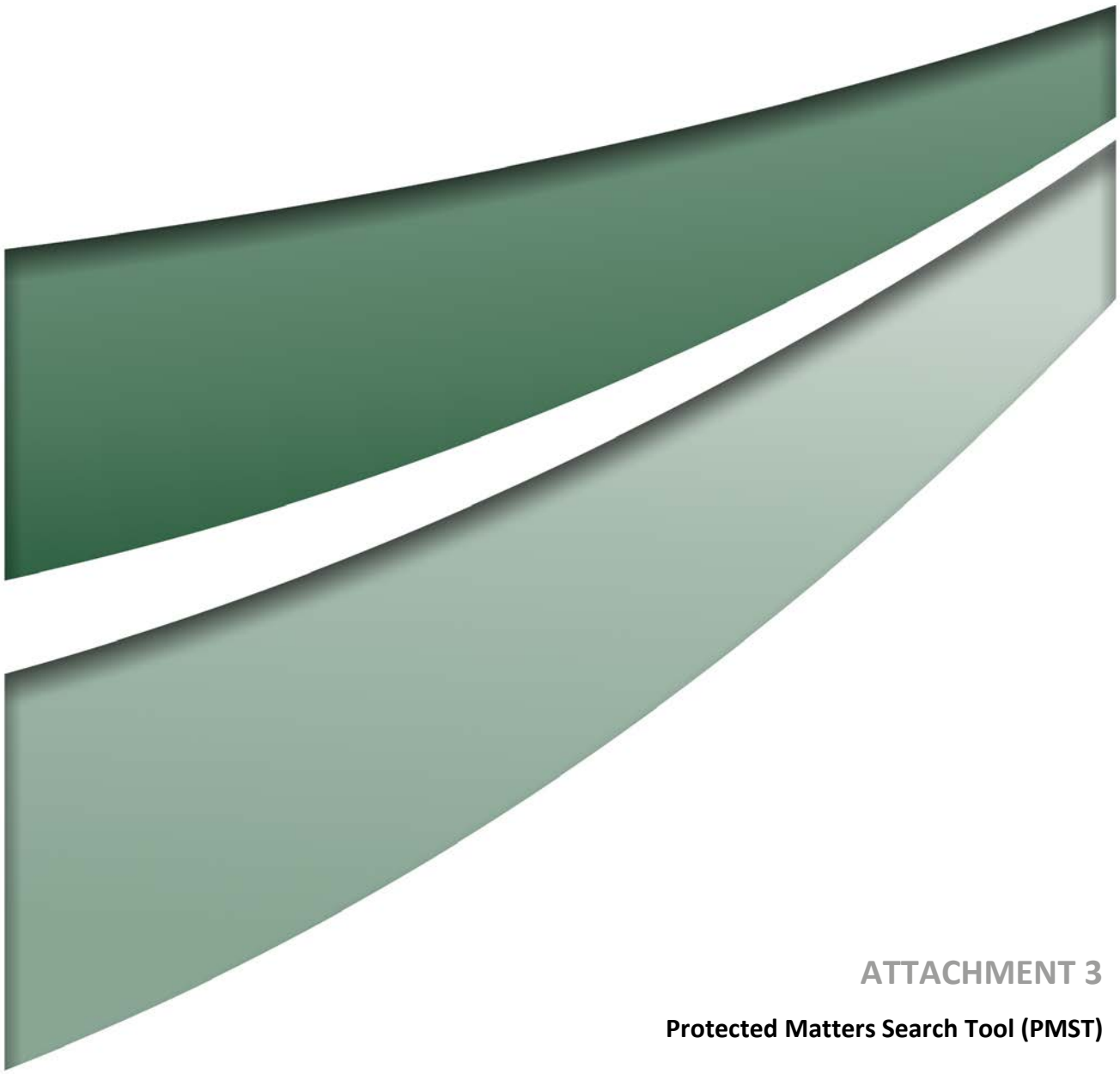
Bionet Atlas Search

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory and may contain errors and omissions. Location accuracy varies. Records of species listed under the Sensitive Species Data Policy are identified in the Sensitivity Class column (^ rounded to 0.1°C; ^^ rounded to 0.01°C). Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Licensed Report of all Valid Records of Threatened (listed on BC Act 2016) ,Commonwealth listed ,CAMBA listed, JAMBA listed or ROKAMBA listed entities in selected area [North: -32.90 West: 151.58 East: 151.68 South: -33.00] returned a total of 2,791 records of 61 species. Report generated on 11/08/2020 3:53 PM

Kingdom Name	Class Name	Family Name	Scientific Name	Common Name	NSW Status	Comm Status
Animalia	Aves	Accipitridae	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V,P	
Animalia	Aves	Accipitridae	*Hieraaetus morphnoides*	Little Eagle	V,P	
Animalia	Aves	Accipitridae	*Pandion cristatus*	Eastern Osprey	V,P,3	
Animalia	Aves	Apodidae	*Hirundapus caudacutus*	White-throated Needletail	P	V,C,J,K
Animalia	Aves	Ardeidae	*Ixobrychus flavicollis*	Black Bittern	V,P	
Animalia	Aves	Artamidae	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P	
Animalia	Aves	Cacatuidae	*Callocephalon fimbriatum*	Gang-gang Cockatoo	V,P,3	
Animalia	Aves	Charadriidae	*Charadrius mongolus*	Lesser Sand-plover	V,P	E,C,J,K
Animalia	Aves	Ciconiidae	*Ephippiorhynchus asiaticus*	Black-necked Stork	E1,P	
Animalia	Aves	Climacteridae	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	V,P	
Animalia	Aves	Columbidae	*Ptilinopus regina*	Rose-crowned Fruit-Dove	V,P	
Animalia	Aves	Columbidae	*Ptilinopus superbus*	Superb Fruit-Dove	V,P	
Animalia	Aves	Cuculidae	*Cuculus optatus*	Oriental Cuckoo	P	C,J,K
Animalia	Aves	Jacanidae	*Irediparra gallinacea*	Comb-crested Jacana	V,P	
Animalia	Aves	Laridae	*Hydroprogne caspia*	Caspian Tern	P	J
Animalia	Aves	Laridae	*Thalasseus bergii*	Crested Tern	P	J
Animalia	Aves	Meliphagidae	*Anthochaera phrygia*	Regent Honeyeater	E4A,P	CE
Animalia	Aves	Meliphagidae	*Epthianura albifrons*	White-fronted Chat	V,P	
Animalia	Aves	Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	V,P	
Animalia	Aves	Petroicidae	*Petroica boodang*	Scarlet Robin	V,P	
Animalia	Aves	Procellariidae	*Ardenna pacifica*	Wedge-tailed Shearwater	P	J

Kingdom Name	Class Name	Family Name	Scientific Name	Common Name	NSW Status	Comm Status
Animalia	Aves	Procellariidae	*Ardenna tenuirostris*	Short-tailed Shearwater	P	C,J,K
Animalia	Aves	Psittacidae	*Glossopsitta pusilla*	Little Lorikeet	V,P	
Animalia	Aves	Psittacidae	*Lathamus discolor*	Swift Parrot	E1,P,3	CE
Animalia	Aves	Scolopacidae	*Arenaria interpres*	Ruddy Turnstone	P	C,J,K
Animalia	Aves	Scolopacidae	*Calidris acuminata*	Sharp-tailed Sandpiper	P	C,J,K
Animalia	Aves	Scolopacidae	*Calidris ferruginea*	Curlew Sandpiper	E1,P	CE,C,J,K
Animalia	Aves	Scolopacidae	*Calidris ruficollis*	Red-necked Stint	P	C,J,K
Animalia	Aves	Scolopacidae	*Gallinago hardwickii*	Latham's Snipe	P	J,K
Animalia	Aves	Scolopacidae	*Limosa lapponica*	Bar-tailed Godwit	P	C,J,K
Animalia	Aves	Scolopacidae	*Tringa glareola*	Wood Sandpiper	P	C,J,K
Animalia	Aves	Scolopacidae	*Tringa stagnatilis*	Marsh Sandpiper	P	C,J,K
Animalia	Aves	Strigidae	*Ninox connivens*	Barking Owl	V,P,3	
Animalia	Aves	Strigidae	*Ninox strenua*	Powerful Owl	V,P,3	
Animalia	Aves	Tytonidae	*Tyto novaehollandiae*	Masked Owl	V,P,3	
Animalia	Aves	Tytonidae	*Tyto tenebricosa*	Sooty Owl	V,P,3	
Animalia	Mammalia	Burramyidae	*Cercartetus nanus*	Eastern Pygmy-possum	V,P	
Animalia	Mammalia	Dasyuridae	*Dasyurus maculatus*	Spotted-tailed Quoll	V,P	E
Animalia	Mammalia	Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P	
Animalia	Mammalia	Miniopteridae	*Miniopterus australis*	Little Bent-winged Bat	V,P	
Animalia	Mammalia	Miniopteridae	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V,P	
Animalia	Mammalia	Molossidae	*Micronomus norfolkensis*	Eastern Coastal Free-tailed Bat	V,P	
Animalia	Mammalia	Petauridae	*Petaurus australis*	Yellow-bellied Glider	V,P	
Animalia	Mammalia	Petauridae	*Petaurus norfolcensis*	Squirrel Glider	V,P	
Animalia	Mammalia	Phascolarctidae	*Phascolarctos cinereus*	Koala	V,P	V
Animalia	Mammalia	Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V
Animalia	Mammalia	Vespertilionidae	*Chalinolobus dwyeri*	Large-eared Pied Bat	V,P	V
Animalia	Mammalia	Vespertilionidae	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V,P	

Kingdom Name	Class Name	Family Name	Scientific Name	Common Name	NSW Status	Comm Status
Animalia	Mammalia	Vespertilionidae	*Myotis macropus*	Southern Myotis	V,P	
Animalia	Mammalia	Vespertilionidae	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P	
Animalia	Mammalia	Vespertilionidae	*Vespadelus troughtoni*	Eastern Cave Bat	V,P	
Animalia	Reptilia	Cheloniidae	*Caretta caretta*	Loggerhead Turtle	E1,P	E
Animalia	Reptilia	Cheloniidae	*Chelonia mydas*	Green Turtle	V,P	V
Plantae	Flora	Elaeocarpaceae	*Tetratheca juncea*	Black-eyed Susan	V	V
Plantae	Flora	Myrtaceae	*Angophora inopina*	Charmhaven Apple	V	V
Plantae	Flora	Myrtaceae	*Callistemon linearifolius*	Netted Bottle Brush	V,3	
Plantae	Flora	Myrtaceae	*Melaleuca biconvexa*	Biconvex Paperbark	V	V
Plantae	Flora	Myrtaceae	*Rhodamnia rubescens*	Scrub Turpentine	E4A	
Plantae	Flora	Myrtaceae	*Syzygium paniculatum*	Magenta Lilly Pilly	E1	V
Plantae	Flora	Orchidaceae	*Cryptostylis hunteriana*	Leafless Tongue Orchid	V,P,2	V
Plantae	Flora	Proteaceae	*Grevillea parviflora* subsp. *parviflora*	Small-flower Grevillea	V	V



ATTACHMENT 3

Protected Matters Search Tool (PMST)

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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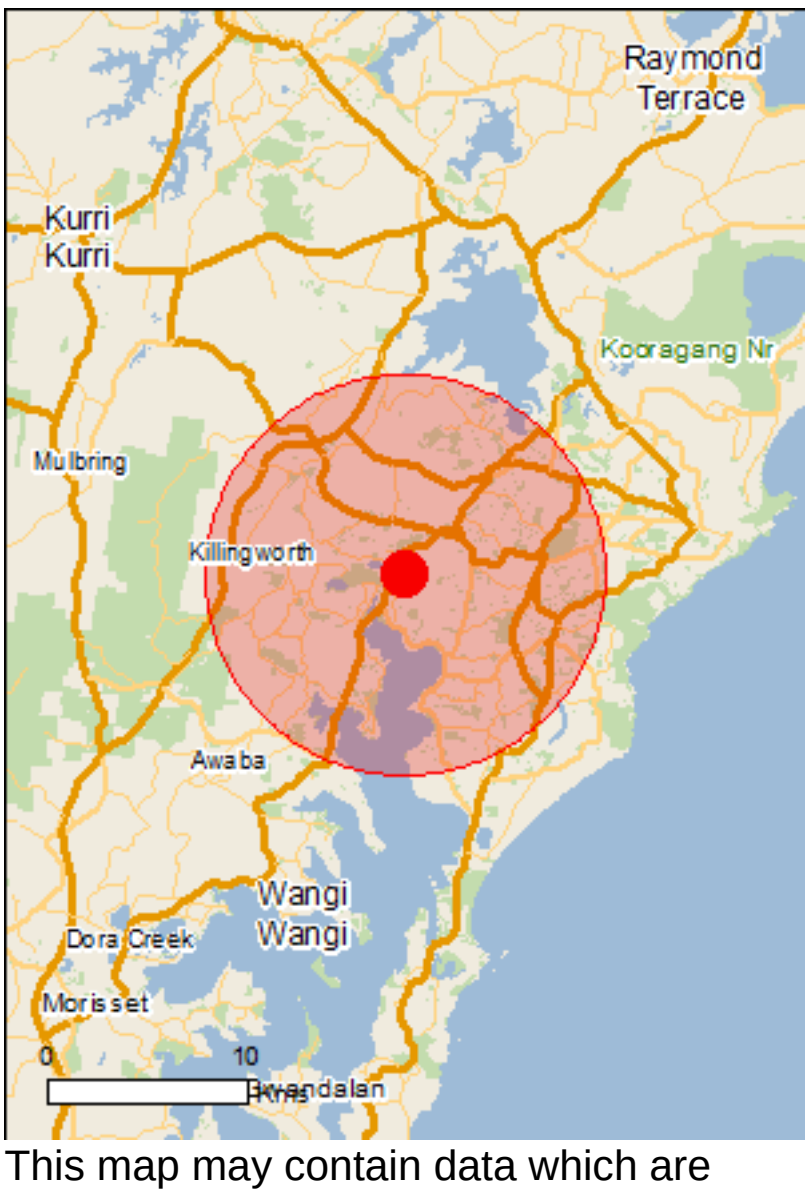

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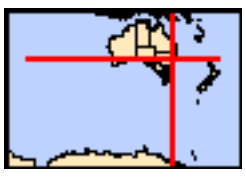

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	77
Listed Migratory Species:	62

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	7
Commonwealth Heritage Places:	None
Listed Marine Species:	70
Whales and Other Cetaceans:	1
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	7
Regional Forest Agreements:	1
Invasive Species:	47
Nationally Important Wetlands:	3
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Hunter estuary wetlands	Within 10km of Ramsar

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Central Hunter Valley eucalypt forest and woodland	Critically Endangered	Community may occur within area
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Name	Status	Type of Presence
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat known to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Thalassarche cauta		
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita		
Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis cucullatus cucullatus		
Hooded Plover (eastern), Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat may occur within area
Fish		
Epinephelus daemelii		
Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Heleioporus australiacus		
Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat may occur within area
Litoria aurea		
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Litoria littlejohni		
Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat may occur within area
Mixophyes balbus		
Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat known to occur within area
Mixophyes iteratus		
Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat may occur within area
Insects		
Synemon plana		
Golden Sun Moth [25234]	Critically Endangered	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat likely to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Acacia bynoeana		
Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat likely to occur within area
Angophora inopina		
Charmhaven Apple [64832]	Vulnerable	Species or species habitat known to occur within area
Caladenia tessellata		
Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area
Corunastylis insignis		
Wyong Midge Orchid 1, Variable Midge Orchid 1 [84692]	Critically Endangered	Species or species habitat likely to occur within area
Cryptostylis hunteriana		
Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat known to occur within area
Cynanchum elegans		
White-flowered Wax Plant [12533]	Endangered	Species or species habitat known to occur within area
Diuris praecox		
Newcastle Doubletail [55086]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus camfieldii		
Camfield's Stringybark [15460]	Vulnerable	Species or species habitat may occur within area
Eucalyptus glaucina		
Slaty Red Gum [5670]	Vulnerable	Species or species habitat may occur within area
Eucalyptus parramattensis subsp. decadens		
Earp's Gum, Earp's Dirty Gum [56148]	Vulnerable	Species or species habitat may occur within area
Euphrasia arguta		
[4325]	Critically Endangered	Species or species habitat may occur within area
Grevillea parviflora subsp. parviflora		
Small-flower Grevillea [64910]	Vulnerable	Species or species habitat known to occur within area
Grevillea shiressii		
[19186]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat known to occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area
Prasophyllum sp. Wybong (C.Phelps ORG 5269) a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area
Rutidosis heterogama Heath Wrinklewort [13132]	Vulnerable	Species or species habitat known to occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat known to occur within area
Tetratheca juncea Black-eyed Susan [21407]	Vulnerable	Species or species habitat known to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur

Name	Threatened	Type of Presence within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat likely to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Migratory Marine Species		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Dugong dugon Dugong [28]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species

Name	Threatened	Type of Presence
		habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known to occur

Name	Threatened	Type of Presence
		within area
Pluvialis fulva		
Pacific Golden Plover [25545]		Species or species habitat known to occur within area
Pluvialis squatarola		
Grey Plover [865]		Species or species habitat known to occur within area
Tringa brevipes		
Grey-tailed Tattler [851]		Species or species habitat known to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis		
Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area
Xenus cinereus		
Terek Sandpiper [59300]		Species or species habitat known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Postal Corporation
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Defence Service Homes Corporation
Commonwealth Land - Director of War Service Homes
Commonwealth Land - Telstra Corporation Limited

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus		
Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis		
Cattle Egret [59542]		Breeding likely to occur within area
Arenaria interpres		
Ruddy Turnstone [872]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Species or species habitat known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area
Pluvialis squatarola Grey Plover [865]		Species or species habitat known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
Puffinus griseus Sooty Shearwater [1024]		Species or species habitat likely to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat known to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche sp. nov. Pacific Albatross [66511]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
[Thinornis rubricollis rubricollis](#)		
Hooded Plover (eastern) [66726]	Vulnerable*	Species or species habitat may occur within area
[Tringa nebularia](#)		
Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
[Tringa stagnatilis](#)		
Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area
[Xenus cinereus](#)		
Terek Sandpiper [59300]		Species or species habitat known to occur within area
Mammals		
[Dugong dugon](#)		
Dugong [28]		Species or species habitat may occur within area
Reptiles		
[Caretta caretta](#)		
Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
[Chelonia mydas](#)		
Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
[Dermochelys coriacea](#)		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
[Eretmochelys imbricata](#)		
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
[Natator depressus](#)		
Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
[Sousa chinensis](#)		
Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Blue Gum Hills	NSW
Hexham Swamp	NSW
Hunter Wetlands	NSW
Lake Macquarie	NSW
Pambalong	NSW
Sugarloaf	NSW
Tingira Heights	NSW

Regional Forest Agreements	[Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
[North East NSW RFA](#)	New South Wales

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Asparagus scandens Asparagus Fern, Climbing Asparagus Fern [23255]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Hexham Swamp	NSW
Jewells Wetland	NSW
Shortland Wetlands Centre	NSW

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-32.94471 151.62769

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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APPENDIX 4

HERTIAGE IMPACT STATEMENT

October 2020

EPS

umwelt
Environmental & Social Consultants

Inspired People
Dedicated Team
Quality Outcomes

Our Ref: 20119/R03/KV/01102020

1 October 2020

Jacob Whiting
A/Development Manager
Hunter & Central Coast Development Corporation

E| Jacob.whiting@hccdc.nsw.gov.au

Dear Jacob

Re: Heritage Impact Statement: Proposed new intersection and access road of Munibung Road, Boolaroo, NSW

1.0 Background

This heritage impact statement (HIS) has been prepared to assess the potential heritage impacts of a proposed new intersection and access road off Munibung Road in the suburb of Boolaroo, NSW (hereafter the project area, shown in **Plate 1.1**) (**Appendix 1**). In addition to these road construction works, ancillary works will be required in the vicinity of the new roads. The total footprint of proposed works is shown in **Plate 1.2**, overleaf.

The proposed works will occur in the vicinity of three locally listed heritage items, and will extend into the curtilage of one locally listed heritage item, as listed in Schedule 5 of the Lake Macquarie Local Environmental Plan (LEP) 2014. This report has therefore been prepared to assess the potential impacts of the proposed works on the significance of these items.

Newcastle | Orange |
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Umwelt (Australia) Pty Limited
ABN 18 059 519 041

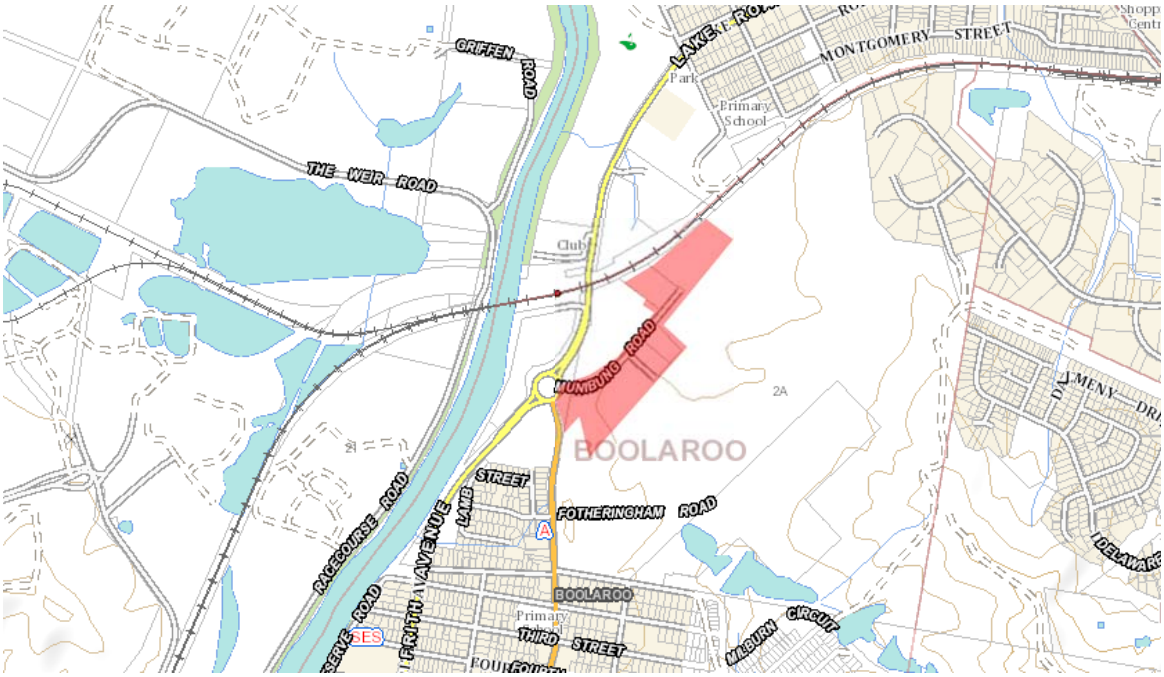


Plate 1.1 Location of the project area shown in red (approximate)

© https://maps.six.nsw.gov.au

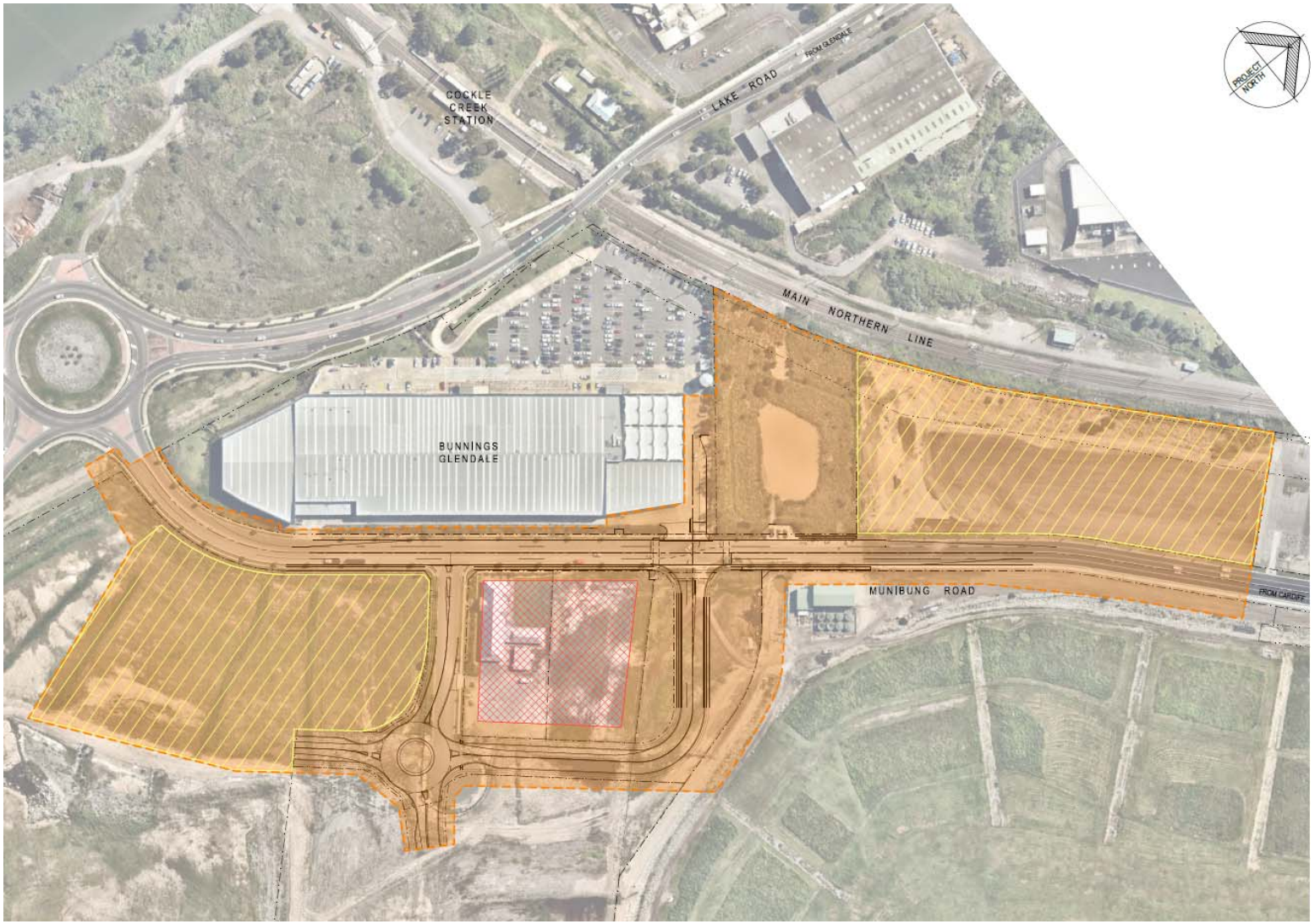


Plate 1.2 Extent of proposed works area directly impacted by proposal (orange)

Ancillary areas used for compounds and staging are shown as yellow hatching and excluded zones are shown in red hatching

2.0 Activity Description

Hunter Central Coast Development Corporation (HCCDC) proposes the construction and operation of road, sewer, water, stormwater, electrical infrastructure and associated infrastructure (the proposal) as specified and positioned in the indicative plans attached as Attachment B in the original consultation letter dated 13 August.

The proposal is primarily on land at 13A Main Road, Boolaroo NSW 2284, in the City of Lake Macquarie, commonly referred to as the Cockle Creek site (formerly Pasminco). The proposal would support the release and development of the lots within the site.

Key features of the proposal presented in the indicative plans attached as **Appendix 1** include but are not limited to:

- A Bunnings/Costco and Munibung Rd signalised intersection, including adjustments to the existing Bunnings driveway
- A T intersection for Hague Rd and Munibung Rd
- Minor modifications and adjustment within existing Munibung Rd
- A realignment and widening of the existing Hague Rd
- A roundabout at southern end of Hague Rd including additional legs to support future development
- An internal road connection between the roundabout at southern end of Hague Rd and the Bunnings/Costco and Munibung Road signalised intersection, including entry points to development lots
- Modified and adjusted footpaths along Munibung Rd and new internal roadworks to accommodate pedestrians and/or cyclists
- Adjustments to parking lanes
- Clearing, demolition and civil earthworks
- Modifications to existing road pavements
- New road pavement works
- Installation of a Heritage Interpretation Sign, at the main entry point to the site from the roundabout on T.C. Frith Avenue and Main Road and Munibung Road
- Utility extensions and/or relocations along Munibung Road and the new roads to service development blocks (e.g. water, sewer, gas, electricity, telecommunication services, etc)
- New stormwater infrastructure to suit new and adjusted roadworks
- Ancillary works including kerb and guttering for the length of the new roads, signs, line marking, landscaping and environmental protection works
- Temporary ancillary facilities including site compounds and stockpile sites.
- Temporary diversion and traffic control as required.

While the plans at **Appendix 1** provide a detailed view of the physical works proposed, **Plate 1.2** above shows the overall extent of the project area, including ancillary areas.

3.0 Relevant Heritage Listings

As noted above, the proposed works will occur in the vicinity of three locally listed heritage items, and partially within the curtilage of one locally listed heritage item. Information about these four heritage items is provided in **Table 1**. The information presented in this table has been sourced directly from the State Heritage Inventory (SHI) listing citations for the items, available on the Heritage NSW website.

The spatial relationship between the project area and these heritage items is shown in **Plate 3.1**.

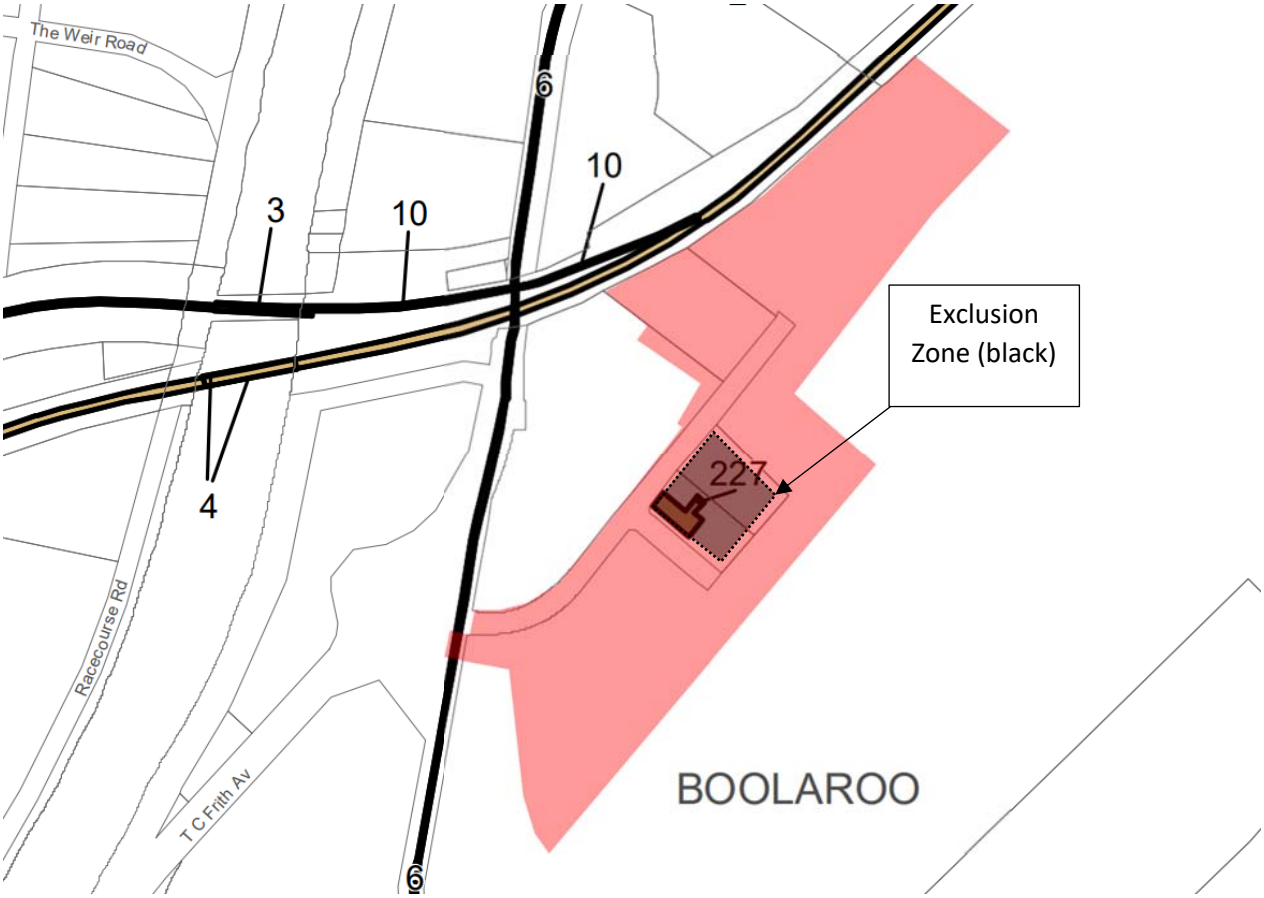


Plate 3.1 Relationship between the project area (shown approximately in red) and listed heritage items

© Heritage Map Sheet HER_009A from the Lake Macquarie LEP 2014, available at https://www.legislation.nsw.gov.au/maps/97d45540-03d5-4263-a3cb-948f4929d935/4650_COM_HER_009A_020_20170920.pdf

Table 1 Heritage items located within or in the vicinity of the proposed works

Name and Item ID	LEP ID No.	Location	Description	Significance
Great Northern Railway Line or Main Northern Line	Item ID 189	Located outside, but in the vicinity of, the current project area. Item runs along the northern boundary of the current project area.	The railway line passes through Lake Macquarie from Tickhole Tunnel in Garden Suburb, down Tickhole Creek to railway stations at Cardiff, across Winding Creek to Sulphide Junction (Cardiff Workshops), Cockle Creek, Teralba, Booragul, Fassifern, Awaba, Dora Creek, Morisset and Wyee. The 1887 railway was built on steep grades at Winding Creek and from Teralba to Fassifern. Major deviations were soon built (1902/3) which lengthened the line, and new stations were introduced at Cardiff (1902) and much later at Booragul (1926). The City of Lake Macquarie section of the Main Northern Line travels through undulating and often picturesque country, with successive cuttings and embankments on most of the route, and two major bridges.[1]	At a State level, the Main Northern Line changed the relationship of Sydney and the north, by speeding up communications and transport. It profoundly changed the relationship of Newcastle with its hinterland and the north, and the standing of Newcastle as a great commercial centre. It confirmed the importance of Newcastle as a great coaling port, comparable with Cardiff in Wales. Locally, the railway brought changes to the pattern of development of Lake Macquarie. It was the route by which Lake Macquarie coal was carried to its markets. It linked the towns and villages of western Lake Macquarie with Newcastle, and was a way for holidaymakers to reach the Lake. It opened the Lake to residential development and, since electrification, has become a commuting link to both Newcastle and Sydney for residents of Lake Macquarie.[2]
Seaham, West Wallsend, Fairley and Killingworth Railway	Item ID 10	Located outside, but in the vicinity of, the current project area. Item is partially located along the northern boundary of the current project area.	Built by the West Wallsend Coal Company Limited and the Monkwearmouth Colliery Estate Company of Australia Ltd., as a private Standard Gauge line, joining the (soon to be completed) Newcastle to Sydney Government line at Cockle Creek Station, east of Cockle Creek. The first stop on the colliery line was the Cockle Creek Exchange Sidings. There appears to have been no turntables or reversing spurs on the line or the branches, so all trains must have been pushed to	The railway was crucial to the establishment and viability of the West Wallsend district Collieries. The railway provided the only practical means by which their coal was got to customers. The cheapness and reliability of rail transport, and the link to the Newcastle Port coal loaders, were major factors in the operating efficiency & profitability of the local collieries. The railway is thought to be the only privately run railway in NSW which had a regular passenger service for an extended length of time (about 30 years). The railway was an integral part of community life, providing the main means of communication

[1] https://apps.environment.nsw.gov.au/dpcheritageapp/ViewHeritageItemDetails.aspx?ID=1910139
[2] https://apps.environment.nsw.gov.au/dpcheritageapp/ViewHeritageItemDetails.aspx?ID=1910139

Name and Item ID	LEP ID No.	Location	Description	Significance
			their destination on one journey, and pulled on the return journey, with the locomotives spending half their life travelling backwards. It seems likely that the locos would normally pull the full coal wagons to Cockle Creek, and push the empty ones back to the collieries.[3]	with Newcastle and the outside world for West Wallsend people for 15 years before the tram service started. The railway has great potential for re-use as a cycleway and heritage trail. [4]
Former laboratory building on the former Pasminco site	Item ID 227	Located outside but in the vicinity of the current project area. The item is surrounded by the current project area on all sides.	The exterior of the building is a relatively simple, single story, utilitarian rectilinear building of red face brickwork. It consists of four distinct sections: The main original building, 1915. The eastern extensions, 1966. The northern annex and toilet amenities, 1961, and the north eastern chemical store and equipment room, 1968.[5]	The remaining early assay building has strong Local and Regional heritage significance in its ability to demonstrate both the early and latter associations with the evolving nature of the Former Cockle Creek Sulphide Corporation, and the closure and remediation of the site by Pasminco for alternative uses. It is an instrumental development building from a key period of development of the site and its prosperous beginnings in the early twentieth Century. These beginnings also saw the first major industrial process develop in the area and was an impetus for the ongoing development of the nearby Boolaroo township. Whilst largely a utilitarian building it has some landmark qualities with its distinctive over scaled roof line and its proximity and location to the main entry road to the site. The retention of the building has strong social significance to the local and regional community as the last remaining building from the 100 years of heavy industry on the site. The local and regional historical societies have expressed a clear desire for the retention of the building. The former Assay building demonstrates some rarity as the last remaining building on the site from the previous significant use that has been able to remain, especially when other significant buildings have been demolished for reasons of high contamination. The intactness of the western room is a good representative example of its use and function within the site and clearly demonstrates as a

[3] https://apps.environment.nsw.gov.au/dpcheritageapp/ViewHeritageItemDetails.aspx?ID=1910143
[4] https://apps.environment.nsw.gov.au/dpcheritageapp/ViewHeritageItemDetails.aspx?ID=1910143
[5] https://apps.environment.nsw.gov.au/dpcheritageapp/ViewHeritageItemDetails.aspx?ID=1910597

Name and Item ID	LEP ID No.	Location	Description	Significance
				laboratory. The relationship of the building to the main entry road is also representative of the early functions and layout of the site and will benefit future interpretation.[6]
Speers Point Steam Tram Line	Item ID 6	Located partially within the current project area. Item runs along the western boundary of the current project area, with a small portion of the project area (small area to the west of Munibung Road) falling within the item's curtilage.	The Speers Point Branch of the West Wallsend Tramway left the West Wallsend line somewhere just north of the present Glendale TAFE, crossed Main Rd Glendale at Frederick St, crossed Winding Creek, ran along the east boundary of the (now) golf course, joined Lake Road and followed Lake Road then Main Rd Boolaroo and Main Road Speers Point to the Esplanade. Wherever the line deviates from existing roadways, the former tramway route is still evident. In some areas, such as across Winding Creek, the tramway easement still exists. It is unlikely that any sections of track survive, however there may be remains of bridge piers in the creek or under the ground surface.[7]	Speers Point steam tram route, as a branch off the West Wallsend route, has considerable historic significance. From 1912-30 (when private motor cars were a rarity), the tram gave Speers Point its main means of daily transport to Newcastle. It provided a most popular way to get to Speers Point, and thence to other parts of the Lake for picnickers and holiday makers. The tram service made a great impact on the development of Speers Point as a holiday resort, so that it rivalled Toronto, which had its own railway train. The Newcastle to Wallsend and then Speers Point tram route (about 25 kilometres) was reputedly the longest in the state. It had the last Newcastle steam trams to run, and was one of the last steam tram services to operate in NSW. The steam trams have a strong nostalgic value, and are still fondly remembered in the district.[8]

[6] https://apps.environment.nsw.gov.au/dpcheritageapp/ViewHeritageItemDetails.aspx?ID=1910597
[7] https://apps.environment.nsw.gov.au/dpcheritageapp/ViewHeritageItemDetails.aspx?ID=1910138
[8] https://apps.environment.nsw.gov.au/dpcheritageapp/ViewHeritageItemDetails.aspx?ID=1910138

4.0 Visual Inspection

A visual inspection of the project area was undertaken by Umwelt Senior Consultant Karyn Virgin on 19 August 2020. The inspection was undertaken on foot, and focused predominately on the interaction between the project area and listed heritage items.

The visual inspection confirmed that the project area in its entirety has been significantly disturbed through a range of factors including but not limited to:

- The construction and later removal (in 2003) of the former Pasminco lead and zinc smelter, including large-scale remediation works across the former smelter footprint which involved substantial earthworks
- The construction of Bunnings
- The construction of Munibung Road and Main Road
- The installation of associated infrastructure and services.

4.1.1 Great Northern Railway Line and the Seaham, West Wallsend, Fairley and Killingworth Railway

A visual inspection of the interaction between the project area and the Great Northern Railway Line and Seaham, West Wallsend, Fairley and Killingworth Railway was undertaken to inform this assessment. As the below images demonstrate, both of these rail lines are located along the northern boundary of the project area, and outside of its boundaries.

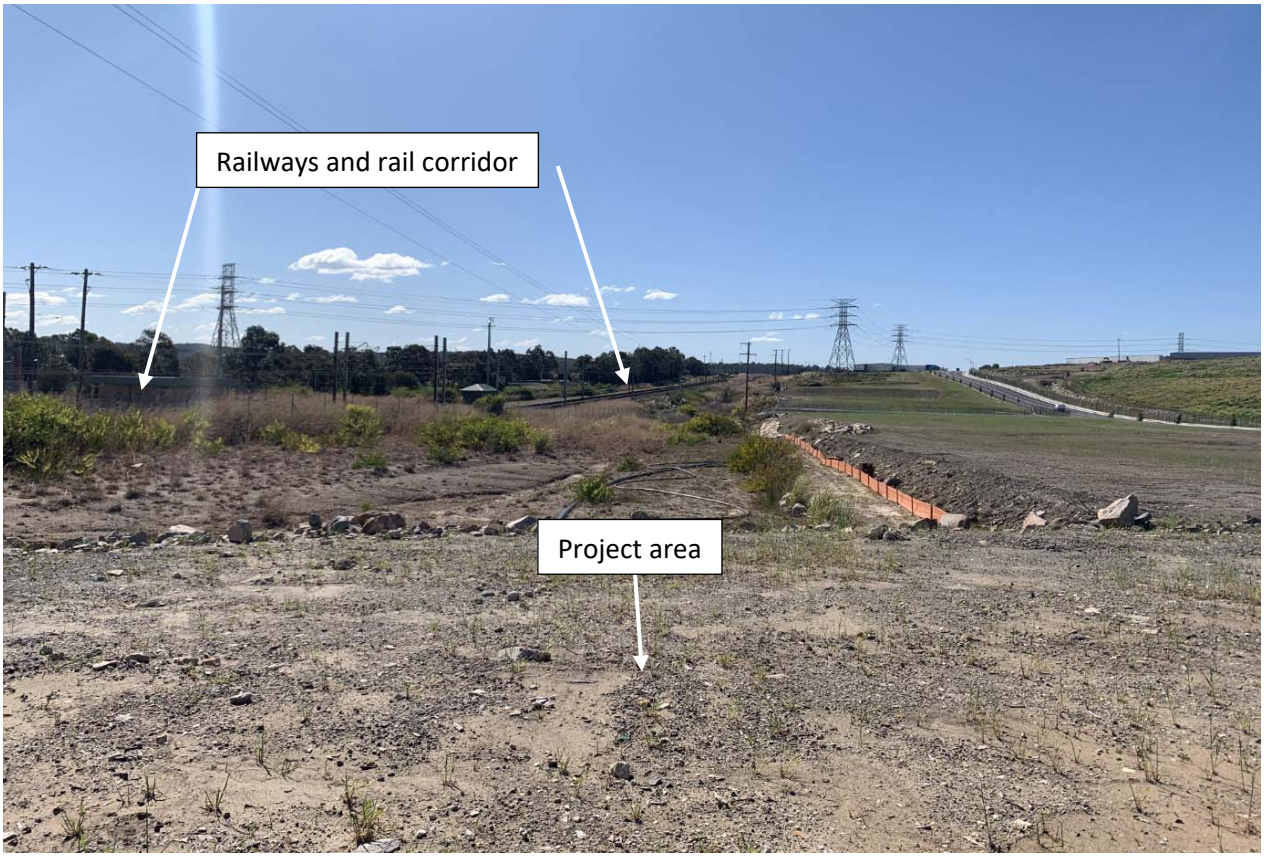


Plate 4.1 View of the project area in relation to the two heritage listed railways

Both railways are contained within the established rail corridor, which is set several metres below the current ground surface of the adjoining project area. Though the railway corridor is visible from the project area, the differences in their respective ground surface levels means that the project area is unlikely to have a high level of visibility from the rail corridor.

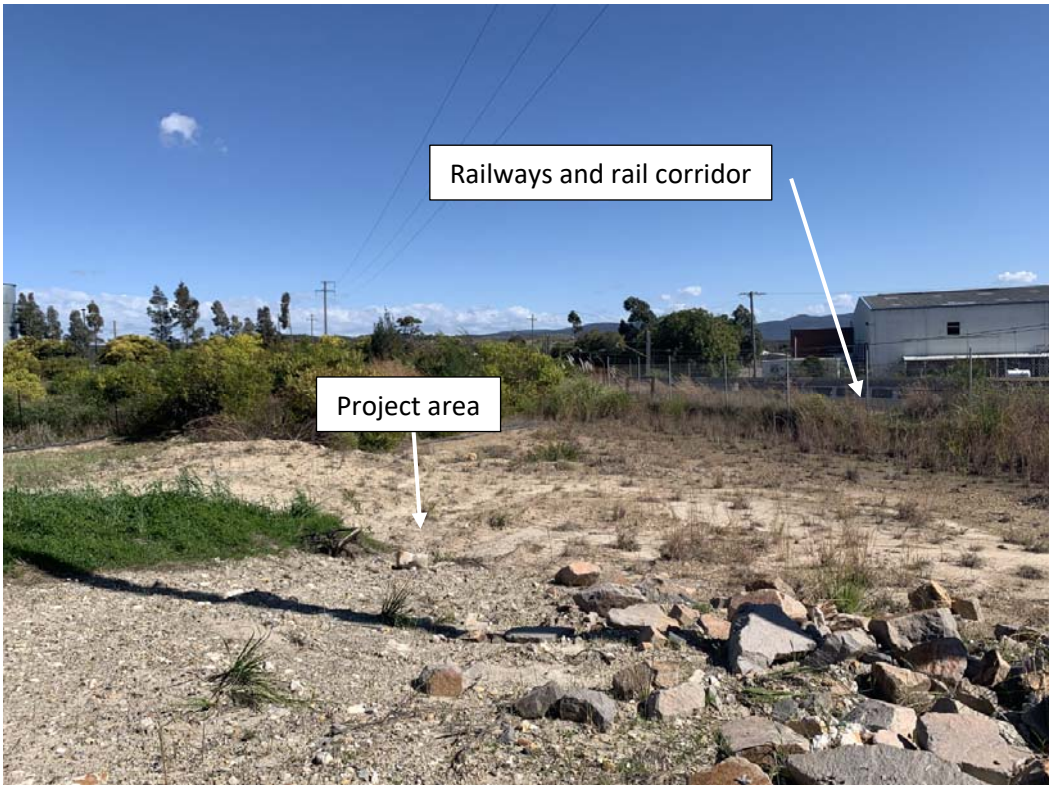


Plate 4.2 View of the rail corridor from within the project area

Plate 4.3 View of the rail corridor from the northern boundary of the project area, demonstrating the significant difference in ground surface levels

4.1.2 Former laboratory building on the former Pasminco site

The visual inspection of the former laboratory building showed that the building has been substantially renovated since the closure of the smelter in 2003. The building sits 1-2 metres above the ground surface level of the surrounding roads and road reserves. The building is surrounded by recent landscaping, including tiered plantings and a sandstone wall. This landscaping creates both a visual and physical buffer between the building and its surrounds.

The area surrounding the building has been substantially altered since 2003; this has included the construction of Bunnings, new roads, the construction of new footpaths and road reserve areas, landscaping and service installation. The setting of the building has therefore been significantly altered since the building was constructed.

Plate 4.4 View of the former Pasminco laboratory building, facing southeast from the opposite side of Munibung Road

Plate 4.5 View of the level change between the building and the surrounding landscape. View is to the rear of the building

Plate 4.6 View of altered setting of the building, which is partially surrounded by new development, facing northeast along Munibung Road

4.1.3 Speers Point Steam Tram Line

This listing refers to a former tram line, the physical evidence of which has been almost entirely removed. As noted in the listing citation:

> *It is unlikely that any sections of track survive, however there may be remains of bridge piers in the creek or under the ground surface.*[9]

A visual inspection of the section of the project area that intersects with the listed curtilage of this item did not result in the identification of any physical remnants of the former tram line. The area was clearly and demonstrably disturbed. The results of the visual inspection are supported by aerial imagery that pre-dates the construction of Munibung Road (**Plate 4.10**).

Plate 4.7 View of the former tram line alignment, facing south

[9] https://apps.environment.nsw.gov.au/dpcheritageapp/ViewHeritageItemDetails.aspx?ID=1910138

Plate 4.8 View of the former tram line alignment, facing south and showing disturbance

Plate 4.9 View of the portion of the former tram line alignment that intersects with the project area, facing east and showing disturbance

Plate 4.10 View of the portion of the former tram line alignment that intersects with the project area in January 2014 (left) and January 2015 (right)

5.0 Impact Assessment

Based on the information presented in **Table 1**, coupled with the outcomes of the visual assessment presented at **Section 4.0**, the assessment of potential heritage impacts presented in below has been prepared.

Table 2 Assessment of potential heritage impacts

Heritage Item	Impact Assessment
Great Northern Railway Line	The proposed works will not extend into the curtilage of this item. The proposed works will therefore not result in any physical impacts to this item. The significance of the item is predominately derived from its historical significance. The listing citation for the item does not identify any aesthetic significance in association with this item, including in relation to its setting. The visual inspection has shown that the visibility of the project area is highly likely to be minimal from the rail corridor. Given the railway's lack of aesthetic significance, the lack of significance attached to its setting, and the extent to which its setting has already been subject to development (along the rail corridor on both sides), it is considered extremely unlikely for any works within the project area to result in a discernible visual impact to the item. It is further noted that works within proximity to the rail corridor will be either at-grade, or be minimal in scale, with no substantial building works proposed. For these reasons, the visual impacts of the proposal on the heritage item are assessed as negligible.
Seaham, West Wallsend, Fairley and Killingworth Railway	The proposed works will not extend into the curtilage of this item. The proposed works will therefore not result in any physical impacts to this item. The significance of the item is predominately derived from its historical significance. The listing citation for the item does not identify any aesthetic significance in association with this item, including in relation to its setting. The visual inspection has shown that the visibility of the project area is highly likely to be minimal from the rail corridor. Given the railway's lack of aesthetic significance, the lack of significance attached to its setting, and the extent to which its setting has already been subject to development (along the rail corridor on both sides), it is considered extremely unlikely for any works within the project area to result in a discernible visual impact to the item. It is further noted that works within proximity to the rail corridor will be either at-grade, or be minimal in scale, with no substantial building works proposed. For these reasons, the visual impacts of the proposal on the heritage item are assessed as negligible.

Heritage Item	Impact Assessment
Former laboratory building on the former Pasminco site	The proposed works will not extend into the curtilage of this item. The proposed works will therefore not result in any physical impacts to this item. As noted, the setting of this item has already been compromised by recent development, and particularly the construction of the Bunnings building. The proposed works in the vicinity of the building will predominately be at-grade, or be very minor in scale. The proposed works will be consistent with the contemporary elements (including new roads, new road reserves and footpaths, and other infrastructure) already in place in the vicinity of this item. The aesthetic significance of the building is somewhat preserved through its height above the surrounding ground level, which visually emphasises the building within its setting. This visual emphasis will be maintained, with no changes made to the landscaping that surrounds the building. For the reasons outlined above, it is assessed that the proposed works will result in a negligible degree of visual impact to this item.
Speers Point Steam Tram Line	The visual inspection of the tram line demonstrated that no physical remnants of the tram line remain *in situ* within the portion of curtilage that intersects the project area. A review of aerial imagery dating from before and after Munibung Road was constructed, coupled with the disturbance observed in the area during the visual inspection, strongly suggests that the area has been extensively disturbed, and that this disturbance would have removed any remnants of the tram line if they had remained present up until that time. For these reasons, the proposed works will not result in any physical impacts to this item. The significance of the item is predominately derived from its historical significance, with the listing citation clearly acknowledging that the presence of *in situ* fabric associated with the former tram line is unlikely to be present. The listing citation for the item does not identify any aesthetic significance in association with this item, including in relation to its setting. As the visual inspection and historical aerials demonstrate, this area has been substantially modified over time, and particularly from 2014 onwards. Given the former tram line's lack of aesthetic significance, the lack of significance attached to its setting, and the extent to which its setting has already been subject to development, plus the absence of any physical evidence of the former tram line, it is assessed that the proposed works will not result in any visual impact to this heritage item. In addition to the above, it is noted that the proposed works in this area are limited to the potential installation of a heritage interpretation sign, which will be modest in scale, and will ultimately result in a positive visual contribution to the immediate area.

6.0 Conclusion and Recommendations

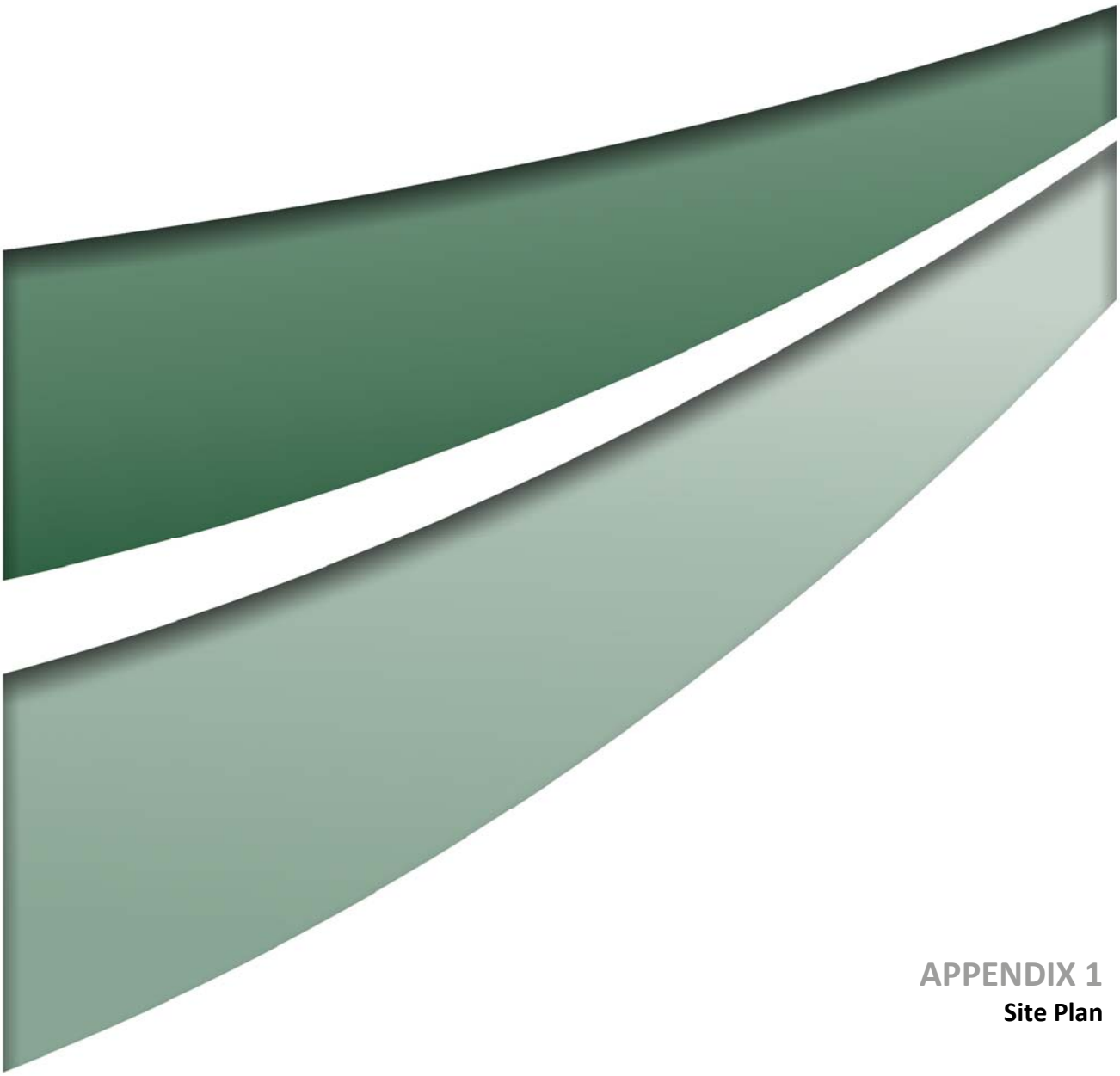
Based on the assessment presented in **Table 2**, no physical or visual impacts to any heritage items located within or in the vicinity of the project area have been identified. Overall, the potential heritage impacts of the proposed works are assessed as negligible at most.

The proposed works may therefore proceed without any requirements for further assessment or investigation with regards to built heritage.

We trust this information meets with your current requirements. Please do not hesitate to contact the undersigned on 1300 793 267 should you require clarification or further information.

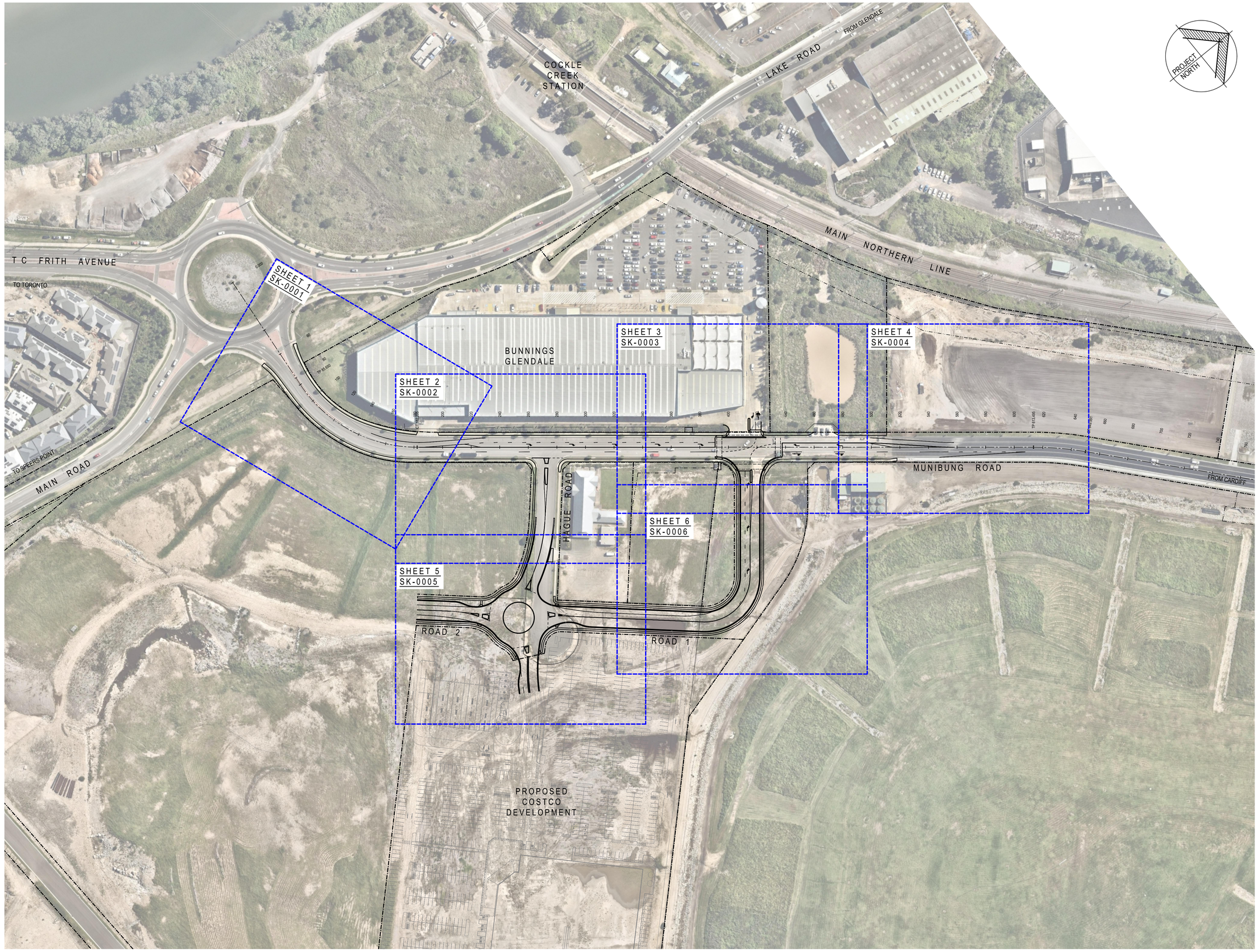
Yours sincerely

Karyn Virgin
Senior Heritage Consultant



APPENDIX 1

Site Plan



PROJECT NORTH

Lindsay Dynan

Sydney | Perth | Newcastle | Central Coast

PROJECT
MUNIBUNG ROAD INTERSECTION WORKS
COCKLE CREEK REDEVELOPMENT
BOOLAROO, NSW

CLIENT
HUNTER & CENTRAL COAST
DEVELOPMENT CORPORATION

THIS DRAWING CONTAINS COLOURED INFORMATION C M Y

LEGEND

- DRAWING SHEET LAYOUT (SCALE 1:250)
- EXISTING FENCE LINE
- BOUNDARY LINE
- EASEMENT LINE

0 25 50 75 100m
1:1250 (A1)

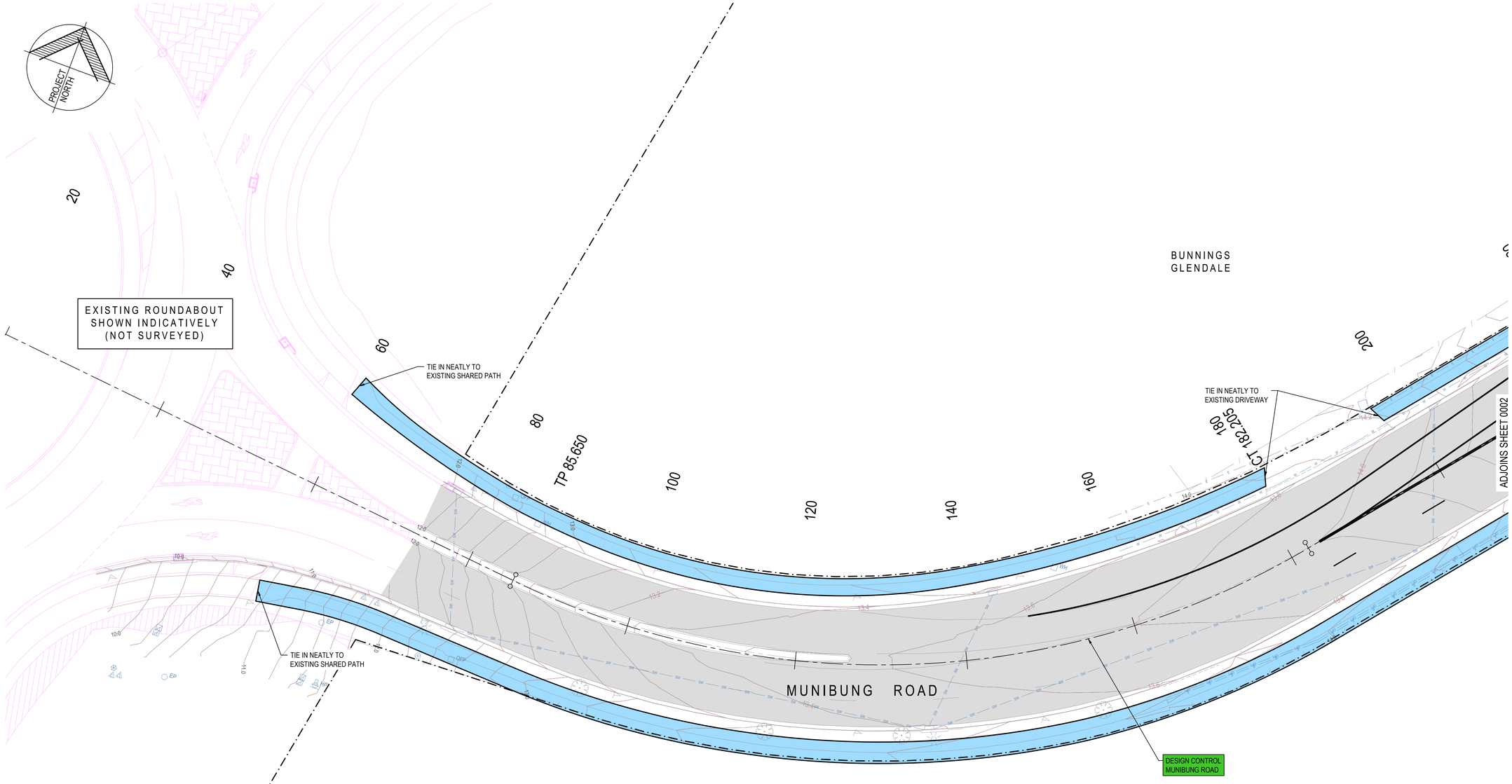
REV	DATE	DESCRIPTION	DRN	APP
C	28/09/20	ISSUED FOR INFORMATION	J.F.	B.R.
B	19/08/20	20% DETAIL DESIGN ISSUE	J.F.	B.R.
A	14/08/20	ISSUED FOR INFORMATION	J.F.	B.R.

TITLE
GENERAL ARRANGEMENT PLAN

GENERAL ARRANGEMENT PLAN
SCALE 1:1250

NOT FOR CONSTRUCTION

DOCUMENT STATUS			SHEET SIZE
DRAFT COPY			A1
DRAWN	DESIGNED	APPROVED	SCALE
J.Fraser	J.Fraser	B.Rodgers	1:1250
DOCUMENT No.			REVISION
16444-MU-SK-0000			C



CONCEPT PLAN

SCALE 1:250

Lindsay Dynan

Sydney | Perth | Newcastle | Central Coast

PROJECT

MUNIBUNG ROAD INTERSECTION WORKS
COCKLE CREEK REDEVELOPMENT
BOOLAROO, NSW

CLIENT

HUNTER & CENTRAL COAST DEVELOPMENT CORPORATION

THIS DRAWING CONTAINS COLOURED INFORMATION C M Y

LEGEND

- PROPOSED ROAD PAVEMENT
- PROPOSED DRIVEWAY PAVEMENT
- PROPOSED CONCRETE FOOTPATH
- EXISTING ROAD PAVEMENT TO REMAIN
- 16.0 — DESIGN MAJOR CONTOUR (0.5m INTERVALS)
- 16.4 — DESIGN MINOR CONTOUR (0.1m INTERVALS)
- 16.4 — EXISTING CONTOUR (0.2m INTERVALS)
- E — EXISTING ELECTRICAL LINE
- OPT — EXISTING OPTIC FIBRE LINE
- S — EXISTING SEWER LINE
- SW — EXISTING STORMWATER LINE
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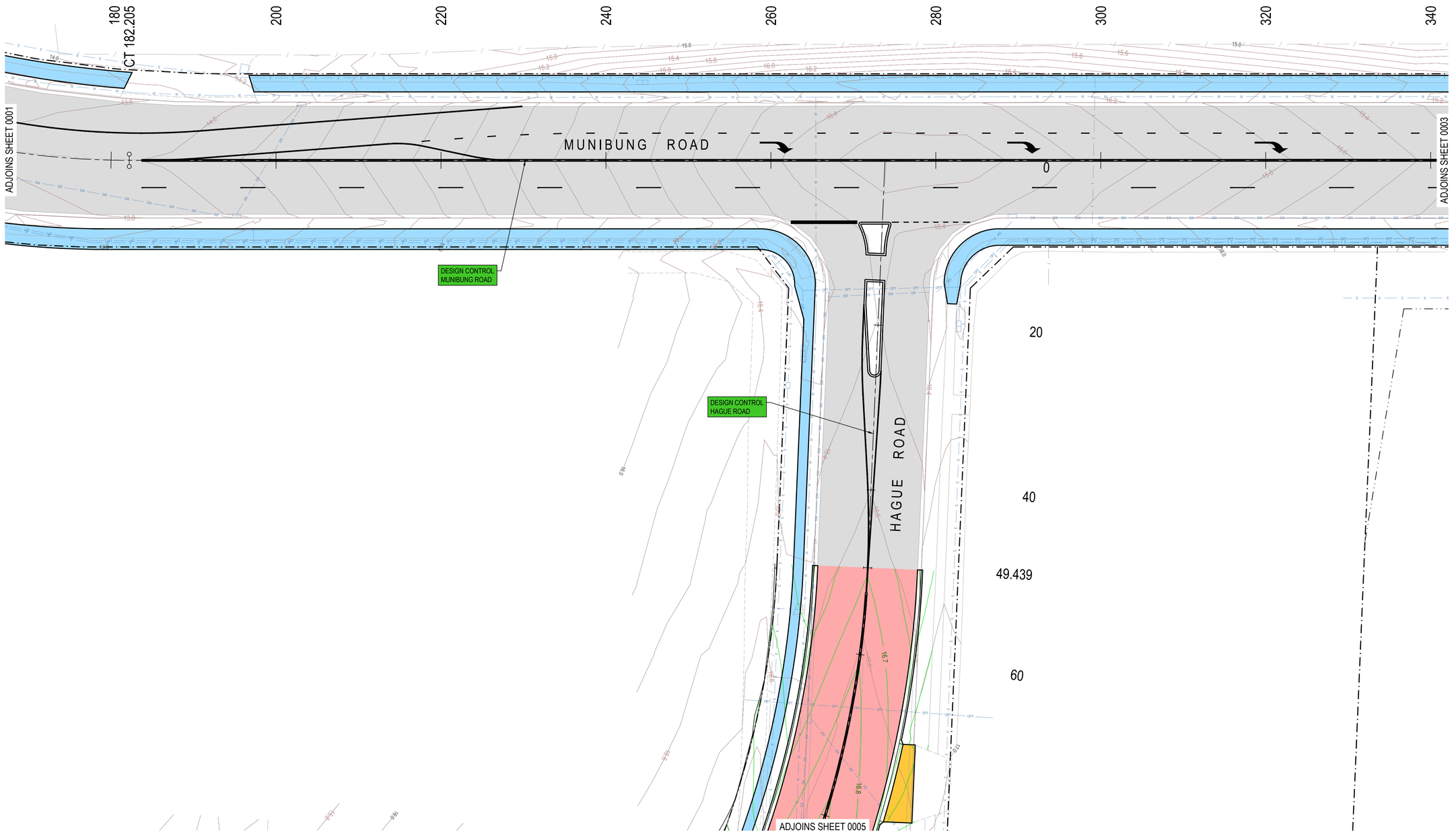

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Lindsay Dynan

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PROJECT
MUNIBUNG ROAD INTERSECTION WORKS
COCKLE CREEK REDEVELOPMENT
BOOLAROO, NSW

CLIENT
HUNTER & CENTRAL COAST
DEVELOPMENT CORPORATION

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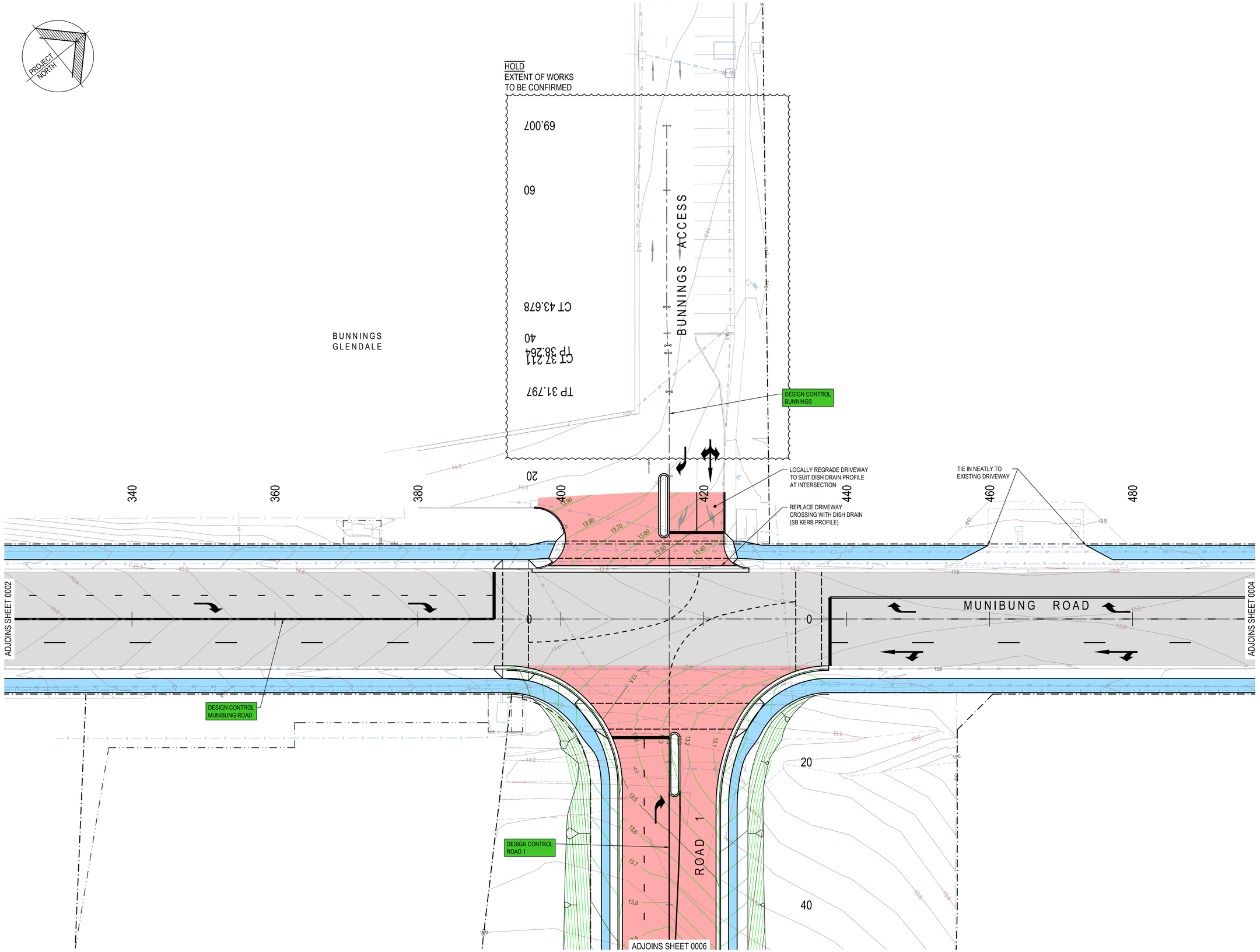

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PROJECT

MUNIBUNG ROAD INTERSECTION WORKS
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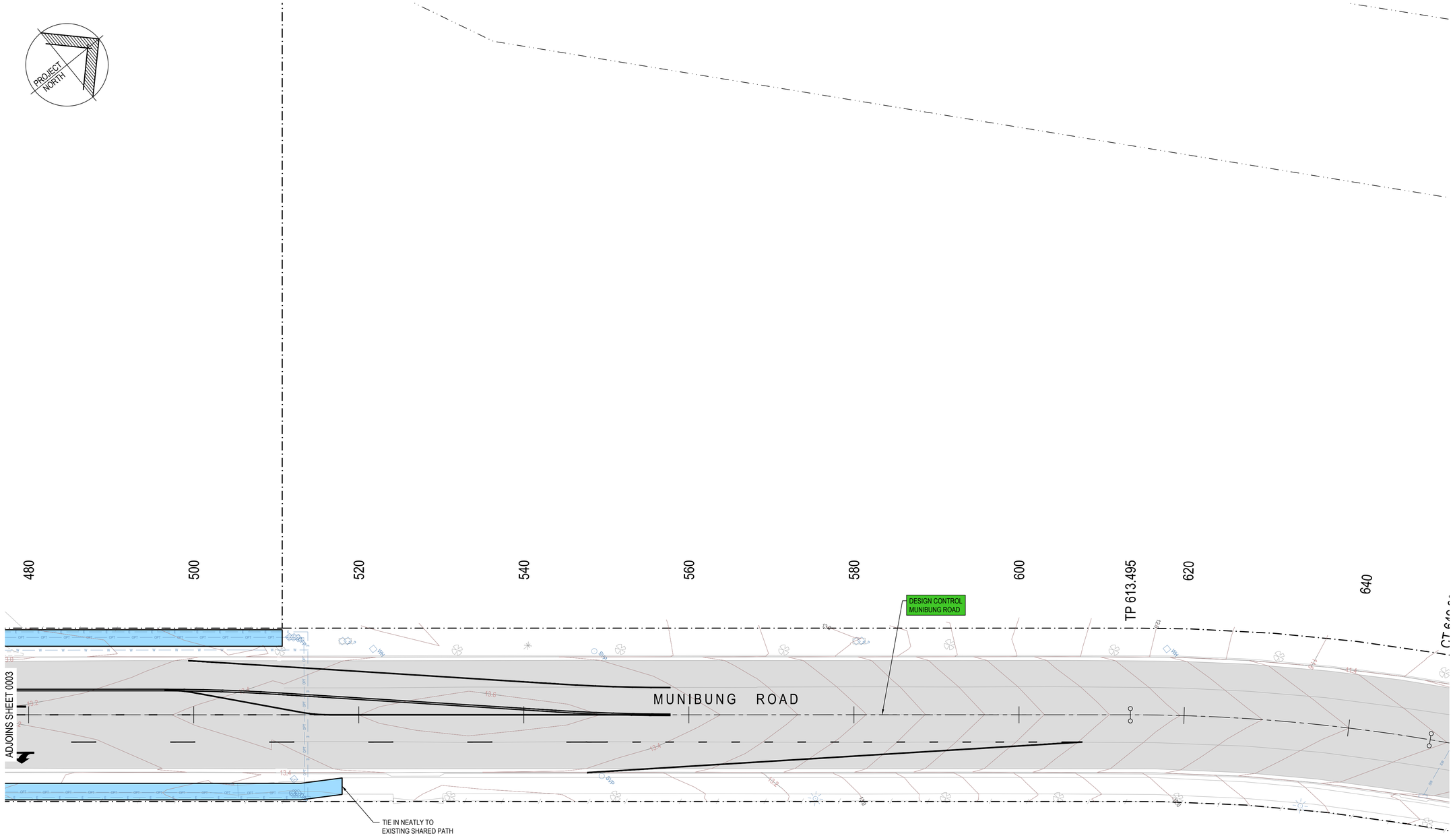

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PROJECT

MUNIBUNG ROAD INTERSECTION WORKS
COCKLE CREEK REDEVELOPMENT
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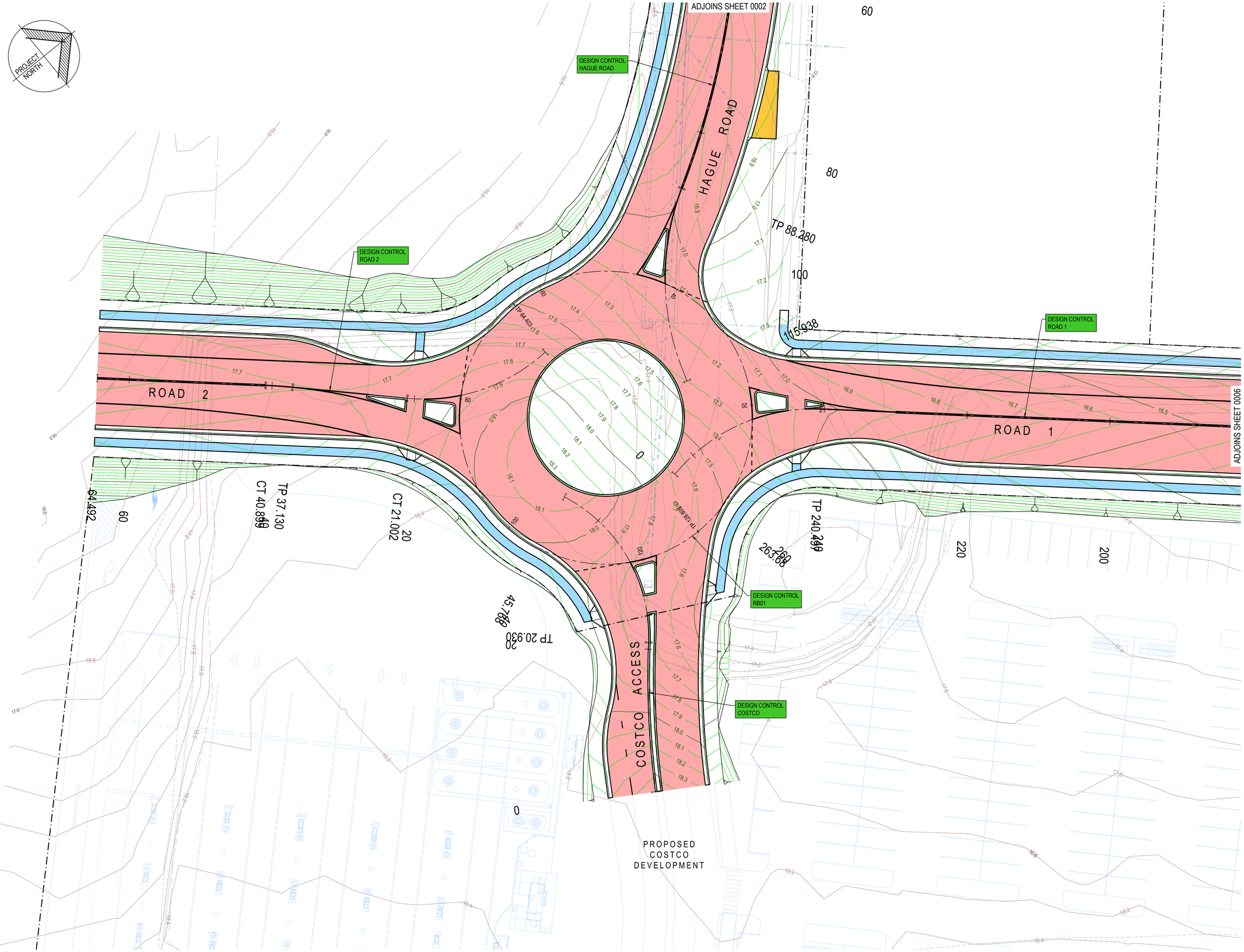

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PROJECT
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COCKLE CREEK REDEVELOPMENT
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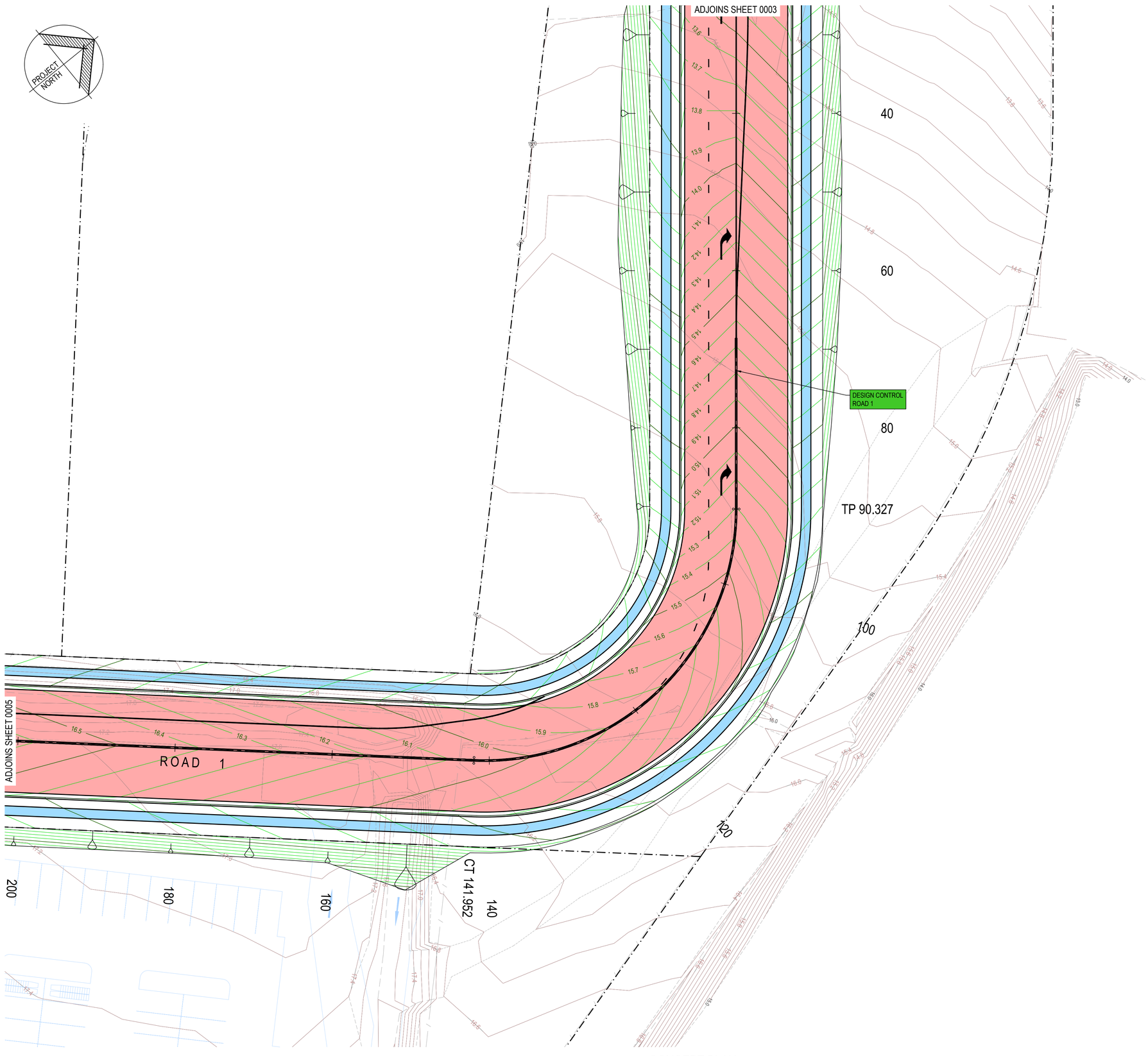

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PROJECT
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APPENDIX 5

ABORIGINAL ARCHAEOLOGICAL DUE DILIGENCE ASSESSMENT

October 2020

EPS

umwelt
Environmental & Social Consultants

Our Ref: 20119/R01/NR/KV/01102020

1 October 2020

Jacob Whiting
A/Development Manager
Hunter & Central Coast Development Corporation

E| Jacob.whiting@hccdc.nsw.gov.au

Dear Jacob

Re: Aboriginal Archaeological Due Diligence Assessment (Desktop): Proposed new intersection and access road of Munibung Road, Boolaroo, NSW

1.0 Background

This Aboriginal archaeological due diligence assessment has been prepared to assess the potential heritage impacts of a proposed new intersection and access road off Munibung Road in the suburb of Boolaroo, NSW (hereafter the project area, shown in **Plate 1.1**) (**Appendix 1**). In addition to these road construction works, ancillary works will be required in the vicinity of the new roads. The total footprint of proposed works is shown in **Plate 1.2**, overleaf.

The majority of the area shown in **Plate 2.1** was subject to a comprehensive Aboriginal Heritage Assessment in 2004 (Umwelt). This found that the majority of the site was highly disturbed due to the activities of the Pasminco Cockle Creek Smelter, and as such had no identified Aboriginal archaeological potential.

As noted above, this previous assessment was undertaken in 2004 and prior to legislative changes relevant to Aboriginal cultural heritage in NSW, which occurred in 2009 and 2010. As such, the current assessment has been undertaken to ensure that all current legislative requirements are met, and has been prepared in accordance with the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (the due diligence code - DECCW 2010a).

The current assessment is largely based on the 2004 assessment, with relevant information such as references to legislation and searches of the AHIMS database updated as required to meet current standards.

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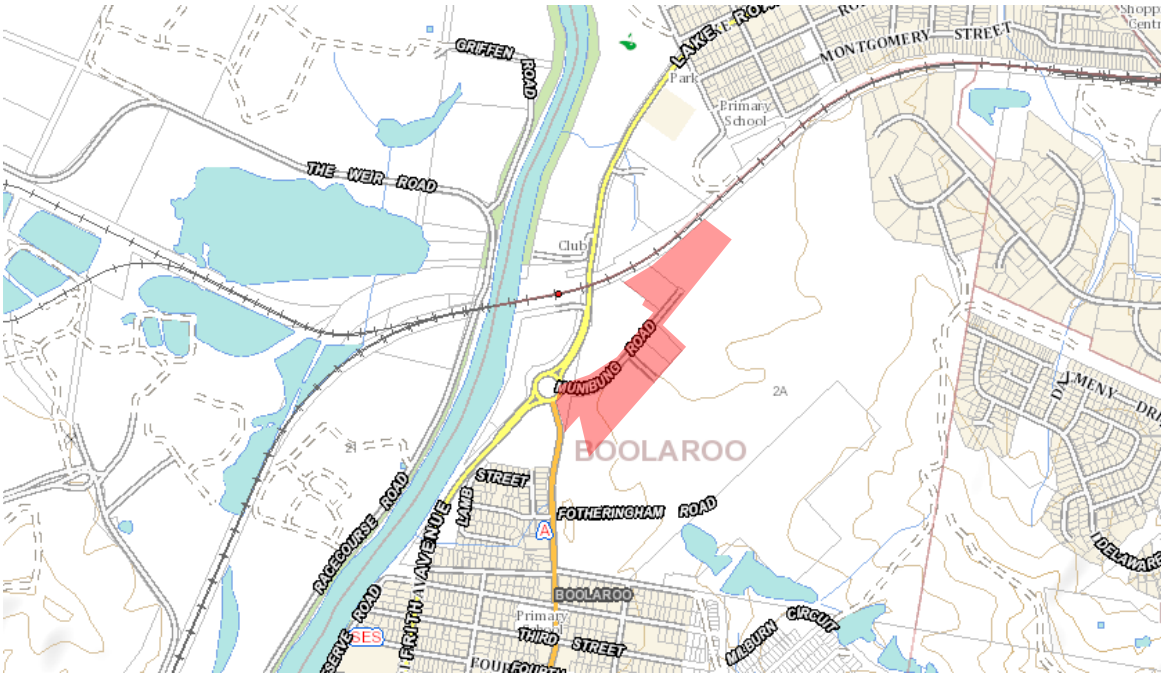

Plate 1.1 Location of the project area shown in red (approximate)

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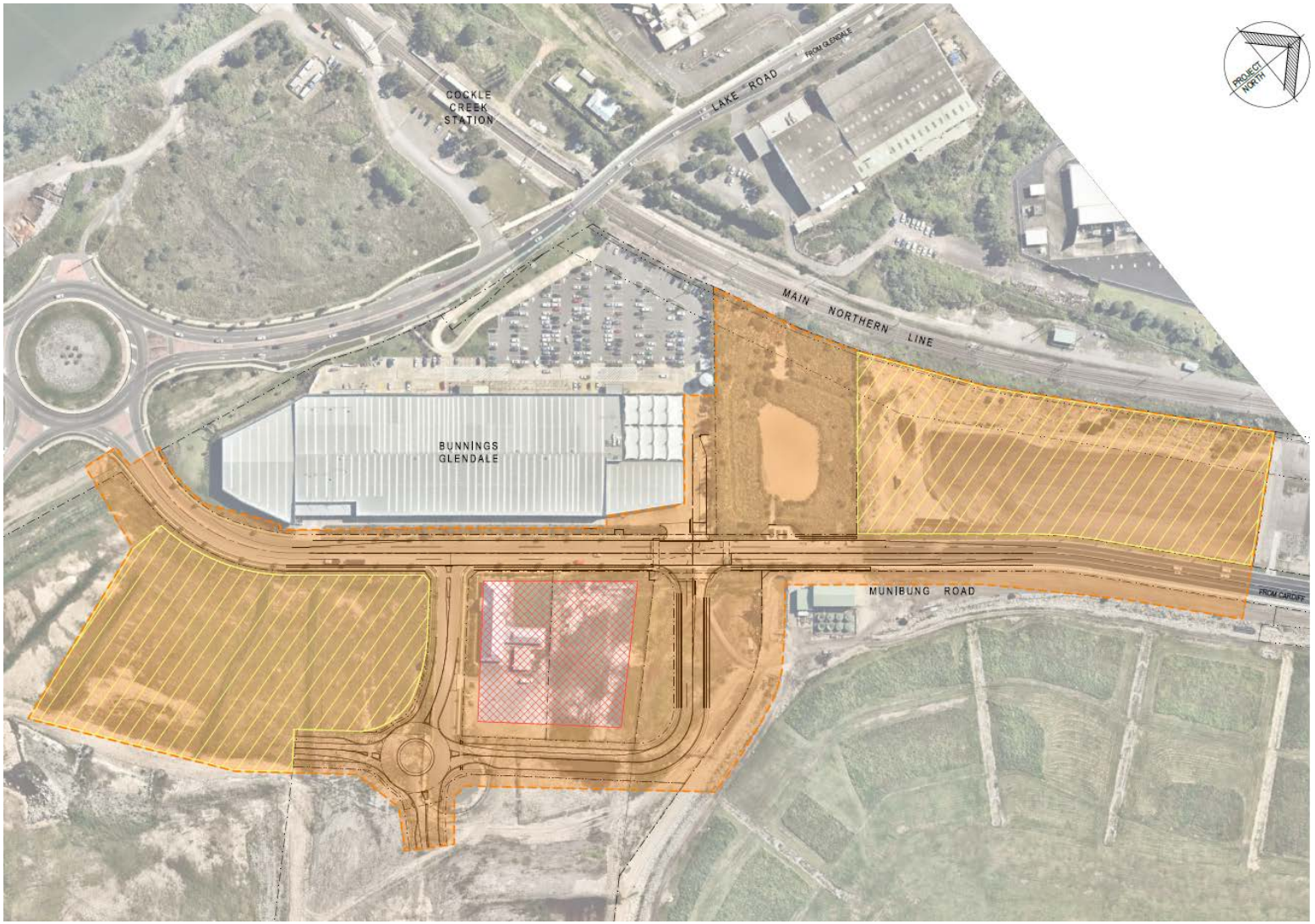


Plate 1.2 Extent of proposed works area directly impacted by proposal (orange)

Ancillary areas used for compounds and staging are shown as yellow hatching and excluded zones are shown in red hatching

2.0 Activity Description

Hunter Central Coast Development Corporation (HCCDC) proposes the construction and operation of road, sewer, water, stormwater, electrical infrastructure and associated infrastructure (the proposal) as specified and positioned in the indicative plans attached as Attachment B in the original consultation letter dated 13 August.

The proposal is primarily on land at 13A Main Road, Boolaroo NSW 2284, in the City of Lake Macquarie, commonly referred to as the Cockle Creek site (formerly Pasminco). The proposal would support the release and development of the lots within the site.

Key features of the proposal presented in the indicative plans attached as Attachment B include but are not limited to:

- A Bunnings/Costco and Munibung Rd signalised intersection, including adjustments to the existing Bunnings driveway
- A T intersection for Hague Rd and Munibung Rd
- Minor modifications and adjustment within existing Munibung Rd
- A realignment and widening of the existing Hague Rd
- A roundabout at southern end of Hague Rd including additional legs to support future development
- An internal road connection between the roundabout at southern end of Hague Rd and the Bunnings/Costco and Munibung Road signalised intersection, including entry points to development lots
- Modified and adjusted footpaths along Munibung Rd and new internal roadworks to accommodate pedestrians and/or cyclists
- Adjustments to parking lanes
- Clearing, demolition and civil earthworks
- Modifications to existing road pavements
- New road pavement works
- Installation of a Heritage Interpretation Sign, at the main entry point to the site from the roundabout on T.C. Frith Avenue and Main Road and Munibung Road
- Utility extensions and/or relocations along Munibung Road and the new roads to service development blocks (e.g. water, sewer, gas, electricity, telecommunication services, etc)
- New stormwater infrastructure to suit new and adjusted roadworks
- Ancillary works including kerb and guttering for the length of the new roads, signs, line marking, landscaping and environmental protection works
- Temporary ancillary facilities including site compounds and stockpile sites.
- Temporary diversion and traffic control as required

While the plans at **Appendix 1** provide a detailed view of the physical works proposed, **Plate 1.2** above shows the overall extent of the project area, including ancillary areas.

The project area in its entirety has been significantly disturbed through a range of factors including but not limited to:

- The construction and later removal (in 2003) of the former Pasminco lead and zinc smelter, including large-scale remediation works across the former smelter footprint which involved substantial earthworks
- The construction of Bunnings
- The construction of Munibung Road and Main Road
- The installation of associated infrastructure and services.

Plate 2.1 2015 aerial showing extensive disturbance across the project area

3.0 Legislative and Regulatory Context

The Department of Premier and Cabinet is primarily responsible for regulating the management of Aboriginal cultural heritage in New South Wales under the *National Parks and Wildlife Act 1974* (NPW Act). Supporting the NPW Act is the National Parks and Wildlife Regulation 2019 (the Regulation) and other codes of practice and guidelines including the due diligence code.

The NPW Act defines an Aboriginal object as:

any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales

In accordance with Section 86(1) of the NPW Act, it is an offence to harm or desecrate a known Aboriginal object, whilst it is also an offence to harm an Aboriginal object under Section 86(2). Harm is defined as any act or omission that:

a) destroys, defaces or damages an object or place, or

b) in relation to an object – moves the object from the land on which it had been situated, or

c) is specified by the regulations, or

d) causes or permits the object or place to be harmed in a manner referred to in paragraph (a), (b) or (c),

but does not include any act or omission that:

e) desecrates the object or place (noting that desecration constitutes an offence separate to harm), or

f) is trivial or negligible, or

g) is excluded from this definition by the regulations.

Section 87(2,4) establishes that it is a defence to prosecution under Section 86(2) (the strict liability offence) if due diligence was exercised to reasonably determine that the activity or omission would not result in harm to an Aboriginal object or if the activity or omission constituting the offence is a low impact act or omission (in accordance with Section 80B of the Regulation). The Regulation identifies that compliance with the due diligence code is taken to constitute due diligence in determining whether a proposed activity will harm an Aboriginal object.

4.0 Consultation with Aboriginal Parties

Consultation with relevant Aboriginal parties is a key component in identifying and assessing the significance of Aboriginal objects and/or places as well as determining and carrying out appropriate strategies to mitigate impacts to Aboriginal heritage. The project area is situated within the boundary of the Biraban Local Aboriginal Land Council (LALC), and does not fall within the boundaries of any current registered Native Title claim areas.

Consultation with Aboriginal parties is not a requirement of the due diligence code and was not undertaken for the current assessment. Consultation was, however, undertaken with representatives of the Koompahtoo LALC as part of the 2004 assessment. The Koompahtoo LALC has since been replaced by the Biraban LALC for this area.

5.0 Summary of the Findings of the 2004 Aboriginal Heritage Assessment (Umwelt)

The 2004 assessment was prepared as part of a constraints and opportunities analysis for potential land uses on the former Pasminco Cockle Creek Smelter site, and encompassed the Smelter site in its entirety, including the current project area. The assessment considered the environmental context of the area, the historical and ethnographic context of the area, previously registered Aboriginal sites or objects in and within proximity of the Smelter site, and the findings of previous archaeological assessments undertaken in the area. A field survey of the Smelter site was undertaken, and representatives of the relevant LALC were consulted.

The 2004 assessment found that:

- The Smelter site was located in between Cockle Creek and Munibung Hill, both of which were important landscape features to Aboriginal people in the past for both spiritual and practical reasons
- The environmental context (including the nearby presence of Cockle Creek and Lake Macquarie) would have provided adequate subsistence resources in the past
- The current project area in its entirety, along with the majority of the Smelter site, was confirmed to be highly disturbed, and was not assessed to have any Aboriginal archaeological potential. The area assessed as such is shown in **Plate 5.1**, overleaf.

No further investigation or assessment was recommended for the majority of the Smelter site, including the current project area.

6.0 AHIMS Search

A search of the Office of Environment and Heritage (OEH) Aboriginal Heritage Information Management System (AHIMS) register for the area contained within Lat, Long from: -32.94496, 151.629231 – Lat, Long to: -32.942065, 151.629123 (the project area and immediate surrounds) with a buffer of 200 metres on 7 July 2020 identified no registered Aboriginal sites within the search area.

The registered site visible on **Plate 5.1**, 38-4-0453, is located approximately 2 kilometres to the south-east of the project area. This site is recorded as a mythological place – stone arrangement, consisting of a stone circle 2-3 metres in diameter. It is considered a highly significant site to the Booragul area.

There are, however, no registered Aboriginal sites located within or in close proximity to the current project area. The complete AHIMS database search is included in **Appendix 2**.

7.0 Assessment of Aboriginal Archaeological Potential

Given the close proximity of multiple perennial water sources, with Cockle Creek being 400 metres to the west and Lake Macquarie being 2.4 kilometres south, it is clear that the project area is located in a broader landscape that would have been richly resourced. This would have made the area an attractive location for Aboriginal people, particularly for the purpose of resource gathering.

However, based on the extent of severe disturbance within and around the project area and the results of a previous Aboriginal archaeological assessment of the project area in its entirety (Umwelt 2004), the project area is assessed to have no Aboriginal archaeological potential.

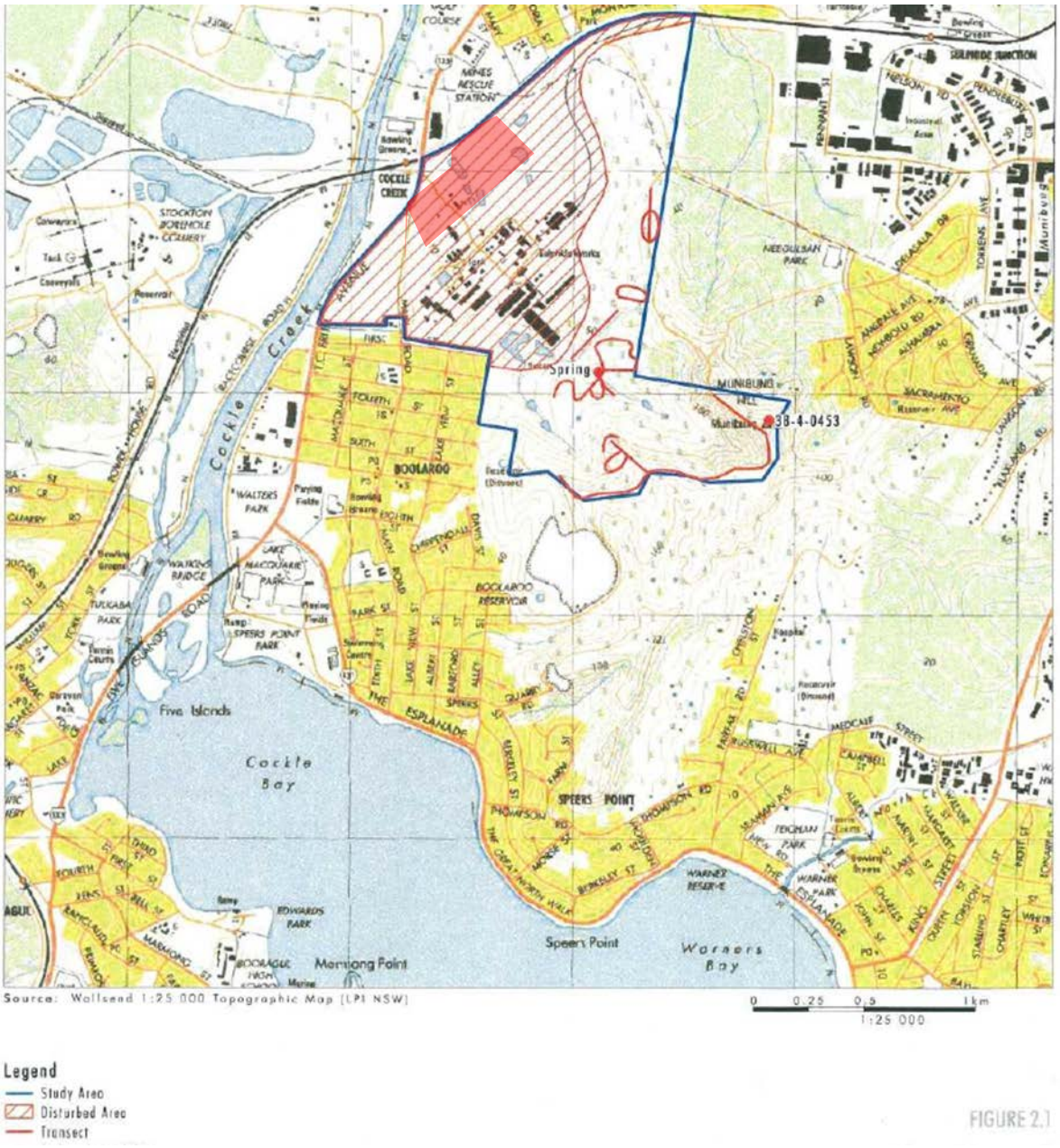


Plate 5.1 Identified 'disturbed' area with no Aboriginal archaeological potential (shown hatched). Area highlighted in red indicates approximate location of project area.

8.0 Due Diligence Inspection

An inspection has not been undertaken for the purposes of this due diligence assessment. This is because:

- A comprehensive field survey was undertaken as part of the 2004 assessment. This survey did not identify any Aboriginal objects or sites, and confirmed the entirety of the current project area (as well as the wider Smelter site) to be severely disturbed.
- Current aerial imagery of the project area (**Plate 2.1**) clearly shows it to be extensively disturbed, with the completion of bulk earthworks identifiable across the entire project area.

- There is no information in the environmental, archaeological (AHIMS), or historical research to suggest that the project area has the potential to contain Aboriginal archaeological material, particularly due to disturbance.

9.0 Consideration of Proposed Work Against the Due Diligence Code

Section 8 of the due diligence code outlines the process to guide due diligence assessments, summarised below in relation to the proposed works.

1. Will the activity disturb the ground surface or any culturally modified trees?

Yes it will. As outlined in **Section 2.0** the proposed works will involve ground disturbance across the project area to facilitate the construction of road works and the installation of associated services.

However, and as discussed, the works will occur in extensively disturbed and a highly modified landscape. As all vegetation has been cleared from the project area, the proposed works will not disturb any culturally modified trees.

2. Are there any:

a) Relevant confirmed site records or other associated landscape feature information on AHIMS?

As discussed in **Section 6.0**, no sites have been previously recorded within or in proximity to the project area.

The project area is located in proximity to known resource areas including Cockle Creek and Lake Macquarie. Munibung Hill, located outside of the project area approximately two kilometres to the southeast, is also known to be a significant landscape feature to Aboriginal people for both spiritual and practical reasons.

However, the extent to which the project area has been disturbed means that it has no potential to contain any Aboriginal archaeological material that may have been deposited by Aboriginal people who may have frequented these resource areas/landscape features in the past.

b) Any other sources of information of which a person is already aware?

The 2004 assessment confirmed that the project area and surrounding landscape, as formed by the former Smelter site, comprises a highly modified landscape that has been subject to extensive disturbance. The findings of the 2004 assessment are supported by the updated AHIMS search as well as a review of current aerial imagery (**Plate 2.1**).

c) Landscape features that are likely to indicate the presence of Aboriginal objects?

The broader landscape of which the project area forms part is likely to have been utilised by Aboriginal people accessing the resources of Lake Macquarie and other nearby resource procurement areas in the past.

However, and as stated above, the extent to which the project area has been disturbed means that it has no potential to contain any Aboriginal archaeological material that may have been deposited by Aboriginal people who may have utilised this landscape in the past.

3. Desktop Assessment and Visual Inspection:

Based on the results of the desktop assessment, which clearly establishes that the project area does not have any identified Aboriginal archaeological potential, a visual inspection of the project area was determined to be unwarranted. As such, a visual inspection has not been undertaken for the purposes of this due diligence assessment.

On the basis of the assessed archaeological potential of the project area, it is assessed that there is a very low to nil likelihood that the proposed works will result in harm to Aboriginal objects. In accordance with the provisions of the due diligence code there is consequently no requirement for further archaeological assessment.

The current due diligence assessment has confirmed the findings of the 2004 assessment undertaken by Umwelt.

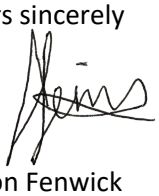
10.0 Management Recommendations

The following recommendations are made with reference to the requirements of the NPW Act, the NPW Regulation and the due diligence code. It is noted that these recommendations are provided from an archaeological perspective only and have not been made with reference to Aboriginal cultural values associated with the project area.

- The proposed works may proceed without any further Aboriginal archaeological investigation provided that the impacts and extent of the proposed works are consistent with those discussed in this report. Works should, however, proceed with caution.
- All persons working on site that are involved in ground disturbing works should be made aware that it is an offence under Section 86 of the NPW Act to harm or desecrate an Aboriginal object unless that harm or desecration is the subject of an approved Aboriginal Heritage Impact Permit (AHIP).
- In the unlikely event that an Aboriginal object is identified whilst carrying out works within the project area, all activities in the immediate vicinity of the identified Aboriginal object should cease and a suitably qualified archaeologist should be contacted to confirm the validity of the object. Should the object be confirmed to be of Aboriginal cultural origin, the landholder/contractor must notify DPIE and may need to apply for an AHIP prior to the recommencement of further ground disturbance works in proximity to that object.

We trust this information meets with your current requirements. Please do not hesitate to contact me on (02) 4950 5322.

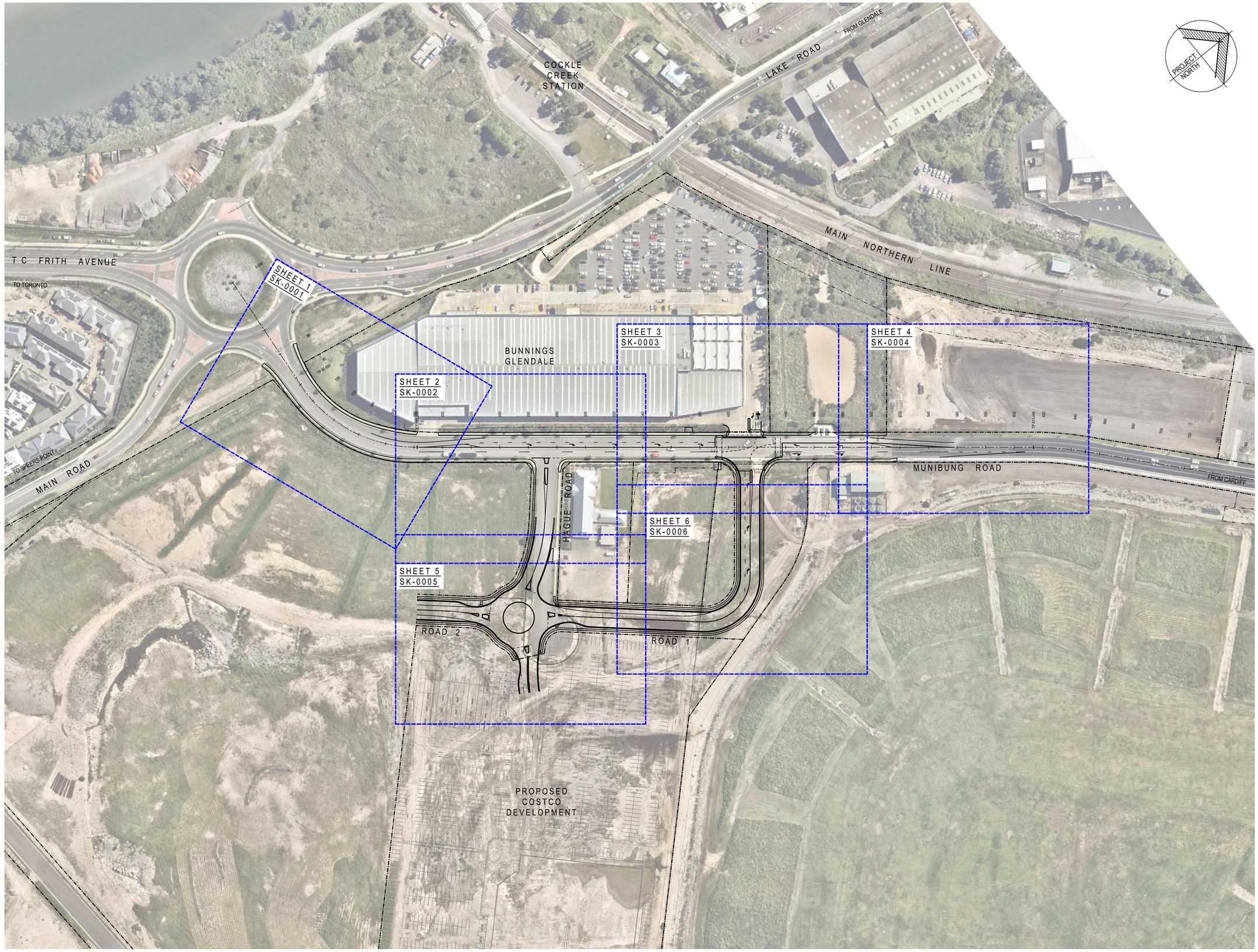
Yours sincerely



Alison Fenwick
Archaeologist

APPENDIX 1

Site Plan



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PROJECT
MUNIBUNG ROAD INTERSECTION WORKS
COCKLE CREEK REDEVELOPMENT
BOOLAROO, NSW

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GENERAL ARRANGEMENT PLAN
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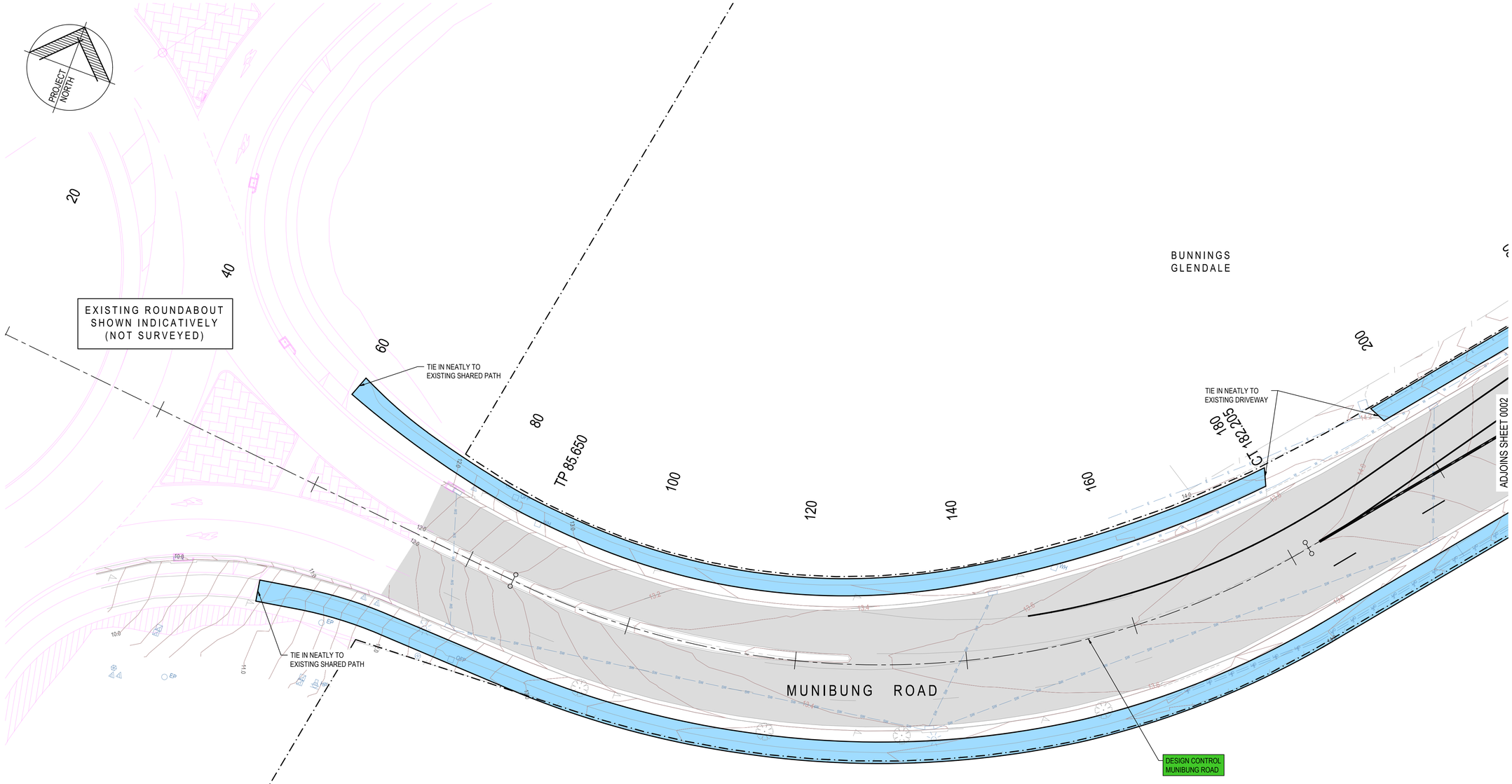

CONCEPT PLAN

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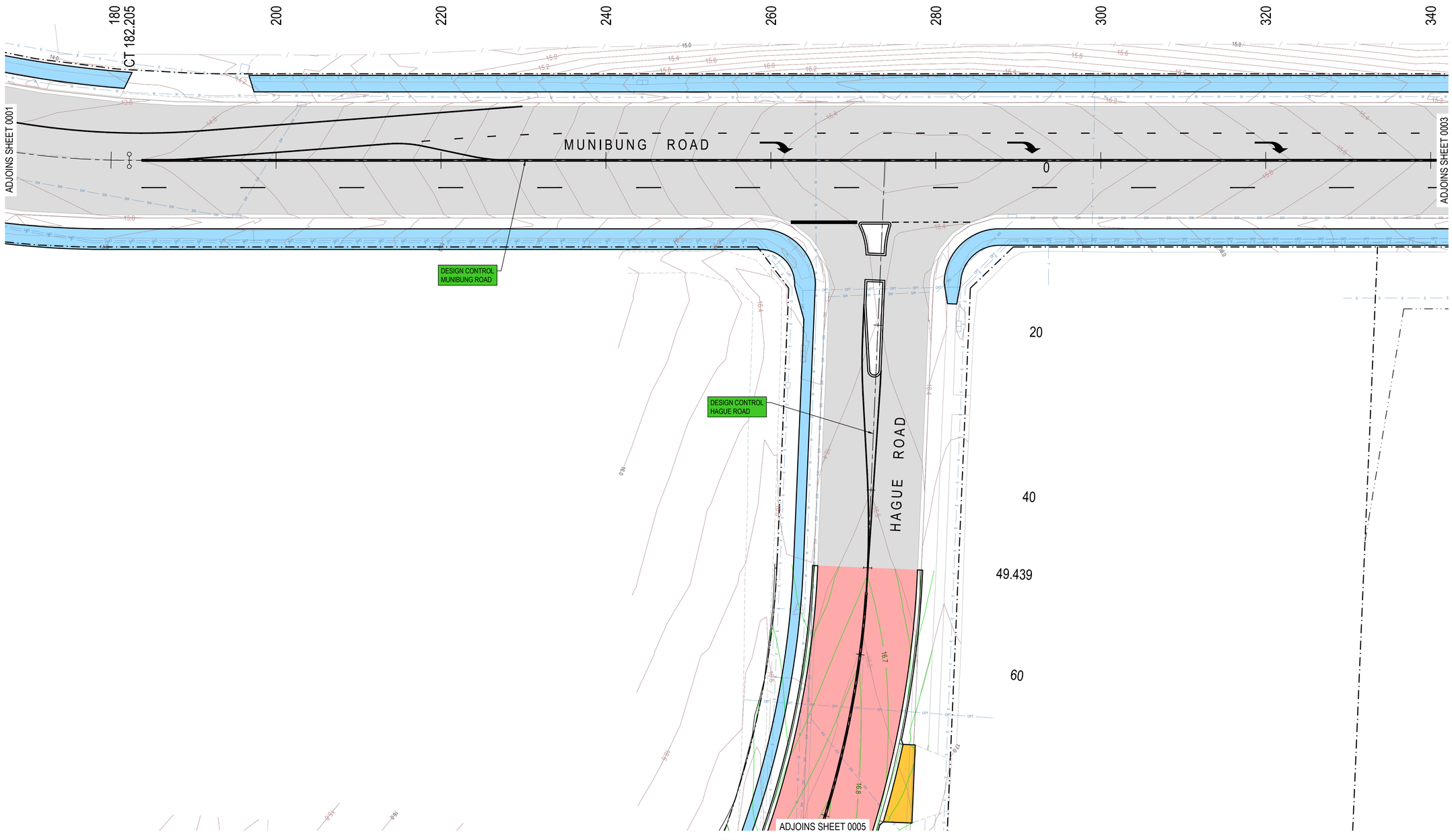
BUNNINGS
GLENDALE



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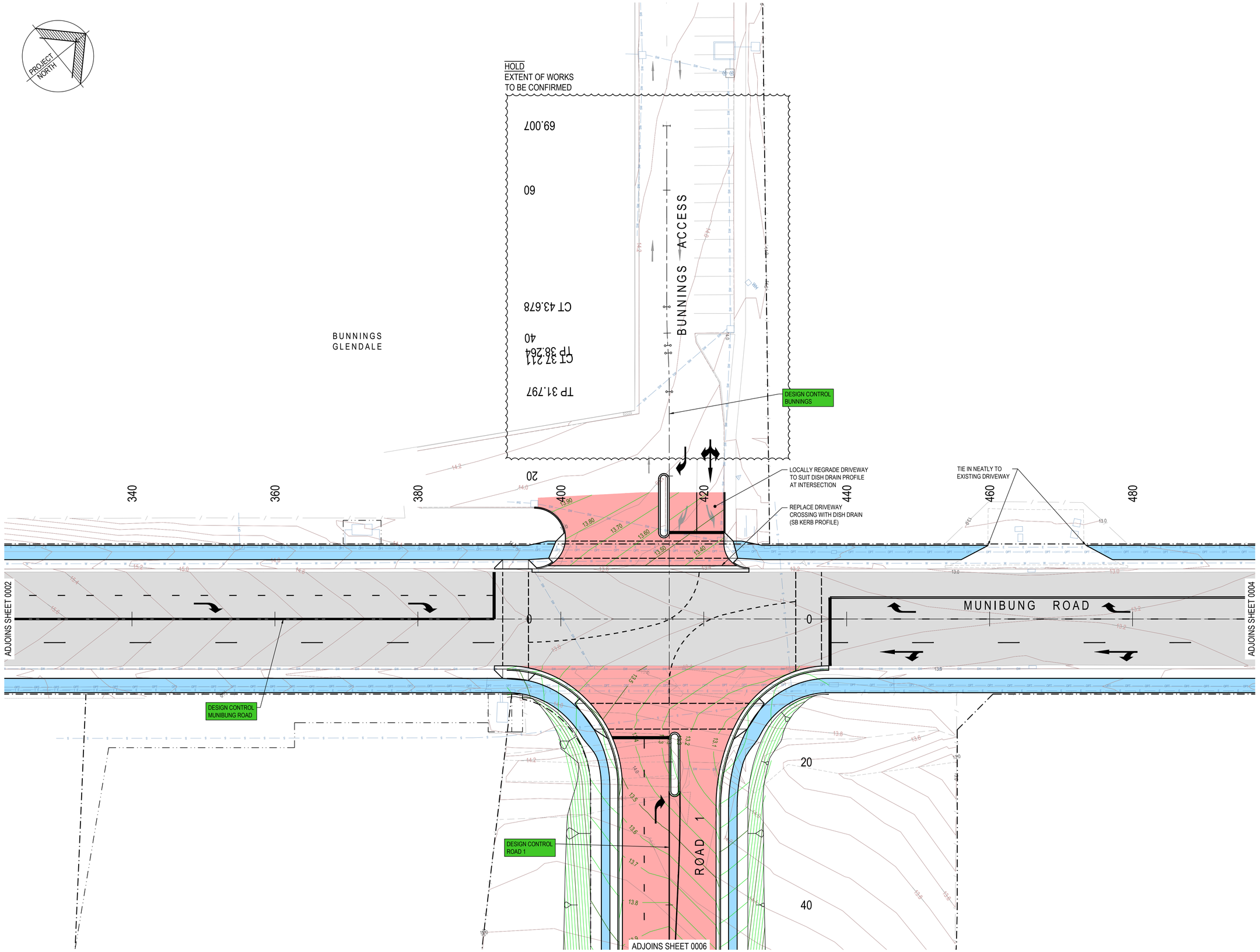

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COCKLE CREEK REDEVELOPMENT
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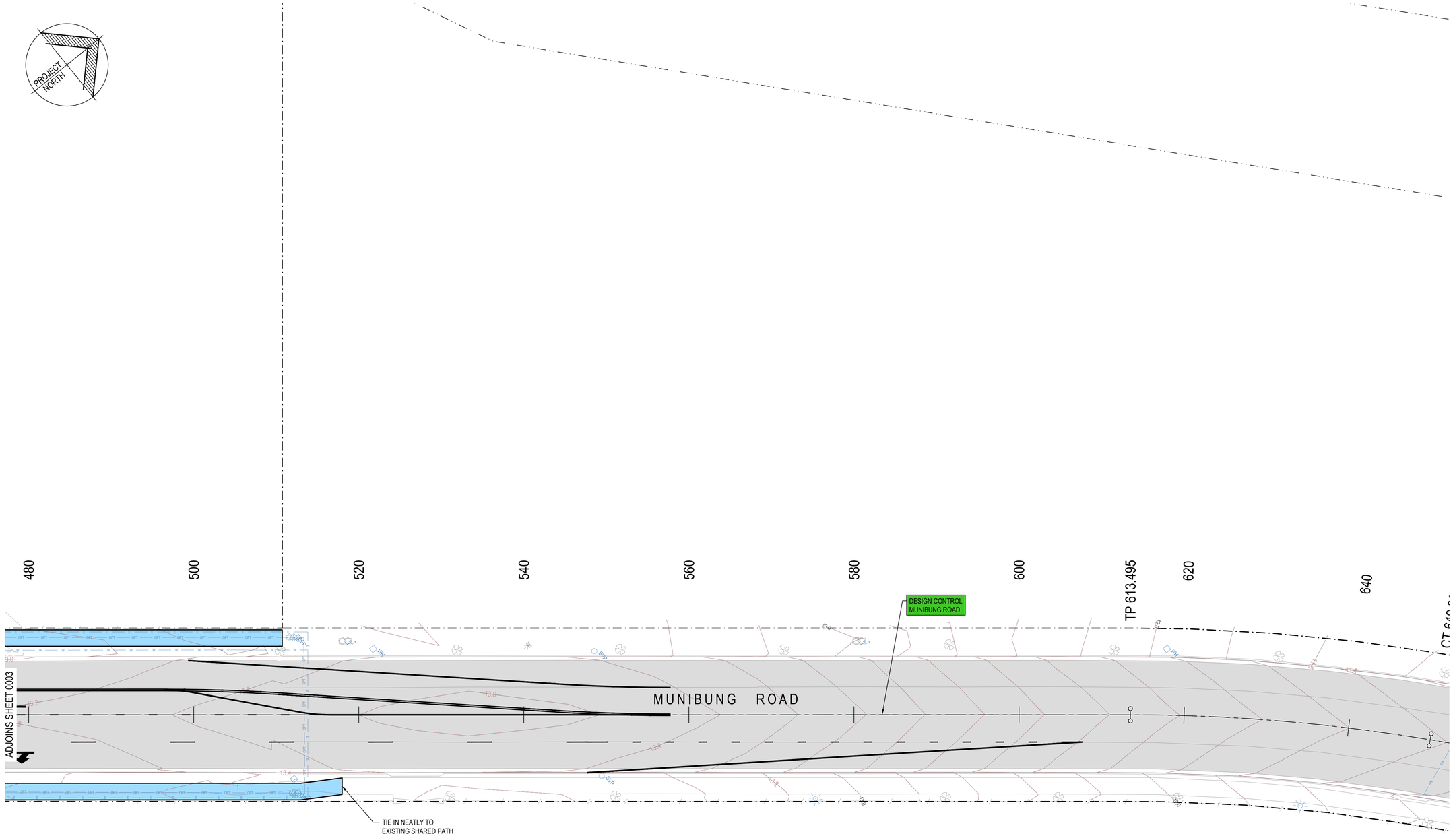

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CONCEPT PLAN
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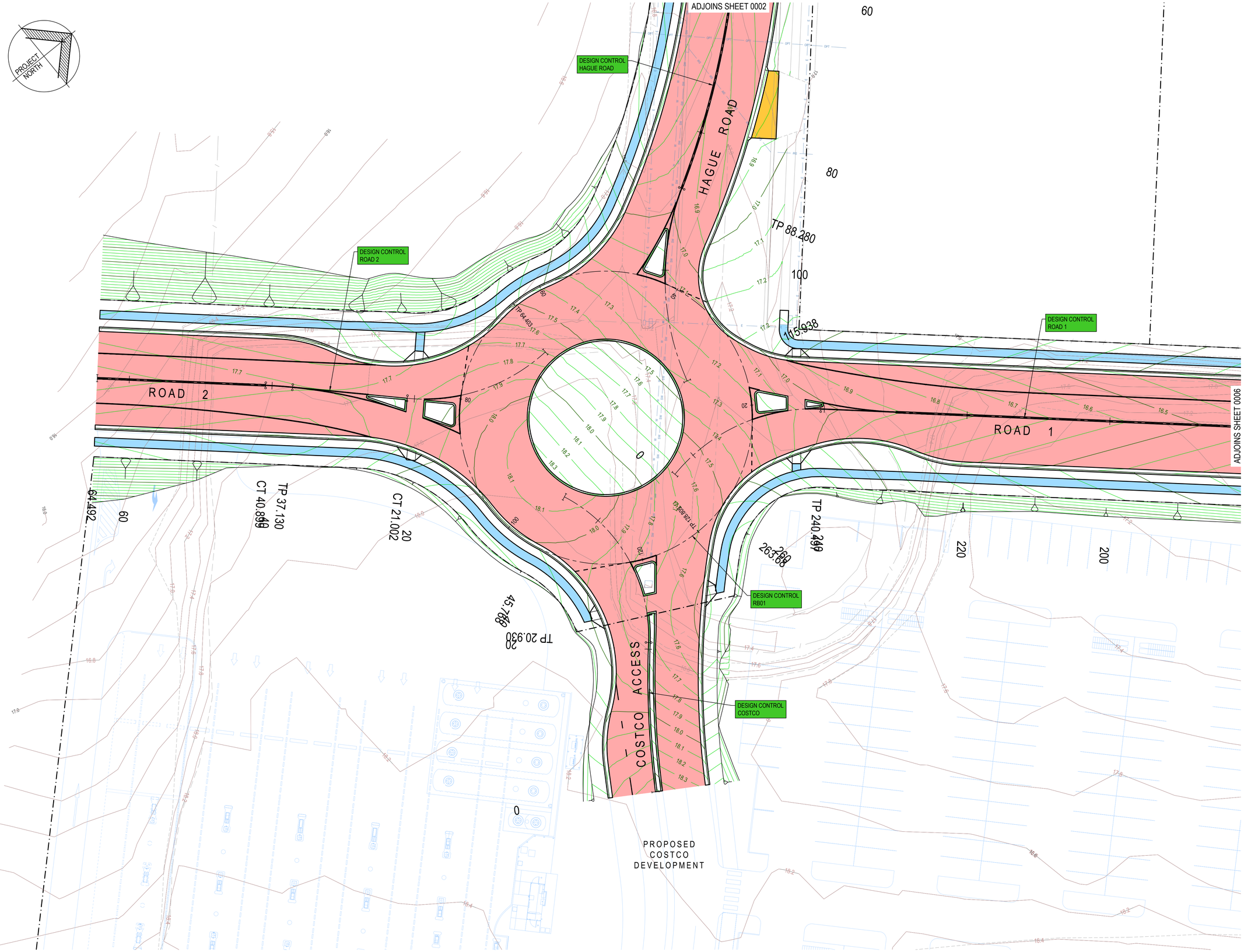

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MUNIBUNG ROAD INTERSECTION WORKS
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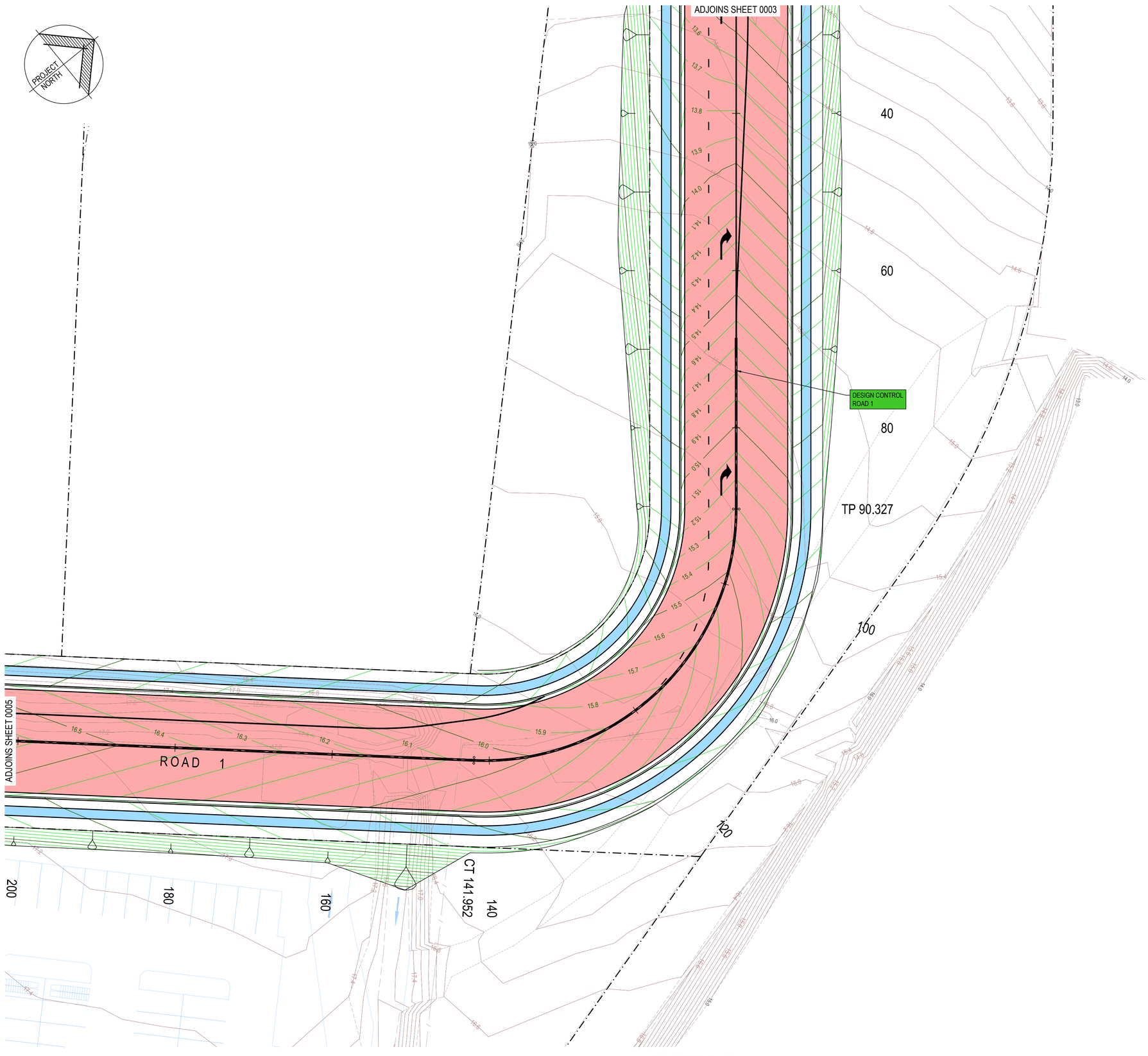

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MUNIBUNG ROAD INTERSECTION WORKS
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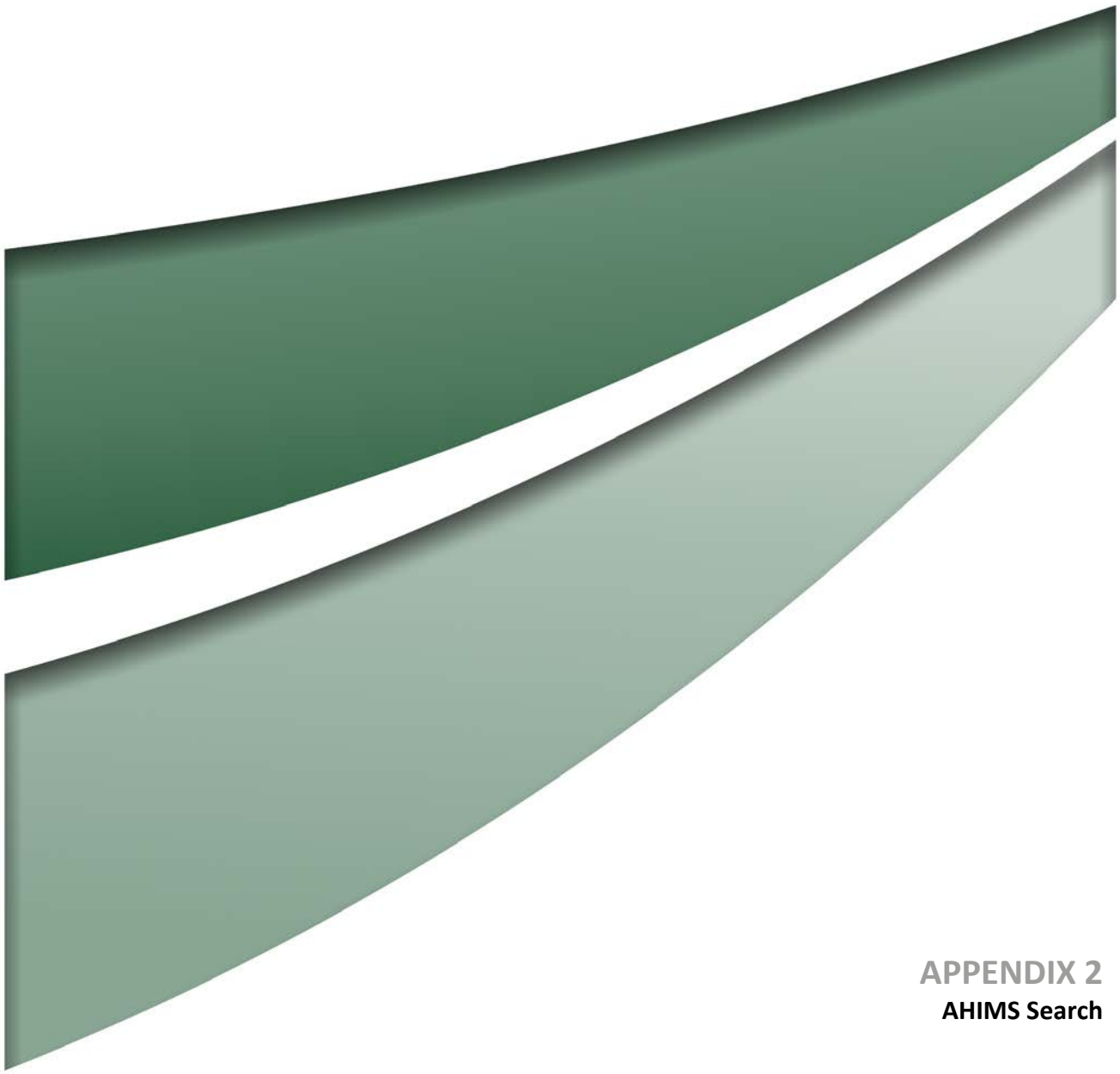


APPENDIX 2

AHIMS Search

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : minu

Client Service ID : 518490

Umwelt (Australia) Pty Limited - Individual users

75 York Street
Teralba New South Wales 2284

Attention: Karyn Virgin

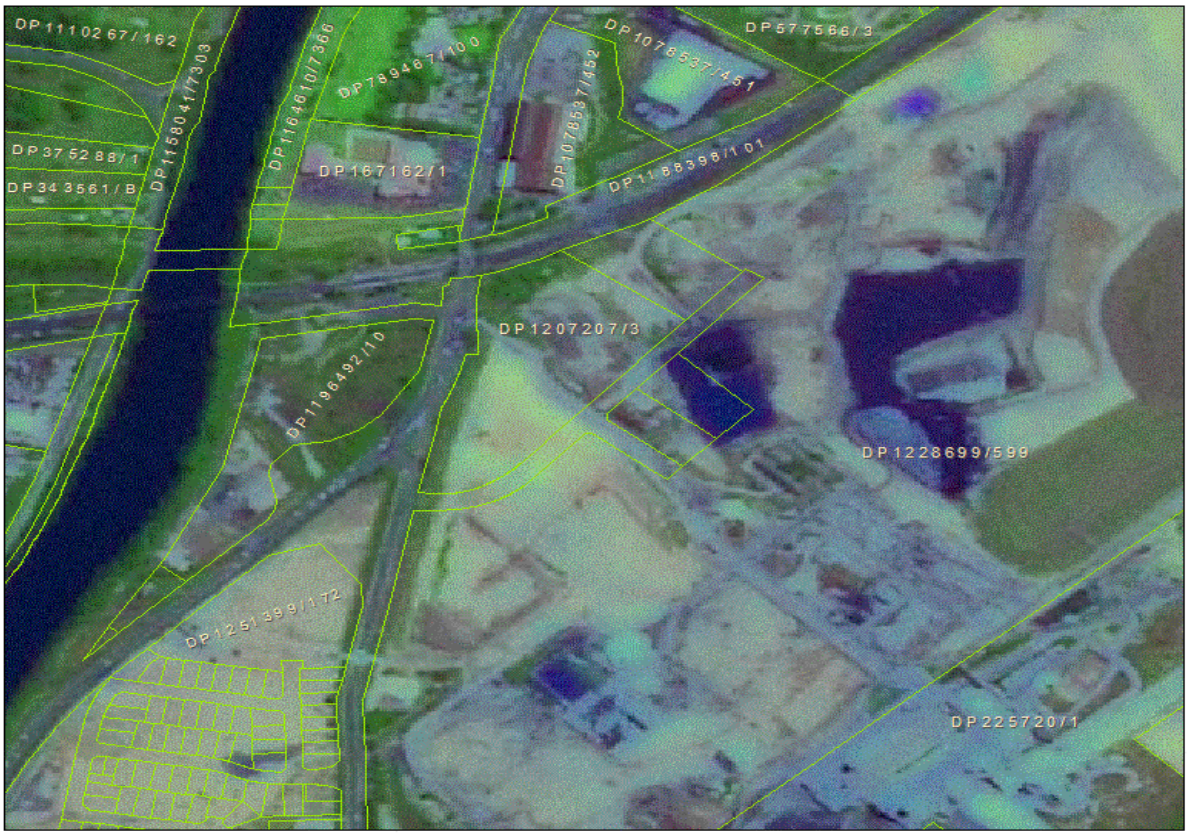
Email: kvirgin@umwelt.com.au

Date: 07 July 2020

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -32.947, 151.6228 - Lat, Long To : -32.9416, 151.6287 with a Buffer of 200 meters, conducted by Karyn Virgin on 07 July 2020.

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



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

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

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

3 Marist Place, Parramatta NSW 2150
Locked Bag 5020 Parramatta NSW 2220
Tel: (02) 9585 6380 Fax: (02) 9873 8599

ABN 30 841 387 271
Email: ahims@environment.nsw.gov.au
Web: www.environment.nsw.gov.au

APPENDIX 6

TRAFFIC AND TRANSPORT IMPACT ASSESSMENT

October 2020

EPS

SMEC
Member of the Surbana Jurong Group

local people
global experience

Traffic and Transport Impact Assessment

Cockle Creek Intersections and Roadworks

Prepared for Hunter and Central Coast Development Corporation
7 October 2020

SMEC INTERNAL REF. 30012752

Document Control

Document:	Traffic and Transport Impact Assessment
File Location:	\\AUNCFSV002\Group\Projects\30012752 - Boolaroo TIA\020 Scope\024 Variations\Var 03
Project Name:	Cockle Creek Intersections and Roadworks
Project Number:	30012752
Revision Number:	03

Revision History

Revision No.	Date	Prepared by	Reviewed by	Approved for Issue by
Draft 01	14 August 2020	Maryam Yadak	Andrew Brown	Christophe Steinbach
Draft 02	2 October 2020	Jack Sandell		Christophe Steinbach
Rev 03	7 October 2020	Jack Sandell		Christophe Steinbach

Issue Register

Distribution List	Date Issued	Number of Copies
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SMEC Company Details

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Email:	christophe.steinbach@smec.com	Website:	www.smec.com

Important Notice

This report is confidential and is provided solely for the purposes of preparing a traffic impact assessment to support the Review of Environmental Factors (REF) for proposed construction works relating to roadworks for the proposed Cockle Creek site, Boolaroo, NSW. This report is provided pursuant to a Consultancy Agreement between SMEC Australia Pty Limited ("SMEC") and Hunter and Central Coast Development Corporation, under which SMEC undertook to perform a specific and limited task for Hunter and Central Coast Development Corporation. This report is strictly limited to the matters stated in it and subject to the various assumptions, qualifications and limitations in it and does not apply by implication to other matters. SMEC makes no representation that the scope, assumptions, qualifications and exclusions set out in this report will be suitable or sufficient for other purposes nor that the content of the report covers all matters which you may regard as material for your purposes.

This report must be read as a whole. Any subsequent report must be read in conjunction with this report.

The report supersedes all previous draft or interim reports, whether written or presented orally, before the date of this report. This report has not and will not be updated for events or transactions occurring after the date of the report or any other matters which might have a material effect on its contents or which come to light after the date of the report. SMEC is not obliged to inform you of any such event, transaction or matter nor to update the report for anything that occurs, or of which SMEC becomes aware, after the date of this report.

Unless expressly agreed otherwise in writing, SMEC does not accept a duty of care or any other legal responsibility whatsoever in relation to this report, or any related enquiries, advice or other work, nor does SMEC make any representation in connection with this report, to any person other than Hunter and Central Coast Development Corporation. Any other person who receives a draft or a copy of this report (or any part of it) or discusses it (or any part of it) or any related matter with SMEC, does so on the basis that he or she acknowledges and accepts that he or she may not rely on this report nor on any related information or advice given by SMEC for any purpose whatsoever.

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1 Introduction

1.1 Background

SMEC was engaged by the Hunter and Central Coast Development Corporation (HCCDC) to undertake a Traffic Impact Assessment (TIA) to support the Review of Environmental Factors (REF) for proposed roadworks required to facilitate access to the proposed Cockle Creek site at Boolaroo, NSW.

SMEC recently carried out a separate TIA to support the rezoning proposal for the Cockle Creek site. The site is now zoned B7 Business Park and B4 Mixed Use.

The rezoning TIA provides a high-level overview of the road network and the impact of the rezoning on the surrounding road network in the future year (2032). This TIA provides assessment of existing transport conditions, as well as construction and operational impacts associated with proposed road infrastructure and associated works required to facilitate access to the site.

1.2 Scope of Report

The scope of this report is to consider proposed works associated with providing access to the proposed site (which is currently undeveloped), including works at three intersections along Munibung Road, and to assess the impacts of these works (both during construction and operation) on the road network with regard to vehicles, pedestrians and cyclists, public transport, as well as emergency services.

1.3 Proposed Roadworks

The proposal includes the construction and operation of road, sewer, water, stormwater, electrical infrastructure and associated infrastructure in the vicinity of site. A summary of the key components of the works is as follows:

- A signalised intersection would be provided at Munibung Road/ Bunnings access/ site access. This would include adjustments to the existing Bunnings driveway
- A left-in/ left-out intersection would be provided at Munibung Road/ Hague Street, including the realignment and widening of the Hague Street
- Modifications and adjustments to Munibung Road to facilitate provision and upgrading of intersections
- An internal roundabout would be provided at the southern end of Hague Street, including additional legs to support future development
- An internal road connection would be provided between the roundabout at the southern end of Hague Street and the Munibung Road/ Bunnings access/ site access signalised intersection, including entry points to development lots.

Figure 1-1 shows the location of the above referred intersections, whilst further details of proposed works are contained in Section 3 of this report.

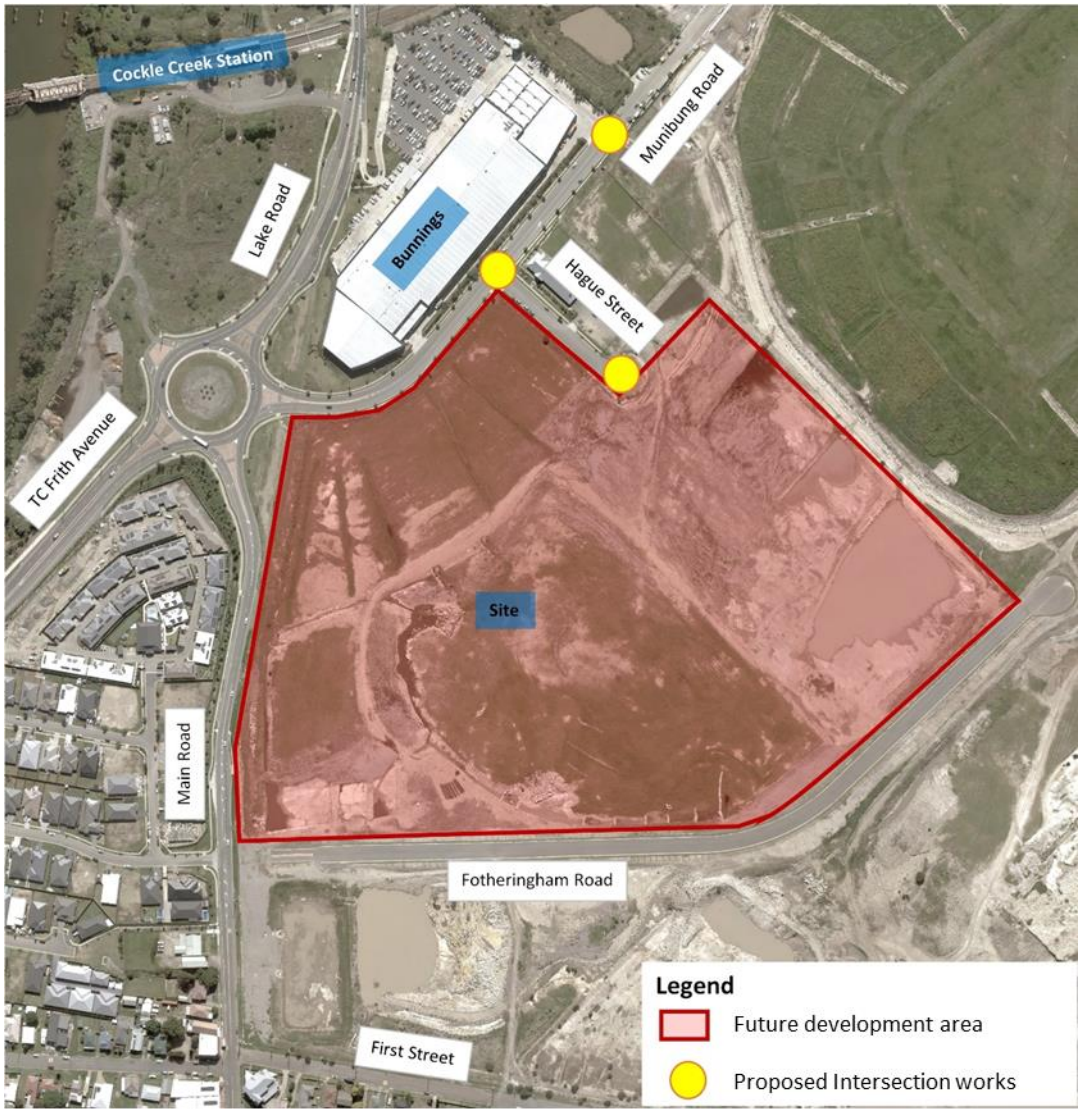


Figure 1-1 Location of proposed intersection works

1.4 Report Structure

The remainder of this report is structured with sections as follows:

- Section 2 - Discusses existing transport conditions concerning road hierarchy, general traffic, crash data, active transport, public transport and parking provision
- Section 3 - Provides details concerning proposed road infrastructure works
- Section 4 - Provides assessment of project impacts during construction
- Section 5 - Provides assessment of impacts during the operation
- Section 6 - Describes proposed mitigation measures to ameliorate or remove impacts relating to proposed works
- Section 7 - Summarises impacts relating to proposed works

2 Existing Transport Conditions

2.1 Existing Road Network Characteristics

2.1.1 Road Hierarchy

The standards adopted for road projects are influenced by the functional classification of the road. Roads of higher classification have a major role in the transportation task and therefore require a higher standard of design. Roads fall into a hierarchy of functional classes ranging from arterial roads to local access roads. Austroads have developed an urban road hierarchy based on the functions of different roads, as shown in Table 2-1 below.

Table 2-1 Austroads urban road functional classification

Type of Road	Function
Controlled access highways (motorways or freeways)	Motorways and freeways have an exclusive function to carry traffic within cities and to ensure the continuity of the national or regional primary road system. As they are designed to accommodate through traffic, they do not offer pedestrian or frontage access
Urban arterial roads	Urban arterial roads have a predominant function to carry traffic but also serve other functions. They form the primary road network and link main districts of the urban area. Arterial roads that perform a secondary function are sometimes referred to as sub-arterial roads.
Urban collector/distributor roads	These are local streets that have a greater role than others in connecting contained urban areas (e.g. residential areas, activity areas) to the arterial road system. Generally, consideration of environment and local life predominate and improved amenity is encouraged over the use of vehicles on these roads.
Urban local roads	These are roads intended exclusively for access with no through traffic function.

The surrounding road network in the vicinity of the site has been defined based on the Austroads definition of urban roads and is described in the following paragraphs.

Lake Road/ TC Frith Avenue is an 'urban arterial' road running in a north/ south direction to the west of the site. The function of this road is to carry local traffic within, as well as traffic travelling to and from and through Boolaroo. Lake Road carries major regional and inter-regional traffic including freight from Newcastle and the wider Hunter and Central Coast Regional Area, connecting Newcastle Link Road with Five Islands Road.

Munibung Road is an 'urban collector' road connecting the B53 Lake Road to the B89 Macquarie Road. It provides linkage between local streets and the broader road network. In the vicinity of the site, it currently has one lane of travel in each direction with an additional lane at the roundabout with Lake Road to ensure capacity.

Main Road is also an 'urban collector' road connecting The Esplanade to Lake Road. In the vicinity of the site, it provides a single lane for each direction of travel with an additional lane at the Lake Road/ Main Road/ Munibung Road roundabout.

2.1.2 Traffic Volumes

The primary existing land use in the vicinity of the site is Bunnings, which is located on the opposite side of Munibung Road. Existing traffic volumes on Munibung road in the vicinity of the site are primarily generated by Bunnings, as well as by traffic travelling between B53 Lake Road/TC Frith Avenue and B89 Macquarie Road following the recent full opening of the road in April 2020.

2.2 Crash Data

Crash history data for the most recent five-year period between October 2014 and September 2019 was provided by Transport for New South Wales. During this five year period there were a total of 6 injury crashes, including 3 serious, 2 moderate and 1 non-casualty crashes in the vicinity of the site. No fatal crashes were recorded. A summary of injury crashes by year and severity is provided in Table 2-2.

Table 2-2 Reported injury crashes by year and severity of crash

Year	Serious	Moderate	Non-casualty	Total
2015	1	0	0	1
2016	1	0	1	2
2017	0	1	0	1
2018	0	0	0	0
2019	1	1	0	2
Total	3	2	1	6

The location of all recorded injury crashes is shown in Figure 2-1 below.

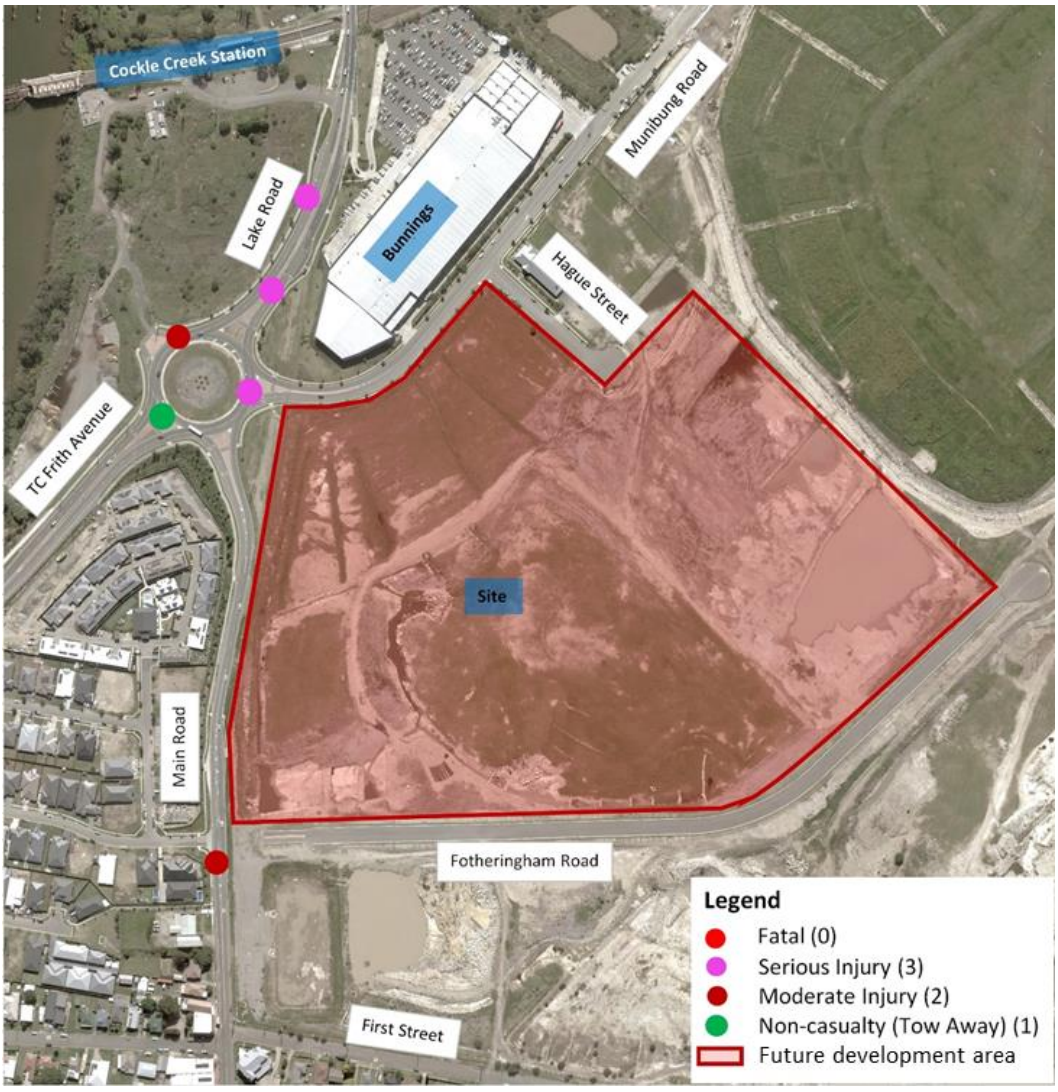


Figure 2-1 Location of recorded crashes

The data shows a concentration of crashes at the Lake Road/ Main Road/ Munibung Road roundabout. In this regard, a total of 3 injury crashes were recorded on the roundabout, including 1 serious, 1 moderate and 1 non-casualty crashes.

The data also indicates a total of two serious injury crashes on Lake Road at the approach to the roundabout, one moderate crash on Main Road and no recorded crashes on Munibung Road.

The majority of injury crashes occurred during fine weather conditions. The time of day of reported crashes is shown in Figure 2-2. This shows that the most common time for crashes to occur is during the AM peak and later in the evening.

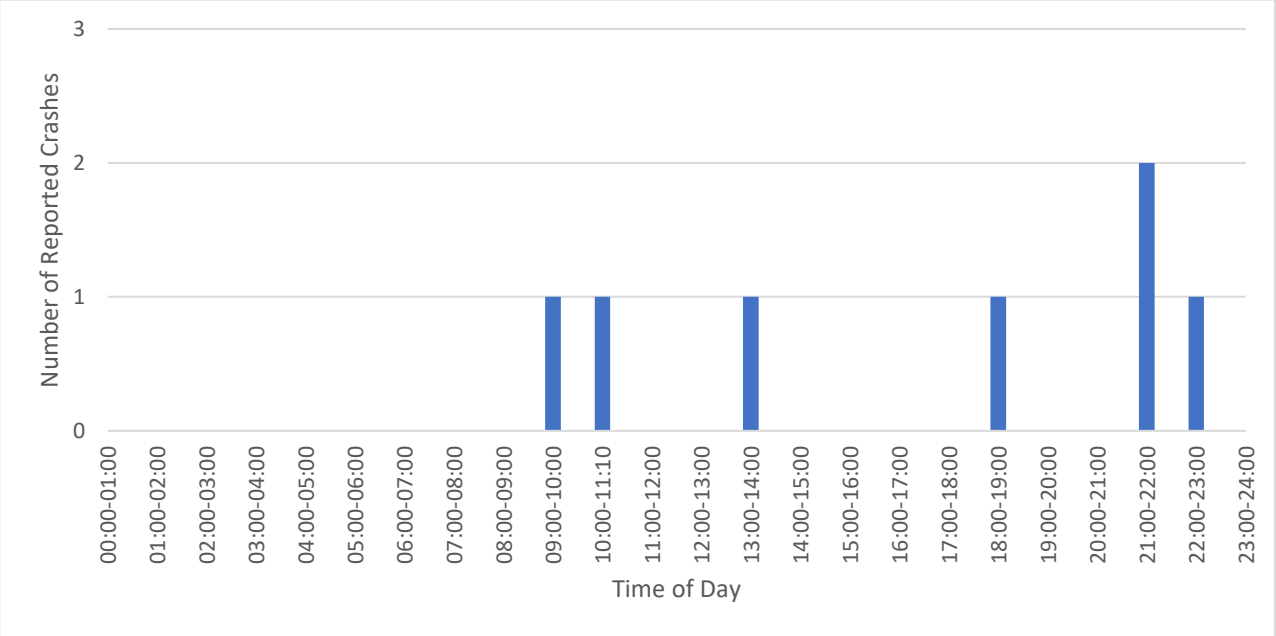


Figure 2-2 Number of recorded crashes by time of day

2.3 Parking Provision

Controlled parking by way of a "No Stopping" restriction currently exists on Munibung Road between the Lake Road/ Main Road/Munibung Road roundabout and the Bunnings service access on Munibung Road some 150 m east of the roundabout. The only off-street parking located nearby is in the Bunnings car park.

2.4 Public Transport

2.4.1 Bus Services

Table 2-3 provides a summary of bus routes, including route number, route description, as well as information concerning service frequencies.

Table 2-3 Public transport (bus) routes and services

Route No	Route Description	AM Peak	PM Peak	weekend
44	Warners Bay to Kotara via Glendale, Cardiff & Macquarie Hills	60 minutes	60 minutes	60 minutes
	Kotara to Warners Bay via Macquarie Hills, Cardiff & Glendale	60 minutes	60 minutes	60 minutes

Route No	Route Description	AM Peak	PM Peak	weekend
270	University of Newcastle to Toronto West	35 minutes	40 minutes	60 minutes
	Toronto West to University of Newcastle	32 minutes	32 minutes	60 minutes
271	Toronto to Glendale	42 minutes	60 minutes	120 minutes
	Glendale to Toronto	60 minutes	60 minutes	120 minutes

Source: Transport for NSW

It is evident that the site benefits from three bus routes which operate along Lake Road and Main Road with bus stops on either side of both roads in the vicinity of the site to the north (Lake Road) and south (Main Road) of the Lake Road/ TC Frith Avenue/ Main Road roundabout. It is however noted that these services are relatively infrequent and mainly operate during peak periods.

2.4.2 Rail Services

The Cockle Creek Station is located approximately 300 metres north of the Lake Road/ Main Road/ Munibung Road roundabout. The station is currently serviced by the Central Coast and Newcastle Line, which provides access between the state's two largest cities, Sydney and Newcastle.

Table 2-4 provides information on train operating hours and average frequencies of existing rail services to and from Cockle Creek Station.

Table 2-4 Train operating hours and service frequencies

Train Line	Direction of Travel	Operating hours (from Cockle Creek Station)		Average Frequency of Services		
		Weekday	Weekend	AM Peak (7:00am-9:00am)	PM Peak (4:00pm-6:00pm)	Off Peak (10:00am-3:00pm)
Central Coast and Newcastle Line	Newcastle Interchange to Central via Strathfield or Gordon	6:13 am to 11:55 pm	2:08 am to 00:01 am	56 minutes	43 minutes	60 minutes
	Central to Newcastle Interchange via Strathfield or Gordon	5:21 am to 4:18 am	5:29 am to 4:18 am	28 minutes	40 minutes	60 minutes

Source: Transport for NSW

The Cockle Creek Station is currently serviced by a train departing every 56 minutes towards Sydney in the AM peak and a train arriving every 40 minutes from Sydney in the PM peak.

2.5 Active Transport

A summary of active transport provision in the vicinity of the site, including pedestrian and cycling infrastructure conditions and accessibility is illustrated in

.

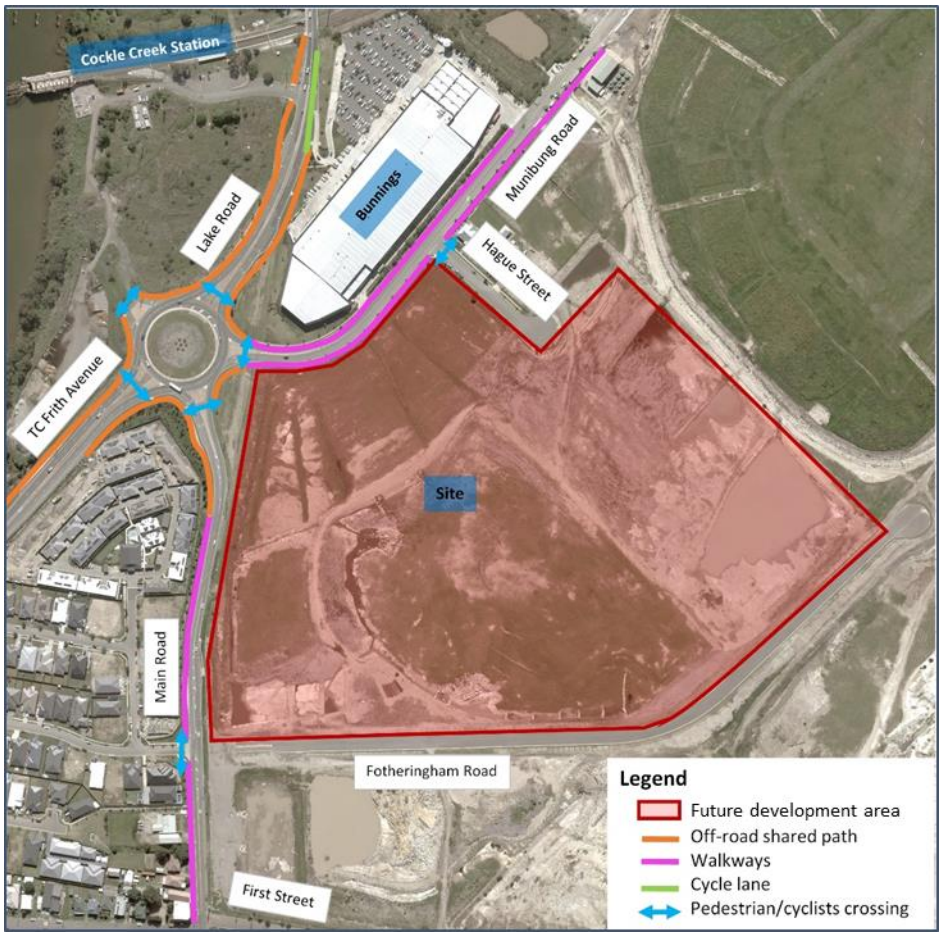


Figure 2-3 Active transport facilities in the vicinity of the site

Off-road shared paths for pedestrians and cyclists are provided along both sides of Lake Road between Cockle Creek Station and the Lake Road/ Main Road/ Munibung Road roundabout. There is also a short length of on-road cycle way adjacent to Bunnings access on the east side of Lake Road.

The off-road shared paths for pedestrians and cyclists continue around the roundabout providing connectivity south to both TC Frith Avenue and Main Road. There are crossing facilities across each leg of the roundabout. Whilst a pedestrian path runs along the west side of Main Road, there are currently no active transport facilities on the east side of Main Road in the vicinity of the site.

Pedestrian footpaths are also provided along both sides of Munibung Road between the Lake Road/ Main Road/ Munibung Road roundabout and the Bunnings access on the north side, as well as a distance of a further 100m east on the south side of the road.

3 Proposed works

3.1 Summary of Proposed Works

The proposal allows for the construction and operation of road, sewer, water, stormwater, electrical infrastructure and associated infrastructure in the vicinity of the site.

Key features of proposed works include the following:

- A signalised intersection would be provided at Munibung Road/ Bunnings access/ site access. This would include adjustments to the existing Bunnings driveway.
- A left-in/ left-out intersection would be provided at Munibung Road/ Hague Street
- Minor modifications and adjustments within the existing Munibung Road
- The realignment and widening of Hague Street
- A roundabout would be provided at the southern end of Hague Street, including additional legs to support future development
- An internal road connection between the roundabout at the southern end of Hague Street and the Munibung Road/ Bunnings access/ site access signalised intersection would be provided, including entry points to development lots
- Modified and adjusted footpaths along Munibung Road and new internal roadworks to accommodate pedestrians and/or cyclists
- Adjustments to parking lanes
- Clearing, demolition and civil earthworks
- Modifications to existing road pavements
- New road pavement works
- Utility extensions and/or relocations along Munibung Road and the new roads to service development blocks
- New stormwater infrastructure to suit new and adjusted roadworks
- Ancillary works including kerb and guttering for the length of the new roads, signs, line marking, landscaping and environmental protection works
- Temporary ancillary facilities including site compounds and stockpile sites

An overview of extent of works is included in Figure 3-1, with a concept of proposed road works provided in Figure 3-2. A more detailed plan of roadworks is provided in Appendix A.

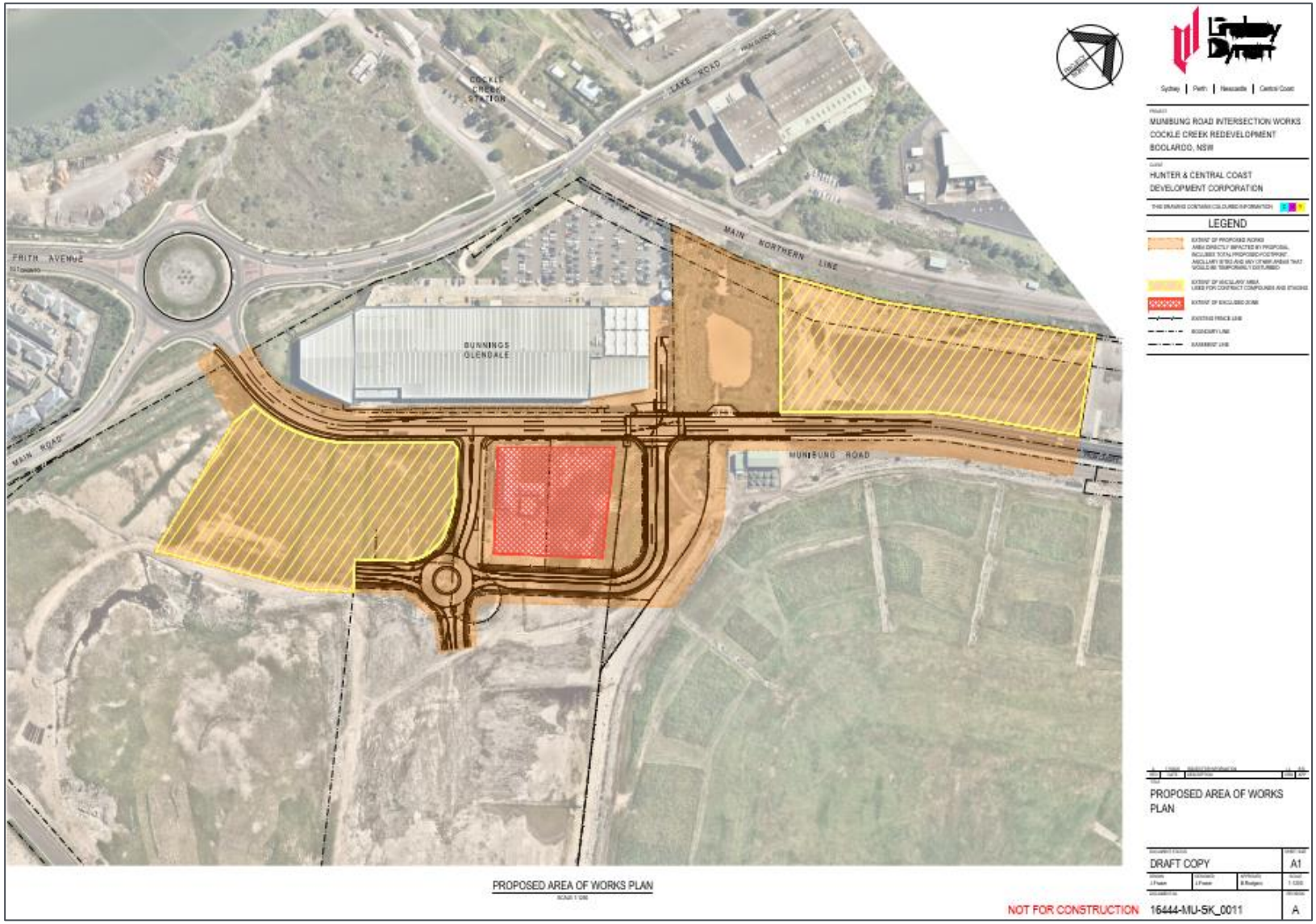


Figure 3-1 Extent of works

Source: Lindsay Dynan

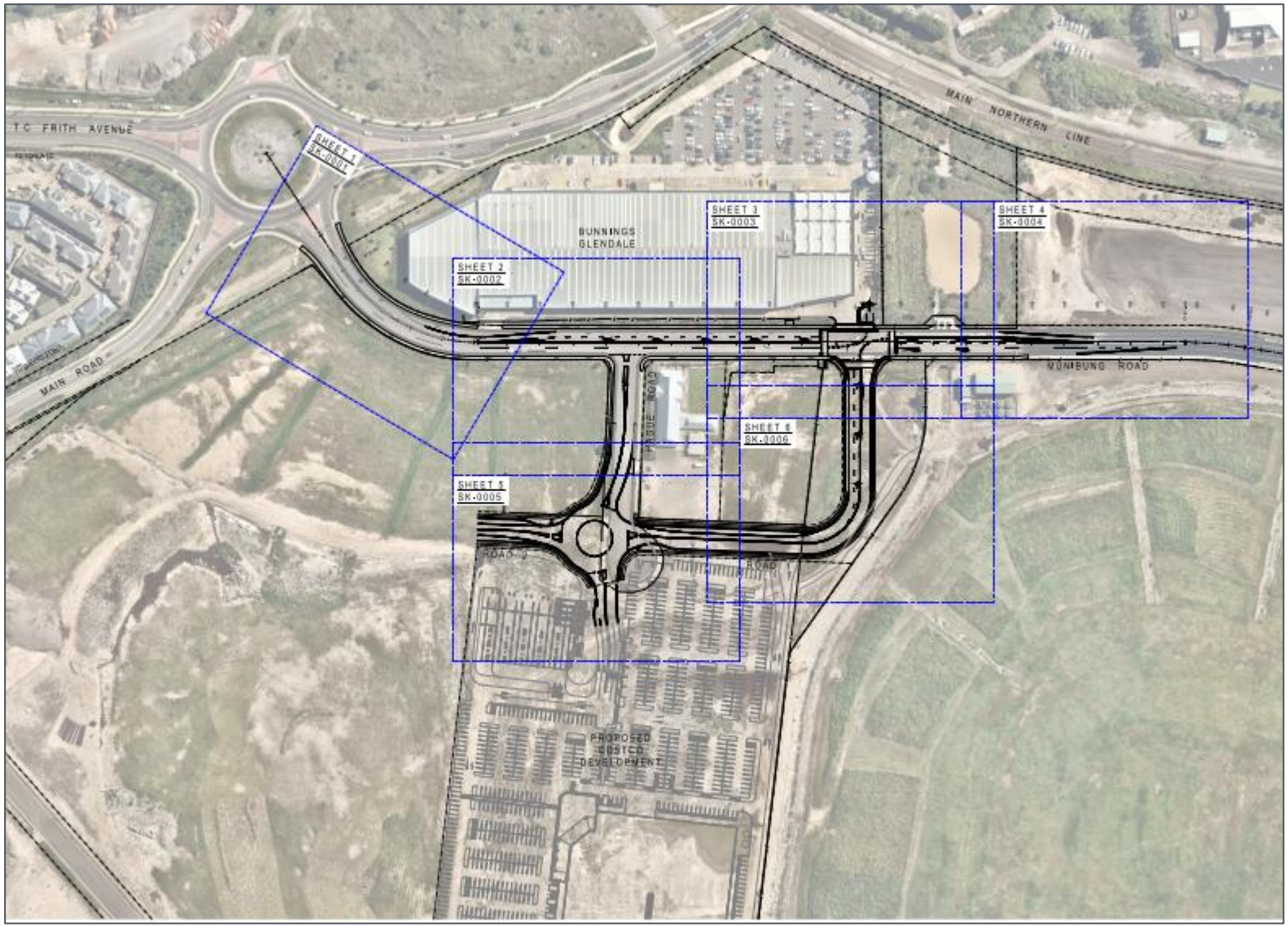


Figure 3-2 Concept overview plan of proposed road works

Source: Lindsay Dynan

4 Construction Traffic Impact Assessment

4.1 Traffic

Construction of proposed works is expected to commence in December 2020 and take around four months to complete. During construction, Munibung Road will remain open to traffic, although this would need to be appropriately managed.

Potential impacts on traffic movement during construction may include increased travel times due to temporary construction zone speed limits, trucks and construction machinery movements, lane closures and stop/go operation. Works with the potential for traffic disruption would be scheduled to take place outside of peak commuting periods in order to minimise road user delays and works impacting on traffic lanes would be undertaken off peak or at night.

Traffic generated by construction vehicles, including staff vehicles, is likely to be small in relation to traffic currently using Munibung Road and most construction traffic movements would occur outside of peak periods. Construction traffic movements would fluctuate dependant on construction stage and associated works activities.

It is recommended that a Construction Traffic Management Plan (CTMP) should be prepared by the appointed contractor for the proposed works. The CTMP should include any required Traffic Control Plan (TCP) to control traffic movements and maintain safety during construction works, which is further discussed in Section 6.

4.2 Property Access and Adjacent Developments

Access to Bunnings would be impacted during the construction of the proposed signalised intersection at Munibung Road/ Bunnings Access/ Costco Access. These impacts would be managed by the appointed contractor through implementation of the CTMP.

No impacts to other property accesses are expected during the construction program.

4.3 Pedestrian and Cyclists

Access will be maintained for pedestrians and cyclists along Munibung Road for the duration of the construction. The proposed works may cause minor delays to pedestrian and cyclist movements along Munibung Road during construction.

4.4 Public Transport

There are no public bus services operating along Munibung Road and no bus stops impacted upon by the construction works. Also, there are no impacts to rail services at Cockle Creek Station associated with proposed works.

4.5 Emergency Services

Emergency services will continue to be able to travel along Munibung Road at all times, as required.

4.6 Car Parking

Although no changes to on-street parking arrangements are proposed as part of the proposed construction roadworks, removal of some parking spaces may be undertaken to facilitate construction, which will be articulated in the CTMP.

5 Operational Traffic Impact Assessment

5.1 Surrounding Roads and Intersections

As part of the recent TIA to support the rezoning of the site, SMEC used SIDRA Intersection software (version 9.0) to assess intersection performance at following intersections:

- A signalised intersection at the Munibung Road/ Access to Bunnings/ Access to Costco
- A left-in/left-out priority intersection at Munibung Road/ Hague Street
- An internal roundabout at the southern end of Hague Street

The performance of the intersections has been assessed based on the 2032 rezoning demand scenario for the PM peak, as well as for a Saturday peak. The weekday demands for Bunnings and Costco are not considered relevant in the AM peak, thus modelling was undertaken for the PM peak and a Saturday when demand is likely to be highest.

5.1.1 Level of Service (LOS) Criteria

The performance of an intersection is measured by the intersection average delay per vehicle which corresponds to a Level of Service (LoS) measure for the intersection.

Performance of an intersection is measured in accordance with the *Austroads Guide to Traffic Management-Part 3: Traffic Studies and Analysis (2013).* The guidelines recommend that for roundabouts and sign controlled intersections, the Level of Service (LoS) value is determined by the critical movement with the highest delay, whereas for a signalised intersection Level of Service (LoS) criteria are related to the average overall intersection delay measured in seconds per vehicle.

Intersection Level of Service (LoS) was assessed using the standard Roads and Maritime Level of Service criteria for intersections, which are reproduced in Table 5-1.

Table 5-1 Level of service criteria for intersections

Level of Service	Average Delay per Vehicle (sec/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	<14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode
F	>70	Unsatisfactory with excessive queuing	Unsatisfactory with excessive queuing

Source: RTA Guide to Traffic Generating Developments

5.1.2 Intersection configurations

The proposed intersection configurations are shown in Figure 5-1 to Figure 5-3.

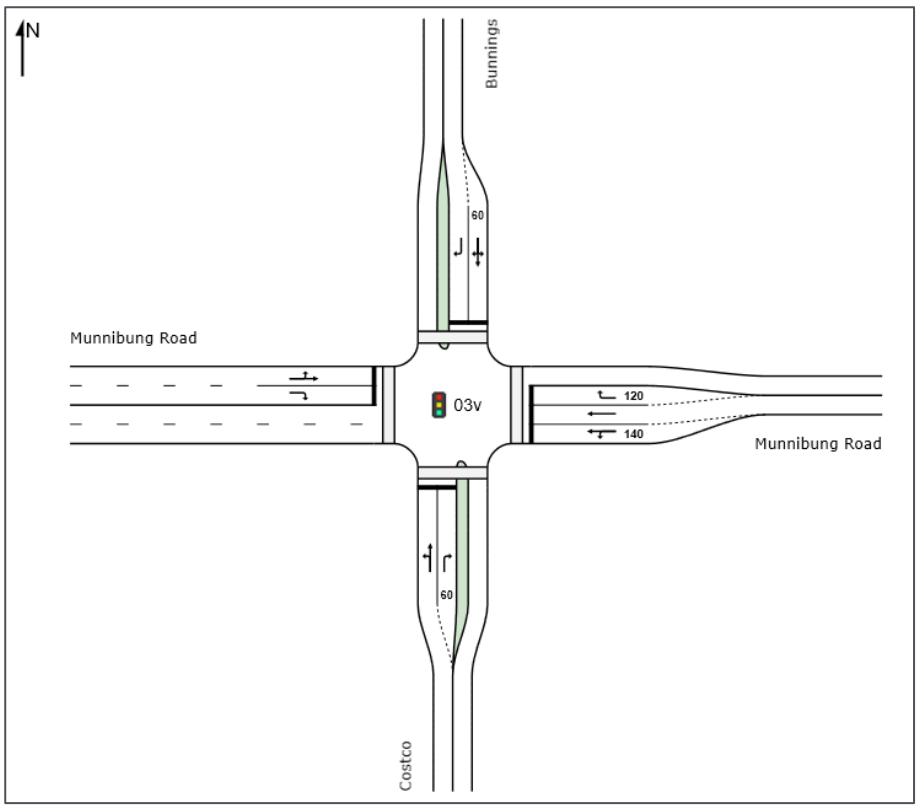


Figure 5-1 Proposed signalised intersection layout of Munibung Road/ Bunnings Access/ Costco Access

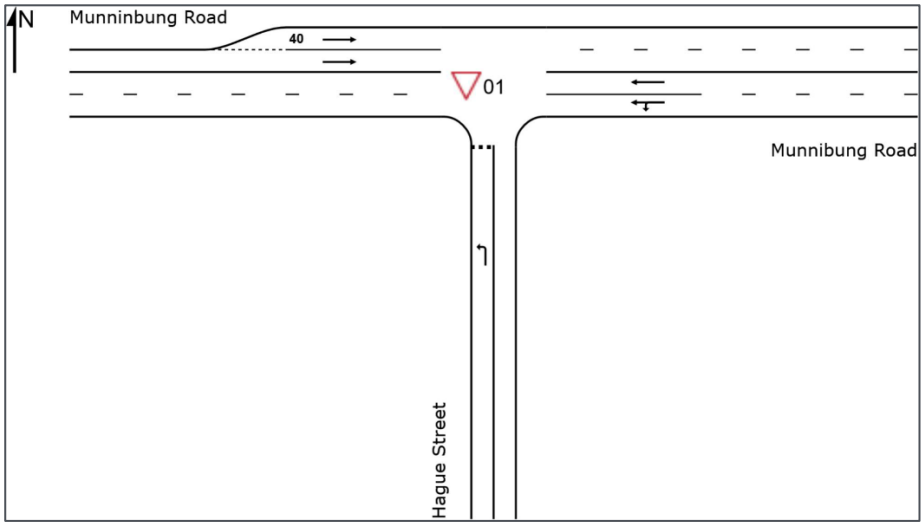


Figure 5-2 Proposed priority intersection layout for Munibung Road/ Hague Street

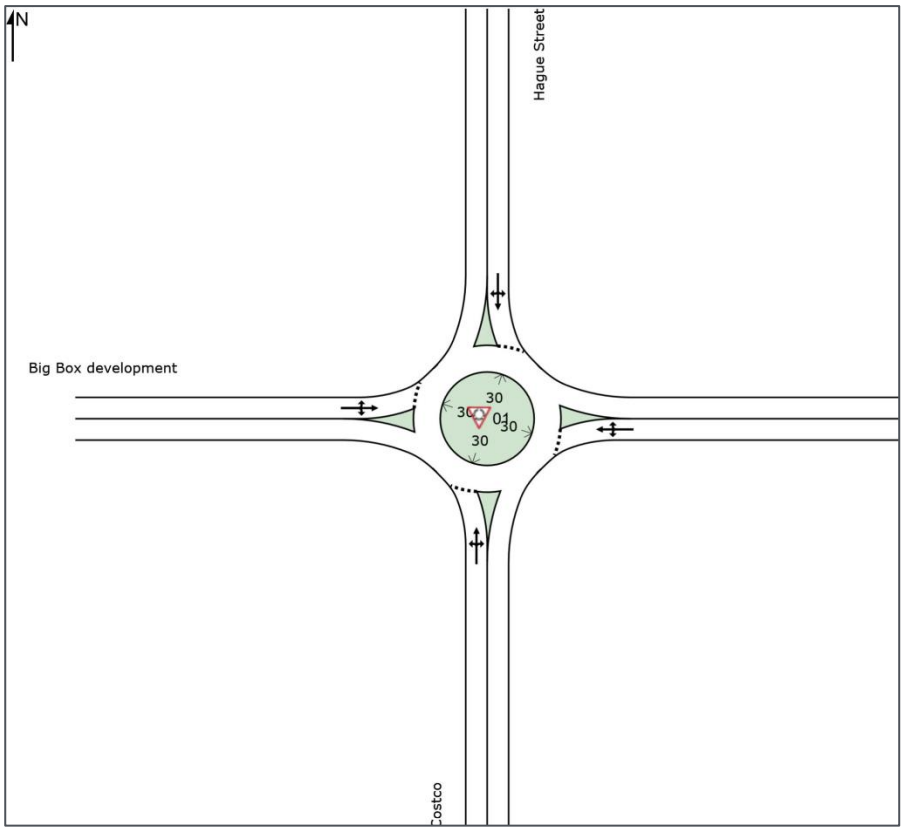


Figure 5-3 Proposed internal roundabout layout at southern end of Hague Street

5.1.3 Intersection Demands

Intersection demands are taken from Option 2 access described in the technical note SiDRA Network Demand Sensitivity Analysis

5.1.4 Intersection Performance Assessment

The results of intersection performance analyses are presented in Table 5-2 with detailed assessment outcomes provided in Appendix B.

Table 5-2 Intersection performance results for PM and Saturday peaks for year 2032

Intersection	Peak	Avg Delay (sec)	DoS	LoS	95th Percentile Queue Length*
Munibung Road/ Bunnings access/ Costco access	PM	27	0.75	B	81
	SAT	33	0.81	C	113
Munibung Road/ Hague Street	PM	8	0.22	A	5
	SAT	7	0.20	A	7
Proposed internal roundabout on Hague Street	PM	10	0.14	A	6
	SAT	8	0.21	A	10

From Table 5-2, traffic model outputs confirm that all intersections would perform within acceptable LOS and degree of saturation in future year 2032.

5.2 Property Access and Adjacent Developments

The proposed works include construction of a four-way signalised intersection, which would include the Bunnings access, as well as access into the proposed site. Whilst there may be short term impacts on the Bunnings access, which would need to be managed during construction, there are long term benefits associated with a signalised intersection at this location.

The proposed signalised intersection would reduce the potential for conflicts associated with vehicles entering or exiting Bunnings and will therefore provide ongoing improvements to the overall level of road safety at this location.

No other changes are proposed which impact upon property access or adjacent development.

5.3 Pedestrian and Cyclists

A two metre wide shared path is proposed on each side of Munibung Road continuing to the Lake Road/ Main Road/Munibung Road roundabout, which would then connect to existing shared paths along Lake Road/ TC Frith Avenue and Main Road. Shared pedestrian/ cycle facilities on Munibung Road are expected to continue along Munibung Road to the east of the proposed development as part of proposed off road cycle routes included in the Lake Macquarie Bicycle Strategy.

Signalised pedestrian crossings are incorporated into the design of the proposed signalised intersection at Munibung Road/ Bunnings Access/ Site Access, which will improve connectivity for pedestrian and cyclists along Munibung Road and help pedestrians cross the road safely. A pedestrian refuge crossing arrangement would also be provided on Hague Street to facilitate safe crossing movements at this intersection.

5.4 Public Transport

No public buses operate along Munibung Road and therefore there is no impact to public transport associated with the proposed works.

5.5 Emergency Services

There are no impacts to emergency service access along Munibung Road associated with the proposed works.

5.6 Car Parking

On road parking along Munibung Road in the vicinity of the site would require removal, to ensure safe and efficient operational performance of the road.

6 Recommended Mitigation Measures

Mitigation measures would be implemented to minimise traffic, transport and access impacts during construction and operation of the roadworks. An outline of potential mitigation measures is provided below:

6.1 Construction

It is recommended that prior to the commencement of construction, a Construction Traffic Management Plan (CTMP) be prepared by the appointed contractor, which should include the following as a minimum:

- Ensuring adequate road signage at the construction work site to inform motorists and pedestrians of the work site ahead to ensure that the risk of road accidents and disruption to traffic and pedestrians is minimised
- Maximising safety and maintaining accessibility for pedestrians and cyclists at all times
- Ensuring adequate sight lines and providing stop/go staff to allow for safe entry and exit from the construction site
- Work zones should be secured to prevent unauthorised access, including pedestrian access with site perimeter fencing and secured gate(s), as required, in particular to prevent access outside work hours
- Measures to manage traffic flows around the area affected by the roadworks, including as required regulatory and direction signposting, line marking and variable message signs and all other traffic control devices necessary for the implementation of the CTMP
- All construction works should be contained within the roadworks site and parking associated with construction staff would be managed within the roadworks site.
- The movement of heavy vehicles in and out of the roadworks site should be safely managed.
- Approval for temporary traffic management works should be sought, as required. Roadworks would be undertaken progressively and in the minimum area and timeframe required to undertake the particular phase of work.

Consultation with the relevant road authority (Lake Macquarie City Council) should be undertaken during preparation of the CTMP. It is also recommended that the CTMP be informed from consultation with Bunnings, to ensure access needs are understood (for both deliveries and customers) and accommodated, as well as to ensure the CTMP minimises disruption to Bunnings.

The performance of all temporary traffic arrangements should be monitored during construction.

6.2 Operation

No measures are necessary once the works are complete and roads operational.

7 Summary

This TIA report has been prepared by SMEC to support the Review of Environmental Factors and considers existing transport conditions, as well as the impacts associated with the proposed works. The impacts were assessed both for the construction and operational phases of the proposed works.

7.1 Construction impacts

Potential impacts on traffic movement during construction may include increased travel times due to temporary construction zone speed limits, truck and construction machinery movements, lane closures and stop/go operation. Works with the potential for traffic disruption would be scheduled to take place outside of peak commuting periods in order to minimise road user delays and works impacting on traffic lanes would be undertaken off peak or at night.

Traffic generated by construction vehicles, including staff vehicles, is likely to be small in relation to traffic currently using Munibung Road and most construction traffic movements would occur outside of peak periods. Construction traffic movements would fluctuate dependant on construction stage and associated works activities.

It is recommended that a Construction Traffic Management Plan (CTMP) should be prepared by the appointed contractor for the proposed works. The CTMP should include any required Traffic Control Plan (TCP) to control traffic movements and maintain safety during the construction works.

Access to Bunnings would be impacted during the construction of the proposed signalised intersection at Munibung Road/ Bunnings Access/ Costco Access. These impacts would be managed by the appointed contractor through implementation of a CTMP, through which consultation with Bunnings will be essential.

7.2 Operational Impacts

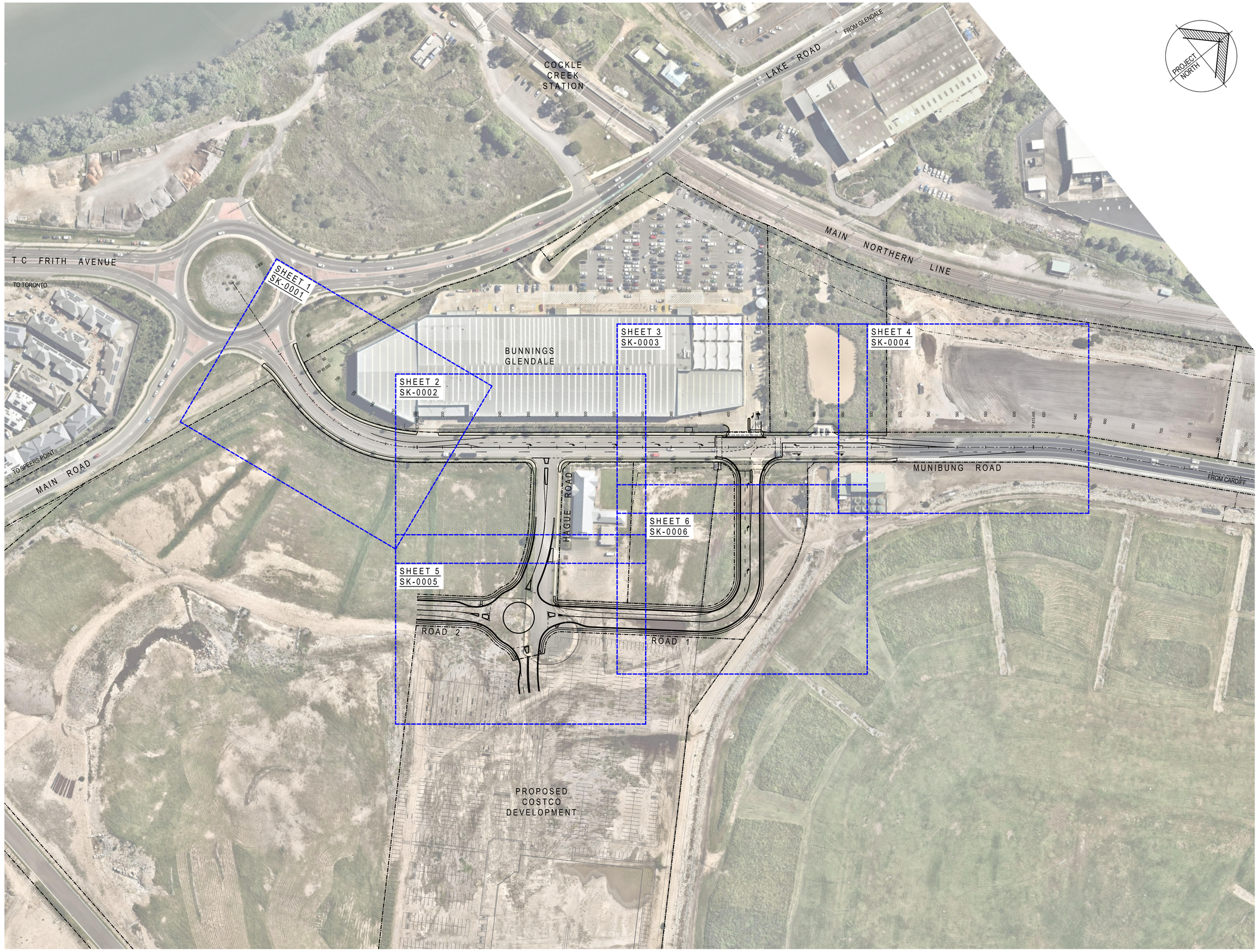
SIDRA intersection modelling was undertaken for the future year 2032 rezoning demand for the PM peak and Saturday. The results of the SIDRA analysis show that all intersections are expected to operate within an acceptable level of service (C or better) in the 2032 future year scenario.

Access to Bunnings is proposed to change to a new signalised intersection and adjustments would require to be made to the Bunnings access. The proposed changes to the Bunnings access will reduce the potential for conflicts associated with vehicles entering or exiting Bunnings and will provide ongoing improvements to the overall level of road safety at this location.

Pedestrian footpaths are provided along both sides of Munibung Road between the Lake Road/ Main Road/ Munibung Road roundabout and the Bunnings access on the north side, as well as a distance of a further 100m east on the south side of the road. The proposed works would enhance pedestrian and cyclist facilities on Munibung Road through provision of 2 metre wide shared paths on both sides of the road between the Lake Road/ Main Road/Munibung Road roundabout and the proposed signalised intersection at the proposed new site access.

Consideration may need to be given to restricting on road parking along Munibung Road in the vicinity of the site to maintain future operational performance of the road. It is suggested that this situation be monitored following opening of the site.

Appendix A Proposed Intersections and Roadworks



PROJECT NORTH

Lindsay Dynan

Sydney | Perth | Newcastle | Central Coast

PROJECT
MUNIBUNG ROAD INTERSECTION WORKS
COCKLE CREEK REDEVELOPMENT
BOOLAROO, NSW

CLIENT
HUNTER & CENTRAL COAST
DEVELOPMENT CORPORATION

THIS DRAWING CONTAINS COLOURED INFORMATION C M Y

LEGEND

- DRAWING SHEET LAYOUT (SCALE 1:250)
- EXISTING FENCE LINE
- BOUNDARY LINE
- EASEMENT LINE

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B	19/08/20	20% DETAIL DESIGN ISSUE	J.F.	B.R.
A	14/08/20	ISSUED FOR INFORMATION	J.F.	B.R.

TITLE
GENERAL ARRANGEMENT PLAN

GENERAL ARRANGEMENT PLAN
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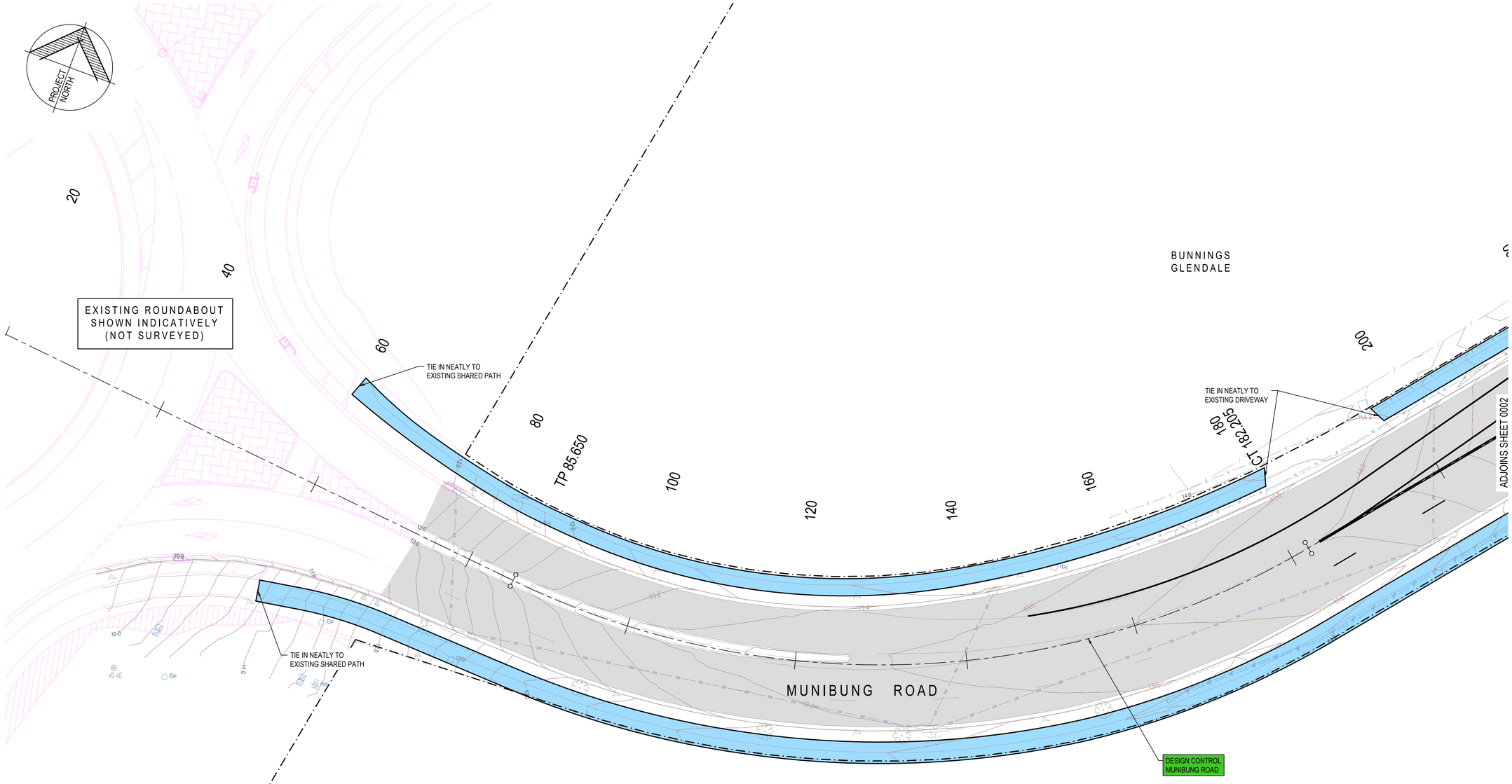

CONCEPT PLAN

SCALE 1:250

Lindsay Dynan

Sydney | Perth | Newcastle | Central Coast

PROJECT

MUNIBUNG ROAD INTERSECTION WORKS
COCKLE CREEK REDEVELOPMENT
BOOLAROO, NSW

CLIENT

HUNTER & CENTRAL COAST DEVELOPMENT CORPORATION

THIS DRAWING CONTAINS COLOURED INFORMATION C M Y

LEGEND

- PROPOSED ROAD PAVEMENT
- PROPOSED DRIVEWAY PAVEMENT
- PROPOSED CONCRETE FOOTPATH
- EXISTING ROAD PAVEMENT TO REMAIN
- 16.0 — DESIGN MAJOR CONTOUR (0.5m INTERVALS)
- 16.4 — DESIGN MINOR CONTOUR (0.1m INTERVALS)
- 16.4 — EXISTING CONTOUR (0.2m INTERVALS)
- E — EXISTING ELECTRICAL LINE
- OPT — EXISTING OPTIC FIBRE LINE
- S — EXISTING SEWER LINE
- SW — EXISTING STORMWATER LINE
- T — EXISTING TELSTRA LINE
- W — EXISTING WATER LINE
- EXISTING FENCE LINE
- BOUNDARY LINE
- EASEMENT LINE
- EXISTING FEATURES DESIGNED BY OTHERS (NOT SURVEYED)
- PROPOSED FEATURES DESIGNED BY OTHERS

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TITLE

CONCEPT PLAN
SHEET 1

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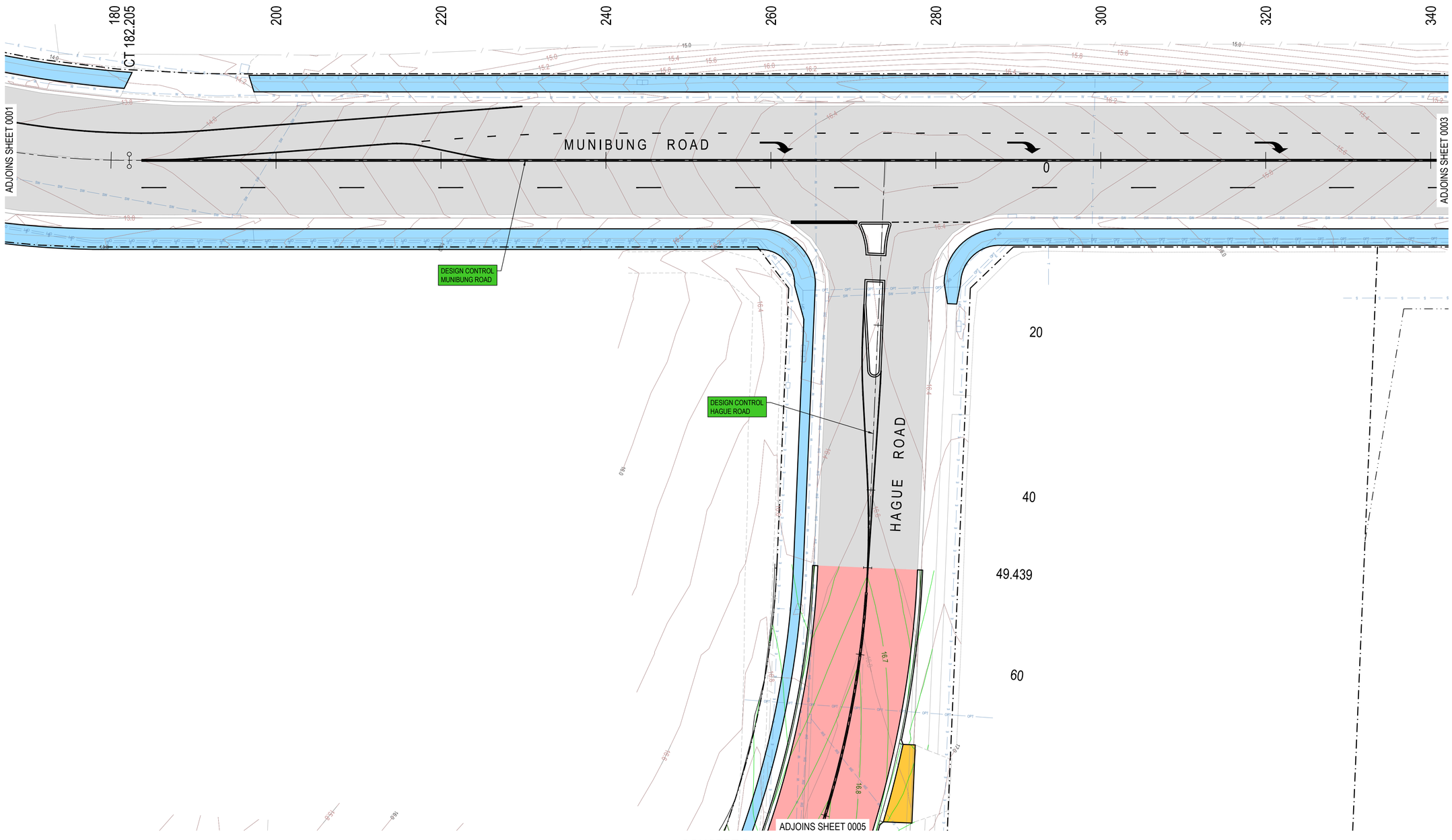
NOT FOR CONSTRUCTION

PROJECT NORTH

BUNNINGS
GLENDALE



CONCEPT PLAN
SCALE 1:250

Lindsay Dynan

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PROJECT
MUNIBUNG ROAD INTERSECTION WORKS
COCKLE CREEK REDEVELOPMENT
BOOLAROO, NSW

CLIENT
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DEVELOPMENT CORPORATION

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- W EXISTING WATER LINE
- EXISTING FENCE LINE
- BOUNDARY LINE
- EASEMENT LINE
- EXISTING FEATURES DESIGNED BY OTHERS (NOT SURVEYED)
- PROPOSED FEATURES DESIGNED BY OTHERS

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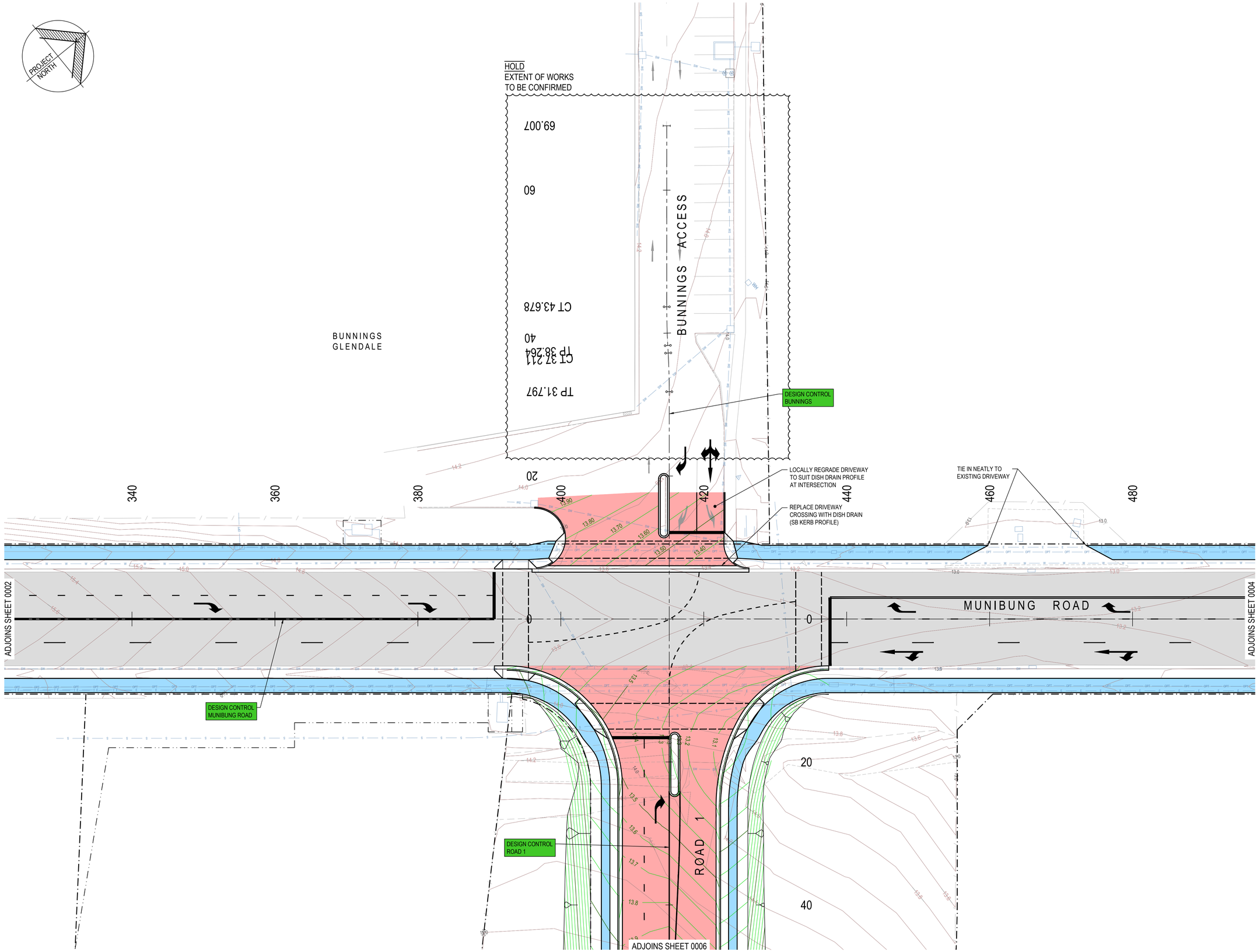

CONCEPT PLAN

SCALE 1:250

NOT FOR CONSTRUCTION

Lindsay Dynan

Sydney | Perth | Newcastle | Central Coast

PROJECT

MUNIBUNG ROAD INTERSECTION WORKS
COCKLE CREEK REDEVELOPMENT
BOOLAROO, NSW

CLIENT

HUNTER & CENTRAL COAST
DEVELOPMENT CORPORATION

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- 16.4 — EXISTING CONTOUR (0.2m INTERVALS)
- E — EXISTING ELECTRICAL LINE
- OPT — EXISTING OPTIC FIBRE LINE
- S — EXISTING SEWER LINE
- SW — EXISTING STORMWATER LINE
- T — EXISTING TELSTRA LINE
- W — EXISTING WATER LINE
- EXISTING FENCE LINE
- BOUNDARY LINE
- EASEMENT LINE
- EXISTING FEATURES DESIGNED BY OTHERS (NOT SURVEYED)
- PROPOSED FEATURES DESIGNED BY OTHERS

0 5 10 15 20m

1:250 (A1)

REV	DATE	DESCRIPTION	DRN	APP
C	28/09/20	ISSUED FOR INFORMATION	J.F.	B.R.
B	19/08/20	20% DETAIL DESIGN ISSUE	J.F.	B.R.
A	14/08/20	ISSUED FOR INFORMATION	J.F.	B.R.

TITLE

CONCEPT PLAN
SHEET 3

DOCUMENT STATUS			SHEET SIZE
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DRAWN	DESIGNED	APPROVED	SCALE
J.Fraser	J.Fraser	B.Rodgers	1:250
DOCUMENT No.			REVISION
16444-MU-SK-0003			C

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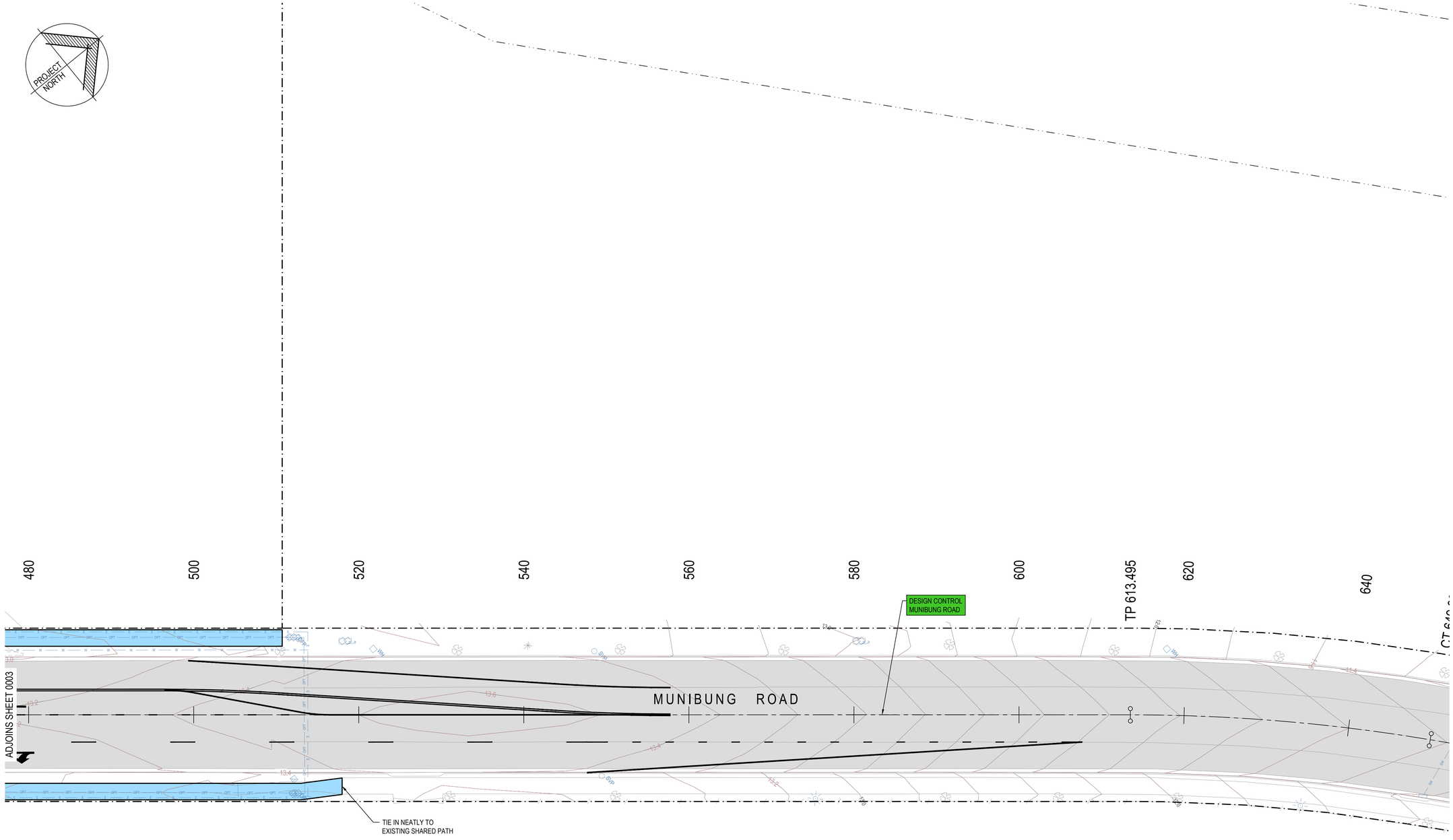

Lindsay Dynan

Sydney | Perth | Newcastle | Central Coast

PROJECT

MUNIBUNG ROAD INTERSECTION WORKS
COCKLE CREEK REDEVELOPMENT
BOOLAROO, NSW

CLIENT

HUNTER & CENTRAL COAST
DEVELOPMENT CORPORATION

THIS DRAWING CONTAINS COLOURED INFORMATION C M Y

LEGEND

- PROPOSED ROAD PAVEMENT
- PROPOSED DRIVEWAY PAVEMENT
- PROPOSED CONCRETE FOOTPATH
- EXISTING ROAD PAVEMENT TO REMAIN
- 16.0 — DESIGN MAJOR CONTOUR (0.5m INTERVALS)
- 16.4 — DESIGN MINOR CONTOUR (0.1m INTERVALS)
- 16.4 — EXISTING CONTOUR (0.2m INTERVALS)
- E — EXISTING ELECTRICAL LINE
- OPT — EXISTING OPTIC FIBRE LINE
- S — EXISTING SEWER LINE
- SW — EXISTING STORMWATER LINE
- T — EXISTING TELSTRA LINE
- W — EXISTING WATER LINE
- EXISTING FENCE LINE
- BOUNDARY LINE
- EASEMENT LINE
- EXISTING FEATURES DESIGNED BY OTHERS (NOT SURVEYED)
- PROPOSED FEATURES DESIGNED BY OTHERS

0 5 10 15 20m

1:250 (A1)

REV	DATE	DESCRIPTION	DRN	APP
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B	19/08/20	20% DETAIL DESIGN ISSUE	J.F.	B.R.
A	14/08/20	ISSUED FOR INFORMATION	J.F.	B.R.

TITLE

CONCEPT PLAN
SHEET 4

CONCEPT PLAN
SCALE 1:250

NOT FOR CONSTRUCTION

DOCUMENT STATUS			SHEET SIZE
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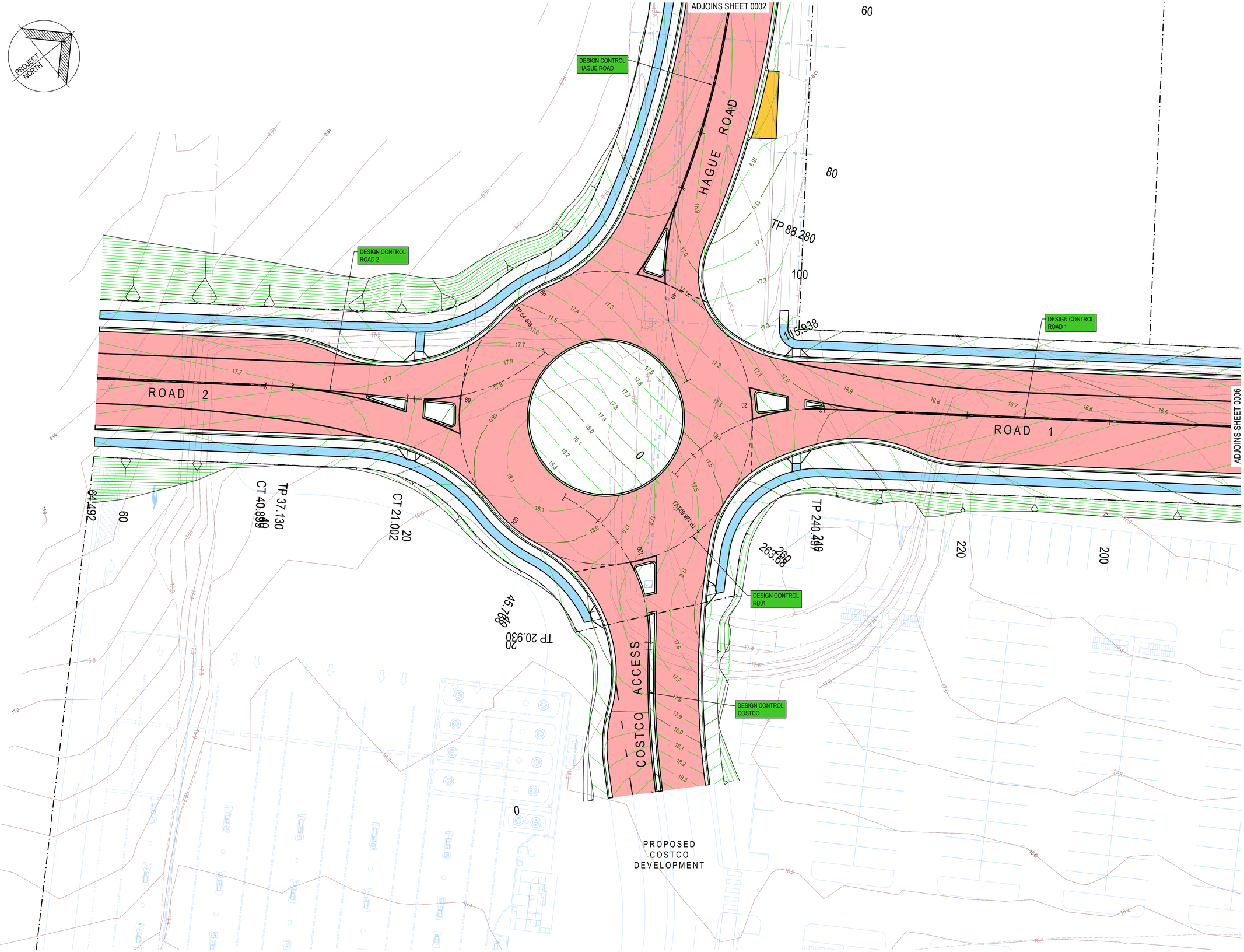
DOCUMENT No.			REVISION
16444-MU-SK-0004			C



CONCEPT PLAN
SCALE 1:250

Lindsay Dynan

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PROJECT
MUNIBUNG ROAD INTERSECTION WORKS
COCKLE CREEK REDEVELOPMENT
BOOLAROO, NSW

CLIENT
HUNTER & CENTRAL COAST
DEVELOPMENT CORPORATION

THIS DRAWING CONTAINS COLOURED INFORMATION C M Y

LEGEND

- PROPOSED ROAD PAVEMENT
- PROPOSED DRIVEWAY PAVEMENT
- PROPOSED CONCRETE FOOTPATH
- EXISTING ROAD PAVEMENT TO REMAIN
- 16.0 DESIGN MAJOR CONTOUR (0.5m INTERVALS)
- 16.4 DESIGN MINOR CONTOUR (0.1m INTERVALS)
- 16.4 EXISTING CONTOUR (0.2m INTERVALS)
- E EXISTING ELECTRICAL LINE
- OPT EXISTING OPTIC FIBRE LINE
- S EXISTING SEWER LINE
- SW EXISTING STORMWATER LINE
- T EXISTING TELSTRA LINE
- W EXISTING WATER LINE
- EXISTING FENCE LINE
- BOUNDARY LINE
- EASEMENT LINE
- EXISTING FEATURES DESIGNED BY OTHERS (NOT SURVEYED)
- PROPOSED FEATURES DESIGNED BY OTHERS

0 5 10 15 20m
1:250 (A1)

REV	DATE	DESCRIPTION	DRN	APP
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B	19/08/20	20% DETAIL DESIGN ISSUE	J.F.	B.R.
A	14/08/20	ISSUED FOR INFORMATION	J.F.	B.R.

TITLE
CONCEPT PLAN
SHEET 5

DOCUMENT STATUS			SHEET SIZE
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NOT FOR CONSTRUCTION

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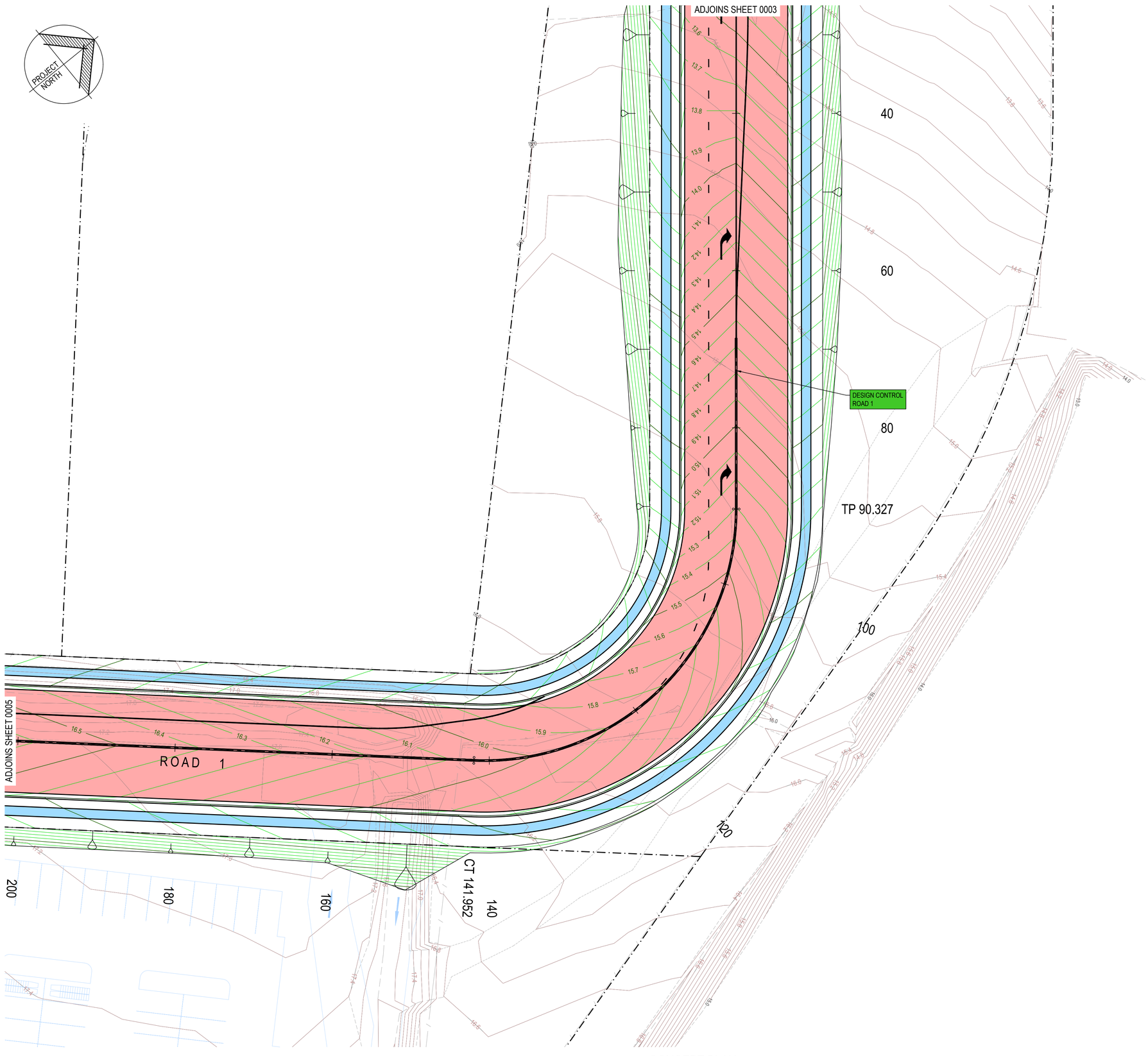

CONCEPT PLAN
SCALE 1:250

Lindsay Dynan

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PROJECT
MUNIBUNG ROAD INTERSECTION WORKS
COCKLE CREEK REDEVELOPMENT
BOOLAROO, NSW

CLIENT
HUNTER & CENTRAL COAST
DEVELOPMENT CORPORATION

THIS DRAWING CONTAINS COLOURED INFORMATION C M Y

LEGEND

- PROPOSED ROAD PAVEMENT
- PROPOSED DRIVEWAY PAVEMENT
- PROPOSED CONCRETE FOOTPATH
- EXISTING ROAD PAVEMENT TO REMAIN
- 16.0 — DESIGN MAJOR CONTOUR (0.5m INTERVALS)
- 16.4 — DESIGN MINOR CONTOUR (0.1m INTERVALS)
- 16.4 — EXISTING CONTOUR (0.2m INTERVALS)
- E — EXISTING ELECTRICAL LINE
- OPT — EXISTING OPTIC FIBRE LINE
- S — EXISTING SEWER LINE
- SW — EXISTING STORMWATER LINE
- T — EXISTING TELSTRA LINE
- W — EXISTING WATER LINE
- / — / — EXISTING FENCE LINE
- BOUNDARY LINE
- EASEMENT LINE
- EXISTING FEATURES DESIGNED BY OTHERS (NOT SURVEYED)
- PROPOSED FEATURES DESIGNED BY OTHERS

0 5 10 15 20m
1:250 (A1)

REV	DATE	DESCRIPTION	DRN	APP
C	28/09/20	ISSUED FOR INFORMATION	J.F.	B.R.
B	19/08/20	20% DETAIL DESIGN ISSUE	J.F.	B.R.
A	14/08/20	ISSUED FOR INFORMATION	J.F.	B.R.

TITLE
CONCEPT PLAN
SHEET 6

DOCUMENT STATUS			SHEET SIZE
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DRAWN: J.Fraser	DESIGNED: J.Fraser	APPROVED: B.Rodgers	SCALE: 1:250
DOCUMENT No.: 16444-MU-SK-0006			REVISION: C

NOT FOR CONSTRUCTION

Appendix B SIDRA Traffic Model Outputs

MOVEMENT SUMMARY

Site: 103 [2032S2 PM_MIT with Slip Ln Dedicated RT (TTPP)- Munibung Road/Hague Road (Site Folder: 2032 Future Yr with Dev Traffic - Scenario 2 Access Arrangement PM)]

Network: N101 [2032S2 PM_MIT with Slip Ln Dedicated RT (TTPP) (Network Folder: 2032 Future Yr with Dev Traffic - Scenario 2 Access Arrangement - Copy)]

Munibung Road/Hague Road - Scenario 2
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Munibung Road														
11	T1	478	3.3	477	3.3	0.127	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		478	3.3	477[N1]	3.3	0.127	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
East: Hague Road														
21	L2	132	3.2	132	3.2	0.141	7.5	LOS A	0.6	4.6	0.44	0.64	0.44	28.8
Approach		132	3.2	132	3.2	0.141	7.5	LOS A	0.6	4.6	0.44	0.64	0.44	28.8
North: Munibung Road														
24	L2	32	3.3	32	3.3	0.220	5.6	LOS A	0.0	0.0	0.00	0.05	0.00	56.9
5	T1	798	2.8	798	2.8	0.220	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	58.4
Approach		829	2.8	829	2.8	0.220	0.2	NA	0.0	0.0	0.00	0.02	0.00	58.3
All Vehicles		1439	3.0	1438[N1]	3.0	0.220	0.8	NA	0.6	4.6	0.04	0.07	0.04	55.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 104 [2032S2 PM_MIT with Slip Ln Dedicated RT (TTPP)- Munibung Road/Bunnings Access/Costco Access (Site Folder: 2032 Future Yr with Dev Traffic - Scenario 2 Access Arrangement PM)]

Network: N101 [2032S2 PM_MIT with Slip Ln Dedicated RT (TTPP) (Network Folder: 2032 Future Yr with Dev Traffic - Scenario 2 Access Arrangement - Copy)]

Munibung Road/Bunnings Access/Costco Access - Scenario 2
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Munibung Road														
1	L2	80	6.6	80	6.6	0.754	30.4	LOS C	11.3	81.2	0.98	0.91	1.11	10.8
2	T1	300	2.5	299	2.5	* 0.754	24.8	LOS B	11.3	81.2	0.98	0.91	1.11	35.7
3	R2	98	3.2	98	3.2	* 0.538	35.8	LOS C	3.0	21.4	0.99	0.78	1.03	11.1
Approach		478	3.3	477 N1	3.3	0.754	28.0	LOS B	11.3	81.2	0.98	0.89	1.10	27.2
East: Costco Access														
4	L2	12	0.0	12	0.0	0.094	19.3	LOS B	0.4	3.0	0.89	0.66	0.89	26.6
5	T1	14	0.0	14	0.0	0.094	13.8	LOS A	0.4	3.0	0.89	0.66	0.89	31.3
6	R2	87	6.0	87	6.0	* 0.421	34.2	LOS C	2.6	18.8	0.97	0.76	0.97	32.6
Approach		113	4.7	113	4.7	0.421	30.2	LOS C	2.6	18.8	0.95	0.74	0.95	32.3
North: Munibung Road														
7	L2	69	3.0	69	3.0	0.675	27.5	LOS B	9.6	69.1	0.94	0.84	0.99	34.4
8	T1	626	2.7	626	2.7	0.675	22.3	LOS B	9.6	69.1	0.95	0.83	0.99	34.5
9	R2	46	2.3	46	2.3	0.253	34.4	LOS C	1.3	9.6	0.96	0.73	0.96	29.3
Approach		742	2.7	742	2.7	0.675	23.5	LOS B	9.6	69.1	0.95	0.83	0.99	34.1
West: Bunnings Access														
10	L2	43	2.4	43	2.4	0.544	33.2	LOS C	3.9	27.8	0.98	0.79	0.99	30.5
11	T1	14	0.0	14	0.0	* 0.544	28.1	LOS B	3.9	27.8	0.98	0.79	0.99	8.9
12	R2	191	3.3	191	3.3	0.544	33.8	LOS C	3.9	27.8	0.98	0.79	1.00	8.6
Approach		247	3.0	247	3.0	0.544	33.4	LOS C	3.9	27.8	0.98	0.79	1.00	14.6
All Vehicles		1580	3.1	1579 N1	3.1	0.754	26.9	LOS B	11.3	81.2	0.96	0.83	1.02	29.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Munibung Road											
P1	Full	53	24.4	LOS C	0.1	0.1	0.90	0.90	189.9	215.2	1.13
East: Costco Access											

P2	Full	53	24.4	LOS C	0.1	0.1	0.90	0.90	188.9	213.9	1.13
North: Munibung Road											
P3	Full	53	24.4	LOS C	0.1	0.1	0.90	0.90	189.9	215.2	1.13
West: Bunnings Access											
P4	Full	53	24.4	LOS C	0.1	0.1	0.90	0.90	188.9	213.9	1.13
All Pedestrians		211	24.4	LOS C	0.1	0.1	0.90	0.90	189.4	214.6	1.13

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 106 [2031S2 PM_MIT Costco Entry (Site Folder: 2032 Future Yr with Dev Traffic - Scenario 2 Access Arrangement PM)]

Network: N101 [2032S2 PM_MIT with Slip Ln Dedicated RT (TTPP) (Network Folder: 2032 Future Yr with Dev Traffic - Scenario 2 Access Arrangement - Copy)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Big Box development														
1	L2	26	4.0	26	4.0	0.043	4.8	LOS A	0.2	1.5	0.35	0.48	0.35	50.6
2	T1	22	4.8	22	4.8	0.043	5.1	LOS A	0.2	1.5	0.35	0.48	0.35	50.6
3	R2	1	0.0	1	0.0	0.043	9.6	LOS A	0.2	1.5	0.35	0.48	0.35	55.4
Approach		49	4.3	49	4.3	0.043	5.0	LOS A	0.2	1.5	0.35	0.48	0.35	50.8
East: Costco														
4	L2	1	0.0	1	0.0	0.142	4.1	LOS A	0.9	6.3	0.17	0.51	0.17	53.3
5	T1	106	4.0	106	4.0	0.142	4.4	LOS A	0.9	6.3	0.17	0.51	0.17	49.4
6	R2	92	5.7	92	5.7	0.142	9.0	LOS A	0.9	6.3	0.17	0.51	0.17	49.4
Approach		199	4.8	199	4.8	0.142	6.5	LOS A	0.9	6.3	0.17	0.51	0.17	49.4
North:														
7	L2	139	1.5	139	1.5	0.125	4.0	LOS A	0.6	4.0	0.10	0.45	0.10	53.4
8	T1	41	7.7	41	7.7	0.125	4.3	LOS A	0.6	4.0	0.10	0.45	0.10	55.1
9	R2	1	0.0	1	0.0	0.125	8.9	LOS A	0.6	4.0	0.10	0.45	0.10	44.9
Approach		181	2.9	181	2.9	0.125	4.1	LOS A	0.6	4.0	0.10	0.45	0.10	53.8
West: Hague Road														
10	L2	1	0.0	1	0.0	0.026	4.4	LOS A	0.1	0.9	0.26	0.46	0.26	33.7
11	T1	25	4.2	25	4.2	0.026	4.6	LOS A	0.1	0.9	0.26	0.46	0.26	52.2
12	R2	6	0.0	6	0.0	0.026	9.2	LOS A	0.1	0.9	0.26	0.46	0.26	52.3
Approach		33	3.2	33	3.2	0.026	5.5	LOS A	0.1	0.9	0.26	0.46	0.26	52.0
All Vehicles		462	3.9	462	3.9	0.142	5.3	LOS A	0.9	6.3	0.17	0.48	0.17	51.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 103 [2032S2 Sat_MIT with Slip Ln Dedicated RT (TTPP)- Munibung Road/Hague Road (Site Folder: 2032 Future Yr with Dev Traffic - Scenario 2 Access Arrangement)]

Network: N101 [2032S2 Sat_MIT with Slip Ln Dedicated RT (TTPP) (Network Folder: 2032 Future Yr with Dev Traffic - Scenario 2 Access Arrangement)]

Munibung Road/Hague Road - Scenario 2
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Munibung Road														
11	T1	673	1.7	595	1.7	0.157	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		673	1.7	595[N1]	1.7	0.157	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
East: Hague Road														
21	L2	194	3.3	194	3.3	0.201	7.4	LOS A	1.0	6.9	0.44	0.64	0.44	29.1
Approach		194	3.3	194	3.3	0.201	7.4	LOS A	1.0	6.9	0.44	0.64	0.44	29.1
North: Munibung Road														
24	L2	16	0.0	16	0.0	0.192	5.5	LOS A	0.0	0.0	0.00	0.03	0.00	58.1
5	T1	719	0.4	719	0.4	0.192	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.0
Approach		735	0.4	735	0.4	0.192	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.0
All Vehicles		1601	1.3	1523[N1]	1.4	0.201	1.0	NA	1.0	6.9	0.06	0.09	0.06	54.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 104 [2032S2 Sat_MIT with Slip Ln Dedicated RT (TTPP)- Munibung Road/Bunnings Access/Costco Access (Site Folder: 2032 Future Yr with Dev Traffic - Scenario 2 Access Arrangement)]

Network: N101 [2032S2 Sat_MIT with Slip Ln Dedicated RT (TTPP) (Network Folder: 2032 Future Yr with Dev Traffic - Scenario 2 Access Arrangement)]

Munibung Road/Bunnings Access/Costco Access - Scenario 2
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Munibung Road														
1	L2	219	0.0	194	0.0	0.799	34.2	LOS C	16.1	113.2	0.98	0.95	1.14	10.1
2	T1	297	1.1	262	1.1	* 0.799	28.6	LOS C	16.1	113.2	0.98	0.95	1.14	33.1
3	R2	157	5.4	139	5.4	* 0.775	43.9	LOS D	5.2	38.4	1.00	0.91	1.30	9.4
Approach		673	1.7	595 N1	1.7	0.799	34.0	LOS C	16.1	113.2	0.99	0.94	1.18	20.3
East: Costco Access														
4	L2	22	4.8	22	4.8	0.189	22.3	LOS B	1.0	6.9	0.92	0.70	0.92	24.2
5	T1	26	0.0	26	0.0	0.189	16.7	LOS B	1.0	6.9	0.92	0.70	0.92	28.8
6	R2	161	3.3	161	3.3	* 0.776	43.1	LOS D	6.0	43.5	1.00	0.92	1.28	29.4
Approach		209	3.0	209	3.0	0.776	37.6	LOS C	6.0	43.5	0.98	0.87	1.20	29.1
North: Munibung Road														
7	L2	145	2.9	145	2.9	0.429	25.0	LOS B	7.1	50.8	0.82	0.75	0.82	34.8
8	T1	372	0.6	372	0.6	0.429	20.9	LOS B	7.1	50.8	0.84	0.72	0.84	35.1
9	R2	74	0.0	74	0.0	0.397	39.5	LOS C	2.5	17.7	0.98	0.76	0.98	27.4
Approach		591	1.1	591	1.1	0.429	24.2	LOS B	7.1	50.8	0.85	0.73	0.85	33.7
West: Bunnings Access														
10	L2	91	1.2	91	1.2	0.814	41.4	LOS C	9.2	64.4	1.00	0.96	1.30	27.4
11	T1	26	0.0	26	0.0	* 0.814	36.2	LOS C	9.2	64.4	1.00	0.96	1.30	7.3
12	R2	340	0.3	340	0.3	0.814	42.0	LOS C	9.2	64.4	1.00	0.95	1.31	7.1
Approach		457	0.5	457	0.5	0.814	41.6	LOS C	9.2	64.4	1.00	0.95	1.30	13.0
All Vehicles		1929	1.4	1851 N1	1.4	0.814	33.2	LOS C	16.1	113.2	0.95	0.87	1.11	23.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Munibung Road											
P1	Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	194.9	215.2	1.10
East: Costco Access											

P2	Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	193.9	213.9	1.10
North: Munibung Road											
P3	Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	194.9	215.2	1.10
West: Bunnings Access											
P4	Full	53	29.3	LOS C	0.1	0.1	0.92	0.92	193.9	213.9	1.10
All Pedestrians		211	29.3	LOS C	0.1	0.1	0.92	0.92	194.4	214.6	1.10

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 106 [2031S2 Sat_MIT Costco Entry (Site Folder: 2032 Future Yr with Dev Traffic - Scenario 2 Access Arrangement)]

Network: N101 [2032S2 Sat_MIT with Slip Ln Dedicated RT (TTPP) (Network Folder: 2032 Future Yr with Dev Traffic - Scenario 2 Access Arrangement)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Big Box development														
1	L2	55	1.9	55	1.9	0.106	5.3	LOS A	0.6	4.0	0.45	0.54	0.45	50.0
2	T1	59	1.8	59	1.8	0.106	5.5	LOS A	0.6	4.0	0.45	0.54	0.45	50.0
3	R2	1	0.0	1	0.0	0.106	10.1	LOS A	0.6	4.0	0.45	0.54	0.45	55.0
Approach		115	1.8	115	1.8	0.106	5.5	LOS A	0.6	4.0	0.45	0.54	0.45	50.1
East: Costco														
4	L2	1	0.0	1	0.0	0.214	4.4	LOS A	1.4	10.3	0.26	0.53	0.26	52.8
5	T1	139	3.8	139	3.8	0.214	4.6	LOS A	1.4	10.3	0.26	0.53	0.26	48.5
6	R2	149	2.8	149	2.8	0.214	9.3	LOS A	1.4	10.3	0.26	0.53	0.26	48.5
Approach		289	3.3	289	3.3	0.214	7.0	LOS A	1.4	10.3	0.26	0.53	0.26	48.6
North:														
7	L2	236	2.2	223	2.2	0.196	3.9	LOS A	1.0	7.2	0.06	0.45	0.06	53.6
8	T1	94	7.9	88	7.7	0.196	4.2	LOS A	1.0	7.2	0.06	0.45	0.06	55.3
9	R2	1	0.0	1	0.0	0.196	8.8	LOS A	1.0	7.2	0.06	0.45	0.06	45.4
Approach		331	3.8	312 N1	3.7	0.196	4.0	LOS A	1.0	7.2	0.06	0.45	0.06	54.0
West: Hague Road														
10	L2	4	0.0	4	0.0	0.014	4.7	LOS A	0.1	0.5	0.35	0.46	0.35	33.4
11	T1	11	0.0	11	0.0	0.014	5.0	LOS A	0.1	0.5	0.35	0.46	0.35	52.5
12	R2	1	0.0	1	0.0	0.014	9.6	LOS A	0.1	0.5	0.35	0.46	0.35	52.4
Approach		16	0.0	16	0.0	0.014	5.2	LOS A	0.1	0.5	0.35	0.46	0.35	50.5
All Vehicles		751	3.2	732 N1	3.3	0.214	5.5	LOS A	1.4	10.3	0.21	0.49	0.21	51.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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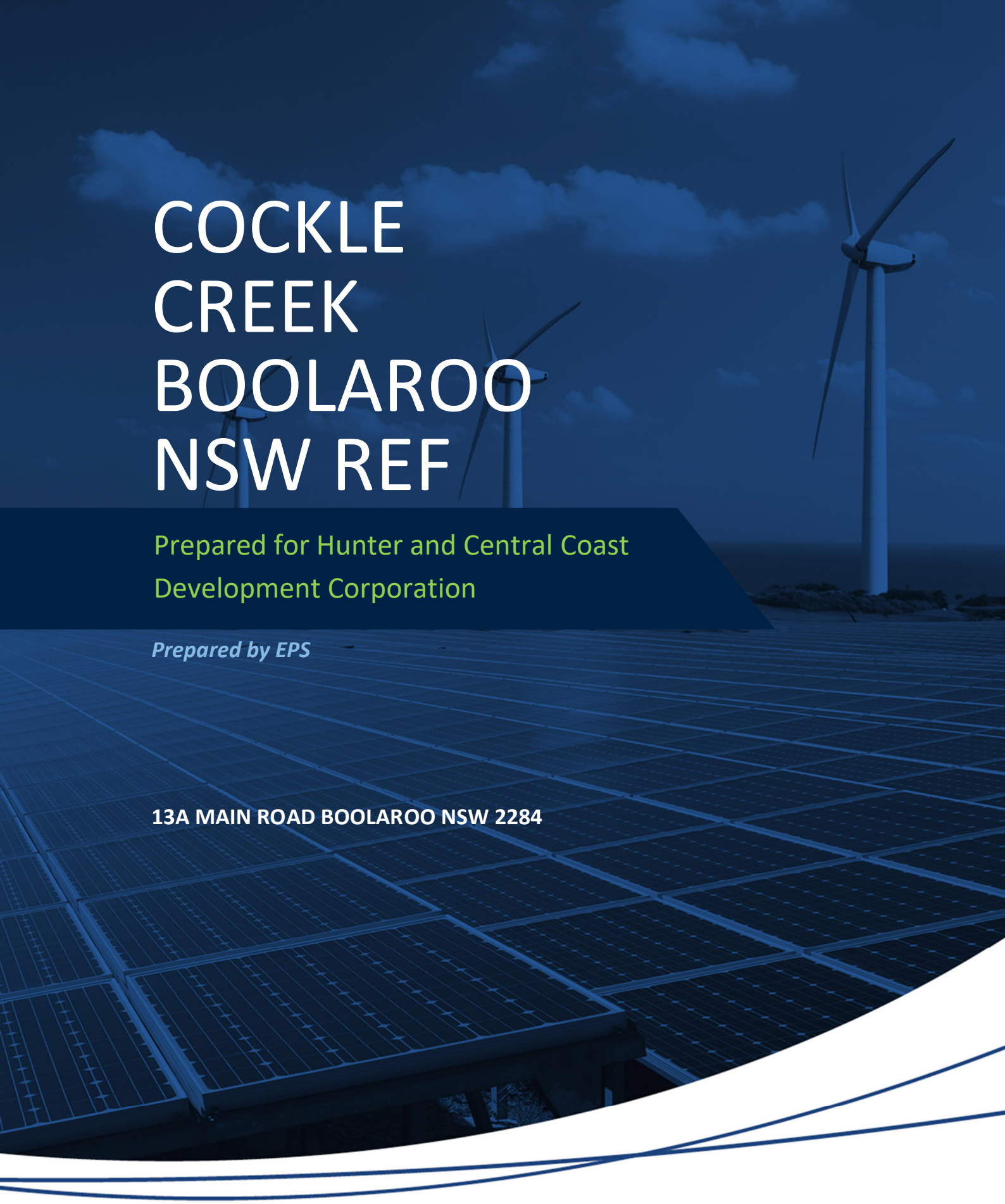
APPENDIX 7

INFRASTRUCTURE SEPP CONSULTATION REQUIREMENTS

October 2020

EPS



COCKLE CREEK BOOLAROO NSW REF

Prepared for Hunter and Central Coast Development Corporation

Prepared by EPS

13A MAIN ROAD BOOLAROO NSW 2284

EPS

Reference No. 11488 October 2020

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ISEPP CONSULTAION REQUIRMENTS		
Requirement	**Consultation Required**	**Comment**
Section 13 Consultation with councils—development with impacts on council-related infrastructure or services (1) This clause applies to development carried out by or on behalf of a public authority that this Policy provides may be carried out without consent if, in the opinion of the public authority, the development:		
(a) will have a substantial impact on stormwater management services provided by a council, or	No consultation with LMCC is required.	The proposal will not have a substantial impact on stormwater management services provided by council. The consultation requirements do not apply because HCCDC is required to give notice of the intention to carry out the proposal to LMCC because an approval is required from LMCC (section 17 (1)(a).
(b) is likely to generate traffic to an extent that will strain the capacity of the road system in a local government area, or	No consultation with LMCC is required.	The proposal is unlikely to generate traffic to an extent that will strain the capacity of the road system in a local government area. The consultation requirements do not apply because HCCDC is required to give notice of the intention to carry out the proposal to LMCC because an approval is required from LMCC (section 17 (1)(a).
(c) involves connection to, and a substantial impact on the capacity of, any part of a sewerage system owned by a council, or	No consultation with LMCC is required.	The proposal involves connection to part of a sewerage system owned by HWC therefore the proposal will not have a substantial impact on the capacity of, any part of a sewerage system owned by a council. The consultation requirements do not apply because HCCDC is required to give notice of the intention to carry out the proposal to LMCC because an approval is required from LMCC (section 17 (1)(a).

(d) involves connection to, and use of a substantial volume of water from, any part of a water supply system owned by a council, or	No consultation with LMCC is required.	The proposal involves connection to part of a water system owned by HWC therefore the proposal will not have a substantial impact on the capacity of, any part of a water system owned by a council. The consultation requirements do not apply because HCCDC is required to give notice of the intention to carry out the proposal to LMCC because an approval is required from LMCC(section 17 (1)(a).
(e) involves the installation of a temporary structure on, or the enclosing of, a public place that is under a council's management or control that is likely to cause a disruption to pedestrian or vehicular traffic that is not minor or inconsequential, or	No consultation with LMCC is required.	The proposal will involve the installation of a temporary structure on, or the enclosing of, a public place that is under a council's management or control that is likely to cause a disruption to pedestrian or vehicular traffic that is not minor or inconsequential. The consultation requirements do not apply because HCCDC is required to give notice of the intention to carry out the proposal to LMCC because an approval is required from LMCC(section 17 (1)(a).
(f) involves excavation that is not minor or inconsequential of the surface of, or a footpath adjacent to, a road for which a council is the roads authority under the Roads Act 1993 (if the public authority that is carrying out the development, or on whose behalf it is being carried out, is not responsible for the maintenance of the road or footpath).	No consultation with LMCC is required.	The proposal will involve excavation of the surface of, or a footpath adjacent to, a road for which a council is the roads authority under the Roads Act 1993 (if the public authority that is carrying out the development, or on whose behalf it is being carried out, is not responsible for the maintenance of the road or footpath). The consultation requirements do not apply because HCCDC is required to give notice of the intention to carry out the proposal to LMCC because an approval is required from LMCC for the proposal (section 17 (1)(a).
(2) A public authority, or a person acting on behalf of a public authority, must not carry out development to which this clause applies unless the authority or the person has:		

(a) given written notice of the intention to carry out the development (together with a scope of works) to the council for the area in which the land is located, and **(b) taken into consideration any response to the notice that is received from the council within 21 days after the notice is given.**		
Section 14 Consultation with councils—development with impacts on local heritage **(1) This clause applies to development carried out by or on behalf of a public authority if the development:**		
(a) is likely to affect the heritage significance of a local heritage item, or of a heritage conservation area, that is not also a State heritage item, in a way that is more than minor or inconsequential, and	No consultation with LMCC is required.	The proposal is unlikely to affect the heritage significance of a local heritage item in a way that is more than minor or inconsequential. The consultation requirements do not apply because HCCDC is required to give notice of the intention to carry out the proposal to LMCC because an approval is required from LMCC for the proposal (section 17 (1)(a).
(b) is development that this Policy provides may be carried out without consent.	No consultation with LMCC is required.	The proposal is unlikely to affect the heritage significance of a local heritage item in a way that is more than minor or inconsequential. The consultation requirements do not apply because HCCDC is required to give notice of the intention to carry out the proposal to LMCC because an approval is required from LMCC(section 17 (1)(a).
(2) A public authority, or a person acting on behalf of a public authority, must not carry out development to which this clause applies unless the authority or the person has: **(a) had an assessment of the impact prepared, and** **(b) given written notice of the intention to carry out the development, with a copy of the assessment and a scope of works, to the council for the area in which the heritage item or heritage conservation area (or the relevant part of such an area) is located, and** **(c) taken into consideration any response to the notice that is received from the council within 21 days after the notice is given.**		
15 Consultation with councils—development with impacts on flood liable land **(1) In this clause, flood liable land means land that is susceptible to flooding by the probable maximum flood event, identified in accordance with the principles set out in the manual entitled Floodplain Development Manual: the management of flood liable land published by the New South Wales Government and as in force from time to time.**		

(2) A public authority, or a person acting on behalf of a public authority, must not carry out, on flood liable land, development that this Policy provides may be carried out without consent and that will change flood patterns other than to a minor extent unless the authority or person has: **(a) given written notice of the intention to carry out the development (together with a scope of works) to the council for the area in which the land is located, and** **(b) taken into consideration any response to the notice that is received from the council within 21 days after the notice is given.**	No consultation with LMCC is required.	The proposal will not be carried out on flood liable land. The consultation requirements do not apply because HCCDC is required to give notice of the intention to carry out the proposal to LMCC because an approval is required from LMCC(section 17 (1)(a).
15AA Consultation with State Emergency Service—development with impacts on flood liable land		
(1) A public authority, or a person acting on behalf of a public authority, must not carry out development on flood liable land that may be carried out without development consent under a relevant provision unless the authority or person has - **(a) given written notice of the intention to carry out the development (together with a scope of works) to the State Emergency Service, and** **(b) taken into consideration any response to the notice that is received from the State Emergency Service within 21 days after the notice is given.** **(2) Any of the following provisions in Part 3 is a *relevant provision*—** **(h) Division 17 (Roads and traffic),** **(i) Division 20 (Stormwater management systems)**	No consultation with State Emergency Service is required.	The proposal will not be carried out on flood liable. land.
15A Consultation with councils—development with impacts on certain land within the coastal zone **(1) This clause applies to development on land that is within a coastal vulnerability area and is inconsistent with a certified coastal management program that applies to that land.**		

(2) A public authority, or a person acting on behalf of a public authority, must not carry out development to which this clause applies, which this Policy provides may be carried out without development consent, unless the authority or person has: **(a) given written notice of the intention to carry out the development to the council for the local government area in which the land is located, and** **(b) taken into consideration any response to the notice that is received from the council within 21 days after the notice is given.**	No consultation with LMCC is required.	The proposal will not be carried out in a coastal vulnerability area. The consultation requirements do not apply because HCCDC is required to give notice of the intention to carry out the proposal to LMCC because an approval is required from LMCC(section 17 (1)(a).
16 Consultation with public authorities other than councils **(1) A public authority, or a person acting on behalf of a public authority, must not carry out specified development that this Policy provides may be carried out without consent unless the authority or person has:** **(a) given written notice of the intention to carry out the development (together with a scope of works) to the specified authority in relation to the development, and** **(b) taken into consideration any response to the notice that is received from that authority within 21 days after the notice is given.** **(2) For the purposes of subclause (1), the following development is specified development and the following authorities are specified authorities in relation to that development:**		
(a) development adjacent to land reserved under the National Parks and Wildlife Act 1974 or to land acquired under Part 11 of that Act—the Office of Environment and Heritage,	No consultation with the Office of Environment and Heritage (or equivalent), is required.	The proposal is not adjacent to land reserved under the National Parks and Wildlife Act 1974 or to land acquired under Part 11 of that Act.
(b) development on land in Zone E1 National Parks and Nature Reserves or in a land use zone that is equivalent to that zone—the Office of Environment and Heritage,	No consultation with the Office of Environment and Heritage (or equivalent), is required.	The proposal is not on land in Zone E1 National Parks and Nature Reserves or in a land use zone that is equivalent to that zone.
(c) development adjacent to an aquatic reserve or a marine park declared under the Marine Estate Management Act 2014—the Department of Industry,	No consultation with the Department of Industry (or equivalent), is required.	The proposal is not adjacent to an aquatic reserve or a marine park declared under the Marine Estate Management Act 2014.

(d) development in the foreshore area within the meaning of the Sydney Harbour Foreshore Authority Act 1998—the Sydney Harbour Foreshore Authority,	No consultation with the Sydney Harbour Foreshore Authority (or equivalent) is required.	The proposal is not in the foreshore area within the meaning of the Sydney Harbour Foreshore Authority Act 1998.
(e) development comprising a fixed or floating structure in or over navigable waters—Roads and Maritime Services,	No consultation with Roads and Maritime Services (or equivalent), is required.	The proposal does not include a fixed or floating structure in or over navigable waters.
(f) development for the purposes of a health services facility, correctional centre or group home, or for residential purposes, in an area that is bush fire prone land (as defined by the Act)—the NSW Rural Fire Service,	No consultation with the NSW Fire Service (or equivalent), is required.	The proposal is not for the purposes of a health services facility, correctional centre or group home, or for residential purposes, in an area that is bush fire prone land (as defined by the Act).
(g) development that may increase the amount of artificial light in the night sky and that is on land within the dark sky region as identified on the dark sky region map—the Director of the Observatory,	No consultation with the Director of the Observatory (or equivalent), is required.	The proposal is not on land within the dark sky region as identified on the dark sky region map.
(h) development on defence communications facility buffer land within the meaning of clause 5.15 of the Standard Instrument—the Secretary of the Commonwealth Department of Defence,	No consultation with the Secretary of the Commonwealth Department of Defence (or equivalent), is required.	The proposal is not on defence communications facility buffer land within the meaning of clause 5.15 of the Standard Instrument.
(i) development on land in a mine subsidence district within the meaning of the Mine Subsidence Compensation Act 1961—the Mine Subsidence Board.	Consultation with Subsidence Advisory NSW is required.	The proposal is on land in the Lake Macquarie Mine Subsidence District within the meaning of the Coal Mine Subsidence Compensation Act 2017.

APPENDIX 8

CLAUSE 228 FACTORS CHECKLIST

Checklist of Clause 228 Factors

Factor	Impact
(a) any environmental impact on a community?	Minor short-term environmental impacts on a small part of the community may be experienced during the proposal's construction period from noise, vibration, traffic and dust. Safeguards and mitigation measures have been proposed.
(b) any transformation of a locality?	Minor short-term impacts on a small part of the locality may be experienced from the proposal's construction works e.g. earthworks and trenching. Safeguards and mitigation measures have been proposed.
(c) any environmental impact on the ecosystems of the locality?	Minor short-term impacts on a small part of the ecosystems of the locality may be experienced from the proposal's construction works e.g. earthworks and trenching. Safeguards and mitigation measures have been proposed.
(d) any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?	Minor short-term impacts may reduce, aesthetic, recreational and/or scientific quality or value for a small part of the locality from the proposal's construction works e.g. earthworks and trenching. Safeguards and mitigation measures have been proposed.
(e) any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?	Minor short-term impacts on a place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations may be experienced from the proposal's construction works e.g. earthworks and trenching. Safeguards and mitigation measures have been proposed.
(f) any impact on the habitat of protected animals (within the meaning of the Biodiversity Conservation Act 2016)?	Impacts are not expected, and mitigation measures are proposed. Refer to Flora and Fauna Assessment Report.
(g) any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?	Impacts are not expected, and mitigation measures are proposed. Refer to Flora and Fauna Assessment Report.
(h) any long-term effects on the environment?	The proposal provides for safe and efficient transfer of water/wastewater and upgrades public services/utilities. The proposal will have a positive long-term effect.
(i) any degradation of the quality of the environment?	The proposal provides for safe and efficient transfer of water and wastewater and upgrades

	public services/utilities. The proposal will have a positive long-term effect.
(j) any risk to the safety of the environment?	The proposal provides for safe and efficient transfer of water/wastewater and upgrades public services/utilities. The proposal will have a positive long-term effect.
(k) any reduction in the range of beneficial uses of the environment?	The proposal will be in part located underground and will in part upgrade existing public services/utilities therefore will not impact on the beneficial uses of the environment. It will allow development to be serviced in the Study area and in the site.
(l) any pollution of the environment?	The proposal provides for safe and efficient transfer of wastewater preventing it from polluting the environment. The proposal will have a positive long-term effect.
(m) any environmental problems associated with the disposal of waste?	The proposal provides for safe and efficient transfer of wastewater. The proposal will have a positive long-term effect.
(n) any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?	Nil.
(o) any cumulative environmental effect with other existing or likely future activities?	Nil.
(p) any impact on coastal processes and coastal hazards, including those under projected climate change conditions?	Nil.