

# **REVIEW OF ENVIRONMENTAL FACTORS**

**Heathcote Road/Bardia Parade and Walder  
Road, Holsworthy Upgrade**

13 July 2020

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**Appendix A – Concept Design Drawings**

**Appendix B – Vegetation Assessment**

**Appendix C – Noise Assessment**

**Appendix D - PACHCI Clearance Letter**

**Appendix E – Heritage BioNet Atlas map**

\*These studies were previously undertaken by the RMS (now TfNSW) in 2016. These studies are considered by the LCC as adequate for the current study and no further updated study was undertaken.

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<sup>1</sup> Appendix B, C and D were prepared in 2016 for RMS, and LCC have confirmed they are applicable for this proposal.

## Revision History

Revision N°	Prepared By	Description	Date
0	Ying Liu	Revised Draft REF	27 April 2020
1	Ying Liu	Final REF	13 July 2020

## Document Acceptance

Action	Name	Signed	Date
Prepared by	Ying Liu		13 July 2020
Reviewed by	Mike Simons		13 July 2020
Approved by	Chris Oakes		13 July 2020
on behalf of	Beca Pty Limited		

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## Abbreviations

Terms and acronyms commonly used in this report are outlined in the glossary table below.

Abbreviation/Term	Definition
AHIMS	Aboriginal Heritage Information Management System
BC Act	NSW Biodiversity Conservation Act 2016
CBD	Central Business District
CEMP	Construction Environmental Management Plan
DBYD	Dial Before You Dig
DoE	Federal Department of the Environment
DPIE	Department of Planning, Industry and Environment
EP&A Act	Environmental Planning and Assessment Act 1979
EPA	NSW Environment Protection Authority
EPA Regs	NSW Environmental Planning and Assessment Regulation 2000
EPBC Act 1999	Australian Government's Environment Protection and Biodiversity Conservation Act 1999
ESCP	Erosion and Sediment Control Plan
FM Act	NSW Fisheries Management Act 1994
ISEPP	NSW State Environmental Planning Policy (Infrastructure) 2007
LCC	Liverpool City Council
LGA	Liverpool City Council Local Government Area
Liverpool LEP 2008	Liverpool Local Environmental Plan 2008
NES	National Environmental Significance
NPW Act	National Parks and Wildlife Act 1974
NSW	New South Wales
PACHCI	Roads and Maritime Procedure for Aboriginal Cultural Heritage Consultation and Investigation
POEO ACT	Protection of the Environment Operations Act 1997
REF	Review of Environmental Factors
RMS2	Roads and Maritime Services
ROL	Road Occupying License
SEPPs	State Environmental Planning Policies
SPRAT	Department of the Environment Species Profile and Threats
TCS	Traffic Control Signal
TfNSW	Transport for New South Wales
TMC	Transport Management Centre

<sup>2</sup> Where reference in this document and consultation has been made to Roads and Maritime Services (RMS) it should be noted that from 1 December 2019 RMS has become an integral part of Transport for New South Wales (TfNSW) and is no longer a separate service entity of TfNSW. References made to RMS is construed as a reference to TfNSW (Network Integration team) where appropriate.

# 1 Introduction

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In 2019, Liverpool City Council (LCC) secured Federal funding under the Western Sydney Infrastructure Program (WSIP), round 3, to upgrade the Heathcote Road/Bardia Parade/Walder Road intersection, Holsworthy.

In 2016, the then RMS carried out traffic studies under its pinch point program and identified that improvement to the Heathcote Road, Bardia Parade and Walder Road intersection, is required to improve road safety and traffic efficiency at the intersection. The identified improvements include the construction of a high angle left turn slip lane from Bardia Parade into Heathcote Road, Traffic Control Signal (TCS) changes, and a new signalised pedestrian crossing across Heathcote Road on the southbound approach, as well as civil works including realignment of kerbs and underground services, adjusting footpaths, new medians, signposting and line markings.

The then RMS engaged Downer Mouchel to carry out the identified intersection improvement works. RMS prepared detailed design and approved the required amended TCS plan. In addition, a strategic concept design of a required water-main relocation in Walder Road and draft Review of Environmental Factors (REF) were prepared but not finalised.

Detailed design of the intersection improvement was carried out; however, funding allocation did not include the required civil works and associated relocation of the water main in Walder Road. Liverpool City Council (LCC) has now received funding to undertake the works **(the proposal)**.

## Purpose of the Report

Implementation of the civil works requires a Works Authorisation Deed (WAD) which in turn requires the project REF to be updated. The REF has been updated by Beca Pty Ltd on behalf of LCC.

For the purposes of this work, LCC is the proponent and the determining authority under Part 5 of the EP&A Act. The purpose of this REF is to describe the proposal, to document the likely impacts of the proposal, and to detail the mitigation measures that would be implemented.

The description of proposal and associated environmental impact have been undertaken in the context of Clause 228 of the NSW Environmental Planning and Assessment Regulation 2000 (EPA Regs), the NSW Biodiversity Conservation Act 2016 (BC Act), the NSW Fisheries Management Act 1994 (FM Act) and the Australian Government's Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

In doing so, this REF helps to fulfil the requirements of Section 111 of the EP&A Act, which requires LCC to examine and consider to the fullest extent possible, all matters affecting or likely to affect the environment by carrying out the work.

The findings of the REF would be considered 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 and Infrastructure 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 5A of the EP&A Act and therefore the requirement for a Species Impact Statement.
- The potential for the proposal to significantly impact a matter of national environmental significance or Commonwealth land and the need to make a referral to the Australian Government Department of Environment for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.

- 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, and whether offsets are required and able to be secured

## 2 The Proposal

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### 2.1 Proposal Identification

**Title:** Heathcote Road/Bardia Parade and Walder Road Intersection Upgrade, Holsworthy.

**Road name and number:** Heathcote Road, Bardia Avenue and Walder Road, Holsworthy (GPS Coordinates: -33.949238°S, 150.950128°E).

**Closest crossroad(s):** The site includes the Heathcote Road, Bardia Avenue and Walder Road intersection and approaches along Heathcote Road, Bardia Parade and Walder Road.

**Local Government Area:** Liverpool City Council.

**Transport for NSW region:** Metro.

**Description of works:** LCC has decided in consultation with the Transport for NSW (TfNSW) to complete the Heathcote Road/Bardia Parade and Walder Road intersection upgrade.

Previous identified improvements include the construction of a high angle left turn slip lane from Bardia Parade into Heathcote Road, Traffic Control Signal (TCS) changes, and a new signalised pedestrian crossing across Heathcote Road on the southbound approach, as well as civil works including realignment of kerbs and underground services, adjusting footpaths, new medians, signposting and line marking.

As indicated above, due to inadequate funding allocations, the proposed upgrade works were not undertaken in 2016.

The purpose of this project is to improve road safety and improve traffic efficiency. The proposal includes:

- Construction of a high angle left slip lane from Bardia Parade into Heathcote Road, including installation of a signalised shared bicycle/pedestrian crossing.
- Implementation of double diamond phasing and associated TCS amendments at the intersection.
- Implementation of one new signalised pedestrian crossing across Heathcote Road, north of the intersection and realignment of two other pedestrian crossings.
- Civil works to adjust existing footpath to match new kerb alignment and kerb ramp locations.
- Localised road widening of Walder Road to accommodate required design vehicle turning paths.
- Modification of the existing signposting and line marking to suit the new signalised intersection arrangement.
- Intersection realignment, line marking and installation of a 40m long, 0.5m wide central median lane in Walder Road.
- Relocation of an affected water main in Walder Road to permit the localised road widening.
- Upgrade of street lighting in Bardia Parade section approximately 100m from the intersection with Heathcote Road and also along the proposed slip lane in Bardia Parade.

Overall, the proposed works aimed to improve road safety and amenity for pedestrians, whilst improving traffic efficiency at the intersection. In addition to the existing traffic control arrangement, signalised pedestrian crossings will be maintained, and new pedestrian signalised crossings incorporated to provide signalised pedestrian crossings across all the intersection approaches.

Design drawings of the proposed intersection upgrade works are included as **Appendix A**.

## 2.2 Proposal background

The intersection of Heathcote Road with Bardia Parade and Walder Road at Holsworthy is currently a signalised intersection with pedestrian provisions on three of the four legs. Investigations by RMS in 2016 indicated the safety and efficiency of the right turn movements from Walder Road could be improved with the implementation of a diamond phase for the right turn movements into and out of Heathcote Road. It also identified the need to improve bus movements from Heathcote Road southbound towards Walder Road.

The purpose of this project is to improve safety and manage congestion. In 2016, RMS investigated the intersection under its pinch point program to improve safety and efficiency of traffic movements through the intersection.

Heathcote Road is a four-lane divided roadway from north of its intersection with M5 Motorway northbound off and on ramps, Moorebank, to south of Infantry Parade, Holsworthy, Short right turning lanes exists at all existing signalised intersection between M5 Motorway and Infantry Parade.

Walder Road and Bardia Parade are both dual lane local roads under LCC jurisdiction. The intersection is fully signalised, with filter right turns from Walder Road and Bardia Parade and a 'diamond phase' from Heathcote Road into Walder Road and Bardia Parade.

Heathcote Road is a state road and managed by TfNSW. Walder Road, Bardia Parade and other local roads in the area which are managed by LCC.

Heathcote Road is a critical arterial road for the developing outer areas of Sydney's western suburbs. Heathcote Road provides a link to the South Western Motorway, which links the west of Sydney to the airport and CBD with Princess Highway at Heathcote. Heathcote Road also provides link to Military establishment in Holsworthy and the Holsworthy Railway Station which is used to commute to and from work and home.

## 2.3 Project Location and Context

Heathcote Road is a divided State Road with two (2) lanes in each direction and has a sign posted speed limit of 60km/h. Bardia Parade and Walder Road are local roads with one lane in each direction with a sign posted speed limit of 50km/h.

Heathcote Road provides an interchange to the South Western Motorway (M5), a major arterial road distributing traffic to and from the south west of Sydney. Bardia Parade and Walder Road service the surrounding predominantly residential suburbs of Wattle Grove and Hammondville respectively. Traffic through the intersection is controlled by traffic lights, while shared path along Heathcote Road exists on the west side. Heathcote Road, Walder Road and Bardia Parade is part of local bus routes connecting surrounding area with Liverpool railway interchange. The project location is as indicated in the locality maps figure 2.1 and 2.2 and the layout of the intersection upgrade is shown in figure 2.3 below.



Figure 2-1: Locality map (source: Google Maps, July 2020)

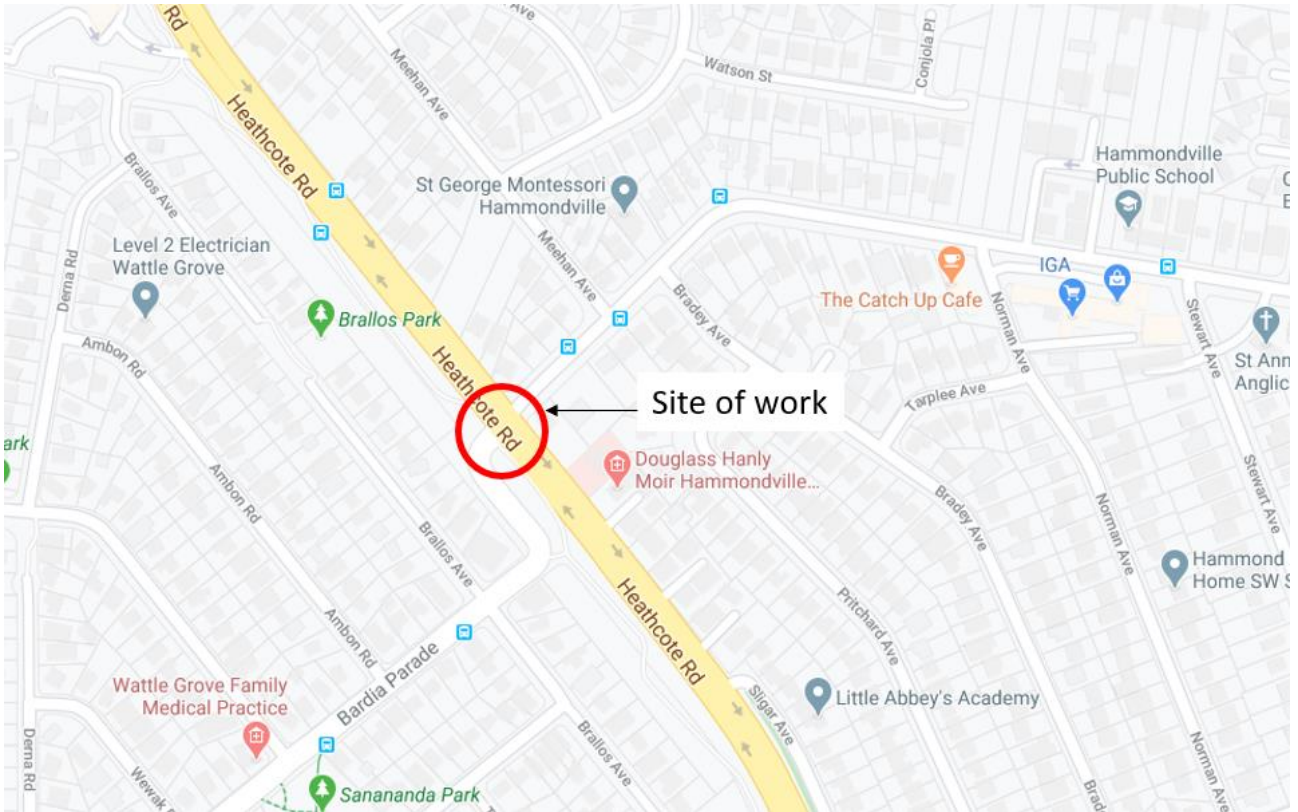


Figure 2-2: Location of the proposed works (source: Google Maps, July 2020)





Figure 2-3: Proposed works (source: Google Maps, July 2020)



Three bus routes are currently operational through the intersection connecting Holsworthy to Sandy Point and Liverpool railway interchange respectively, via outlying suburbs including Wattle Grove and Moorebank.

The proposed work site is predominantly surrounded by low density residential areas including Hammond Care aged care facilities, high and primary schools, Holsworthy railway station, open space connectivity routes for pedestrians and community facilities including a medical centre, shopping centre, clubs and pubs, and car parking areas. Holsworthy Barracks military facility is located approximately 1.5 kilometres south of the intersection, while the closest sensitive environmental receptors include Lieutenant Cantello Reserve and Williams Creek (1.5 kilometres east), Georges River (2 kilometres east) and Harris Creek Reserve (1.2 kilometres south).

## 2.4 Environmental and Community Impact

The proposed intersection upgrade works may cause varying impacts to the environment and community, of which this REF considers in detail.

As shown in Figure 2-4, the proposed introduction of a high entry left turn lane exiting Bardia Parade into Heathcote Road, including the installation of a pedestrian crossing, and the implementation of double diamond phasing and associated TCS amendments at the Heathcote Road / Bardia Parade intersection will require the removal of a minor amount of roadside vegetation.

This vegetation has been investigated as part of a preliminary vegetation assessment to identify potentially significant species and habitat which may require State or Commonwealth referral. The assessment conducted by Ecology and Heritage Partners in July 2016, during the initial project phase, concluded the following:

- The survey area includes a small patch of roadside vegetation covering approximately 170 square metres.
- The vegetation proposed to be removed consists of a small cluster of trees, including one large and well-established Grey Ironbark (*Eucalyptus paniculata*), four Flax-leaved Paperbarks (*Melaleuca linarifolia*) and one small Parramatta Red Gum (*Eucalyptus parametensis*).
- The understory is dominated by introduced grasses typical roadsides and lawns, with scattered weeds also present.
- All of the above species are indigenous to the area.
- It is likely that these trees and shrubs are planted.
- No Threatened flora species were observed during field investigations.
- Vegetation is likely to provide limited habitat opportunities for vertebrate fauna.
- The proposed tree removal will not have any impact on any matters of National Environmental Significance (EPBC Act 1999).
- The flora species identified are not listed as threatened under the BC Act.

It is understood that this vegetation has been planted for amenity purposes along the southern side of the pedestrian footpath along Heathcote Road. This vegetation includes a mixture of native and exotic species and does not hold any significant ecological value or habitat. The full impacts of these works will be fully assessed as per the requirements of the Environmental Planning and Assessment Act 1979. Any unavoidable impacts to existing vegetation will be in accordance with relevant biodiversity guidelines and legislation. The vegetation assessment was conducted in 2016 by the RMS (now TfNSW). The vegetation study is considered by the LCC as adequate for the current study and no further updated study was undertaken.

A copy of the Ecology and Heritage Partners vegetation assessment has been included as **Appendix B**.

With consideration to the proposed works, it is understood that there is the potential for some minor construction related amenity impacts to the local environment and surrounding community. This REF will seek to accurately define the relative risk associated with the proposed works upon the community and the environment and identify the importance of upgrading this infrastructure and its associated safety profile.

The community, inclusive of road users and pedestrians, will be exposed to limited periods altered traffic conditions during staged construction works. Pedestrian pathways traversing the works area may also be re-aligned temporarily during construction, or controlled via traffic management, to reduce the interface between the public and the construction area.



Figure 2-1: Aerial view of vegetation impacted by the proposed works (source: Google Maps, July 2020)

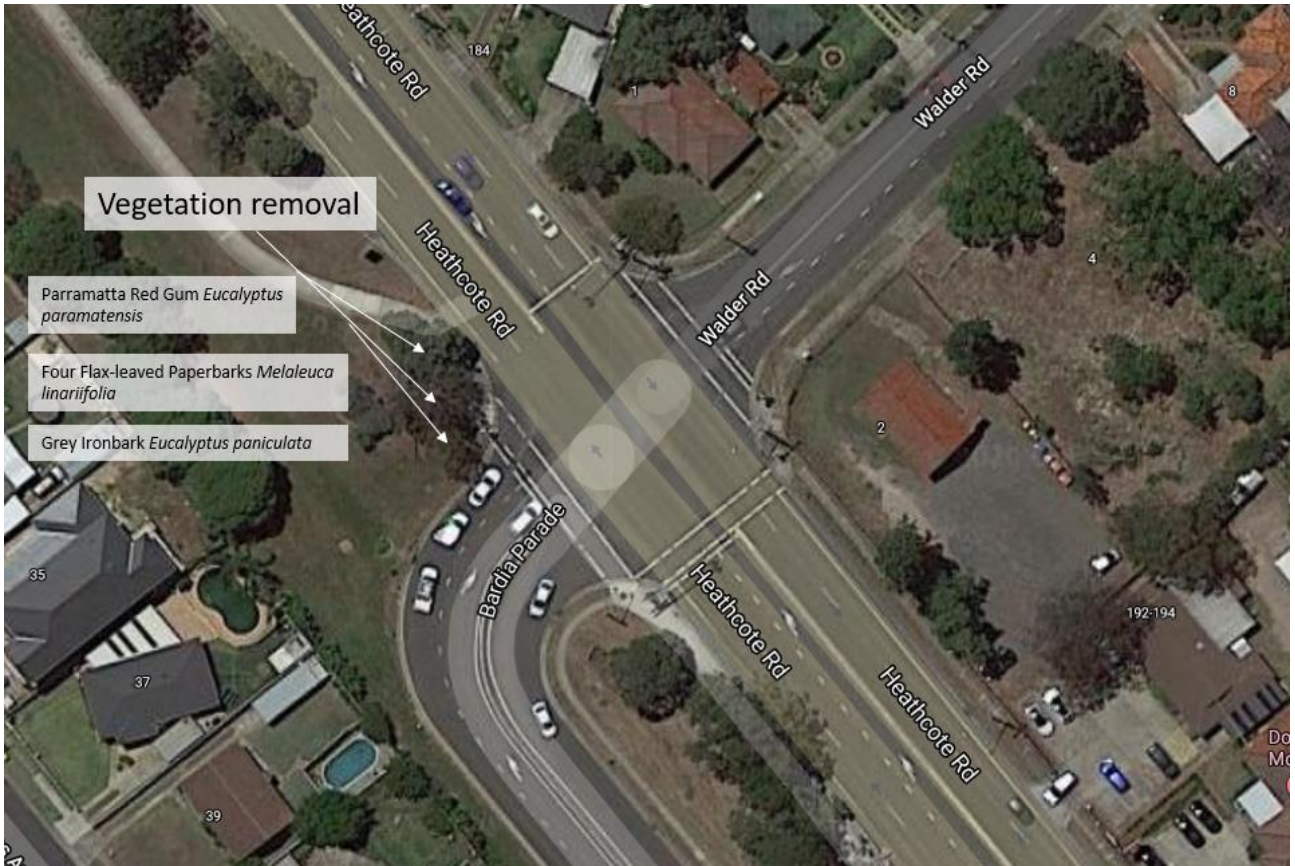


Figure 2-2: Street view of roadside vegetation within the proposed project boundary (source: NearMap)



## 2.5 Underground services

The proposal has been designed with the objective of avoiding disruptions to existing services and utilities. This will be monitored closely throughout the design and construction phases of the works.

A *Dial Before You Dig* search (DBYD) was undertaken on 30 March 2020. Utilities authorities with assets within the vicinity of the project are listed in Table 2-1. Further DBYD searches will be undertaken prior to works commencing.

The proposed works and design have been planned in a manner which will avoid impacts to, and relocation of, existing services and utilities within the area of works. This will be monitored closely throughout the design and construction phases of the works.

Table 2-1: Utility services

	Asset Owner	Existing Asset	Existing Utility Description
1	Endeavour Energy	No asset affected	N/A
2	Jemena Gas West	3500kPa 500mm primary main	A primary gas main crosses Bardia Parade west of the intersection running parallel to Heathcote Road.
3	Jemena Gas West	210kPa 200mm steel main	A gas main runs along the eastern verge of Heathcote Road crossing Walder Road.
4	Jemena Gas West	210kPa 50mm steel main	A gas main runs along the northern verge of Walder Road branching off the 200mm steel main in Heathcote Road.
5	Optus Uecomm	Optus fibre in Other Utility conduit	An asset runs along the west side of Bardia Parade, parallel to Heathcote Road.
6	Sydney Water	DN500 cast iron cement lined (CICL) water main	A water main runs along the western verge of Heathcote Road crossing Bardia Parade.
7	Sydney Water	DN300 CICL water main	A water main branches off the DN500 CICL and continues north along the west side of Heathcote Road.
8	Sydney Water	DN300 CICL water main	A water main runs along the eastern verge of Heathcote Road crossing Walder Road.
9	Sydney Water	DN300 steel cement lined (SCL) water main	A water main branches off the DN500 CICL and crosses Heathcote Road.
10	Sydney Water	DN200 CICL water main	A water main runs along the southern verge of Walder Road branching off the 300 CICL water main running along the eastern verge of Heathcote Road.
11	Sydney Water	DN200 ductile iron cement lined (DICL) water main	A water main runs along the southern verge of Walder Road branching off the 300 CICL water main running along the eastern verge of Heathcote Road.
12	Sydney Water	DN100 CICL water main	A water main runs along the northern verge of Walder Road branching off the 300 CICL water main running along the eastern verge of Heathcote Road.
13	Sydney Water	DN500 SCL sewer rising main (concrete encased)	A sewer rising main runs along the western verge of Heathcote Road crossing Bardia Parade.

	Asset Owner	Existing Asset	Existing Utility Description
14	Sydney Water	DN400/300 vitrified clay (VC) sewer main	A sewer main runs along the eastern boundary of Heathcote Road crossing Walder Road and changes size at the manhole within the intersection.
15	Sydney Water	DN150 VC sewer main	A sewer main runs along the southern edge of Walder Road carriageway and connects into the manhole within the intersection.
16	Sydney Water	Disused water main	A disused water main runs along the eastern verge of Heathcote Road crossing Walder Road and branches to cross Heathcote Road at the northern leg of the intersection.
17	Sydney Water	Disused sewer main	A disused sewer main crosses Heathcote Road and Bardia Parade at the southern leg of the intersection.
18	Telstra	35mm PVC conduit	A 35mm conduit runs along the eastern verge of Heathcote Road and continues along the northern verge of Walder Road. There is a cable jointing pit at the north corner of the intersection.
19	Telstra	32mm PVC conduit	A 32mm conduit runs south along the eastern verge of Heathcote Road from a pit on the eastern corner of the intersection.
20	Telstra	100mm PVC conduit	There is a 100mm conduit connecting the pit on the eastern corner to a pit 4.6m along Walder Road, where the conduit continues along Walder road in the southern verge.
21	NBN	Service cables	NBN service cables running north south along Walder Road and Bardia Parade.
22	Optus	Fiber Optic cables	Fiber optic cables running east west to the south of Bardia Parade.
23	AARnet	Fiber Optic cables	Fiber optic cables running east west along Heathcote Road.

## 2.6 Objectives of works

The objectives of the works are to:

- Improve road safety and traffic efficiency at the Heathcote Road, Bardia Parade and Walder Road intersection, Holsworthy.
- Improve bus movements from Heathcote Road southbound towards Walder Road, Hammondville.
- Improve pedestrian safety.
- To include consent conditions of the proposed development at 192-194 Heathcote Road, Hammondville.

## 2.7 Construction hours and duration

### 2.7.1 Proposed date of commencement

The indicative timeframe of works commencing on site is proposed as from October 2020, dependent upon acquisition of approvals.

### 2.7.2 Estimated length of construction period

The project is scheduled to be completed by April 2021. The works are likely to be scheduled over staged intervals.



### 2.7.3 Property acquisition

The proposed works will be within the existing road reserve and adjacent public land reserves, no property acquisition will be required to facilitate the works.

### 2.7.4 Other construction details

It is anticipated that some activities outside of standard working hours will be required to facilitate the works, including night works, the purpose of this being to minimise impacts to traffic movement by conducting works during off-peak times, temporary lane closures have been notified to the Minister's office. All Traffic Control will be in accordance with appropriate TfNSW guidelines and in accordance with conditions prescribed in the ROL issued by the TMC.

## 2.8 Ancillary Facilities

<p>Will the proposed work require the use or installation of a compound site?</p> <p><i>A dedicated site shed with amenities will likely be provided for the workers. A laydown area will be required with temporary fencing that would be locked outside construction hours.</i></p>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
<p>Will the proposed work require the use or installation of a stockpile site?</p> <p><i>Excavated materials will be stockpiled briefly directly adjacent the works site. No satellite sites for bulk storage or stockpiled will be required.</i></p>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
<p>Are any other ancillary facilities required (e.g. temporary plants, parking areas, access tracks)?</p> <p><i>All plant and equipment would be transported to and from site at the beginning and end of each shift. A site compound will be established in an appropriate place on site.</i></p>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

## 2.9 Project Justification and Consideration of Alternatives

The need for the proposal arises from the need to improve the safety and efficiency for pedestrian and traffic movements and improve bus movements through a busy intersection.

LCC has adopted the RMS approved detailed design and is updated to meet the proposal objectives, refer item 2.6.

## 3 Statutory and Planning Context

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This chapter provides the statutory and planning framework for the proposal and considers provisions of relevant Federal, State environmental planning policies, local environmental plans and other legislation.

### 3.1 Commonwealth Legislation

#### 3.1.1 *Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act)*

The EPBC Act protects matters of National Environmental Significance (NES), such as threatened species and ecological communities, migratory species (protected under international agreements), and National Heritage places.

Any actions that will or are likely to have 'significant impacts' on matters of NES require referral and approval from the Australian Government Environment Minister. Significant impacts are defined by the Commonwealth (reference <http://www.environment.gov.au/epbc/guidelines-policies.html>) for matters of NES.

No matters of NES have been identified at or near the site nor are any significant impacts anticipated. Referral to the Commonwealth under the EPBC Act is therefore not required for the proposal.

### 3.2 State Environmental Planning Policies

*State Environmental Planning Policies* (SEPPs) can specify planning controls for certain areas and/or types of development. SEPPs can also identify:

- The development assessment system that applies to developments (e.g. whether a development is State significant)
- The type of environmental assessment that is required (e.g. whether an environmental impact statement is required)

Key SEPPs relating to this proposal have been included as follows:

#### 3.3 NSW State Environmental Planning Policy (Infrastructure) 2007

The *NSW State Environmental Planning Policy (Infrastructure) 2007* (ISEPP) aims to facilitate the effective delivery of infrastructure across the state, including for roads and road infrastructure facilities. Clause 94 of the ISEPP permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent.

As the proposal is appropriately characterized as development for the purposes of a road or road infrastructure facilities and is to be carried out by or on behalf of LCC, it can be assessed under Part 5 of the EP&A Act. Development consent is not required.

The proposal is not located on land reserved under the *National Parks and Wildlife Act 1974* and does not affect land or development regulated by *State Environmental Planning Policy No. 14 – Coastal Wetlands*, *State Environmental Planning Policy No. 26 – Littoral Rainforests* or *State Environmental Planning Policy (Major Projects) 2005*.

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

The EP&A Act is the principal planning legislation for NSW. It provides a framework for environmental planning and assessment of proposals.

As LCC is the proponent for this proposal, the works are assessed as 'development permissible without consent' under Part 5 of the EP&A Act. Accordingly, LCC must satisfy Sections 5.5, 5.6 and 5.7 of the EP&A Act by examining, and considering to the fullest extent possible, all matters which are likely to affect the environment. This REF is intended to assist, and ensure that LCC complies with, the EP&A Act including Sections 5.5, 5.6 and 5.7 and the requirements of Clause 228 of the EP&A Regulation 2000. Environmental Planning Instruments made under the EP&A Act may also be relevant and are addressed below.

### 3.5 Biodiversity Conservation Act 2016 (BC Act)

Part 7 of the BC Act provides the environmental assessment requirements for activities being considered under Part 5 of the EP&A Act 1979. If a significant impact is likely, the environmental impact statement is to be accompanied by a Species Impact Statement, or if the proponent so elects – a biodiversity development assessment report. Sections 7.2(1)(a) and 7.3 describe the assessment requirements and thresholds for what is considered a significant impact.

Under the BC Act and the Biodiversity Offsets Scheme, after biodiversity certification is conferred on an area of land, development may proceed without the usual requirement under the Environmental Planning and Assessment Act 1979 for site-by-site threatened species assessment. As the Study Area does not possess a Biodiversity Certification, it must be assessed for impacts from the project activities to threatened species under the BC Act. Threatened species and communities listed under the BC Act were identified as potentially being impacted by the works. Assessments of Significance were undertaken for these matters and concluded that a significant impact is not likely to result due to the limited spatial extents of the project activities and therefore a Species Impact Statement or Biodiversity Development Assessment Report is not required.

### 3.6 Protection of the Environment Operations Act 1997 (POEO ACT)

The *Protection of Environment Operations Act 1997* regulates noise, air, water and soil pollution in NSW. As the works would result in minor temporary risks of air, water and noise pollution, the works would need to comply with the requirements of the Act. Relevant sections of the POEO Act are listed below:

- Part 5.4 Air Pollution
- Part 5.5 Noise Pollution
- Part 5.6 Land Pollution and Waste

Any work potentially resulting in pollution must comply with the POEO Act and relevant licences must be obtained if required.

No licences have been identified as being required by the proposal.

### 3.7 National Parks and Wildlife Act 1974 (NPW ACT)

The *National Parks and Wildlife Act 1974* is administered by the Office of Environment and Heritage. It provides statutory protection for all Aboriginal 'objects' (Section 90) and 'places' (Section 84).

The proposal would not impact any known Aboriginal sites, the proponent would not need to obtain an Aboriginal Heritage Impact Permit (AHIP) for this project.

### 3.8 Environment Protection and Biodiversity Conservation Act 1999

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), a referral is required to the Australian Government for proposed actions that have the potential to significantly impact on matters of national environmental significance or a direct or indirect impact on Commonwealth land. These matters are considered in Section 8 of this REF.

The assessment has found that the proposal is not likely to significantly affect any matters of national environmental significance or Commonwealth land. Accordingly, the proposal has not been referred to the Federal Department of the Environment (DoE).

### 3.9 Heritage Act 1977

The *Heritage Act 1977* protects items of environmental heritage (natural and cultural) in NSW. State significant items listed on the NSW State Heritage Register are protected under the *Heritage Act 1977* against any activities that may damage an item or affect its heritage significance.

It is understood that the proposed works will not impact upon any recognised areas of natural or cultural heritage.

### 3.10 Local Environmental Plans

The site of the proposed works is located within the Liverpool City Council Local Government Area (LGA). Consequently, the principal relevant local environmental planning instrument under the EP&A Act is the *Liverpool Local Environmental Plan 2008* (Liverpool LEP 2008).

The site of the proposed works affecting the roadway directly is located within the Special Activity (SP2 - Infrastructure) Zone under the Liverpool LEP 2008. The road reserve adjacent and Bardia Parade affected by the works is currently zoned Public Recreation (RE1).

It should be noted that the objectives of these zones include the following:

- To provide for infrastructure and related uses.
- To prevent development that is not compatible with or that may detract from the provision of infrastructure.
- To reserve land for the provision of infrastructure.

The existing land use as infrastructure supporting and complementary to the road corridor is compliant with the objectives of the SP2 zone.

Development consent from LCC is not required under Part 5 of the EP&A Act.

The proposal would be within the existing road corridor and adjacent areas, with no impacts expected on other land zones within the proposal area. Intersection upgrade works in order to improve safety is in general accordance with the objectives of this zone and is permissible with development consent under the above zone. Notwithstanding this, since the ISEPP applies to this proposal, the works do not require consent under the Liverpool LEP 2008. However, LCC would endeavour to incorporate measures that are in keeping with the Liverpool LEP 2008 requirements.

## 4 Community and Agency Consultation

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### 4.1 ISEPP Consultation

Part 2 of the ISEPP (Clauses 13-16) provides provisions for local councils to consult with other public authorities prior to undertaking some development activities.

The site of the proposed works is not located within a designated Flood Planning Area, area of High or Moderate Biodiversity Sensitivity, or an area containing a heritage item as identified in the Liverpool LEP 2008 maps. Therefore, consultation is not required under ISEPP.

### 4.2 Community Consultation

LCC will undertake community consultation with potentially affected residents within approximately 100m of the works area. Community consultation will be undertaken in accordance with LCC policies including requesting responses from those contacted within 21 days. Responses received will be considered and design changes or work practices amended where considered appropriate.

LCC will prepare traffic control plans and seek ROL approval from the TMC prior to undertaking the works.



## 5 Proposal Assessment Process and Determination

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ISEPP 2007 is an “Environmental Planning Instrument” made in accordance under “Part 3, division 3.2, section 3.13 “Making of environmental planning instruments” under the Environmental Planning and Assessment Act 1979.

Part 5, division 5.1, subdivision 2 “Duty to Consider Environmental Impact” under The Environmental Planning and Assessment Act 1979 requires a “Determining Authority” examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

Section 6 details environmental assessments relating to;

- EP&A Act - Part 5, division 5.1, subdivision 2 “Duty to Consider Environmental Impact”
- EPA Regs - Regulation 228 “What factors must be taken into account concerning the impact of an activity on the environment”

LCC is the determining authority for the proposed works. This REF fulfils LCC’s obligation as the proponent under Part 5 of the Environment Planning and Assessment Act 1979. The works are permissible without consent by adopting the ISEPP the proposed works would be undertaken under Part 5 of the Environment Planning and Assessment Act 1979.

## 6 Environmental Assessment

### 6.1 Summary

This section provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposal. All aspects of the environment potentially impacted upon by the proposal are considered. The factors specified in clause 228(2) of the Environmental Planning and Assessment Regulation 2000 and the matters of national environmental significance under the Environment Protection and Biodiversity Conservation Act 1995. Site-specific safeguards are provided to ameliorate the identified potential impacts.

All aspects of the environment potentially impacted upon by the proposal are considered including:

- Soil
- Waterways and water quality
- Noise and Vibration
- Air quality
- Non-Aboriginal Heritage
- Aboriginal Heritage
- Biodiversity
- Trees
- Traffic and transport
- Socio-economic
- Landscape character and visual amenity
- Waste
- Cumulative Effects

### 6.2 Soil

*Description of existing environment and potential impacts:*

<p>Are there any known occurrences of salinity or acid sulphate soils in the area?</p> <p>A review of the Australian Soil Resource Information System (ASRIS) maps indicate that the project area and surrounds is categorised as Level 4 - Low Probability of Occurrence of Acid Sulfate Soils.</p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<p>Does the project involve the disturbance of large areas (e.g. &gt;2ha) for earthworks?</p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<p>Does the site have constraints for erosion and sedimentation controls such as steep gradients or narrow corridors?</p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<p>Are there any sensitive receiving environments that are located in or nearby the likely project footprint or that would likely receive storm-water discharge from the project?</p> <p><i>The closest sensitive environmental receptors include Lieutenant Cantello Reserve and Williams Creek (1.5 kilometres east), Georges River (2 kilometres east) and Harris Creek Reserve (1.2 kilometres south).</i></p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

<i>The nature and location of the proposed works are not expected to impact on the closest sensitive receiving environments.</i>		
Is there any evidence within or nearby the likely footprint of potential contamination?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Is the likely project footprint in or nearby highly sloping landform?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Are the works likely to result in more than 2.5ha (area) of exposed soil?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

### 6.2.1 Soil - Safeguards

Safeguards to be implemented are:

1. Erosion and sediment control measures are to be implemented and maintained to:
  - Divert clean water around the site
  - Prevent sediment moving off-site and sediment laden water entering any water course, drainage lines, or drain inlets (in accordance with the Landcom/Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book)).
  - Reduce water velocity and capture sediment on-site.
  - Minimise the amount of material transported from site to surrounding pavement surfaces.
2. Erosion and sedimentation controls are to be checked and maintained on a regular basis (including clearing of sediment from behind barriers) and records kept and provided on request.
3. Erosion and sediment control measures are not to be removed until the works are completed and areas are stabilised.
4. Work areas are to be stabilised progressively at the end of the works.
5. An erosion and sediment control plan (ESCP) should be prepared for the works.
6. If any unexpected contaminants are encountered during the works, work in the area would cease immediately and the LCC Officer would be contacted to seek and advise on the appropriate action.
7. Any waste sent off-site would be classified according to the relevant NSW Environment Protection Authority (EPA) Waste Classification Guidelines.
8. Any storage of materials on site would be managed in accordance with the LCC guidelines.

## 6.3 Waterways and water quality

Description of existing environment and potential impacts:

<p>Are the works located within, adjacent to or near a waterway? <i>The closest waterways include Williams Creek (1.5 kilometres east), Georges River (2 kilometres east) and Harris Creek (1.2 kilometres south).</i></p> <p><i>Run-off within the proposal area is currently managed by a localised kerb and gutter stormwater system. Sediment controls would be used during construction to protect drainage points from uncontrolled run-off.</i></p> <p><i>An ESCP plan is expected to be prepared to minimise potential discharge of sediment or contaminants to drainage lines or waterways during construction</i></p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<p>Is the location known to flood or be prone to water logging? <i>The site of the proposed works is not identified as a designated Flood Planning Area by the Liverpool City Council LEP 2008.</i></p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<p>Are the proposed works located within or immediately adjacent to the area managed by Sydney Catchment Authority covered by <i>State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011?</i> (Maps of the Sydney Water Drinking Water Catchment are available from: <a href="http://www.legislation.nsw.gov.au/mapindex?type=epi&amp;year=2011&amp;no=28">http://www.legislation.nsw.gov.au/mapindex?type=epi&amp;year=2011&amp;no=28</a>)</p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<p>Will the proposed works be undertaken on a bridge or ferry?</p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<p>Are the works likely to require the extraction of water from a local water course (not mains)?</p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

### 6.3.1 Water and water quality - Safeguards

Safeguards to be implemented are:

1. There is to be no release of dirty water into drainage lines and/or waterways.
2. Water quality control measures are to be used to prevent any materials (e.g. concrete, grout, sediment, etc.) entering drain inlets or waterways.
3. Potable water is to be used for wash down of vehicles and equipment.
4. No concrete wash out is to be carried out on-site.
5. Containment material is to be used to capture / filter water used in wash down.
6. An emergency spill kit is to be kept on-site at all times. All staff are to be made aware of the location of the spill kit and trained in its use.
7. Water required for the proposal would be obtained from an approved source (e.g. potentially including hydrants or tankers).

8. All fuels, chemicals and liquids are to be stored in an impervious bunded area a minimum of 50 metres away from:
  - Rivers, creeks or any areas of concentrated water flow.
  - Flooded or poorly drained areas.
  - Slopes above 10%.
9. Refuelling of plant and equipment is to occur in impervious bunded areas located a minimum of 50 metres from drainage lines or waterways.

## 6.4 Noise and Vibration

Description of existing environment and potential impacts:

Are there any residential properties or other noise sensitive areas near the location of the proposed works that may be affected by the works (i.e. church, school, hospital):		
During construction?  <i>The site of the proposed works is set within an intersection which controls the flow of traffic through an established residential area. A community medical centre is also located directly adjacent the intersection to the south-east along Heathcote Road approximately 70 metres from the centre of the intersection. Residential receivers directly abutting Walder Road, while the distance from Bardia Parade to the nearest residential receiver is approximately 50 metres.</i>  <i>Works may be conducted during and out of standard working hours, with the intention of staging works so as to avoid peak hour traffic, and reduce chronic noise and vibration impacts to adjacent residents. Duration of works is scheduled to be approximately 22 weeks.</i>  <i>The proposed works are located directly adjacent residences within the suburb of Holsworthy. Noise impacts to surrounding sensitive receivers (properties abutting Heathcote Road, Walder Road and Bardia Parade) would be managed through the implementation of standard mitigation measures, such as surrounding residential receivers with adequate notification of the proposed works. Additional measures would be implemented for out of hour works (see below).</i>  <i>The contractor will select the most appropriate machinery to deliver this work to minimise noise and vibration and will closely monitor impacts during work.</i>  <i>A quantitative noise assessment using the RMS Construction Noise Calculator and RMS Construction Noise and Vibration Guideline (April 2016) for the works has been conducted. Refer to <b>Appendix C</b>.</i>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
During operation?  <i>The proposed works would not move the road corridor closer to sensitive receivers to the extent whereby elevated traffic noise would be experienced and is not expected to increase traffic volumes as a result of the proposal.</i>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

<p>Are the proposed works going to be undertaken only during standard working hours?</p> <p><i>In order to minimise impacts on the congested road network, some road closures and works would need to be undertaken outside of standard working hours of:</i></p> <p><i>Monday-Friday: 7:00am to 6.00pm</i></p> <p><i>Saturday: 8.00am to 1.00pm</i></p> <p><i>Sunday and Public Holidays: no work.</i></p> <p><i>Noise mitigation measures for out of hours work have been proposed.</i></p> <p><i>Night works are likely to include asphaltting and line marking.</i></p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<p>Is any explosive blasting required for the proposed works?</p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<p>Will operation of the works alter the noise environment for sensitive receivers? This might include, but not be limited to, altering the line or level of an existing carriageway, changing traffic flow, increasing traffic speeds by more than 10km/hr. or installing audio-tactile line markings.</p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<p>Will the works result in vibration being experienced by any surrounding properties or infrastructure (during either construction or operation).</p> <p><i>Due to the minor nature of the works and distance to the nearest receivers, any vibration impacts are expected to be negligible or very minor.</i></p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

#### 6.4.1 Noise and Vibration - Safeguards

Safeguards to be implemented are:

1. Construction personnel will select the most appropriate machinery to deliver this work to minimise noise and vibration and will closely monitor impacts during work.
2. All receivers within the noise impact boundary will be notified of the proposed works prior to the commencement of construction in accordance with the LCC consultation procedure. This notification would include 24-hour contact details for the on-site project manager to report any noise issues as a result of the works.
3. Works are to be carried out during standard construction hours (i.e. 7.00am to 6.00pm Monday – Friday; 8.00am to 1.00pm on Saturdays; no work to be undertaken on Sundays or Public Holidays) where it is feasible to undertake those works without major impacts on the local road network. Any work that is performed outside normal work hours or on Sundays and public holidays is to minimise noise impacts in accordance with Roads and Maritime’s Construction Noise and Vibration Guideline (April 2016).
4. Additional measures to minimise noise would be considered, including:
  - Undertaking the noisiest activities during standard construction hours.
  - Allowing adequate respite periods during noise intensive works.
  - Using alternatives to reversing alarms, such as ambient noise sensitive or ‘quacker’ type reversing alarms.

- Turning off plant and equipment when not in use.
  - Ensuring plant/equipment is regularly maintained and repair/replace equipment that becomes noisy.
  - Throughout each construction activity, locating stationary plant items as far from receivers as possible.
  - Choosing mobile plant and equipment that includes exhaust silencers or residential class mufflers.
  - Communicating with construction workers via toolbox talks about minimising noise, including the use of equipment, avoidance of shouting, loud talking and door slamming.
5. Implement community consultation measures - Periodic notification (monthly letterbox drops or equivalent) detailing proposed dates, alternative dates for wet weather and hourly activity plan for night works.
  6. Site inductions for all site personnel outlining noise management procedures.
  7. No swearing or unnecessary shouting or loud stereos/radios on site.
  8. No dropping of materials from height, throwing of metal items and slamming of doors.
  9. The CEMP must be regularly updated to account for changes in noise and vibration management issues and strategies.
  10. Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods.
  11. As a guide high noise and vibration generating activities near receivers should be carried out in continuous blocks that do not exceed 3 hours each, with a minimum respite period of one hour between each block. The duration of each block of work and respite should be flexible to accommodate the usage and amenity at nearby receivers.
  12. Unless negotiated with the community with consultation documented and approved by LCC project manager, the following shifts should not be exceeded:
    - 2 consecutive evenings or nights per week; and
    - 3 evenings or nights per week; and
    - 6 evenings or nights per month.
  13. For night work these periods of work should be separated by not less than one week.
  14. Use quieter and less vibration emitting construction methods where feasible and reasonable.
  15. Ensure plant including the silencer is well maintained.
  16. The offset distance between noisy plant and adjacent sensitive receivers is to be maximised.
  17. Plant used intermittently to be throttled down or shut down.
  18. Noise-emitting plant to be directed away from sensitive receivers.
  19. Only have necessary equipment on site.

20. Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.
21. Increased noise producing activities should be scheduled for normal working hours. If the work cannot be undertaken during the day, it should be completed before 11:00pm.
22. Loading and unloading of materials/deliveries is to occur as far as possible from sensitive receivers.
23. Select site access points and roads as far as possible away from sensitive receivers.
24. Dedicated loading/unloading areas to be shielded if close to sensitive receivers.
25. Delivery vehicles to be fitted with straps rather than chains for unloading, wherever possible.
26. Avoid or minimise these out of hours movements where possible.
27. Use structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing; erection of operational stage noise barriers (where practicable) and consideration of site topography when situating plant.

## 6.5 Air quality

*Description of existing environment and potential impacts:*

Are the proposed works likely to result in large areas (>2ha) of exposed soils?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Will there be any dust sensitive receivers located within the vicinity of the proposed works during the construction period? <i>The works will be in close proximity to sensitive receivers (residential properties). The safeguards below will be implemented to mitigate where possible and manage these potential impacts.</i>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Is there likely to be an emission to air during construction? <i>Minor exhaust emissions from plant may be expected during construction.</i>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

### 6.5.1 Air Quality - Safeguards

Safeguards to be implemented are:

1. Measures (including watering or covering exposed areas) are to be used to minimise or prevent air pollution and dust.
2. Works (including the spraying of paint and other materials) are not to be carried out during strong winds or in weather conditions where high levels of dust or airborne particulates are likely.
3. Vehicles and plant used on site are to be kept in efficient working order. The Protection of the Environment Operations Act 1997 must be complied with.
4. Work vehicles / machinery would not be left running or idling when not in use.



5. Stand down machinery producing excess emissions.
6. Appropriate action would be taken when levels of dust become unacceptable. This would include suspending works during high wind events.

## 6.6 Non-Aboriginal Heritage

Description of existing environment and potential impacts:

<p>Have online heritage database searches been completed?</p> <p>The following searches have been undertaken on July 2020 with no non-Aboriginal heritage items found proximate to the proposed area of works:</p> <ul style="list-style-type: none"> <li>• NSW Heritage database</li> <li>• Commonwealth EPBC heritage list</li> <li>• Australian Heritage Places Inventory</li> <li>• Local Environmental Plan(s) heritage schedule</li> </ul>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
<p>Are there any items of non-Aboriginal heritage or heritage conservation areas located within the vicinity of the proposed works?</p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<p>Are there any items of potential non-Aboriginal heritage significance within the vicinity of the works?</p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<p>Are works likely to occur in or near features that indicate potential archaeological remains?</p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

### 6.6.1 Non-Aboriginal Heritage - Safeguards

Safeguards to be implemented are:

1. Should unknown finds be exposed, which are identified as having non-Aboriginal heritage significance, works on the site shall immediately cease in the affected area and the Department of Planning, Industry and Environment (DPIE) and LCC will be informed to determine the appropriate management strategy. The duration of the cessation of works will depend on the integrity and significance of any relic.
2. As part of the site induction, all workers will be advised of their obligations in relation to heritage before construction begins and the guidelines to follow if unanticipated heritage items or deposits are located during construction.

## 6.7 Aboriginal Heritage

Description of existing environment and potential impacts:

<p>Would the works involve disturbance in any area that has not been subject to previous ground disturbances?</p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<p>Have online AHIMS search been completed?</p> <p><i>Yes, the AHIMS Basic Search has been completed using the online portal returning results showing no (zero) Aboriginal sites or places within a 50-metre search buffer.</i></p>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
<p>Is there potential for the proposed works to impact on any items of Aboriginal heritage?</p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

<i>The proposed works area is within the road corridor, road shoulder and road reserve, all subject to previous ground disturbance. Therefore, there is negligible potential for the works to affect Aboriginal heritage.</i>		
<p>Would the works involve the removal of mature native trees?</p> <p><i>Yes, the proposed works will impact upon a patch of roadside vegetation planted within the road reserve at the corner of Heathcote Road and Bardia Parade, at the site of the proposed high entry left turn lane exiting Bardia Parade into Heathcote Road. This patch of vegetation has undergone assessment by a qualified ecologist and has been identified to be planted.</i></p>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
<p>Would the works impact on any features that may indicate any potential archaeological remains?</p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<p>Are the works consistent with the requirements of the <i>Roads and Maritime Procedure for Aboriginal Cultural Heritage Consultation and Investigation</i>?</p> <p><i>The PACHICI was previously undertaken in 2016 by RMS.</i></p> <p><i>It is understood that the proposed works at are still consistent with the requirements of Roads and Maritime Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI). The PACHCI clearance letter from 2016 is included as <b>Appendix D</b>.</i></p>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

### 6.7.1 Aboriginal Heritage - Safeguards

Safeguards to be implemented are:

- An unknown finds procedure will be incorporated into the CEMP to provide guidance on the process to be followed if suspected Aboriginal heritage items are found during project works. At a minimum, that process will:
  - Provide that if unforeseen Aboriginal heritage items are uncovered, works will immediately cease and LCC, DPIE and the Local Aboriginal Land Council will be informed
  - Provide that if human remains are uncovered, works will immediately cease, the site will be secured and the NSW Police, LCC and DPIE shall be notified
  - Record that it is an offence under the NPW Act (Section 86) to disturb or destroy an Aboriginal object
- As part of the site induction, all workers will be advised of their obligations in relation to heritage under the National Parks and Wildlife Act 1974 before construction begins and the guidelines to follow if unanticipated heritage items or deposits are located during construction

## 6.8 Biodiversity

*Description of existing environment and potential impacts:*

<p>Have relevant database searches been carried out?</p> <p><i>Commonwealth and State Department Environment and Biodiversity database searches (NSW Department of Environment &amp; Heritage BioNet database, Department of the Environment Species Profile and Threats (SPRAT) Database, EPBC Act Protected Matters Search Tool) were conducted on 19<sup>th</sup> July 2016. No areas of national or state</i></p>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
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<p><i>significance, or species/habitats deemed to be threatened or endangered were identified.</i></p> <p><i>BioNet Atlas search results did not identify any threats or endangered populations within direct proximity to the proposed works area, namely due to the nature of the area being highly modified and built up.</i></p> <p><i>An extract from the Office of Environment and Heritage BioNet Atlas map is included as <b>Appendix E</b>.</i></p>		
<p>Did the database searches identify any endangered ecological communities, threatened flora and/or threatened or protected fauna within the vicinity of the proposed works?</p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<p>Will the proposed works require the removal of any other vegetation?</p> <p><i>Yes, the proposed works will impact upon a patch of roadside vegetation planted within the road reserve at the corner of Heathcote Road and Bardia Parade, at the site of the proposed high entry left turn lane exiting Bardia Parade into Heathcote Road. This patch of vegetation has undergone assessment by a qualified ecologist and identified the following:</i></p> <ul style="list-style-type: none"> <li>▪ <i>One large and well-established Grey Ironbark Eucalyptus paniculata</i></li> <li>▪ <i>Four Flax-leaved Paperbarks Melaleuca linariifolia.</i></li> <li>▪ <i>One small Parramatta Red Gum Eucalyptus parramattensis.</i></li> <li>▪ <i>Two large shrubs Coast Myall Acacia binervia are also present and are located several metres from the trees near the culvert.</i></li> <li>▪ <i>The understorey was dominated by introduced grasses typical of roadsides and lawns, with scattered weeds.</i></li> <li>▪ <i>These species do not constitute threatened species under the EPBC Act or BC Act. The trees are not representative of a threatened ecological community.</i></li> <li>▪ <i>There were no nests or hollows present within the study area and the vegetation is likely to provide limited habitat opportunities for fauna.</i></li> </ul> <p><i>The vegetation assessment of this patch of roadside vegetation proposed for removal is included as <b>Appendix B</b>.</i></p> <p><i>Safeguard number 8 below specifies how the removal of trees will be mitigated. The mitigation specified will replace canopy cover lost in the works area.</i></p> <p><i>In addition, the proposed works will include the connection of new overhead conductors to an existing utility pole 259285. Tree trimming on the tree circled yellow in Figure 2-4 may be required in order to maintain clearance between conductors and vegetation.</i></p>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
<p>Will the proposed works affect any tree hollows or hollow logs?</p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<p>Are there any known areas of critical habitat, SEPP 14 wetland area or SEPP 26 littoral rainforest area within the vicinity of the proposed works?</p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<p>Will the proposed works provide any additional barriers to the movement of wildlife?</p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

Will the proposed works disturb any natural waterways or aquatic habitat?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Will the proposed works disturb any crevices or other locations (such as on bridges and culverts) for potential bat habitat?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Will there be impact on any vegetation or land that is part of an offset or is protected under a condition of approval from a previous project?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

### 6.8.1 Biodiversity - Safeguards

Safeguards to be implemented are:

1. The works would be limited to the excavation of the grassed verge adjacent to the road and removal/pruning of nominated vegetation.
2. All works areas, including the fenced storage area, would be fully reinstated at the completion of works.
3. If unexpected threatened fauna or flora species are discovered, stop works immediately and follow the LCC guidelines. Any excavation left overnight to be covered and checked at the start of works for trapped fauna.
4. Contact 1300 WIRES (1300 094 737) in the event of injured fauna being discovered.
5. The CEMP prepared for the works will include details of the pre-clearing process for the vegetation.
6. The pre-clearing process will include a requirement to check the trees and shrubs for vertebrate fauna prior to clearing, and to apply a fauna rescue and release procedure should vertebrate fauna be present.
7. Native vegetation to be removed should be recycled (mulched) and re-used within landscaped areas.
8. For the removal of the six existing trees, each tree will need to be replaced at a ratio of three to each one removed. Therefore, a total of 18 trees should be specified in the immediate vicinity of the intersection in order to replace canopy cover lost. These trees should be planted as 100L stock with correct planting detail, staking, mulch ring and spade cut edge and surrounded by turf. The trees should be planted in groups of three with connected mulching and ensure the mulch area and spacing accommodates the mowing requirements of LCC's maintenance team. The replacement species to include *Eucalyptus Paniculata*, *Melaleuca Linariifolia* and *Eucalyptus Parramattensis*.

## 6.9 Trees

Description of existing environment and potential impacts:

Do the proposed works involve pruning, trimming or removal of any tree/s? <i>Tree removal will be limited to the nominated roadside vegetation which has been planted within the road reserve at the corner of Heathcote Road and Bardia Parade.</i>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
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Do the trees form part of a streetscape, an avenue or roadside planting?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Have the trees been planted by a community group, Landcare group or by council or is the tree a memorial or part of a memorial group e.g. has a plaque?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Do the trees form part of a heritage listing or have other heritage value?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

### 6.9.1 Trees - Safeguards

Safeguards to be implemented are:

1. Consultation with relevant authorities and the community will be conducted prior to the commencement of works so that an appropriate course of action can be identified.
2. No excavation works would be undertaken within the root zone of mature trees outside of those nominated for removal.

## 6.10 Traffic and transport

Description of existing environment and potential impacts:

<p>Are the proposed works likely to result in detours or disruptions to traffic flow (vehicular, cycle and pedestrian) or access during construction?</p> <p><i>Construction related detours/diversions may be required to enable the proposed works during critical construction tasks. This will likely include localised lane closures and traffic management to be implemented to avoid peak hour timing. All access movements to the works area would be maintained at all times. Some works are proposed to be undertaken at night to minimise impacts on the local road network during construction.</i></p> <p><i>Vehicular traffic travelling along Heathcote Road, Bardia Parade and Walder Road may need to be held for brief periods of time for the purpose of floating large items of plant and vehicles to and from the proposed works area.</i></p>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
<p>Are the proposed works likely to result in detours or disruptions to traffic flow (vehicular, cycle and pedestrian) or access during operation?</p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<p>Are the proposed works likely to affect any other transport nodes or transport infrastructure (e.g. bus stops, bus routes) in the surrounding area?</p> <p><i>Heathcote road is the site of a passenger bus service, yet the site of the proposed works will not impact on nearby bus stops or operations.</i></p>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

### 6.10.1 Traffic and transport - Safeguards

Safeguards to be implemented are:

1. Where possible, current traffic movements and property accesses are to be maintained during the workday. Any disturbance is to be minimised to prevent unnecessary traffic delays.

2. Where works would affect the free flow of traffic, a ROL would be obtained from TMC and a Traffic Control Plan would be prepared in accordance with the requirements of the Roads and Maritime's Traffic Control at Worksites Manual (2018) and Australian Standard (AS1743.3 Traffic Control Devices for Projects on Roads).
3. Appropriate signage (such as variable message signs) and supervision would be provided at all times to ensure that all work areas are controlled and that unauthorised personnel (e.g. pedestrians) are excluded from work areas.
4. Vehicle movement arrangements would be developed to limit impacts on other road users (including pedestrians, vehicles and cyclists) and the environment, with specific regard to other road works in the area, local traffic movement requirements and peak traffic volumes.
5. A Traffic Management Plan would be prepared as part of the CEMP or equivalent Site Environmental Plan and approved by LCC prior to implementation.
6. Where changes to access arrangements are necessary, LCC will advise owners and tenants and consult with them in advance regarding alternate access arrangements.
7. Appropriate pedestrian traffic controls must be set up to allow safe passage of pedestrians around the work site.

## 6.11 Socio-economic

Description of existing environment and potential impacts:

Are the proposed works likely to impact on local business, including public services?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Are the proposed works likely to require any property acquisition?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Are the proposed works likely to alter any access for properties (either temporarily or permanently)?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Are the proposed works likely to alter any on-street parking arrangements (either temporarily or permanently)?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Are the proposed works likely to change pedestrian movements or pedestrian access (either temporarily or permanently)? <i>The intersection currently contains signalised pedestrian crossings in all four directions. The pedestrian link along Heathcote Road west of Bardia Parade may need to be re-routed during works to facilitate the removal of vegetation and the introduction of the dedicated left turn slip lane with pedestrian crossing. The proposed works will improve pedestrian safety, road safety and traffic efficiency at the Heathcote Road, Bardia Parade and Walder Road intersection, Holsworthy.</i>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Are the proposed works likely to impact on any items or places of social value to the community (either temporarily or permanently)?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Are the proposed works likely to reduce or change visibility of any businesses, farms, tourist attractions or the like (either temporarily or permanently)?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

### 6.11.1 Socio-economic - Safeguards

Safeguards to be implemented are:

1. LCC will consult with potentially affected landholders before and during construction to minimise the potential for impacts on land use.
2. LCC will consult with relevant service providers during detailed design to identify possible interactions and develop procedures to be implemented to minimise the potential for service interruptions which have the potential to impact on existing land use.
3. A community notice would be delivered to all near-by properties prior to works and would include contact details for a site supervisor, for residents to raise any construction issues.

## 6.12 Landscape character and visual amenity

Description of existing environment and potential impacts:

Are the proposed works over or near an important physical or cultural element or landscape?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Would the proposed works obstruct or intrude upon the character or views of a valued landscape or urban area. For example, locally significant topography, a rural landscape or a park, a river, lake or the ocean or a historic or distinctive townscape or landmark?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Would the proposal require the removal of mature trees or stands of vegetation, either native or introduced? <i>Existing vegetation at the corner of Bardia Parade and Heathcote Road will be removed to facilitate the proposed works.</i>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Would the proposal result in large areas of shotcrete visible from the road or adjacent properties?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Would the proposal involve new noise walls or visible changes to existing noise walls?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Would the proposal involve the removal or reuse of large areas of road corridor, landscape, either verges or medians?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Would the proposal involve substantial changes to the appearance of a bridge (including piers, girders, abutments and parapets) that are visible from the road or residential areas?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
If involving lighting, would the proposal create unwanted light spillage on residential properties at night (in construction or operation)? <i>The street lightings have been designed by a Level 3 street lighting consultant to the Endeavour Energy requirements. In addition, temporary construction lighting may be required during construction. Street lighting and construction lighting will have selected lamps that ensure that unwanted lights do not spill in the adjoining development affecting resident amenities during both construction and</i>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Would any new structures or features being constructed result in over shadowing to adjoining properties or areas?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No



**6.12.1 Landscape character and visual amenity - Safeguards**

Safeguards to be implemented are:

1. The site will be kept rubbish free at all times.
2. Temporary erosion and sediment controls would be removed from the site once landforms have been assessed as stable.
3. All disturbed areas would be rehabilitated and progressively stabilised following the completion of the works.
4. Landscaping is to be managed in accordance with LCC guidelines.
5. Replacement tree planting as outlined in section 6.8.1 to be undertaken.

**6.13 Waste**

*Description of existing environment and potential impacts:*

Are the proposed works likely to generate >200 tonnes of waste material (contaminated and /or non-contaminated material)?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Are the proposed works likely to require a licence from DPIE?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

**6.13.1 Waste - Safeguards**

Safeguards to be implemented are:

1. A concrete washout would be established in accordance with Best Practice Guidelines (Department of Environment and Conservation’s Environmental Best Practice Management Guideline for Concreting Contractors). Concrete washout should be clearly marked with signage, located away from drainage lines and be contained using appropriate sediment control measures to prevent any runoff.
  - a) Only chutes of concrete trucks and tools can be washout out in the corridor, into a concrete washout pit.
  - b) Washout pit should be located at least 30m away from a water course and no more than 100m from the pour site.
  - c) The main truck is not to be washed onsite and must be taken back to the concrete plant.
  - d) Concrete washout pits are to be lined with suitable plastic lining or similar to prevent soak away of pH affected water. Any pH affected water is expected to be bunded and captured on site, before being disposed of offsite.
2. Spoil and waste for disposal must be classified and transported by appropriately licensed contractors to licensed or approved facilities.
3. Any excavated soil would be reused on site as fill.
4. Resource management hierarchy principles are to be followed, including:
  - avoid unnecessary resource consumption as a priority;
  - use resource recovery measures (including re-use of materials, reprocessing, recycling and energy recovery) where waste generation cannot be avoided; and



- Dispose of wastes as a last resort in accordance with the Waste Avoidance & Resource Recovery Act 2001).
- 5. There is to be no disposal or reuse of construction waste onto other land.
- 6. No waste is to be burnt on-site.
- 7. All waste material would be removed from the site once the activity is complete.
- 8. Waste must be disposed of in accordance with DPIE guidelines.
- 9. Working areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day.
- 10. No fuels or hazardous materials are to be held in bulk containers on-site. Only small volumes (<20 litres) are to be stored for refuelling of small handheld equipment. All refuelling of this equipment will be done in a bunded area, and refuelling of vehicles would be conducted off-site.
- 11. All fuels, chemicals and liquids to be stored in impervious bunded area a minimum of 50m away from rivers, creeks or any concentrated water flow.

## 6.14 Cumulative impacts

The proposal has the potential to have temporary cumulative environmental effects with other existing or likely future activities (other construction projects in the area), however the effects would be minimal due to the limited scope of works for the activities covered in this REF, and the potential impacts on the environment would be minimised with the implementation of the safeguards set out in Section 6.

### 6.14.1 Cumulative Impacts - Safeguards

Safeguards to be implemented are:

1. Ongoing coordination and consultation will be carried out with any other proponents to ensure potential cumulative impacts are appropriately assessed and managed
2. The CEMP will be revised to consider potential cumulative impacts from surrounding development activities as they become known

## 6.15 Matters of National Environmental Significance (MNES)

The EPBC Act protects matters of National Environmental Significance (NES), such as threatened species and ecological communities, migratory species (protected under international agreements), and National Heritage places.

Any actions that will or are likely to have 'significant impacts' on matters of NES require referral and approval from the Australian Government Environment Minister. Significant impacts are defined by the Commonwealth (reference <http://www.environment.gov.au/epbc/guidelines-policies.html>) for matters of NES.

No matters of NES have been identified at or near the site nor are any significant impacts anticipated. Referral to the Commonwealth under the EPBC Act is therefore not required for the proposal.

## 7 Consideration of State and Commonwealth Environmental Factors

### 7.1 Environmental Planning and Assessment Regulation 2000 checklist

In addition to the requirements of the REF, the following factors listed in clause 228(2) of the *Environmental Planning and Assessment Regulation, 2000* have also been considered to assess the likely impacts of the proposal on the natural and built environment. This consideration is required to comply with sections 111 and 112 of the EP&A Act.

Environmental Factor / Relevant Clause	Impacts	Comment
<b>(a) Any environmental impact on a community?</b>	Minor/Temporary	<p>The proposal may cause minor short-term environmental impacts to the road users (construction disruption) and the local community, such as visual amenity, dust and noise during construction.</p> <p>However, the potential impacts would be minimised with the implementation of the safeguards as detailed in this REF.</p> <p>In the longer term, the community would benefit through improved safety conditions and traffic flow at an integral intersection.</p>
<b>(b) Any transformation of a locality?</b>	Negligible	The proposed works will transform the arrangement of the existing road corridor. The locality is expected to remain the same
<b>(c) Any environmental impact on the ecosystems of a locality?</b>	Minor/Temporary	The proposal will not impact on the ecosystem of the locality.
<b>(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?</b>	Negligible	The proposal would not reduce the aesthetic, recreational, scientific or other environmental quality or value of the locality, impacts from the removal of roadside vegetation will likely be offset through plantings.
<b>(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 generations?</b>	Nil	<p>The proposal would not have any adverse impacts on a locality, place or building with aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations.</p> <p>There are no known items of heritage or social significance at the locality. Environmental safeguards in Section 6 would be adopted to ensure that unexpected finds are managed appropriately.</p>

Environmental Factor / Relevant Clause	Impacts	Comment
<b>(f) Any impact on habitat of any protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)?</b>	Nil	The proposal would not impact on the habitat of any protected or endangered fauna.
<b>(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?</b>	Nil	The proposal would not endanger any species of animal, plant or other form of life, whether living on land, in water or in the air as all the works would be contained within the road corridor, shoulder and reserve, Proposed tree removal would not impact critical habitat.
<b>(h) Any long-term effects on the environment?</b>	Positive, long term	The proposal would have positive long-term effects on the environment due to the intersection upgrade increasing the safety profile of the road network and in turn the local road network. No long-term adverse effects are expected.
<b>(i) Any degradation of the quality of the environment?</b>	Potential short-term negative	There is potential for typical minor short-term noise, visual, dust, noise, vegetation, water quality and traffic impacts during construction. These would be managed and mitigated with the implementation of appropriate environmental safeguards listed in Section 6 of this REF, such that no long-term degradation of the quality of the environment is expected.
<b>(j) Any risk to the safety of the environment?</b>	Potential short-term negative	The proposed works would have minimal risk to the safety of the environment due to the limited scope of works, and because the potential impacts would be minimised with the implementation of the safeguards given in Section 6 in this REF.
<b>(k) Any reduction in the range of beneficial uses of the environment?</b>	Short term minor negative	The proposal would cause a minor adjustment in the existing arrangement of the road at the site of the proposed works, as result of temporary disruption during construction, which would potentially increase travelling time for the road users in the short-term. Alterations to the existing road arrangement would seek to be implemented during off-peak times and would typically see the closure of the road shoulder. Lane closures deemed necessary during critical works would be conducted under traffic management and ROL.  There would be no long-term reduction in the range of beneficial uses of the environment as a result of the proposal.
<b>(l) Any pollution of the environment?</b>	Potential short-term negative	It is unlikely that the proposed work will cause pollution of the environment. There is the potential for acute air quality impacts and noise that may temporarily affect adjacent sensitive receivers in a minor way during construction activities. Potential adverse impacts associated with the proposal would be manageable through the application of the environmental

Environmental Factor / Impacts Relevant Clause		Comment
		management measures and safeguards documented in Section 6.
<b>(m) Any environmental problems associated with the disposal of waste?</b>	None	The waste generated during the proposal would be contained and removed for disposal to approved facilities accordance with the proposed safeguards in Section 6 of this REF. No environmental problems are anticipated for the disposal of waste. Excavated materials are likely to be used for backfilling following construction, excess materials will be removed.
<b>(n) Any increased demands on resources, natural or otherwise which are, or are likely to become, in short supply?</b>	Nil	The proposed work would not significantly increase demands on resources, which are, or are likely to become, in short supply. Relatively small amounts of materials would be required for the proposed work. The safeguards provided in this REF would be implemented to minimise any impacts.
<b>(o) Any cumulative environmental effect with other existing or likely future activities?</b>	Potential short-term negative	The proposal has the potential to have temporary cumulative environmental effects with other existing or likely future activities (other construction projects in the area); however the effects would be minimal due to the limited scope of works for the activities covered in this REF, and the potential impacts on the environment would be minimised with the implementation of the safeguards in Section 6 of this REF.
<b>(p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?</b>	None	The proposed activities would not have any impacts on coastal processes and coastal hazards, taking into account projected climate change conditions.

## 7.2 Matters of national environmental significance checklist

Under the environmental assessment provisions of the EPBC Act, the following matters of national environmental significance are required to be considered to assist in determining whether the proposal should be referred to the Australian Government Department of Environment.

Factor	Impact
a. Any impact on a World Heritage property? The proposal would not have any impact on a World Heritage property.	Nil
b. Any impact on a National Heritage place? The proposal would not have any impact on a National Heritage place	Nil
c. Any impact on a wetland of international importance? The proposal would not have any impact on a wetland of international importance.	Nil
d. Any impact on a listed threatened species or communities? The proposal would not impact on Commonwealth listed threatened species or communities listed migratory species.	Nil
e. Any impacts on listed migratory species? The proposal would not impact on Commonwealth listed migratory species.	Nil
f. Any impact on a Commonwealth marine area? There would be no impact on a Commonwealth marine area as a result of the proposal.	Nil
g. Does the proposal involve a nuclear action (including uranium mining)? The proposal does not involve a nuclear action.	Nil
Additionally, any impact (direct or indirect) on Commonwealth land? The proposal would not directly or indirectly impact on Commonwealth land.	Nil

## 8 Summary of safeguards and environmental management measures

This section provides a summary of the site-specific environmental safeguards and management measures identified in described in Section 6 of this REF (refer Table 8-1). These safeguards will be implemented to reduce potential environmental impacts throughout construction and operation. A framework for managing the potential impacts is provided with reference to environmental management plans and relevant Roads and Maritime Services QA specifications. Any potential licence and/or approval requirements required prior to construction are also listed.

Table 8-1: Summary of site-specific safeguards for proposed works

Aspect	Safeguards
<b>Soil</b>	<ol style="list-style-type: none"> <li>1. Erosion and sediment control measures are to be implemented and maintained to: <ul style="list-style-type: none"> <li>▪ Divert clean water around the site</li> <li>▪ Prevent sediment moving off-site and sediment laden water entering any water course, drainage lines, or drain inlets (in accordance with the Landcom/Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book)).</li> <li>▪ Reduce water velocity and capture sediment on-site.</li> <li>▪ Minimise the amount of material transported from site to surrounding pavement surfaces.</li> </ul> </li> <li>2. Erosion and sedimentation controls are to be checked and maintained on a regular basis (including clearing of sediment from behind barriers) and records kept and provided on request.</li> <li>3. Erosion and sediment control measures are not to be removed until the works are completed, and areas are stabilised.</li> <li>4. Work areas are to be stabilised progressively at the end of the works.</li> <li>5. An erosion and sediment control plan (ESCP) should be prepared for the works.</li> <li>6. If any unexpected contaminants are encountered during the works, work in the area would cease immediately and the LCC Officer would be contacted to seek and advise on the appropriate action.</li> <li>7. Any waste sent off-site would be classified according to the relevant NSW Environment Protection Authority (EPA) Waste Classification Guidelines.</li> <li>8. Any storage of materials on site would be managed in accordance with the LCC guidelines.</li> </ol>
<b>Waterways and water quality</b>	<ol style="list-style-type: none"> <li>1. There is to be no release of dirty water into drainage lines and/or waterways.</li> <li>2. Water quality control measures are to be used to prevent any materials (e.g. concrete, grout, sediment, etc.) entering drain inlets or waterways.</li> <li>3. Potable water is to be used for wash down of vehicles and equipment.</li> <li>4. No concrete wash out is to be carried out on-site.</li> <li>5. Containment material is to be used to capture / filter water used in wash down.</li> <li>6. An emergency spill kit is to be kept on-site at all times. All staff are to be made aware of the location of the spill kit and trained in its use.</li> <li>7. Water required for the proposal would be obtained from an approved source (e.g. potentially including hydrants or tankers).</li> <li>8. All fuels, chemicals and liquids are to be stored in an impervious bunded area</li> </ol>

	<p>a minimum of 50 metres away from:</p> <ul style="list-style-type: none"> <li>▪ Rivers, creeks or any areas of concentrated water flow.</li> <li>▪ Flooded or poorly drained areas.</li> <li>▪ Slopes above 10%.</li> </ul> <p>9. Refuelling of plant and equipment is to occur in impervious bunded areas located a minimum of 50 metres from drainage lines or waterways.</p>
<p><b>Noise and Vibration</b></p>	<p>1. Construction personnel will select the most appropriate machinery to deliver this work to minimise noise and vibration and will closely monitor impacts during work.</p> <p>2. All receivers within the noise impact boundary will be notified of the proposed works prior to the commencement of construction in accordance with the LCC consultation procedure. This notification would include 24-hour contact details for the on-site project manager to report any noise issues as a result of the works.</p> <p>3. Works are to be carried out during standard construction hours (i.e. 7.00am to 6.00pm Monday – Friday; 8.00am to 1.00pm on Saturdays; no work to be undertaken on Sundays or Public Holidays) where it is feasible to undertake those works without major impacts on the local road network. Any work that is performed outside normal work hours or on Sundays and public holidays is to minimise noise impacts in accordance with Roads and Maritime's Construction Noise and Vibration Guideline (April 2016).</p> <p>4. Additional measures to minimise noise would be considered, including:</p> <ul style="list-style-type: none"> <li>▪ Undertaking the noisiest activities during standard construction hours.</li> <li>▪ Allowing adequate respite periods during noise intensive works.</li> <li>▪ Using alternatives to reversing alarms, such as ambient noise sensitive or 'quacker' type reversing alarms.</li> <li>▪ Turning off plant and equipment when not in use.</li> <li>▪ Ensuring plant/equipment is regularly maintained and repair/replace equipment that becomes noisy.</li> <li>▪ Throughout each construction activity, locating stationary plant items as far from receivers as possible.</li> <li>▪ Choosing mobile plant and equipment that includes exhaust silencers or residential class mufflers.</li> <li>▪ Communicating with construction workers via toolbox talks about minimising noise, including the use of equipment, avoidance of shouting, loud talking and door slamming.</li> </ul> <p>5. Implement community consultation measures - Periodic notification (monthly letterbox drops or equivalent) detailing proposed dates, alternative dates for wet weather and hourly activity plan for night works.</p> <p>6. Site inductions for all site personnel outlining noise management procedures.</p> <p>7. No swearing or unnecessary shouting or loud stereos/radios on site.</p> <p>8. No dropping of materials from height, throwing of metal items and slamming of doors.</p>

9. The CEMP must be regularly updated to account for changes in noise and vibration management issues and strategies.
10. Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods.
11. As a guide high noise and vibration generating activities near receivers should be carried out in continuous blocks that do not exceed 3 hours each, with a minimum respite period of one hour between each block. The duration of each block of work and respite should be flexible to accommodate the usage and amenity at nearby receivers.
12. Unless negotiated with the community with consultation documented and approved by LCC project manager, the following shifts should not be exceeded:
  - 2 consecutive evenings or nights per week; and
  - 3 evenings or nights per week; and
  - 6 evenings or nights per month.
13. For night work these periods of work should be separated by not less than one week.
14. Use quieter and less vibration emitting construction methods where feasible and reasonable.
15. Ensure plant including the silencer is well maintained.
16. The offset distance between noisy plant and adjacent sensitive receivers is to be maximised.
17. Plant used intermittently to be throttled down or shut down.
18. Noise-emitting plant to be directed away from sensitive receivers.
19. Only have necessary equipment on site.
20. Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.
21. Increased noise producing activities should be scheduled for normal working hours. If the work cannot be undertaken during the day, it should be completed before 11:00pm.
22. Loading and unloading of materials/deliveries is to occur as far as possible from sensitive receivers.
23. Select site access points and roads as far as possible away from sensitive receivers.
24. Dedicated loading/unloading areas to be shielded if close to sensitive receivers.



	<p>25. Delivery vehicles to be fitted with straps rather than chains for unloading, wherever possible.</p> <p>26. Avoid or minimise these out of hours movements where possible.</p> <p>27. Use structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing; erection of operational stage noise barriers (where practicable) and consideration of site topography when situating plant.</p>
<b>Air Quality</b>	<p>1. Measures (including watering or covering exposed areas) are to be used to minimise or prevent air pollution and dust.</p> <p>2. Works (including the spraying of paint and other materials) are not to be carried out during strong winds or in weather conditions where high levels of dust or airborne particulates are likely.</p> <p>3. Vehicles and plant used on site are to be kept in efficient working order. The Protection of the Environment Operations Act 1997 must be complied with.</p> <p>4. Work vehicles / machinery would not be left running or idling when not in use.</p> <p>5. Stand down machinery producing excess emissions.</p> <p>6. Appropriate action would be taken when levels of dust become unacceptable. This would include suspending works during high wind events.</p>
<b>Non-Aboriginal Heritage</b>	<p>1. Should unknown finds be exposed, which are identified as having non-Aboriginal heritage significance, works on the site shall immediately cease in the affected area and the DPIE and LCC will be informed to determine the appropriate management strategy. The duration of the cessation of works will depend on the integrity and significance of any relic.</p> <p>2. As part of the site induction, all workers will be advised of their obligations in relation to heritage before construction begins and the guidelines to follow if unanticipated heritage items or deposits are located during construction.</p>
<b>Aboriginal Heritage</b>	<p>1. An unknown finds procedure will be incorporated into the CEMP to provide guidance on the process to be followed if suspected Aboriginal heritage items are found during project works. At a minimum, that process will:</p> <ul style="list-style-type: none"> <li>▪ Provide that if unforeseen Aboriginal heritage items are uncovered, works will immediately cease and LCC, DPIE and the Local Aboriginal Land Council will be informed</li> <li>▪ Provide that if human remains are uncovered, works will immediately cease, the site will be secured and the NSW Police, LCC and DPIE shall be notified</li> <li>▪ Record that it is an offence under the NPW Act (Section 86) to disturb or destroy an Aboriginal object</li> </ul> <p>2. As part of the site induction, all workers will be advised of their obligations in relation to heritage under the National Parks and Wildlife Act 1974 before construction begins and the guidelines to follow if unanticipated heritage items or deposits are located during construction</p>

<b>Biodiversity</b>	<ol style="list-style-type: none"> <li>1. The works would be limited to the excavation of the grassed verge adjacent to the road and removal/pruning of nominated vegetation.</li> <li>2. All works areas, including the fenced storage area, would be fully reinstated at the completion of works.</li> <li>3. If unexpected threatened fauna or flora species are discovered, stop works immediately and follow the LCC guidelines. Any excavation left overnight to be covered and checked at the start of works for trapped fauna.</li> <li>4. Contact 1300 WIRES (1300 094 737) in the event of injured fauna being discovered.</li> <li>5. The Construction Environmental Management Plan prepared for the works will include details of the pre-clearing process for the vegetation.</li> <li>6. The pre-clearing process will include a requirement to check the trees and shrubs for vertebrate fauna prior to clearing, and to apply a fauna rescue and release procedure should vertebrate fauna be present.</li> <li>7. Native vegetation to be removed should be recycled (mulched) and re-used within landscaped areas.</li> <li>8. For the removal of the six existing trees, each tree will need to be replaced at a ratio of three to each one removed. Therefore, a total of 18 trees should be specified in the immediate vicinity of the intersection in order to replace canopy cover lost. These trees should be planted as 100L stock with correct planting detail, staking, mulch ring and spade cut edge and surrounded by turf. The trees should be planted in groups of three with connected mulching and ensure the mulch area and spacing accommodates the mowing requirements of LCC's maintenance team. The replacement species to include <i>Eucalyptus Paniculata</i>, <i>Melaleuca Linariifolia</i> and <i>Eucalyptus Parramattensis</i>.</li> </ol>
<b>Trees</b>	<ol style="list-style-type: none"> <li>1. Consultation with relevant authorities and the community will be conducted prior to the commencement of works so that an appropriate course of action can be identified.</li> <li>2. No excavation works would be undertaken within the root zone of mature trees outside of those nominated for removal.</li> </ol>
<b>Traffic and transport</b>	<ol style="list-style-type: none"> <li>1. Where possible, current traffic movements and property accesses are to be maintained during the workday. Any disturbance is to be minimised to prevent unnecessary traffic delays.</li> <li>2. Where works would affect the free flow of traffic, a ROL would be obtained from TMC and a Traffic Control Plan would be prepared in accordance with the requirements of the Roads and Maritime's Traffic Control at Worksites Manual (2018) and Australian Standard (AS1743.3 Traffic Control Devices for Projects on Roads).</li> </ol>

	<ol style="list-style-type: none"> <li>3. Appropriate signage (such as variable message signs) and supervision would be provided at all times to ensure that all work areas are controlled and that unauthorised personnel (e.g. pedestrians) are excluded from work areas.</li> <li>4. Vehicle movement arrangements would be developed to limit impacts on other road users (including pedestrians, vehicles and cyclists) and the environment, with specific regard to other road works in the area, local traffic movement requirements and peak traffic volumes.</li> <li>5. A Traffic Management Plan would be prepared as part of the Construction Environmental Management Plan (CEMP) or equivalent Site Environmental Plan and approved by LCC prior to implementation.</li> <li>6. Where changes to access arrangements are necessary, LCC will advise owners and tenants and consult with them in advance regarding alternate access arrangements.</li> <li>7. Appropriate pedestrian traffic controls must be set up to allow safe passage of pedestrians around the work site.</li> </ol>
<b>Socio-economic</b>	<ol style="list-style-type: none"> <li>1. LCC will consult with potentially affected landholders before and during construction to minimise the potential for impacts on land use</li> <li>2. LCC will consult with relevant service providers during detailed design to identify possible interactions and develop procedures to be implemented to minimise the potential for service interruptions which have the potential to impact on existing land use</li> <li>3. A community notice would be delivered to all near-by properties prior to works and would include contact details for a site supervisor, for residents to raise any construction issues.</li> </ol>
<b>Landscape character and visual amenity</b>	<ol style="list-style-type: none"> <li>1. The site will be kept rubbish free at all times.</li> <li>2. Temporary erosion and sediment controls would be removed from the site once landforms have been assessed as stable.</li> <li>3. All disturbed areas would be rehabilitated and progressively stabilised following the completion of the works.</li> <li>4. Landscaping is to be managed in accordance with LCC guidelines.</li> <li>5. Works to be carried out in accordance with EIA-N04 Guidelines for visual impact assessment and landscape character assessment.</li> </ol>
<b>Waste</b>	<ol style="list-style-type: none"> <li>1. A concrete washout would be established in accordance with Best Practice Guidelines (Department of Environment and Conservation's Environmental Best Practice Management Guideline for Concreting Contractors). Concrete washout should be clearly marked with signage, located away from drainage lines and be contained using appropriate sediment control measures to prevent any runoff.</li> </ol>

- Only chutes of concrete trucks and tools can be washout out in the corridor, into a concrete washout pit.
  - Washout pit should be located at least 30m away from a water course and no more than 100m from the pour site.
  - The main truck is not to be washed onsite and must be taken back to the concrete plant.
  - Concrete washout pits are to be lined with suitable plastic lining or similar to prevent soak away of pH affected water. Any pH affected water is expected to be bunded and captured on site, before being disposed of offsite.
2. Spoil and waste for disposal must be classified and transported by appropriately licensed contractors to licensed or approved facilities.
  3. Any excavated soil would be reused on site as fill.
  4. Resource management hierarchy principles are to be followed, including:
    - avoid unnecessary resource consumption as a priority;
    - use resource recovery measures (including re-use of materials, reprocessing, recycling and energy recovery) where waste generation cannot be avoided; and
    - Dispose of wastes as a last resort in accordance with the Waste Avoidance & Resource Recovery Act 2001).
  5. There is to be no disposal or reuse of construction waste onto other land.
  6. No waste is to be burnt on-site.
  7. All waste material would be removed from the site once the activity is complete.
  8. Waste must be disposed of in accordance with DPIE guidelines.
  9. Working areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day.
  10. No fuels or hazardous materials are to be held in bulk containers on-site. Only small volumes (<20 litres) are to be stored for refuelling of small handheld equipment. All refuelling of this equipment will be done in a bunded area and refuelling of vehicles would be conducted off-site.
  11. All fuels, chemicals and liquids to be stored in impervious bunded area a minimum of 50m away from rivers, creeks or any concentrated water flow.

**Cumulative Effects**

1. Ongoing coordination and consultation will be carried out with any other proponents to ensure potential cumulative impacts are appropriately assessed and managed
2. The CEMP will be revised to consider potential cumulative impacts from surrounding development activities as they become known

## 8.1 Licensing and approvals

A list of licences and / or approvals required for the proposed works is given in Table 8-2.

Table 8-2: Summary of licensing and approvals required

Requirement	Timing
LCC approval of REF	Prior to commencement of works
Any necessary road permits such as Road Occupancy Licence(s) from Roads and Maritime (under the <i>Roads Act 1993</i> )	Prior to commencement of works

## 9 Conclusion

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Implementation of the remaining intersection improvement works involving the construction of a slip lane from Bardia Parade into Heathcote Road, installation of additional signalised cycle/pedestrian crossings and associated civil and utility works required a Works Authorisation Deed (WAD), which in turn requires a REF.

The proposal as described in this REF best meets the project objectives but would still result in some minor impacts to the surrounding environment, yet due to the beneficial nature of the works, the environment being highly modified and the scale and timeline of construction being of minimal risk, such impacts are expected to be limited with respect to the environment and community.

Safeguards proposed in this REF would ameliorate or minimise these expected impacts. The proposal would also have a range of benefits including improved safety conditions for road users and pedestrians within the immediate vicinity and wider road network. On balance the proposal is considered justified.

This REF concludes that the proposal is unlikely to have a significant impact on any threatened species, populations or ecological communities or their habitats, listed under the Biodiversity Conservation Act 2016 or Fisheries Management Act 1994 and therefore a species impact statement is not required. This REF finds that the proposal is unlikely to have a significant environmental impact and therefore an Environmental Impact Statement is not required.

Approval from the Minister for Planning and Infrastructure under Part 5.1 of the Environmental Planning and Assessment Act 1979 is not required. The proposal is unlikely to affect Commonwealth land or have a significant impact on any matters of national environmental significance and therefore a referral under the Environment Protection and Biodiversity Conservation Act 1999 to the Australian Government Department of the Environment and Energy is not required.

## REF Determination Page

### 9.1 Assessor declaration

This REF provides a true and fair review of the activity in relation to its likely effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the project, and provides sufficient information to determine whether there is likely to be a significant impact on the environment as a result of the Project.

I have considered all environmental impacts and safeguards to the best of my knowledge and have sought advice where required.

<b>Project Name</b>	Heathcote Road/Bardia Parade, Walder Road, Holsworthy Upgrade
<b>Name:</b> Ying Liu <b>Location:</b> Sydney	Signature: 
<b>Phone:</b> +61 4 264 40276	Date: 07/07/2020
<b>Work Package Manager:</b> Mike Simons <b>Location:</b> Melbourne	Signature:  Date: 07/07/2020

### 9.2 Determiner declaration and approval

I have reviewed the document and consider that the project will not have a significant impact and can proceed subject to the controls outlined in this REF.

<b>Name:</b>	Signature:
<b>Location:</b>	Date:

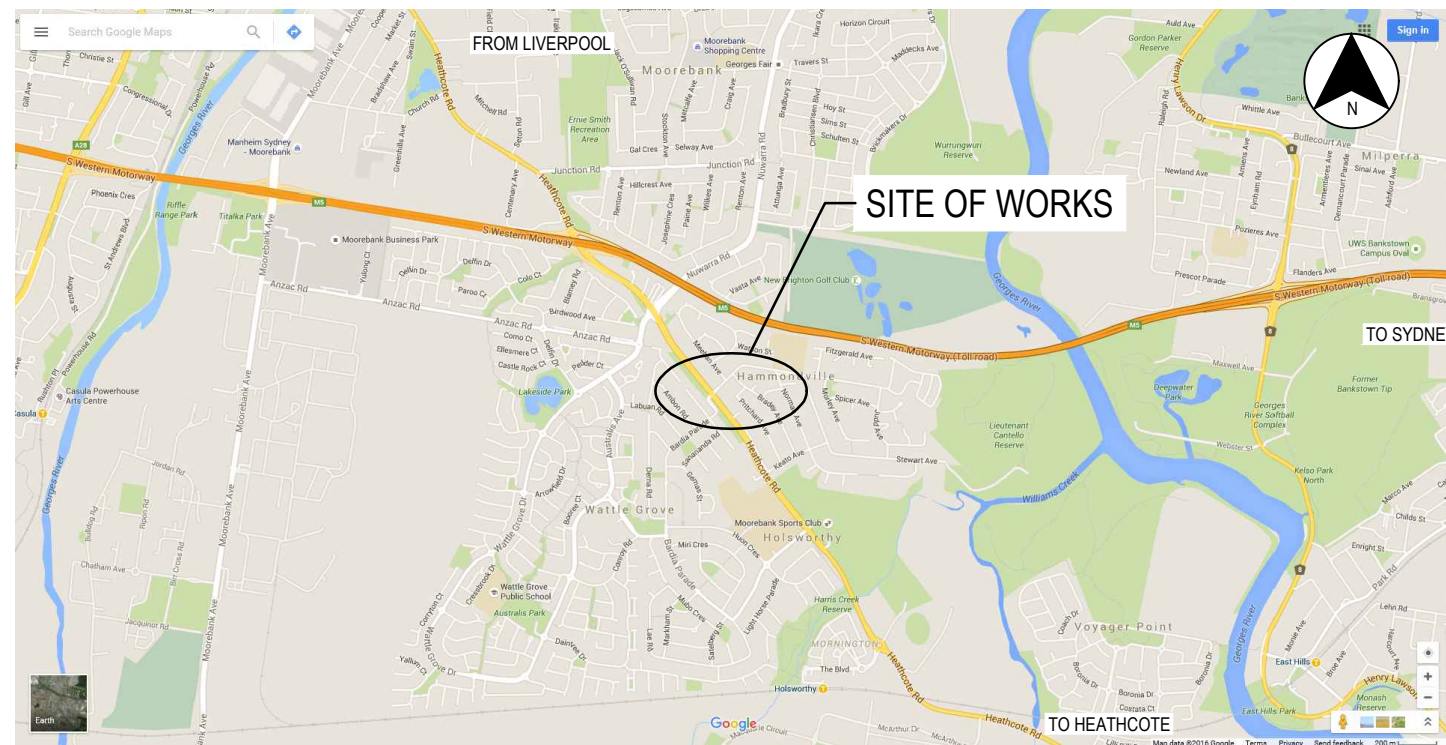




Appendix A – Concept Design Drawings

# LIVERPOOL CITY COUNCIL AREA (MR512) HEATHCOTE ROAD

## INTERSECTION UPGRADE AT BARDIA PDE / WALDER RD, HAMMONDVILLE ROAD DESIGN 100% DETAILED DESIGN



LOCALITY PLAN

Map Data © 2016 Google

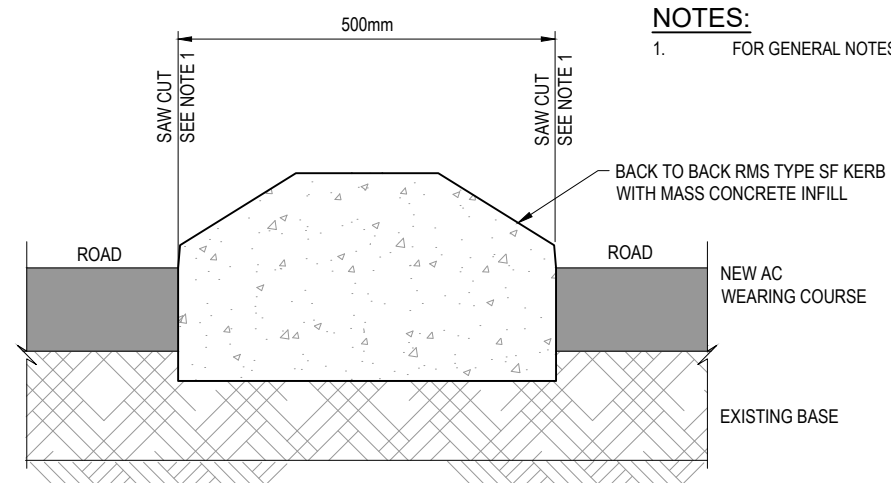
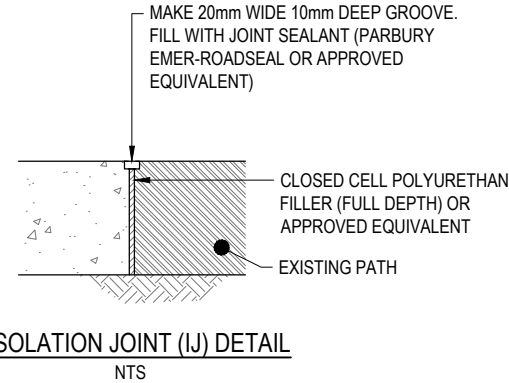
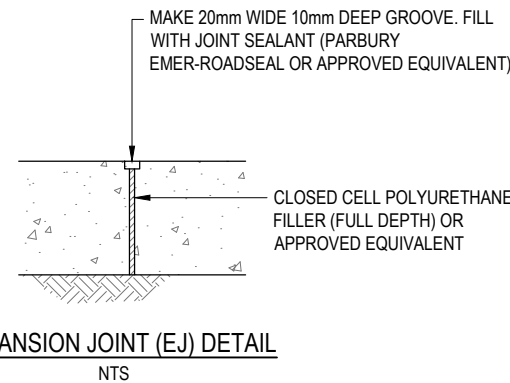
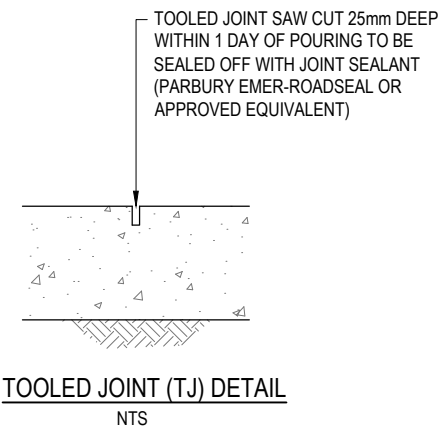
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DRAWING NUMBER	DRAWING TITLE
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RD-0001	TYPICAL DETAILS
RD-0051	TYPICAL CROSS SECTIONS
RD-0101	GENERAL ARRANGEMENT PLAN
RD-0151	KERB PROFILES
RD-0201	ALIGNMENT CONTROL AND SETOUT
RD-0251	ALIGNMENT CONTROL AND SETOUT TABLES
RD-0301	KERB SETOUT DETAILS
RD-1001	TURNING PATHS
PV-0001	PAVEMENT PLAN
RF-0101	SIGNAGE AND LINEMARKING PLAN
SM-0101	DRAINAGE LONGSECTION AND DETAILS
UT-0101	COMBINED UTILITIES PLAN
VV 3516_4A	TCS DESIGN LAYOUT
LD-0101	LANDSCAPE AND PLANTING

SUPPLEMENTARY DRAWINGS	
DRAWING NUMBER	DRAWING TITLE
R0220-01	GULLY PIT TYPE SA PIPE DIAMETER UP TO 450mm
R0300-01	STANDARD KERB AND GUTTER SHAPES
R0300-04	STANDARD VEHICULAR CROSSING FOR USE WITH TYPE SA KERB AND CHANNEL
MD.R33.A08.B.2	COMBINED STORMWATER AND SUBSURFACE DRAINAGE LAYOUT
R0300-11	KERB RAMPS
MD.R33.A06.B.2	STANDARD PAVEMENT SUBSURFACE DRAINAGE DETAILS

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50mm ON A3 SIZE ORIGINAL

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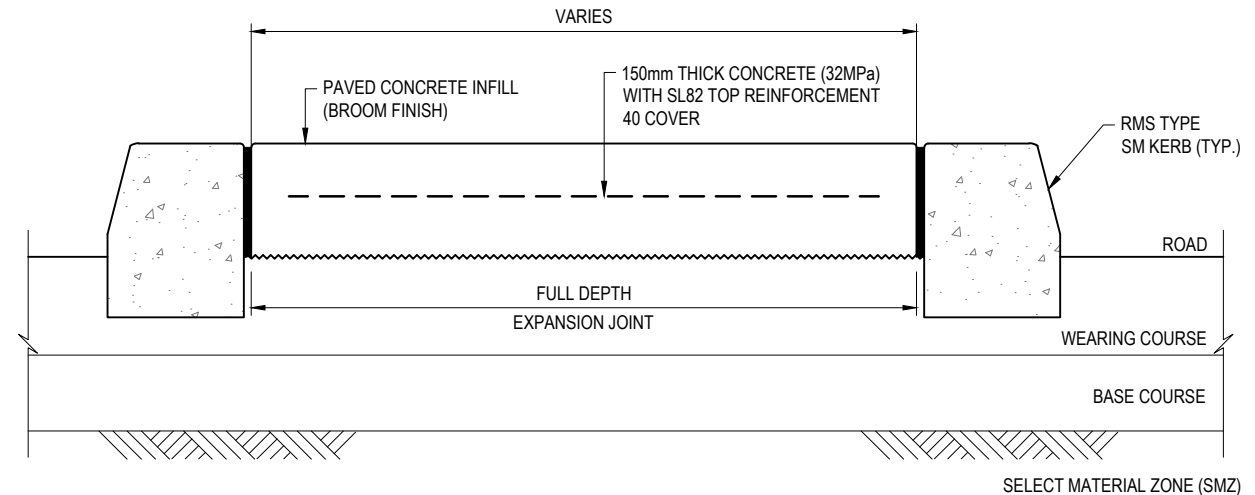
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1. FOR GENERAL NOTES REFER TO DRG RD-0101.

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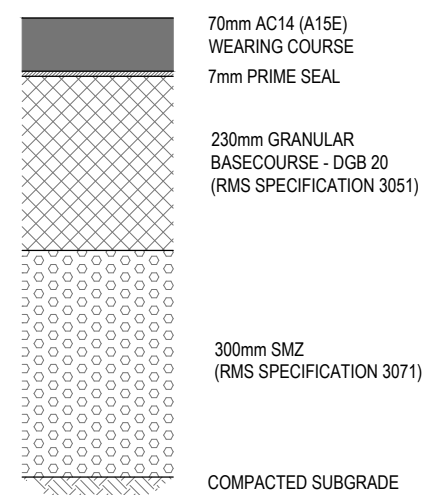
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**ISOLATION JOINT (IJ) DETAIL**  
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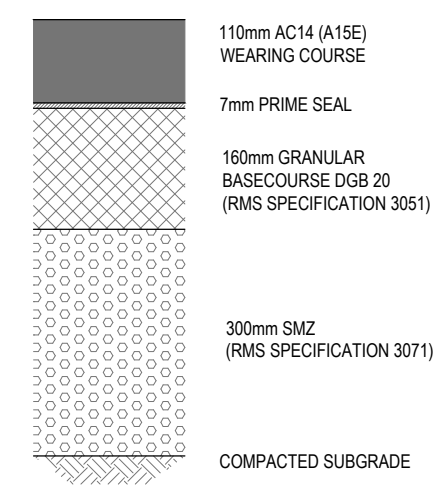
**PROPOSED RAISED MEDIAN ON FLEXIBLE PAVEMENT**  
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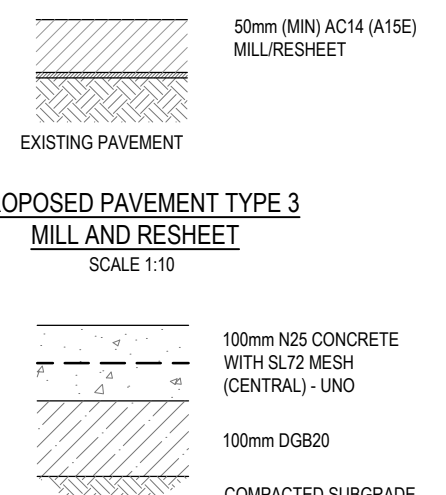
**PROPOSED TRAFFIC ISLAND PROFILE**  
NTS



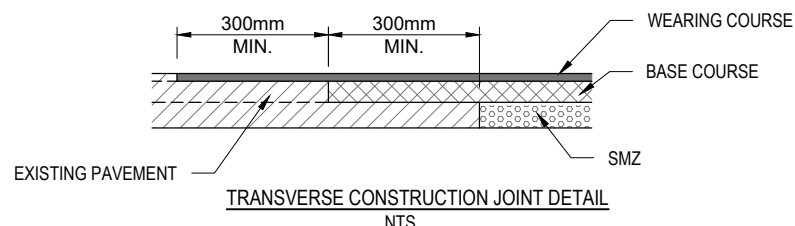
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**WALDER RD**  
NTS



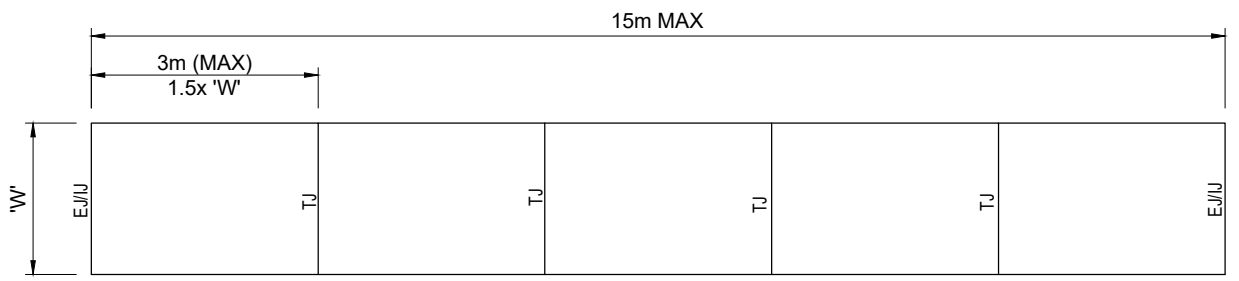
**PROPOSED PAVEMENT TYPE 2**  
**BARDIA PDE**  
NTS



**PROPOSED CONCRETE FOOTPATH PAVEMENT**  
NTS



**TRANSVERSE CONSTRUCTION JOINT DETAIL**  
NTS



TJ: TOOL JOINT  
EJ: EXPANSION JOINT  
IJ: ISOLATION JOINT

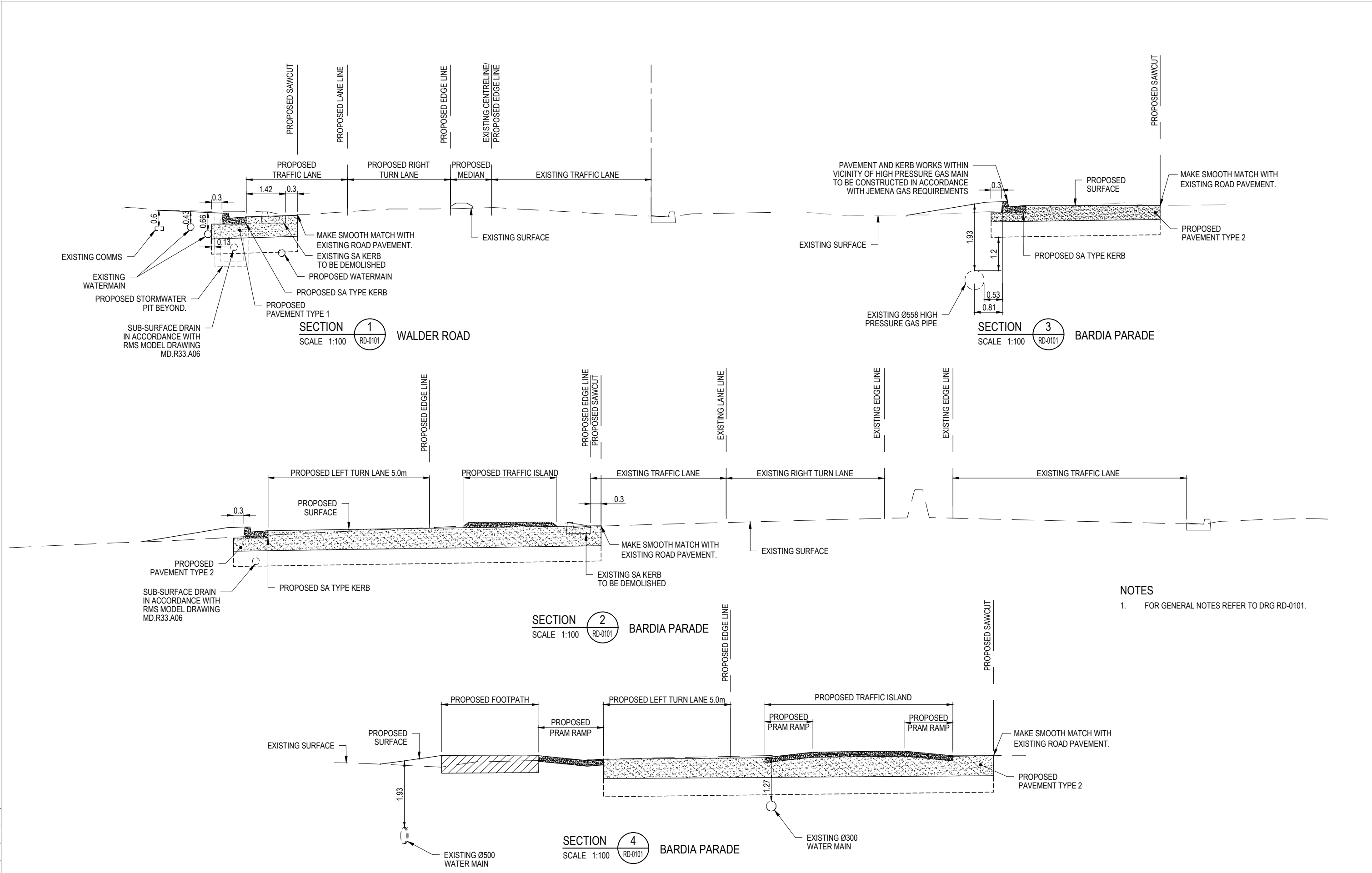
**TYPICAL JOINT PLAN FOR FOOTPATHS**  
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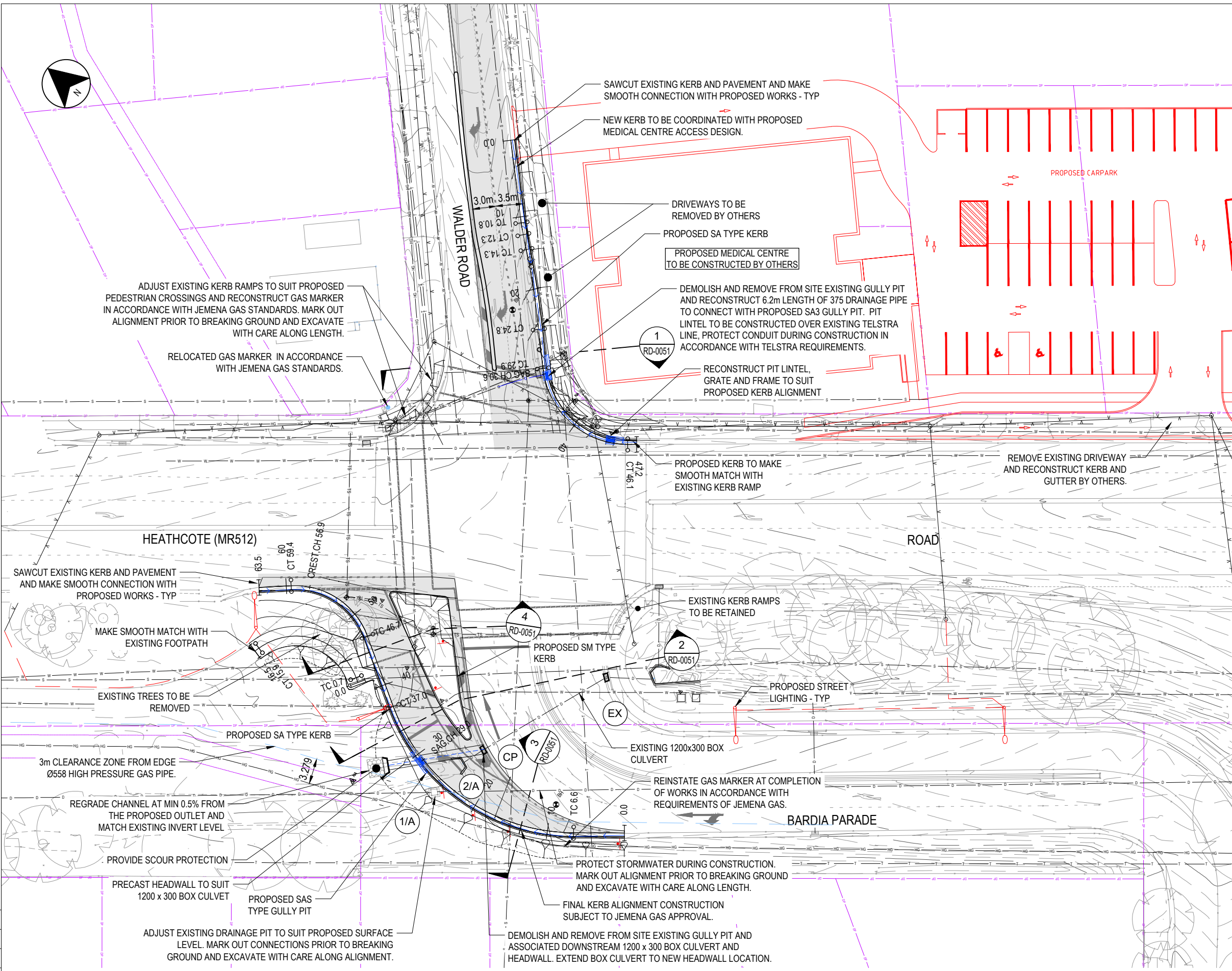
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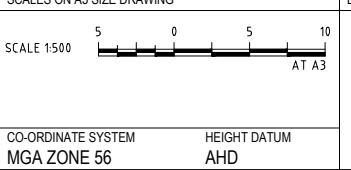


- NOTES**
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  2. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH CURRENT RMS STANDARDS UNLESS NOTED OTHERWISE.
  3. PROVISION FOR TRAFFIC DURING CONSTRUCTION TO BE IN ACCORDANCE WITH THE CURRENT RMS SPECIFICATION G10, RMS PUBLICATION "TRAFFIC CONTROL AT WORK SITE" AND AS1742.3.
  4. ALL NEW KERB AND CHANNEL PROFILES ARE TO BE IN ACCORDANCE WITH RMS MODEL DRAWING MD.R15.A01.A.2.
  5. ALL NEW DISHED CROSSINGS ARE TO BE IN ACCORDANCE WITH RMS MODEL DRAWING MD.R15.A05.A.
  6. ALL NEW CONCRETE PATHWAYS TO BE IN ACCORDANCE WITH LIVERPOOL CITY COUNCIL FOOTPATH AND KERB & GUTTER DETAIL STANDARD DRAWING No. 23.

- LEGEND**
- PROPOSED DESIGN
  - - - PROPOSED SAWCUT
  - ▽ PROPOSED KERB RAMP
  - ▭ PROPOSED PAVEMENT
  - ▭ PROPOSED DRAINAGE PIT
  - RELOCATED GAS MARKER POST
  - - - PROPOSED LOW VOLTAGE TRENCHING

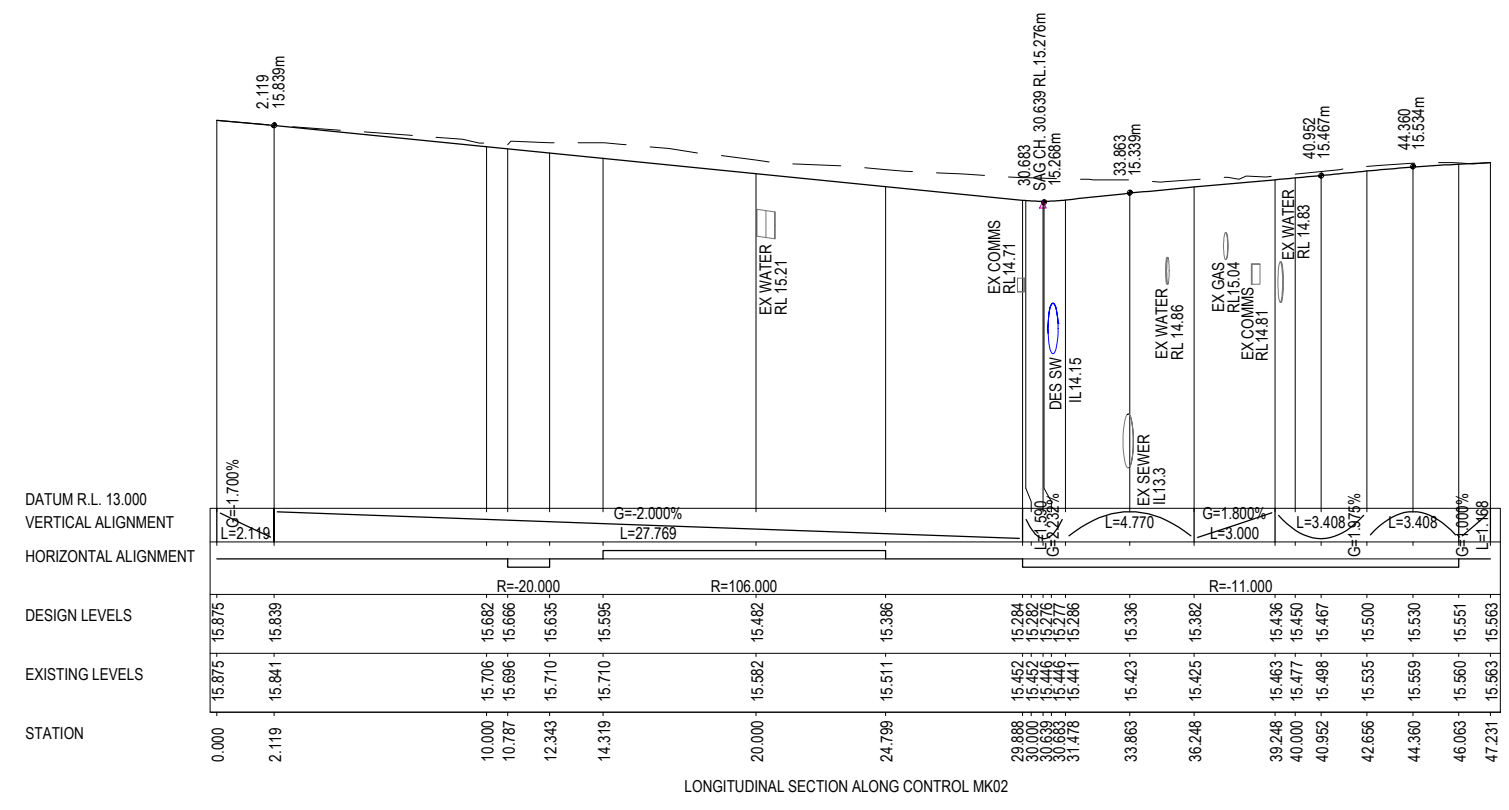
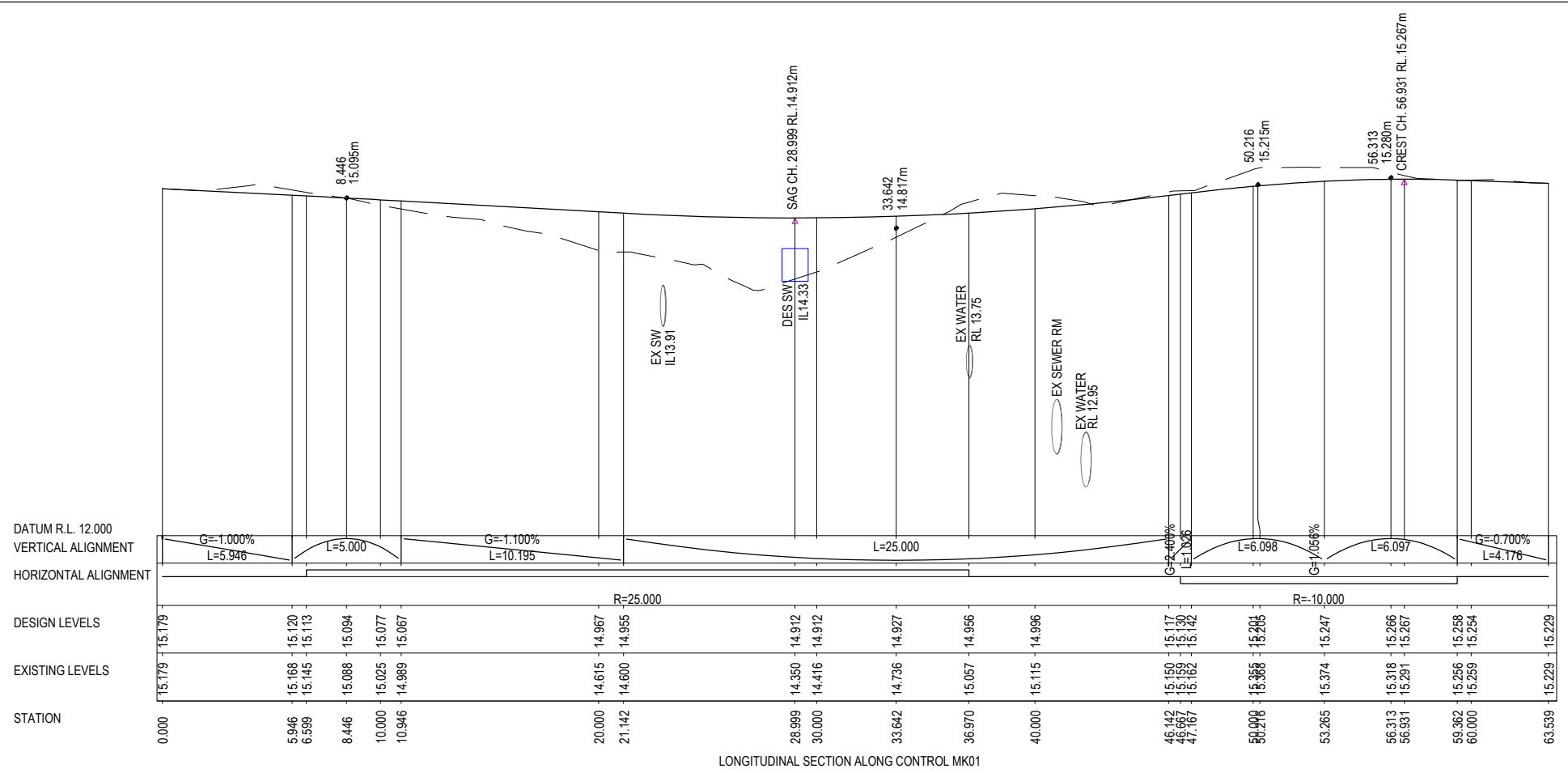
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x-rd-d-control-plan								



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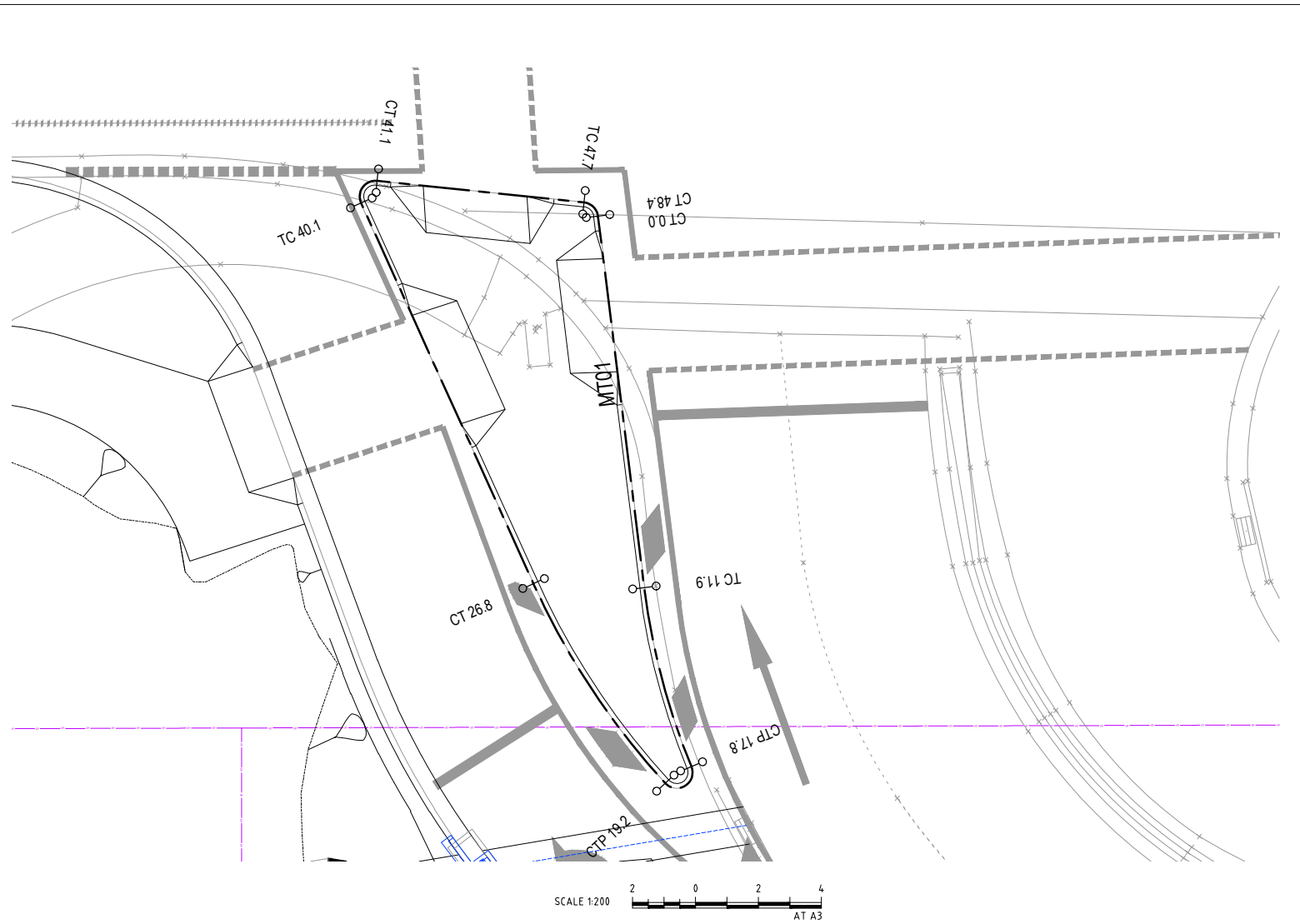
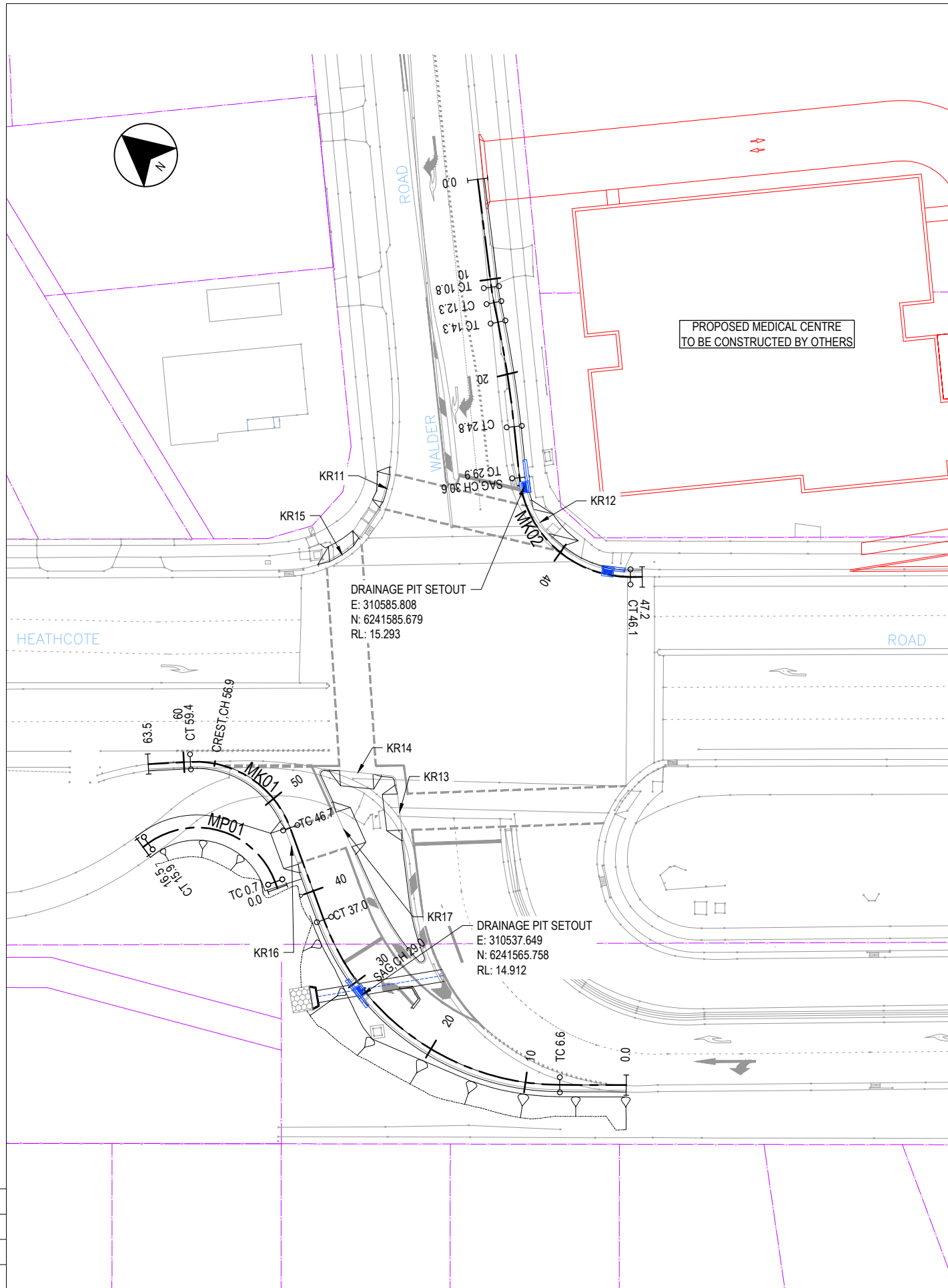
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PREPARED FOR	EDMS No.	SHEET No. RD-0151	ISSUE D
LIVERPOOL CITY COUNCIL MR512 HEATHCOTE ROAD INTERSECTION UPGRADE AT BARDIA PDE / WALDER RD, HAMMONDVILLE GENERAL KERB PROFILES		SHEET 1 OF 1	





**NOTES**

1. SURVEY MARKS ARE NOT TO BE DISTURBED BEFORE ASSESSMENT BY SURVEYOR.
2. THE CONTRACTOR SHALL ARRANGE FOR THE WORKS TO BE SETOUT BY A REGISTERED SURVEYOR.
3. THE CONTRACTOR SHALL CHECK THE STABILITY OF THE STATED COORDINATES PRIOR TO COMMENCEMENT OF CONSTRUCTION.
4. ALL SURVEY MARKS MUST BE PRESERVED, UNLESS NOTED OTHERWISE.
5. FOR SETOUT TABLES, REFER TO DRG RD-0251.
6. FOR KERB RAMP SETOUT TABLE, REFER TO DRG RD-0301.

**SCHEDULE OF SURVEY CONTROL POINTS**

EASTING	NORTHING	HEIGHT	DESCRIPTION
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310604.822	6241491.055	16.095	STN 9001(DPY)
310527.075	6241592.970	14.911	STN 9003(NAIL)
310577.562	6241599.979	15.540	STN 9008(DPY)
310632.671	6241653.068	17.157	STN 9009(GIN)

**GENERAL NOTES:**

1. LEVEL DATUM A.H.D., ORIGIN OF LEVELS PM 31045, RL 20.650 VIDE SCIMS
2. THE BOUNDARIES HAVE NOT BEEN SURVEYED. BOUNDARY INFORMATION SHOWN HAS BEEN COMPILED FROM THE RELEVANT DEPOSITED SURVEY PLANS.
3. IMPROVEMENTS AND FEATURES SHOWN ON OR NEAR THE BOUNDARIES ARE INDICATIVE ONLY.

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DRAWING FILE LOCATION / NAME P:\349\3496376\CAD\RD-0201.dwg		DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING		PLOT DATE / TIME 13/07/2020 5:54:14 PM	PLOT BY DFF	CLIENT <b>LIVERPOOL CITY COUNCIL</b>	LIVERPOOL CITY COUNCIL MR512 HEATHCOTE ROAD INTERSECTION UPGRADE AT BARDIA PDE / WALDER RD, HAMMONDVILLE GENERAL ALIGNMENT CONTROL AND SETOUT	A1
EXTERNAL REFERENCE FILES		WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	TITLE	NAME	DATE	PREPARED FOR	RMS REGISTRATION No.
XT_3496376_A3_SHT x-su-e-survey-plan x-rd-d-trmk-plan x-rd-d-control-plan x-rd-d-design-plan x-sm-d-drainage-plan			AI AI CO CO	SCALE 1:500 		C.LAWRENCE	13.07.20		ISSUE STATUS DETAILED DESIGN
REV	DATE	AMENDMENT / REVISION DESCRIPTION				F.MIGUES	13.07.20		EDMS No.
A	14.04.20	ISSUED FOR DISCUSSION				B.STRANG	13.07.20		SHEET No. RD-0201
B	17.06.20	ISSUED FOR REVIEW				C.OAKES	13.07.20		ISSUE D
C	30.06.20	ISSUED FOR REVIEW				C.OAKES	13.07.20		
D	13.07.20	ISSUED FOR TfNSW APPROVAL				S.OETOMO	13.07.20		
				CO-ORDINATE SYSTEM MGA ZONE 56	HEIGHT DATUM AHD				



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50mm ON A3 SIZE ORIGINAL

MK01 HORIZONTAL POINTS								
PT	CHAINAGE	EASTING	NORTHING	HEIGHT	BEARING	RAD/SPIRAL	A.LENGTH	DEFL.ANGLE
IP 1	0.000	310547.142	6241539.628	15.179	320°13'00.02"			
TC	6.599	310542.919	6241544.700	15.113	320°13'00.02"			
IP 2	21.785	310531.800	6241558.054	14.948		R = 25.000	30.371	69°36'19.20"
CT	36.970	310540.442	6241573.130	14.956	29°49'19.23"			
TC	46.667	310545.264	6241581.542	15.130	29°49'19.23"			
IP 3	53.015	310548.926	6241587.931	15.245		R = -10.000	12.695	72°44'12.47"
CT	59.362	310543.912	6241593.325	15.258	317°05'06.75"			
IP 4	63.539	310541.068	6241596.383	15.229	317°05'06.75"			

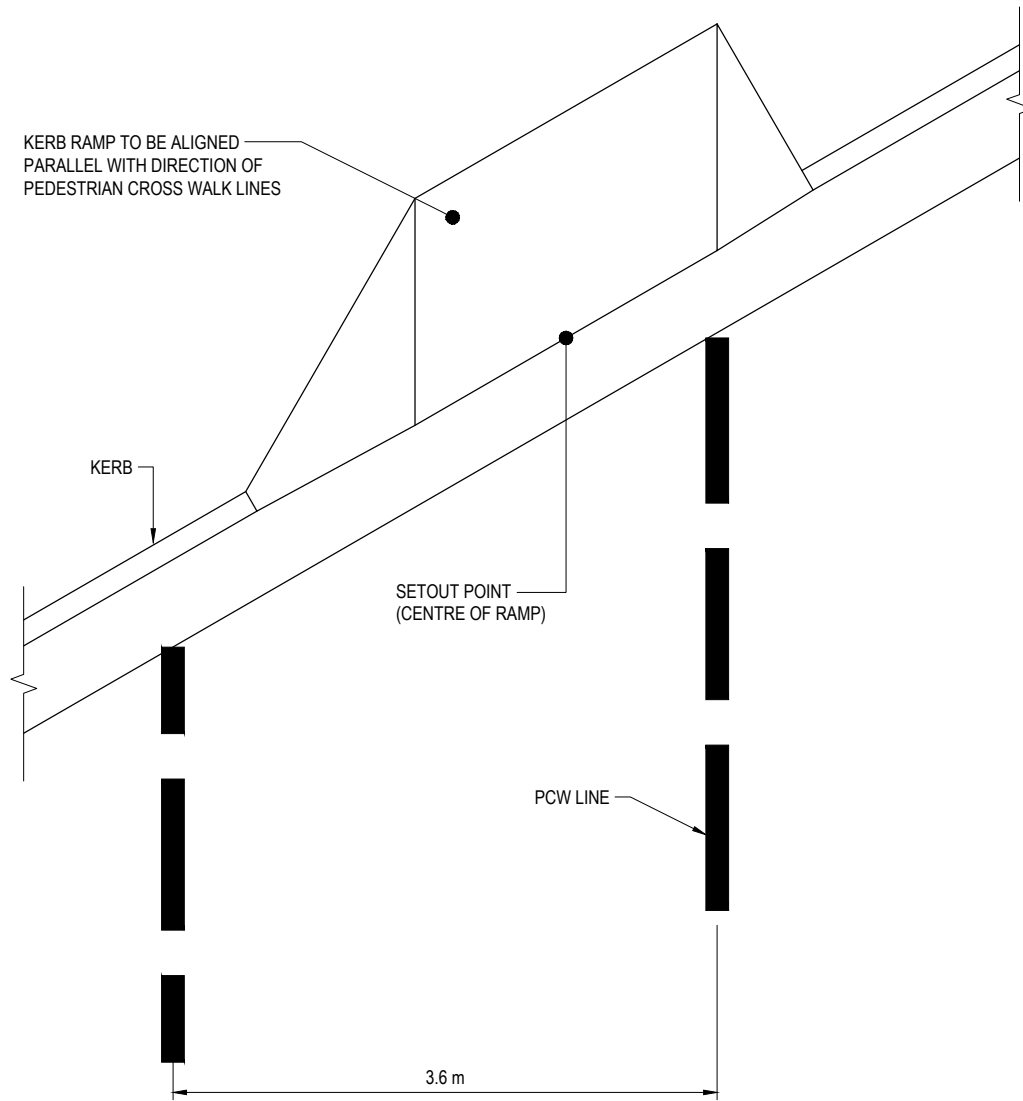
MK02 HORIZONTAL POINTS								
PT	CHAINAGE	EASTING	NORTHING	BEARING	RAD/SPIRAL	A.LENGTH	DEFL.ANGLE	
IP 1	0.000	310606.464	6241608.633	222°46'48.25"				
TC	10.787	310599.138	6241600.716	222°46'48.25"				
IP 2	11.565	310598.610	6241600.145		R = -20.000	1.556	4°27'27.38"	
CT	12.343	310598.127	6241599.534	218°19'20.87"				
TC	14.319	310596.901	6241597.984	218°19'20.87"				
IP 3	19.559	310593.649	6241593.869		R = 106.000	10.480	5°39'53.06"	
CT	24.799	310590.007	6241590.096	223°59'13.93"				
TC	29.888	310586.473	6241586.435	223°59'13.93"				
IP 4	37.976	310579.564	6241579.277		R = -11.000	16.176	84°15'13.55"	
CT	46.063	310585.994	6241571.686	139°44'00.38"				
IP 5	47.231	310586.749	6241570.794	139°44'00.38"				

MP01 HORIZONTAL POINTS								
PT	CHAINAGE	EASTING	NORTHING	HEIGHT	BEARING	RAD/SPIRAL	A.LENGTH	DEFL.ANGLE
IP 1	0.000	310539.855	6241578.642	15.130	29°49'20.54"			
TC	0.677	310540.192	6241579.229	15.143	29°49'20.54"			
IP 2	8.291	310545.613	6241588.686	15.178		R = -8.250	15.228	105°45'34.33"
CT	15.906	310535.039	6241591.335	15.088	284°03'46.21"			
IP 3	16.540	310534.424	6241591.489	15.080	284°03'46.21"			

MT01 HORIZONTAL POINTS (CLOSED)								
PT	CHAINAGE	EASTING	NORTHING	HEIGHT	BEARING	RAD/SPIRAL	A.LENGTH	DEFL.ANGLE
IP 1	0.000	310555.588	6241576.559	15.289				
TC	11.883	310547.500	6241567.854	15.023	222°53'44.60"			
IP 2	14.827	310545.483	6241565.684	14.995		R = -22.000	5.889	15°20'15.91"
CC	17.772	310544.113	6241563.057	14.967	207°33'28.69"			
IP 3	18.121	310543.919	6241562.686	14.964		R = 0.500	0.698	79°56'41.40"
CC	18.470	310543.519	6241562.812	14.962	287°30'10.09"			
IP 4	18.818	310543.119	6241562.938	14.959		R = 0.500	0.698	79°56'41.40"
CC	19.167	310543.174	6241563.354	14.956	7°26'51.49"			
IP 5	22.978	310543.672	6241567.165	14.982		R = 24.000	7.623	18°11'50.96"
CT	26.790	310545.335	6241570.630	15.008	25°38'42.45"			
TC	40.052	310551.075	6241582.585	15.231	25°38'42.45"			
IP 6	40.314	310551.200	6241582.846	15.233		R = 0.500	0.525	60°09'17.36"
CT	40.577	310551.489	6241582.868	15.235	85°47'59.81"			
IP 7	40.839	310551.778	6241582.889	15.237		R = 0.500	0.525	60°09'17.36"
CT	41.102	310551.940	6241582.649	15.238	145°57'17.17"			
TC	47.703	310555.636	6241577.179	15.285	145°57'17.17"			
IP 8	48.038	310555.858	6241576.850	15.287		R = 0.500	0.671	76°56'27.43"
CT	48.374	310555.588	6241576.559	15.289	222°53'44.60"			

DRAWING FILE LOCATION / NAME P:\349\3496376\CAD\IRD-0251.dwg		DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING		PLOT DATE / TIME 13/07/2020 4:40:51 PM	PLOT BY CRL2	CLIENT <b>LIVERPOOL CITY COUNCIL</b>	LIVERPOOL CITY COUNCIL MR512 HEATHCOTE ROAD INTERSECTION UPGRADE AT BARDIA PDE / WALDER RD, HAMMONDVILLE GENERAL ALIGNMENT CONTROL AND SETOUT TABLES	A1																					
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY																							
XT_3496376_A3_SHT	A	14.04.20	ISSUED FOR DISCUSSION		AI																									
	B	17.06.20	ISSUED FOR REVIEW		AI																									
	C	30.06.20	ISSUED FOR REVIEW		CO																									
	D	13.07.20	ISSUED FOR TfNSW APPROVAL		CO																									
																														
						<table border="1"> <thead> <tr> <th>TITLE</th> <th>NAME</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>DRAWN</td> <td>C.LAWRENCE</td> <td>13.07.20</td> </tr> <tr> <td>DRG CHECK</td> <td>F.MIGUES</td> <td>13.07.20</td> </tr> <tr> <td>DESIGN</td> <td>B.STRANG</td> <td>13.07.20</td> </tr> <tr> <td>DESIGN CHECK</td> <td>C.OAKES</td> <td>13.07.20</td> </tr> <tr> <td>DESIGN MNGR</td> <td>C.OAKES</td> <td>13.07.20</td> </tr> <tr> <td>PROJECT MNGR</td> <td>S.OETOMO</td> <td>13.07.20</td> </tr> </tbody> </table>		TITLE	NAME	DATE	DRAWN	C.LAWRENCE	13.07.20	DRG CHECK	F.MIGUES	13.07.20	DESIGN	B.STRANG	13.07.20	DESIGN CHECK	C.OAKES	13.07.20	DESIGN MNGR	C.OAKES	13.07.20	PROJECT MNGR	S.OETOMO	13.07.20	PREPARED FOR	
TITLE	NAME	DATE																												
DRAWN	C.LAWRENCE	13.07.20																												
DRG CHECK	F.MIGUES	13.07.20																												
DESIGN	B.STRANG	13.07.20																												
DESIGN CHECK	C.OAKES	13.07.20																												
DESIGN MNGR	C.OAKES	13.07.20																												
PROJECT MNGR	S.OETOMO	13.07.20																												
								RMS REGISTRATION No.																						
								ISSUE STATUS DETAILED DESIGN	EDMS No.																					
								SHEET No. RD-0251	ISSUE D																					

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**KERB RAMP TYPICAL SETOUT DETAIL**  
SCALE 1:50

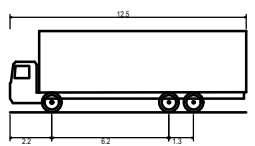
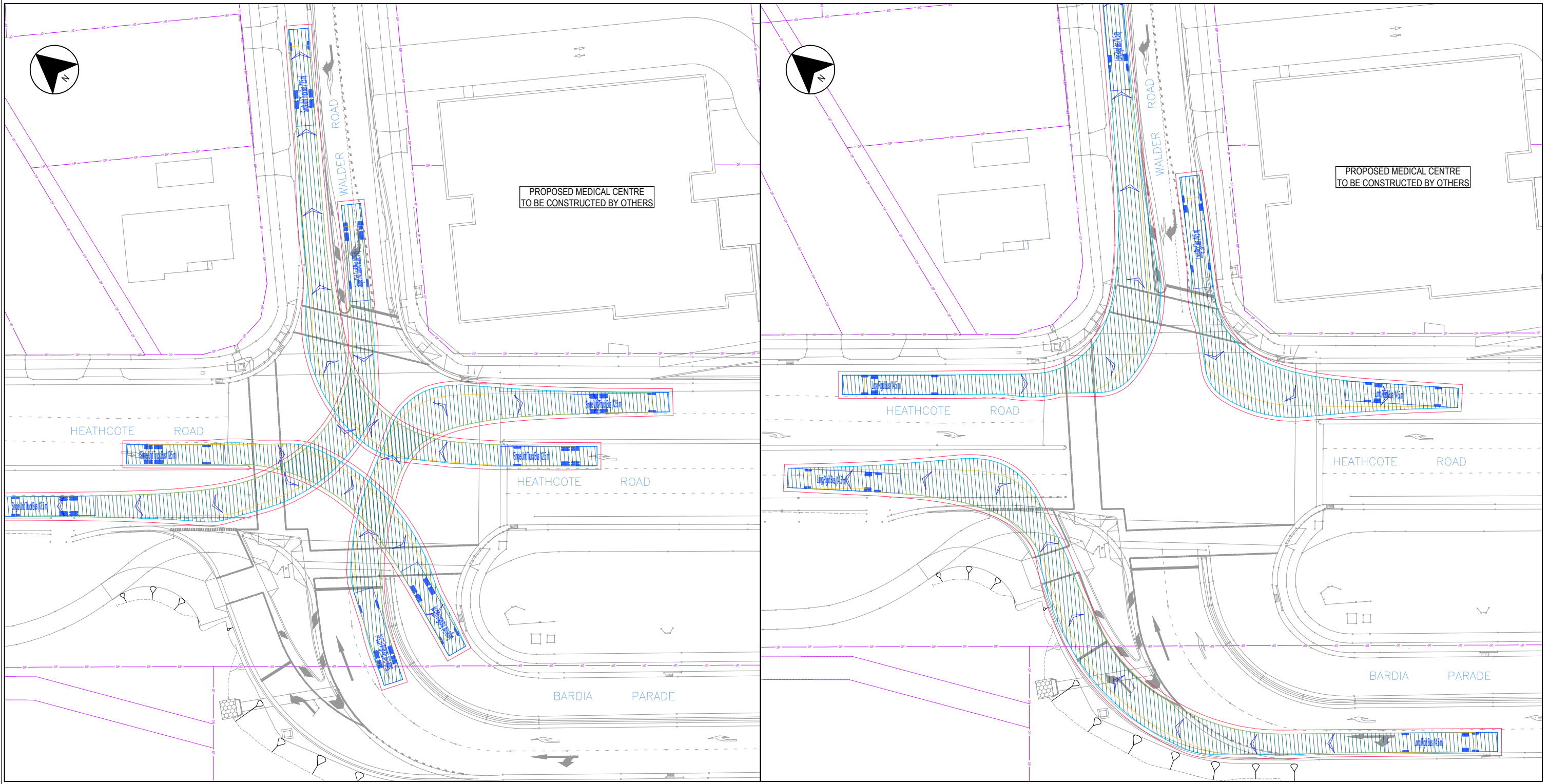
KERB RAMP SETOUT COORDINATES		
RAMP No.	EASTING	NORTHING
KR11	310577.194	6241595.806
KR12	310584.408	6241582.028
KR13	310553.431	6241574.238
KR14	310553.788	6241579.914
KR15	310569.330	6241595.002
KR16	310543.945	6241580.250
KR17	310548.565	6241577.357

**NOTES**

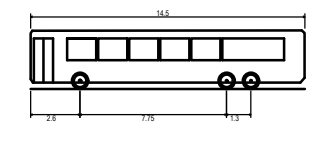
- FOR SETOUT NOTES REFER TO DRG RD-0201.
- REFER TO RMS STANDARD DRAWINGS R0300-11 FOR KERB RAMP.

DRAWING FILE LOCATION / NAME P:\349\3496376\CAD\RD-0301.dwg				DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	PLOT DATE / TIME 13/07/2020 4:41:12 PM	PLOT BY CRL2	CLIENT <b>LIVERPOOL CITY COUNCIL</b>	LIVERPOOL CITY COUNCIL MR512 HEATHCOTE ROAD INTERSECTION UPGRADE AT BARDIA PDE / WALDER RD, HAMMONDVILLE GENERAL KERB SETOUT DETAILS	A1		
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	TITLE	NAME	DATE	RMS REGISTRATION No.			
XT_3496376_A3_SHT	A	14.04.20	ISSUED FOR DISCUSSION		AI	DRAWN	C.LAWRENCE	13.07.20				
	B	17.06.20	ISSUED FOR REVIEW		AI	DRG CHECK	F.MIGUES	13.07.20				
	C	30.06.20	ISSUED FOR REVIEW		CO	DESIGN	B.STRANG	13.07.20				
	D	13.07.20	ISSUED FOR TfNSW APPROVAL		CO	DESIGN CHECK	C.OAKES	13.07.20				
						DESIGN MNGR	C.OAKES	13.07.20				
						PROJECT MNGR	S.OETOMO	13.07.20				
				SCALE 150 				PREPARED FOR	ISSUE STATUS DETAILED DESIGN	EDMS No.	SHEET No. RD-0301	ISSUE D
				CO-ORDINATE SYSTEM MGA ZONE 56		HEIGHT DATUM AHD						

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Single Unit Truck/Bus (12.5 m)  
 Overall Length 12.500m  
 Overall Width 2.500m  
 Overall Body Height 4.300m  
 Min Body Ground Clearance 0.490m  
 Track Width 2.500m  
 Lock-to-lock time 6.00s  
 Curb to Curb Turning Radius 12.500m



Long Rigid Bus (14.5 m) - Mandatory Stop  
 Overall Length 14.500m  
 Overall Width 2.500m  
 Overall Body Height 3.120m  
 Min Body Ground Clearance 0.837m  
 Track Width 2.500m  
 Lock-to-lock time 6.00s  
 Curb to Curb Turning Radius 12.500m

DRAWING FILE LOCATION / NAME P:\349\3496376\CAD\RD-1001.dwg		DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	PLOT DATE / TIME 13/07/2020 4:41:58 PM	PLOT BY CRL2	CLIENT <b>LIVERPOOL CITY COUNCIL</b>	LIVERPOOL CITY COUNCIL MR512 HEATHCOTE ROAD INTERSECTION UPGRADE AT BARDIA PDE / WALDER RD, HAMMONDVILLE GENERAL TURNING PATHS	A1
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY	
XT_3496376_A3_SHT x-su-e-survey-plan x-rd-d-trmk-plan x-rd-d-design-plan x-rd-d-turnpaths-plan	A	14.04.20	ISSUED FOR DISCUSSION		AI	SCALE 1:500 		
	B	17.06.20	ISSUED FOR REVIEW		AI			
	C	30.06.20	ISSUED FOR REVIEW		CO			
	D	13.07.20	ISSUED FOR TNSW APPROVAL		CO			
CO-ORDINATE SYSTEM MGA ZONE 56		HEIGHT DATUM AHD		TITLE		DATE		
				DRAWN		C.LAWRENCE		13.07.20
				DRG CHECK		F.MIGUES		13.07.20
				DESIGN		B.STRANG		13.07.20
				DESIGN CHECK		C.OAKES		13.07.20
				DESIGN MNGR		C.OAKES		13.07.20
				PROJECT MNGR		S.OETOMO		13.07.20

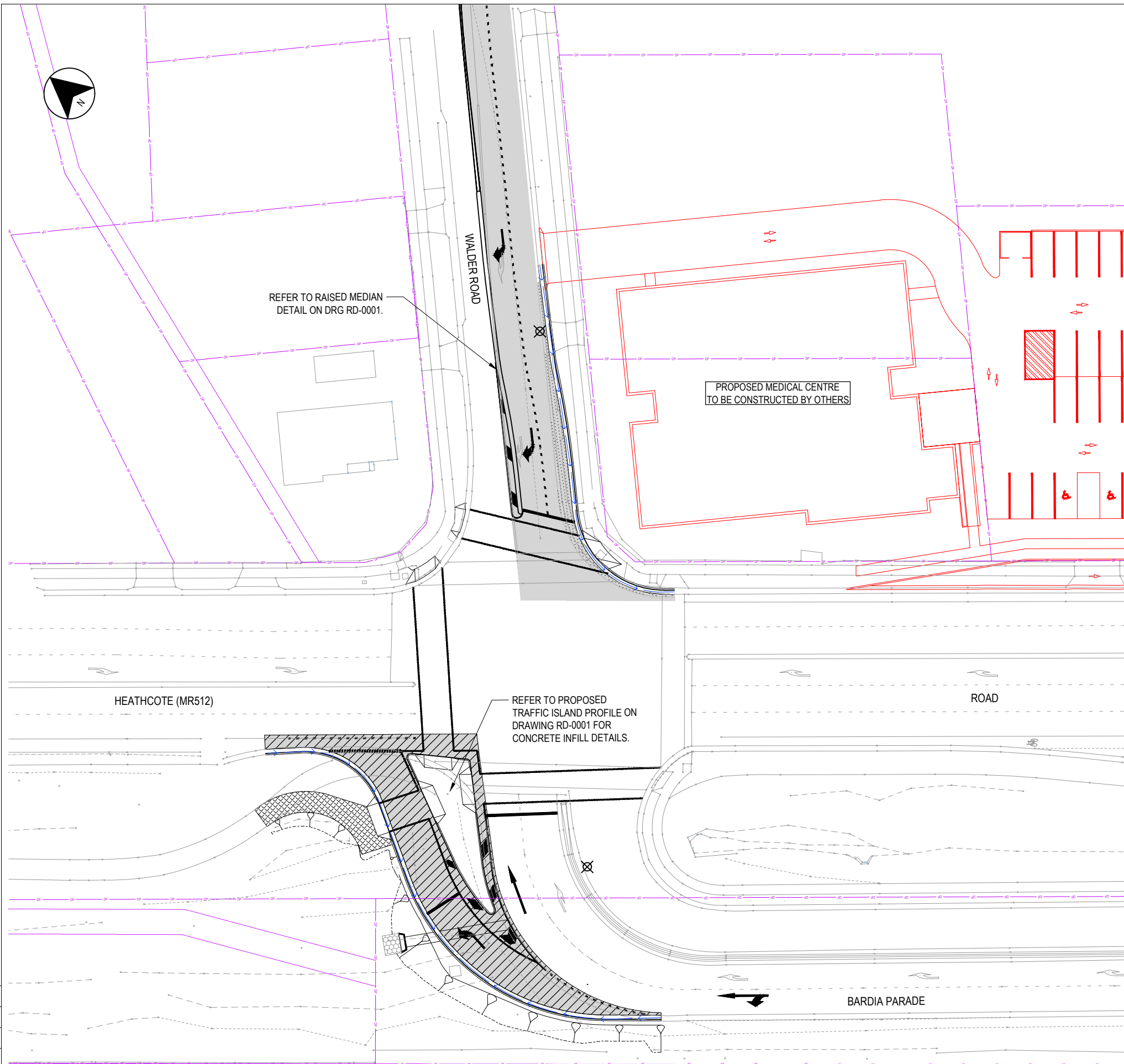
PREPARED FOR	ISSUE STATUS DETAILED DESIGN	EDMS No.	SHEET No. RD-1001	ISSUE D
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RMS REGISTRATION No.		SHEET 1 OF 1	
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PREPARED FOR		SHEET 1 OF 1	
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
THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED  
50mm ON A3 SIZE ORIGINAL

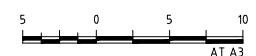



**NOTES**

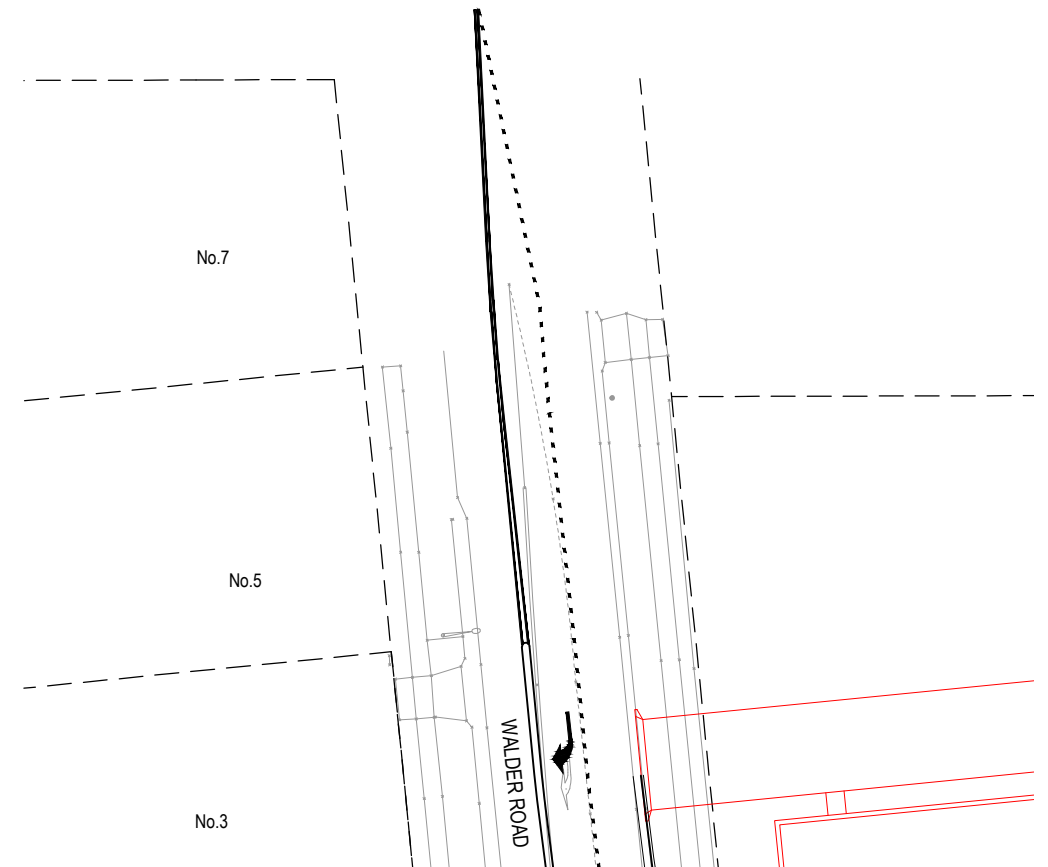
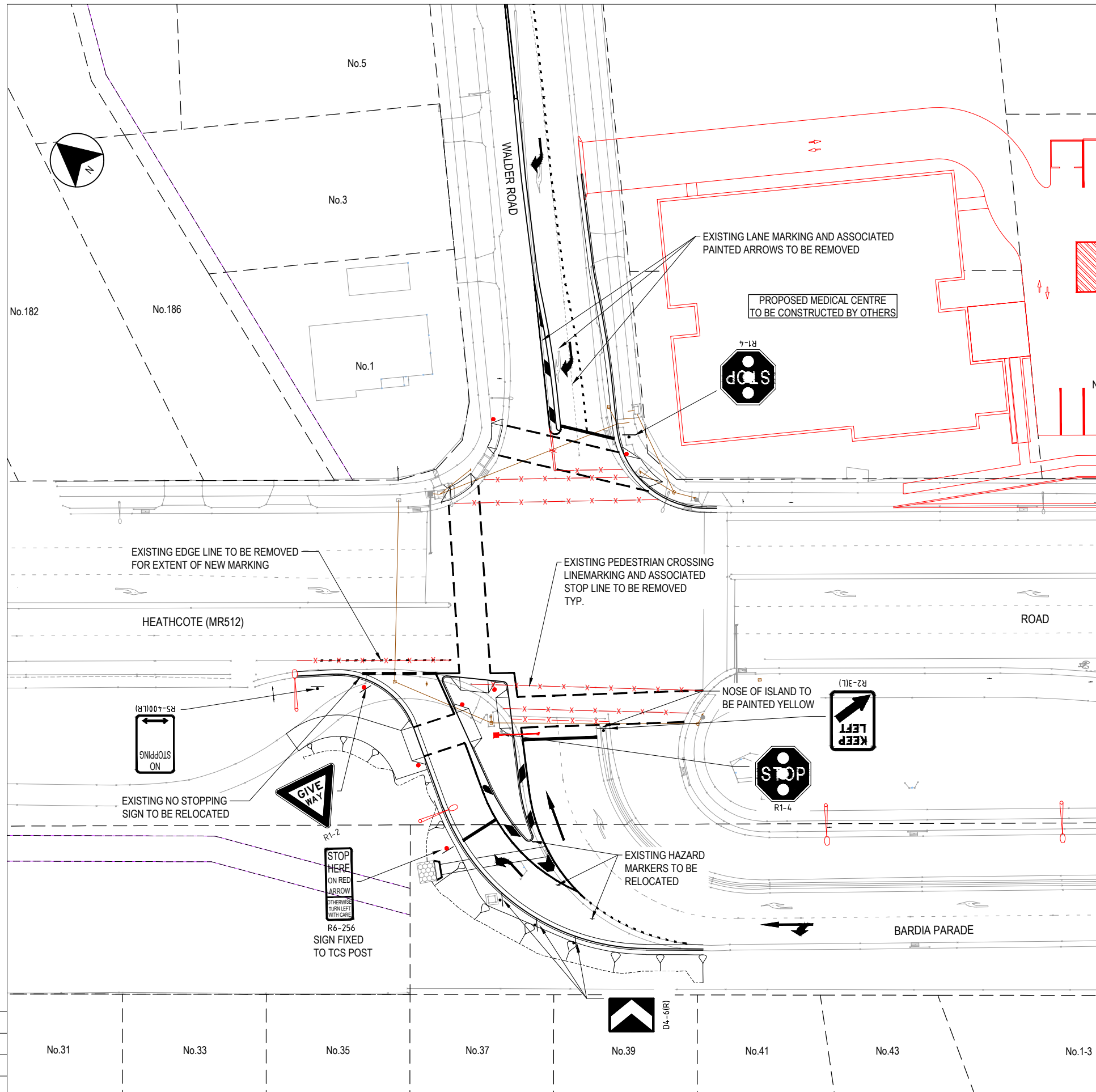
- FOR PAVEMENT TYPES AND DETAILS REFER TO DRG RD-0001.
- SUBSOIL DRAINAGE SHALL BE INSTALLED IN ACCORDANCE WITH RMS QA SPECIFICATION R33.
- MINIMUM GRADE OF SUBSURFACE DRAIN IS TO BE 0.5%.
- SUBSURFACE DRAINAGE TO BREAK INTO STORMWATER STRUCTURES IN ACCORDANCE WITH RMS MODEL DRAWING MD.R33.A08.B.2.
- APPROPRIATE PROTECTION MEASURES SHALL BE PUT IN PLACE WHEN CONSTRUCTING PAVEMENT AND KERBING IN CLOSE PROXIMITY TO UTILITY SERVICES.
- FOR KERB RAMP PAVEMENT DETAILS REFER TO

**LEGEND**

-  PROPOSED CONCRETE FOOTPATH PAVEMENT
-  PROPOSED PAVEMENT TYPE 1 - WALDER ROAD
-  PROPOSED PAVEMENT TYPE 2 - BARDIA PARADE
-  PROPOSED PAVEMENT TYPE 3 - MILL RESHEET
-  BOREHOLE LOCATION
-  SUBSURFACE DRAIN
-  CADASTRAL BOUNDARY

DRAWING FILE LOCATION / NAME P:\349\3496376\CAD\IPV-0001.dwg		DESIGN LOT CODE		DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING		PLOT DATE / TIME 13/07/2020 4:37:00 PM		PLOT BY CRL2		CLIENT <b>LIVERPOOL CITY COUNCIL</b>		LIVERPOOL CITY COUNCIL MR512 HEATHCOTE ROAD INTERSECTION UPGRADE AT BARDIA PDE / WALDER RD, HAMMONDVILLE GENERAL PAVEMENT PLAN SHEET 1 OF 1	A1	
EXTERNAL REFERENCE FILES		WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY		TITLE	NAME	DATE	PREPARED FOR				
XT_3496376_A3_SHT	A	14.04.20	ISSUED FOR DISCUSSION		 SCALE 1500 AT A3		DRAWN	C.LAWRENCE	13.07.20	PREPARED FOR		RMS REGISTRATION No.		
x-rd-g-rmk-plan	B	17.06.20	ISSUED FOR REVIEW				DRG CHECK	F.MIGUES	13.07.20	PREPARED FOR			ISSUE STATUS DETAILED DESIGN	
x-rd-g-design-plan	C	30.06.20	ISSUED FOR REVIEW				DESIGN	B.STRANG	13.07.20	PREPARED FOR				EDMS No.
x-pv-d-pavement-plan	D	13.07.20	ISSUED FOR TNSW APPROVAL				DESIGN CHECK	C.OAKES	13.07.20	PREPARED FOR				
x-su-e-survey-plan					DESIGN MNGR	C.OAKES	13.07.20	PREPARED FOR		ISSUE D				
x-su-e-street-names-plan					PROJECT MNGR	S.OETOMO	13.07.20	PREPARED FOR						

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**NOTES**

1. ALL PAVEMENT MARKING AND SIGNPOSTING TO BE IN ACCORDANCE WITH RMS DELINEATION GUIDELINES.
2. ALL PAVEMENT MARKING AND SIGNPOSTING TO BE IN ACCORDANCE WITH RMS SPECIFICATIONS R141, R143 AND AS 1742.
3. ONLY OFFICERS WITH A MINIMUM DELEGATION LEVEL 5.0 OF THE RMS DELEGATIONS MANUAL ARE AUTHORISED TO APPROVE REGULATORY SIGNPOSTING AND LINEMARKING ILLUSTRATED ON THIS PLAN. REGULATORY SIGNPOSTING AND LINEMARKING SHOWN ON THIS PLAN ARE NOT APPROVED FOR INSTALLATION WITHOUT THE WRITTEN AUTHORISATION FROM RMS NETWORK AND SAFETY SERVICES.
4. ALL REDUNDANT LINEMARKING TO BE REMOVED BY APPROVED METHODS.
5. FOR INTERSECTION DETAILS REFER TO RMS TRAFFIC SIGNAL CONTROL PLAN REGISTRATION NUMBER DS2014/003903.
6. FOR STREET LIGHTING REFER ARCONATECH DESIGN.

**LEGEND**

- - - - - INDICATIVE PROPERTY BOUNDARY
- EXISTING PAVEMENT ARROW
- PROPOSED TRAFFIC SIGN
- PROPOSED PAVEMENT ARROW
- x-x-x- LINE MARKING TO BE REMOVED
- EXISTING TCS POLE
- NEW TCS POLE
- PROPOSED ELECTRICAL POLE WITH STREET LIGHT
- EXISTING ELECTRICAL POLE WITH STREET LIGHT

DRAWING FILE LOCATION / NAME P:\349\3496376\CAD\RF-0101.dwg		DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	PLOT DATE / TIME 13/07/2020 4:42:40 PM	PLOT BY CRL2	CLIENT <b>LIVERPOOL CITY COUNCIL</b>	LIVERPOOL CITY COUNCIL MR512 HEATHCOTE ROAD INTERSECTION UPGRADE AT BARDIA PDE / WALDER RD, HAMMONDVILLE GENERAL SIGNAGE AND LINEMARKING PLAN	A1
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY	
XT_3496376_A3_SHT	A	14.04.20	ISSUED FOR DISCUSSION		AI	SCALE 1500 5 0 5 10 AT A3		
x-su-e-survey-plan	B	17.06.20	ISSUED FOR REVIEW		AI			
x-su-e-cadastre-plan	C	30.06.20	ISSUED FOR REVIEW		CO			
x-rd-d-trmk-plan	D	13.07.20	ISSUED FOR TNSW APPROVAL		CO			
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x-su-e-street-names-plan								

CO-ORDINATE SYSTEM MGA ZONE 56	HEIGHT DATUM AHD
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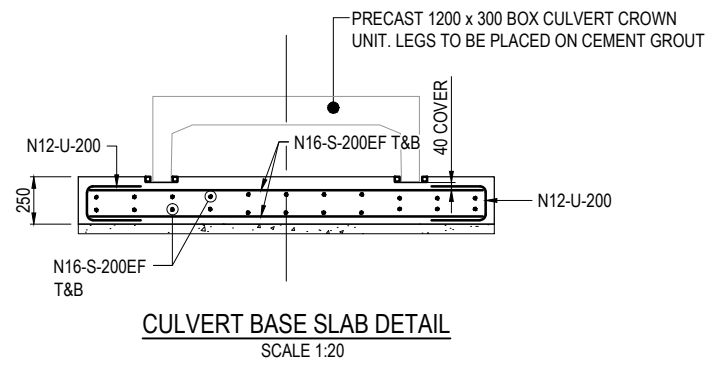
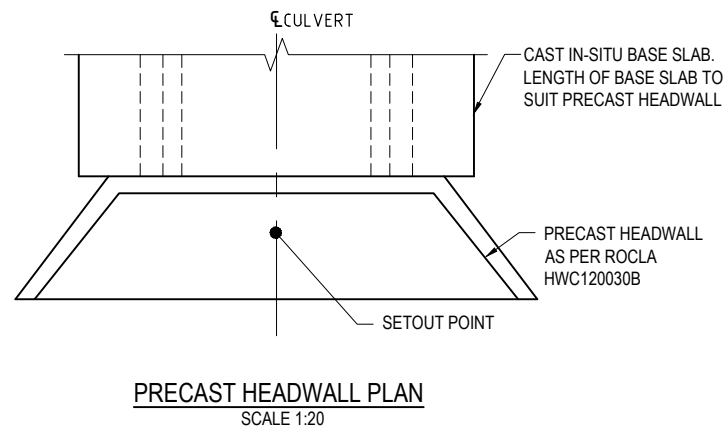


TITLE	NAME	DATE
DRAWN	C.LAWRENCE	13.07.20
DRG CHECK	F.MIGUES	13.07.20
DESIGN	B.STRANG	13.07.20
DESIGN CHECK	C.OAKES	13.07.20
DESIGN MNGR	C.OAKES	13.07.20
PROJECT MNGR	S.OETOMO	13.07.20

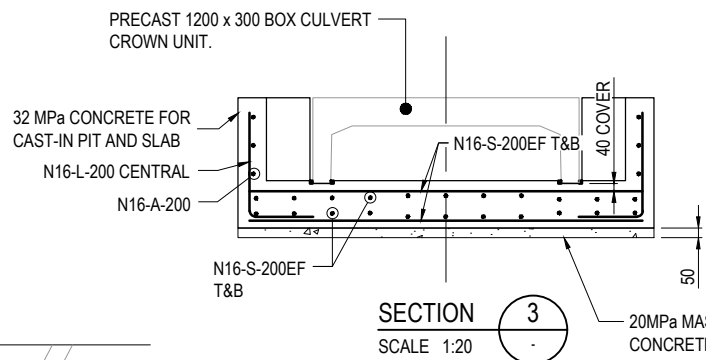
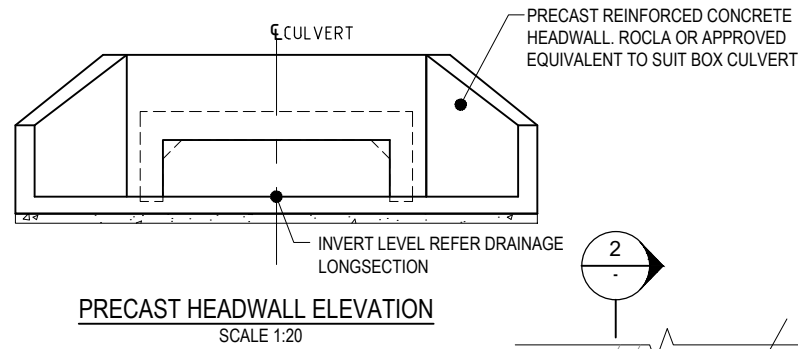
PREPARED FOR	ISSUE STATUS DETAILED DESIGN	EDMS No.	SHEET No. RF-0101	ISSUE D
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RMS REGISTRATION No.	
ISSUE STATUS DETAILED DESIGN	EDMS No.
SHEET No. RF-0101	ISSUE D

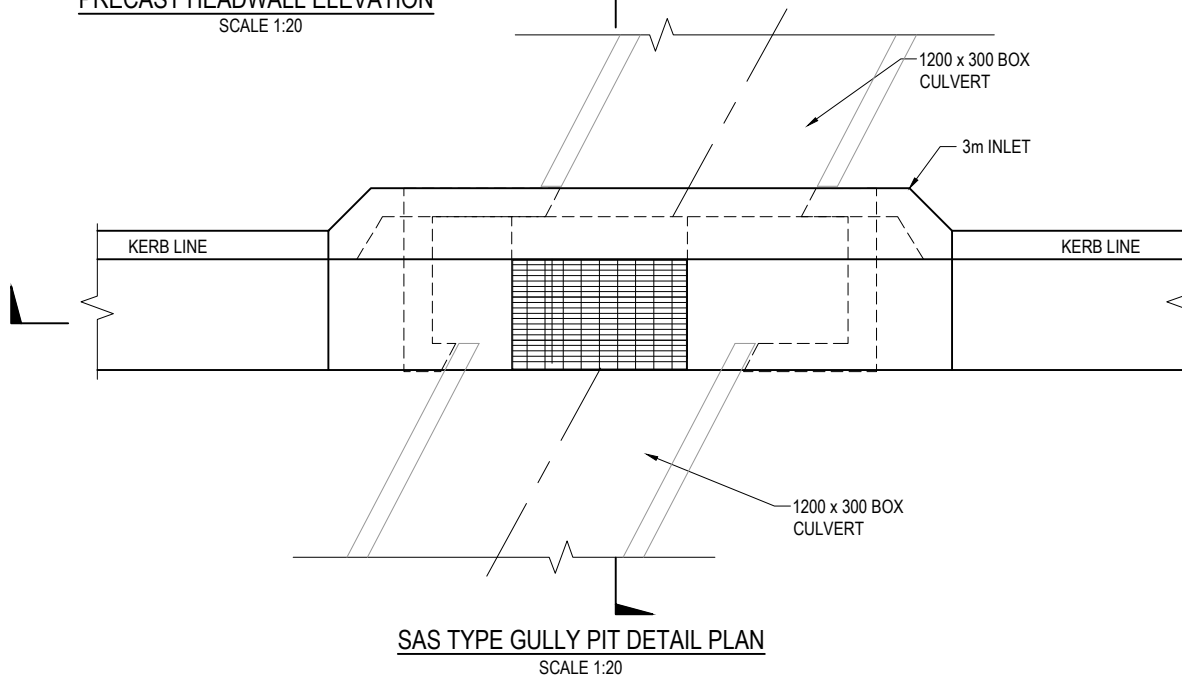




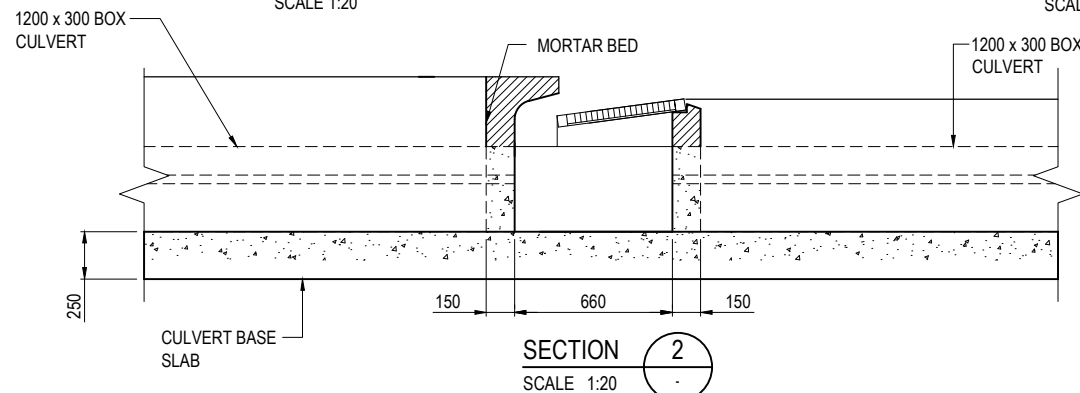
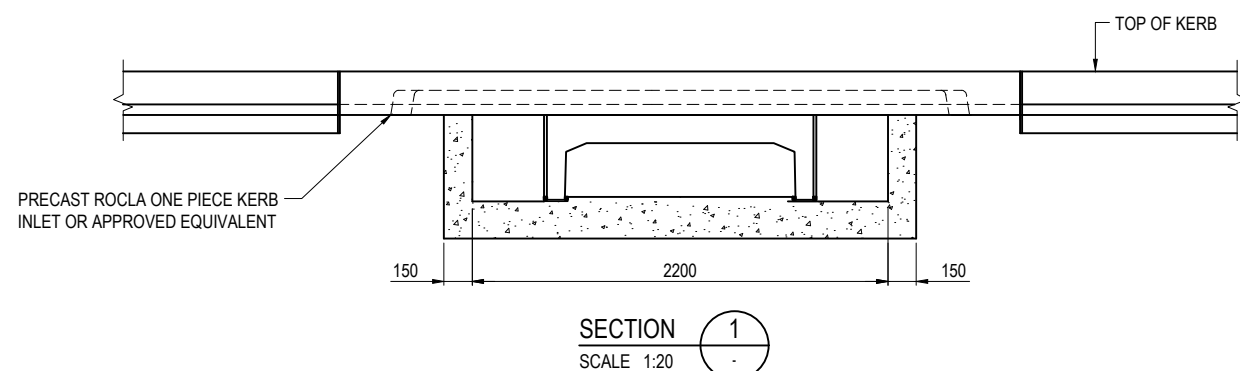
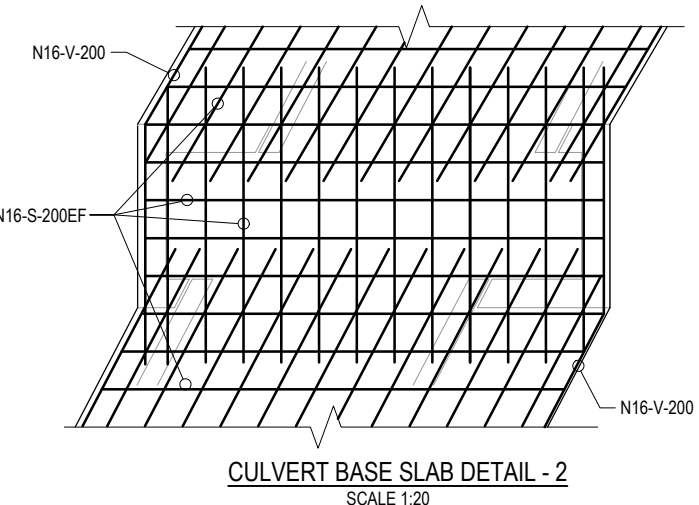
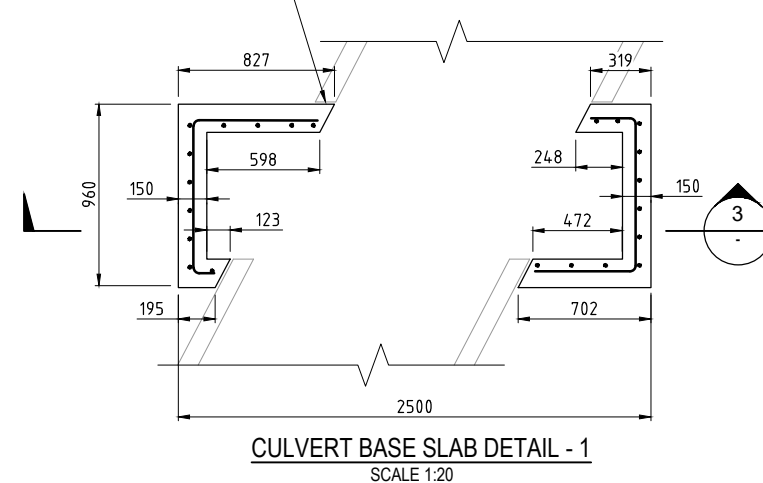
CHAINAGE	18.404	26.456	31.020
BOX SIZE (mm)	1200x300	1200x300	1200x300
PIPE GRADE (%)	0.76%	0.48%	0.48%
DATUM R.L.	12.000		
DEPTH TO INVERT	0.651	0.651	0.631
INVERT LEVELS	14.320	14.320	14.281
DESIGN SURFACE LEVELS	15.111	14.971	14.912
EXISTING SURFACE LEVELS	15.111	15.001	14.350



CHAINAGE	18.404	26.456	31.020
DEPTH TO INVERT	0.651	0.651	0.631
INVERT LEVELS	14.320	14.320	14.281
DESIGN SURFACE LEVELS	15.111	14.971	14.912
EXISTING SURFACE LEVELS	15.111	15.001	14.350



PROVIDE WATERTIGHT JOINT TREATMENT WITH 20 DIAMETER BACKING ROD AND SEALANT SN TO RMS SPECIFICATION B312 OR APPROVED EQUIVALENT. TYP PIT AND PRECAST CULVERT JOINT.

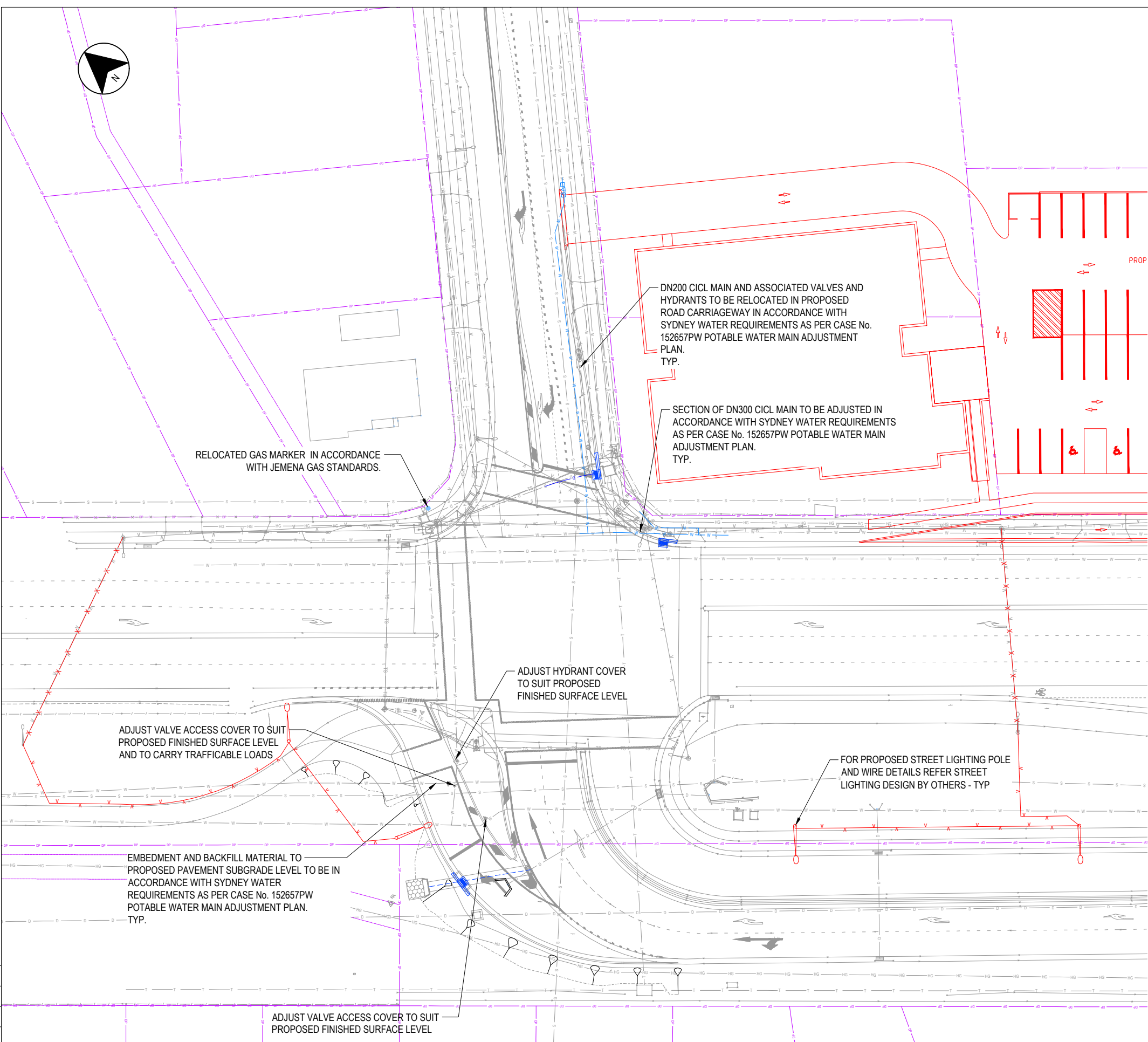


THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME P:\349\3496376\CAD\ISM-0101.dwg		DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING		PLOT DATE / TIME 13/07/2020 6:48:58 PM	PLOT BY CRL2	CLIENT <b>LIVERPOOL CITY COUNCIL</b>	LIVERPOOL CITY COUNCIL MR512 HEATHCOTE ROAD INTERSECTION UPGRADE AT BARDIA PDE / WALDER RD, HAMMONDVILLE GENERAL DRAINAGE LONGSECTION AND DETAILS	A1																								
EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	DRAWINGS / DESIGN PREPARED BY	RMS REGISTRATION No.	SHEET 1 OF 1																								
XT_3496376_A3_SHT	A	14.04.20	ISSUED FOR DISCUSSION		AI	SCALE 1:4.0																											
	B	17.06.20	ISSUED FOR REVIEW		AI																												
	C	30.06.20	ISSUED FOR REVIEW		CO																												
	D	13.07.20	ISSUED FOR TNSW APPROVAL		CO																												
CO-ORDINATE SYSTEM MGA ZONE 56		HEIGHT DATUM AHD				<table border="1"> <thead> <tr> <th>TITLE</th> <th>NAME</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>DRAWN</td> <td>C.LAWRENCE</td> <td>13.07.20</td> </tr> <tr> <td>DRG CHECK</td> <td>F.MIGUES</td> <td>13.07.20</td> </tr> <tr> <td>DESIGN</td> <td>B.STRANG</td> <td>13.07.20</td> </tr> <tr> <td>DESIGN CHECK</td> <td>C.OAKES</td> <td>13.07.20</td> </tr> <tr> <td>DESIGN MNGR</td> <td>C.OAKES</td> <td>13.07.20</td> </tr> <tr> <td>PROJECT MNGR</td> <td>S.OETOMO</td> <td>13.07.20</td> </tr> </tbody> </table>		TITLE	NAME	DATE	DRAWN	C.LAWRENCE	13.07.20	DRG CHECK	F.MIGUES	13.07.20	DESIGN	B.STRANG	13.07.20	DESIGN CHECK	C.OAKES	13.07.20	DESIGN MNGR	C.OAKES	13.07.20	PROJECT MNGR	S.OETOMO	13.07.20	PREPARED FOR	ISSUE STATUS DETAILED DESIGN	EDMS No.	SHEET No. SM-0101	ISSUE D
TITLE	NAME	DATE																															
DRAWN	C.LAWRENCE	13.07.20																															
DRG CHECK	F.MIGUES	13.07.20																															
DESIGN	B.STRANG	13.07.20																															
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DESIGN MNGR	C.OAKES	13.07.20																															
PROJECT MNGR	S.OETOMO	13.07.20																															

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**NOTES**

- UTILITY INFORMATION SHOWN ON THE PLANS DOES NOT DEPICT ANYMORE THAN THE PRESENCE OF A SERVICE BASED ON AVAILABLE DOCUMENTARY EVIDENCE. THE PRESENCE OF A UTILITY SERVICE, ITS SIZE AND LOCATION SHOULD BE CONFIRMED BY FIELD INSPECTION PRIOR TO THE COMMENCEMENT OF ROAD WORKS AND THE RELEVANT UTILITY PLANS OBTAINED BY DIALLING, PH:1100 OR FAX:1300 652 077 (DIAL BEFORE YOU DIG). CAUTION SHOULD BE EXERCISED WHEN WORKING IN THE VICINITY OF ALL UTILITY SERVICES.
- THE CONTRACTOR SHALL LOCATE ALL EXISTING SERVICES AND CONSULT WITH RELEVANT AUTHORITY AS REQUIRED PRIOR TO COMMENCING CONSTRUCTION. PROTECT SERVICES AND MAKE NECESSARY ARRANGEMENTS WITH THE RELEVANT AUTHORITY TO RELOCATE AND/OR ADJUST IF NECESSARY. EXISTING SERVICES LOCATIONS GIVEN ON THE DRAWINGS ARE PROVIDED FOR INFORMATION ONLY AND THE ACCURACY IS NOT GUARANTEED.
- THE POSITION OF SERVICES SHOWN IS APPROXIMATE ONLY AND HAS BEEN PLOTTED FROM FEATURES FOUND AT THE TIME OF SURVEY AND FROM PLANS RECEIVED FROM THE RELEVANT SERVICE AUTHORITIES. THE POSITION OF SERVICES MUST BE CONFIRMED PRIOR TO THE COMMENCEMENT OF WORKS.
- FOR POTABLE WATER MAIN ADJUSTMENT DESIGN REFER SYDNEY WATER CASE No. 152657PW PREPARED BY RARI

**LEGEND**

- PROPOSED WATER PIPE
- PROPOSED LOW VOLTAGE TRENCHING
- PROPOSED ELECTRICAL POLE WITH STREET LIGHT
- EXISTING ELECTRICAL LINE O/H TO BE REMOVED

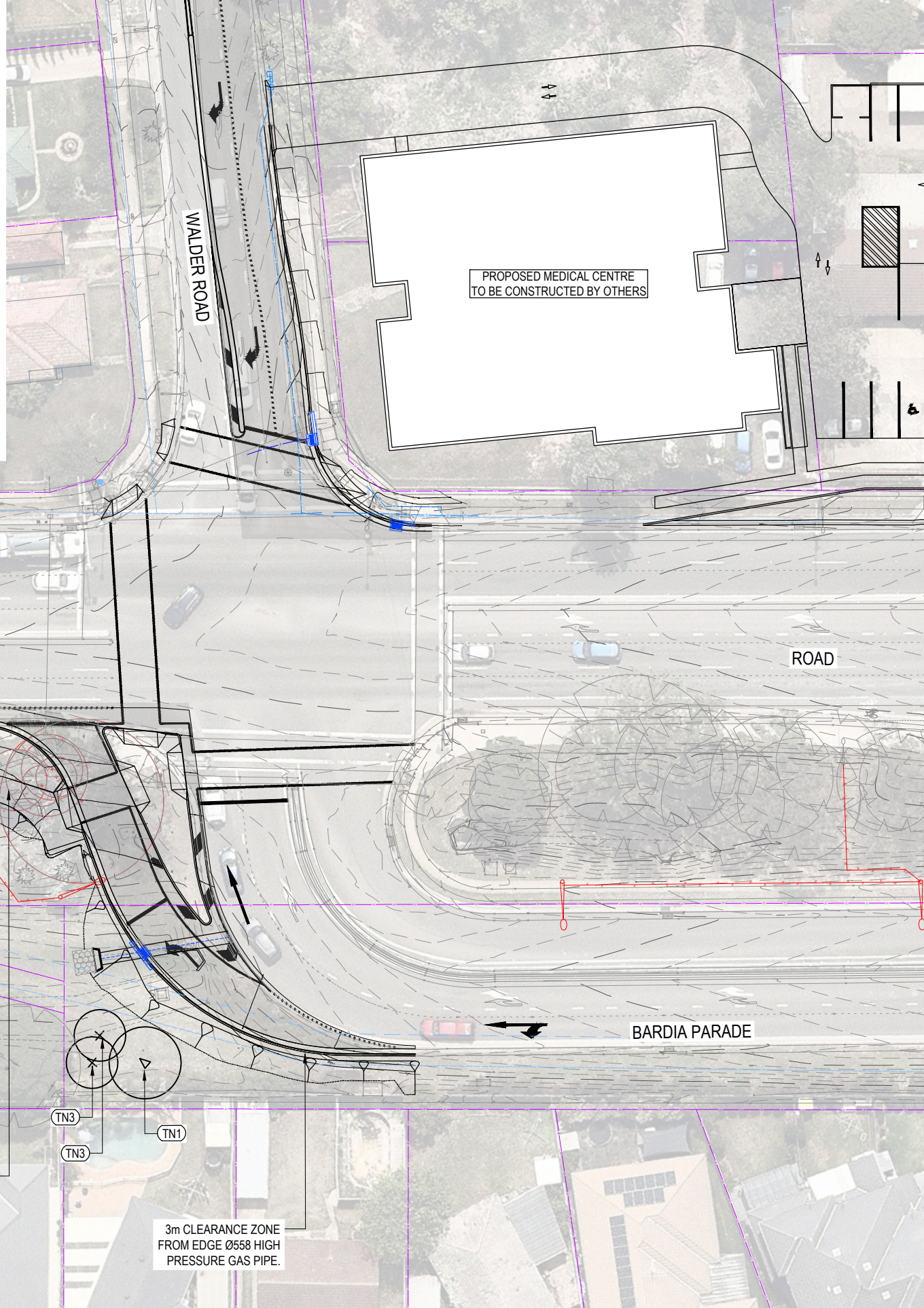
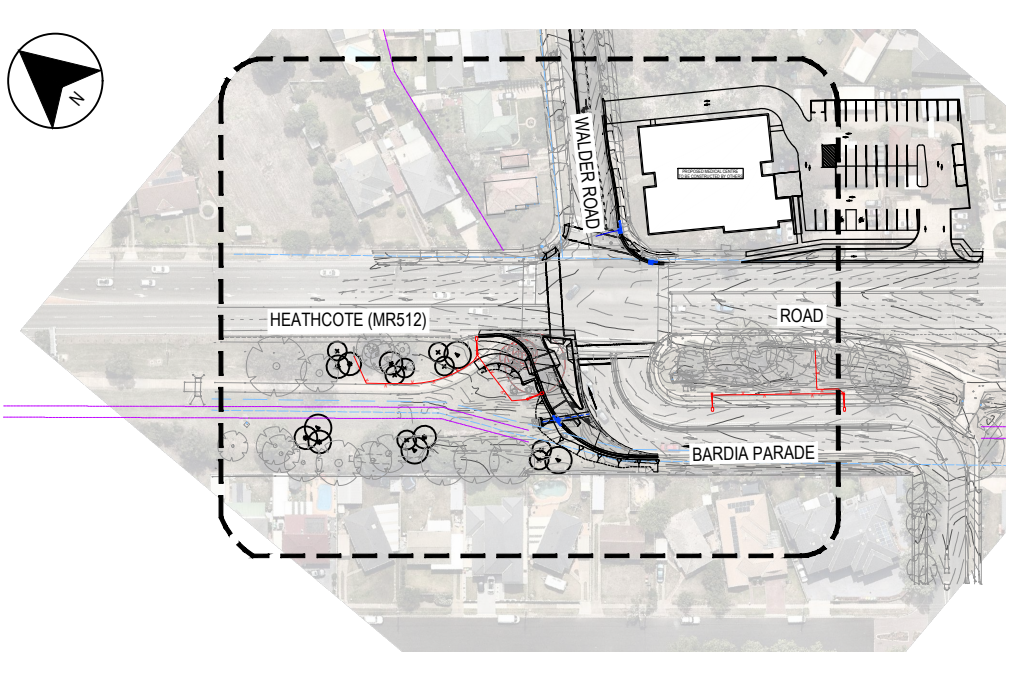
**EXISTING UTILITIES**

- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIT
- EXISTING TELECOMM LINE U/G
- EXISTING TELECOM PIT
- EXISTING ELECTRICAL LINE O/H
- EXISTING ELECTRICAL POLE WITH STREET LIGHT
- EXISTING GAS MAIN (HIGH PRESSURE)
- EXISTING GAS MAIN MARKER
- EXISTING SEWER MAIN
- EXISTING SEWER MANHOLE
- EXISTING WATER MAIN
- EXISTING WATER HYDRANT / VALVE
- EXISTING TCS CABLES
- EXISTING TCS POLE
- RELOCATED GAS MARKER POST

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EXTERNAL REFERENCE FILES		WVR No.	APPROVAL	SCALES ON A3 SIZE DRAWING	TITLE	NAME	DATE		
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x-su-e-survey-plan	B	17.06.20	ISSUED FOR REVIEW		DRG CHECK	F.MIGUES	13.07.20		ISSUE STATUS DETAILED DESIGN
x-rd-d-design-plan	C	30.06.20	ISSUED FOR REVIEW		DESIGN	B.STRANG	13.07.20	EDMS No.	
x-ut-e-utilities-plan	D	13.07.20	ISSUED FOR TNSW APPROVAL		DESIGN CHECK	C.OAKES	13.07.20		SHEET No. UT-0101
x-ut-d-utilities-plan				CO-ORDINATE SYSTEM MGA ZONE 56	DESIGN MNGR	C.OAKES	13.07.20	ISSUE	
x-rd-d-lrnmk-plan				HEIGHT DATUM AHD	PROJECT MNGR	S.OETOMO	13.07.20	D	







NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. EXISTING TREES THAT ARE TO BE RETAINED ARE TO BE PROTECTED DURING CONSTRUCTION IN ACCORDANCE WITH THE LIVERPOOL DEVELOPMENT CONTROL PLAN, PART 1, SECTION 3.4
3. ALL TREES TO BE INSTALLED IN ACCORDANCE WITH THE LIVERPOOL DEVELOPMENT CONTROL PLAN, DETAILS AND SPECIFICATION, PART 1, SECTION 3.4
4. ALL TREES TO ALIGN WITH SETBACK REQUIREMENTS FROM IDENTIFIED SERVICES AS OUTLINED IN THE LIVERPOOL DEVELOPMENT CONTROL PLAN LANDSCAPE SPECIFICATION, PART 1, SECTION 3.4.7.
5. ALL TREES SHALL HAVE A MINIMUM CONTAINER SIZE OF 100L AT THE TIME OF PLANTING
6. ALL TREES TO HAVE MULCH RING INSTALLED WITH A CLEAN SPADE CUT EDGE AND WELL STAKED TO SUPPORT ESTABLISHMENT. FOR DETAILS, REFER TO THE LANDSCAPE SPECIFICATION, SECTION 3.4 IN THE LIVERPOOL DEVELOPMENT CONTROL.
7. ALL TREES SHOULD BE PLANTED IN GROUPS OF THREE WITH CONNECTED MULCHING - ENSURE THE MULCH AREA AND SPACING ACCOMMODATES THE MOWING REQUIREMENTS OF LCC'S MAINTENANCE TEAM.
8. THE CONTRACTOR SHALL MAKE GOOD AREAS OF EXISTING TURF THAT HAVE BEEN DISTURBED DURING CONSTRUCTION.

LEGEND

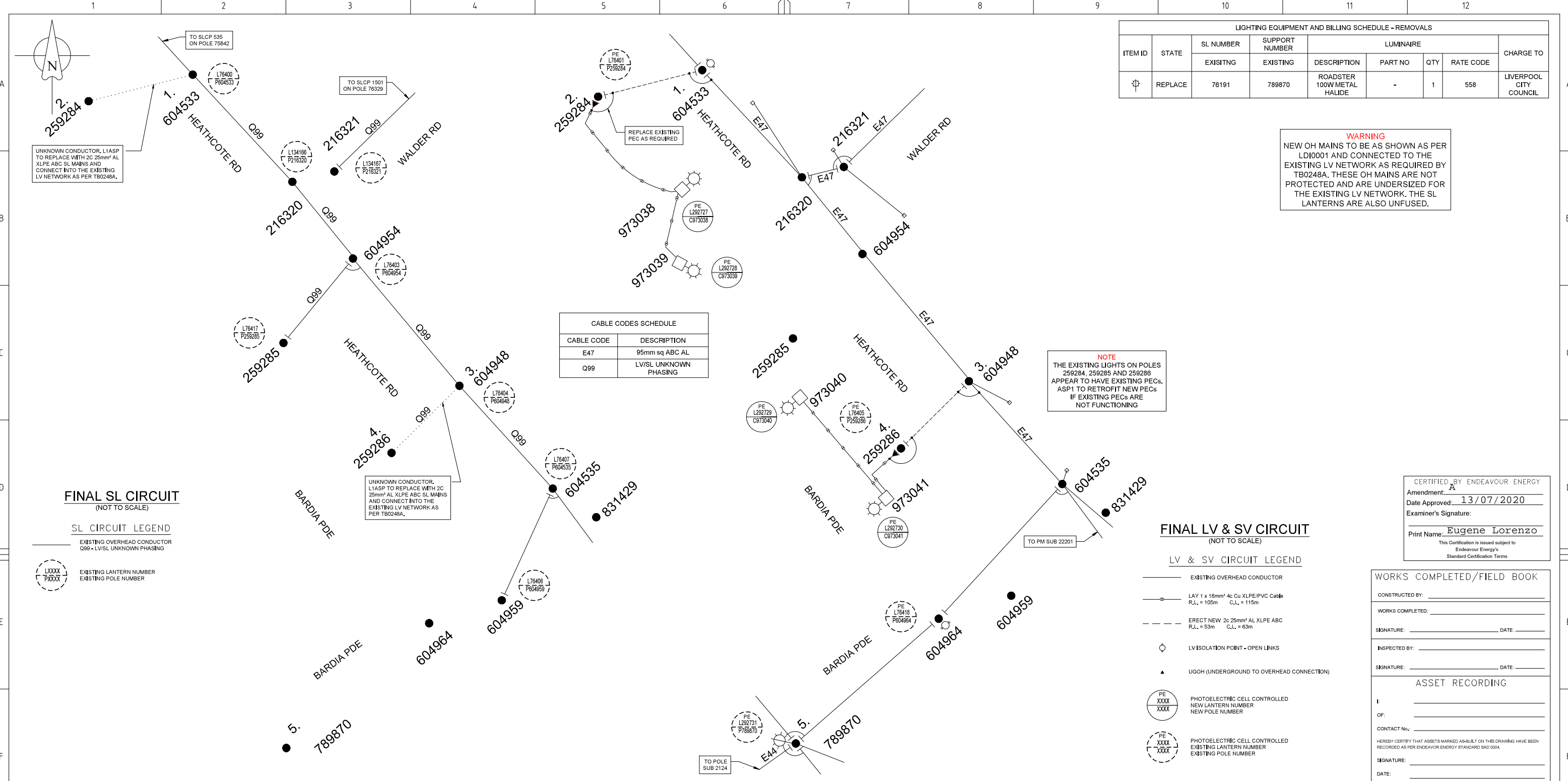
- (TN1) PROPOSED TREE, *MELALEUCA LINARIIFOLIA*, SNOW-IN-SUMMER  
TOTAL NUMBER OF TREES: 4
- (TN2) PROPOSED TREE, *EUCALYPTUS PARRAMATTENSIS*, PARRAMATTA RED GUM  
TOTAL NUMBER OF TREES: 6
- (TN3) PROPOSED TREE, *EUCALYPTUS PANICULATA*, GREY IRON BARK  
TOTAL NUMBER OF TREES: 8
- EXISTING TREE TO BE REMOVED
- EXISTING TREE TO BE RETAINED AND PROTECTED DURING CONSTRUCTION

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DRAWING FILE LOCATION / NAME P:\349\3496376\CAD\LD-0101.dwg		DESIGN LOT CODE	DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	PLOT DATE / TIME 13/07/2020 4:36:19 PM	PLOT BY CRL2	CLIENT <b>LIVERPOOL CITY COUNCIL</b>	LIVERPOOL CITY COUNCIL MR512 HEATHCOTE ROAD INTERSECTION UPGRADE AT BARDIA PDE / WALDER RD, HAMMNDVILLE GENERAL LANDSCAPE AND PLANTING	A1
EXTERNAL REFERENCE FILES	REV A B	DATE 26.06.20 13.07.20	AMENDMENT / REVISION DESCRIPTION ISSUED FOR REVIEW ISSUED FOR TNFSW APPROVAL	WVR No.	APPROVAL AI AI	SCALES ON A3 SIZE DRAWING SCALE 1:500 5 0 5 10 AT A3	DRAWINGS / DESIGN PREPARED BY <b>Beca</b>	
XT_3496376_A3_SHT x-rd-d-trimk-plan x-rd-d-design-plan x-su-e-survey-plan x-su-e-contours-plan x-su-d-contours-plan x-pv-d-pavement-plan x-ut-d-utilities-plan x-sm-d-drainage-plan x-af-landscape-plan x-su-e-aerial-faded-plan						CO-ORDINATE SYSTEM MGA ZONE 56	HEIGHT DATUM AHD	
				TITLE	NAME	DATE	PREPARED FOR	
				DRAWN	B.TOSIC	26.06.20		
				DRG CHECK	K.MCNEILL	26.06.20		
				DESIGN	B.TOSIC	26.06.20		
				DESIGN CHECK	S.BOWDEN	26.06.20		
				DESIGN MNGR	C.OAKES	14.04.20		
				PROJECT MNGR	S.OETOMO	14.04.20		
				ISSUE STATUS DETAILED DESIGN	EDMS No.	SHEET No. LD-0101	ISSUE	







LIGHTING EQUIPMENT AND BILLING SCHEDULE - REMOVALS								
ITEM ID	STATE	SL NUMBER	SUPPORT NUMBER	LUMINAIRE			RATE CODE	CHARGE TO
		EXISTING	EXISTING	DESCRIPTION	PART NO	QTY		
☼	REPLACE	76191	789870	ROADSTER 100W METAL HALIDE	-	1	558	LIVERPOOL CITY COUNCIL

**WARNING**  
 NEW OH MAINS TO BE AS SHOWN AS PER LD10001 AND CONNECTED TO THE EXISTING LV NETWORK AS REQUIRED BY TB0248A. THESE OH MAINS ARE NOT PROTECTED AND ARE UNDERSIZED FOR THE EXISTING LV NETWORK. THE SL LANTERNS ARE ALSO UNFUSED.

CABLE CODES SCHEDULE	
CABLE CODE	DESCRIPTION
E47	95mm sq ABC AL
Q99	LV/SL UNKNOWN PHASING

**NOTE**  
 THE EXISTING LIGHTS ON POLES 259284, 259285 AND 259286 APPEAR TO HAVE EXISTING PECs. ASP1 TO RETROFIT NEW PECs IF EXISTING PECs ARE NOT FUNCTIONING

**FINAL SL CIRCUIT**  
(NOT TO SCALE)

- SL CIRCUIT LEGEND**
- EXISTING OVERHEAD CONDUCTOR
  - Q99 - LV/SL UNKNOWN PHASING
  - EXISTING LANTERN NUMBER
  - EXISTING POLE NUMBER

**FINAL LV & SV CIRCUIT**  
(NOT TO SCALE)

- LV & SV CIRCUIT LEGEND**
- EXISTING OVERHEAD CONDUCTOR
  - LAY 1 x 16mm<sup>2</sup> 4c Cu XLPE/PVC Cable R.L. = 105m C.L. = 115m
  - ERECT NEW 2c 25mm<sup>2</sup> AL XLPE ABC R.L. = 53m C.L. = 63m
  - LV ISOLATION POINT - OPEN LINKS
  - UGOH (UNDERGROUND TO OVERHEAD CONNECTION)
  - PE XXXX / XXXX PHOTOELECTRIC CELL CONTROLLED NEW LANTERN NUMBER NEW POLE NUMBER
  - PE XXXX / XXXX PHOTOELECTRIC CELL CONTROLLED EXISTING LANTERN NUMBER EXISTING POLE NUMBER

CERTIFIED BY ENDEAVOUR ENERGY  
 Amendment: A  
 Date Approved: 13/07/2020  
 Examiner's Signature:  
 Print Name: Eugene Lorenzo  
 This Certification is issued subject to Endeavour Energy's Standard Certification Terms

**WORKS COMPLETED/FIELD BOOK**

CONSTRUCTED BY: \_\_\_\_\_  
 WORKS COMPLETED: \_\_\_\_\_  
 SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_  
 INSPECTED BY: \_\_\_\_\_  
 SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

**ASSET RECORDING**

CONTACT No.: \_\_\_\_\_  
 HEREBY CERTIFY THAT ASSETS MARKED AS-BUILT ON THIS DRAWING HAVE BEEN RECORDED AS PER ENDEAVOUR ENERGY STANDARD SAD 0004.  
 SIGNATURE: \_\_\_\_\_  
 DATE: \_\_\_\_\_

**LIGHTING EQUIPMENT SCHEDULE**

ITEM ID	STATE	SL NUMBER	SUPPORT NUMBER	LUMINAIRE				COLUMN/POLE				BRACKET/OUTREACH			UPCAST	CATEGORY	CHARGE TO	MOUNTING HEIGHT	
		NEW	NEW	DESCRIPTION	PART NO	QTY	RATE CODE	DESCRIPTION	PART NO	FOOTING (BOLT/FOUNDATION)	QTY	RATE CODE	DESCRIPTION	PART NO					RATE CODE
☼	NEW	292727	973038	100W ROADLED	PL99G01L100	2	951	8.5m ENLARGED BASE	IE/EB 8.5	TYPE 2 UNIVERSAL	2	995	4.5m OUTREACH	IE 4.5 CPS	991	5°	V5	LIVERPOOL CITY COUNCIL	10.5m
☼	NEW	292728	973039	82W ROADLED	PL99G01L80	2	950	7.0m ENLARGED BASE	IE/EB 7.0	TYPE 2 UNIVERSAL	2	N/A	EXISTING B1 BRACKET	N/A	N/A	N/A	V5	LIVERPOOL CITY COUNCIL	9m
☼	REPLACE	292731	789870	82W ROADLED	PL99G01L80	1	950	EXISTING WOOD POLE	N/A	N/A	N/A	N/A	EXISTING B1 BRACKET	N/A	N/A	N/A	V5	LIVERPOOL CITY COUNCIL	EXISTING

**DESIGN COMPLIANCE AND INDEMNITY**

This design complies with Endeavour Energy's relevant standards as current at this time and as listed on the Endeavour Energy Accredited Service Provider's Internet site. These standards include, but are not limited to:

- CP: Connection Policy
- EMS: Environmental Management Standard
- MC: Mains Construction Instruction
- MD: Mains Design Instruction
- PD: Protection Design Instruction
- SD: Substation Design Instruction
- SAD 0001: Design Drawing Standard
- MM: Mains Maintenance Instruction
- SM: Substation Maintenance Instruction
- LD 0001: Public Lighting Electrical Design Element

Additionally, where relevant, the design complies with AS/NZS 7000 "Overhead Line Design - Detailed Procedures" published by The Australian Standards.

ArconaTech Pty Ltd indemnifies Endeavour Energy for any loss or damage resulting from non-compliance of the design with the above standards.

Signed: \_\_\_\_\_  
 Name: MIKHONG CHEN  
 Service Provider Number: 3812 Date: 23-Jun-20

Cadastre: © Land and Property Information 2016

**ArconaTech**  
 ACN 162 670 957  
 E info@arconatech.com.au  
 M PO Box 890  
 P Liverpool NSW 2170  
 Reference: 20083

ABN 13 162 670 957  
 W www.arconatech.com.au  
 PO Box 78  
 Wollongong NSW 2520  
 0427 700 452  
 Revision: 02

REFERENCE DRAWING'S

GENERAL
OVERHEAD
UNDERGROUND
SUBSTATIONS

WORK ORDERS

CAP / SAMP No.	PLT1266
AM PROJ. No	2020/00196/001
HV SWITCHING	
UBD/PENGUIN REF	
GIS MAP No	U91375
HV OP DIAGRAM	ANZAC VILLAGE
LOCAL GOV AREA	LIVERPOOL COUNCIL

ORIGINAL SCALE

DO NOT SCALE DIMENSIONS IN METRES

HEATHCOTE ROAD, BARDIA PARADE, WALDER ROAD  
 HOLSWORTHY  
 PLT1266  
 PUBLIC LIGHTING

Drawn: ME  
 Date: 12/02/2020  
 Design: CHD  
 MC  
 DESIGN MC

A1 518879 A  
 SHEET No 2 OF 2 SHEETS



DRAWN BY CADD  
DO NOT AMEND MANUALLY

DATE IN SERVICE : 27/07/2000  
DATE RECONSTRUCTED : 00/00/00

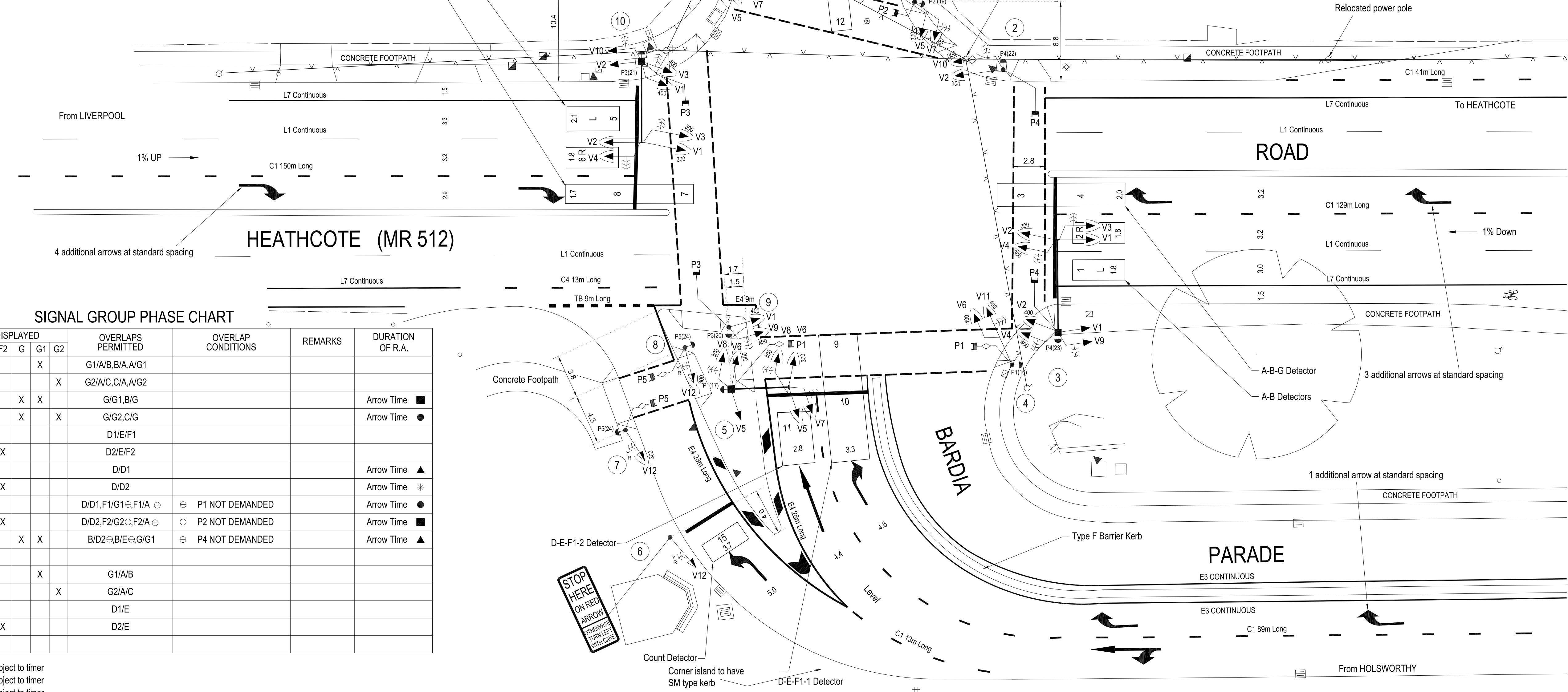
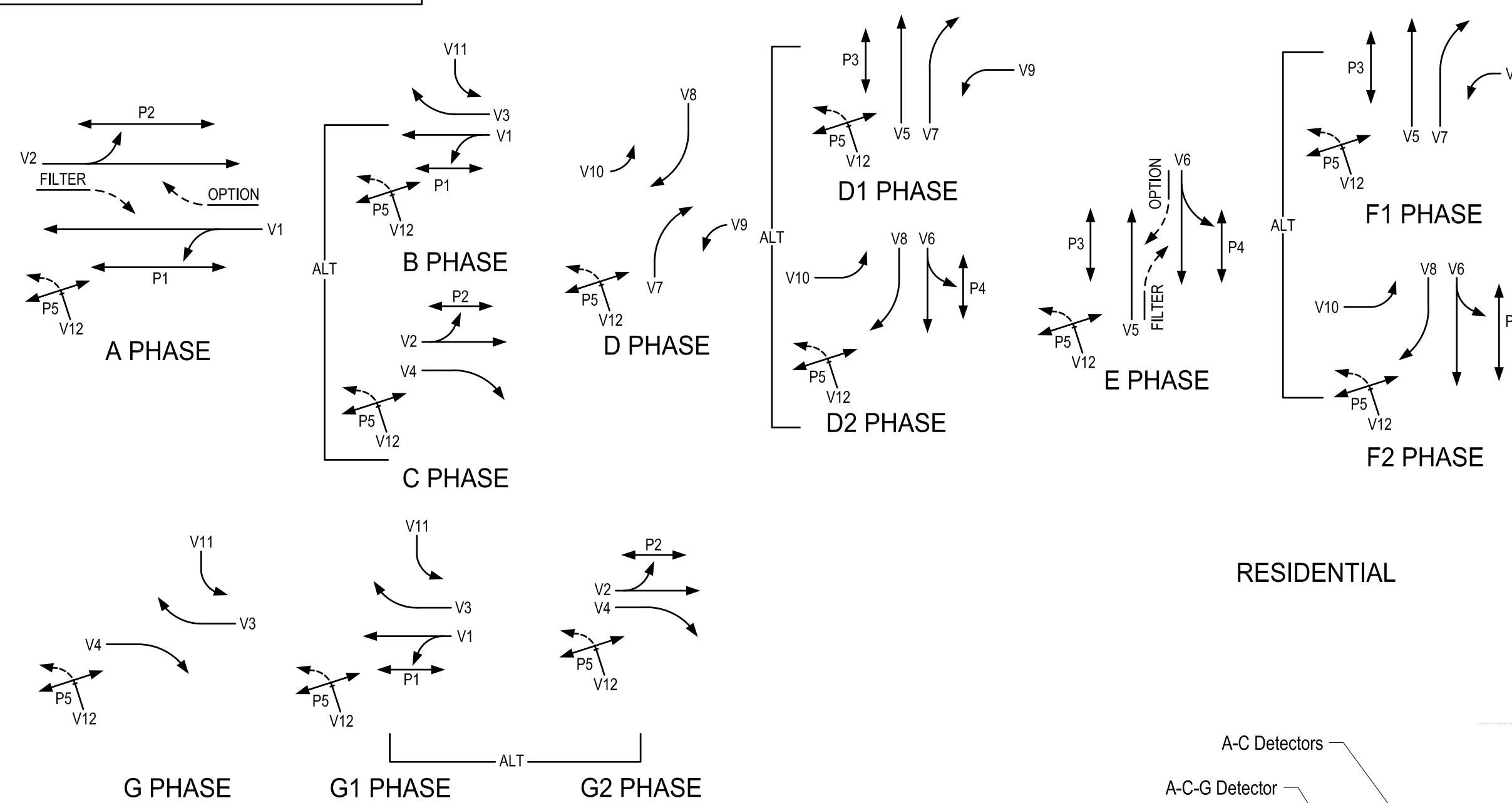


**NOTES**

- THIS SITE IS SCATS LINKED.
- AUDIO-TACTILE PUSH BUTTONS ARE PROVIDED POSTS 1, 2, 3, 4, 5, 7, 8, 9, 10 AND 11.
- SPECIAL STOP SIGN (R1-4) PLACED ON POSTS 1 AND 5.
- KERB RAMPS TO BE CONSTRUCTED AT ALL PEDESTRIAN CROSSINGS IN ACCORDANCE WITH RMS STANDARD ROAD DRAWING R0300-11.
- STANDARD DOUBLE DIAMOND OPERATION AND FILTER OPTION PHASING IN ACCORDANCE WITH TS-TN-027.
- FOR DETAILS OF CIVIL ROADWORKS FOR THE INTERSECTION, REFER TO DRAWING RMS REG No DS2016/001518.
- VERTICAL LOUVRES TO BE PROVIDED ON THE GREEN ASPECTS OF V1 LANTERNS ON POSTS 3 AND 9.

**POSTS**

POSTS	TYPE	LENGTH	OFFSET	REMARKS
1	2	4.1	1.0	New
2	2	4.1	1.0	Existing
3	10	-	2.4	Existing 8m Outreach
4	2	4.1	1.0	Existing
5	5L	-	2.0	New
6	2	4.1	1.0	New
7	2	4.1	1.0	New
8	2	4.1	1.0	New
9	2	4.1	1.0	New
10	9	-	1.5	Existing 7m Outreach
11	2	4.1	1.0	New



**SIGNAL GROUP PHASE CHART**

SIGNAL GROUP	PHASE DURING WHICH GREEN DISPLAYED												OVERLAPS PERMITTED	OVERLAP CONDITIONS	REMARKS	DURATION OF R.A.			
	A	B	C	D	D1	D2	E	F1	F2	G	G1	G2							
V1	X	X										X	X			G1/A/B, B/A, A/G1			Arrow Time ■
V2	X		X											X		G2/A/C, C/A, A/G2			Arrow Time ●
V3		X										X	X			G/G1, B/G			Arrow Time ▲
V4			X									X		X		G/G2, C/G			Arrow Time ●
V5				X		X	X									D1/E/F1			Arrow Time ▲
V6					X	X		X								D2/E/F2			Arrow Time ▲
V7				X	X			X								D/D1			Arrow Time ▲
V8				X		X			X							D/D2			Arrow Time *
V9				X	X			X								D/D1, F1/G1 ⊕, F1/A ⊖	⊖ P1 NOT DEMANDED		Arrow Time ●
V10				X		X			X							D/D2, F2/G2 ⊕, F2/A ⊖	⊖ P2 NOT DEMANDED		Arrow Time ■
V11	X									X	X					B/D2 ⊕, B/E ⊕, G/G1	⊖ P4 NOT DEMANDED		Arrow Time ▲
V12												X	X						Arrow Time ▲
P1	X	X										X				G1/A/B			
P2	X		X										X			G2/A/C			
P3				X		X	X									D1/E			
P4					X	X		X								D2/E			
P5																			

- R.A. protection extended by P.B. on post 5, subject to timer
- R.A. protection extended by P.B. on post 1, subject to timer
- \* R.A. protection extended by P.B. on post 7, subject to timer
- ▲ R.A. protection extended by P.B. on post 3, subject to timer

A ORIGINAL ISSUE	PUBLIC UTILITY LEGEND		REFERENCE PLANS		U.S.D. Ref. Map 269 P15		DESIGN APPROVAL		RMS RECOMMENDATION		RMS ACCEPTANCE		ROADS AND MARITIME SERVICES LIVERPOOL COUNCIL AREA TRAFFIC SIGNALS AT HEATHCOTE ROAD (MR512), BARDIA PARADE AND WALDER ROAD HAMMONDVILLE		EXISTING <input type="checkbox"/> PROPOSED <input checked="" type="checkbox"/>	
	HYDRANT		SYMBOLS/ABRVS		I.S.C. E: 295 280 C.C.-ORDS N: 1 242 005		APPROVED		ROAD DESIGN ENGINEERING		ACCEPTED				CADD FILE: VV3516_??_DES.dgn	
	STOP VALVE		STD POSN CMPT		DESIGNED BY: J. SINGH		NAME: R. NETTLE		NAME: _____		NAME: _____		SCALE: 5 0 5 10 (1:200) ISSUE ?			
	GAS VALVE		INSTL STOP DET		CHECKED BY: M. KONG		POSITION: DIRECTOR		POSITION: _____		POSITION: _____		FILE: SF2014/013049			
	SEWER MANHOLE		VEH GROUP OP		SITE CHECKED		DATE: 08.07.2020		DATE: _____		DATE: _____		REG No. DS2014/003903			
COMMS PIT		DET LOGIC OP		RECOMMENDED		DESIGN PREPARED BY		NETWORK OPERATIONS		ACCEPTED BY		SUPERSEDES SHEET/ISSUE: -/ - ?				
ELECT LIGHT POLE		PED MVT OP				TRANSPORT AND TRAFFIC PLANNING ASSOCIATES		NAME: _____		SECTION: _____		TCS No. 3516				
POWER POLE								NAME: _____				SHEET ?				
STAY POLE								POSITION: _____								
TELEPHONE BOX		SURVEYOR: Downer MouchalBeca						DATE: _____								
COMMS PILLAR		DATE: 2016														

# B

## Appendix B – Vegetation Assessment



## Vegetation Assessment: Intersection of Heathcote Road and Bardia Parade, Holsworthy, NSW

Date: 14<sup>th</sup> July 2016

Author: Brigette Hodson

Ref: 8372

### 1 Introduction

Ecology and Heritage Partners Pty Ltd was commissioned by Beca to provide a letter of advice regarding an assessment of a small patch of native vegetation located at the corner of Heathcote Road and Bardia Parade, Holsworthy in New South Wales (NSW).

It is understood that the vegetation is required to be removed prior to the proposed upgrade of the intersection between Heathcote Road, Bardia Avenue and Walder Road in Holsworthy (the survey area) by Roads and Maritime Services (RMS). The purpose of this report is to identify the ecological values of the vegetation proposed for removal and determine the potential regulatory and legislative implications associated with the proposed action. This report is to inform the Review of Environmental Factors (REF) prepared by Beca along with the design of the intersection upgrade.

### 2 Survey Area

The survey area is located in the suburb of Holsworthy, approximately 25 kilometres south-west of Sydney's central business district and the site is within the Liverpool City Council local government area. The survey area includes a small patch of roadside vegetation covering approximately 170 square metres and is bound by Heathcote Road and Bardia Parade (Figure 1).

### 3 Field Investigation

An assessment of the survey area was undertaken by a qualified ecologist on 5 July 2016. The assessment sought primarily to identify the extent and type of native vegetation present within the survey area and to identify potential habitat for species and ecological communities listed under the NSW State *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

## 4 Results

### 4.1 Vegetation

The vegetation proposed to be removed consists of a small cluster of trees, including one large and well-established Grey Ironbark *Eucalyptus paniculata*, four Flax-leaved Paperbarks *Melaleuca linariifolia* and one small Parramatta Red Gum *Eucalyptus paramatensis* (Plate 1). The understorey is dominated by introduced grasses typical of roadsides and lawns, with scattered weeds also present. Two large shrubs Coast Myall *Acacia binervia* are also present and are located several metres west from the trees near the culvert (Plate 2).

All of the above species are indigenous to the area, however given the location and size of the trees; it is likely that these trees and shrubs are planted. No threatened flora species were observed during field investigations.



**Plate 1: Vegetation patch including Grey Ironbark, Flax-leaved Paperbarks and Parramatta Red Gum.**



**Plate 2: Coast Myall (two large shrubs) located behind the patch of vegetation.**

### 4.2 Fauna habitat

There are no nests or tree-hollows present hence vegetation is likely to provide limited habitat opportunities for vertebrate fauna.

The vegetation is likely to be used as a foraging resource by common bird species which are tolerant of modified open areas such as Australian Magpie *Gymnorhina tibicen*, honey-eaters and lorikeets *Trichoglossus* species.

## 5 Discussion

Although the trees identified in the survey area are native to the area, retaining the trees is not a feasible option given the layout of the proposed road intersection upgrade works and the risk they would cause to public safety if left in situ. Overall, the threat to loss of biodiversity from the removal of these trees is minimal, given their isolated nature and lack of habitat features for vertebrate fauna.

The loss of vegetation may be compensated by incorporating these species or other similar native tree species into the landscaping design for the proposed road intersection upgrade works.



## **5.1 Legislative, Planning and Policy Framework**

### *5.1.1 Commonwealth Legislation*

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

The EPBC Act establishes a Commonwealth process for the assessment of proposed actions (i.e. project, development, undertaking, activity, or series of activities) that are likely to have a significant impact on matters of national environmental significance (NES), or on Commonwealth land. An action, unless otherwise exempt, requires approval from the Commonwealth Environment Minister if it is considered likely to have an impact on any matters of NES.

These species do not constitute threatened species under the EPBC Act, nor is the vegetation representative of a threatened ecological community. Therefore the proposed tree removal will not have an impact on any matters of NES.

### *5.1.2 NSW Legislation*

#### **Environmental Planning and Assessment Act 1979**

Where Part 5 of the EP&A Act applies to a proposed construction activity, RMS examines and takes into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity. This includes consideration of the effect on critical habitat, impacts on threatened species, populations and ecological communities and their habitats and other protected flora or native species under the TSC Act (RMS 2014).

The removal of trees does not conflict with the regulations outlined in the EP&A Act, as no impacts to threatened species or communities are anticipated. However, notification to Council is required pursuant to Clause 13-15 of the State Environmental Planning Policy (SEPP) (Infrastructure) 2007 for the proposed removal of vegetation within a Council managed road reserve.

#### **Threatened Species Conservation Act 1995**

The TSC Act is the primary legislation in dealing with biodiversity conservation of native flora and fauna in NSW.

The flora species identified during field investigations are not listed as threatened under the TSC Act. The vegetation is not considered to contain important habitat for any threatened fauna species listed under the TSC Act. Furthermore, the species identified within the survey area are not considered to be regionally significant, as identified in the Western Sydney Urban Bushland Biodiversity Survey (NSW NPWS 1997).

### *5.1.3 Local Government Plans and Policy*

#### **Liverpool Local Environmental Plan**

The environmentally significant land map (sheet ESL-105) which forms part of the Liverpool Local Environment Plan (LEP) 2008 indicates that the site of the proposed road intersection upgrade is not environmentally significant, although the edge of the Holsworthy Road adjacent to Bardia Parade is zoned RE1 which is for public recreation. According to the LEP, one of the objectives of this zone is 'to protect and

enhance the natural environment for recreational purposes' which suggests any native vegetation in the vicinity is important.

### **Liverpool Biodiversity Management Plan**

The Liverpool Biodiversity Management Plan includes as part of its core objectives a requirement to partner with the community (which would include state government agencies) to maintain, enhance and restore native flora and fauna and their habitat. This means that Council is committed to cooperating and negotiating with agencies such as RMS to ensure that when vegetation needs to be removed or modified, it is done so in a manner that does not adversely impact on the area's biodiversity.

Due to the ecological value and scale of the vegetation proposed for removal, adverse impacts to the biodiversity of the area will be negligible.

### **Liverpool City Council Tree Management Policy**

This policy, which was adopted by Council on 30 March 2016, highlights that Council seeks to maximise the preservation of all existing trees that provide a pleasant visual amenity within the City of Liverpool. Although the policy applies to all land within the Liverpool Local Government Area, in the case of the proposed road intersection upgrade, the policy is overridden by the *Roads Act 1993*. Nonetheless, it is desirable that given Council's commitment to tree management that RMS consult with Council to obtain their acceptance and agree to a compensation arrangement.

## **5.2 Conclusion**

In conclusion, it is noted that the removal of the trees is necessary for the proposed road intersection upgrade works and it is considered that the removal does not represent a significant impact. However, prior to removal of the trees, consultation with the Liverpool City Council is required under Clause 13-15 of the SEPP (Infrastructure) 2007. Consultation should also take into account Council's biodiversity or visual amenity objectives.

In addition to the above, it is suggested that the following mitigation measures will be undertaken as part of the road intersection upgrade:

- The Construction Environmental Management Plan be required to include details of the pre-clearing process for the vegetation;
- The pre-clearing process include a requirement to check the trees and shrubs for vertebrate fauna prior to the clearing of vegetation and to apply a fauna rescue and release procedure should vertebrate fauna be present; and,
- The native vegetation to be removed be recycled (mulched) and re-used on site.

## References

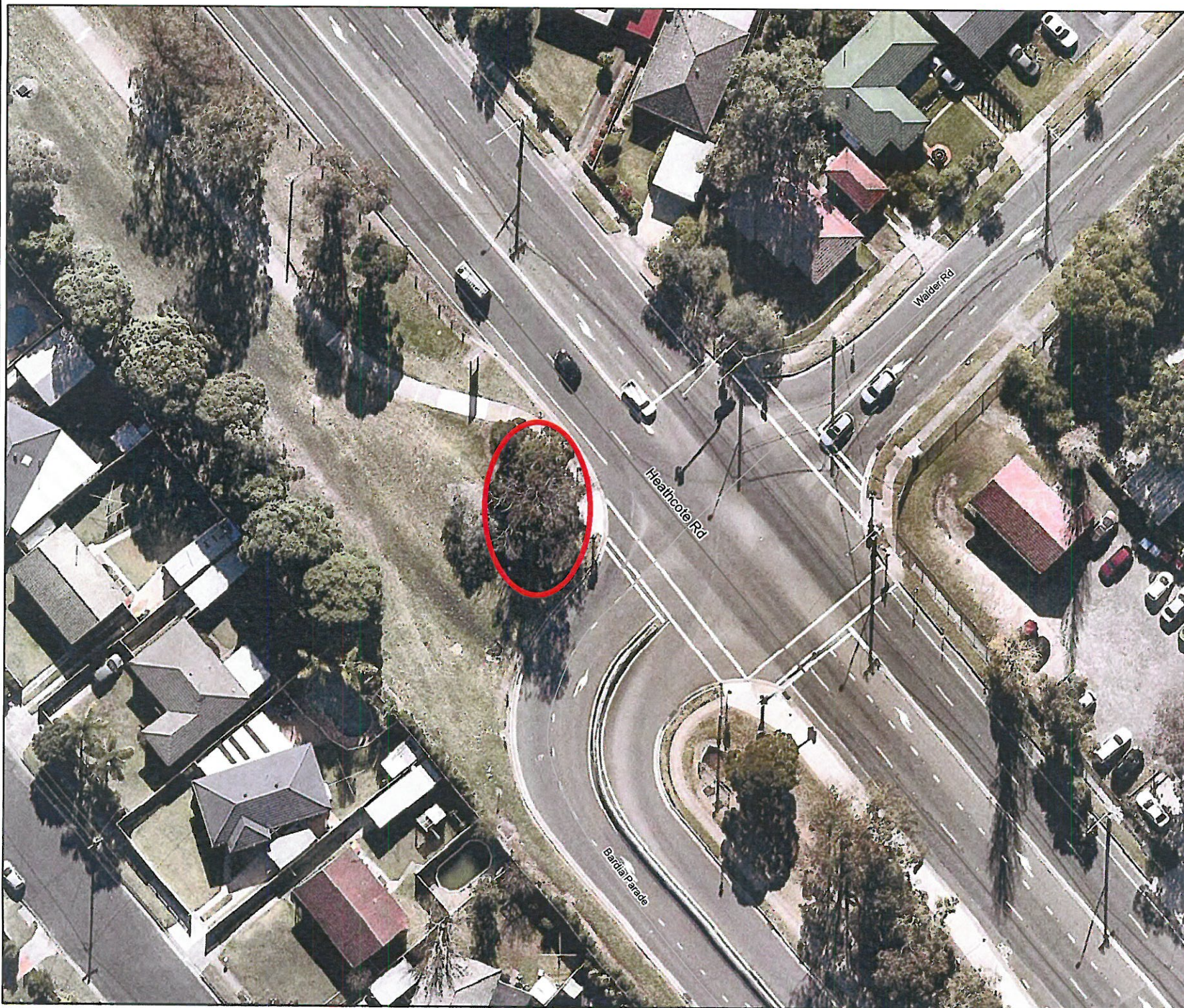
Liverpool Local Environmental Plan 2008, accessed on 7/07/2016  
<[www.legislation.nsw.gov.au/#/view/EPI/2008/403](http://www.legislation.nsw.gov.au/#/view/EPI/2008/403)>

Eco Logical Australia Pty Ltd 2012. Liverpool Biodiversity Management Plan 2012. Prepared for Liverpool City Council, Liverpool NSW.

Liverpool City Council 2016. Tree Management Policy. Liverpool City Council, Liverpool NSW.

NSW National Parks and Wildlife Service (NPWS) 1997. Western Sydney Urban Bushland Biodiversity Survey. NSW National Parks and Wildlife Service, Hurstville.





**Legend**  
[Red outline box] Survey area



**Figure 1**  
Location of the Survey Area  
Vegetation Assessment,  
Heathcote Road, Holsworthy





A large, white, sans-serif capital letter 'C' is centered on the right side of a teal horizontal band. The band is a solid teal color and spans the width of the page.

Appendix C – Noise Assessment

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# **Proposed Intersection Upgrade Heathcote Road /Bardia Parade and Walder Street, Holsworthy**

## **Community Consultation Report**

July 2016



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## Executive summary

This report provides a summary of the community consultation carried out by Roads and Maritime Services in March 2016 on the proposed intersection upgrade of Heathcote Road, Walder Road and Bardia Parade in Holsworthy.

The NSW Government is funding this \$1.4 million improvement project to improve safety and manage congestion. The proposal includes:

- Installing two new pedestrian crossings and modifying another crossing
- Building a new left turn bay to improve capacity and traffic flow from Bardia Parade onto Heathcote Road
- Realigning the intersection for left and right turning lanes from Walder Road onto Heathcote Road to improve traffic flow
- Removing five trees
- Installing a CCTV camera on an existing traffic light post for monitoring of traffic
- Installing new signs and line marking.

Roads and Maritime Services distributed 750 letters to local residents, businesses and key stakeholders in early March 2016, inviting feedback by Friday 18 March (see Appendix A and B). We received comments from eight people who raised six different matters. Five people were supportive of the proposal and three were neutral, raised questions or made suggestions.

The key points raised were regarding the time taken to turn right from Meehan Avenue onto Walder Road because of queueing traffic and the need for a right turn arrow to turn right from Walder Road onto Heathcote Road. The comments raised will be taken into account in finalising the next step of the project.

We thank everyone who provided comments and the community and stakeholders for considering the proposal.

Some other matters raised were outside the scope of the proposal and will be passed on to Liverpool City Council.

After reviewing the feedback, Roads and Maritime has decided to proceed with the proposal, without change.

We will continue to keep the community and stakeholders informed as the project progresses.

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# 1. Introduction

## 1.1. Background

Heathcote Road is a four lane roadway with a central median and right turn bays into Walder Road and Bardia Parade. Walder Road and Bardia Parade are both two lane local roads. The intersection is fully signalised, with filter right turns from Walder Road and Bardia Parade and a 'diamond phase' from Heathcote Road into Walder Road and Bardia Parade.

Heathcote Road is managed by Roads and Maritime Services (Roads and Maritime). Walder Road, Bardia Parade and other local roads in the area are managed by Liverpool City Council.

Roads and Maritime received feedback from the community regarding the right turn movements from Walder Road into Heathcote Road, Holsworthy. Roads and Maritime conducted an investigation and found that the safety and efficiency of the movement could be improved with changes to the traffic signals to allow right turns from Walder Road and Bardia Parade into Heathcote Road.

## 1.2. The proposal

Roads and Maritime is proposing to upgrade the intersection of Heathcote Road with Bardia Parade in Holsworthy.

The NSW Government is funding this \$1.4 million improvement project to improve safety and manage congestion

The proposed upgrade includes:

- Installing two new pedestrian crossings and modifying another crossing
- Building a new left turn bay to improve capacity and traffic flow from Bardia Parade onto Heathcote Road
- Realigning the intersection for left and right turning lanes from Walder Road onto Heathcote Road to improve traffic flow
- Removing five trees
- Installing a CCTV camera on an existing traffic light post for monitoring of traffic
- Installing new signs and line marking.

Proposal to upgrade the intersection on Heathcote Road at Bardia Parade and Walder Road, Holsworthy





## 2. Consultation approach

### 2.1. Consultation objectives

Consultation was carried out with the community between Friday 4 March and Friday 18 March 2016 to:

- Seek comment, feedback, ideas, and suggestions for us to consider when making a decision and
- Build a database of interested and concerned community members with whom we can continue to engage during the proposal's development.

### 2.2. How consultation was done

We distributed 750 letters to the community in the local area and key stakeholders in March inviting community members and stakeholders to provide feedback on the proposal via mail, email or phone by Friday 18 March.

**Table 1 – Consultation tools**

Have Your Say Letter (Appendix A)	<ul style="list-style-type: none"><li>• Delivered to 750 residents and businesses in Holsworthy (Appendix B)</li><li>• Emailed to emergency services, key stakeholders and community groups in the local area.</li></ul>
--------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

## 3. Consultation summary

### 3.1. Overview

We received comments from eight people who raised six different matters. Five were supportive of the proposal, and three were either neutral, raised questions or made suggestions. Matters raised included the time taken to turn right from Meehan Avenue onto Walder Road because of queueing traffic, the need for a right turn arrow to turn right from Walder Road onto Heathcote Road, the provision of a left turn from Heathcote Road into Walder Road, parking on Walder Road near the intersection and other matters which are outside of the scope of the proposal.

### 3.2 Feedback summary and Roads and Maritime's responses

Roads and Maritime has provided responses to all feedback received on this proposal. The responses are provided directly to the person who commented as well as in this report, which will be made available to the public.

All comments have been considered to help Roads and Maritime make decisions on this proposal. Matters raised during consultation that are not within Roads and Maritime's area of responsibility have been forwarded to the relevant authority.

**Table 2 – Comments and responses**

Issue category	Matter raised	Roads and Maritime response
<p><b>Right Turn arrow from Walder Road to Heathcote Road</b> (3 comments)</p>	<p>Will the traffic signals have a right turn arrow from Walder Road into Heathcote Road? This will help traffic flow, especially in peak periods.</p> <p>The signals should have a right turn arrow to turn onto Heathcote Road in the morning. There should not be a red arrow when nobody is coming from Bardia Parade – it is really frustrating.</p>	<p>The new traffic signal phasing will have a right turn arrow from Walder Road into Heathcote Road.</p> <p>The traffic signal phasing has been modelled and optimised to allow the best traffic flow for the volume of traffic and movements on different arms of the intersection. The new traffic signal phasing will provide improved flexibility over the current phasing at the intersection and will be adaptive to changes in traffic conditions.</p>
<p><b>Left turn from Heathcote Road to Walder Road</b> (1 comment)</p>	<p>The proposal should include a left hand turn from Heathcote Road into Walder Road on the red light.</p>	<p>The proposal includes a left hand turn from Heathcote Road into Walder Road. The new phasing will provide more opportunities for vehicles turning left at the intersection including the ability for vehicles turning left from Heathcote Road towards Walder Road to be operating concurrently with the right turn movement out of Walder Road.</p>

**Table 3 - Out of scope comments and responses**

Issue category	Matter raised	Roads and Maritime response
<p><b>Exiting from Meehan Road onto Walder Road</b> (6 comments)</p>	<p>There are difficulties getting out of Meehan Avenue onto Walder Road, especially during school pick up and drop off times. Queuing traffic does not leave a gap across Meehan Road.</p>	<p>The new intersection layout and traffic signal phasing will improve traffic flow along Walder Road and make it easier to exit from Meehan Avenue, improving safety and traffic flow in the surrounding area.</p> <p>Improvements at the intersection of Walder Road and Meehan Avenue are not within the scope of this proposal, however Roads and Maritime Services will pass this suggestion on to Liverpool City Council for their consideration.</p>

Issue category	Matter raised	Roads and Maritime response
	<p data-bbox="439 244 819 579">Please include and enforce 'do not queue across intersection' markings across Meehan Avenue at the intersection with Walder Road as part of the proposal, or a roundabout. This will give residents some right of way in the difficult traffic.</p> <p data-bbox="439 603 819 738">Will the proposed improvements enable better traffic flow from Meehan Avenue onto Walder Road?</p> <p data-bbox="439 762 819 922">There have been near misses with people turning from Meehan Avenue into oncoming traffic and drivers running red lights.</p>	
<p data-bbox="163 946 416 1058"><b>Walder Avenue parking</b> (1 comment)</p>	<p data-bbox="439 946 819 1209">In the morning peak, when driving from Walder Avenue, across Heathcote Road into Bardia Parade, it is difficult to get into the left lane because of cars queuing in the right turn lane and parked vehicles.</p> <p data-bbox="439 1233 819 1361">Suggest a clearway on Walder Road between Bradey Avenue and Heathcote Road.</p>	<p data-bbox="842 946 2000 1042">Roads and Maritime will take the comment about parking along Walder Avenue near the intersection with Heathcote Road into consideration in the final design of the proposed intersection improvement.</p> <p data-bbox="842 1066 2000 1121">A clearway to prevent cars queueing in the right hand lane will be considered in the detailed design and discussed further with Liverpool Council.</p>

Issue category	Matter raised	Roads and Maritime response
<p><b>U turning in Meehan Road</b> (1 comment)</p>	<p>Many vehicles make U turns at the entrance to Meehan Avenue at the intersection with Walder Road, which has caused several accidents. The respondent suggested a 'No U Turn' sign is erected.</p>	<p>Improvements at the intersection of Walder Road and Meehan Avenue are not within the scope of this proposal.</p> <p>Roads and Maritime will pass this suggestion on to Liverpool City Council for their consideration.</p>
<p><b>Bus Stop Location</b> (1 comment)</p>	<p>When a bus is stopped at the bus stop on Walder Road, south of Meehan Avenue it becomes dangerous as you cannot see oncoming traffic when turning out of Meehan Avenue.</p>	<p>Changes to the bus stop on Walder Road, northbound, south of Meehan Avenue are not within the scope of this proposal.</p> <p>Roads and Maritime will pass this comment on to Liverpool City Council for their consideration.</p>

### **3.2. Decision**

Following a review of the comments received, Roads and Maritime has decided to proceed with the proposal without change.

### **3.3. Next steps**

We will keep the community informed as the project progresses.

Issues raised concerning turning from Meehan Avenue onto Walder Road, U turning in Meehan Avenue and bus stop location will be passed onto Liverpool City Council for their consideration.

## Appendix A – Have your say Letter, March 2016



March 2016

### Have your say – Proposal to improve safety on Heathcote Road, Holsworthy

The NSW Government is funding this \$1.4 million proposal at the intersection of Bardia Parade and Walder Road to improve safety and manage congestion.

Roads and Maritime Services is seeking your feedback by Friday 18 March on a proposal, which involves:

- Installing two new pedestrian crossings and modifying another crossing
- Building a new left turn bay to improve capacity and traffic flow from Bardia Parade onto Heathcote Road
- Realigning the intersection for left and right turning lanes from Walder Road onto Heathcote Road to improve traffic flow
- Removing five trees
- Installing a CCTV camera on an existing traffic light post for monitoring of traffic
- Installing new signs and line marking.

We have included a map to help explain the project's location.

Investigation work is required to help us finalise a design for the proposal. This work will include locating utilities and drilling holes then reinstating the pavement.

This work will take **three shifts** to complete between **Thursday 10 March** and **Thursday 17 March**, excluding **weekends**, weather permitting. Our working hours will be from **8am** to **5pm**.

#### How will the work affect you?

There will be noise associated with this work, but we will make every effort to minimise its impact.

#### Traffic changes

There will be some temporary traffic changes to ensure the work zone is safe.

Lane closures will be in place and may affect travel times. Please keep to speed limits and follow the direction of traffic controllers and signs. For the latest traffic updates, you can call 132 701, visit [livetraffic.com](http://livetraffic.com) or download the Live Traffic NSW App.

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## How can you give feedback?

We encourage you to send us your comments by **Friday 18 March** to:

DownerMouchel  
PO Box 6465  
North Ryde NSW 2113  
Or enquiries\_nsw@downermouchel.com

## Contact

If you have any questions, please contact our delivery partner DownerMouchel on 1800 332 660 or email Enquiries\_nsw@downermouchel.com. For more information on our projects, visit [rms.nsw.gov.au](http://rms.nsw.gov.au)

### Proposal to upgrade the intersection on Heathcote Road at Bardia Parade and Walder Road, Holsworthy



## Translating and Interpreting Service

If you need an interpreter, please call TIS National on 131 450 and ask them to call DownerMouchel on 1800 332 660.

**Arabic**  
إذا كنتم بحاجة إلى مترجم، الرجاء الاتصال بخدمة الترجمة الخطية والشفهية (TIS National) على الرقم 1800 332 660 و الطلب منهم الاتصال بـ DownerMouchel على الرقم 1800 332 660.

**Cantonese**  
若你需要口譯員，請致電 131 450 聯絡翻譯和口譯服務署 (TIS National)，要求他們致電 1800 332 660 聯絡 DownerMouchel。

**Mandarin**  
如果你需要口译员，请致电 131 450 联系翻译和口译服务署 (TIS National)，要求他们致电 1800 332 660 联系 DownerMouchel。

### Greek

Αν χρειάζεστε διερμηνεία, παρακαλείσθε να τηλεφωνήσετε στην Υπηρεσία Μετάφρασης και Διερμηνείας (Εθνική Υπηρεσία ΤΙΣ) στο 131 450 και ζητήστε να τηλεφωνήσουν DownerMouchel στο 1800 332 660.

### Russian

Если вам нужен переводчик, то позвоните в Службу письменного и устного перевода (TIS National) по номеру 131 450 и скажите переводчику, что вам нужно позвонить в DownerMouchel по номеру 1800 332 660.

### Korean

통역사가 필요하시면 번역통역서비스 (TIS National) 에 131 450 으로 연락하여 이들에게 1800 332 660 번으로 DownerMouchel 에 전화 하도록 요청하십시오.

### Vietnamese

Nếu cần thông ngữ viên, xin quý vị gọi cho Dịch Vụ Thông Phiên Dịch (TIS Toàn Quốc) qua số 131 450 và nhờ họ gọi cho DownerMouchel qua số 1800 332 660.



Transport  
Roads & Maritime  
Services



## Appendix B – Distribution Area





[rms.nsw.gov.au/xxxxx](https://rms.nsw.gov.au/xxxxx)



13 22 13



Customer feedback  
Roads and Maritime  
Locked Bag 928,  
North Sydney NSW 2059

Month 201X  
RMS XX.XXX  
ISBN: XXX-X-XXXXXX-XX-X



Appendix D - PACHCI Clearance Letter





27/07/2016

Hannah D'eau  
Environment Officer

Dear Hannah

**Re: Preliminary assessment results for the Heathcote Rd and Bardia Pde Project proposal based on Stage 1 of the Procedure for Aboriginal cultural heritage consultation and investigation (the procedure).**

The project, as described in the Stage 1 assessment checklist, was assessed as being unlikely to have an impact on Aboriginal cultural heritage. The assessment is based on the following due diligence considerations:

- The project is unlikely to harm known Aboriginal objects or places.
- The AHIMS search did not indicate any known Aboriginal objects or places in the immediate study area.
- The study area does contain landscape features that indicate the presence of Aboriginal objects, based on the Office of Environment and Heritage's *Due diligence Code of Practice for the Protection of Aboriginal objects in NSW* and the Roads and Maritime Services' procedure.

Your project may proceed in accordance with the environmental impact assessment process, as relevant, and all other relevant approvals.

If the scope of your project changes, you must contact me to reassess any potential impacts on Aboriginal cultural heritage.

If any potential Aboriginal objects (including skeletal remains) are discovered during the course of the project, all works in the vicinity of the find must cease. Follow the steps outlined in the Roads and Maritime Services' *Unexpected Archaeological Finds Procedure*.

For further assistance in this matter do not hesitate to contact me.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Jeff Nelson'.

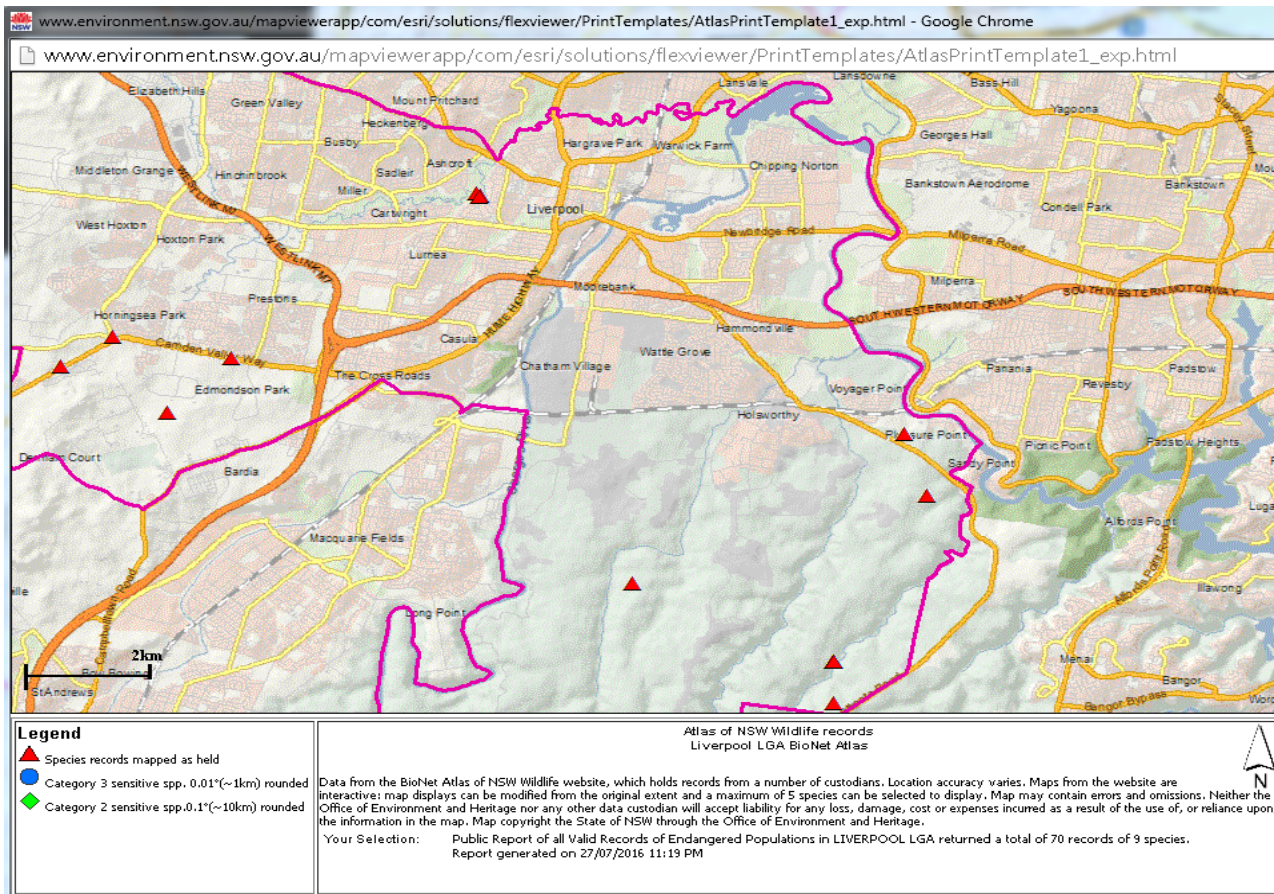
Jeff Nelson  
Aboriginal Cultural Heritage Officer (ACHO) – Sydney Region

**Roads and Maritime Services**






# E






## Appendix E – Heritage BioNet Atlas map



Data from the BioNet Atlas of NSW Wildlife 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. Species listed under the Sensitive Species Data Policy may have their locations denatured ( $\wedge$  rounded to  $0.1\hat{\text{A}}^\circ$ ;  $\wedge\wedge$  rounded to  $0.01\hat{\text{A}}^\circ$ ). Copyright the State of NSW through the Office of Environment and Heritage. Search criteria : Public Report of all Valid Records of Endangered Populations in LIVERPOOL LGA returned a total of 70 records of 9 species.

Report generated on 27/07/2016 11:19 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm status	Records	Info
Animalia	Aves	Meliphagidae	0448	<i>Epthianura albifrons</i>		White-fronted Chat population in the Sydney Metropolitan Catchment Management Area	E2,V,P		1	
Animalia	Insecta	Chrysomelidae	1008	<i>Menippus darcyi</i>		Menippus darcyi population in the Sutherland Shire	E2		K	
Plantae	Flora	Apocynaceae	10896	<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i>		Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	E2		17	

Plantae	Flora	Campanulaceae	1937	<i>Wahlenbergia multicaulis</i>	Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	E2	K	
Plantae	Flora	Casuarinaceae	9009	<i>Allocasuarina diminuta subsp. mimica</i>	Allocasuarina diminuta subsp. mimica L.A.S.Johnson population in the Sutherland and Liverpool local government areas	E2	7	
Plantae	Flora	Fabaceae (Faboideae)	2853	<i>Dillwynia tenuifolia</i>	Dillwynia tenuifolia, Kemps Creek	E2,V,P	43	
Plantae	Flora	Lamiaceae	3429	<i>Prostanthera saxicola</i>	Prostanthera saxicola population in Sutherland and Liverpool local government areas	E2	2	
Plantae	Flora	Myrtaceae	11397	<i>Gossia acmenoides</i>	Gossia acmenoides population in the Sydney Basin Bioregion south of the Georges River	E2	P	

Plantae

Flora

Rhamnaceae

5591

*Pomaderris prunifolia*

P. prunifolia in the  
Parramatta, Auburn,  
Strathfield and Bankstown  
Local Government Areas

E2

K

