



THE NORTHERN ROAD, PENRITH - INTERSECTION UPGRADES

Review of environmental factors

DECEMBER 2016

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Penrith City Council

The Northern Road, Penrith - Intersection Upgrades

Review of environmental factors

December 2016

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1	18/08/2015	Draft REF	Shani Archer	Belinda Crichton
2	14/09/2015	Final REF	Shani Archer	Belinda Crichton
3	20/12/2016	Revised Final REF incorporating 2 intersections only	Megan Topham	Belinda Crichton

Executive summary

The proposal

Penrith City Council (Council) proposes to upgrade two intersections in the vicinity of the Northern Road, Penrith, between Great Western Highway and Derby Street, Penrith (the proposal). The proposal involves modifications to lane configurations at the following intersections:

- The Northern Road / Great Western Highway
- The Northern Road / Derby Street.

Need for the proposal

The Western Sydney Infrastructure Plan (WSIP) will deliver major road infrastructure upgrades to support an integrated transport solution for the region and capitalise on the economic benefits from developing a western Sydney airport. The Plan provides improved road transport capacity ahead of future traffic demand, as planned residential and employment development comes online in Western Sydney growth centre precincts and the Western Sydney Employment Area (RMS, 2015).

The Northern Road is an arterial road running north / south between Windsor and Narellan via Penrith that will ultimately form one of the main arterial transport corridors to the South West Growth Centre (SWGC) and the Western Sydney Employment Area (WSEA).

Intersections along The Northern Road between the Great Western Highway and the M4 Western Motorway are currently operating at capacity. As a result of the increasing population and employment growth and changes in land use, traffic flow efficiency, travel time and road user safety will continue to decline. The proposed works would address these issues at the selected intersections along The Northern Road.

Proposal objectives

The proposed works form part of the wider proposed upgrade of The Northern Road. The key objectives of the proposed intersection upgrades are as follows:

- Improve traffic flow
- Improve road safety.

Options considered

For each intersection various minor and major options were developed based on the recommendations provided in the Traffic Modelling Report prepared by Jacobs (2015). Options are defined as follows:

- Minor options - generally maintain the current level of service (LOS) up to 2031 and require no land acquisition Provides same level of service (LOS) as existing until 2031 and no land acquisition required. Existing lane widths are maintained except where widening is needed.
- Major options – Provides improved LOS with land acquisition. Proposed lane widths are increased to 3.5m for through lanes and 3.3m for turning as requested by Roads and Maritime.

Assessment of the options at each of the intersections involved consideration of the recommendations presented in the Traffic Modelling Report (Jacobs, 2015), key stakeholder workshops (comprising Roads and Maritime, Land Partners and Council) and additional meetings with Council.

Analysis of each intersection was completed to provide a summary of the improvements and benefit of each option as well as the disadvantages of each option including impacts on traffic flow, road user safety, environment, parking, land acquisition and public utilities.

Statutory and planning framework

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across the State. Clause 94 of 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 for road infrastructure facilities and is to be carried out by Penrith City Council (Council), it can be assessed under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Development consent from Council is not required.

This review of environmental factors (REF) fulfils the requirements of section 111 of the EP&A Act and has been prepared in accordance with Clause 228 of the *Environmental Planning and Assessment Regulation 2000* and matters of national environmental significance (NES) under the EP&A Act.

Community and stakeholder consultation

Ongoing consultation with Roads and Maritime has been undertaken throughout the strategic and concept design process for the proposed intersection upgrades. Roads and Maritime has provided advice in the development of the preferred options.

Environmental impacts

As part of this REF an assessment of the potential impacts of the proposal and associated works was undertaken, as well as the identification of safeguards and management measures to mitigate these impacts.

Beneficial effects of the proposal would be increased traffic flow efficiency, reduced travel times and increased road user safety.

The following negative environmental impacts have been identified as likely to occur as a result of the proposed works:

- Clearing of 0.050ha of vegetation comprised of planted streetscape individuals. No threatened flora species will be affected
- Disruption of traffic on The Northern Road, Great Western Highway and Derby Street due to lane closures resulting in potential delays and a potential increase in congestion due to construction works
- Potential noise impacts at sensitive receivers as a result of vegetation clearing and road upgrade works
- Long term operational impacts including partial land acquisition and removal of vegetation and on-street parking.

Negative environmental impacts would be minimised through the implementation of mitigation measures outlined in Chapter 7 of this REF. This would include the implementation of a contractors Construction Environmental Management Plan (CEMP) and relevant sub-plans.

Council has considered the need for the proposal against its potential benefits and impacts, and has determined that the benefits outweigh the potential negative outcomes.

Greater detail regarding the potential environmental impacts associated with the proposal is provided in Chapter 6 of this REF.

Justification and conclusion

The Northern Road covered by this project is an arterial road running north / south between the Great Western Highway and M4 Western Motorway that will ultimately form one of the main arterial transport corridors to the SWGC and the WSEA. As a result of increasing population and employment growth in the area, upgrades to the intersections along The Northern Road are required to improve traffic flow efficiency, travel times and road user safety.

Key environmental impacts of the proposal have been avoided or reduced. The proposal as described in the REF best meets the proposal objectives, however would still require some clearing of individual planted street trees, partial land acquisition and removal of on-street parking. Temporary impacts would include construction noise and construction related traffic delays. Mitigation measures as detailed in this REF would ameliorate or minimise these expected impacts.

This REF has determined that the proposal is unlikely to have a significant impact on the environment and therefore the preparation of an Environmental Impact Statement under Part 5.1 of the EP&A Act is not required. The proposal would not result in any significant impacts on threatened species, as listed under the *Threatened Species Conservation Act 1995* (TSC Act) and/or *Fisheries Management Act 1994* (FM Act), and would therefore not require a Species Impact Statement to be prepared in accordance with Section 5A of the EP&A Act. Significant impacts on matters of NES under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) are not anticipated and accordingly, the proposal has not been referred to the Australian Government Department of the Environment.

On balance, the benefits of the proposal meet its identified objectives and, when considered in conjunction with the safeguards identified in this REF, outweigh the identified impacts. The proposal is therefore considered to be justified.

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1 Introduction

This chapter introduces the proposal and provides the context of the environmental assessment. In introducing the proposal, the objectives and project development history are detailed and the purpose of the report provided.

1.1 Proposal identification

Penrith City Council (Council) proposes to upgrade four intersections in the vicinity of the Northern Road, Penrith, between Great Western Highway and Derby Street, Penrith (the proposal). The proposal involves modifications to lane configurations at the following intersections:

- The Northern Road / Great Western Highway
- The Northern Road / Derby Street.

The extent of work would include 200m from each intersection on The Northern Road, 100m along all side streets except The Great Western Highway which is 200m in each direction. **Figure 1-1** to **Figure 1-3** shows the proposal in relation to its local and regional context.

The proposed works form part of the wider proposed upgrade of The Northern Road. This road would ultimately form one of the main arterial transport corridors within the South West Growth Centre (SWGC). The intersections are situated in a developed landscape comprising predominantly residential and some commercial and special land uses. Additional development is planned for the area and as residential and commercial development occurs, the amount of traffic using The Northern Road is expected to increase. The key objectives of the proposal are to improve traffic flow and enhance road safety as traffic volumes increase. **Table 1-1** provides a brief description of the proposed works at each of the intersections. The proposal is located approximately 47km west of the Sydney Central Business District (CBD).

Table 1-1 Proposed intersection upgrades

Intersection	Key features
The Northern Road / Great Western Highway	▪ Turning lane extensions on both roads
The Northern Road / Derby Street	▪ Addition of turning lanes and turning lane extensions on both roads

1.2 Purpose of the report

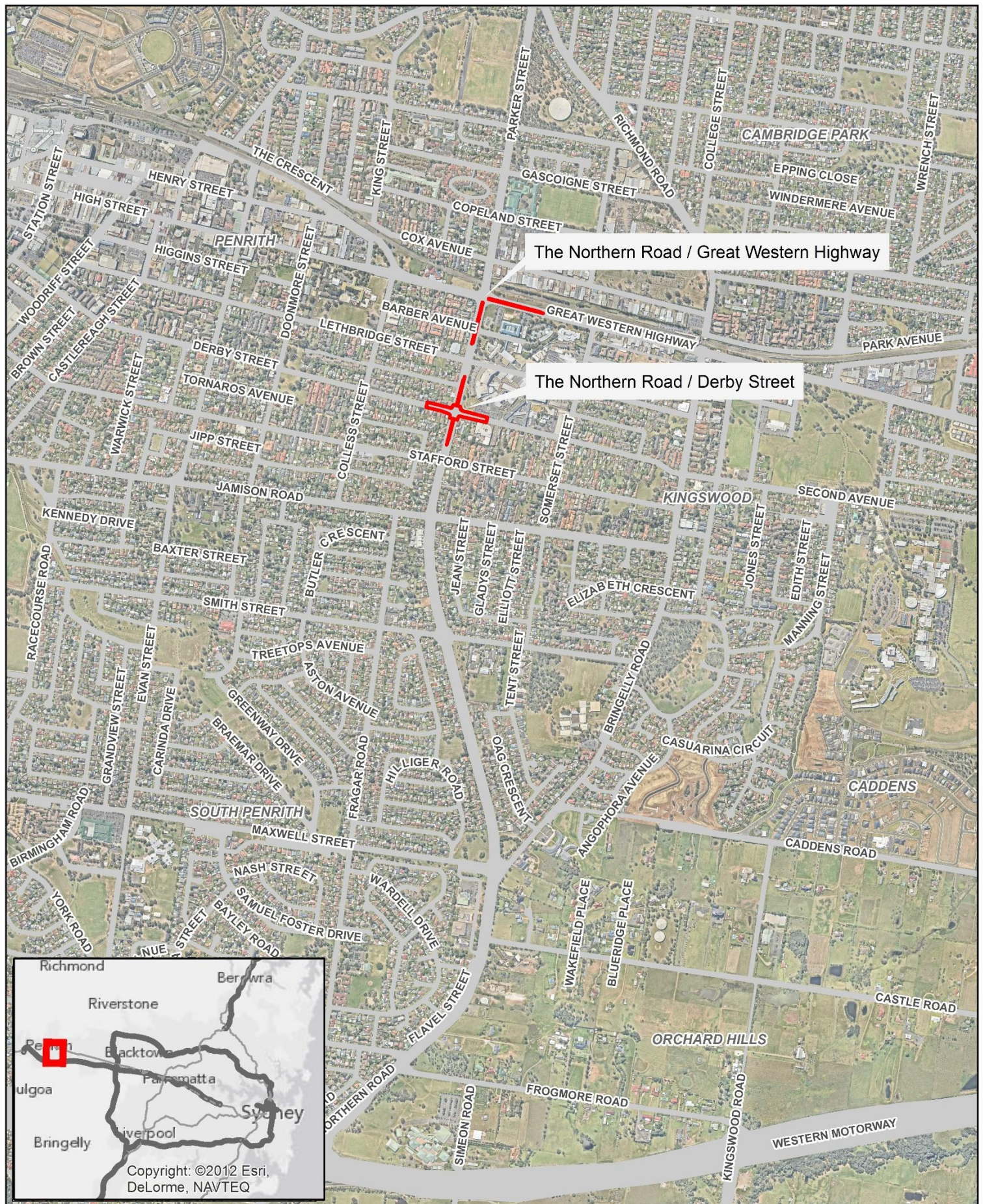
This Review of Environmental Factors (REF) has been prepared by Cardno (NSW/ACT) Pty Ltd (Cardno) on behalf of Council. For the purposes of these works, Council is the proponent and the determining authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

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

The description of the proposed works and associated environmental impacts have been undertaken in context of clause 228 of the *Environmental Planning and Assessment Regulation 2000*, the *Threatened Species Conservation Act 1995* (TSC Act), the *Fisheries Management Act 1994* (FM Act), and the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). In doing so, the REF helps to fulfil the requirements of section 111 of the EP&A Act, that Council examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF will 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 under Part 5.1 of the EP&A Act
- The significance of any impact on threatened species as defined by the TSC 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 the Environment for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.



Legend

Site Location

1:18,000 Scale at A4

Metres
0 200 400 600



Site Location

THE NORTHERN ROAD PENRITH
REVIEW OF ENVIRONMENTAL FACTORS
FIGURE 1-1



Map Produced by NSW/ACT (2304)
Date: 2016-12-19
Coordinate System: GDA 1994 MGA Zone 56
Project: 80015058
Map: 80015058_GS_003a_Figure1-1_SiteLocation.mxd 02
Aerial Imagery Supplied by Nearmap (March 2015)



1:1,350 Scale at A4

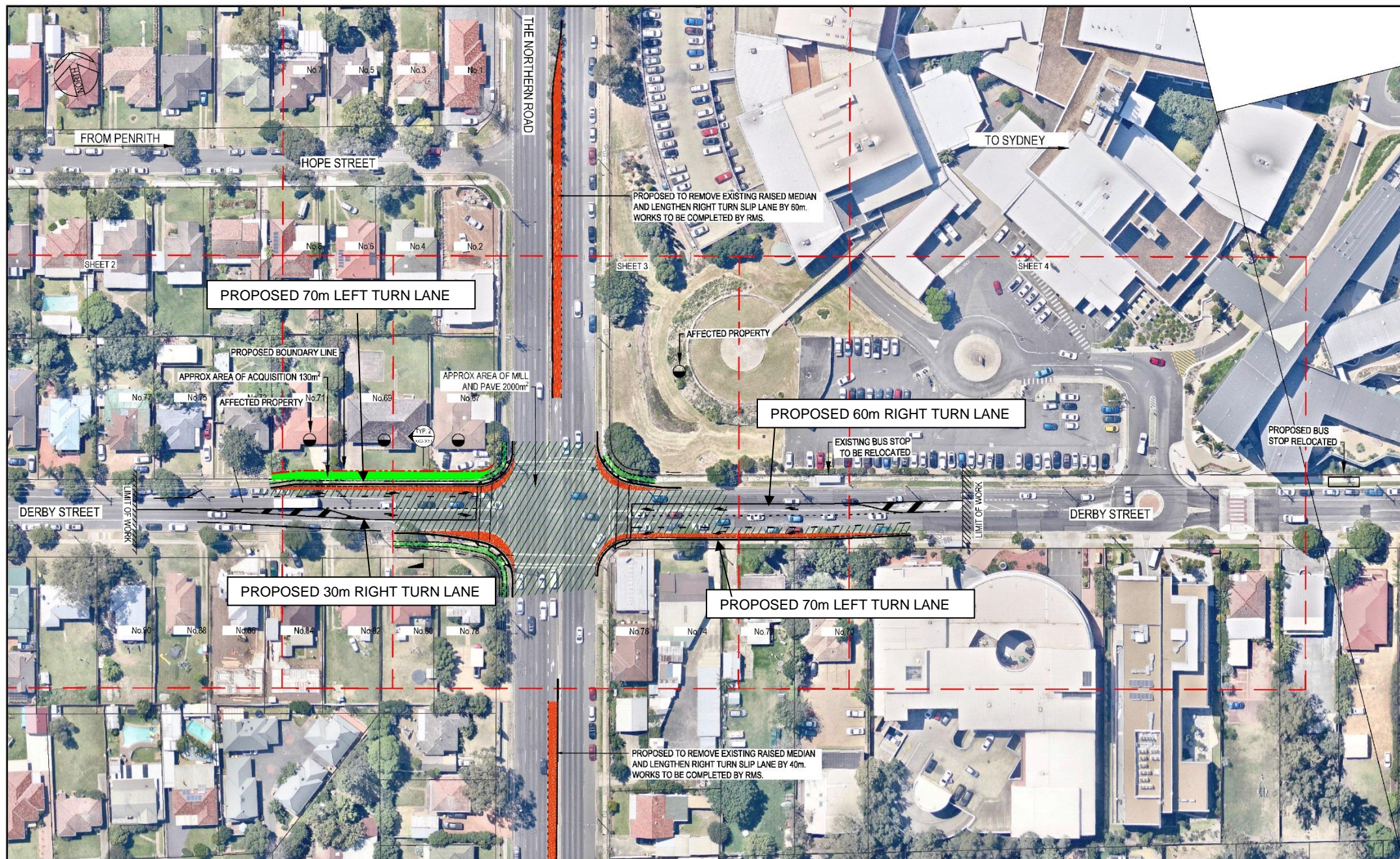


Concept Design - The Northern Road / Great Western Highway

THE NORTHERN ROAD PENRITH - REVIEW OF ENVIRONMENTAL FACTORS
FIGURE 1-2



Map Produced by NSW/ACT (2304)
Date: 2015-08-18
Coordinate System: GDA 1994 MGA Zone 56
Project: 80015058
Map: 80015058_GS_004a_Figure1-2_ConceptDesignGWH.mxd 01



1:1,350 Scale at A4



Concept Design - The Northern Road / Derby Street

THE NORTHERN ROAD PENRITH - REVIEW OF ENVIRONMENTAL FACTORS
FIGURE 1-3



Map Produced by NSWACT (2304)
Date: 2015-08-17
Coordinate System: GDA 1984 MGA Zone 56
Project: 80015058
Map: 80015058_GS_004b_Figure1-3_ConceptDesignDerby.mxd 01

2 Need and options considered

2.1 Strategic need for the proposal

Western Sydney is Australia's third largest economy and in its own right would be Australia's fourth largest city. During the next 20 years the region is expected to grow from two million to three million people. The Australian and NSW governments are investing money into significant road infrastructure as part of the Western Sydney Infrastructure Plan (WSIP). WSIP is an Australian Government initiative aimed to build and/or upgrade the infrastructure required to support planned growth in Western Sydney. The WSIP totals \$3.6B to upgrade infrastructure over 10 years. WSIP will deliver major road infrastructure upgrades to support an integrated transport solution for the region and capitalise on the economic benefits from developing a western Sydney airport. The Plan provides improved road transport capacity ahead of future traffic demand, as planned residential and employment development comes online in western Sydney growth centre precincts and the Western Sydney Employment Area (RMS, 2015).

As part of the WSIP, there is a \$200M Local Roads Package allocated directly to local Councils. In order to accommodate the forecasted population and economic growth in the Penrith Local Government Area (LGA), improvements are required in terms of traffic flow, road safety, road network efficiency and travel time particularly along key regional link roads which promote greater integration and access between residential, commercial and transport centres. Penrith City Council has been allocated \$1.1M in funding from the federal Department of Infrastructure and Regional Development (DIRD) for investigations into the upgrade of major intersections including those along The Northern Road (Cardno, 2015). The Northern Road is an arterial road running north / south between Windsor and Narellan via Penrith that will ultimately form one of the main arterial transport corridors to the South West Growth Centre (SWGC) and the Western Sydney Employment Area (WSEA).

Based on the modelling undertaken by Jacobs (2015) three intersections in the study area were found to operate at an unsatisfactorily level of service for both the both the AM and PM peak periods. This means that the average delay per vehicle was over 70 seconds and extra capacity is required (Jacobs, 2015). This is the case for The Northern Road / Great Western Highway and The Northern Road / Derby Street. In addition, outputs from the Strategic Traffic Assignment Model (STAM) for the study area (provided by Roads and Maritime Services) indicate that all intersections in the study area are anticipated to have growth rates of between 1.2 and 2.1% per annum.

2.1.1 Strategic Planning and Policy Framework

The proposed intersection upgrades are in accordance with NSW Government strategies including:

- NSW State Plan 2021 – A plan to make NSW number one (Department of Premier and Cabinet, 2011). This proposal would help to meet a number of the transport goals of the state plan, including reducing travel times and improving road safety
- Metropolitan Plan for Sydney 2036 – A plan for making Sydney a strong global city and a great place to live (DP&E, 2015). One key principle of this plan is to ensure connectivity of centres with a networked transport system. This is relevant to the proposal since The Northern Road will ultimately form one of the main arterial transport corridors within the SWGC
- Blue Mountains and Western Sydney Regional Strategy (under the NSW State

Plan 2021) – One key aim of this action plan is to build a well-connected region through actions such as reducing travel times within the region and to other regions, and improving connections to major employment centres. The proposal would assist in achieving this through improving traffic flow.

2.2 Existing road and infrastructure

Key roads in the study area are described below:

- The Northern Road – an arterial road running north / south between the Great Western Highway and M4 Western Motorway. The carriageway varies between four and six lanes with hard shoulder lanes and kerbside parking at various locations. The posted speed limit is 70km/h
- Great Western Highway – an arterial road running east / west which intersects with The Northern Road, running parallel and to the north of the M4 Western Motorway. East of The Northern Road intersection there are six lanes with parking in the kerbside lanes. West of The Northern Road intersection there are four lanes with no parking. The posted speed limit is 60 km/h
- Derby Street – a collector road running east / west which intersects with The Northern Road. There are two lanes with on-street parking. The posted speed limit is 50km/h.

Public and active transport

A number of bus routes are in operation along or across The Northern Road. Footpaths are generally present and in good condition for the majority of the study area, however no dedicated cycling infrastructure is in place in the study area. Further information on public and active transport is provided in **Section 6.4**.

2.3 Proposal objectives

The proposed works form part of the wider proposed upgrade of The Northern Road. The key objectives of the proposed intersection upgrades are as follows:

- Improve traffic flow
- Improve road safety.

2.4 Alternatives and options considered

2.4.1 Methodology for selection of preferred option

The following represents the desired qualitative assessment criteria for intersection upgrades along The Northern Road (Jacobs, 2015):

- Provision of adequate capacity on The Northern Road to cater for predicted traffic
- Increased capacity for roads that intersect with The Northern Road that would improve the level of amenity and the reliability of bus services that operate on these roads
- Minimised queue length spillback impacts on The Northern Road
- Reduced delays and travel times along the corridor
- Provision of optimum intersection configurations whilst considering the practicalities of physical constraints
- Improved safety as a result of reduced conflict between different traffic streams.

It is generally accepted that in the short term, intersections should be operating at a satisfactory level of service (LOS). In the longer term (ten plus years), intersections should be operating near capacity or better. The assessment of intersection upgrade options in all scenarios aimed to achieve this in addition to significant reductions in queue lengths and delays. Active transport was also given consideration in the identification of options. Enhanced pedestrian facilities are to be incorporated where

possible. However, based on the Penrith Accessible Trails Hierarchy Strategy (PATHS) and subsequent consultation with Council, there is no specific bicycle path requirement for this study area.

Cardno was commissioned by Council to develop strategic design and concept designs that provide optimal intersection configurations in response to the challenges and constraints of The Northern Road study area. Constraints mapping was undertaken to provide an overview of the physical constraints at each intersection. The constraints in the study area include features such as utilities, property boundaries, bus zones, heritage items and environmental and biodiversity features.

For each intersection various minor and major options were developed based on the recommendations provided in the Traffic Modelling Report prepared by Jacobs (2015). Options are defined as follows:

- Minor options - generally maintain the current level of service (LOS) up to 2031 and require no land acquisition Provides same level of service (LOS) as existing until 2031 and no land acquisition required. Existing lane widths are maintained except where widening is needed.
- Major options – Provides improved LOS with land acquisition. Proposed lane widths are increased to 3.5m for through lanes and 3.3m for turning as requested by RMS.

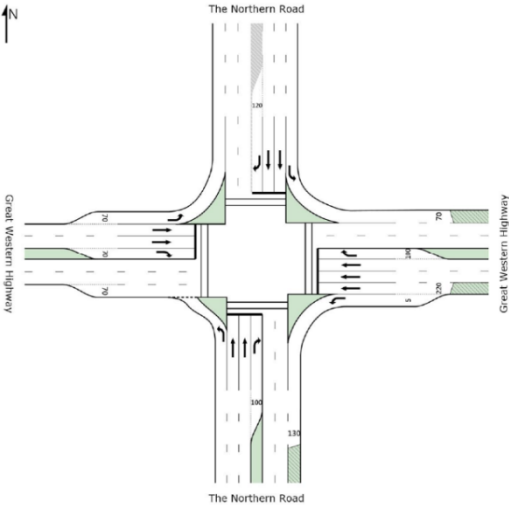
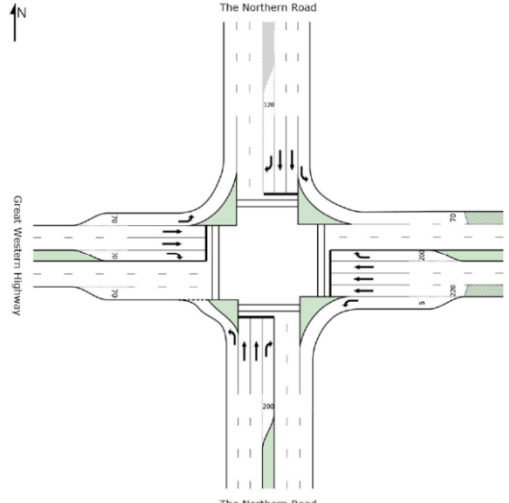
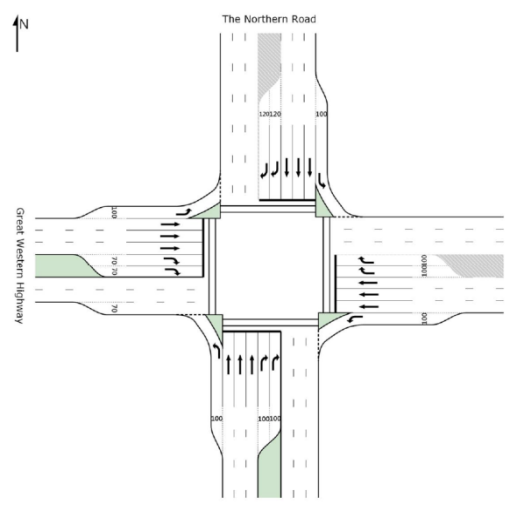
Stakeholder consultation was a key part of the options development. Key stakeholders (comprising Roads and Maritime and Council) were engaged in the development of the strategic designs to provide insights into the site constraints and future development or growth plans, and to participate in the development and assessment of the intersection improvement options.

Analysis of each intersection was completed to provide a summary of the improvements and benefit of each option as well as the disadvantages of each option including impacts on traffic flow, road user safety, environment, parking, land acquisition and public utilities.

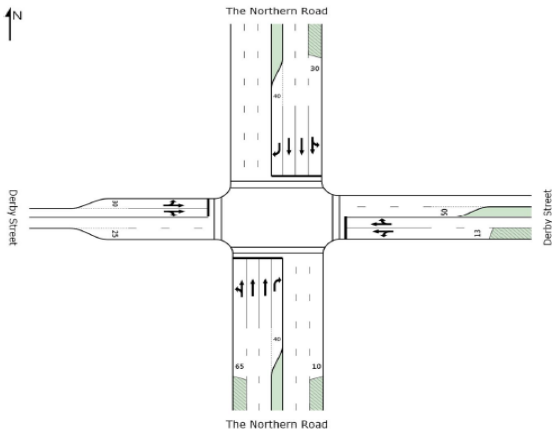
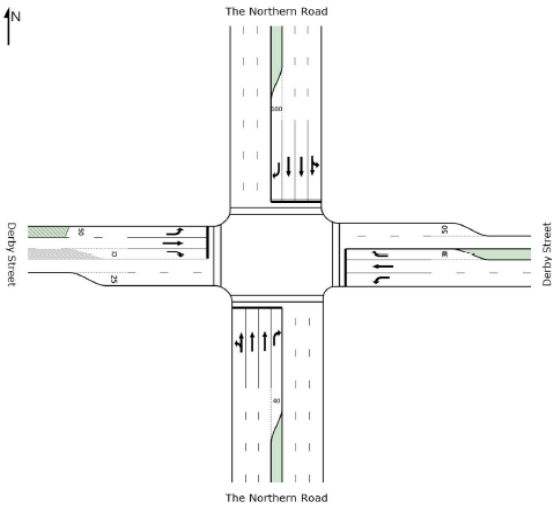
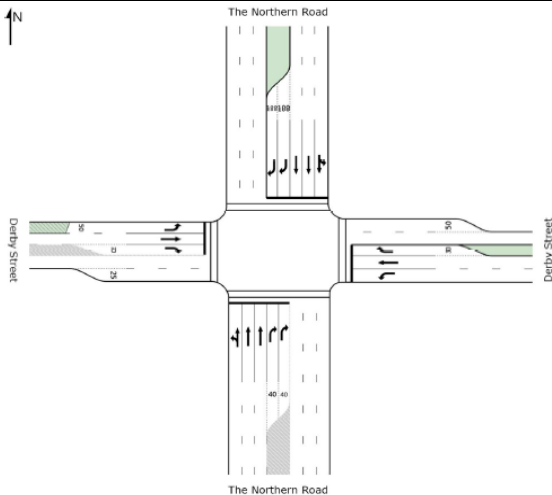
2.4.2 Identified options

A summary of the minor and major options for each intersection is provided in **Table 2-1**.

Table 2-1 The Northern Road intersection option descriptions

Scenario	Intersection Layout	Option Description
The Northern Road / Great Western Highway intersection		
2015 Existing		<p>The existing intersection is signalised with four approaches.</p> <p>All approaches consist of one slip lane, one right turn lane. The north, south and westbound approaches have two lanes, while the eastbound approach consists of three lanes.</p>
Minor Option		<p>The minor option changes from existing conditions include:</p> <ul style="list-style-type: none"> • Increase the length of the dedicated right turn lanes by an additional 100m for Great Western Highway westbound approach and The Northern Road northbound approach. • Remove all on-street parking on The Northern Road.
Major Option		<p>The major option changes from the minor conditions include:</p> <ul style="list-style-type: none"> • Provide additional dedicated right turn lanes the same length as existing on all approaches. • Provide additional approach and departure lanes 200m long on the northbound, southbound and westbound approaches. • Convert the three continuous left turn slip lanes on the southbound, eastbound and westbound approaches to 70 degree slip lanes. • Extend all left turn slip lanes to 100m in length.

Diagrams source: Jacobs (2015)

Scenario	Intersection Layout	Option Description
The Northern Road / Derby Street intersection		
2015 Existing		<p>The existing intersection is signalised with four approaches. The Northern Road approaches both consist of one right turn lane, a short left turn/through lane and two through lanes only.</p> <p>The Derby Street approaches consist of two lanes. Both left lane approaches are short lanes.</p>
Minor Option		<p>The minor option changes from existing conditions include:</p> <ul style="list-style-type: none"> • Increase the length of the dedicated right turn lanes by an additional 100m on The Northern Road southbound approach. • Provide three lanes at the stop line on both Derby Street approaches. • Remove 20m of parking on the Derby Street eastbound approach. • Remove all parking on the Derby Street eastbound approach. • Remove all on-street parking on The Northern Road.
Major Option		<p>The major option changes from the minor conditions include:</p> <ul style="list-style-type: none"> • Additional dedicated right turn lanes on The Northern Road approaches.

Diagrams source: Jacobs (2015)

2.4.3 Analysis of options

In accordance with input from relevant stakeholders, an assessment of the options at each intersection was undertaken to facilitate the option selection process. This assessment was based on the advantages and disadvantages of each option (refer **Table 2-2**).

Table 2-2 Intersection options – advantages and disadvantages

Scenario	Advantages	Disadvantages
The Northern Road/ Great Western Highway		
Minor	<ul style="list-style-type: none"> Provides same LOS as existing until 2031 and no land acquisition required. Significantly less infrastructure required compared to major options. 	<ul style="list-style-type: none"> Extended northbound dedicated right turn impacts existing signalised mid-block crossing (150m provided not 200m)
Major	<ul style="list-style-type: none"> Provides desirable lane widths (3.5 m through lane and 3.3m turning lane). Provides increased LOS efficiency compared to minor option. Minimal impact to existing properties on western side. Provides double diamond intersection for B-doubles. Provides dual right turns and 3 through lanes. 	<ul style="list-style-type: none"> Impacts larger number of properties on eastern side of The Northern Road and RailCorp north side Greater impact on public utilities compared to minor option Impacts mid-block pedestrian crossing on The Northern Road Bridge widening/new bridge east of existing required Loss of on-street parking Potential impact on heritage listed house on the corner of Copeland Road and The Northern Road Some loss of mature trees.
The Northern Road/ Derby Street		
Minor	<ul style="list-style-type: none"> Provides same LOS as existing until 2031 Minor land acquisition Significantly less infrastructure required compared to major option 	<ul style="list-style-type: none"> Requires relocation of a bus zone on Derby Street Requires closure of dedicated right turn eastbound near roundabout Potential loss of mature trees.
Major	<ul style="list-style-type: none"> Provides desirable lane widths (3.5 m through lane and 3.3m turning lane). Provides increased LOS efficiency compared to minor option. No impact to shop on south east corner of intersection. Provides dual right turns (north & south on The Northern Road). Provision of 3 lanes at intersection. 	<ul style="list-style-type: none"> Loss of on-street parking. Requires relocation of a bus zone on Derby Street. Closure of dedicated right turn eastbound near roundabout. Greater impact on public utilities compared to minor option. Land acquisition of properties on the western side of The Northern Road and northern side of Derby Street. Some loss of mature trees.
Both intersections		
Do Nothing	<ul style="list-style-type: none"> No land acquisition No environmental disturbance 	<ul style="list-style-type: none"> Does not meet the strategic need for the proposal Does not meet proposal objectives to enhance road safety and improve traffic flow.

2.5 Preferred option

Based on the assessment and following stakeholder workshops, the following options were identified as being most suitable to progress further:

- Northern Road / Great Western Highway – minor option
- Northern Rd / Derby St – minor option.

These upgraded strategic concept designs were then progressed to concept designs by applying a series of refinements in the context of project constraints.

3 Description of the proposal

This chapter describes the proposal and provides descriptions of existing conditions, the design parameters including major design features, the construction method and associated infrastructure and activities.

3.1 The proposal

Penrith City Council (Council) proposes to upgrade two intersections in the vicinity of the Northern Road, Penrith, between Great Western Highway, Penrith and Derby Street, Penrith (the proposal). The proposal involves modifications to lane configurations at the following intersections:

- The Northern Road / Great Western Highway
- The Northern Road / Derby Street.

Table 3-1 provides a brief description of the proposed works at each of the intersections and also includes a strategic cost estimate. The proposal is located approximately 47km west of the Sydney Central Business District (CBD).

Table 3-1 Proposed intersection upgrades

Intersection	Key features of concept design
The Northern Road / Great Western Highway (refer Figure 1-2)	<ul style="list-style-type: none"> ▪ 100m extension of the right turn lane from the Great Western Highway westbound into The Northern Road northbound including: <ul style="list-style-type: none"> ○ 339.5m² of new pavement ○ 140m of additional median pedestrian fencing ○ Lane markings ○ Modification to the existing raised median ▪ 50m extension of the right turn lane from The Northern Road northbound into the Great Western Highway eastbound including: <ul style="list-style-type: none"> ○ 157m² of new pavement ○ Relocation of existing pedestrian fence ○ Lane markings ○ Modification to the existing raised median ▪ Removal of on-street car parking along The Northern Road in the proximity of Lethbridge Street and associated new 'NO STOPPING' signage.
The Northern Road / Derby Street (refer Figure 1-3)	<ul style="list-style-type: none"> ▪ Proposed 60m right turn lane from Derby Street westbound to The Northern Road northbound, ▪ Proposed 70m left turn lane from Derby Street westbound into The Northern Road southbound, ▪ Proposed 30m right turn lane from Derby Street eastbound to The Northern Road southbound, and ▪ Proposed 70m left turn lane from Derby Street eastbound to The Northern Road northbound. ▪ These works include: <ul style="list-style-type: none"> ○ Road widening ○ 268.5m² of new pavement ○ 130m² of property acquisition (4 properties affected) ○ Lane markings ○ Utilities relocation (power pole and telecommunication pit) and new sewer manhole construction ▪ The existing bus zone on Derby Street eastbound is to be relocated east of the pedestrian crossing east of the roundabout in the Derby Street so it is closer to the hospital access ▪ Removal of on-street car parking along Derby Street and The Northern Road in proximity to the intersection, and associated new 'NO STOPPING' signage.

Intersection	Key features of concept design
	<ul style="list-style-type: none"> Extension of right turn lanes on The Northern Road will be undertaken by RMS as part of the Pinch Point Program. Works to be completed by RMS include new pavement, lane markings and new Signage.

3.2 Design

3.2.1 Design criteria

Design considerations taken into account include site constraints, utilities, civil, road safety audit, active transport, freights and trucks, traffic control signals, geotechnical, heritage, biodiversity and environment. Design considerations for the proposal are outlined in **Table 3-2**.

Table 3-2 Design criteria

Requirement	Design
Civil	<ul style="list-style-type: none"> The Northern Road and Great Western Highway arterial road design options are to be designed in accordance with RMS and AustRoads Guide to Road Design standards. The remaining sub-arterial, collector and local roads are to be designed in accordance with Penrith City Council Design Guidelines for Engineering Works for Subdivisions and Developments
Roads Safety Audit	<ul style="list-style-type: none"> Standard safety inspection checklist provided in Austroads' "Guide to Road Safety, Part 6: Road Safety Audit" and RTA's (RMS) "Accident Reduction Guide – Part 2: Road Safety Audits".
Active Transport	<ul style="list-style-type: none"> Existing Pedestrian Connectivity within the study area will be maintained There is no proposed bicycle path within the study area in the Penrith Accessible Trails Hierarchy Strategy (PATHS).
Freight and Trucks	<ul style="list-style-type: none"> The Northern Road and Great Western Highway are B-Double routes and will be designed to accommodate these vehicles.
Environment and Heritage	<ul style="list-style-type: none"> Biodiversity, heritage, landscape, hydrology, geology, soils, contamination, utilities and potential sensitive receivers constraints have been considered in the design.

3.2.2 Engineering constraints

Utilities were identified as a potential constraint. Refer to Section 6.6 for relevant information on affected utilities.

3.3 Construction activities

3.3.1 Work methodology

The final construction methodology would be determined during the detailed design phase. The following construction activities would likely be completed as part of the works:

- Installation of environmental controls including erosion and sediment controls
- Establishment of temporary fencing, work compounds and access
- Implement traffic controls, including partial road closures
- Marking of trees requiring clearing
- Clearing of existing trees and vegetation
- Stripping, stockpiling and management of topsoil
- Removal of existing pavement and road structures
- Removal of kerb and guttering as required
- Relocation of utilities

- Minor earthworks and regrading as required
- Construction of new pavement for lane widening
- Construction of new kerb and guttering
- Line-marking and signposting
- Installation of lighting
- Removal of traffic controls and erosion and sediment controls
- Site clean-up and rehabilitation of disturbed areas.

3.3.2 Construction hours and duration

It is expected that the proposed works would commence in 2017 subject to detailed design.

Standard working hours would generally be adopted (Monday to Friday between 7am and 6pm, and Saturday between 8am and 1pm). It is expected that most works would be undertaken during standard working hours, however, night works may be required to reduce potential traffic delays. The timing of night works would be confirmed during construction scheduling.

3.3.3 Plant and equipment

The following heavy plant and machinery is expected to be used in the construction of the proposal:

- Excavators
- Bulldozer
- Front end loader
- Tipper trucks and truck and dog combinations
- Graders
- Asphalt paver
- Vibratory rollers
- Water cart
- Concrete Pump Truck.
- Elevated Work Platform
- Generator
- Power Tools
- Bitumen trucks
- Light commercial and passenger vehicles
- Gravel trucks
- Hand tools
- Scrapers
- Vibrating and static rollers
- Backhoe.

3.3.4 Earthworks

Only minor earthworks, pavement widening and regrading would be required at each of the proposed intersections.

3.3.5 Source and quantity of materials

Aggregate pavement materials would be imported from a local quarry using truck and dog. Concrete for kerbs would be sourced from local suppliers.

3.3.6 Traffic management and access

The following traffic management restrictions would be in place during construction works:

- Construction speed limits of between 40 and 60 km/h during work hours and 80 km/h outside of work hours along affected roads
- Access to residences and businesses would be maintained at all times.

Approximately 30-40 truck movements per day are expected to be generated for the delivery of materials. For the remaining time, the number of truck movements per day is expected to be negligible and would not constitute a substantial increase to the existing traffic conditions.

3.4 Ancillary facilities

Ancillary facilities for the proposal have not yet been identified. The facility sites would likely be a site compound and/or stockpile site. These facilities may include a meal room, site office, ablution block, a fuel storage container and temporary materials and stockpiles.

The location of any ancillary facilities would be selected bearing in mind potential environmental and social impacts, including:

- Locating sites more than 50 metres from waterways
- Selection of areas of low ecological and heritage conservation significance
- Sites that require no significant clearing of native vegetation beyond that already required for the project
- Sites that minimise impact on amenity of the closest sensitive receiver
- Sites located on relatively level ground
- Sites can be accessed from the existing roads and no new access tracks would be required.

Where considered necessary further environmental assessment would be undertaken prior to its establishment of any ancillary facilities.

3.5 Public utility adjustment

The public utility adjustments required for this proposal are outlined in **Table 3-3**.

Table 3-3 Public utility adjustment

Intersection	Public utility adjustment
The Northern Road / Great Western Highway	The proposed road works are contained within the existing median and do not impact on any existing utilities
The Northern Road / Derby Street	<p>The following utilities would be impacted:</p> <ul style="list-style-type: none"> ▪ Endeavour Energy infrastructure ▪ AARNet fibre optic cable ▪ Telstra infrastructure ▪ Jemena gas main ▪ Sydney Water sewer main and water main ▪ RMS traffic control signal infrastructure.

3.6 Property acquisition

The property acquisitions required for this proposal are outlined in **Table 3-4**.

Table 3-4 Property acquisition

Intersection	Full acquisition	Partial acquisition (street number and area of acquisition where relevant)
The Northern Road / Great Western Highway	0	0
The Northern Road / Derby Street	0	4 properties Nepean Hospital - 30m ² No.67 - 34m ² No.69 - 54m ² No.71 - 37m ²

4 Statutory and planning framework

4.1 State Environmental Planning Policies

4.1.1 State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across the State.

Clause 94 of 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 for road infrastructure facilities and is to be carried out under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Development consent from Council 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*, *State Environmental Planning Policy (State and Regional Development) 2011* or *State Environmental Planning Policy (Major Development) 2005*.

Part 2 of the ISEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. Consultation, including consultation as required by ISEPP (where applicable), is discussed in **Section 5** of this REF.

4.2 Local Environmental Plans

4.2.1 Penrith City Council Local Environmental Plan 2010

The site of the proposal lies within Penrith LGA. Roads in the study area (and adjacent land where relevant) is zoned as per **Table 4-1**.

Table 4-1 Land zoning in the study area

Road (and surrounds)	Zone	Objectives
The Northern Road	SP2 – Infrastructure	<ul style="list-style-type: none">▪ To provide for infrastructure and related uses.▪ To prevent development that is not compatible with or that may detract from the provision of infrastructure. Road development is permitted with consent.
Great Western Highway	SP2 – Infrastructure	
Derby Street	R3 – Medium Density Residential	<ul style="list-style-type: none">▪ To provide for the housing needs of the community within a medium density residential environment.▪ To provide a variety of housing types within a medium density residential environment.▪ To enable other land uses that provide facilities or services to meet the day to day needs of residents.▪ To provide for a concentration of housing with access to services and facilities.▪ To enhance the essential character and identity of established residential areas.▪ To ensure that a high level of residential amenity is achieved and maintained.▪ To ensure that development reflects the desired future character and dwelling densities

Road (and surrounds)	Zone	Objectives
		of the area. Road development is permitted with consent.
Derby Street	B4 – Mixed Use	<ul style="list-style-type: none"> •To provide a mixture of compatible land uses. •To integrate suitable business, office, residential, retail and other development in accessible locations so as to maximise public transport patronage and encourage walking and cycling. •To minimise conflict between land uses within the zone and land uses within adjoining zones. •To create opportunities to improve public amenity. •To provide a wide range of retail, business, office, residential, community and other suitable land uses. <p>Road development is permitted with consent.</p>

4.3 Other relevant legislation

4.3.1 *Threatened Species Conservation Act 1995*

The *Threatened Species Conservation Act 1995* (TSC Act) protects threatened species, populations and ecological communities and their habitat in NSW. If threatened species, populations, ecological communities or their habitat could be impacted by the proposal, an assessment of significance must be completed to determine the significance of the impact, in accordance with Section 5A of the EP&A Act.

Ecological investigations have considered the requirements of Section 5A of the EP&A Act and concluded that the proposal would be unlikely to result in a significant impact on threatened species, populations, ecological communities or their habitat. Potential biodiversity impacts of the proposal are discussed further in **Section 6.1**.

4.3.2 *National Parks and Wildlife Act 1974*

The *National Parks and Wildlife Act 1974* (NPW Act) aims to conserve nature, habitat, ecosystems, ecosystem processes and biological diversity at the community, species and genetic levels. It also legislates Aboriginal heritage in NSW. This Act is administered by the Office of Environment and Heritage (OEH).

The proposal is not located on land reserved under this Act.

Part 6 of this Act refers to Aboriginal objects and places and prevents persons from impacting on an Aboriginal place or relic, without consent or a permit. The *Roads and Maritime Procedure for Aboriginal cultural heritage consultation and investigation* was followed. Potential impacts on Aboriginal heritage are considered unlikely and are discussed further in **Section 6.10**.

4.3.3 *Heritage Act 1977*

The *Heritage Act 1977* (Heritage Act) aims to protect and preserve items of non-Aboriginal heritage significance. The Heritage Act provides for the protection of items of local, regional and State heritage significance. It establishes a list of State Heritage Items and outlines process for approval of development which may impact items of non-Aboriginal heritage significance. The assessment concluded that the project is unlikely to impact on any items of local, regional and State heritage significance.

4.3.4 *Protection of the Environment Operations Act 1997*

The *Protection of the Environment Operations Act 1997* (POEO Act) provides an integrated system of licensing for polluting activities within the objective of protecting the environment. The contractor and Council are obliged to notify the Environment Protection Authority (EPA) when a 'pollution incident' occurs that causes or threatens 'material harm' to the environment.

Section 143 of the POEO Act requires waste to be transported to a place that can lawfully accept it and that the owner of the waste and the transporter are responsible for ensuring that waste is transported to a suitable waste facility.

The proposal does not constitute scheduled development work and does not require a licence under this Act.

4.3.5 *Protection of the Environment (Waste) Regulation 2014*

The POEO (Waste) Regulation provides for resource recovery exemptions that may be used without seeking approval from the EPA provided the waste generators, processors and consumer fully comply with the conditions.

Resource Recovery Exemption under Part 9, Clauses 91 and 92 of the POEO (Waste) Regulation, the excavated public road material exemption 2014, is relevant to this proposal.

The exemption applies to excavated public road material that is, or is intended to be, applied to land within the road corridor for public road related activities including road construction, maintenance and installation of road infrastructure facilities.

The following conditions apply:

- The excavated public road material can only be applied to land within the road corridor for public road related activities including road construction, maintenance and installation of road infrastructure facilities
- The excavated public road material can only be stored within the road corridor at the site where it is to be applied to land
- The excavated public road material cannot be applied to private land
- The consumer must ensure that any application of excavated public road material to land must occur within a reasonable period of time after its receipt.

This exemption allows for the reuse of spoil material to be used as fill if needed.

4.3.6 *Roads Act 1993*

The *Roads Act 1993* (Roads Act) is administered by either Roads and Maritime, local government or the Department of Finance and Services - Crown Land Division. Roads and Maritime has jurisdiction over major roads, whilst local government has jurisdiction over minor roads and the Crown Land Division over Crown roads.

Under Clause 2, Section 138 of the Roads Act, a consent may not be given with respect to a classified road except with the concurrence of Roads and Maritime. The Northern Road and the Great Western Highway are classified roads and therefore concurrence from Roads and Maritime is required for the proposed works.

4.4 Commonwealth legislation

4.4.1 *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 the environment of Commonwealth land.

The assessment of the proposal's impacts found that there is unlikely to be a significant impact on relevant matters of national environmental significance and the environment of Commonwealth land. Accordingly, the proposal has not been referred to the Australian Government Department of the Environment.

These are considered in **Section 6.1** and **Appendix A** of this REF.

4.5 Confirmation of statutory position

Penrith City Council is the proponent and determining authority for the proposal. The proposal is not State significant development or State Significant infrastructure. Clause 94 of the ISEPP provides that the proposal may be carried out without development consent and is therefore subject to assessment under Part 5 of the EP&A Act.

5 Stakeholder and community consultation

This section discusses the consultation undertaken to date for the proposal and the consultation proposed for the future. The description contains the consultation strategy or approach used and the results of consulting with the community, the Aboriginal community and relevant government agencies and stakeholders.

5.1 Aboriginal community involvement

The Roads and Maritime *Procedure for Aboriginal cultural heritage consultation and investigation* (PACHCI) is a four stage process used to assess the potential impact on Aboriginal cultural heritage and ensure effective consultation with the Aboriginal community is completed for all Roads and Maritime developments.

A Stage 1 assessment was undertaken for this proposal. This found that the proposal is unlikely to affect Aboriginal cultural heritage and therefore the proposal was not required to progress to Stage 2 (refer **Section 6.10**).

5.2 ISEPP consultation

Clause 16 of the ISEPP states that a consent authority must not carry out any of the following development without giving written notice to the specified authority and taking their responses into consideration:

- a) Development adjacent to land reserved under the *National Parks and Wildlife Act 1974* – the Office of Environment and Heritage,
- b) Development adjacent to a marine park declared under the *Marine Parks Act 1997* – Marine Parks Authority,
- c) Development adjacent to an aquatic reserve declared under the *Fisheries Management Act 1994* – the Office of Environment and Heritage,
- d) Development in the foreshore area within the meaning of the *Sydney Harbour Foreshore Authority Act 1998* – Sydney Harbour Foreshore Authority,
- e) Development comprising a fixed or floating structure in or over navigable waters – *Roads and Maritime Services* (maritime branch),
- f) Development for the purposes of an education establishment, health services facility, correctional centre or group home, or for residential purposes, in an area that is bush fire prone land – NSW Rural Fire Services.

No part of the proposal would be located on land to which any of the above clauses apply.

5.3 Consultation with Roads and Maritime Services

Roads and Maritime Services (Roads and Maritime) is a key stakeholder in the proposal and has been engaged in the development of the strategic and concept design options. Consultation has included meetings and workshops, involving Roads and Maritime and other key stakeholders.

6 Environmental assessment

This section of the REF 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. This includes consideration of the factors specified in the guidelines *Is an EIS required?* (DUAP 1999) and *Roads and Related Facilities* (DUAP 1996) as required under clause 228(1)(b) of the *Environmental Planning and Assessment Regulation 2000*. The factors specified in clause 228(2) of the *Environmental Planning and Assessment Regulation 2000* are also considered in **Appendix A**. Site-specific safeguards are provided to ameliorate the identified potential impacts.

6.1 Biodiversity

The potential for impacts to biodiversity were assessed through both review of desktop databases as well as site inspection of extant flora and fauna habitat.

A search of environmental databases was conducted on 20 December 2016. Databases and maps utilised during this assessment included:

- BioNet – Atlas of NSW Wildlife
- OEH Spatial Data Download - Vegetation Mapping
- OEH BioBanking Public Register
- OEH Critical Habitat Register and DPI NSW Register of Critical Habitat
- EPBC Act Protected Matters Search Tool (PMST)
- Department of Primary Industries Noxious Weeds
- Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands (Tozer et al. 2010).

A field survey was undertaken on 21 July 2015. The field survey focussed on assessing the condition and extent of habitat and the potential presence of threatened species listed under the TSC Act and the EPBC Act. Field inspection and the database searches indicated that nocturnal surveys were not required for the site.

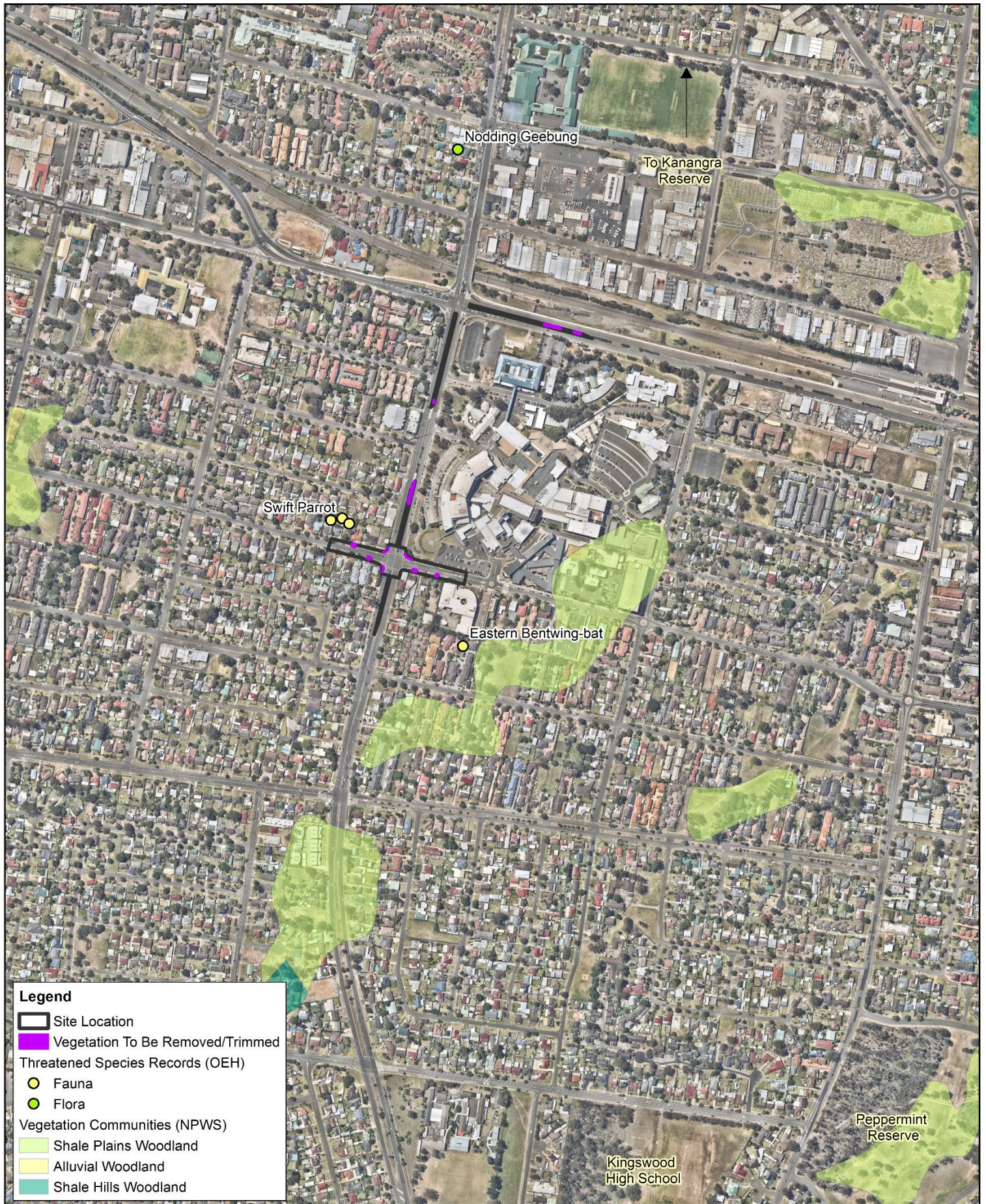
6.1.1 Existing environment

Vegetation Communities and Habitat

The proposal locations are within a highly urbanised and disturbed environment with little remnant vegetation. The closest areas of significant habitat size are (refer **Figure 6-1**):

- Kanangra Reserve – 15ha, 600m to the north of the Great Western Highway / The Northern Road intersection
- Kingswood High School – 1.7ha, 850m to south of the Derby Street / The Northern Road intersection
- Peppermint Reserve – 2.3ha, 980m to the southeast of the Derby Street / The Northern Road intersection.

No other habitat areas larger than one hectare are present within 1km of any of the two intersections. Connectivity to these habitat areas is minimal, provided through streetscape plantings and scattered garden habitat. The streetscape plantings are not continuous and considered unlikely to act as significant migration corridors for species.



1:8,000 Scale at A4

Metres
0 200

Flora and Fauna

THE NORTHERN ROAD PENRITH
REVIEW OF ENVIRONMENTAL FACTORS
FIGURE 6-1



Map Produced by NSW/ACT (2304)
Date: 2016-12-20
Coordinate System: GDA 1994 MGA Zone 56
Project: 80015058
Map: 80015058_GS_005_Figure6-1_FloraFauna.mxd 02
Aerial Imagery supplied by Nearmap (Nov 2016)

Vegetation habitat and communities at each of the intersections are limited to scattered street trees located along the road verge or within adjacent gardens. Along The Northern Road, Great Western Highway and Jamison Road, the dividing road median contains vegetated plantings primarily of Crepe Myrtle (*Lagerstroemia indica*) and *Fraxinus* spp.. Street tree species observed at the two intersection included a mixture of native and non-native species, including:

- Great Western Highway – The Northern Road:

- Crepe Myrtle (*Lagerstroemia indica*)
- *Acacia implexa*
- *Eucalyptus tereticornis*
- *Grevillia robusta*
- Juvenile *Eucalypt* spp.
- *Ficus rubiginosa*

- Derby Street – The Northern Road:

- *Eucalyptus amplifolia*
- *Grevillia* spp.
- *Jacaranda mimosifolia*
- *Melaleuca viminalis*

Based on OEH vegetation mapping of the Cumberland Plain, none of the intersections are located within endangered or threatened ecological communities. The conservation value of the species present at each of these intersections is considered low, and the habitat value the assemblages are minimal. The highest value community is considered to be the *Eucalyptus tereticornis* stand (six trees) adjacent to the railway, to the northeast of the Great Western Highway – The Northern Road intersection. It is understood that this area stand forms part of a locally significant scenic protection area.

It is noted that the land to the northeast of the Derby Street / The Northern Road intersection, within the grounds of the Nepean Hospital, includes an open drainage swale, which provides a low quality riparian habitat. Pooled standing water was present in the swale at the time of inspection. This swale may provide habitat for amphibian species.

A search of the BioBanking Public Register did not identify any habitat areas subject to a BioBanking Agreement at the intersection locations or in the immediate vicinity.

Threatened flora and fauna

The database searches, although identifying the potential occurrence of threatened species in the wider vicinity of the proposal, did not identify the presence of any threatened flora or fauna species at any of the intersections. This was confirmed through the site inspection. It is considered that the minimal habitat present at the site is not conducive to sustaining threatened species populations.

The closest recorded sightings of threatened species are:

- Nodding Geebung (*Persoonia nutans*) - 250m from the Great Western Highway intersection
- Swift Parrot (*Lathamus discolor*) – 300m from the Great Western Highway intersection and 150m from the Derby Street intersection
- Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*) – 150m from the Derby Street intersection.

It is possible the mobile fauna species, like the two threatened species identified may temporarily utilise the habitat present at the intersections. However, given the highly disturbed nature of these areas and the presence of high traffic volume roads, it is

unlikely such species would be dependent upon the available habitat for key lifecycle stages.

Weeds

The vegetated areas present at each intersection are highly disturbed, with many weed species present. Common weed species observed on site included *Pittosporum undulatum*, *Araujia sericifera* and *Solanum mauritianum*. There are over 250 weed species (Control Classes 1-5) identified by the Local Control Area for Penrith Control that are listed under the *Noxious Weed Act 1993* (NW Act).

6.1.2 Potential impacts

The proposed works have the potential to affect biodiversity value in the construction phase through:

- Clearance of habitat and direct loss/mortality of flora and fauna
- Reduced vegetated connectivity along road verges
- Disturbance to adjacent communities through pollution
- Introduction and/or spread of noxious weeds and other invasive species.

Provided appropriate site restoration activities are undertaken as part of applied management measures, operation of the upgraded intersections would not materially alter biodiversity values as the roads and intersections would continue to operate with a high volume of traffic, similar to current scenario.

Clearance and mortality

The clearance and loss of vegetation required at each intersection is documented in **Table 6-1**.

Table 6-1 Habitat removal

Intersection	Area to be cleared (ha) ¹	Description	Trees to be removed
Great Western Highway – The Northern Road	0.017	Removal of median strip vegetation along The Northern Road and Great Western Highway (Crepe myrtle individuals) No land acquisition of removal of other verge habitat required	15 Crepe myrtle trees
Derby Street – The Northern Road	0.033	Removal of median strip vegetation along The Northern Road (Crepe myrtle individuals). Pavement widening that requires the removal of verge vegetation	11 Crepe myrtle trees 3 <i>Eucalyptus amplifolia</i>

¹These areas include potential trimming

The area of disturbance is low, less than 0.050ha overall. All vegetation to be removed is comprised of planted streetscape individuals; no threatened flora species will be affected. Loss of these species would not significantly alter the habitat in the area available for mobile fauna species that are present. None of the trees to be removed were seen to be hollow bearing or likely to be used as shelter for fauna species.

Connectivity

Streetscape vegetation within road corridors may act as linear habitat corridors connecting areas of high habitat value. Interruption of such corridors (either temporary or permanent) can affect fauna migration.

Vegetation within the road corridors of the streets surrounding the proposed intersections are considered to be of very low connectivity value, providing variable and discontinuous cover and habitat. Further, there are no areas of sufficient size and habitat value in close proximity to the proposal that would sustain populations capable of utilising such corridors. Interruption of connectivity associated with proposal is considered to be negligible as:

- The majority of vegetation to be removed is located within road median areas and separated from other vegetation
- The area to be cleared is small in scale and unlikely to significantly alter the general vegetative character of the area
- Any interruption would be temporary in nature: restoration of verge vegetation would be undertaken as part of project environmental management measures.

Disturbance

Construction activities at the intersections may disturb adjacent flora and fauna communities through:

- Light pollution at night
- Noise pollution associated with plant and equipment
- Lowered air quality through vehicle and equipment emissions and dust deposition associated with construction activities.

Such impacts are likely to be negligible in terms of biodiversity as:

- There are no significant flora or fauna populations of conservation value in close enough proximity to the intersections to be affected by construction emissions
- The area is currently highly disturbed in terms of light, noise and air quality due to existing high volumes of traffic
- Construction works would be temporary
- Construction works are unlikely to require significant bulk earthworks reducing the potential for dust emissions.

It is noted that the open swale to the northeast of the Derby Road – The Northern Road intersection is upstream of the majority of intersection works and does not receive the stormwater run-off of the intersection. Provided standard sediment and erosion control measures are applied, it is unlikely that this low quality aquatic habitat would be affected by potential spills or increased sediment load in stormwater run-off.

Introduction of weeds

The construction works are highly unlikely to lead to the introduction of new weed species or spread of existing species as the proposal area and surrounding region are already highly disturbed. It is unlikely that any construction equipment, vehicles or materials associated with construction would be sourced from locations that may act as a potential source of new noxious species.

6.1.3 Safeguards and management measures

Table 6-2 identifies safeguards and management measures that would be implemented to assess potential impacts of the proposal on biodiversity. No management measures are required under the operational phase of the proposal. Additional measures to address air quality, noise, lighting and water quality issues are outlined in the relevant sections of this report.

Table 6-2 Safeguards and management measures for biodiversity

No.	Impact	Environmental safeguards	Responsibility	Timing
BD1	Clearance of habitat and direct loss/mortality of flora and fauna	<ul style="list-style-type: none"> • Vegetation removal would be restricted to only those areas identified as being necessary for the intersection works. • Prior to the commencement of works a physical vegetation clearing boundary is to be demarcated and implemented to prevent accidental over clearing in areas where there is considered a risk of accidental damage occurring. • The location of site compounds would take existing vegetation into consideration. • Staff are to be made aware, prior to the commencement of the construction works, of their environmental responsibilities including vegetation clearing boundaries, working in proximity to native vegetation, potential presence of fauna and other environmental matters related to the project. • As part of the proposed works a suitably qualified ecologist and animal handler is to be present on site for the removal of the trees. • All trees should be inspected for the presence of hollows or fauna species prior to removal or trimming. • If any animals are injured during the course of the works, in particular threatened or native species, the NSW Wildlife Information, Rescue and Education Service (WIRES) should be contacted immediately. • If unexpected threatened fauna or flora species are discovered onsite, stop works in that area until an approved management plan for the species has been implemented. 	Contractor	Construction
BD2	Reduced vegetated connectivity along road verges	<ul style="list-style-type: none"> • Revegetation works would be completed as soon as practicable to a suitable condition, in keeping with adjacent verge areas. 	Contractor	Construction
BD3	Introduction and/or spread of noxious weeds and other invasive species	<ul style="list-style-type: none"> • Declared noxious weeds are to be managed according to requirements under the <i>Noxious Weeds Act 1993</i>. 	Contractor	Construction

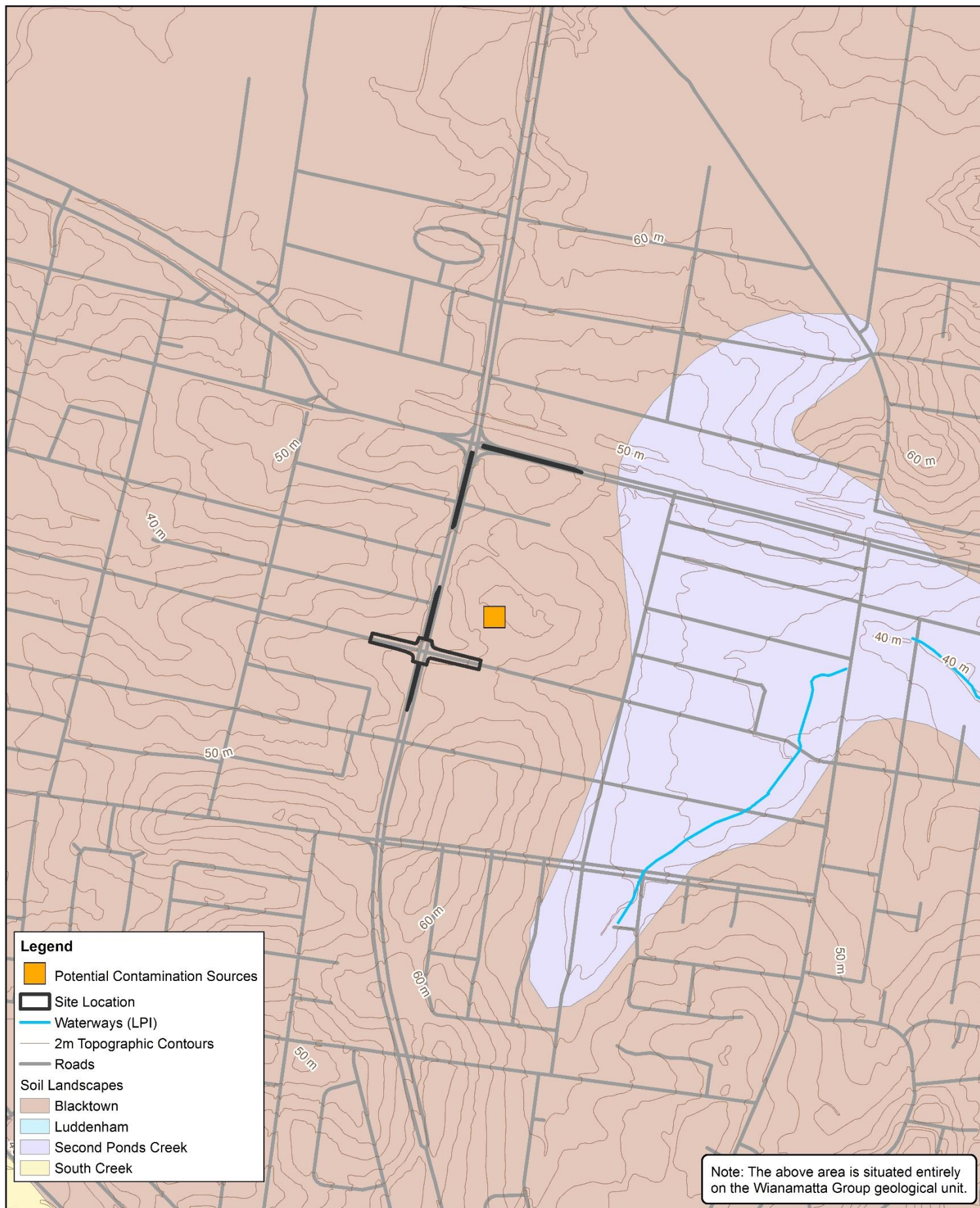
6.2 Water quality, hydrology and flooding

6.2.1 Existing environment

The Penrith LGA lies within the Hawkesbury - Nepean Catchment and is dominated by rivers, creeks, waterways and associated tributaries, the most significant being Nepean River and South Creek, both of which are accompanied by wide open floodplains. There are no large waterways in close proximity to the proposed intersections (refer **Figure 6-2**), however, the following smaller waterway is noted in close proximity to the proposal:

- Open drainage swale to the northeast of The Northern Road / Derby Street intersection. Pooled standing water was present in the swale at the time of the site inspection.

Council LEP Flood Planning maps show that the study area is not located in a flood planning area.



1:10,000 Scale at A4



Soils and Hydrology

THE NORTHERN ROAD PENRITH REVIEW OF ENVIRONMENTAL FACTORS FIGURE 6-2



Map Produced by NSW/ACT (2304)
Date: 2016-12-19
Coordinate System: GDA 1994 MGA Zone 56
Project: 80015058
Map: 80015058_GS_006_Figure6-2_SoilsHydrology.mxd 02

6.2.2 Potential impacts

Construction

The construction of the proposal represents a small risk to downstream water quality if management measures are not implemented, monitored and maintained through the construction process. Impacts that may directly impact water quality within the catchment during construction include spills or leaks of oil, fuel and/or hydraulic fluids that could occur from excavators, trucks and plant used during operations. These spills could potentially contaminate run off and pollute receiving waters. With the application of appropriate preventative measures detailed in **Section 6.2.3**, the impacts are considered unlikely.

Similarly, site disturbance during construction activities may result in increased erosion risk and sedimentation of downstream waterways, particularly at Northern Road / Derby Street watercourses are in close proximity to the intersections. This is considered unlikely with the installation and proper maintenance of adequate erosion and sediment controls detailed in **Section 6.2.3**.

The potential impacts of unmitigated construction activities on receiving surface waters include:

- Increased sedimentation and elevated turbidity levels of nearby waterways from exposed soil during site disturbance and movement of construction vehicles, particularly following rainfall events
- Increased levels of nutrients, metals and other pollutants, transported via sediment to downstream watercourses
- Chemical, heavy metal, oil and grease, and petroleum hydrocarbon spills from construction machinery directly contaminating downstream waterways
- Increased levels of litter from construction activities polluting downstream watercourses.

Flooding and drainage issues are not anticipated to cause significant concerns within the study area.

Operation

Potential operational impacts include increased surface water runoff from an increase in the area of impervious surfaces associated with road widening and additional pavement. The increased runoff could potentially increase scour of local watercourses. Contaminant runoff from the roadway is not expected to increase from current loads as there is not anticipated to be an increase in traffic as a result of the proposal. The application of water quality measures outlined in **Section 6.2.3** are expected to result in an overall neutral or beneficial impact on water quality in comparison to existing conditions.

Hydrology and flooding

The increase in pavement area is quite small in comparison to the pavement area associated with the existing road. The resulting increase in runoff would be minor and the increase in flood risk would be negligible. Overland flood paths would not be significantly altered as a result of this proposal.

6.2.3 Safeguards and management measures

Table 6-3 identifies safeguards and management measures that would be implemented to assess potential impacts of the proposal on water quality. Additional sediment and erosion controls are outlined in **Section 6.2.3**.

Table 6-3 Safeguards and management measures for water quality

No.	Impact	Environmental safeguards	Responsibility	Timing
WQ1	Pollution of waterway by chemical, fuel or lubricant.	<ul style="list-style-type: none"> • All fuels, chemicals and liquids are to be stored in an impervious bunded area away from drainage lines or waterways. • Refuelling of plant and equipment, and any plant maintenance is to occur in impervious bunded areas located away from drainage lines or waterways. Onsite plant maintenance is to be avoided. • 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. • A site Emergency Plan would be prepared and implemented as part of the CEMP. The plan would identify procedures to be followed in the event of incidents including (but not limited to) spills and damage to services. 	Contractor	Construction

6.3 Topography, geology, soils and contamination

6.3.1 Existing environment

Geology and soils

The geology across the entire study area is comprised of the Wianamatta Group, which represents sedimentary siliciclastic rock types of the Triassic era, comprising sandstone, siltstone and shale.

The soil landscape across the entire study area is comprised of the Luddenham landscape. Based on the Soil Landscapes of the Penrith 1:100,000 sheet (Bannerman & Hazelton, 1990), this landscape comprises moderately reactive soils and has a high erosion hazard.

Contamination

A review of the following publicly available registers maintained by the Environmental Protection Agency (EPA) was conducted on 20 December 2016:

- Register of Environment Protection Licences (EPLs) issued under the POEO Act (EPA 2016a)
- Register of contaminated lands under the Contaminated Land Management Act 1997 (EPA 2016b)
- List of NSW contaminated sites notified to the EPA (EPA 2016c).

A total of 22 EPLs were found to have been issued for sites in the suburbs of Penrith and Kingswood (EPA 2016a), and one site was listed on the contaminated land record of notices (EPA 2016b). Eight sites were listed on the list of NSW contaminated sites notified to the EPA (EPA 2016c) for the suburbs of Penrith and Kingswood.

Sites near to the study area (within 1km) are shown in **Table 6-4** and **Figure 6-2**

Table 6-4 Design refinements for the preferred options

Address	Type	Status
Sydney West Area Health Service Cnr Derby Street and Parker Street, Kingswood	POEO Licence	No longer in force November 2000
Western Sydney Automotives 107-121 Great Western Highway, Kingswood	POEO Licence	Surrendered January 2000
Narex Australia Pty Ltd Lot D Frogmore Road, Penrith	POEO Licence	Surrendered January 2000

It is noted that the registers are not an exhaustive list of contaminated sites and there may be previously unidentified sites in the vicinity of the proposal.

Acid sulphate soils

There are no known areas of potential acid sulphate soils (ASS) in the proposal area.

6.3.2 Potential impacts

Construction

The proposal would not have a significant impact on the topography, geology or soils at the site due to the limited extent of the works. Site disturbance works such as tree clearing may result in increased erosion risk and sedimentation. Earthworks would include cut and fill excavation and regrading.

Although unlikely, there is potential for contaminated soils to be uncovered during construction, given that industrial land uses have historically and are currently present in the vicinity.

Operation

Once the proposal is operational, there would be potential for indirect impacts on soils as a result of run-off and drainage. This potential impact would be managed through the revegetation of exposed soils.

Contamination impacts would generally be associated with contaminated run-off, which may arise from normal vehicle operation (tyre wear, minor leaks of lubricants and fuels, etc.), maintenance practices, or a spill or accident.

6.3.3 Safeguards and management measures

Table 6-5 identifies safeguards and management measures that would be implemented to assess potential impacts of the proposal on the geology and soil landscape.

Table 6-5 Safeguards and management measures for geology and soils

No.	Impact	Environmental safeguards	Responsibility	Timing
S1	Site disturbance may result in increased erosion and sedimentation	<ul style="list-style-type: none"> A Soil and Water Management Plan, and Erosion and Sediment Control Plan will be prepared in accordance with QA Specification G38 and implemented as part of the CEMP. 	Project manager	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
	risk.	<ul style="list-style-type: none"> Throughout construction, erosion and sediment control measures are to be implemented and maintained to: <ul style="list-style-type: none"> Prevent sediment moving off-site and sediment laden water entering any water course, drainage lines, or drain inlets. Reduce water velocity and capture sediment on site. Minimise the amount of material transported from site to surrounding pavement surfaces. Divert clean water around the site. <p>(in accordance with the Landcom/Department of Housing <i>Managing Urban Stormwater, Soils and Construction Guidelines</i> (the Blue Book)).</p>	Contractor	Construction
S2	Erosion or pollution could occur due to lack of adequate maintenance of erosion and sediment control and pollution control devices.	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.	Contractor	Construction
S3	Construction activities have the potential to disturb contaminated lands or contaminating materials.	If contaminated material is encountered during construction, the material must be managed and disposed of lawfully.	Contractor	Construction

6.4 Traffic and access

6.4.1 Existing environment

The Northern Road is a major north-south arterial road that provides both a traffic and access function. Intersections along The Northern Road are currently operating at capacity. With the increasing level of worker home-based trips, business-based work trips and home-based social trips as a result of increasing population and employment growth and changes in land use, traffic flow efficiency, travel times and road user safety will continue to decline further.

A classification and description of the key roads in study area are as follows:

- The Northern Road: Arterial Road running north / south between the Great Western Highway and M4 Western Motorway. The Northern Road varies between four and six lanes with hard shoulder lanes and kerbside parking at various locations. The posted speed limit is 70km/h
- Great Western Highway: Arterial Road running east / west which intersects with The Northern Road, running parallel and to the north of the M4 Western Motorway. East of The Northern Road intersection there are six lanes with

parking in the kerbside lanes. West of The Northern Road intersection there are four lanes with no parking. The posted speed limit is 60 km/h

- Derby Street: Collector Road running east / west which intersects with The Northern Road. There are two lanes with on-street parking. The posted speed limit is 50km/h

Traffic planning and analysis was undertaken by Jacobs (2015) to ascertain the current (2015) and future (2026 and 2031) functional and operational traffic conditions along The Northern Road.

Intersection performance

Based on the modelling undertaken by Jacobs (2015), for the two intersections they were found to operate at an unsatisfactorily level of service for both the both the AM and PM peak periods. This means that the average delay per vehicle was over 70 seconds and extra capacity is required.

Parking

On-street parking is available on the northbound carriageway of The Northern Road between Jamison Road and Derby Street, and on the southbound carriageway between Jamison Road and Great Western Highway, within marked kerbside lanes. No time restrictions apply and no clearways are in place.

On-street parking on Derby Street west of The Northern Road is permitted only in marked bays within the parking lanes on both sides of the road. No time restrictions apply to the marked bays. Between The Northern Road and Colless Street there is space for a total of approximately 50 cars. On-street parking on Derby Street east of The Northern Road is provided on the southern side only. Time restrictions apply to parking on both sides of the road near the Nepean Hospital entrance. The time restrictions range from 15 minutes operating part-time near the hospital entrance on the southern side, to two hours operating full-time on the northern side.

Public transport

The study area is located within Region 1 of the Sydney Metropolitan Bus Service Contract regions. Busways operates bus services in the region, including eight daytime routes along or across The Northern Road and one NightRide route.

Pedestrian and cyclist facilities

Footpaths run continuously along both sides of The Northern Road between Great Western Highway and Bringelly Road. Driveways frequently cross these footpaths and laybacks have been installed at each kerb. The pedestrian network within the study area is well developed north of Bringelly Road / Maxwell Street, and footpaths are generally in reasonable condition. Footpaths also run along both sides of Great Western Highway and Derby Street.

No dedicated cycling infrastructure is in place within the study area. Cyclists are limited to on-road environments only, with local and collector roads in the study area designated as low difficulty and arterial roads designated as high difficulty. These roads are not marked or signed for cyclists. The Northern Road presents a challenging environment for cyclists due to high traffic volumes and fast moving traffic.

6.4.2 Potential impacts

Construction

Some impacts on traffic flow may be apparent during the construction phase of the works. Construction is planned to occur over a 2-3 month period in 2017. During construction it is anticipated that roads are to remain open for the construction

period, however some lane closures may occur when necessary. Construction speed limits would be in place during construction, and stop/slow controls would be used during construction activities where necessary to protect construction workers. Speed controls would temporarily impact travel times along roads in the study area though this is not anticipated to be a significant increase due to the short length of the construction period. Works outside of standard hours may be required to reduce potential traffic delays during peak periods.

In addition, a small increase in traffic along The Northern Road and other roads in the study area may be experienced as a result of construction vehicles and contractors utilising the road, however any increases in traffic are expected to be negligible.

It is noted that given the location of the proposal relative to the Nepean Hospitals, there is the potential for impacts on emergency access. A Traffic Management Plan (TMP) would ensure adequate accessibility for emergency vehicles at all times.

Operation

The primary focus of this proposal is to improve safety and reduce delays along and in the vicinity of The Northern Road. Following construction of the intersection upgrades, traffic flow is anticipated to improve, access to The Northern Road from nearby areas would be enhanced, and road safety would also be improved.

The removal of on-street car parking at some the intersections would be required as part of the works. **Table 6-6** indicates the loss of on-street car parking, as proposed for each location. For estimation purposes it has been assumed that there is no on-street car parking allowed within the first 20m from the intersection and a 6m long on-street car parking bay.

Table 6-6 On-street parking impacts

Intersection	Parking loss (number of bays)*	Comments
Great Western Highway	0 spaces	Median works only – no impact to on-street parking
The Northern Road	53 spaces	All on-street parking on TNR around the Great Western Highway and Derby Street intersections would be removed (Jacobs 2015)
Derby Street	13 spaces	On-street car parking at Derby Street both sides of TNR impacted

*Calculated from design drawings (Appendix A).

6.4.3 Safeguards and management measures

Table 6-7 identifies safeguards and management measures that would be implemented to assess potential impacts of the proposal on traffic and access.

Table 6-7 Safeguards and management measures for traffic and access

No.	Impact	Environmental safeguards	Responsibility	Timing
T1	Increased heavy vehicle traffic and light vehicle traffic	A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the Roads and Maritime <i>Traffic Control at Work Sites Manual</i> and the worksite manual Roads and Maritime Services Specification G10. The TMP must restrict vehicle movements and	Project manager	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		parking to approved project areas, and manage speed limits on all roads near the work.		
T2	Potential impacts on emergency access to and from the Nepean Hospital	Ensure that there is adequate accessibility for emergency vehicles to and from the hospital. This should be addressed in the TMP for the proposal.	Project manager	Pre-construction
T3	Temporary speed limitations may increase travel times	Refer to Safeguard T1.	Project manager	Construction
T4	Temporary closure of roads	Road and lane closures would be limited to times when work is taking place on sections that cannot otherwise be avoided. The TMP will include measures that minimise traffic disruptions to the road network during peak periods, such as undertaking work outside of standard hours.	Contractor	Construction
T5	Loss of on-street parking may impact businesses and residences	A community consultation plan will be prepared to allow consultation with the residences and businesses. This plan should identify how residences would be advised about loss of on-street parking and to provide a procedure for managing concerns or complaints raised by the community.	Project manager	Pre-construction

6.5 Noise and vibration

6.5.1 Existing environment

Ambient noise at The Northern Road / Great Western Highway and The Northern Road / Derby Street intersections is characteristic of a busy road environment. Daytime traffic noise is readily apparent, with cars, heavy vehicles and trucks utilising the road frequently.

Potential sensitive receivers in the area include residences along The Northern Road, Great Western Highway and Derby Street. In addition there is a childcare centre at the site within 300m of the works:

- Tresillian Wentworth Family Care Centre – 280m south-east of The Northern Road / Great Western Highway intersection

6.5.2 Criteria

Interim Construction Noise Guideline

The *Interim Construction Noise Guideline* (ICNG) (DECC, 2009) provides guidance on assessing potential impacts and managing construction works to minimise noise, with an emphasis on communication and cooperation with all involved in, or affected by, construction noise. The ICNG sets out standard construction hours as Monday-

Friday: 7:00am to 6.00pm, Saturday: 8.00am to 1.00pm and no work on Sunday and Public Holidays.

The ICNG (DECC, 2009b) stipulates a noise guideline of 75 dB(A) (sound pressure) which equates to the 'highly noise affected' management level for construction noise received at residences.

NSW Road Noise Policy

The NSW Road Noise Policy (DECCW, 2011) (NSW RNP) is a guideline for use in planning approvals by local councils and licenses issued by the Environmental Protection Authority (EPA).

The RNP contains strategies to address the issue of road traffic noise from traffic-generating developments.

Quantitative criteria stated in the RNP associated with road traffic noise have now been superseded by those detailed in the *Roads and Maritime Services Noise Criteria Guideline* (2014). However, section 3.4.1 of the RNP does state the following in relation to the consideration of feasible and reasonable application of mitigation, relevant to assessment of this project:

"Where existing traffic noise levels are above the noise assessment criteria, the primary objective is to reduce these through feasible and reasonable measures to meet the assessment criteria. A secondary objective is to protect against excessive decreases in amenity as the result of a project by applying the relative increase criteria."

In assessing feasible and reasonable mitigation measures, an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person."

NSW Roads and Maritime Services Noise Criteria Guideline

Target criteria

The *NSW Noise Criteria Guideline* (Roads and Maritime 2014) (NSW NCG) provides Roads and Maritime's approach to establishing project specific criteria, with particular detail to establishing transition zones between new, redeveloped, and existing roads.

The applicable NCG target criteria for residential receivers located near to arterial and sub-arterial roads are shown for information in **Table 6-8**.

Table 6-8 NCG road traffic noise assessment criteria for residential land uses

Road category	Type of project/land use	Assessment criteria – dB(A)	
		Day (7am–10pm)	Night (10pm–7am)
Freeway/arterial/sub-arterial roads	1. Existing residences* affected by noise from new freeway/arterial/sub-arterial road corridors	L _{Aeq} , (15 hour) 55 (external)	L _{Aeq} , (9 hour) 50 (external)
	2. Existing residences* affected by noise from redevelopment of existing freeway/arterial/ sub-arterial roads	L _{Aeq} , (15 hour) 60 (external)	L _{Aeq} , (9 hour) 55 (external)

Minor Works

The NSW NCG states the following with regard to minor works:

- Some works may be primarily to improve safety. This may include minor straightening of curves, installing traffic control devices, intersection widening and turning bay extensions or making minor road realignments
- These works are not considered redeveloped or new as they are not intended to increase the traffic carrying capacity of the overall road or accommodate a significant increase in heavy vehicle traffic
- Roads and Maritime applies existing road criteria where the minor works increase noise levels by more than 2.0dBA relative to the existing noise levels at the worst affected receiver
- The noise catchment area should include all receivers where noise levels increase. A 600 metre noise catchment may not be required
- Transition zones (where new roads meet existing, and where redeveloped meet new roads) are not applicable to minor works.

6.5.3 Potential impacts

Construction

Increased noise at the site would occur as a result of the plant and machinery expected to be used during construction. The following list identifies potential noise sources with respective A-weighted sound pressure levels at 10m (from *AS2436-2010 – Australian Standard “Guide to noise and vibration control on construction, demolition and maintenance sites”*):

- Excavators (79dB)
- Bulldozer (80dB)
- Front end loader (85dB)
- Tipper trucks (89dB)
- Graders (82dB)
- Asphalt paver (80dB)
- Vibratory rollers (80dB)
- Water cart (79dB)
- Concrete pump truck (80dB)
- Generator (71dB)
- Power tools (74dB)
- Light commercial and passenger vehicles (78dB)
- Hand tools (88dB)
- Scrapers (88dB)
- Backhoe (76dB).

As the immediate surroundings includes residential dwellings, some with façades being approximately 5m distant from the proposed works, the relevant noise criteria are likely to be exceeded at certain times during construction. Similarly, the potentially sensitive receivers may experience some impacts during the construction phase. Most of the activities would be for a short duration, potentially resulting in some discomfort due to noise, before moving to the next location.

Works undertaken outside of standard hours may result in occasional noise 5dB or greater above the background noise level. These potential exceedances are likely to be of short duration due to the progressive movement of the construction activities along the road alignment. However, in accordance with the ICNG a community consultation plan is to be prepared as a basis for informing the community of the works and enabling feedback to be provided to the project team.

Given the nature and scale of the proposed works, vibration is not anticipated to be a significant issue. Any vibration impacts are anticipated to be minor and transitory.

Operation

Noise modelling has been carried out to determine whether the proposed intersection upgrade works for the Northern Road upgrade are likely to result in increases in road traffic noise level of 2dB(A) or more, thus triggering the need for a detailed road traffic noise impact assessment in accordance with Roads and Maritime requirements. The specialist noise report is provided in **Appendix D** and a summary is provided below.

Model setup

SoundPLAN 7.4 3D noise modelling software was used to predict noise impacting residential receivers from the realigned road segments at the upgraded intersections. Separate noise models were constructed for each of the following intersections:

- The Northern Road / Derby Street
- The Northern Road / Great Western Highway.

A noise model was constructed for each intersection for a “with project” and “no project” scenario. The results of the “no project” scenario were then subtracted from the “with project” scenario to obtain a relative increase due to the project realignment alone.

Model results

The noise modelling results for each intersection are shown in **Appendix D**.

Modelling results indicate that there are no predicted increases in noise level of 2 dB(A) or more as a result of the project, which can therefore be defined as minor works. For this reason it is recommended that a detailed noise impact assessment of road traffic noise is not likely to be required in accordance with Roads and Maritime current practice.

6.5.4 Safeguards and management measures

Table 6-9 identifies safeguards and management measures that would be implemented to assess potential noise and vibration impacts of the proposal.

Table 6-9 Safeguards and management measures for noise and vibration

No.	Impact	Environmental safeguards	Responsibility	Timing
N1	Increased noise levels as a result of construction activities.	<ul style="list-style-type: none"> • Noisy work activities would be conducted in accordance with the ICNG (DECC, 2009). • The construction contractor would be required to implement all practicable noise control measures including: <ul style="list-style-type: none"> ○ Scheduling the noisiest construction activities and the use of vibration causing equipment at the least sensitive times ○ Keeping noise and vibration generating equipment well maintained; and ○ Selecting and maintaining equipment and plant in a manner 	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		<p>which minimises noise and vibration emissions.</p> <ul style="list-style-type: none"> • A community consultation plan would be prepared to allow consultation with the neighbouring residences and other sensitive land uses. This plan should identify how residences will be advised of noisy activities and works outside of standard hours and provide a procedure for managing concerns or complaints raised by the community. • Ensure any required out-of-hours work complies with the requirements of G36 Environmental Protection (Roads and Maritime, 2014) relating to community notification requirements. • Any required night time work predicted to be significantly exceed background noise levels should aim to not affect residences for more than two consecutive nights or where possible, more than six nights over a one month period. 		

6.6 Utilities

6.6.1 Existing environment

Cardno undertook a dial before you dig for the project on 13 April 2015 to determine the location of utilities and services in the vicinity of the proposal. The utilities identified by the search at each of the intersections are outlined in **Table 6-10**.

Table 6-10 Existing utilities

Intersection	Utilities present
The Northern Road / Great Western Highway	<p>Endeavour Energy Jemena NBN co. Optus/ Uecomm RMS Sydney Water Telstra</p>
The Northern Road / Derby Street	<p>Endeavour Energy Jemena NBN co. Sydney Water Telstra AARNet</p>

6.6.2 Potential impacts

The potential impacts on utilities for each intersection are described in **Table 6-11**.

Table 6-11 Potential impacts on utilities

Intersection	Public utility adjustment
The Northern Road / Great Western Highway	The proposed road works are contained to the existing median and does not impact on any existing utilities
The Northern Road / Derby Street	<p>The following utilities would be impacted:</p> <ul style="list-style-type: none">▪ Endeavour Energy infrastructure▪ AARNet fibre optic cable▪ Telstra infrastructure▪ Jemena gas main▪ Sydney Water sewer main and water main▪ RMS traffic control signal infrastructure.

6.6.3 Safeguards and management measures

Table 6-12 identifies safeguards and management measures that would be implemented to assess potential impacts of the proposal on utilities.

Table 6-12 Safeguards and management measures for utilities

No.	Impact	Environmental safeguards	Responsibility	Timing
U1	Potential damage may occur to utilities and services not identified in the DBYD search.	<ul style="list-style-type: none">• Prior to the commencement of works the location of existing utilities would be confirmed.• A Hazard and Risk Management Plan would be prepared and implemented as part of the CEMP. The Plan will identify working around existing utilities as a site hazard.• Refer to Safeguard WQ1.	<p>Project manager</p> <p>Contractor</p>	<p>Pre-construction</p> <p>Construction</p>

6.7 Waste management

6.7.1 Existing environment

Existing waste production is generally confined to residences and businesses along The Northern Road and other roads in the study area. A small amount of general litter was observed along the roadside at the location of the proposed works during the site inspection.

6.7.2 Criteria

Section 143 of the POEO Act requires waste to be transported to a place that can lawfully accept it and that the owner of the waste and the transporter are responsible for ensuring that waste is transported to a suitable waste facility. Principles of waste management and the Resource Management Hierarchy (e.g. avoid, reduce, reuse, dispose) are embodied in the *Waste Avoidance & Resource Recovery Act 2001* and through the *NSW Waste Avoidance and Resource Recovery Strategy 2007*.

6.7.3 Potential impacts

Construction

The following waste streams are expected to be produced during the construction phase of the works:

- Green waste during tree removal and vegetation clearing
- Waste road material from removal of road and footpath pavements
- General construction litter
- Waste oils and other materials from the maintenance of construction machinery may also be produced.

Construction works are unlikely to require significant bulk earthworks and therefore significant volumes of excess spoil are not anticipated.

Operation

No additional operational waste is expected to be generated above the existing waste levels.

6.7.4 Safeguards and management measures

Table 6-13 identifies safeguards and management measures that would be implemented to assess potential impacts of the proposal on waste management.

Table 6-13 Safeguards and management measures for waste management

No.	Impact	Environmental safeguards	Responsibility	Timing
WM1	Waste material including green waste, construction waste and general litter will be generated during construction.	<ul style="list-style-type: none"> • A Waste Management Plan will be prepared and implemented as part of the CEMP. The Plan will outline: <ul style="list-style-type: none"> ○ Measures and controls to minimise waste generation. ○ Lawful handling and disposal of unavoidable waste. • The Plan will be prepared in accordance with the RMS Environmental Procedure - Management of Wastes on Roads and <i>Maritime Services Land, the Waste Classification Guidelines</i> (DECC, 2009a) and relevant RMS Waste Fact Sheets. 	Project manager	Pre-construction
WM2	General domestic waste is expected to be generated during construction activities.	<ul style="list-style-type: none"> • General waste and recycling bins will be provided at the site compound for the duration of construction. • The works area will be maintained, kept free of rubbish and cleaned up at the end of each working day. 	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
WM3	Waste oils and other materials from the maintenance of construction machinery may be generated.	<ul style="list-style-type: none"> Refer to Safeguard WM1. Refer to Safeguard WQ1. 	Contractor Project manager	Construction Pre-construction

6.8 Land use

The proposal is located in the Penrith City Council LGA. The land comprising the subject area is zoned SP2 – Infrastructure, R3 – Medium Density Residential, R4 – High Density Residential, and B4 – Mixed Use. Road development is permissible with consent within all of these land zones. Zone objectives are provided in **Table 4-1**.

6.8.1 Potential impacts

Minor impacts are anticipated as part of this proposal. Although the proposal would remain predominantly within the road corridor, some land acquisition would be required as outlined in **Table 6-14**.

Table 6-14 Property impacts

Intersection	Full acquisition	Partial acquisition
The Northern Road / Great Western Highway	0	0
The Northern Road / Derby Street	0	4

6.8.2 Safeguards and management measures

Table 6-15 identifies safeguards and management measures that would be implemented to assess potential impacts of the proposal on land use.

Table 6-15 Safeguards and management measures for land use

No.	Impact	Environmental safeguards	Responsibility	Timing
LU1	Partial property acquisition is proposed for 4 properties	<ul style="list-style-type: none"> Property acquisition would be managed in accordance with the provisions of the Road and Maritime Services' <i>Land Acquisition Policy</i> and the <i>Land Acquisition (Just Terms Compensation) Act 1991</i>. 	Penrith City Council	Pre-construction

6.9 Socio-economic

6.9.1 Existing environment

The proposal is located in the Penrith City LGA in Western Sydney. In 2011, the Penrith LGA had a population of 178,467 people. Between 2001 and 2006 population in the LGA did not increase substantially, however between 2006 and 2011 increased by approximately 6,300 people, and the current population is now estimated at over 194,000. Penrith LGA is generally characterised by young families with children, dependent on access to employment, community and recreational facilities (ABS, 2015).

The Western Sydney Employment Area (WSEA) is situated in the south of the LGA, and currently enables businesses to use land for purposes such as transport and logistics, warehousing and office space. The WSEA is proposed to be expanded and is expected to provide over 300,000 jobs over the long term (DP&E, 2014).

The Nepean Hospital (public and private) is located on the corner of The Northern Road / Great Western Highway intersection. Due to the proximity to the hospital, businesses in the area are primarily healthcare related, e.g. doctors and surgeons.

6.9.2 Potential impacts

Construction

The community has the potential to be affected through the introduction of construction traffic, noise, decreased visual amenity and air quality impacts. These impacts would be temporary and are addressed in **Section 6.4**, **Section 6.5**, **Section 6.12**, and **Section 6.12** respectively. These have the potential to affect sensitive receivers such as local residents and schools in the vicinity of the intersections.

Operation

It is anticipated that access to businesses would not be substantially negatively impacted by the proposed works, due to the nature and scale of the works. The removal of on-street car parking at some intersections would be required as part of the works which may impact local businesses and residences (refer **Section 6.4**). All businesses and residences likely to be affected by the proposed works must be notified at least five working days prior to the commencement of the proposed activities.

The existing bus zone on Derby Street eastbound is to be relocated east of the pedestrian crossing east of the roundabout in the Derby Street so it is closer to the hospital access.

This proposal for two intersection upgrades in the vicinity of The Northern Road forms a part of the wider The Northern Road upgrade being undertaken by Roads and Maritime. The wider project will provide a range of benefits, and the intersection upgrades will help to facilitate these, including:

- Increased capacity to cater for future population growth in the area
- Improved safety for motorists by building turning lanes at intersections and installing traffic calming devices
- Improved safety for pedestrians
- Improved travel times and capacity to accommodate future development needs
- Access to future South West Growth Centre precincts along The Northern Road
- Improved access and travel times for road freight in Sydney's south west.

While the proposal has been designed to minimise the impact to existing properties along The Northern Road and associated streets, some residences would require partial acquisition for the proposal. Partial acquisition of properties would be required to meet the project objectives and is outlined in **Section 6.8**.

6.9.3 Safeguards and management measures

Table 6-16 identifies safeguards and management measures that would be implemented to assess potential impacts of the proposal on socio-economic factors.

Table 6-16 Safeguards and management measures for socio-economic factors

No.	Impact	Environmental safeguards	Responsibility	Timing
SE1	Local businesses may experience loss of patronage due to construction works and removal of on-street parking	<ul style="list-style-type: none"> Refer to safeguard T5 	Project Manager	Pre-construction

6.10 Aboriginal heritage

6.10.1 Existing environment

The Darug people are the traditional owners of the land in the Penrith LGA. A search of the Aboriginal Heritage Information Management System (AHIMS) database was completed on 16 April 2015 and revised on 20 December 2016. The AHIMS search did not indicate moderate to high concentrations of aboriginal objects or places in the study area. The closest recorded AHIMS site (artefact – isolated find) is located more than 500m from any of the proposed intersection upgrade works the proposal. No native title exists in the study area.

6.10.2 Potential impacts

A preliminary assessment of the proposal based on Stage 1 of the Procedure for Aboriginal cultural heritage consultation and investigation (the procedure). The project was assessed as being unlikely to have an impact on Aboriginal cultural heritage and therefore the proposal was not required to progress to Stage 2.

The heritage clearance letter is located in **Appendix E**.

Construction

The proposal is unlikely to have any construction impacts on Aboriginal cultural heritage in the study area, however, there is the potential for unexpected and previously unknown Aboriginal cultural objects to be discovered during the course of the development.

Operation

No impacts on Aboriginal heritage are expected following construction.

6.10.3 Safeguards and management measures

Table 6-17 identifies safeguards and management measures that would be implemented to assess potential impacts of the proposal on Aboriginal cultural heritage.

Table 6-17 Safeguards and management measures for Aboriginal cultural heritage

No.	Impact	Environmental safeguards	Responsibility	Timing
AH1	Previously unidentified Aboriginal sites may be uncovered during construction.	If any suspected heritage sites or relics are uncovered during the works, construction must cease Roads and Maritime must be notified and the Roads and Maritime <i>Unexpected Archaeological Finds Procedure</i> must be followed. If any skeletal	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		material is uncovered, works must cease immediately and Roads and Maritime, OEH and NSW Police must be notified.		

6.11 Non-Aboriginal heritage

6.11.1 Existing environment

The town of Penrith became considerably populated in the 1860s, following the construction of the western Sydney railway line. The town experienced further population growth during the 1940s with the establishment of several military depots in the area. Rapid expansion then took place in the 1970s with considerable residential housing being built at that time. Penrith has continued to grow since then and now represents the central business district for the Hawkesbury Valley and Blue Mountains areas (Stralia Web 2015).

A search of the Australian Heritage Database (AUSHD) and the State Heritage Register (SHR) for the suburbs of Penrith and Kingswood was undertaken in December 2016 with no heritage being recorded within the vicinity of the proposal.

Two locally significant heritage areas listed on the Penrith LEP were found to be located in close proximity to the proposal. These are shown on

Figure 6-3 and comprise:

- Kelvin Brae Federation Square – 141 High Street, Penrith
- Weatherboard Cottage, 71 Parker Street, Penrith.



6.11.2 Potential impacts

Construction

The locally significant heritage places would not be directly affected by the proposal. Similarly, indirect effects are not anticipated due to the nature and scale of the works.

Although the works are located within an urban and highly disturbed environment, there is still a chance that construction activities may uncover or disturb previously unknown items of non-Aboriginal heritage, although this is considered unlikely.

Operation

No impacts on heritage items are expected following construction.

6.11.3 Safeguards and management measures

Table 6-18 identifies safeguards and management measures that would be implemented to assess potential impacts of the proposal on utilities.

Table 6-18 Safeguards and management measures for non-Aboriginal cultural heritage

No.	Impact	Environmental safeguards	Responsibility	Timing
H1	Unexpected and previously unidentified archaeological relics may be uncovered during construction.	Refer to Safeguard AH1.	Contractor	Construction

6.12 Visual amenity and landscape character

6.12.1 Existing environment

The intersections are situated in a developed landscape comprising predominantly residential and some commercial and special land uses such as the Nepean Hospital. The visual landscape is representative of suburban development on a busy road, with highly modified landscape features being the road corridor and low to medium-density residential development.

The typical landscape character throughout the proposal study area is shown in **Figure 6-4**.

A locally significant scenic protection area is located to the north of the Great Western Highway at the intersection with The Northern Road (refer

Figure 6-3).



Intersection of The Northern Road and Great Western Highway, looking north-west



View west along Derby Street at intersection with The Northern Road

Visual Landscape
 THE NORTHERN ROAD PENRITH
 REVIEW OF ENVIRONMENTAL FACTORS
FIGURE 6-4



Map Produced by NSWACT (2304)
 Date: 2016-12-19
 Coordinate System: GDA 1994 MGA Zone 56
 Project: 80015058
 Map: 80015058_GS_007_Figure6-4a_VisualLandscape.mxd 02

6.12.2 Potential impacts

Construction

The proposed works are likely to result in minor short term visual impacts during the construction phase due to the use of construction equipment, stockpiles and the generation of waste at the site. These impacts may be experienced when viewing the proposal from roads, footpaths and from residences in the vicinity.

Operation

The visual character of the area is not anticipated to be particularly susceptible to the proposed works, and once construction is complete, only minimal visual changes are anticipated compared to the existing visual landscape. The loss of some trees in the vicinity of the proposal may generate a more open visual landscape at a very local scale. Overall, impacts on the landscape and visual amenity are considered to be negligible. Impacts on the scenic protection area are not anticipated as the proposed intersection upgrade at The Northern Road / Great Western Highway is located beyond the extent of the scenic protection area.

6.12.3 Safeguards and management measures

Table 6-19 identifies safeguards and management measures that would be implemented to assess potential impacts of the proposal on visual amenity and landscape character.

Table 6-19 Safeguards and management measures for visual amenity

No.	Impact	Environmental safeguards	Responsibility	Timing
V1	Some minor short term visual impacts would result from the proposed works due to disturbed areas, site fencing, machinery and equipment working on roads in the study area.	<ul style="list-style-type: none">Clutter and materials at the worksite should be minimised where possible.Refer to Safeguard T1.	Contractor	Construction
V2	Loss of some trees may generate an operational visual landscape impact.	<ul style="list-style-type: none">Existing trees would be retained in the road corridor where feasible. This would be undertaken by identifying 'no go areas' to restrict access around trees not affected by the proposal and making minor adjustments to the horizontal and vertical carriageways to move them clear of root zones.	Contractor	Construction

6.13 Climate and air quality

6.13.1 Existing environment

The closest Bureau of Meteorology (BOM) automatic weather station (AWS) to the site that records daily rainfall and temperature data is Orchard Hills Treatment Works (station number 067084). BOM (2016) climate statistics indicate that average daily maximum temperatures in this location range from 17.2°C in July to 28.5°C in

December, whilst average daily minimum temperatures range from 5.3°C in July to 17.4°C in February. The wettest period for the area is between January and March, with the highest average monthly rainfall recorded in February (111.1mm). The driest period of the year on average is in July and September, with the lowest average monthly rainfall recorded in September (35.3mm).

The area surrounding the site of proposed works is predominantly residential land. A search of air quality data for the monitoring station at St Marys within the last 10 years (EPA 2016d) indicates that average yearly pollutant levels are relatively compliant with recommended levels, although exceedances were observed for ozone and particulates (PM₁₀) across the 10 year time frame. The most prevalent exceedances were recorded in 2009 for ozone (18 times) and PM₁₀ (9 times).

6.13.2 Criteria

The National Environment Protection (Ambient Air Quality) Measure (NEPM) (2003) provides the maximum concentration standards for pollutants and these are identified in **Table 6-20**.

Table 6-20 NEPM maximum concentration standards for pollutants

Pollutant	Averaging period	Maximum concentration
Nitrogen dioxide	1 hour	0.12 ppm
	1 year	0.03 ppm
Photochemical oxidants (as ozone)	1 hour	0.10 ppm
	4 hours	0.08 ppm
Sulfur dioxide	1 hour	0.20 ppm
	1 day	0.08 ppm
	1 year	0.02 ppm
Particles as PM ₁₀	1 day	50 µg/m ³

6.13.3 Potential impacts

Construction

The proposed works are not anticipated to significantly affect the climate or air quality within the local surrounds or the wider area. However, there is some potential for a small increase in construction dust associated with the removal of trees and vegetation during construction. Given the scope of the proposed works, any dust is anticipated to be restricted to a localised area, which is likely to include the work site itself.

During the construction phase of the proposed works, a slight increase in the number and frequency of heavy vehicles along key roads in the area may be expected as construction vehicles make their way to and from the site. Consequently, a short-term and negligible increase in local exhaust emissions may occur during the construction period.

Operation

No adverse air quality impacts above existing levels are expected to result from the proposal during operation.

6.13.4 Safeguards and management measures

Table 6-21 identifies safeguards and management measures that would be implemented to assess potential impacts of the proposal on utilities.

Table 6-21 Safeguards and management measures for climate and air quality

No.	Impact	Environmental safeguards	Responsibility	Timing
AQ1	Emission of particulate matter during the construction phase from several potential sources, including: <ul style="list-style-type: none"> Uncovered loads of materials during transportation. Unloading materials from trucks and placement. Construction and demolition activity. Stockpiles (if any) during dry and windy conditions. 	<ul style="list-style-type: none"> Works are not to be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely. Vegetation or other materials are not to be burnt on site. Vehicles transporting waste or other materials that may produce odours or dust are to be covered during transportation. Measures (including watering or covering exposed areas) are to be used to minimise or prevent air pollution and dust. Stockpiles or areas that may generate dust are to be managed to suppress dust emissions in accordance with the <i>RMS Stockpile Site Management Guideline</i>. 	Contractor	Construction
		<ul style="list-style-type: none"> Complaints received are to be recorded and attended to promptly in accordance with the <i>RMS Community Involvement Practice Notes and Resource Manual</i>. 	Contractor and Project manager	Construction
AQ2	Increased number of vehicles along key roads in the area may impact on local air quality due to exhaust emissions.	<ul style="list-style-type: none"> Plant and equipment will be maintained regularly, with records kept and provided on request Engines will not be left idling unnecessarily. 	Contractor	Construction

6.14 Cumulative impacts

6.14.1 Existing environment

There is a requirement under Clause 228(2) of the EP&A Regulation to take into account any cumulative environmental impacts of the proposed works with other existing or planned future activities. Cumulative impacts have the potential to arise from the interaction of individual components within the proposed site and the effects of the proposal with other projects in the local area.

A review of the Department of Planning Major Projects Register on 20 December 2016 returned the following results for the Penrith LGA:

- 126 Andrews Road, Penrith
- 521 The Nothern Road, Londonderry and 108 Mulgrave Road, Mulgrave
- 585-649 Mamre Road

- Altis Bulky Retail
- Bluescope Steel Paintline Western Sydney Service Centre - Penrith LGA
- Coles Myer National Distribution Centre
- Concept Plan for mixed use development at 164 Station Street Penrith
- Corner of Parker Street and Barber Avenue
- DA 497-12-2003 – New Assembly Hall
- Erskine Park Link Road Network
- Erskine Park Waste and Resource Management Facility
- Goodman Interlink Industrial Estate
- GPT Warehouse and Distribution Centre - Erskine Park
- Hookit Liquid Waste Recycling Facility
- Interlink Industrial Estate
- Jacfin Horsley Park Project
- Jacfin Warehousing Facility
- Kemps Creek Landfill (Suez Environment)
- Kemps Creek Logistics Project
- Kemps Creek Resource Recovery Facility
- Klekies Waste Oil Facility - St Marys
- Lot 62 Erskine Park Warehouse (formerly PacLib Erskine Park)
- Mulgoa, Wallacia and Silverdale Sewerage Scheme
- Murray Goulburn Milk Processing Facility
- No Fuss Waste Water Treatment Plant
- North Penrith Defence Site
- North West Growth Centre
- Oakdale South Industrial Estate
- Oakdale West Industrial Estate
- Orchard Hills Waste Project
- Penrith Health Campus
- Penrith Lakes Scheme
- Penrith Waste Recycling and Transfer Facility
- Reckitt Benckiser
- Smorgon Steel St Marys
- St Marys Intermodal Site
- St Marys Resource Recovery Facility
- Sydney International Regatta Centre
- Templar Road, Erskine Park Retail Ready Meat Facility
- The Northern Road Upgrade – Glenmore Park to Bringelly
- TNT Lockwood Road, Erskine Park
- Wallacia Sewerage Scheme
- Western Sydney Recycled Water Initiative - Replacement Flows Project
- WestPark Industrial Estate
- Woolworths Erskine Park
- Voluntary Planning Agreement – Sydney Science Park.

In addition to the major projects identified above, a variety of local and regional development may occur in the vicinity of the proposed works.

6.14.2 Potential impacts

Cumulative impacts such as increased traffic and noise and local impacts to air quality may occur as a result of the combined impacts of projects in the vicinity.

Construction

This proposal forms part of the wider The Northern Road safety improvement

program of works. Construction on The Northern Road – Stage 1 is anticipated to commence in late 2015 and additional improvement works along the road are in planning.

Due to both the scale and spatial location of the proposed The Northern Road intersection upgrade works that are the subject of this REF, it is unlikely that there would be any significant cumulative impact. However, potential cumulative impacts may include:

- Additional traffic impacts as a result of multiple construction projects. This may increase traffic and travel times, however, due to proposal staging and individual traffic management at the project level, impacts are anticipated to be minimal
- Noise, vibration and air quality impacts associated with each of the proposals are expected to be managed at project level through appropriate noise, vibration and air quality mitigation measures. Due to the distance between the proposals and proposal staging, impacts are anticipated to be minimal
- Multiple projects have the potential to increase the area of ecological disturbance.

Operation

As part of The Northern Road upgrade program, this proposal would contribute to the overall safety of the road network across Western Sydney.

6.14.3 Safeguards and management measures

Table 6-22 identifies safeguards and management measures that would be implemented to assess potential impacts of the proposal on utilities.

Table 6-22 Safeguards and management measures for cumulative impacts

No.	Impact	Environmental safeguards	Responsibility	Timing
C1	Cumulative traffic, noise and biodiversity impacts.	The construction schedule is to be developed in conjunction with other planned construction and maintenance programs for The Northern Road to minimise potential cumulative impacts.	Roads and Maritime Penrith City Council	Detailed design and pre-construction

6.15 Summary of beneficial effects

The beneficial effects of the proposal would occur once construction is completed. These would include:

- Improved safety for motorists and pedestrians
- Reduction in travel times along The Northern Road for motorists.

6.16 Summary of adverse effects

The adverse impacts of the proposal would generally be short term (during construction) with only limited long term impacts. Short term impacts would include:

- Disruptions to traffic and limited closure of road lanes
- Noise, dust generation, increased risk of spills and contamination, and erosion and sedimentation
- Impacts on visual amenity from the clearing of vegetation stockpiles and the generation of wastes.

In the context of the project long term impacts are considered negligible and include removal of vegetation, removal of on-street parking and partial land acquisition.

7 Environmental management

This section describes how the proposal will be managed to reduce potential environmental impacts throughout detailed design, 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. A summary of site-specific environmental safeguards is provided as detailed in **Section 6** and the licence and/or approval requirements required prior to construction are also listed.

7.1 Environmental management plans (or system)

A number of safeguards and management measures have been identified in order to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the proposal. Should the proposal proceed, these management measures would be incorporated into the detailed design and applied during the construction and operation of the proposal.

A Project Environmental Management Plan (PEMP) and a Contractors Environmental Management Plan (CEMP) will be prepared to describe safeguards and management measures identified. These plans will provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation.

The plans will be prepared prior to construction of the proposal and must be reviewed and certified by the Roads and Maritime Environment Officer, Sydney Region, prior to the commencement of any on-site works. The CEMP will be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP and PEMP would be developed in accordance with the specifications set out in the

- QA Specification G36 – Environmental Protection (Management System)
- QA Specification G38 – Soil and Water Management (Soil and Water Plan)
- QA Specification G40 – Clearing and Grubbing].

7.2 Summary of safeguards and management measures

Environmental safeguards outlined in this document would be incorporated into the detailed design phase of the proposal and during construction and operation of the proposal, should it proceed. These safeguards would minimise any potential adverse impacts arising from the proposed works on the surrounding environment. The safeguards and management measures are summarised in **Table 7-1**.

Table 7-1 Summary of site specific environmental safeguards

No.	Impact	Environmental safeguards	Responsibility	Timing
General				
G1	General	<ul style="list-style-type: none"> All environmental safeguards must be incorporated within the following: <ul style="list-style-type: none"> Project Environmental Management Plan Detailed design stage Contract specifications for the proposal Contractor's Environmental Management Plan 	Project manager	Pre-construction
G2	General	<ul style="list-style-type: none"> A risk assessment must be carried out on the proposal in accordance with the Roads and Maritime Services Project Pack and PMS risk assessment procedures to determine an audit and inspection program for the works. The recommendations of the risk assessment are to be implemented. A review of the risk assessment must be undertaken after the initial audit or inspection to evaluate if the level of risk chosen for the project is appropriate. Any works resulting from the proposal and as covered by the REF may be subject to environmental audit(s) and/or inspection(s) at any time during their duration. 	Project manager and regional environmental staff	Pre-construction After first audit
G3	General	<ul style="list-style-type: none"> The environmental contract specification must be forwarded to the Roads and Maritime Services Environment Manager Sydney Region for review at least 10 working days prior to the tender stage. A contractual hold point must be maintained until the CEMP is reviewed by the Roads and Maritime 	Project manager	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		Services Environment Manager, Sydney Region..		
G4	General	<ul style="list-style-type: none"> The Roads and Maritime Services Project Manager must notify the Roads and Maritime Services Environmental Officer, Sydney Region, at least five working days prior to work commencing. 	Project manager	Pre-construction
G5	General	<ul style="list-style-type: none"> All businesses and residences likely to be affected by the proposed works must be notified at least five working days prior to the commencement of the proposed activities. 	Project manager	Pre-construction
G6	General	<ul style="list-style-type: none"> Environmental awareness training must be provided, by the contractor, to all field personnel and subcontractors. 	Contractor	Pre-construction and during construction as required.
Biodiversity				
BD1	Clearance of habitat and direct loss/mortality of flora and fauna	<ul style="list-style-type: none"> Vegetation removal would be restricted to only those areas identified as being necessary for the intersection works. Prior to the commencement of works a physical vegetation clearing boundary is to be demarcated and implemented to prevent accidental over clearing in areas where there is considered a risk of accidental damage occurring. The location of site compounds would take existing vegetation into consideration. Staff are to be made aware, prior to the commencement of the construction works, of their environmental responsibilities including vegetation clearing 	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		<p>boundaries, working in proximity to native vegetation, potential presence of fauna and other environmental matters related to the project.</p> <ul style="list-style-type: none"> • As part of the proposed works a suitably qualified ecologist and animal handler is to be present on site for the removal of the trees. • All trees should be inspected for the presence of hollows or fauna species prior to removal or trimming. • If any animals are injured during the course of the works, in particular threatened or native species, the NSW Wildlife Information, Rescue and Education Service (WIRES) should be contacted immediately. • If unexpected threatened fauna or flora species are discovered onsite, stop works in that area until an approved management plan for the species has been implemented. 		
BD2	Reduced vegetated connectivity along road verges	<ul style="list-style-type: none"> • Revegetation works would be completed as soon as practicable to a suitable condition, in keeping with adjacent verge areas. 	Contractor	Construction
BD3	Introduction and/or spread of noxious weeds and other invasive species	<ul style="list-style-type: none"> • Declared noxious weeds are to be managed according to requirements under the <i>Noxious Weeds Act 1993</i>. 	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		<ul style="list-style-type: none"> ○ Minimise the amount of material transported from site to surrounding pavement surfaces. ○ Divert clean water around the site. (in accordance with the Landcom/Department of Housing <i>Managing Urban Stormwater, Soils and Construction Guidelines</i> (the Blue Book)).		
S2	Erosion or pollution could occur due to lack of adequate maintenance of erosion and sediment control and pollution control devices.	<ul style="list-style-type: none"> • 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. 	Contractor	Construction
S3	Construction activities have the potential to disturb contaminated lands or contaminating materials.	<ul style="list-style-type: none"> • If contaminated material is encountered during construction, the material must be managed and disposed of lawfully. 	Contractor	Construction
Traffic and access				
T1	Increased heavy vehicle traffic and light vehicle traffic	<ul style="list-style-type: none"> • A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the Roads and Maritime <i>Traffic Control at Work Sites Manual</i> and the worksite manual Roads and Maritime Services 	Project manager	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		Specification G10. The TMP must restrict vehicle movements and parking to approved project areas, and manage speed limits on all roads near the work.		
T2	Potential impacts on emergency access to and from the Nepean Hospital	<ul style="list-style-type: none"> Ensure that there is adequate accessibility for emergency vehicles to and from the hospital. This should be addressed in the TMP for the proposal. 	Project manager	Pre-construction
T3	Temporary speed limitations may increase travel times	<ul style="list-style-type: none"> Refer to Safeguard T1. 	Project manager	Construction
T4	Temporary closure of roads	<ul style="list-style-type: none"> Road and lane closures would be limited to times when work is taking place on sections that cannot otherwise be avoided. The TMP will include measures that minimise traffic disruptions to the road network during peak periods, such as undertaking work outside of standard hours. 	Contractor	Construction
T5	Loss of on-street parking may impact businesses and residences	<ul style="list-style-type: none"> A community consultation plan would be prepared to allow consultation with the residences and businesses. This plan should identify how residences would be advised about loss of on-street parking and to provide a procedure for managing concerns or complaints raised by the community. 	Project manager	Pre-construction
Noise and vibration				
N1	Increased noise levels as a result of construction	<ul style="list-style-type: none"> Noisy work activities would be conducted in accordance with the ICNG (DECC, 2009). The construction contractor would be required to 	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
	activities.	<p>implement all practicable noise control measures including:</p> <ul style="list-style-type: none"> ○ Scheduling the noisiest construction activities and the use of vibration causing equipment at the least sensitive times ○ Keeping noise and vibration generating equipment well maintained; and ○ Selecting and maintaining equipment and plant in a manner which minimises noise and vibration emissions. <ul style="list-style-type: none"> • A community consultation plan would be prepared to allow consultation with the neighbouring residences and other sensitive land uses. This plan should identify how residences will be advised of noisy activities and works outside of standard hours and provide a procedure for managing concerns or complaints raised by the community. • Ensure any required out-of-hours work complies with the requirements of G36 Environmental Protection (Roads and Maritime, 2014) relating to community notification requirements. • Any required night time work predicted to be excessively exceed background noise levels should aim to not affect residences for more than two consecutive nights or where possible, more than six nights over a one month period. 		
Utilities				
U1	Potential damage	<ul style="list-style-type: none"> • Prior to the commencement of works the location of 	Project manager	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
	may occur to utilities and services not identified in the DBYD search.	<ul style="list-style-type: none"> existing utilities would be confirmed. A Hazard and Risk Management Plan would be prepared and implemented as part of the CEMP. The Plan will identify working around existing utilities as a site hazard. Refer to Safeguard WQ1. 	Contractor	Construction
Waste Management				
WM1	Waste material including green waste, construction waste and general litter will be generated during construction.	<ul style="list-style-type: none"> A Waste Management Plan will be prepared and implemented as part of the CEMP. The Plan will outline: <ul style="list-style-type: none"> Measures and controls to minimise waste generation. Lawful handling and disposal of unavoidable waste. The Plan will be prepared in accordance with the RMS Environmental Procedure - Management of Wastes on Roads and <i>Maritime Services Land, the Waste Classification Guidelines</i> (DECC, 2009a) and relevant RMS Waste Fact Sheets. 	Project manager	Pre-construction
WM2	General domestic waste is expected to be generated during construction activities.	<ul style="list-style-type: none"> General waste and recycling bins will be provided at the site compound for the duration of construction. The works area will be maintained, kept free of rubbish and cleaned up at the end of each working day. 	Contractor	Construction
WM3	Waste oils and other materials from the	<ul style="list-style-type: none"> Refer to Safeguard WM1. Refer to Safeguard WQ1. 	Contractor Project manager	Construction Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
	maintenance of construction machinery may be generated.			
Land use				
LU1	Partial property acquisition is proposed for 4 properties	<ul style="list-style-type: none"> Property acquisition would be managed in accordance with the provisions of the Road and Maritime Services' <i>Land Acquisition Policy</i> and the <i>Land Acquisition (Just Terms Compensation) Act 1991</i>. 	Penrith City Council	Pre-construction
Socio-economic				
SE1	Local businesses may experience loss of patronage due to construction works and removal of on-street parking	<ul style="list-style-type: none"> Refer to safeguard T5 	Project Manager	Pre-construction
Aboriginal heritage				
AH1	Previously unidentified Aboriginal sites may be uncovered during construction.	<ul style="list-style-type: none"> If any suspected heritage sites or relics are uncovered during the works, construction must cease Roads and Maritime must be notified and the Roads and Maritime <i>Unexpected Archaeological Finds Procedure</i> must be followed. If any skeletal material is uncovered, works must cease immediately and Roads and Maritime, OEH and NSW Police must be notified. 	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
Non-Aboriginal heritage				
H1	Unexpected and previously unidentified archaeological relics may be uncovered during construction.	<ul style="list-style-type: none"> Refer to Safeguard AH1. 	Contractor	Construction
Visual amenity				
V1	Some minor short term visual impacts would result from the proposed works due to disturbed areas, site fencing, machinery and equipment working on roads in the study area.	<ul style="list-style-type: none"> Clutter and materials at the worksite should be minimised where possible. Refer to Safeguard T1. 	Contractor	Construction
V2	Loss of some trees may generate an operational visual landscape impact.	<ul style="list-style-type: none"> Existing trees would be retained in the road corridor where feasible. This would be undertaken by identifying 'no go areas' to restrict access around trees not affected by the proposal and making minor adjustments to the horizontal and vertical carriageways to move them clear of root zones. 	Contractor	Construction
Climate and air quality				

No.	Impact	Environmental safeguards	Responsibility	Timing
Cumulative impacts				
C1	Cumulative traffic, noise and biodiversity impacts.	<ul style="list-style-type: none"> The construction schedule is to be developed in conjunction with other planned construction and maintenance programs for The Northern Road to minimise potential cumulative impacts. 	Roads and Maritime Penrith City Council	Detailed design and pre-construction

7.3 Licensing and approvals

The licences and approvals required for the proposal are listed in **Table 7-2**.

Table 7-2 Summary of licensing and approvals required

Requirement	Timing
In accordance with Section 138 of the <i>Roads Act 1993</i> , concurrence of Roads and Maritime is required for the proposal.	Before start of construction within the road reserve.

8 Conclusion

This section provides the justification for the proposal taking into account its biophysical, social and economic impacts, the suitability of the site and whether or not the proposal is in the public interest. The proposal is also considered in the context of the objectives of the EP&A Act, including the principles of ecologically sustainable development as defined in Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*.

8.1 Justification

Western Sydney is Australia's third largest economy and in its own right would be Australia's fourth largest city. During the next 20 years the region is expected to grow from two million to three million people. In order to accommodate the forecasted population and economic growth in the Penrith Local Government Area (LGA), improvements are required in terms of traffic flow, road safety, road network efficiency and travel time particularly along key regional link roads which promote greater integration and access between residential, commercial and transport centres.

Based on the modelling undertaken by Jacobs (2015) three intersections in the study area (Northern Road / Great Western Highway, The Northern Road / Derby Street, and The Northern Road / Jamison Road) were found to operate at an unsatisfactorily level of service for both the both the AM and PM peak periods. In addition, outputs from the Strategic Traffic Assignment Model (STAM) for the study area (provided by Roads and Maritime) indicate that all intersections in the study area are anticipated to have growth rates of between 1.2 and 2.1% per annum in coming years.

The do-nothing option will not achieve the proposal objectives of improving road safety and traffic flow. Council has considered the need for the proposal against its potential benefits and impacts, and it is considered that the beneficial outcomes outweigh the potential negative outcomes, provided adequate mitigation is implemented.

8.2 Objects of the EP&A Act

Object	Comment
5(a)(i) To encourage the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment.	<p>The proposal design, impact mitigation and management measures detailed in this REF allow for the proper management, development and conservation of natural and artificial resources. The main objective of the proposal is to provide improve the road safety and traffic flow in the vicinity of The Northern Road, Penrith in order to support the urban development occurring in Western Sydney over coming years.</p> <p>Where possible throughout the design of the proposal, management and conservation of natural resources has been incorporated. This has included optimising the balance between cut and fill, minimising the need to import additional natural resources and minimising vegetation removal as far as possible to reduce the potential impact on the natural environment.</p>
5(a)(ii) To encourage the promotion and co-	As a result of the increasing population and

Object	Comment
ordination of the orderly economic use and development of land.	employment growth and changes in land use in Western Sydney, road traffic flow efficiency and road user safety will continue to decline if adequate road and intersection capacity is not maintained. The proposed activity fits into the wider strategy for development in Western Sydney.
5(a)(iii) To encourage the protection, provision and co-ordination of communication and utility services.	Utility and communication services are not anticipated to be negatively impacted by the works.
5(a)(iv) To encourage the provision of land for public purposes.	The proposed development would be used operationally for public use.
5(a)(v) To encourage the provision and co-ordination of community services and facilities.	The proposal would improve safety for local motorists and those in the broader community.
5(a)(vi) To encourage the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats.	The proposal has been designed to minimise impacts on the environment, including threatened species, populations and ecological communities and their habitats.
5(a)(vii) To encourage ecologically sustainable development.	Ecologically sustainable development is considered in Sections 8.2.1 – 8.2.4 below.
5(a)(viii) To encourage the provision and maintenance of affordable housing.	Not relevant to the proposal.
5(b) To promote the sharing of the responsibility for environmental planning between different levels of government in the State.	Not relevant to the proposal.
5(c) To provide increased opportunity for public involvement and participation in environmental planning and assessment.	Community consultation plan is being developed for the proposal.

8.2.1 The precautionary principle

The assessment of the potential impacts of the proposal is considered to be consistent with the precautionary principle. The detailed environmental investigations carried out for this REF have been consistent with accepted scientific and assessment methodologies. The investigations have identified a range of potential impacts associated with the construction and operation of the proposal. The evaluation and assessment of alternative options within the proposal have also aimed to reduce the risk of serious and irreversible impacts on the environment as a result of the proposal.

The proposal has sought to take a precautionary approach to minimising environmental impacts. This has been applied through the development of a range of environmental safeguards, as summarised in **Section 7**. These safeguards would be implemented during construction and operation of the proposal. In particular, the selected construction contractor would be required to prepare a PEMP and CEMP before starting construction. No mitigation measures or management mechanisms would be postponed as a result of a lack of information or scientific certainty.

8.2.2 Intergenerational equity

The proposal would benefit future generations by improving road safety. Implementation of the safeguards contained in this REF (refer **Section 7**) would ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

8.2.3 Conservation of biological diversity and ecological integrity

Conservation of biological diversity and ecological integrity has been considered during all stages of the proposal's development. Potential impacts have been avoided where possible, and safeguarded against or offset where necessary.

The biodiversity assessment (refer **Section 6.1**) concludes that the proposal would not have a significant impact on the existing ecological environment. Impacts would be minimised through the safeguards summarised in **Section 7**.

8.2.4 Improved valuation, pricing and incentive mechanisms

Environmental and social issues were considered in the strategic planning and establishment of the need for the proposal, and in consideration of various proposal options. The value placed on environmental resources is evident in the extent of the planning and environmental investigations, and in the design of the proposed mitigation measures and safeguards. Implementation of these mitigation measures and safeguards would result in an economic cost to Roads and Maritime, which would be included in the capital cost of the proposal.

8.3 Conclusion

The proposed upgrade of four intersections in the vicinity of The Northern Road, Penrith is subject to assessment under Part 5 of the EP&A Act. The REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity. This has included consideration of conservation agreements and plans of management under the NPW Act, joint management and biobanking agreements under the TSC Act, wilderness areas, critical habitat, impacts on threatened species, populations and ecological communities and their habitats and other protected fauna and native plants.

A number of potential environmental impacts from the proposal have been avoided or reduced during the concept design development and options assessment. The proposal as described in this REF best meets the project objectives but would still result in some impacts, namely vegetation removal, property acquisition and loss of on-street parking which may have some minor impacts on local businesses. Mitigation measures as detailed in this REF would ameliorate or minimise these expected impacts. The proposal would provide some positive impacts in terms of improved road safety and traffic flow, with reduce travel times. On balance the proposal is considered justified.

The environmental impacts of the proposal are not likely to be significant and therefore it is not necessary for an environmental impact statement to be prepared and approval to be sought for the proposal from the Minister for Planning under Part 5.1 of the EP&A Act. The proposal is unlikely to affect threatened species, populations or ecological communities or their habitats, within the meaning of the *Threatened Species Conservation Act 1995* or *Fisheries Management Act 1994* and therefore a Species Impact Statement is not required. Significant impacts on matters of NES under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) are not anticipated and accordingly, the proposal has not been referred to the Australian Government Department of the Environment.

Certification

This review of environmental factors provides a true and fair review of the proposal in relation to its potential 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 proposal.

Kevin Roberts
Section Leader - Environment
Cardno (NSW/ACT) Pty Ltd
Date:

I have examined this review of environmental factors and the certification by Kevin Roberts, Cardno and accept the review of environmental factors on behalf of Penrith City Council.

Ari Fernando
Project Manager
Penrith City Council
Date:

9 References

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Terms and acronyms used in this REF

AHIMS	Aboriginal Heritage Information Management System
ASS	acid sulphate soils
AUSHD	Australian Heritage Database
BOM	Bureau of Meteorology
CBD	Central Business District
CEMP	Construction environmental management plan
EPA	Environmental Protection Agency
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW). Provides the legislative framework for land use planning and development assessment in NSW
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
EPLs	Environment Protection Licences
ESD	Ecologically sustainable development. Development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased
Council	Penrith City Council
DIRD	Department of Infrastructure and Regional Development
FM Act	<i>Fisheries Management Act 1994</i> (NSW)
Heritage Act	<i>Heritage Act 1977</i> (NSW)
ICNG	<i>Interim Construction Noise Guideline</i>
ISEPP	State Environmental Planning Policy (Infrastructure) 2007
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act.
LGA	Local Government Area
LoS	Level of Service. A qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers.
NCG	Noise Criteria Guideline
NES	Matters of national environmental significance under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
Noxious Weeds Act	<i>Noxious Weeds Act 1993</i> (NSW)
NPW Act	<i>National Parks and Wildlife Act 1974</i> (NSW)
OEH	Office of Environment and Heritage

PACHCI	Procedure for Aboriginal cultural heritage consultation and investigation
PATHS	Penrith Accessible Trails Hierarchy Strategy
PMST	EPBC Act Protected Matters Search Tool
REF	review of environmental factors
RNP	Road Noise Policy
SEPP	State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act.
SHR	State Heritage Register
STAM	Strategic Traffic Assignment Model
SWGC	South West Growth Centre
TMP	Traffic Management Plan
TSC Act	<i>Threatened Species Conservation Act 1995</i> (NSW)
POEO Act	Protection of the Environment Operations Act 1997
WIRES	NSW Wildlife Information, Rescue and Education Service
WSEA	Western Sydney Employment Area
WSIP	Western Sydney Infrastructure Plan

Appendix A

Consideration of clause 228(2) factors and matters of national environmental significance

Clause 228(2) Checklist

In addition to the requirements of the *Is an EIS required?* guideline as detailed in 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.

Factor	Impact
<p>a. Any environmental impact on a community?</p> <p>Construction of the proposal would result in some short term negative impacts as a result of visual amenity impacts and traffic impacts. These impacts would be limited to community members around the proposal intersection upgrades.</p> <p>Potential visual amenity impacts would include the removal of vegetation along the road. Potential traffic impacts would include increased travel times during construction for a period of up to about 2 months.</p> <p>The long term positive impact would be improved road user safety, increased traffic flow efficiency and reduced travel times.</p>	<p>Negative, short term, minor</p> <p>Positive, long term, minor</p>
<p>b. Any transformation of a locality?</p> <p>Nil</p>	<p>Nil</p>
<p>c. Any environmental impact on the ecosystems of the locality?</p> <p>Clearing of up to 0.0502ha of vegetation including planted street trees.</p>	<p>Negative, long term, minor</p>
<p>d. Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?</p> <p>During construction, the proposal has the potential to reduce the aesthetic quality of the surrounding area. Construction impacts include dust and noise generation, visual impacts, and increased vehicle movements. The impacts would be limited as far as practicable through the implementation of safeguards summarised in Section 7.</p> <p>The proposal would result in a minor reduction in the overall aesthetic quality of the area as a result of the removal of vegetation. The removal of trees as a result of roadwork will be minimised where possible. It is expected that the aesthetic amenity will not be substantially reduced as landscaping is proposed.</p> <p>No recreational or scientific qualities are likely to be impacted by the proposal</p>	<p>Negative, short term, minor</p> <p>Negative, long term, minor</p>
<p>e. Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?</p> <p>No effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance is expected from this proposal.</p>	<p>Unlikely</p>
<p>f. Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)?</p> <p>Clearing of up to 0.050ha of vegetation including planted street trees.</p>	<p>Negative, long term, minor</p>

Factor	Impact
g. Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? The proposal is unlikely to further endanger any species of flora or fauna due to the limited extent of vegetation proposed to be removed.	Negative, long term, minor
h. Any long-term effects on the environment? Minor negative long term impacts are expected for visual impacts due to the removal of vegetation, loss of on-street parking and partial property acquisition. Long term positive impacts would include improved road user safety, increased traffic flow efficiency and reduced travel times.	Negative, long term, minor Positive, long term, minor
i. Any degradation of the quality of the environment? Minor negative long term impacts are expected for visual impacts due to the removal of vegetation, removal of on-street parking and partial land acquisition.	Negative, short/long term, minor
j. Any risk to the safety of the environment? Environmental management plans and work health and safety plans would be implemented during construction to minimise the risk to the safety of the environment.	Negative, short term, minor
k. Any reduction in the range of beneficial uses of the environment? The majority of the works are within the designated road reserve and would be consistent with the intended future uses of the area.	Nil
l. Any pollution of the environment? There is the potential for oil spills, increases in dust and vehicle emissions, noise and rubbish during construction activities which may impact water and air quality. Management of water quality and air quality impacts would be carried out in accordance with the safeguards summarised in Section 7 .	Negative, short term, minor
m. Any environmental problems associated with the disposal of waste? Significant or contaminated waste is not anticipated to be generated as a result of the proposal. Waste generated by the proposal would be recycled or reused as much as practicable. All materials that cannot be reused or recycled would be disposed of appropriately in accordance with the safeguards outlined in Section 7 .	Negative, short term, minor
n. Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply? The proposal would require resources such as concrete and steel, which are common construction materials. The proposal would not create any significant demand on these resources	Nil
o. Any cumulative environmental effect with other existing or likely future activities? This proposal forms part of the Western Sydney Infrastructure Plan (WSIP) and is part of the Local Roads Package. Long term positive impacts would include improved road user safety, increased traffic flow efficiency and reduced travel times. Potential cumulative effects may include impacts on traffic, noise, air quality and biodiversity. These are expected to be temporary and managed through construction staging and project specific controls.	Positive, long term, minor Negative, short term, minor
p. Any impact on coastal processes and coastal hazards, including those under projected climate change conditions? The proposal is not located in a coastal areas and will not impact coastal processes and coastal hazards.	Nil

Matters of National Environmental Significance

Under the environmental assessment provisions of the *Environment Protection and Biodiversity Conservation Act 1999*, the following matters of national environmental significance and impacts on Commonwealth land are required to be considered to assist in determining whether the proposal should be referred to the Australian Government Department of the Environment.

Factor	Impact
a. Any impact on a World Heritage property? The proposal would not have an impact on a World Heritage property.	Nil
b. Any impact on a National Heritage place? The proposal would not have an impact on a National Heritage place.	Nil
c. Any impact on a wetland of international importance? The proposal would not have an impact on a wetland or international importance.	Nil
d. Any impact on a listed threatened species or communities? The proposal would not have an impact on listed threatened species or communities.	Nil
e. Any impacts on listed migratory species? Migratory fauna have the potential to utilise the proposal area, however, field investigations found no evidence to suggest that the proposal area is a significant habitat area for migratory species.	Nil
d. Any impact on a Commonwealth marine area? The proposal would not have an impact on a Commonwealth marine area.	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 have an impact on Commonwealth land.	Nil

Appendix B

Concept Designs



Rev.	Date	Description	Des.	Verif.	Appd.
3	17.08.15	CONCEPT DESIGN	JP	DNA	RE
2	31.07.15	CONCEPT DESIGN	JP	DNA	RE
1	16.07.15	CONCEPT DESIGN	TM	DA	RE

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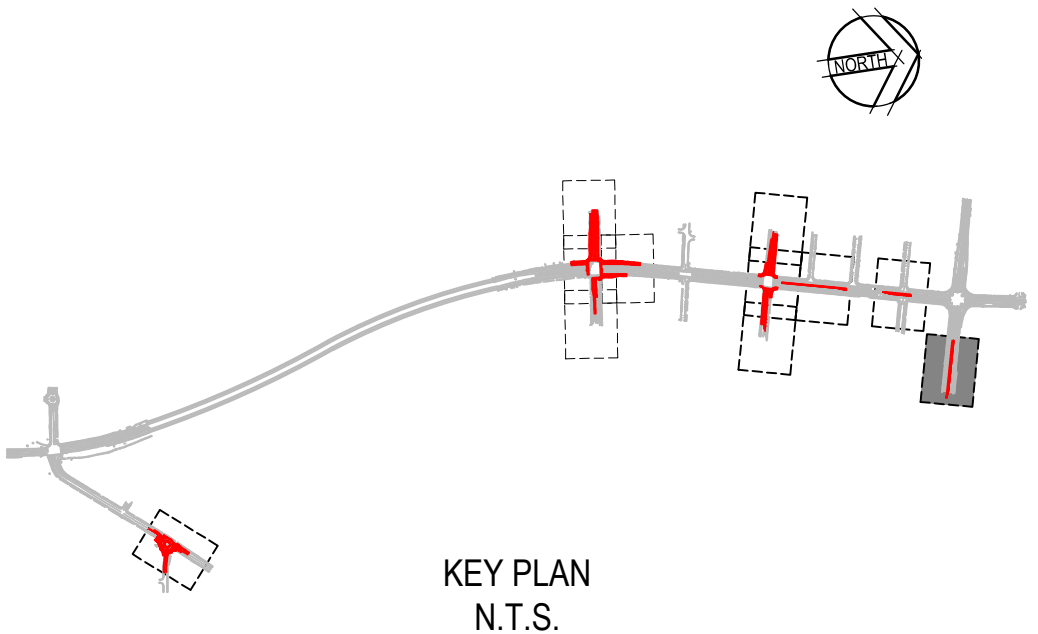
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Checked	D. Atkinson	Date	16.07.15
Designed	T. Mistry	Date	16.07.15
Verified	D. Atkinson	Date	16.07.15
Approved	R. Estrada	Date	16.07.15

Client	PENRITH CITY COUNCIL
Project	DIRD/RMS WSP LOCAL ROADS PACKAGE (ROUND 1) MAJOR INTERSECTIONS ON THE NORTHERN ROAD
Title	CONCEPT DESIGN GENERAL ARRANGEMENT THE NORTHERN RD / GREAT WESTERN HIGHWAY

Status				
PRELIMINARY				
NOT TO BE USED FOR CONSTRUCTION PURPOSES				
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Drawing Number				Revision
TNR-DRG-20-1000-RD-0051				3



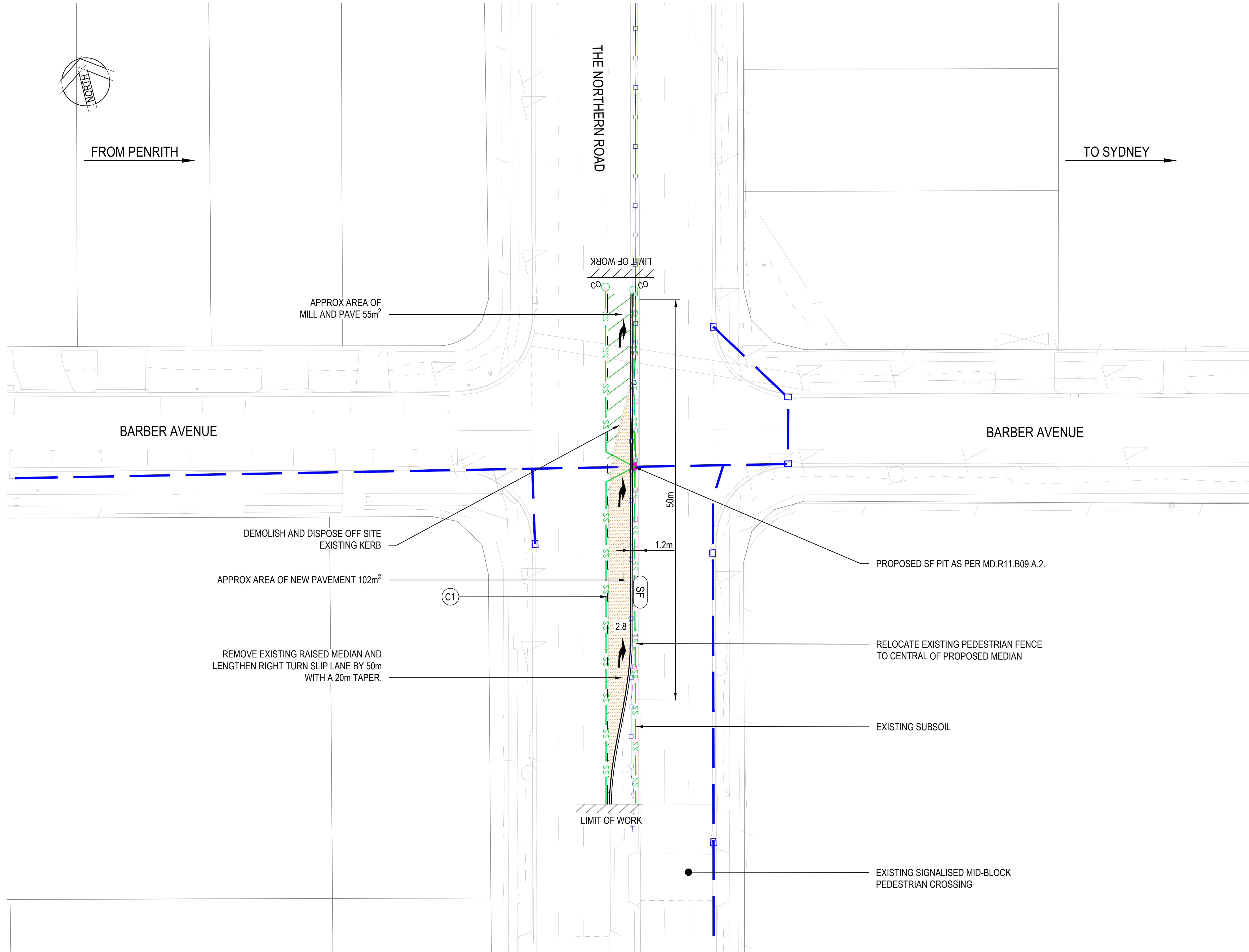
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Verified D. Atkinson	Date 16.07.15		<div><div>AHD</div><div>Register</div><div>Scale AS SHOWN</div><div>Size A1</div></div>		
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R. Estrada	16.07.15				

XREFs: TNR-XRF-00-0000-GN-STREET NAMES; TNR-XRF-00-0000-SU-SURVEY; TNR-XRF-00-0000-CADASTRAL; TNR-XRF-00-0000-GN-SHT-LAYOUT_A1_0250; TNR-XRF-20-1000-RD-DESIGN; TNR-XRF-20-0000-UT-DRAINAGE
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DATE PLOTTED: 18 August 2015 9:21 AM BY: JULIA PACHKOVA



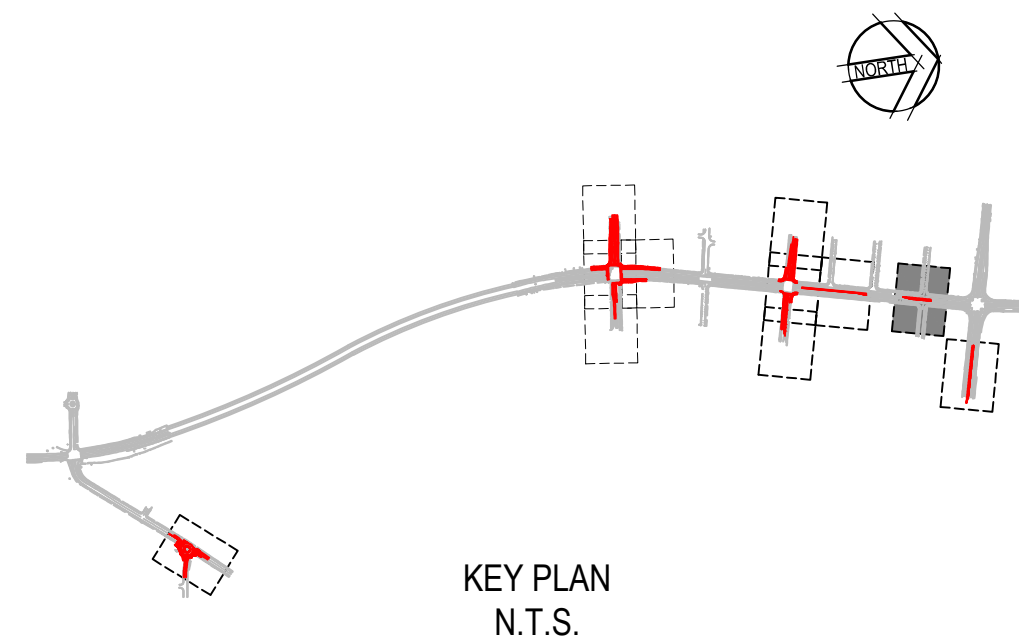
- LEGEND**
- ROAD DESIGN
 - SURVEY
 - LOT BOUNDARY
 - RETAINING WALL
 - EXISTING PEDESTRIAN SAFETY FENCE
 - PEDESTRIAN SAFETY FENCE (RMS STANDARD DRAWING MD.R201.C07.A)
 - PAVEMENT LINEMARKING TAG (E4)
 - RMS TYPE KERB (SA)
 - VEHICULAR CROSSING (VC)

- DRAINAGE**
- DRAINAGE PIT EXISTING
 - DRAINAGE PIPE EXISTING
 - DRAINAGE PIT PROPOSED
 - DRAINAGE PIPE PROPOSED
 - SUBSOIL DRAINAGE WITH CLEANOUT (SS)

- PAVEMENT**
- TYPE 1 - THE NORTHERN ROAD
 - TYPE 2 - MILL AND PAVE
 - TYPE 3 - RAISED MEDIAN
 - TYPE 4 - SHARED PATH / DRIVEWAY
 - TYPE 5 - APRON SLAB
 - TYPE 6 - BRINGELLY RD / CADDENS RD
 - TYPE 7 - FOOTPATH

NOTE:

1. FOR PAVEMENT DETAILS REFER RD-0031



Rev.	Date	Description	Des.	Verif.	Appd.
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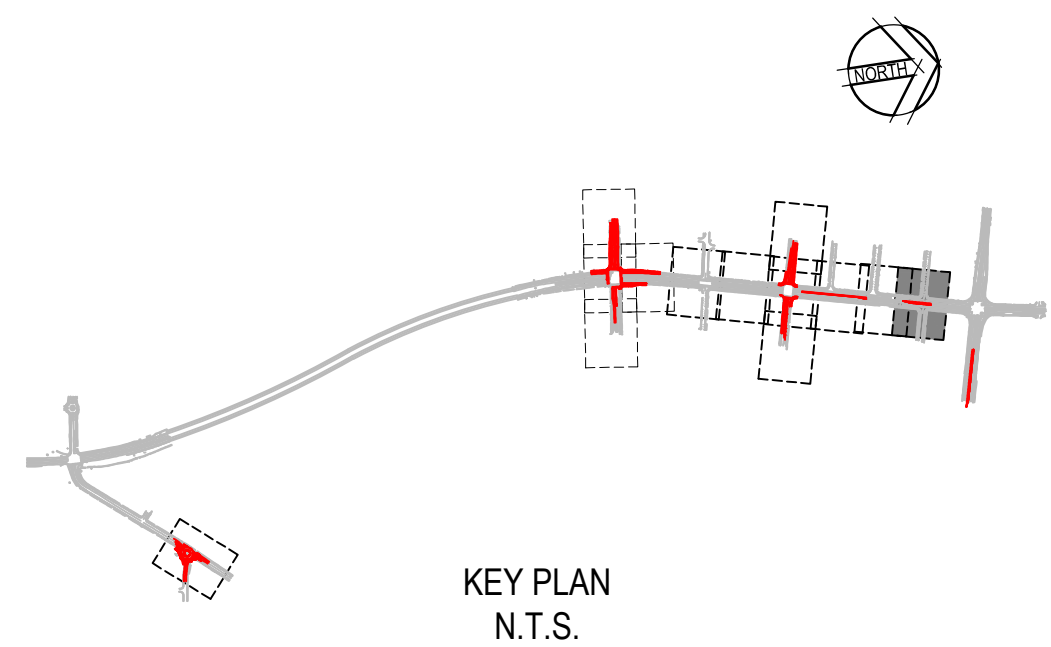
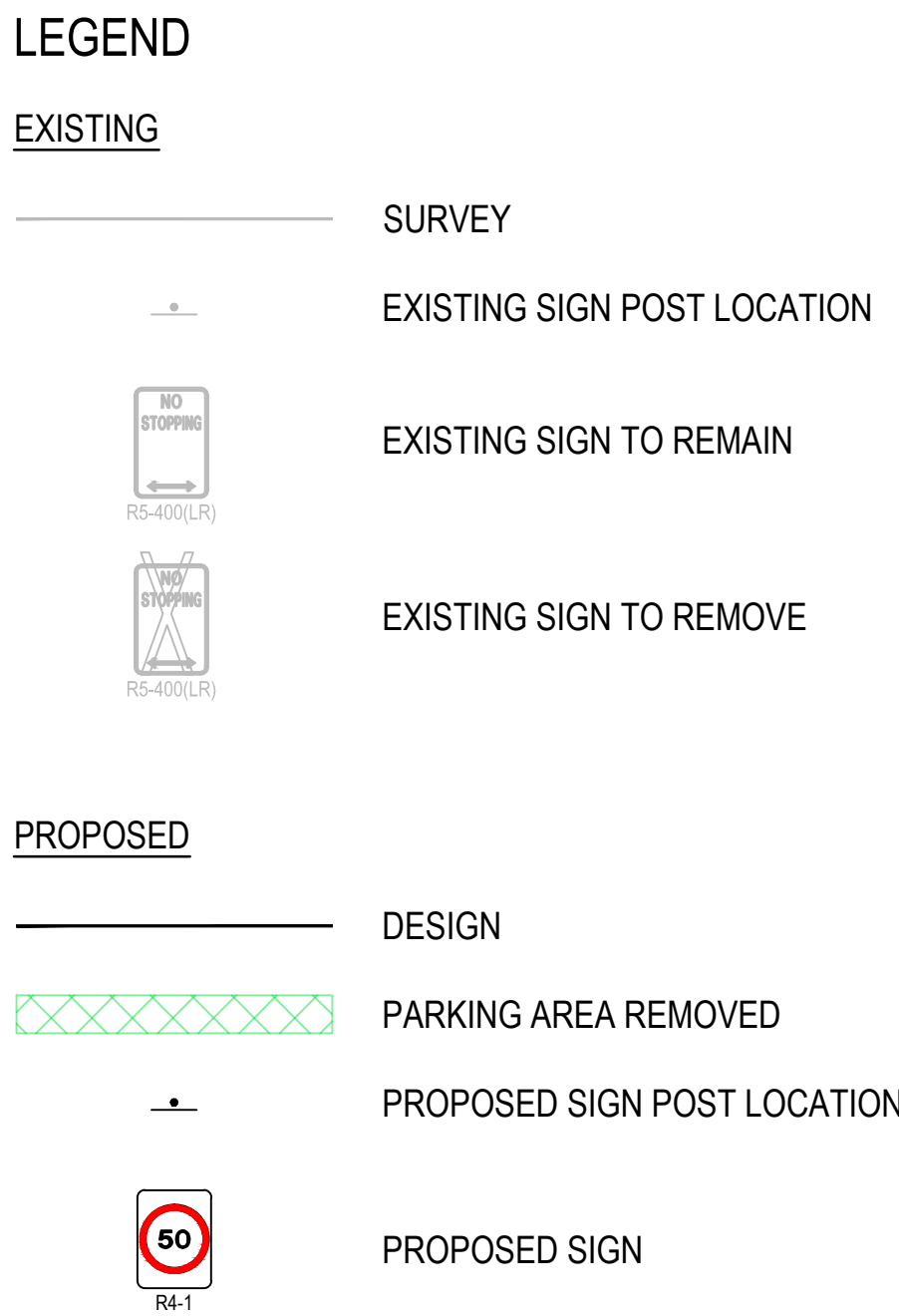
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Checked	D. Atkinson	Date	16.07.15
Designed	T. Mistry	Date	16.07.15
Verified	D. Atkinson	Date	16.07.15
Approved	R. Estrada	Date	16.07.15

Client	PENRITH CITY COUNCIL
Project	DIRD/RMS WSP LOCAL ROADS PACKAGE (ROUND 1) MAJOR INTERSECTIONS ON THE NORTHERN ROAD
Title	CONCEPT DESIGN ROAD PLAN THE NORTHERN RD / GREAT WESTERN HIGHWAY SHEET 2

Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION PURPOSES			
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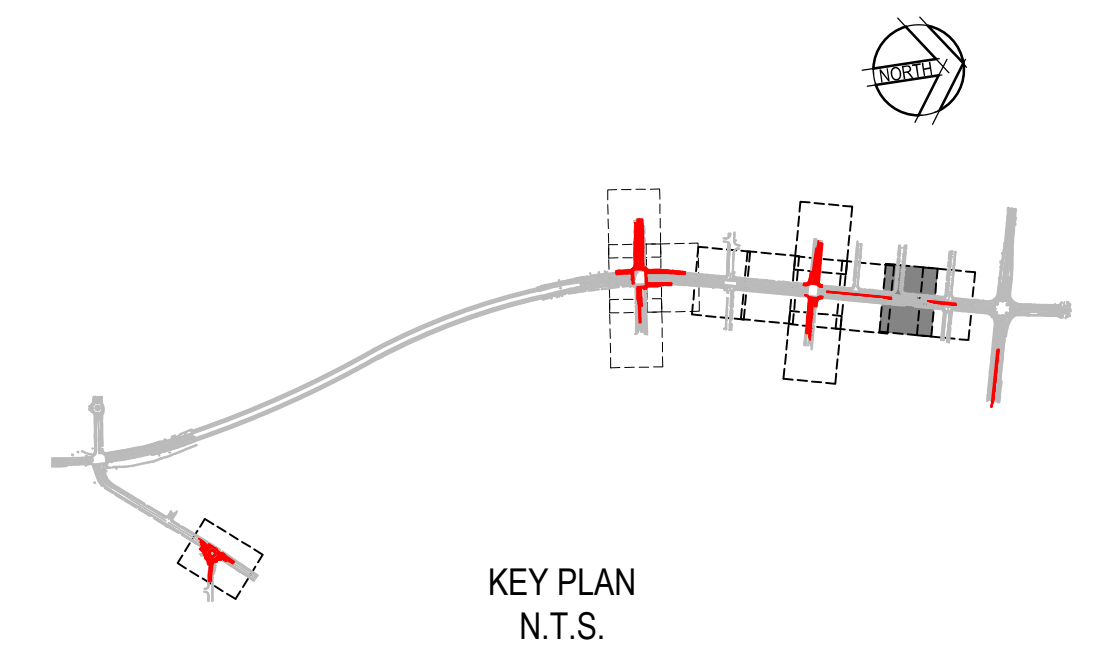
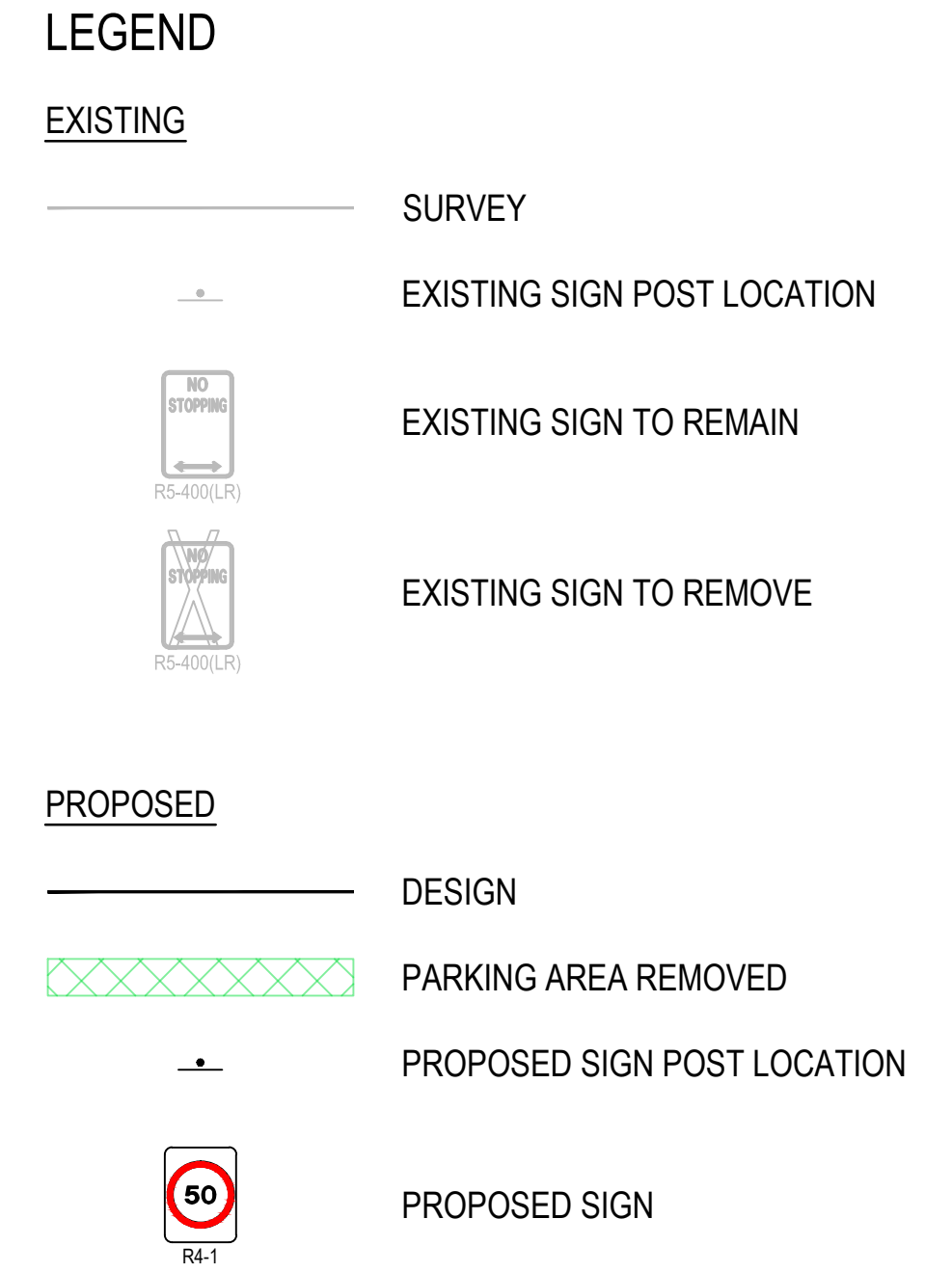
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Drawn	Date
J. Pachikova	31.07.15
Checked	Date
D. Atkinson	31.07.15
Designed	Date
D. Atkinson	31.07.15
Verified	Date
D. Atkinson	31.07.15
Approved	
R. Estrada	31.07.15

Client	PENRITH CITY COUNCIL
Project	DIRD/RMS WSP LOCAL ROADS PACKAGE (ROUND 1) MAJOR INTERSECTIONS ON THE NORTHERN ROAD
Title	CONCEPT DESIGN SIGNAGE PLAN THE NORTHERN RD / GREAT WESTERN HIGHWAY SHEET 1

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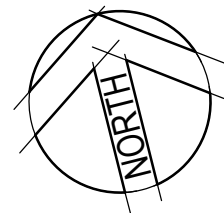
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R. Estrada	31.07.15

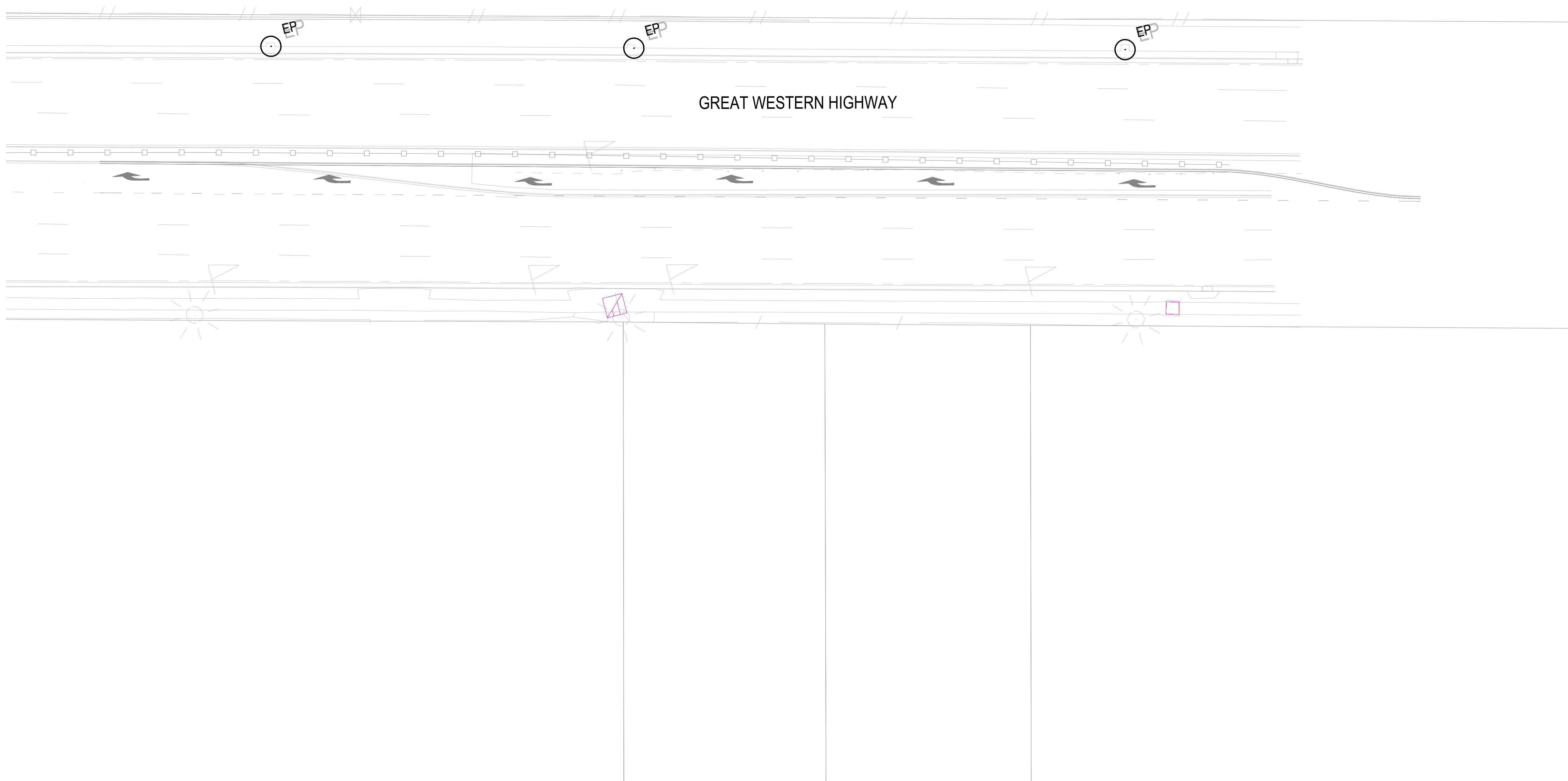
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Drawing Number						Revision	
TNR-DRG-20-1000-RF-0253						2	



FROM PENRITH →

→ TO SYDNEY



LEGEND

PROPOSED

- W PROPOSED WATER MAIN
- S PROPOSED SEWER MAIN
- G PROPOSED GAS MAIN
- T PROPOSED TELECOMMUNICATIONS
- E PROPOSED ELECTRICAL

EXISTING TO REMAIN

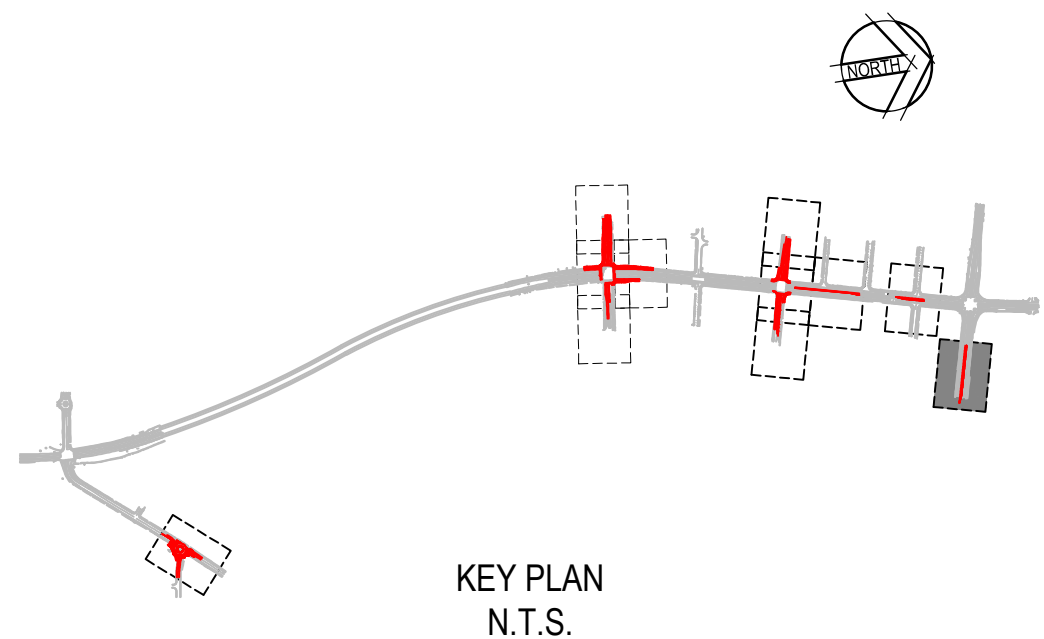
- W (D) EXISTING WATER MAIN
- W (U) EXISTING WATER UNDER GROUND
- S (D) EXISTING SEWER MAIN
- G (D) EXISTING GAS MAIN
- T (D) EXISTING TELECOMMUNICATIONS
- T (U) EXISTING TELECOMMUNICATIONS U/G
- E (D) EXISTING ELECTRICAL
- LV EXISTING ELECTRICAL LV A/G
- HV EXISTING ELECTRICAL HV A/G
- HV EXISTING ELECTRICAL HV U/G
- E (U) EXISTING ELECTRICAL
- SL STREET LIGHT

REMOVED / RELOCATED

- W REMOVED WATER MAIN
- S REMOVED SEWER MAIN
- G REMOVED GAS MAIN
- T REMOVED TELECOMMUNICATIONS
- E REMOVED ELECTRICAL

NOTES:

- UTILITY INFORMATION SHOWN ON THESE PLANS DOES NOT DEPICT ANY MORE 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 ROADWORKS AND THE RELEVANT UTILITY PLANS OBTAINED BY DIALLING DIAL BEFORE YOU DIG '1100'. CAUTION SHOULD BE EXERCISED WHEN WORKING IN THE VICINITY OF ALL UTILITY SERVICES.
- NO UTILITY ADJUSTMENTS REQUIRED



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2	17.08.15	CONCEPT DESIGN	JP	DNA	RE
1	31.07.15	CONCEPT DESIGN	JP	DNA	RE

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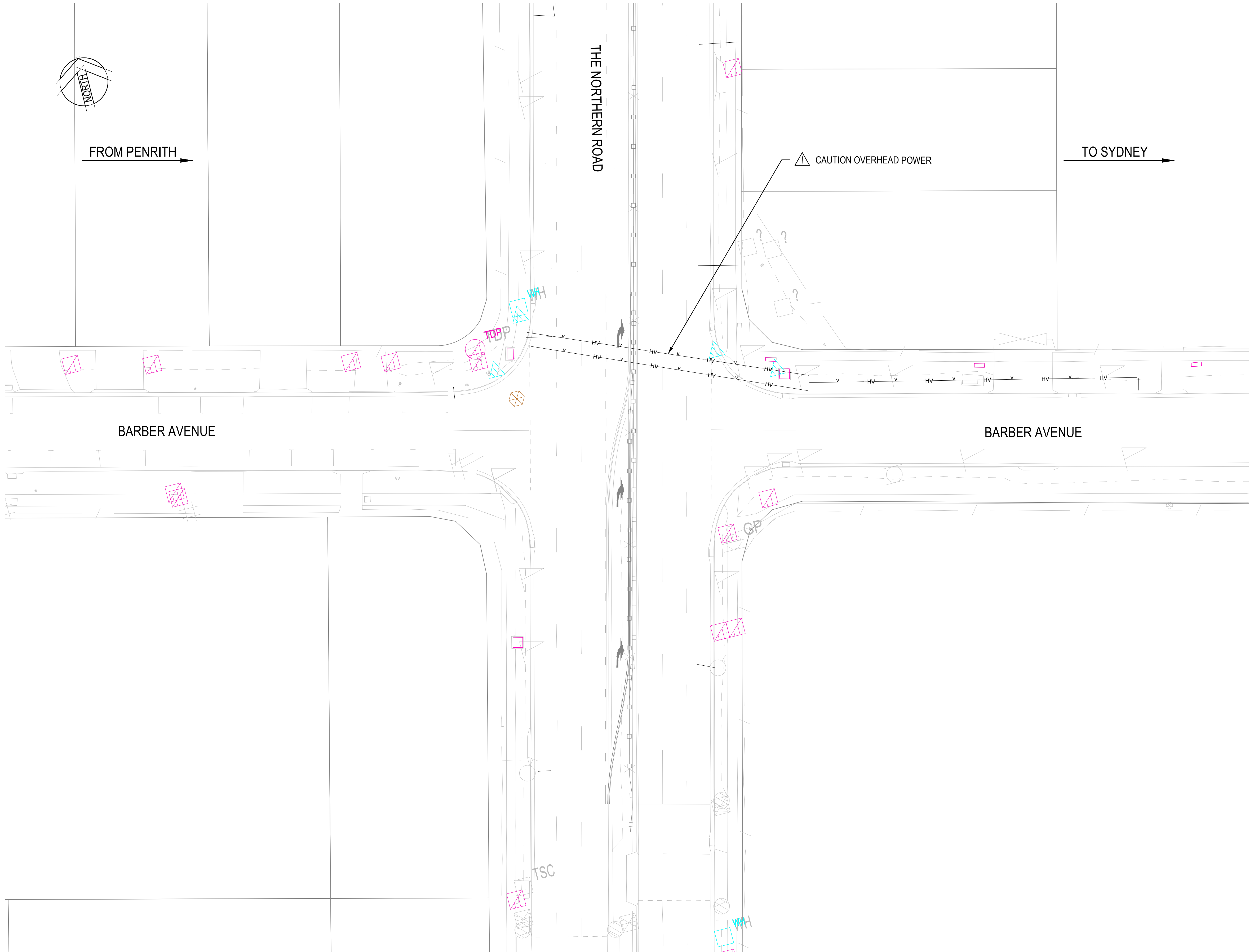
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Designed	A. Dorani	Date	31.07.15
Verified	D. Atkinson	Date	31.07.15
Approved	R. Estrada	Date	31.07.15

Client	PENRITH CITY COUNCIL
Project	DIRD/RMS WSP LOCAL ROADS PACKAGE (ROUND 1) MAJOR INTERSECTIONS ON THE NORTHERN ROAD
Title	CONCEPT DESIGN UTILITIES PLAN THE NORTHERN RD / GREAT WESTERN HIGHWAY SHEET 1

Status	PRELIMINARY
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Register	
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Drawing Number	TNR-DRG-20-1000-UT-0251
Revision	2

XREFs: TNR-XRF-00-0000-GN-STREET NAMES; TNR-XRF-00-0000-SU-CADASTRAL; TNR-XRF-00-0000-SU-SURVEY; TNR-XRF-20-0000-UT-DESIGN; TNR-XRF-20-0000-UT-LEGEND; A1_0250
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DATE PLOTTED: 18 August 2015 9:22 AM BY: JULIA PACHIKOVA



LEGEND

PROPOSED

- W PROPOSED WATER MAIN
- S PROPOSED SEWER MAIN
- G PROPOSED GAS MAIN
- T PROPOSED TELECOMMUNICATIONS
- E PROPOSED ELECTRICAL

EXISTING TO REMAIN

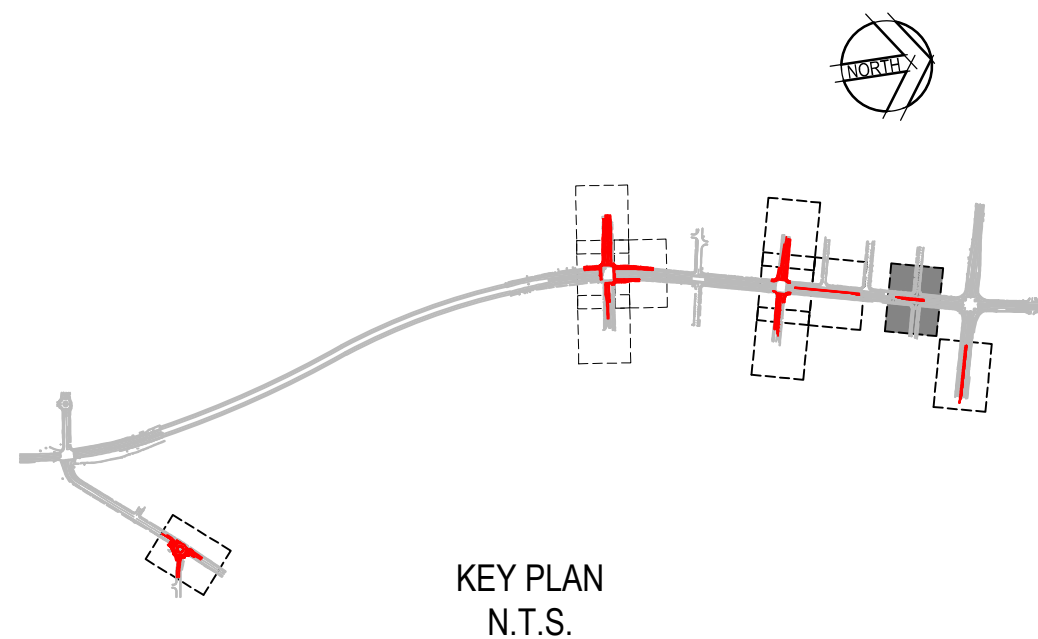
- W (D) EXISTING WATER MAIN
- W (D) EXISTING WATER UNDER GROUND
- S (D) EXISTING SEWER MAIN
- G (D) EXISTING GAS MAIN
- T (D) EXISTING TELECOMMUNICATIONS
- T (D) EXISTING TELECOMMUNICATIONS U/G
- E (D) EXISTING ELECTRICAL
- LV EXISTING ELECTRICAL LV A/G
- HV EXISTING ELECTRICAL HV A/G
- HV EXISTING ELECTRICAL HV U/G
- E (D) EXISTING ELECTRICAL
- SL STREET LIGHT

REMOVED / RELOCATED

- W REMOVED WATER MAIN
- S REMOVED SEWER MAIN
- G REMOVED GAS MAIN
- T REMOVED TELECOMMUNICATIONS
- E REMOVED ELECTRICAL

NOTES:

- UTILITY INFORMATION SHOWN ON THESE PLANS DOES NOT DEPICT ANY MORE 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 ROADWORKS AND THE RELEVANT UTILITY PLANS OBTAINED BY DIALLING DIAL BEFORE YOU DIG '1100'. CAUTION SHOULD BE EXERCISED WHEN WORKING IN THE VICINITY OF ALL UTILITY SERVICES.
- NO UTILITY ADJUSTMENTS REQUIRED



Rev.	Date	Description	Des.	Verif.	Appd.
2	17.08.15	CONCEPT DESIGN	JP	DNA	RE
1	31.07.16	CONCEPT DESIGN	JP	DNA	RE

2.5 0 2.5 5 7.5m
1: 250 FULL SIZE A1

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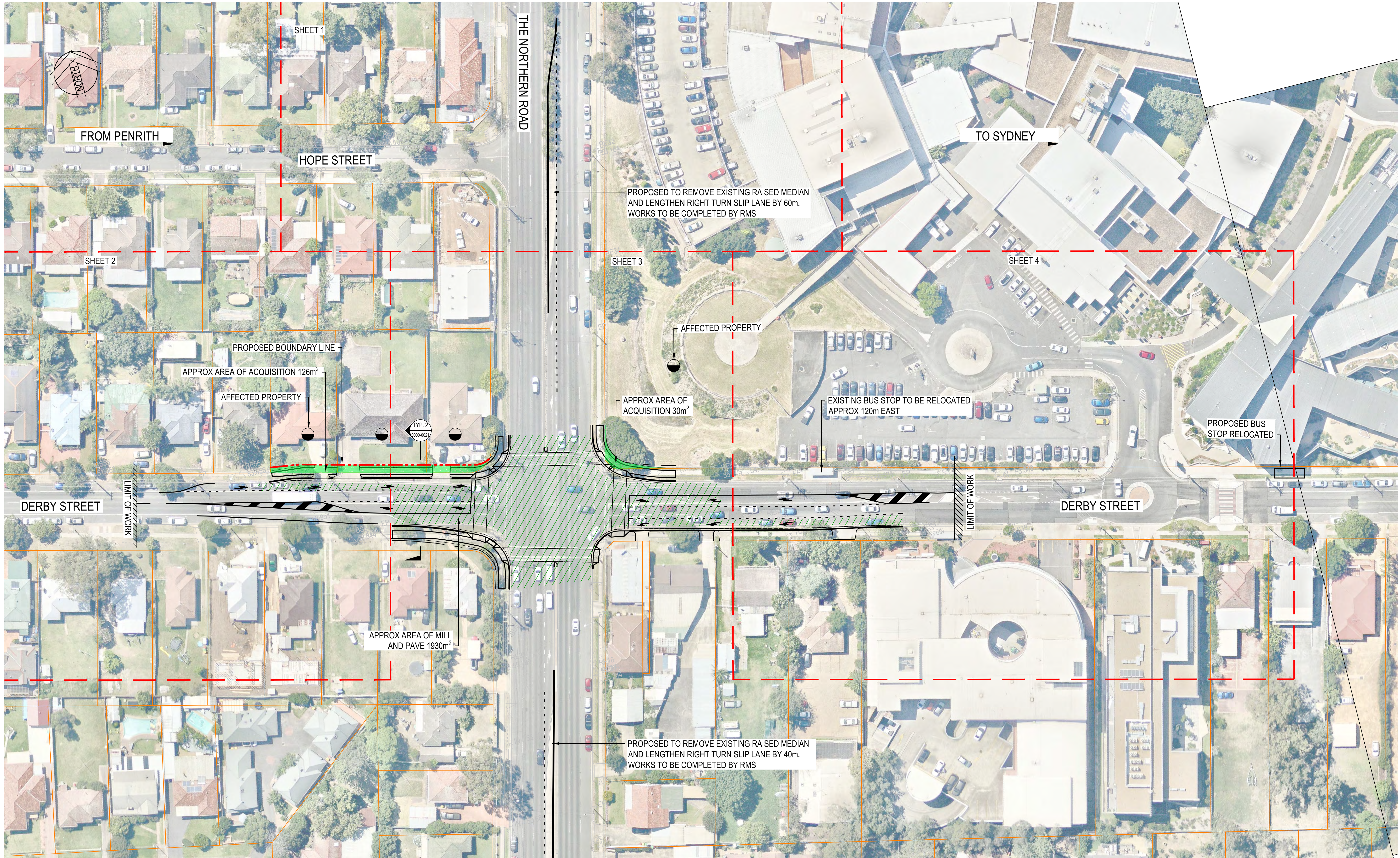
PRELIMINARY	FINAL	INITIAL	DATE	INITIAL	DATE
MARKUP					
BACKDRAFTED / CORRECTED					
CONFIRMED					

SELF CHECK

Drawn	J. Pachikova	Date	31.07.15
Checked	D. Atkinson	Date	31.07.15
Designed	A. Dorani	Date	31.07.15
Verified	D. Atkinson	Date	31.07.15
Approved			
	R. Estrada	Date	31.07.15

Client	PENRITH CITY COUNCIL
Project	DIRD/RMS WSIP LOCAL ROADS PACKAGE (ROUND 1) MAJOR INTERSECTIONS ON THE NORTHERN ROAD
Title	CONCEPT DESIGN UTILITIES PLAN THE NORTHERN RD / GREAT WESTERN HIGHWAY SHEET 2

Status	PRELIMINARY
Datum	AHD
Register	
Scale	AS SHOWN
Size	A1
Drawing Number	TNR-DRG-20-1000-UT-0252
Revision	2



Rev.	Date	Description	Des.	Verif.	Appd.
3	17.08.15	CONCEPT DESIGN	JP	DNA	RE
2	31.07.15	CONCEPT DESIGN	JP	DNA	RE
1	16.07.15	CONCEPT DESIGN	TM	DA	RE

5 0 5 10 15m
1: 500 FULL SIZE A1

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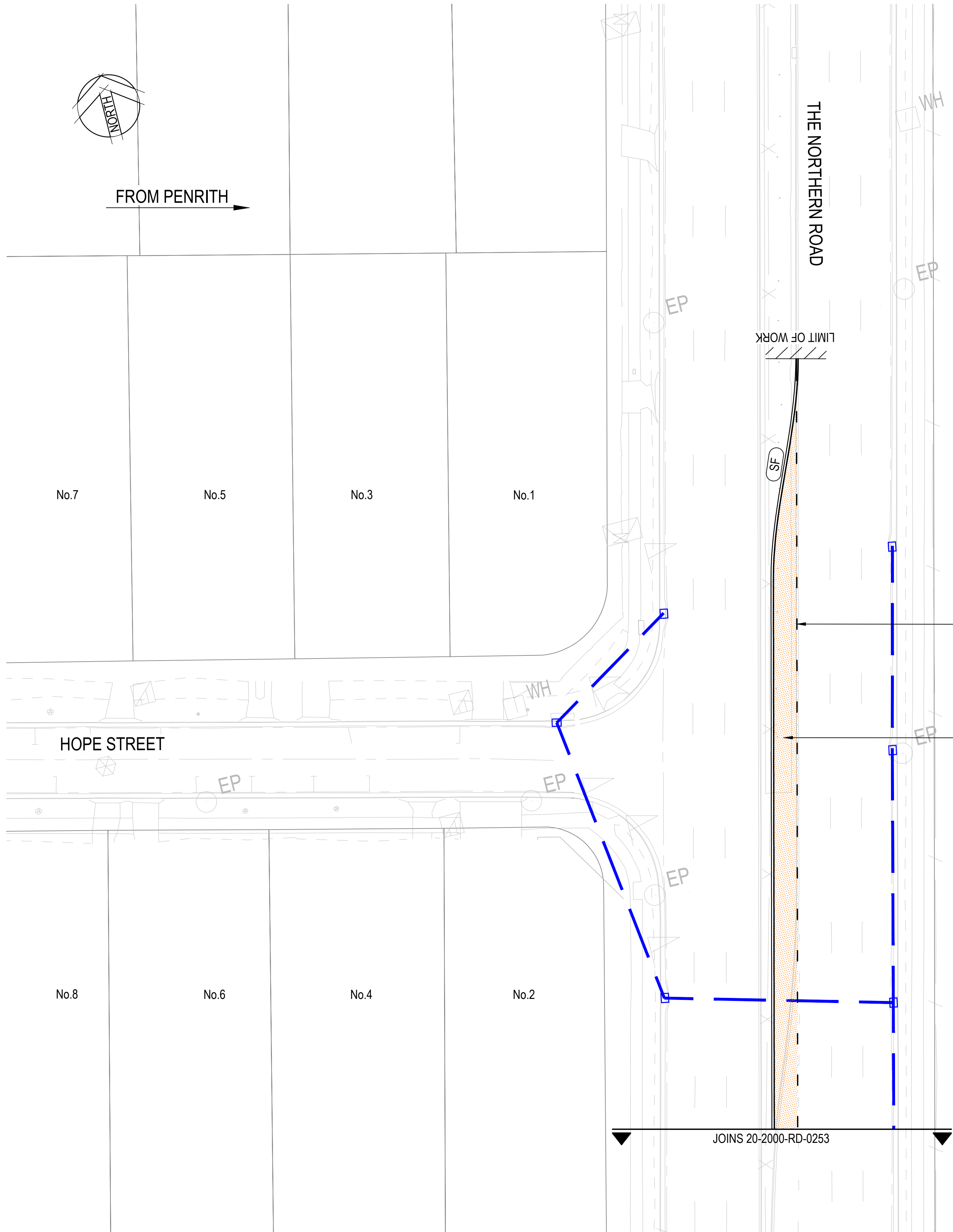
Drawn	J. Pachikova	Date	16.07.15
Checked	D. Atkinson	Date	16.07.15
Designed	T. Mistry	Date	16.07.15
Verified	D. Atkinson	Date	16.07.15
Approved	R. Estrada	Date	16.07.15

Client	PENRITH CITY COUNCIL
Project	DIRD/RMS WSP LOCAL ROADS PACKAGE (ROUND 1) MAJOR INTERSECTIONS ON THE NORTHERN ROAD
Title	CONCEPT DESIGN GENERAL ARRANGEMENT

Status				
<div>PRELIMINARY</div> <div>NOT TO BE USED FOR CONSTRUCTION PURPOSES</div>				
Datum		Register	Scale	Size
AHD			AS SHOWN	A1
Drawing Number				Revision
TNR-DRG-20-2000-RD-0051				3

XREFs: TNR-XRF-20-2000-RD-DESIGN; TNR-XRF-00-0000-SU-AERIAL_FADED; TNR-XRF-00-0000-SU-CADASTRAL; TNR-XRF-00-0000-SU-SURVEY; TNR-XRF-20-0000-RD-LEGEND_A1_0250; TNR-XRF-00-0000-GN-STREET NAMES; TNR-XRF-20-0000-UT-DRAINAGE
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DATE PLOTTED: 18 August 2015 9:23 AM BY: JULIA PACHIKOVA



TO SYDNEY

LEGEND

- ROAD DESIGN
- SURVEY
- LOT BOUNDARY
- RETAINING WALL
- EXISTING PEDESTRIAN SAFETY FENCE
- PEDESTRIAN SAFETY FENCE (RMS STANDARD DRAWING MD.R201.C07.A)
- PAVEMENT LINEMARKING TAG (E4)
- RMS TYPE KERB (SA)
- VEHICULAR CROSSING (VC)

DRAINAGE

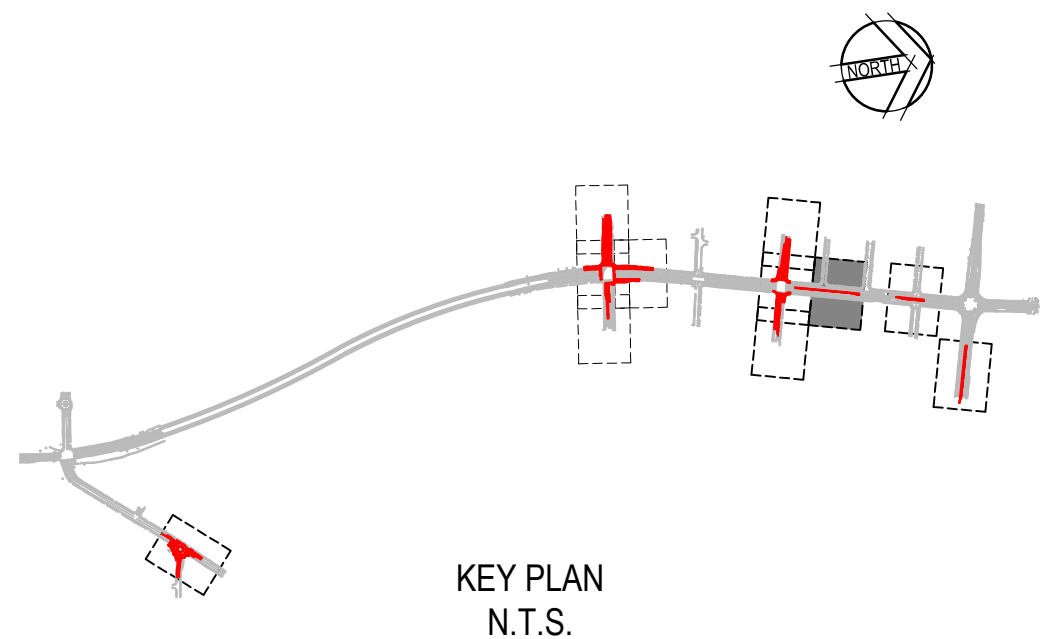
- DRAINAGE PIT EXISTING
- DRAINAGE PIPE EXISTING
- DRAINAGE PIT PROPOSED
- DRAINAGE PIPE PROPOSED
- SUBSOIL DRAINAGE WITH CLEANOUT (SS)

PAVEMENT

- TYPE 1 - THE NORTHERN ROAD
- TYPE 2 - MILL AND PAVE
- TYPE 3 - RAISED MEDIAN
- TYPE 4 - SHARED PATH / DRIVEWAY
- TYPE 5 - APRON SLAB
- TYPE 6 - BRINGELLY RD / CADDENS RD
- TYPE 7 - FOOTPATH

NOTE:

- FOR PAVEMENT DETAILS REFER RD-0031



Rev.	Date	Description	Des.	Verif.	Appd.
3	17.08.15	CONCEPT DESIGN	JP	DNA	RE
2	31.07.15	CONCEPT DESIGN	JP	DNA	RE
1	16.07.15	CONCEPT DESIGN	TM	DA	RE

2.5 0 2.5 5 7.5m
1: 250 FULL SIZE A1

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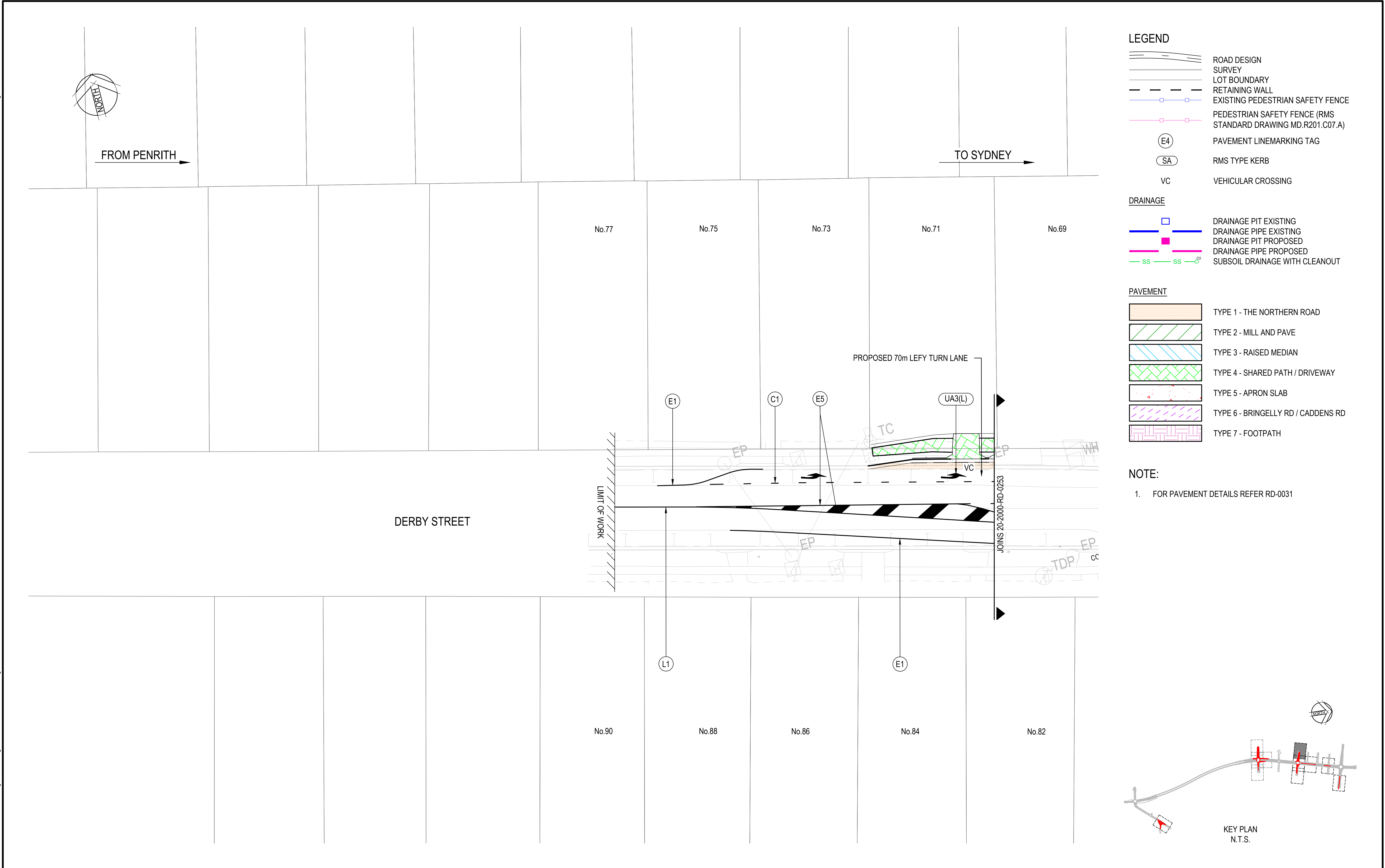
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Drawn	J. Pachikova	Date	16.07.15
Checked	D. Atkinson	Date	16.07.15
Designed	T. Mistry	Date	16.07.15
Verified	D. Atkinson	Date	16.07.15
Approved	R. Estrada	Date	16.07.15

Client	PENRITH CITY COUNCIL
Project	DIRD/RMS WSIP LOCAL ROADS PACKAGE (ROUND 1) MAJOR INTERSECTIONS ON THE NORTHERN ROAD
Title	CONCEPT DESIGN ROAD PLAN THE NORTHERN RD / DERBY STREET SHEET 1

Status	PRELIMINARY
Datum	AHD
Register	
Scale	AS SHOWN
Size	A1
Drawing Number	TNR-DRG-20-2000-RD-0251
Revision	3

XREFs: TNR-XRF-20-2000-RD-DESIGN; TNR-XRF-00-0000-SU-AERIAL_FADED; TNR-XRF-00-0000-SU-STREET_NAMES; TNR-XRF-00-0000-SU-CAADASTRAL; TNR-XRF-00-0000-SU-SURVEY; TNR-XRF-00-0000-RD-LEGEND_A1_0250; TNR-XRF-20-0000-RF-SIGNAGE; TNR-XRF-20-0000-UT-DRAINAGE
CAD File: N:\Projects\0001\Y15058 - THE NORTHERN RD PENRITH\Drawings\Build\Drawings\TNR-DRG-20-2000-RD-0252.dwg
DATE PLOTTED: 18 August 2015 9:23 AM BY: JULIA PACHKOVA



LEGEND

- ROAD DESIGN
- SURVEY
- LOT BOUNDARY
- RETAINING WALL
- EXISTING PEDESTRIAN SAFETY FENCE
- PEDESTRIAN SAFETY FENCE (RMS STANDARD DRAWING MD.R201.C07.A)
- PAVEMENT LINEMARKING TAG
- RMS TYPE KERB
- VEHICULAR CROSSING

DRAINAGE

- DRAINAGE PIT EXISTING
- DRAINAGE PIPE EXISTING
- DRAINAGE PIT PROPOSED
- DRAINAGE PIPE PROPOSED
- SUBSOIL DRAINAGE WITH CLEANOUT

PAVEMENT

- TYPE 1 - THE NORTHERN ROAD
- TYPE 2 - MILL AND PAVE
- TYPE 3 - RAISED MEDIAN
- TYPE 4 - SHARED PATH / DRIVEWAY
- TYPE 5 - APRON SLAB
- TYPE 6 - BRINGELLY RD / CADDENS RD
- TYPE 7 - FOOTPATH

NOTE:

- FOR PAVEMENT DETAILS REFER RD-0031

Rev.	Date	Description	Des.	Verif.	Appd.
3	17.08.15	CONCEPT DESIGN	JP	DNA	RE
2	31.07.15	CONCEPT DESIGN	JP	DNA	RE
1	16.07.15	CONCEPT DESIGN	TM	DA	RE

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1: 250 FULL SIZE A1

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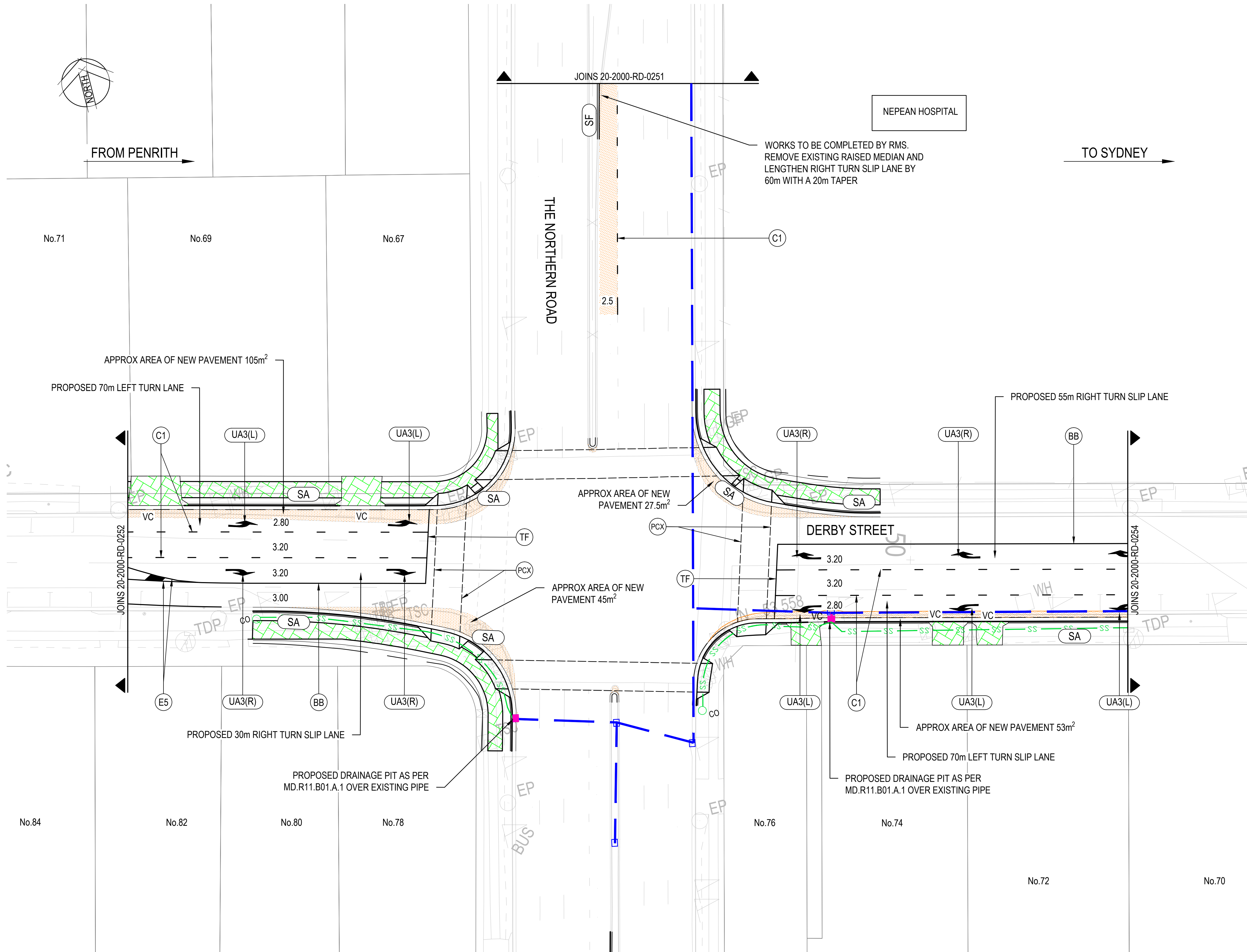
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Checked	D. Atkinson	Date	16.07.15
Designed	T. Mistry	Date	16.07.15
Verified	D. Atkinson	Date	16.07.15
Approved	R. Estrada	Date	16.07.15

Client	PENRITH CITY COUNCIL
Project	DIRD/RMS WSP LOCAL ROADS PACKAGE (ROUND 1) MAJOR INTERSECTIONS ON THE NORTHERN ROAD
Title	CONCEPT DESIGN ROAD PLAN THE NORTHERN RD / DERBY STREET SHEET 2

Status	PRELIMINARY
Datum	AHD
Register	
Scale	AS SHOWN
Size	A1
Drawing Number	TNR-DRG-20-2000-RD-0252
Revision	3

XREFs: TNR-XRF-00-2000-RD-DESIGN; TNR-XRF-00-0000-SU-AERIAL; TNR-XRF-00-0000-SU-CAASTRAL; TNR-XRF-00-0000-SU-SURVEY; TNR-XRF-00-0000-GN-SHT-LAYOUT; A1_0250; TNR-XRF-00-0000-GN-STREET-NAMES; TNR-XRF-00-0000-UT-DRAINAGE
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DATE PLOTTED: 18 August 2015 9:23 AM BY: JULIA PACHIKOVA



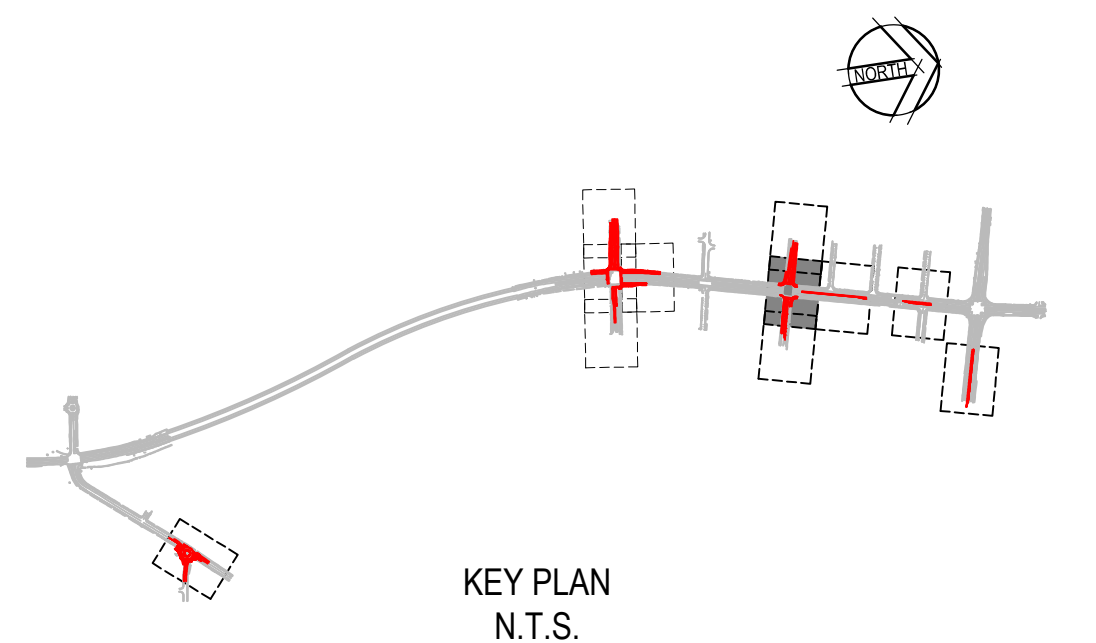
- LEGEND**
- ROAD DESIGN
 - SURVEY
 - LOT BOUNDARY
 - RETAINING WALL
 - EXISTING PEDESTRIAN SAFETY FENCE
 - PEDESTRIAN SAFETY FENCE (RMS STANDARD DRAWING MD.R201.C07.A)
 - PAVEMENT LINEMARKING TAG
 - RMS TYPE KERB
 - VEHICULAR CROSSING

- DRAINAGE**
- DRAINAGE PIT EXISTING
 - DRAINAGE PIPE EXISTING
 - DRAINAGE PIT PROPOSED
 - DRAINAGE PIPE PROPOSED
 - SUBSOIL DRAINAGE WITH CLEANOUT

- PAVEMENT**
- TYPE 1 - THE NORTHERN ROAD
 - TYPE 2 - MILL AND PAVE
 - TYPE 3 - RAISED MEDIAN
 - TYPE 4 - SHARED PATH / DRIVEWAY
 - TYPE 5 - APRON SLAB
 - TYPE 6 - BRINGELLY RD / CADDENS RD
 - TYPE 7 - FOOTPATH

NOTE:

- FOR PAVEMENT DETAILS REFER RD-0031



Rev.	Date	Description	Des.	Verif.	Appd.
3	17.08.15	CONCEPT DESIGN	JP	DNA	RE
2	31.07.15	CONCEPT DESIGN	JP	DNA	RE
1	16.07.15	CONCEPT DESIGN	TM	DA	RE

2.5 0 2.5 5 7.5m
1: 250 FULL SIZE A1

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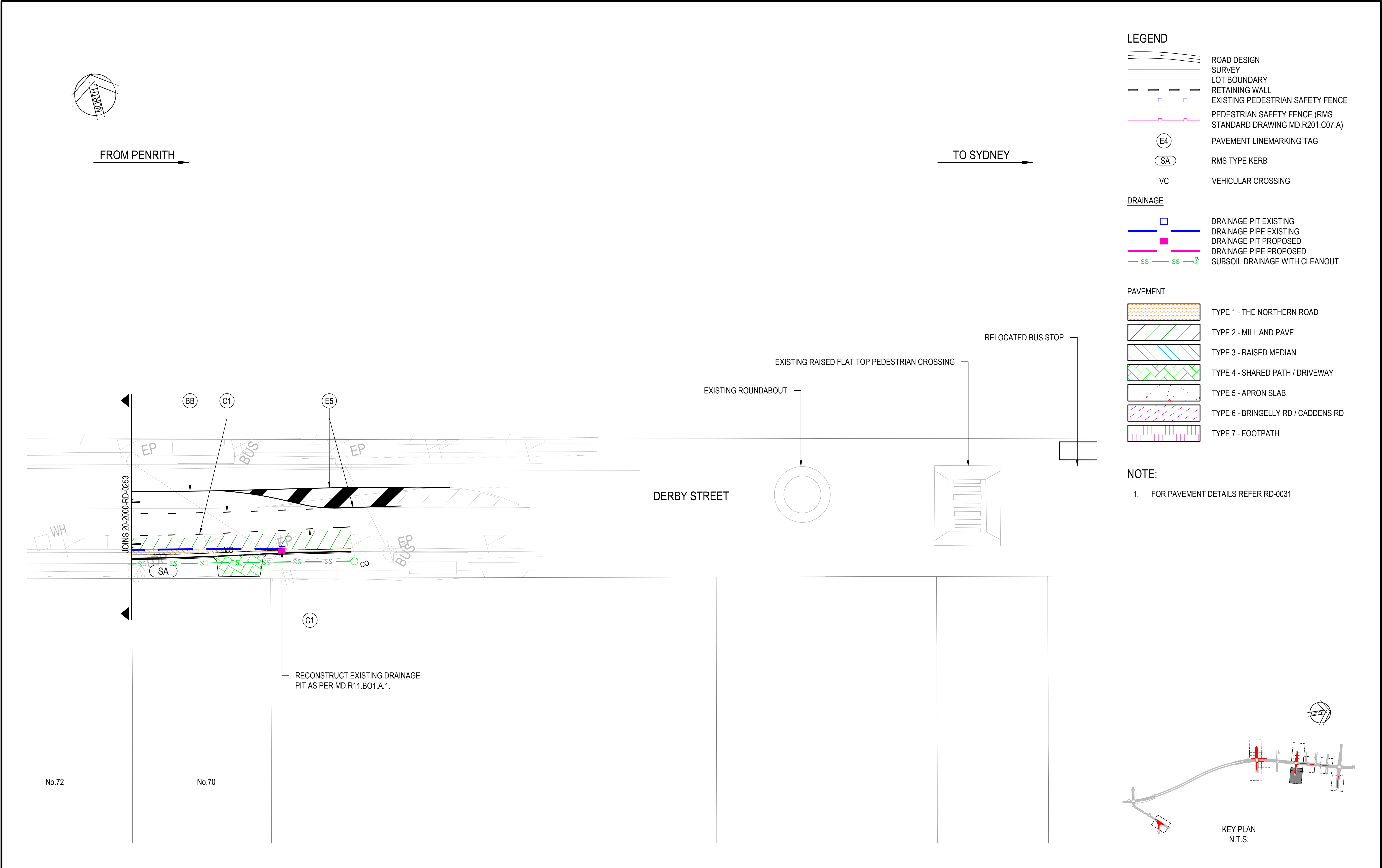
Drawn	J. Pachikova	Date	16.07.15
Checked	D. Atkinson	Date	16.07.15
Designed	T. Mistry	Date	16.07.15
Verified	D. Atkinson	Date	16.07.15
Approved	R. Estrada	Date	16.07.15

Client	PENRITH CITY COUNCIL
Project	DIRD/RMS WSP LOCAL ROADS PACKAGE (ROUND 1) MAJOR INTERSECTIONS ON THE NORTHERN ROAD
Title	CONCEPT DESIGN ROAD PLAN THE NORTHERN RD / DERBY STREET SHEET 3

Status	PRELIMINARY
Datum	AHD
Register	
Scale	AS SHOWN
Size	A1
Drawing Number	TNR-DRG-20-2000-RD-0253
Revision	3

XREFs: TNR-XRF-20-2000-RD-DESIGN; TNR-XRF-00-0000-SU-AERIAL_FADED; TNR-XRF-00-0000-SU-CAASTRAL; TNR-XRF-00-0000-SU-SURVEY; TNR-XRF-20-0000-RD-LEGEND_A1_0250; TNR-XRF-20-0000-GN-STREET NAMES; TNR-XRF-20-0000-UT-DRAINAGE
CAD File: N:\Projects\0001\Y15058 - THE NORTHERN RD PENRITH\Drawings\Build\Drawings\TNR-DRG-20-2000-RD-0254.dwg

DATE PLOTTED: 18 August 2015 9:24 AM BY: JULIA PACHIKOVA



LEGEND

- ROAD DESIGN
- SURVEY
- LOT BOUNDARY
- RETAINING WALL
- EXISTING PEDESTRIAN SAFETY FENCE
- PEDESTRIAN SAFETY FENCE (RMS STANDARD DRAWING MD.R201.C07.A)
- PAVEMENT LINEMARKING TAG
- RMS TYPE KERB
- VEHICULAR CROSSING

DRAINAGE

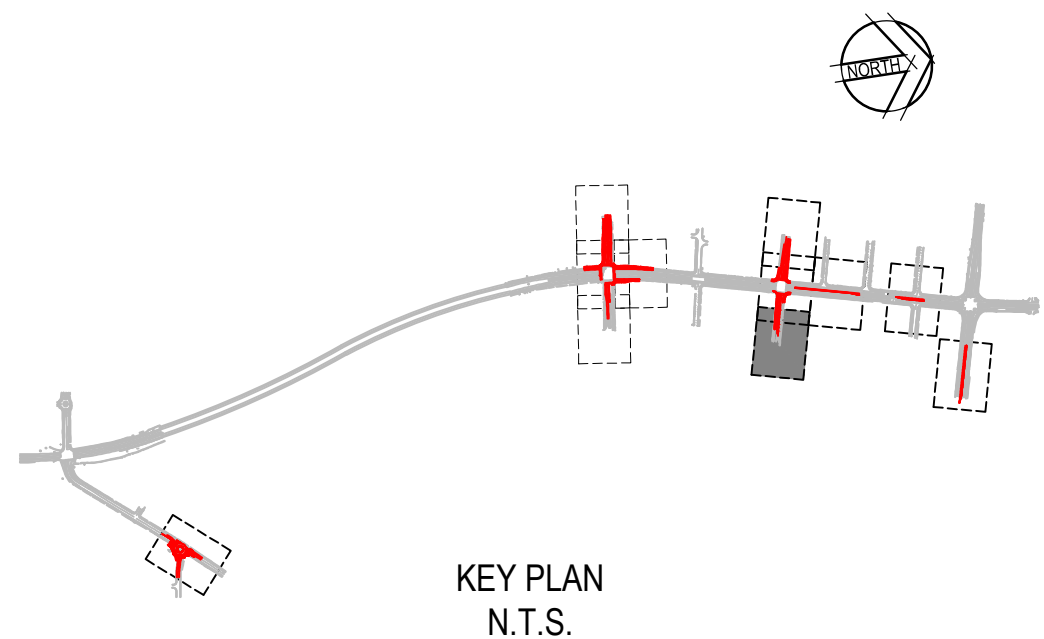
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- DRAINAGE PIPE EXISTING
- DRAINAGE PIT PROPOSED
- DRAINAGE PIPE PROPOSED
- SUBSOIL DRAINAGE WITH CLEANOUT

PAVEMENT

- TYPE 1 - THE NORTHERN ROAD
- TYPE 2 - MILL AND PAVE
- TYPE 3 - RAISED MEDIAN
- TYPE 4 - SHARED PATH / DRIVEWAY
- TYPE 5 - APRON SLAB
- TYPE 6 - BRINGELLY RD / CADDENS RD
- TYPE 7 - FOOTPATH

NOTE:

- FOR PAVEMENT DETAILS REFER RD-0031



Rev.	Date	Description	Des.	Verf.	Appd.
3	17.08.15	CONCEPT DESIGN	JP	DNA	RE
2	31.07.15	CONCEPT DESIGN	JP	DNA	RE
1	16.07.15	CONCEPT DESIGN	TM	DA	RE

2.5 0 2.5 5 7.5m
1: 250 FULL SIZE A1

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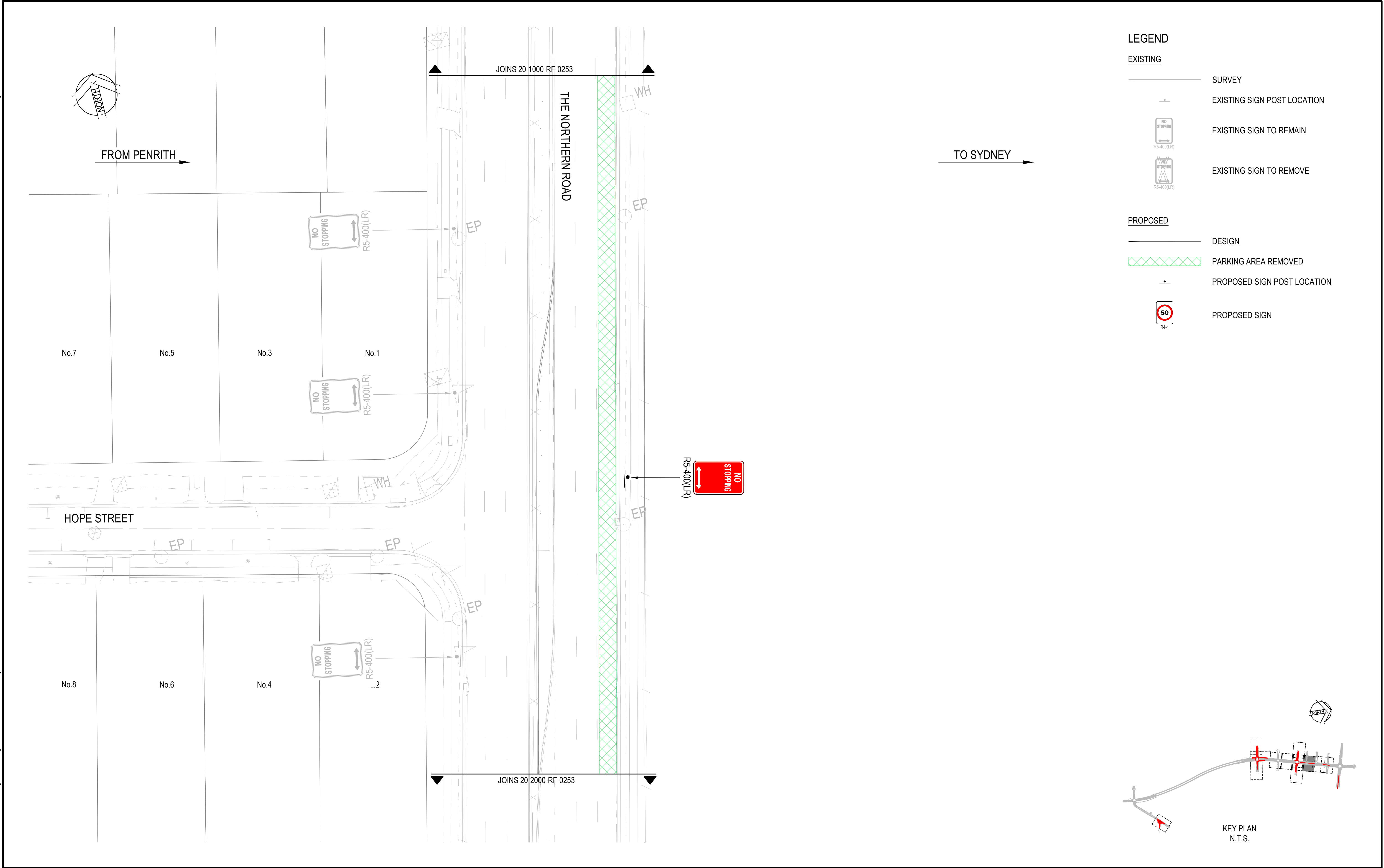
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Drawn	J. Pachikova	Date	16.07.15
Checked	D. Atkinson	Date	16.07.15
Designed	T. Mistry	Date	16.07.15
Verified	D. Atkinson	Date	16.07.15
Approved	R. Estrada	Date	16.07.15

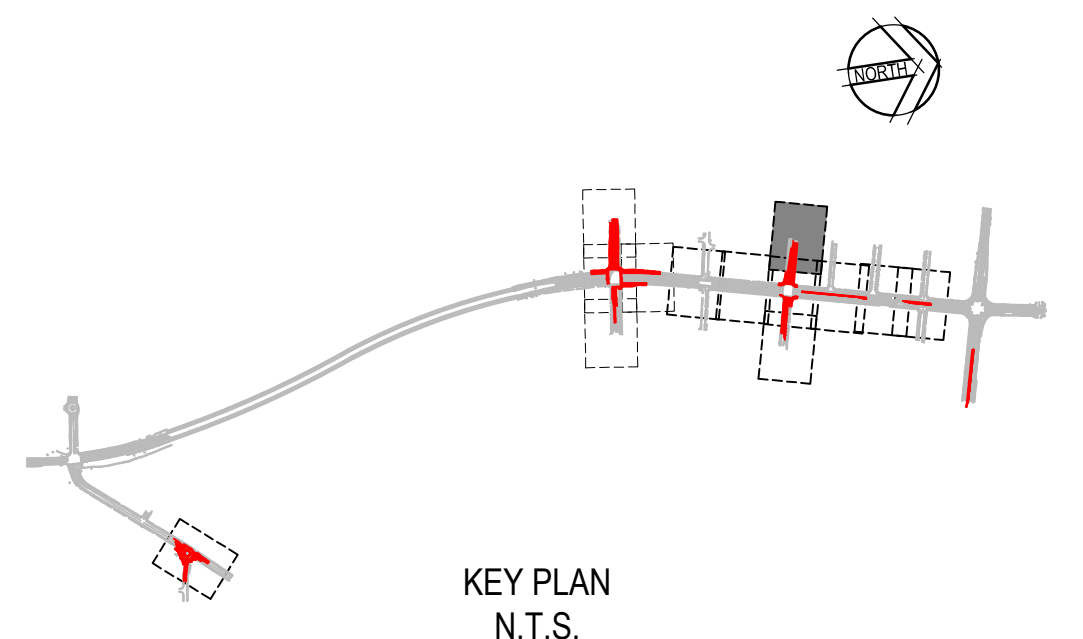
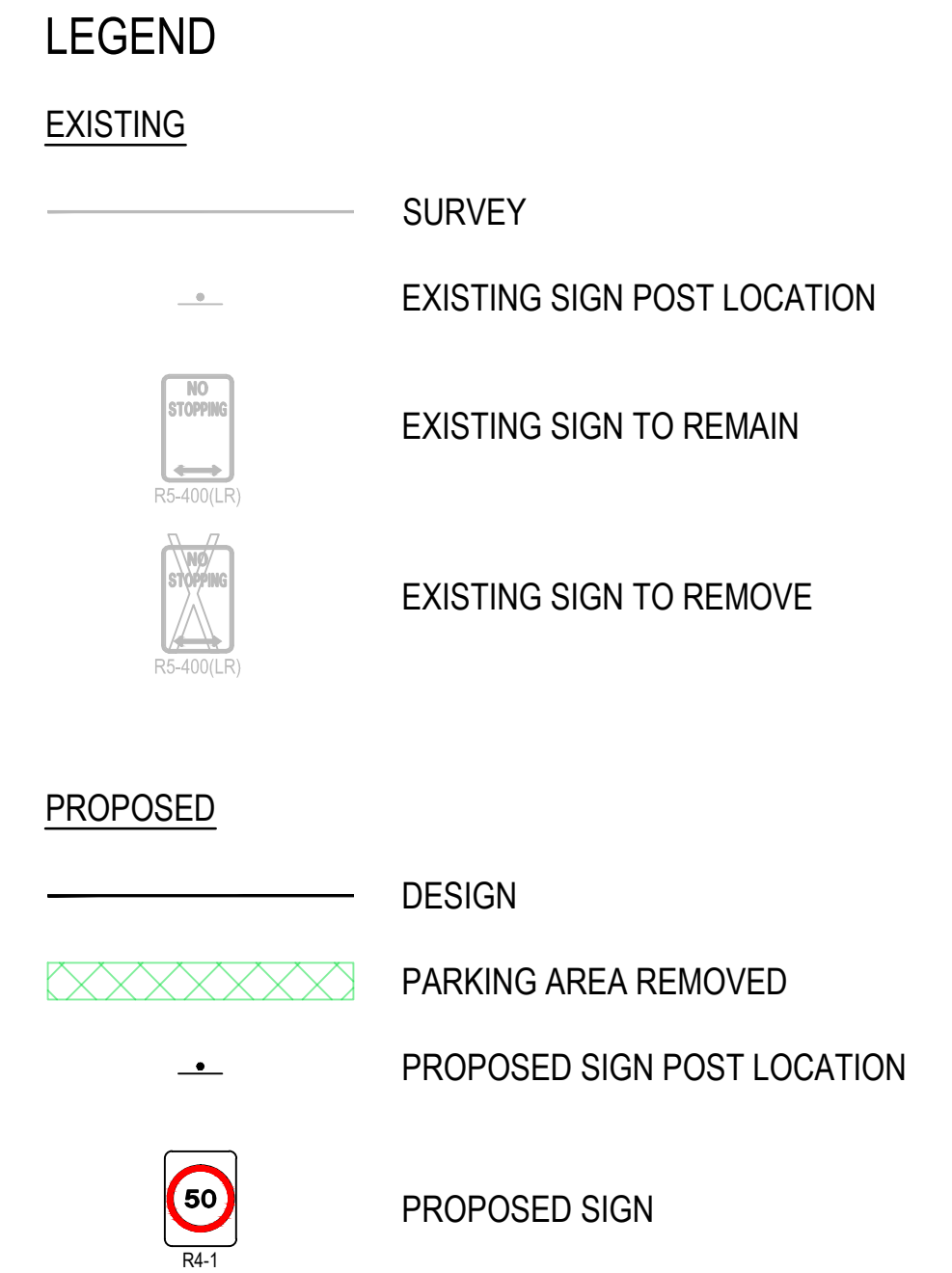
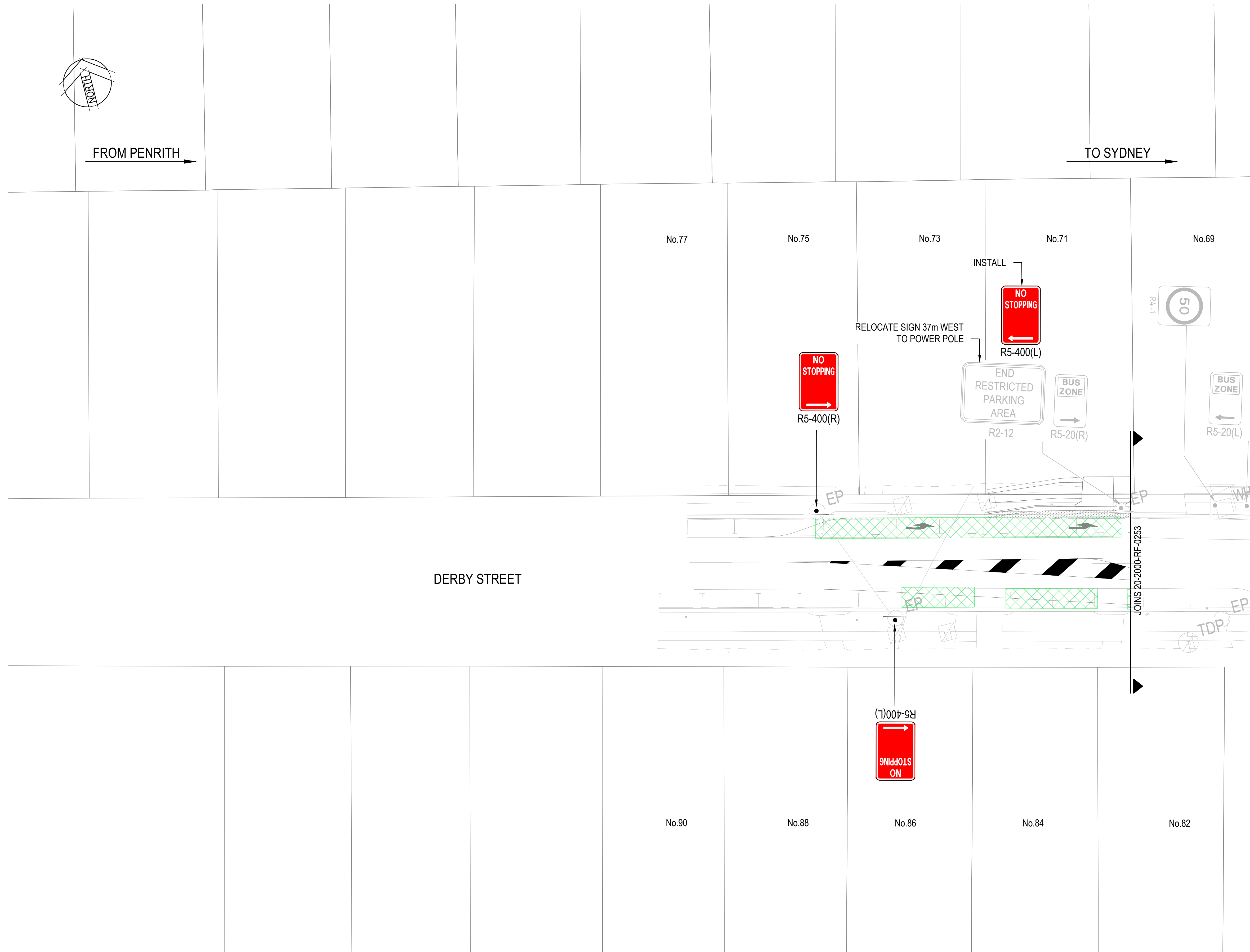
Client	PENRITH CITY COUNCIL
Project	DIRD/RMS WSP LOCAL ROADS PACKAGE (ROUND 1) MAJOR INTERSECTIONS ON THE NORTHERN ROAD
Title	CONCEPT DESIGN ROAD PLAN THE NORTHERN RD / DERBY STREET SHEET 4

Status				
PRELIMINARY				
NOT TO BE USED FOR CONSTRUCTION PURPOSES				
Datum	Register	Scale	Size	
AHD		AS SHOWN	A1	
Drawing Number				Revision
TNR-DRG-20-2000-RD-0254				3

XREFs: TNR-XRF-20-2000-RD-DESIGN; TNR-XRF-00-0000-SU-AERIAL_FADED; TNR-XRF-00-0000-SU-CADASTRAL; TNR-XRF-00-0000-SU-SURVEY; TNR-XRF-20-0000-GN-SHT_LAYOUT_A1_0250; TNR-XRF-00-0000-GN-STREET NAMES; TNR-XRF-20-0000-RF-SIGNAGE; TNR-XRF-20-0000-RF-SIGNAGE
CAD File: N:\Projects\0201\Y15058 - THE NORTHERN RD PENRITH\Drawings\Build\Drawings\TNR-DRG-20-2000-RF-0251.dwg
DATE PLOTTED: 18 August 2015 9:24 AM BY: JULIA PACHIKOVA



REVISION IN PROGRESS				2.5 0 2.5 5 7.5m 1: 250 FULL SIZE A1		© Cardno Limited All Rights Reserved. This document is produced by Cardno Limited solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno Limited does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.				CHECK PRINT ONLY				Drawn J. Pachikova 31.07.15	Date 31.07.15	Client PENRITH CITY COUNCIL
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2				2		BACKDRAFTED / CORRECTED				CONFIRMED				Designed D. Atkinson 31.07.15	Date 31.07.15	Package (Round 1) MAJOR INTERSECTIONS ON THE NORTHERN ROAD
Rev.				Date		Description				Des.				Verified D. Atkinson 31.07.15	Date 31.07.15	Title CONCEPT DESIGN SIGNAGE PLAN THE NORTHERN RD / DERBY STREET SHEET 1
1				1		SELF CHECK				Approved R. Estrada 31.07.15				Status PRELIMINARY NOT TO BE USED FOR CONSTRUCTION PURPOSES		Datum AHD
Des.				Verif.		Appd.				Drawing Number TNR-DRG-20-2000-RF-0251				Scale AS SHOWN		Size A1
JP				DNA		RE				Revision 2				Register		

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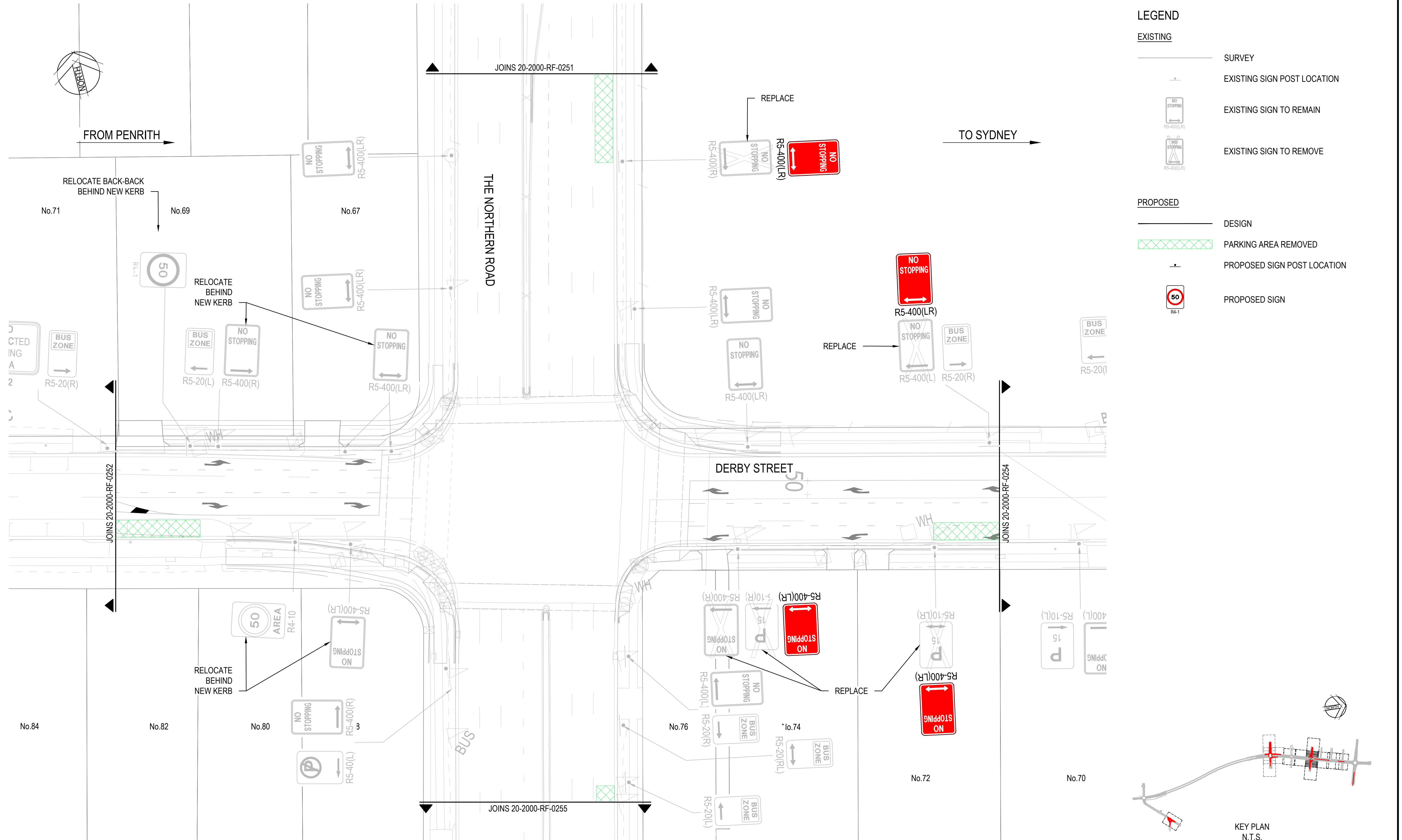
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MARKUP					
BACKDRAFTED / CORRECTED					
CONFIRMED					
SELF CHECK					

Drawn	Date
J. Pachikova	31.07.15
Checked	Date
D. Atkinson	31.07.15
Designed	Date
D. Atkinson	31.07.15
Verified	Date
D. Atkinson	31.07.15
Approved	
R. Estrada	31.07.15

Client	PENRITH CITY COUNCIL
Project	DIRD/RMS WSP LOCAL ROADS PACKAGE (ROUND 1) MAJOR INTERSECTIONS ON THE NORTHERN ROAD
Title	CONCEPT DESIGN SIGNAGE PLAN THE NORTHERN RD / DERBY STREET SHEET 2

Status				PRELIMINARY			
NOT TO BE USED FOR CONSTRUCTION PURPOSES							
Datum		Register		Scale		Size	
AHD				AS SHOWN		A1	
Drawing Number						Revision	
TNR-DRG-20-2000-RF-0252						2	

[illegible]

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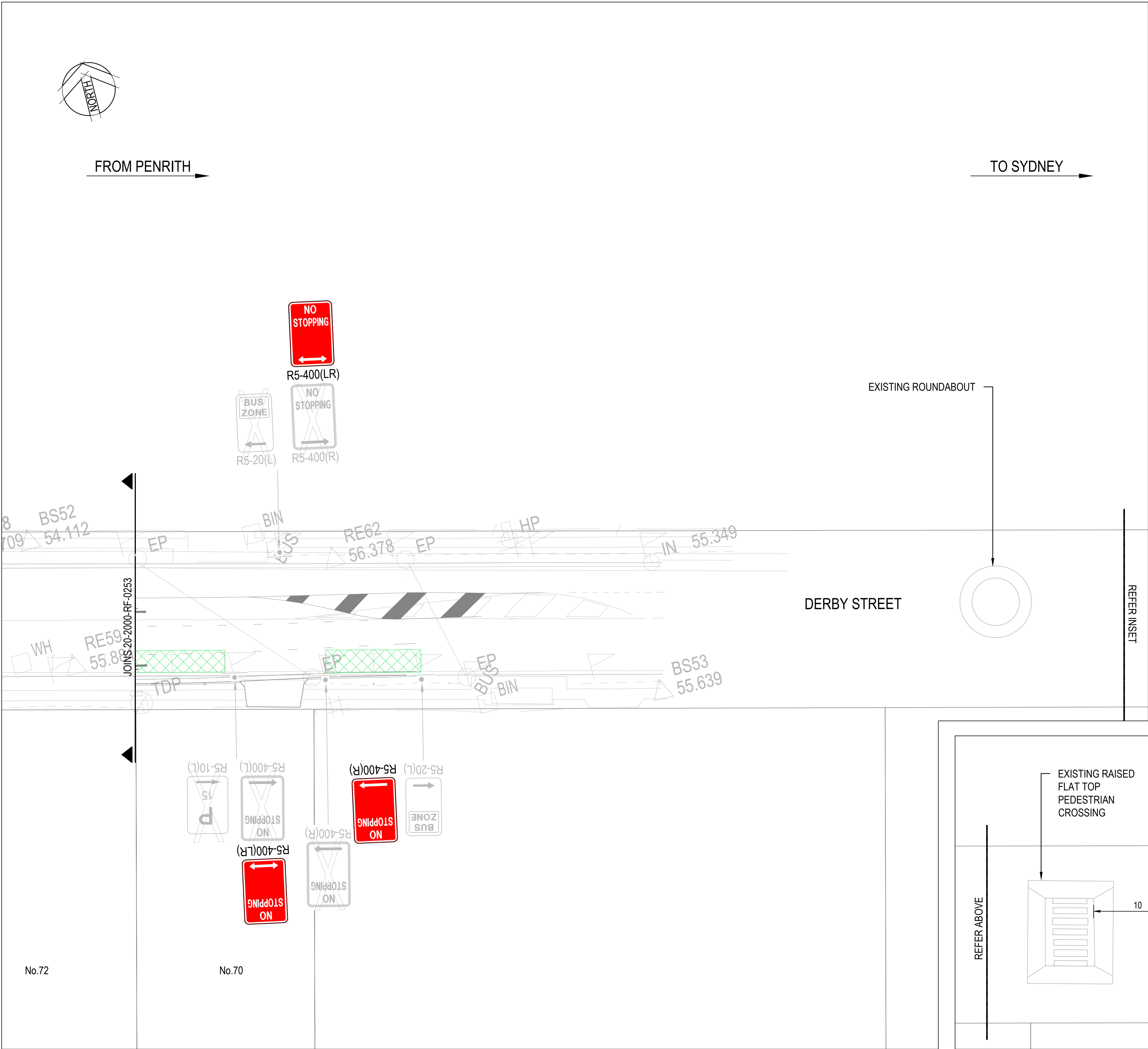
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MARKUP					
BACKDRAFTED / CORRECTED					
CONFIRMED					
SELF CHECK					

Drawn	Date
J. Pachikova	31.07.15
Checked	Date
D. Atkinson	31.07.15
Designed	Date
D. Atkinson	31.07.15
Verified	Date
D. Atkinson	31.07.15
Approved	
R. Estrada	31.07.15

Client	PENRITH CITY COUNCIL
Project	DIRD/RMS WSP LOCAL ROADS PACKAGE (ROUND 1) MAJOR INTERSECTIONS ON THE NORTHERN ROAD
Title	CONCEPT DESIGN SIGNAGE PLAN THE NORTHERN RD / DERBY STREET SHEET 3

Status			
PRELIMINARY			
NOT TO BE USED FOR CONSTRUCTION PURPOSES			
Date	Register	Scale	Size
AHD		AS SHOWN	A1
Drawing Number			Revision
TNR-DRG-20-2000-RF-0253			2

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DATE PLOTTED: 18 August 2015 9:25 AM BY: JULIA PACHIKOVA



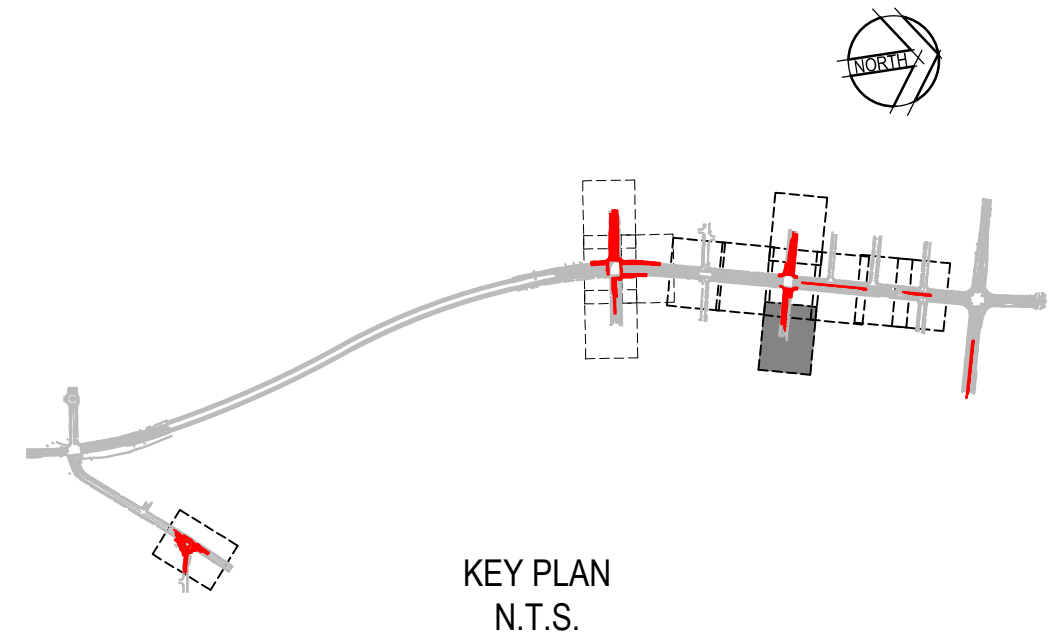
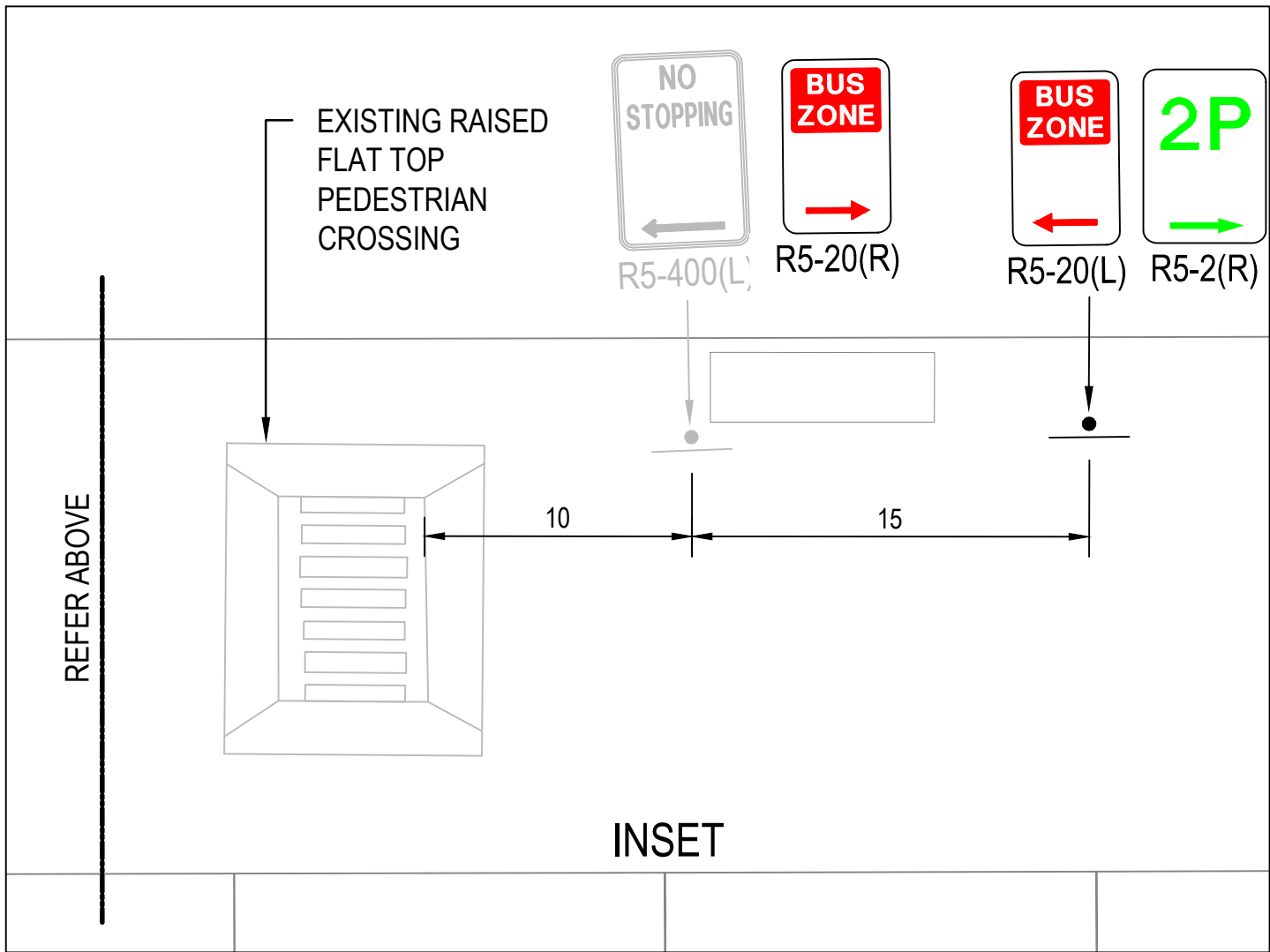
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EXISTING

- SURVEY
- EXISTING SIGN POST LOCATION
- EXISTING SIGN TO REMAIN
- EXISTING SIGN TO REMOVE

PROPOSED

- DESIGN
- PARKING AREA REMOVED
- PROPOSED SIGN POST LOCATION
- PROPOSED SIGN



REVISION IN PROGRESS									
2	17.08.15	CONCEPT DESIGN	JP	DNA	RE				
1	31.07.15	CONCEPT DESIGN	JP	DNA	RE				
Rev.	Date	Description	Des.	Verif.	Appd.				

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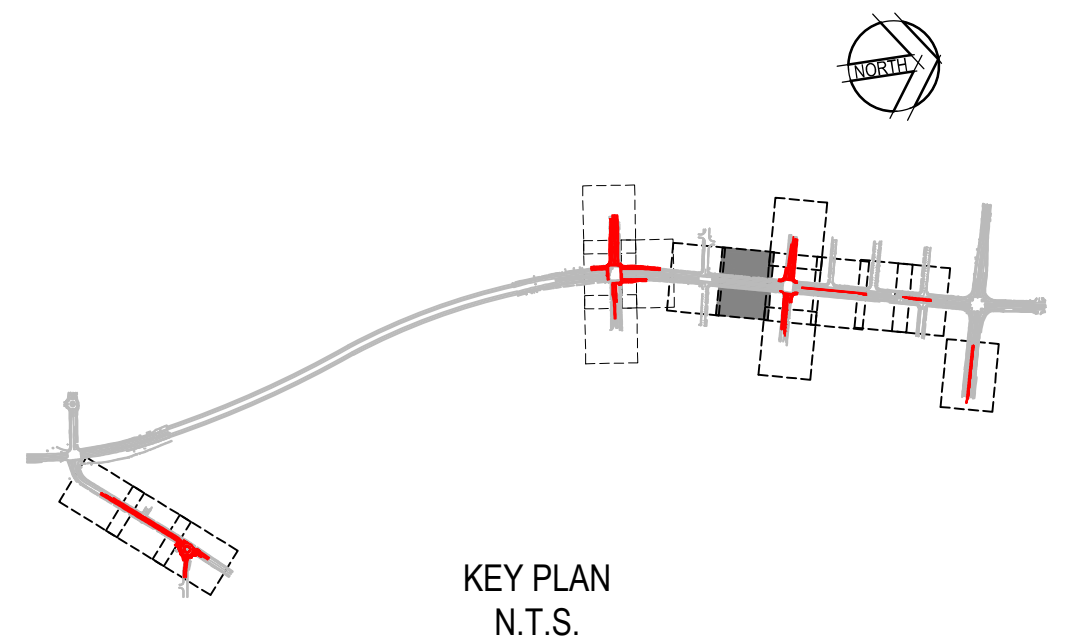
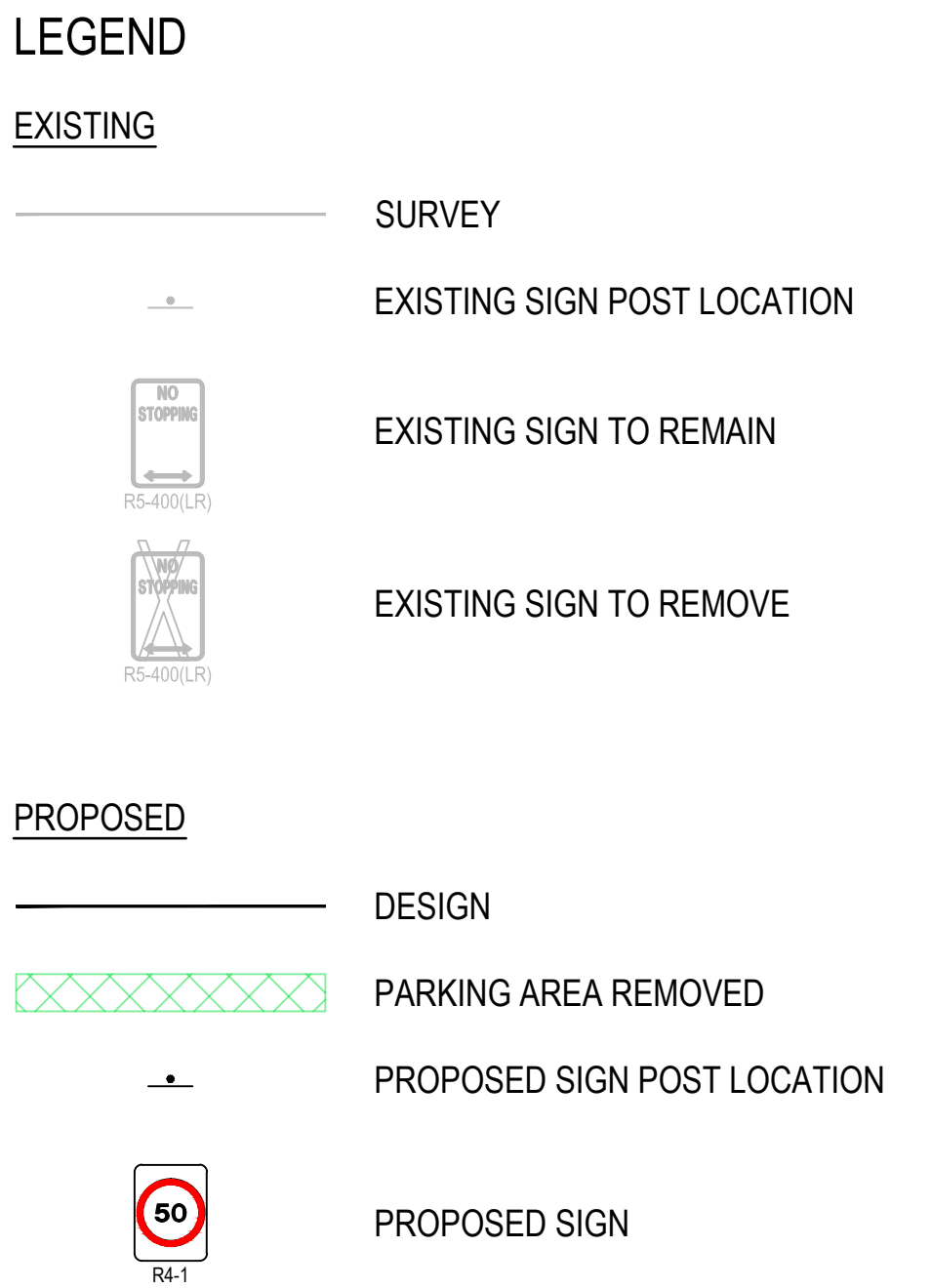
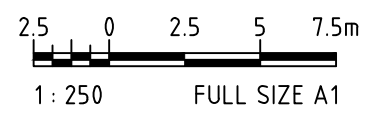
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BACKDRAFTED / CORRECTED					
CONFIRMED					

SELF CHECK

Drawn	J. Pachikova	Date	31.07.15
Checked	D. Atkinson	Date	31.07.15
Designed	D. Atkinson	Date	31.07.15
Verified	D. Atkinson	Date	31.07.15
Approved			
	R. Estrada		31.07.15

Client	PENRITH CITY COUNCIL
Project	DIRD/RMS WSP LOCAL ROADS
	PACKAGE (ROUND 1)
	MAJOR INTERSECTIONS ON THE NORTHERN ROAD
Title	CONCEPT DESIGN
	SIGNAGE PLAN
	THE NORTHERN RD / DERBY STREET SHEET 4

Status	PRELIMINARY			
NOT TO BE USED FOR CONSTRUCTION PURPOSES				
Datum	Register	Scale	Size	
AHD		AS SHOWN	A1	
Drawing Number				Revision
TNR-DRG-20-2000-RF-0254				2

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CONFIRMED					
SELF CHECK					

Drawn	Date
J. Pachikova	31.07.15
Checked	Date
D. Atkinson	31.07.15
Designed	Date
D. Atkinson	31.07.15
Verified	Date
D. Atkinson	31.07.15
Approved	
R. Estrada	31.07.15

Client	PENRITH CITY COUNCIL
Project	DIRD/RMS WSP LOCAL ROADS PACKAGE (ROUND 1) MAJOR INTERSECTIONS ON THE NORTHERN ROAD
Title	CONCEPT DESIGN SIGNAGE PLAN THE NORTHERN RD / DERBY STREET SHEET 5

Status		PRELIMINARY	
NOT TO BE USED FOR CONSTRUCTION PURPOSES			
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AHD		AS SHOWN	A1
Drawing Number			Revision
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DATE PLOTTED: 18 August 2015 9:26 AM BY: JULIA PACHIKOVA



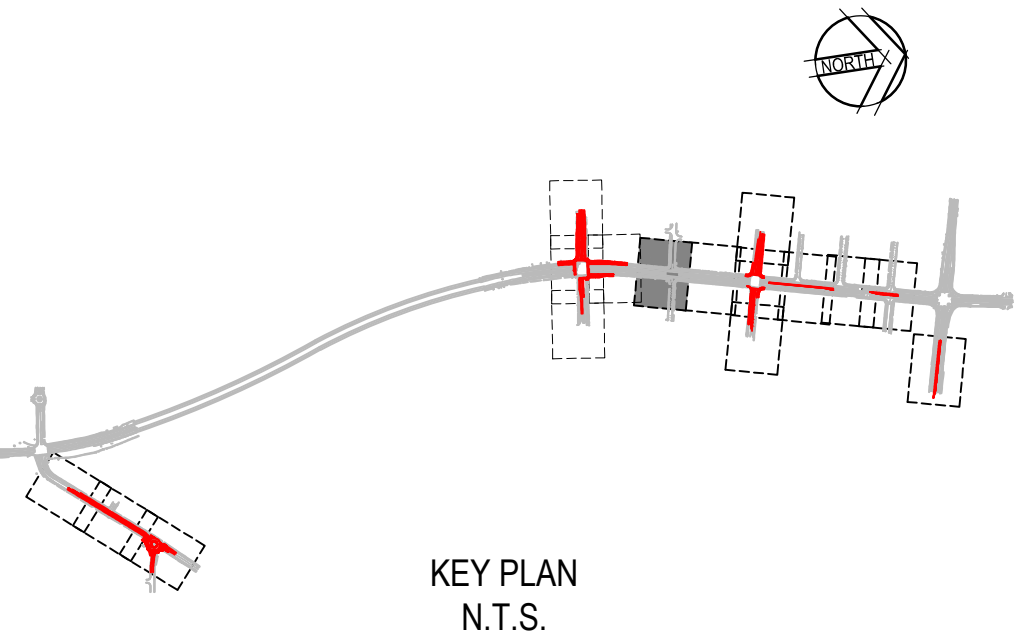
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EXISTING

- SURVEY
- EXISTING SIGN POST LOCATION
- EXISTING SIGN TO REMAIN
- EXISTING SIGN TO REMOVE

PROPOSED

- DESIGN
- PARKING AREA REMOVED
- PROPOSED SIGN POST LOCATION
- PROPOSED SIGN



Rev.	Date	Description	Des.	Verif.	Appd.
2	17.08.15	CONCEPT DESIGN	JP	DNA	RE
1	31.07.15	CONCEPT DESIGN	JP	DNA	RE

1: 250 FULL SIZE A1

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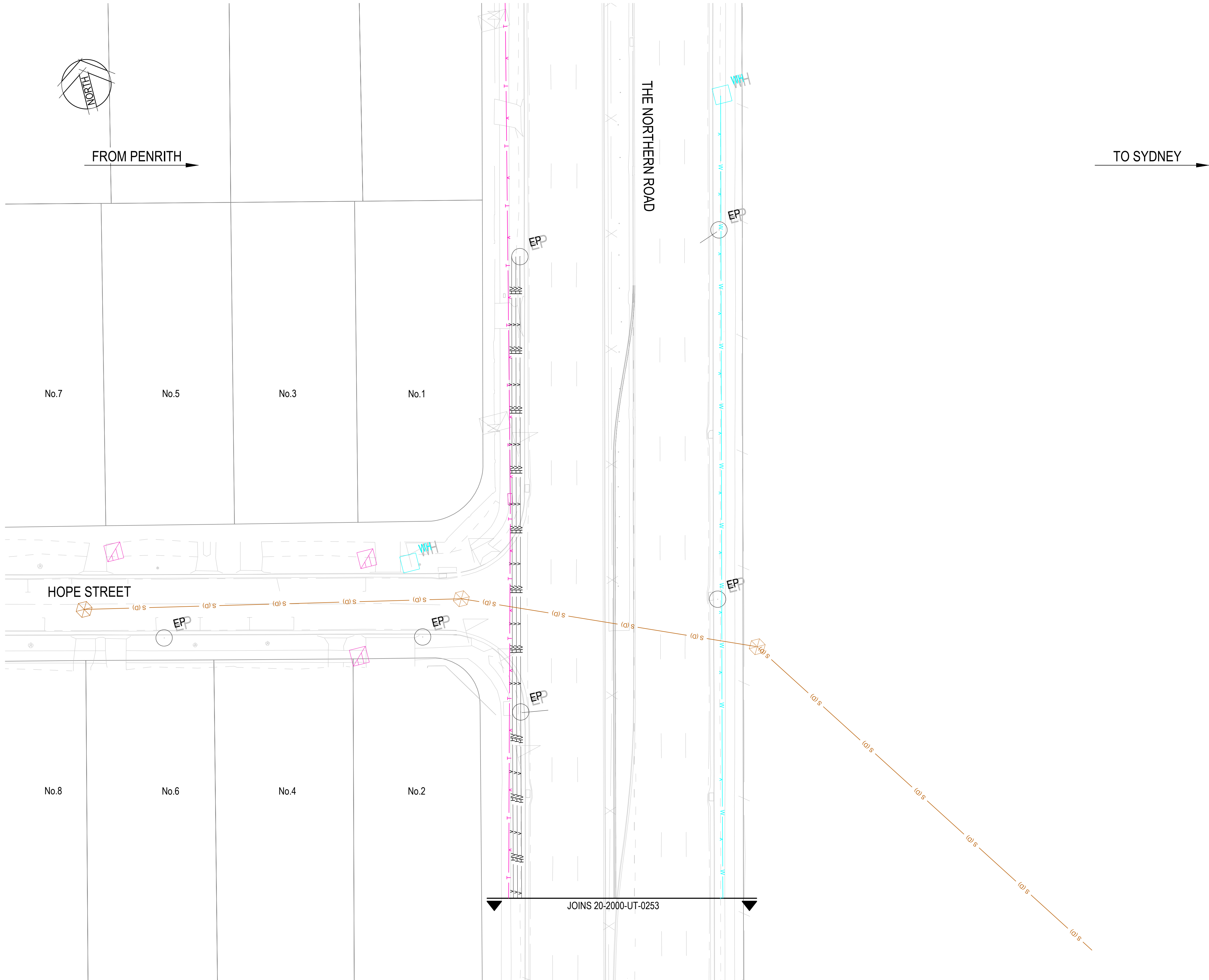
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Checked	D. Atkinson	Date	31.07.15
Designed	D. Atkinson	Date	31.07.15
Verified	D. Atkinson	Date	31.07.15
Approved		Date	

Client	PENRITH CITY COUNCIL
Project	DIRD/RMS WSIP LOCAL ROADS
Package (Round 1)	MAJOR INTERSECTIONS ON THE NORTHERN ROAD
Title	CONCEPT DESIGN SIGNAGE PLAN THE NORTHERN RD / DERBY STREET SHEET 6

Status	PRELIMINARY
Datum	AHD
Register	
Scale	AS SHOWN
Size	A1
Drawing Number	TNR-DRG-20-2000-RF-0256
Revision	2

XREFs: TNR-XRF-20-2000-RD-DESIGN; TNR-XRF-00-0000-SU-AERIAL; TNR-XRF-00-0000-SU-CAASTRAL; TNR-XRF-00-0000-SU-SURVEY; TNR-XRF-20-0000-GN-SHT-LAYOUT; TNR-XRF-20-0000-UT-DESIGN; TNR-XRF-20-0000-UT-LEGEND; A1_0250
CAD File: N:\Projects\0001\Y15058 - THE NORTHERN RD PENRITH\Drawings\Build\Drawings\TNR-DRG-20-2000-UT-0251.dwg
DATE PLOTTED: 18 August 2015 9:26 AM BY: JULIA PACHIKOVA



LEGEND

PROPOSED

- W PROPOSED WATER MAIN
- S PROPOSED SEWER MAIN
- G PROPOSED GAS MAIN
- T PROPOSED TELECOMMUNICATIONS
- E PROPOSED ELECTRICAL

EXISTING TO REMAIN

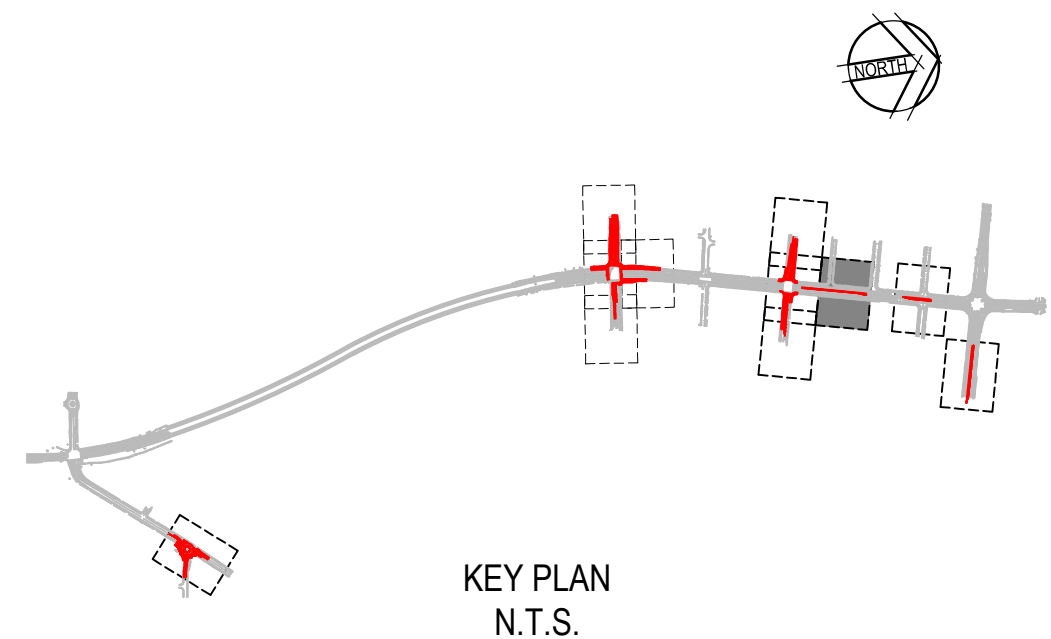
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- W (X) EXISTING WATER UNDER GROUND
- S (D) EXISTING SEWER MAIN
- G (D) EXISTING GAS MAIN
- T (D) EXISTING TELECOMMUNICATIONS
- T (X) EXISTING TELECOMMUNICATIONS U/G
- E (D) EXISTING ELECTRICAL
- LV EXISTING ELECTRICAL LV A/G
- HV EXISTING ELECTRICAL HV A/G
- HV EXISTING ELECTRICAL HV U/G
- E (D) EXISTING ELECTRICAL
- SL STREET LIGHT

REMOVED / RELOCATED

- W (X) REMOVED WATER MAIN
- S (X) REMOVED SEWER MAIN
- G (X) REMOVED GAS MAIN
- T (X) REMOVED TELECOMMUNICATIONS
- E (X) REMOVED ELECTRICAL

NOTES:

- UTILITY INFORMATION SHOWN ON THESE PLANS DOES NOT DEPICT ANY MORE 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 ROADWORKS AND THE RELEVANT UTILITY PLANS OBTAINED BY DIALLING DIAL BEFORE YOU DIG '1100'. CAUTION SHOULD BE EXERCISED WHEN WORKING IN THE VICINITY OF ALL UTILITY SERVICES.
- NO UTILITY ADJUSTMENTS REQUIRED



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Rev.	Date	Description	Des.	Verif.	Appd.				
2	17.08.15	CONCEPT DESIGN		JP	DNA	RE			
1	31.07.15	CONCEPT DESIGN		JP	DNA	RE			

2.5 0 2.5 5 7.5m
1 : 250 FULL SIZE A1

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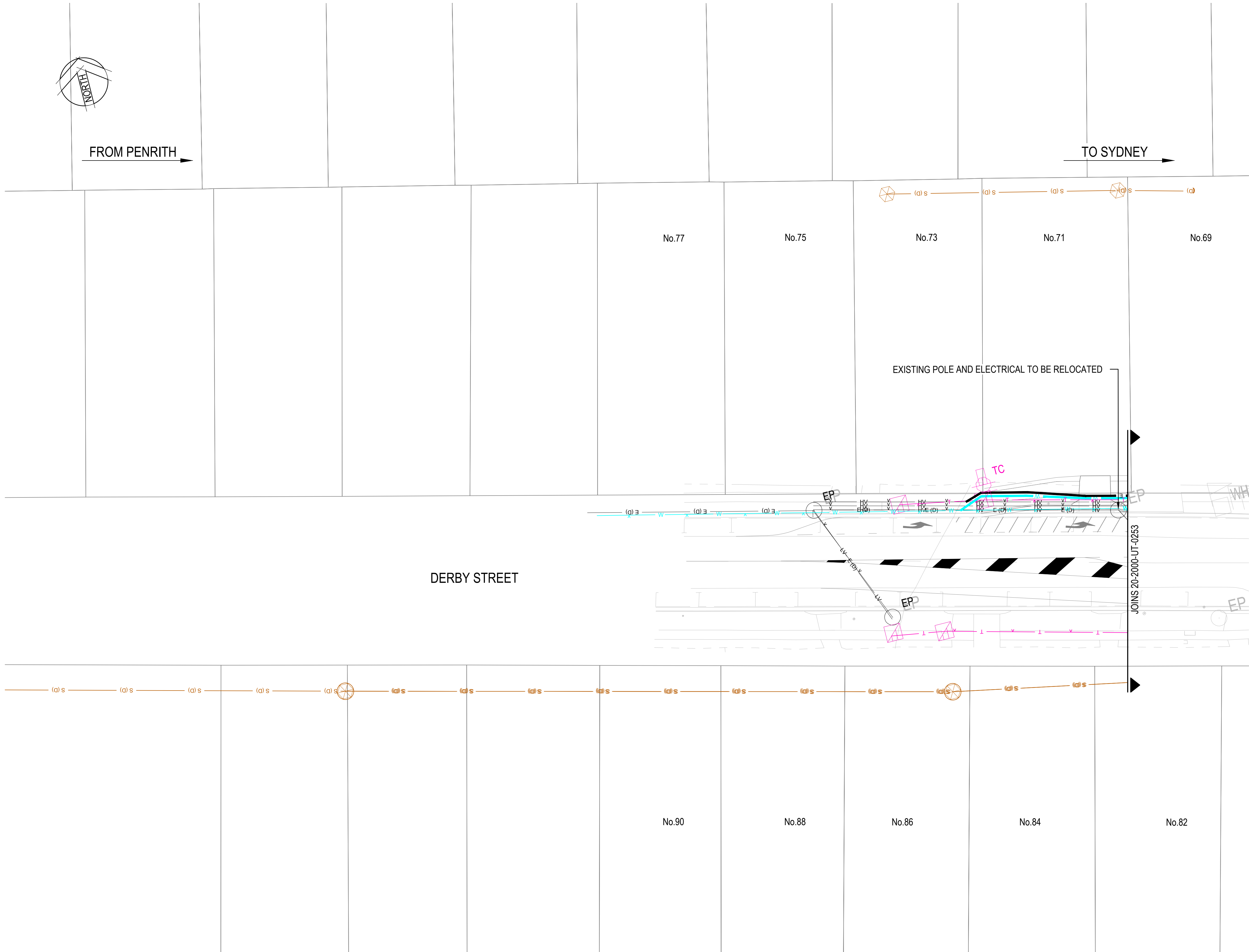
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Checked	D. Atkinson	Date	31.07.15
Designed	A. Dorani	Date	31.07.15
Verified	D. Atkinson	Date	31.07.15
Approved			
	R. Estrada	Date	31.07.15

Client	PENRITH CITY COUNCIL
Project	DIRD/RMS WSP LOCAL ROADS PACKAGE (ROUND 1) MAJOR INTERSECTIONS ON THE NORTHERN ROAD
Title	CONCEPT DESIGN UTILITIES PLAN THE NORTHERN RD / DERBY STREET SHEET 1

Status	PRELIMINARY			
NOT TO BE USED FOR CONSTRUCTION PURPOSES				
Datum	Register	Scale	Size	
AHD		AS SHOWN	A1	
Drawing Number				Revision
TNR-DRG-20-2000-UT-0251				2

XREFs: TNR-XRF-20-2000-RD-DESIGN; TNR-XRF-00-0000-SU-AERIAL_FADED; TNR-XRF-00-0000-SU-STREET_NAMES; TNR-XRF-00-0000-SU-SURVEY; TNR-XRF-20-0000-UT-LEGEND_A1_0250; TNR-XRF-20-0000-UT-DESIGN
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DATE PLOTTED: 18 August 2015 9:27 AM BY: JULIA PACHKOVA



LEGEND

PROPOSED

- W PROPOSED WATER MAIN
- S PROPOSED SEWER MAIN
- G PROPOSED GAS MAIN
- T PROPOSED TELECOMMUNICATIONS
- E PROPOSED ELECTRICAL

EXISTING TO REMAIN

- W (D) EXISTING WATER MAIN
- W EXISTING WATER UNDER GROUND
- S (D) EXISTING SEWER MAIN
- G (D) EXISTING GAS MAIN
- T (D) EXISTING TELECOMMUNICATIONS
- T EXISTING TELECOMMUNICATIONS U/G
- E (D) EXISTING ELECTRICAL
- LV EXISTING ELECTRICAL LV A/G
- HV EXISTING ELECTRICAL HV A/G
- HV EXISTING ELECTRICAL HV U/G
- E (D) EXISTING ELECTRICAL
- SL STREET LIGHT

REMOVED / RELOCATED

- W REMOVED WATER MAIN
- S REMOVED SEWER MAIN
- G REMOVED GAS MAIN
- T REMOVED TELECOMMUNICATIONS
- E REMOVED ELECTRICAL

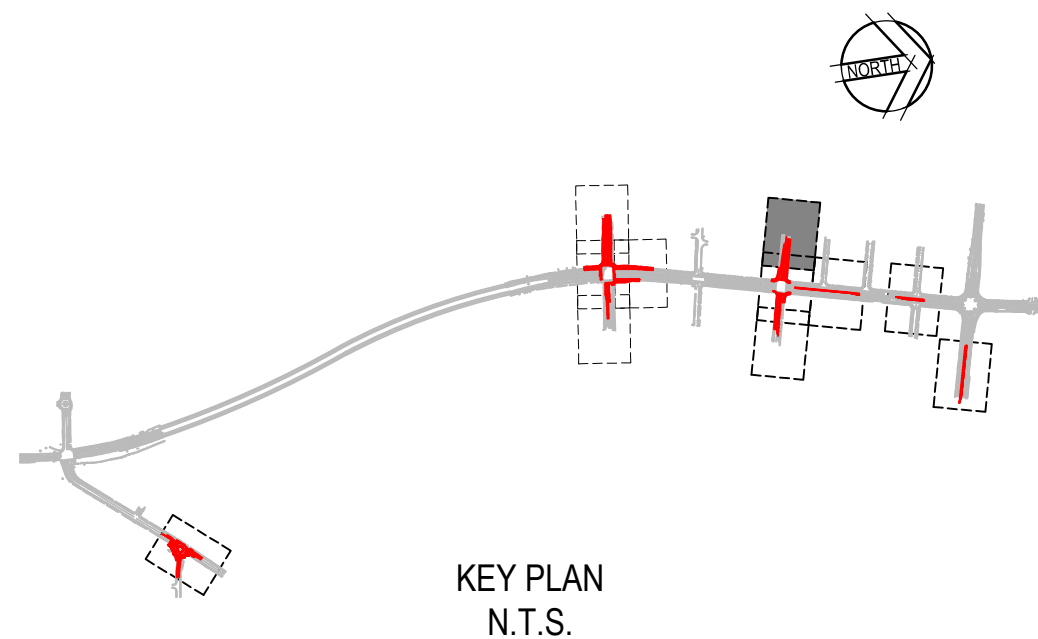
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1.



ROADWORKS AND THE RELEVANT UTILITY PLANS OBTAINED BY DIALLING DIAL BEFORE YOU DIG '1100'. CAUTION SHOULD BE EXERCISED WHEN WORKING IN THE VICINITY OF ALL UTILITY SERVICES.

UTILITY INFORMATION SHOWN ON THESE PLANS DOES NOT DEPICT ANY MORE 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



Rev.	Date	Description	Des.	Verif.	Appd.
2	17.08.15	CONCEPT DESIGN	JP	DNA	RE
1	31.07.15	CONCEPT DESIGN	JP	DNA	RE

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1: 250 FULL SIZE A1

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BACKDRAFTED / CORRECTED					
CONFIRMED					

SELF CHECK

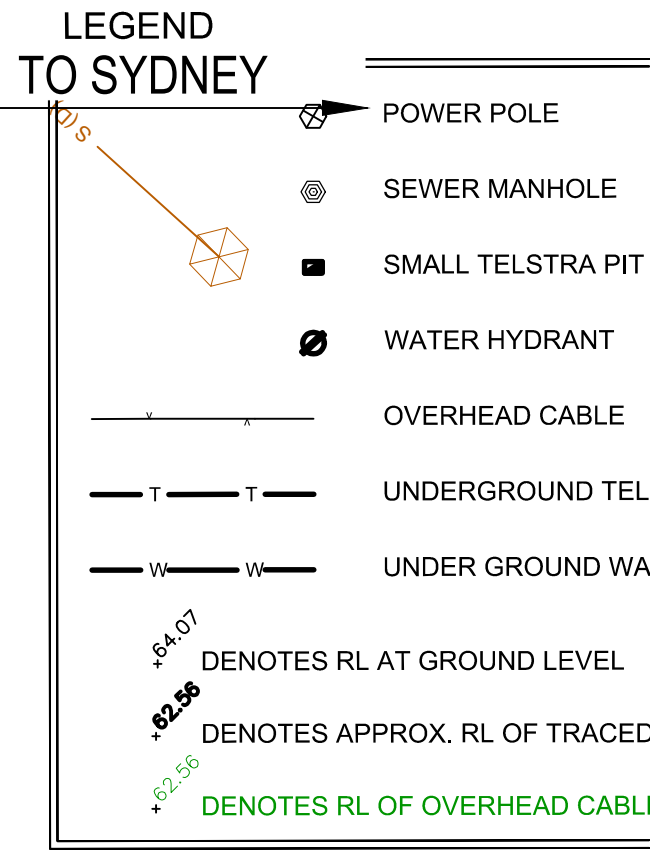
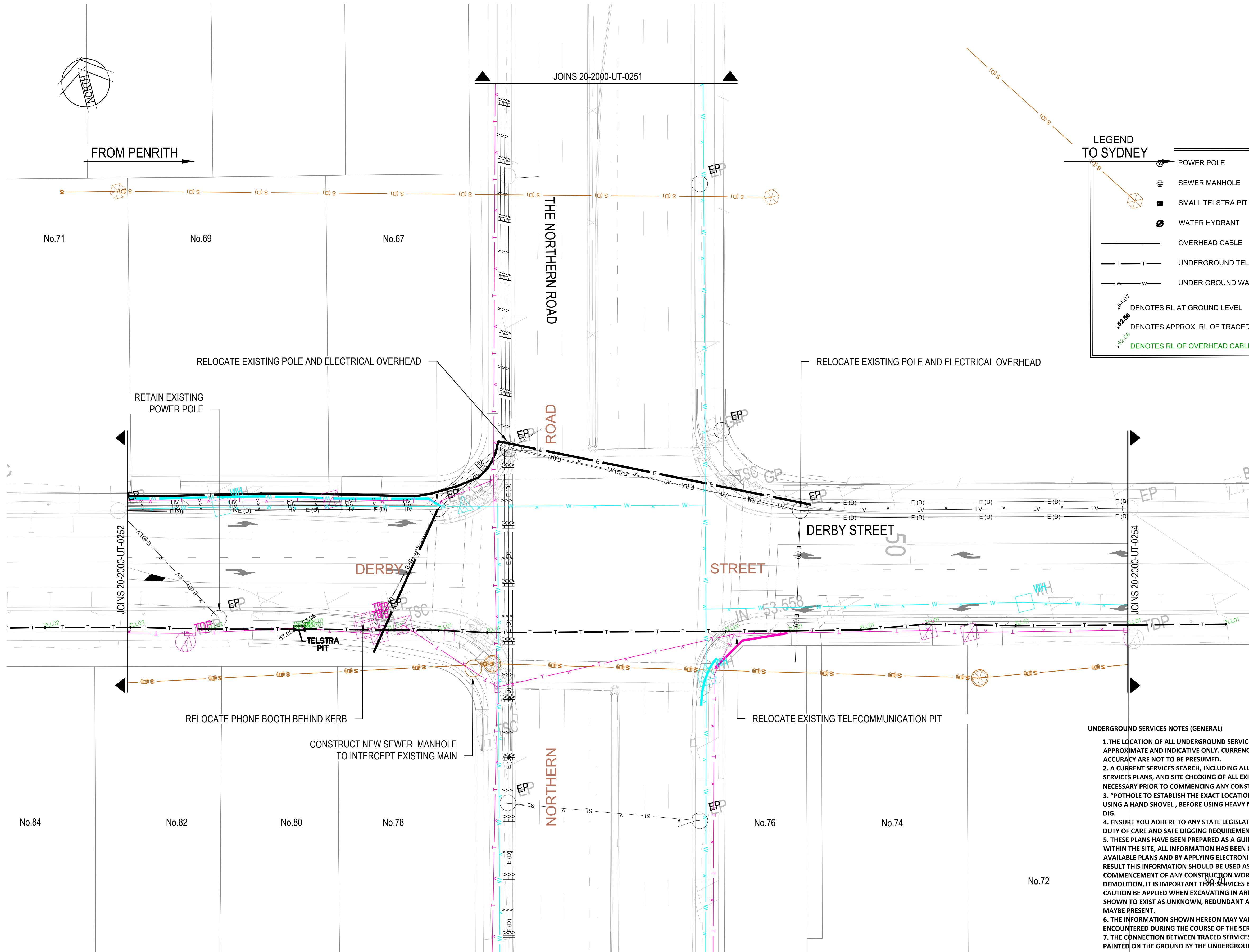
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Checked	D. Atkinson	Date	31.07.15
Designed	A. Dorani	Date	31.07.15
Verified	D. Atkinson	Date	31.07.15
Approved			

Client	PENRITH CITY COUNCIL
Project	DIRD/RMS WSIP LOCAL ROADS PACKAGE (ROUND 1) MAJOR INTERSECTIONS ON THE NORTHERN ROAD
Title	CONCEPT DESIGN UTILITIES PLAN THE NORTHERN RD / DERBY STREET SHEET 2

Status	PRELIMINARY
Datum	AHD
Register	
Scale	AS SHOWN
Size	A1
Drawing Number	TNR-DRG-20-2000-UT-0252
Revision	2

XREFs: TNR-XRF-20-2000-RD-DESIGN; TNR-XRF-00-0000-SU-AERIAL; TNR-XRF-00-0000-SU-CA/ASTRAL; TNR-XRF-00-0000-SU-SURVEY; TNR-XRF-20-0000-GN-SHT-LAYOUT; A1_0250; TNR-XRF-20-0000-UT-LEGEND; A1_0250; TNR-XRF-20-0000-UT-DESIGN
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DATE PLOTTED: 18 August 2015 9:27 AM BY: JULIA PACHKOVA



LEGEND

PROPOSED

- W PROPOSED WATER MAIN
- S PROPOSED SEWER MAIN
- G PROPOSED GAS MAIN
- T PROPOSED TELECOMMUNICATIONS
- E PROPOSED ELECTRICAL

EXISTING TO REMAIN

- W (D) EXISTING WATER MAIN
- W (D) EXISTING WATER UNDER GROUND
- S (D) EXISTING SEWER MAIN
- G (D) EXISTING GAS MAIN
- T (D) EXISTING TELECOMMUNICATIONS
- T (D) EXISTING TELECOMMUNICATIONS U/G
- E (D) EXISTING ELECTRICAL
- LV EXISTING ELECTRICAL LV A/G
- HV EXISTING ELECTRICAL HV A/G
- HV EXISTING ELECTRICAL HV U/G
- E (D) EXISTING ELECTRICAL
- SL STREET LIGHT

REMOVED / RELOCATED

- W REMOVED WATER MAIN
- S REMOVED SEWER MAIN
- G REMOVED GAS MAIN
- T REMOVED TELECOMMUNICATIONS
- E REMOVED ELECTRICAL

NOTES:

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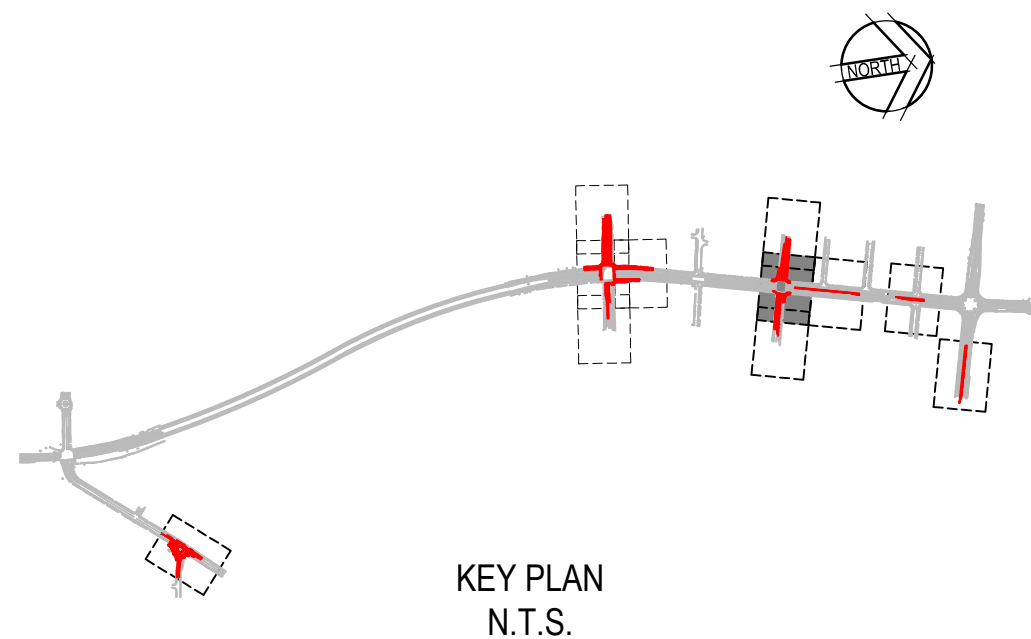


ROADWORKS AND THE RELEVANT UTILITY PLANS OBTAINED BY DIALLING DIAL BEFORE YOU DIG '1100'. CAUTION SHOULD BE EXERCISED WHEN WORKING IN THE VICINITY OF ALL UTILITY SERVICES.

UTILITY INFORMATION SHOWN ON THESE PLANS DOES NOT DEPICT ANY MORE 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 ANY CONSTRUCTION WORK.

UNDERGROUND SERVICES NOTES (GENERAL)

1. THE LOCATION OF ALL UNDERGROUND SERVICES ARE APPROXIMATE AND INDICATIVE ONLY. CURRENT ACCURACY ARE NOT TO BE PRESUMED.
2. A CURRENT SERVICES SEARCH, INCLUDING ALL SERVICES PLANS, AND SITE CHECKING OF ALL EXISTING SERVICES PRIOR TO COMMENCING ANY CONSTRUCTION WORK IS NECESSARY.
3. "POTHOLE TO ESTABLISH THE EXACT LOCATION OF SERVICES PRIOR TO COMMENCING ANY CONSTRUCTION WORK. USING A HAND SHOVEL, BEFORE USING HEAVY DIGGER."
4. ENSURE YOU ADHERE TO ANY STATE LEGISLATION RELATIVE TO THE DUTY OF CARE AND SAFE DIGGING REQUIREMENTS.
5. THESE PLANS HAVE BEEN PREPARED AS A GUIDE ONLY. WITHIN THE SITE, ALL INFORMATION HAS BEEN OBTAINED FROM AVAILABLE PLANS AND BY APPLYING ELECTRONIC SERVICES. THIS INFORMATION SHOULD BE USED AS A GUIDE ONLY. THE RESULT OF THIS INFORMATION SHOULD BE USED AS A GUIDE ONLY. THE RESULT OF THIS INFORMATION SHOULD BE USED AS A GUIDE ONLY.
6. THE INFORMATION SHOWN HEREON MAY VARY FROM THE ACTUAL SITUATION ENCOUNTERED DURING THE COURSE OF THE WORK.
7. THE CONNECTION BETWEEN TRACED SERVICES TO EXISTING SERVICES MAY BE PRESENT.



REVISION IN PROGRESS

2.5 0 2.5 5 7.5m
1: 250 FULL SIZE A1

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CONFIRMED					

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Drawn	J. Pachikova	Date	31.07.15
Checked	D. Atkinson	Date	31.07.15
Designed	A. Dorani	Date	31.07.15
Verified	D. Atkinson	Date	31.07.15
Approved		Date	

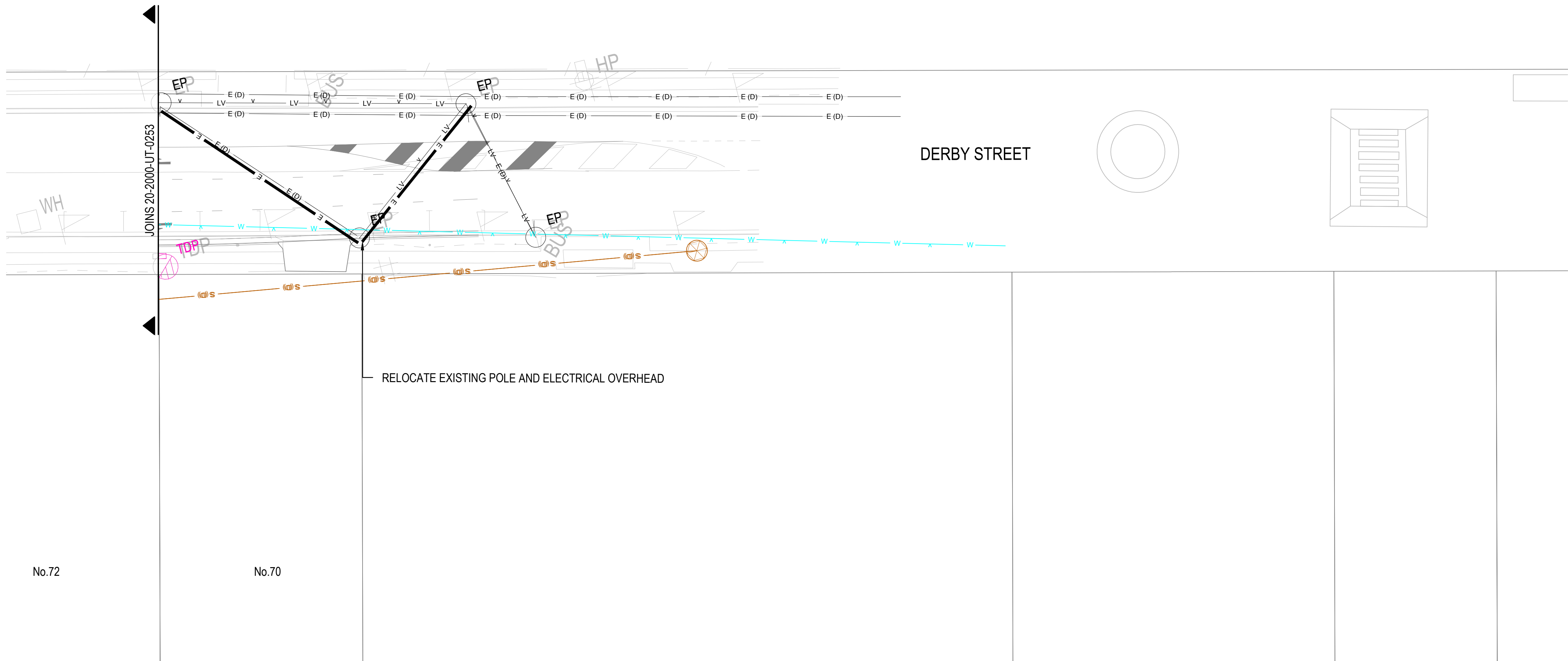
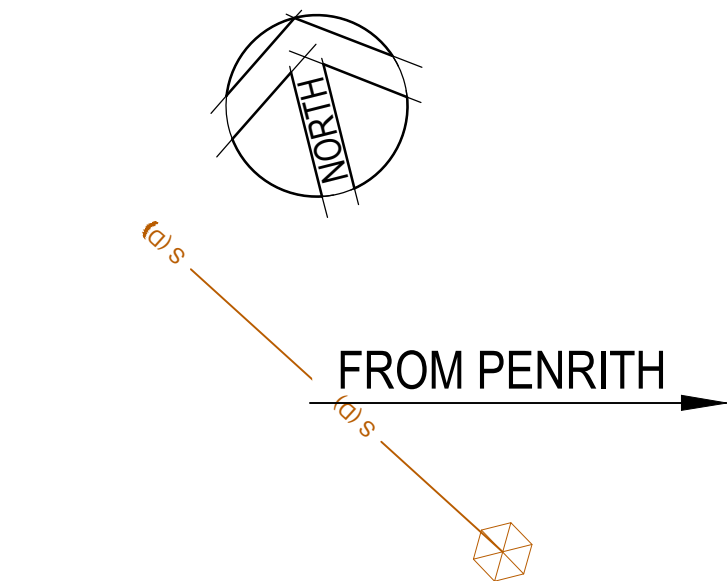
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Project	DIRD/RMS WSP LOCAL ROADS PACKAGE (ROUND 1) MAJOR INTERSECTIONS ON THE NORTHERN ROAD UTILITIES PLAN
Title	THE NORTHERN RD / DERBY STREET SHEET 3

Status	PRELIMINARY
Datum	AHD
Register	
Scale	AS SHOWN
Size	A1
Drawing Number	TNR-DRG-20-2000-UT-0253
Revision	2

Rev.	Date	Description	Des.	Verif.	Appd.
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1	31.07.15	CONCEPT DESIGN	JP	DNA	RE

XREFs: TNR-XRF-20-2000-RD-DESIGN; TNR-XRF-20-2000-SU-AERIAL; TNR-XRF-20-2000-SU-CAASTRAL; TNR-XRF-20-2000-SU-SURVEY; TNR-XRF-20-2000-GN-STREET NAMES; TNR-XRF-20-2000-UT-LEGEND; A1_0250; TNR-XRF-20-2000-UT-DESIGN
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DATE PLOTTED: 18 August 2015 9:27 AM BY: JULIA PACHKOVA



LEGEND

PROPOSED

- W PROPOSED WATER MAIN
- S PROPOSED SEWER MAIN
- G PROPOSED GAS MAIN
- T PROPOSED TELECOMMUNICATIONS
- E PROPOSED ELECTRICAL

EXISTING TO REMAIN

- W (D) EXISTING WATER MAIN
- W (D) EXISTING WATER UNDER GROUND
- S (D) EXISTING SEWER MAIN
- G (D) EXISTING GAS MAIN
- T (D) EXISTING TELECOMMUNICATIONS
- T (D) EXISTING TELECOMMUNICATIONS U/G
- E (D) EXISTING ELECTRICAL
- LV EXISTING ELECTRICAL LV A/G
- HV EXISTING ELECTRICAL HV A/G
- HV EXISTING ELECTRICAL HV U/G
- E (D) EXISTING ELECTRICAL
- SL STREET LIGHT

REMOVED / RELOCATED

- W REMOVED WATER MAIN
- S REMOVED SEWER MAIN
- G REMOVED GAS MAIN
- T REMOVED TELECOMMUNICATIONS
- E REMOVED ELECTRICAL

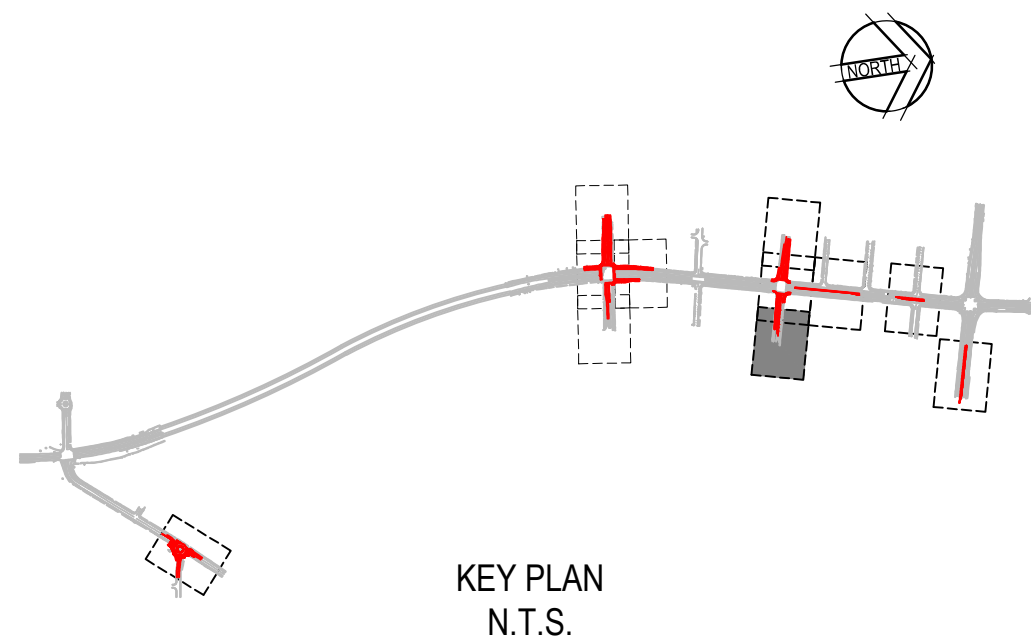
NOTES:

1.



ROADWORKS AND THE RELEVANT UTILITY PLANS OBTAINED BY DIALLING YOU DIG '1100'. CAUTION SHOULD BE EXERCISED WHEN WORKING IN THE VICINITY OF ALL UTILITY SERVICES.

UTILITY INFORMATION SHOWN ON THESE PLANS DOES NOT DEPICT ANY MORE 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



Rev.	Date	Description	Des.	Verif.	Appd.
2	17.08.15	CONCEPT DESIGN	JP	DNA	RE
1	31.07.15	CONCEPT DESIGN	JP	DNA	RE

2.5 0 2.5 5 7.5m
1: 250 FULL SIZE A1

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CONFIRMED					

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Drawn	J. Pachikova	Date	31.07.15
Checked	D. Atkinson	Date	31.07.15
Designed	A. Dorani	Date	31.07.15
Verified	D. Atkinson	Date	31.07.15
Approved			
	R. Estrada	Date	31.07.15

Client	PENRITH CITY COUNCIL
Project	DIRD/RMS WSIP LOCAL ROADS PACKAGE (ROUND 1) MAJOR INTERSECTIONS ON THE NORTHERN ROAD
Title	CONCEPT DESIGN UTILITIES PLAN THE NORTHERN RD / DERBY STREET SHEET 4

Status	PRELIMINARY
Datum	AHD
Register	
Scale	AS SHOWN
Size	A1
Drawing Number	TNR-DRG-20-2000-UT-0254
Revision	2

Appendix C

Database Search Results

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 (^ rounded to 0.1°; ^^ rounded to 0.01°). Copyright the State of NSW through the Office of Environment and Heritage. Search criteria : Public Report of all Valid Records of Entities in PENRITH LGA returned a total of 39,257 records of 2,206 species.

Report generated on 20/12/2016 8:28 AM

k=known

Kingdom	Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records
Animalia	Amphibia	Myobatrachidae	<i>Heleioporus australiacus</i>	Giant Burrowing Frog	V,P	V	1
Animalia	Amphibia	Myobatrachidae	<i>Mixophyes balbus</i>	Stuttering Frog	E1,P,2	V	K
Animalia	Amphibia	Myobatrachidae	<i>Mixophyes iteratus</i>	Giant Barred Frog	E1,P,2	E	K
Animalia	Amphibia	Myobatrachidae	<i>Pseudophryne australis</i>	Red-crowned Toadlet	V,P		1
Animalia	Amphibia	Hylidae	<i>Litoria aurea</i>	Green and Golden Bell Frog	E1,P	V	9
Animalia	Amphibia	Hylidae	<i>Litoria booroolongensis</i>	Booroolong Frog	E1,P	E	K
Animalia	Amphibia	Hylidae	<i>Litoria littlejohni</i>	Littlejohn's Tree Frog	V,P	V	K
Animalia	Reptilia	Scincidae	<i>Eulamprus leuraensis</i>	Blue Mountains Water skink	E1,P	E	K
Animalia	Reptilia	Varanidae	<i>Varanus rosenbergi</i>	Rosenberg's Goanna	V,P		K
Animalia	Reptilia	Elapidae	<i>Hoplocephalus bungaroides</i>	Broad-headed Snake	E1,P,2	V	K
Animalia	Aves	Anatidae	<i>Stictonetta naevosa</i>	Freckled Duck	V,P		2
Animalia	Aves	Columbidae	<i>Ptilinopus superbus</i>	Superb Fruit-Dove	V,P		K
Animalia	Aves	Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	E1,P		4
Animalia	Aves	Ardeidae	<i>Botaurus poiciloptilus</i>	Australasian Bittern	E1,P	E	1
Animalia	Aves	Ardeidae	<i>Ixobrychus flavicollis</i>	Black Bittern	V,P		2
Animalia	Aves	Accipitridae	<i>Circus assimilis</i>	Spotted Harrier	V,P		1
Animalia	Aves	Accipitridae	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V,P	C	7
Animalia	Aves	Accipitridae	<i>Hieraetus morphnoides</i>	Little Eagle	V,P		6
Animalia	Aves	Accipitridae	<i>Lophoictinia isura</i>	Square-tailed Kite	V,P,3		5
Animalia	Aves	Accipitridae	<i>Pandion cristatus</i>	Eastern Osprey	V,P,3		K
Animalia	Aves	Falconidae	<i>Falco subniger</i>	Black Falcon	V,P		K
Animalia	Aves	Burhinidae	<i>Burhinus grallarius</i>	Blush Stone-curlew	E1,P		2
Animalia	Aves	Jacaniidae	<i>Irediparra gallinacea</i>	Comb-crested Jacana	V,P		K
Animalia	Aves	Rostratulidae	<i>Rostratula australis</i>	Australian Painted Snipe	E1,P	E	1
Animalia	Aves	Scolopacidae	<i>Calidris ferruginea</i>	Curlew Sandpiper	E1,P	CE,C,J,K	K
Animalia	Aves	Scolopacidae	<i>Limicola falcinellus</i>	Broad-billed Sandpiper	V,P	C,J,K	K
Animalia	Aves	Scolopacidae	<i>Limosa limosa</i>	Black-tailed Godwit	V,P	C,J,K	1
Animalia	Aves	Cacatuidae	<i>Callocephalus fimbriatum</i>	Gang-gang Cockatoo	V,P,3		5
Animalia	Aves	Cacatuidae	<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	V,P,2		9
Animalia	Aves	Psittacidae	<i>Glossopsitta pusilla</i>	Little Lorikeet	V,P		9
Animalia	Aves	Psittacidae	<i>Lathamus discolor</i>	Swift Parrot	E1,P,3	CE	33
Animalia	Aves	Psittacidae	<i>Neophema pulchella</i>	Turquoise Parrot	V,P,3		2
Animalia	Aves	Strigidae	<i>Ninox connivens</i>	Barking Owl	V,P,3		2
Animalia	Aves	Strigidae	<i>Ninox strenua</i>	Powerful Owl	V,P,3		9
Animalia	Aves	Tytonidae	<i>Tyto novaehollandiae</i>	Masked Owl	V,P,3		13
Animalia	Aves	Tytonidae	<i>Tyto tenebricosa</i>	Sooty Owl	V,P,3		1
Animalia	Aves	Climacteridae	<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V,P		K
Animalia	Aves	Acanthizidae	<i>Chthonicola sagittata</i>	Speckled Warbler	V,P		21
Animalia	Aves	Meliphagidae	<i>Anthochaera phrygia</i>	Regent Honeyeater	E4A,P	CE	5
Animalia	Aves	Meliphagidae	<i>Epthianura albifrons</i>	White-fronted Chat	V,P		P

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Animalia	Aves	Meliphagidae	<i>Grantiella picta</i>	Painted Honeyeater	V,P	V	1
Animalia	Aves	Meliphagidae	<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	V,P		3
Animalia	Aves	Pomatostomidae	<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V,P		K
Animalia	Aves	Neosittidae	<i>Daphoenositta chrysoptera</i>	Varied Sittella	V,P		59
Animalia	Aves	Artamidae	<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V,P		27
Animalia	Aves	Petroicidae	<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern form)	V,P		1
Animalia	Aves	Petroicidae	<i>Petroica boodang</i>	Scarlet Robin	V,P		12
Animalia	Aves	Petroicidae	<i>Petroica phoenicea</i>	Flame Robin	V,P		5
Animalia	Aves	Estrildidae	<i>Stagonopleura guttata</i>	Diamond Firetail	V,P		4
Animalia	Mammalia	Dasyuridae	<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V,P	E	4
Animalia	Mammalia	Dasyuridae	<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale	V,P		K
Animalia	Mammalia	Peramelidae	<i>Isodon obesulus obesulus</i>	Southern Brown Bandicoot (eastern)	E1,P	E	K
Animalia	Mammalia	Phascolarctidae	<i>Phascolarctos cinereus</i>	Koala	V,P	V	6
Animalia	Mammalia	Burramyidae	<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V,P		K
Animalia	Mammalia	Petauridae	<i>Petaurus australis</i>	Yellow-bellied Glider	V,P		1
Animalia	Mammalia	Petauridae	<i>Petaurus norfolcensis</i>	Squirrel Glider	V,P		4
Animalia	Mammalia	Macropodidae	<i>Macropus parma</i>	Parma Wallaby	V,P		P
Animalia	Mammalia	Macropodidae	<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E1,P	V	K
Animalia	Mammalia	Pteropodidae	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V,P	V	61
Animalia	Mammalia	Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V,P		1
Animalia	Mammalia	Molossidae	<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat	V,P		35
Animalia	Mammalia	Vespertilionidae	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V,P	V	4
Animalia	Mammalia	Vespertilionidae	<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V,P		13
Animalia	Mammalia	Vespertilionidae	<i>Miniopterus australis</i>	Little Bentwing-bat	V,P		1
Animalia	Mammalia	Vespertilionidae	<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat	V,P		45
Animalia	Mammalia	Vespertilionidae	<i>Myotis macropus</i>	Southern Myotis	V,P		31
Animalia	Mammalia	Vespertilionidae	<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V,P		22
Animalia	Mammalia	Vespertilionidae	<i>Vespadelus troughtoni</i>	Eastern Cave Bat	V,P		K
Animalia	Insecta	Lycaenidae	<i>Paralucia spinifera</i>	Purple Copper Butterfly, Bathurst Copper Butterfly	E1	V	K
Animalia	Insecta	Petaluridae	<i>Petalura gigantea</i>	Giant Dragonfly	E1		K
Animalia	Gastropoda	Camaenidae	<i>Meridolum corneovirens</i>	Cumberland Plain Land Snail	E1		168
Animalia	Gastropoda	Camaenidae	<i>Pommerhelix duralensis</i>	Dural Woodland Snail	E1	E	K

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Plantae	Flora	Anthericaceae	<i>Caesia parviflora</i> var. <i>minor</i>	Small Pale Grass-lily	E1,P		K
Plantae	Flora	Apiaceae	<i>Xanthosia scopulicola</i>		V,P		K
Plantae	Flora	Apocynaceae	<i>Cynanchum elegans</i>	White-flowered Wax Plant	E1,P	E	K
Plantae	Flora	Apocynaceae	<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		219
Plantae	Flora	Araliaceae	<i>Astrotricha crassifolia</i>	Thick-leaf Star-hair	V,P	V	K
Plantae	Flora	Asteraceae	<i>Olearia cordata</i>		V,P	V	K
Plantae	Flora	Calomniaceae	<i>Calomnion complanatum</i>		E1,P		K
Plantae	Flora	Casuarinaceae	<i>Allocasuarina glareicola</i>		E1,P	E	35
Plantae	Flora	Cunoniaceae	<i>Acrophyllum australe</i>		V,P	V	K
Plantae	Flora	Cyperaceae	<i>Carex klaphakei</i>	Klaphake's Sedge	E1,P		K
Plantae	Flora	Cyperaceae	<i>Lepidosperma evansianum</i>	Evans Sedge	V,P		K
Plantae	Flora	Dilleniaceae	<i>Hibbertia puberula</i>		E1,P		K
Plantae	Flora	Dilleniaceae	<i>Hibbertia</i> sp. <i>Bankstown</i>		E4A,P	CE	P
Plantae	Flora	Dilleniaceae	^ <i>Hibbertia spanantha</i>	Julian's Hibbertia	E4A,P,2	CE	K
Plantae	Flora	Dilleniaceae	<i>Hibbertia superans</i>		E1,P		K
Plantae	Flora	Dryopteridaceae	^^ <i>Lastreopsis hispida</i>	Bristly Shield Fern	E1,P,3		K
Plantae	Flora	Elaeocarpaceae	<i>Tetratheca glandulosa</i>		V,P		K
Plantae	Flora	Ericaceae	<i>Epacris hamiltonii</i>		E1,P	E	K
Plantae	Flora	Ericaceae	<i>Epacris purpurascens</i> var. <i>purpurascens</i>		V,P		K
Plantae	Flora	Ericaceae	<i>Epacris sparsa</i>	Sparse Heath	V,P	V	K
Plantae	Flora	Ericaceae	<i>Leucopogon exolasius</i>	Woronora Beard-heath	V,P	V	K
Plantae	Flora	Ericaceae	<i>Leucopogon fletcheri</i> subsp. <i>fletcheri</i>		E1,P		K
Plantae	Flora	Fabaceae (Faboideae)	<i>Dillwynia tenuifolia</i>	Dillwynia tenuifolia, Kemps Creek	E2,V,P		K
Plantae	Flora	Fabaceae (Faboideae)	<i>Dillwynia tenuifolia</i>		V,P		393
Plantae	Flora	Fabaceae (Faboideae)	<i>Pultenaea glabra</i>	Smooth Bush-Pea	V,P	V	K
Plantae	Flora	Fabaceae (Faboideae)	<i>Pultenaea parviflora</i>		E1,P	V	139
Plantae	Flora	Fabaceae (Faboideae)	<i>Pultenaea pedunculata</i>	Matted Bush-pea	E1,P		K
Plantae	Flora	Fabaceae (Faboideae)	^^ <i>Pultenaea</i> sp. <i>Olinda</i>		E1,P,3		K
Plantae	Flora	Fabaceae (Faboideae)	<i>Pultenaea villifera</i>	<i>Pultenaea villifera</i> Sieber ex DC. population in the Blue Mountains local government area	E2		K
Plantae	Flora	Fabaceae (Mimosoideae)	<i>Acacia baueri</i> subsp. <i>aspera</i>		V,P		K
Plantae	Flora	Fabaceae (Mimosoideae)	<i>Acacia bynoeana</i>	Bynoe's Wattle	E1,P	V	45

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Plantae	Flora	Fabaceae	<i>Acacia flocktoniae</i>	Flockton Wattle	V,P	V	K
Plantae	Flora	(Mimosoideae) Fabaceae	<i>Acacia gordonii</i>		E1,P	E	K
Plantae	Flora	(Mimosoideae) Fabaceae	<i>Acacia meiantha</i>		E1,P		K
Plantae	Flora	(Mimosoideae) Fabaceae	<i>Acacia pubescens</i>	Downy Wattle	V,P	V	1
Plantae	Flora	Goodeniaceae	<i>Velleia perfoliata</i>		V,P	V	K
Plantae	Flora	Grammitidaceae	<i>^^Grammitis stenophylla</i>	Narrow-leaf Finger Fern	E1,P,3		K
Plantae	Flora	Gyrostemonaceae	<i>^^Gyrostemon thesioides</i>		E1,P,3		K
Plantae	Flora	Haloragaceae	<i>Haloragis exalata subsp. exalata</i>	Square Raspwort	V,P	V	K
Plantae	Flora	Haloragaceae	<i>Haloragodendron lucasii</i>		E1,P	E	K
Fungi	Flora	Hygrophoraceae	<i>Hygrocybe anomala var. ianthinomarginata</i>		V,P		P
Fungi	Flora	Hygrophoraceae	<i>Hygrocybe aurantipes</i>		V,P		K
Fungi	Flora	Hygrophoraceae	<i>Hygrocybe reesiaae</i>		V,P		K
Plantae	Flora	Lamiaceae	<i>Prostanthera cryptandroides subsp. cryptandroides</i>	Wollemi Mint-bush	V,P	V	K
Plantae	Flora	Malvaceae	<i>Commersonia prostrata</i>	Dwarf Kerrawang	E1,P	E	P
Plantae	Flora	Malvaceae	<i>Lasiopetalum joyceae</i>		V,P	V	K
Plantae	Flora	Marsileaceae	<i>^^Pilularia novae-hollandiae</i>	Austral Pillwort	E1,P,3		K
Plantae	Flora	Myrtaceae	<i>^^Baeckea kandos</i>		E1,P,3	E	P
Plantae	Flora	Myrtaceae	<i>Callistemon megalongensis</i>	Megalong Valley Bottlebrush	E4A,P	CE	P
Plantae	Flora	Myrtaceae	<i>Darwinia biflora</i>		V,P	V	K
Plantae	Flora	Myrtaceae	<i>Darwinia peduncularis</i>		V,P		K
Plantae	Flora	Myrtaceae	<i>Eucalyptus benthamii</i>	Camden White Gum	V,P	V	21
Plantae	Flora	Myrtaceae	<i>Eucalyptus cannonii</i>	Capertee Stringybark	V,P		K
Plantae	Flora	Myrtaceae	<i>^^Eucalyptus copulans</i>		E1,P,3	E	K
Plantae	Flora	Myrtaceae	<i>Eucalyptus pulverulenta</i>	Silver-leafed Gum	V,P	V	K
Plantae	Flora	Myrtaceae	<i>Eucalyptus sp. Cattai</i>		E4A,P		P
Plantae	Flora	Myrtaceae	<i>Eucalyptus sp. Howes Swamp Creek</i>		E1,P	E	K
Plantae	Flora	Myrtaceae	<i>Kunzea cambagei</i>	Cabbage Kunzea	V,P	V	K
Plantae	Flora	Myrtaceae	<i>Melaleuca biconvexa</i>	Biconvex Paperbark	V,P	V	K
Plantae	Flora	Myrtaceae	<i>Melaleuca deanei</i>	Deane's Paperbark	V,P	V	K
Plantae	Flora	Myrtaceae	<i>Melaleuca groveana</i>	Grove's Paperbark	V,P		K
Plantae	Flora	Myrtaceae	<i>Micromyrtus minutiflora</i>		E1,P	V	110
Plantae	Flora	Orchidaceae	<i>^Genoplesium baueri</i>	Bauer's Midge Orchid	E1,P,2	E	K
Plantae	Flora	Orchidaceae	<i>^Genoplesium superbum</i>	Superb Midge Orchid	E1,P,2		K
Plantae	Flora	Orchidaceae	<i>^Prasophyllum fuscum</i>	Slaty Leek Orchid	E4A,P,2	V	K
Plantae	Flora	Orchidaceae	<i>^Prasophyllum pallens</i>	Musty Leek Orchid	V,P,2		K
Plantae	Flora	Orchidaceae	<i>^Pterostylis saxicola</i>	Sydney Plains Greenhood	E1,P,2	E	1
Plantae	Flora	Orchidaceae	<i>^Rhizanthella slateri</i>	Eastern Australian Underground Orchid	V,P,2	E	K

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Plantae	Flora	Plantaginaceae	<i>Veronica blakelyi</i>		V,P		K
Plantae	Flora	Poaceae	<i>Ancistrachne maidenii</i>		V,P		K
Plantae	Flora	Podocarpaceae	<i>Ptherosphaera fitzgeraldii</i>	Dwarf Mountain Pine	E1,P	E	K
Plantae	Flora	Polygonaceae	<i>Persicaria elatior</i>	Tall Knotweed	V,P	V	K
Plantae	Flora	Proteaceae	<i>Grevillea evansiana</i>	Evans Grevillea	V,P	V	K
Plantae	Flora	Proteaceae	<i>Grevillea juniperina subsp. juniperina</i>	Juniper-leaved Grevillea	V,P		507
Plantae	Flora	Proteaceae	<i>Grevillea parviflora subsp. parviflora</i>	Small-flower Grevillea	V,P	V	2
Plantae	Flora	Proteaceae	<i>Grevillea parviflora subsp. supplicans</i>		E1,P		K
Plantae	Flora	Proteaceae	<i>Isopogon fletcheri</i>	Fletcher's Drumsticks	V,P	V	K
Plantae	Flora	Proteaceae	<i>Persoonia acerosa</i>	Needle Geebung	V,P	V	K
Plantae	Flora	Proteaceae	<i>Persoonia bargoensis</i>	Bargo Geebung	E1,P	V	K
Plantae	Flora	Proteaceae	<i>Persoonia glaucescens</i>	Mittagong Geebung	E1,P	V	K
Plantae	Flora	Proteaceae	<i>Persoonia hindii</i>		E1,P		K
Plantae	Flora	Proteaceae	<i>Persoonia hirsuta</i>	Hairy Geebung	E1,P,3	E	8
Plantae	Flora	Proteaceae	<i>Persoonia marginata</i>	Clandulla Geebung	V,P	V	K
Plantae	Flora	Proteaceae	<i>Persoonia mollis subsp. maxima</i>		E1,P	E	K
Plantae	Flora	Proteaceae	<i>Persoonia nutans</i>	Nodding Geebung	E1,P	E	192
Plantae	Flora	Rhamnaceae	<i>Pomaderris brunnea</i>	Brown Pomaderris	E1,P	V	K
Plantae	Flora	Rubiaceae	<i>Galium australe</i>	Tangled Bedstraw	E1,P		K
Plantae	Flora	Rutaceae	<i>Boronia deanei</i>	Deane's Boronia	V,P	V	K
Plantae	Flora	Rutaceae	<i>Leionema lachnaeoides</i>		E1,P	E	K
Plantae	Flora	Rutaceae	<i>Leionema sympetalum</i>	Rylstone Bell	V,P	V	K
Plantae	Flora	Rutaceae	<i>Zieria involucrata</i>		E1,P	V	K
Plantae	Flora	Rutaceae	<i>Zieria murphyi</i>	Velvet Zieria	V,P	V	K
Plantae	Flora	Santalaceae	<i>Thesium australe</i>	Austral Toadflax	V,P	V	K
Plantae	Flora	Thymelaeaceae	<i>Pimelea curviflora var. curviflora</i>		V,P	V	1
Plantae	Flora	Thymelaeaceae	<i>Pimelea spicata</i>	Spiked Rice-flower	E1,P	E	7
Plantae	Flora	Orobanchaceae	<i>Euphrasia bowdeniae</i>		V,P	V	K

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Community			<i>Agnes Banks Woodland in the Sydney Basin Bioregion</i>	Agnes Banks Woodland in the Sydney Basin Bioregion	E4B		K
Community			<i>Blue Gum High Forest in the Sydney Basin Bioregion</i>	Blue Gum High Forest in the Sydney Basin Bioregion	E4B	CE	K
Community			<i>Blue Mountains Shale Cap Forest in the Sydney Basin Bioregion</i>	Blue Mountains Shale Cap Forest in the Sydney Basin Bioregion	E3	CE	K
Community			<i>Blue Mountains Swamps in the Sydney Basin Bioregion</i>	Blue Mountains Swamps in the Sydney Basin Bioregion	V2	E	K
Community			<i>Castlereagh Scribbly Gum Woodland in the Sydney Basin Bioregion</i>	Castlereagh Scribbly Gum Woodland in the Sydney Basin Bioregion	V2	E	K
Community			<i>Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion</i>	Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion	E3	CE	K
Community			<i>Cumberland Plain Woodland in the Sydney Basin Bioregion</i>	Cumberland Plain Woodland in the Sydney Basin Bioregion	E4B	CE	K
Community			<i>Elderslie Banksia Scrub Forest in the Sydney Basin Bioregion</i>	Elderslie Banksia Scrub Forest in the Sydney Basin Bioregion	E4B		K
Community			<i>Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions</i>	Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K
Community			<i>Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions</i>	Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	E3	E	K
Community			<i>Newnes Plateau Shrub Swamp in the Sydney Basin Bioregion</i>	Newnes Plateau Shrub Swamp in the Sydney Basin Bioregion	E3	E	K
Community			<i>River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions</i>	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K
Community			<i>Shale Gravel Transition Forest in the Sydney Basin Bioregion</i>	Shale Gravel Transition Forest in the Sydney Basin Bioregion	E3	CE	K
Community			<i>Shale Sandstone Transition Forest in the Sydney Basin Bioregion</i>	Shale Sandstone Transition Forest in the Sydney Basin Bioregion	E4B	CE	K
Community			<i>Southern Sydney sheltered forest on transitional sandstone soils in the Sydney Basin Bioregion</i>	Southern Sydney sheltered forest on transitional sandstone soils in the Sydney Basin Bioregion	E3		K
Community			<i>Sun Valley Cabbage Gum Forest in the Sydney Basin Bioregion</i>	Sun Valley Cabbage Gum Forest in the Sydney Basin Bioregion	E4B		K
Community			<i>Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions</i>	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K
Community			<i>Western Sydney Dry Rainforest in the Sydney Basin Bioregion</i>	Western Sydney Dry Rainforest in the Sydney Basin Bioregion	E3	CE	K
Community			<i>White Box Yellow Box Blakely's Red Gum Woodland</i>	White Box Yellow Box Blakely's Red Gum Woodland	E3	CE	K



EPBC Act Protected Matters Report

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

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

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 20/12/16 09:18:43

[Summary](#)

[Details](#)

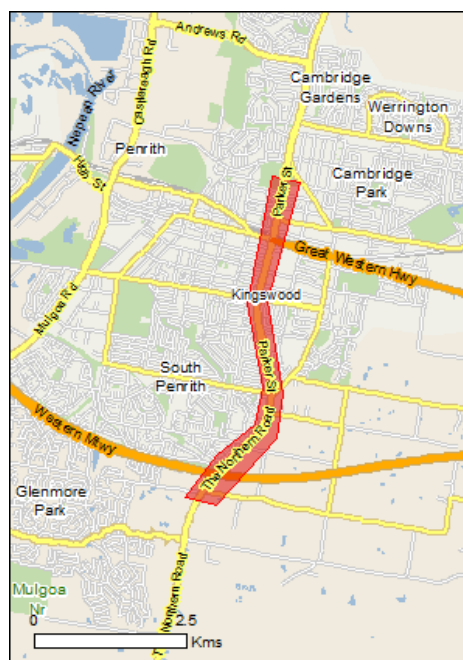
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

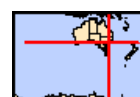
[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)

[Buffer: 2.0Km](#)



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	30
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	9
Commonwealth Heritage Places:	1
Listed Marine Species:	17
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	50
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[\[Resource Information \]](#)

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

Name	Status	Type of Presence
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	Endangered	Community may occur within area
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community may occur within area
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically Endangered	Community likely to occur within area
Shale Sandstone Transition Forest of the Sydney Basin Bioregion	Critically Endangered	Community may occur within area
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically Endangered	Community may occur within area

Listed Threatened Species

[\[Resource Information \]](#)

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Fish		
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species

Name	Status	Type of Presence habitat may occur within area
Frogs		
Heleioporus australiacus		
Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea		
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Plants		
Acacia bynoeana		
Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat may occur within area
Acacia pubescens		
Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat may occur within area
Allocasuarina glareicola		
[21932]	Endangered	Species or species habitat likely to occur within area
Cynanchum elegans		
White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Genoplesium baueri		
Yellow Gnat-orchid [7528]	Endangered	Species or species habitat may occur within area
Haloragis exalata subsp. exalata		
Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat may occur within area
Pimelea spicata		
Spiked Rice-flower [20834]	Endangered	Species or species habitat likely to occur within area
Pomaderris brunnea		
Rufous Pomaderris [16845]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Pterostylis saxicola Sydney Plains Greenhood [64537]	Endangered	Species or species habitat may occur within area
Pultenaea parviflora [19380]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area

Reptiles

Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to occur within area
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Listed Migratory Species

[[Resource Information](#)]

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

Name	Threatened	Type of Presence
Migratory Marine Birds		

Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
---	--	--

Migratory Terrestrial Species

Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
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Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
--	--	---

Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
--	--	---

Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
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Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
--	--	---

Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
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Migratory Wetlands Species

Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
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Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
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Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
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Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
---	--	--

Other Matters Protected by the EPBC Act

Commonwealth Land [\[Resource Information \]](#)

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

Name

Commonwealth Land -
 Commonwealth Land - Australian Postal Commission
 Commonwealth Land - Australian Postal Corporation
 Commonwealth Land - Australian Telecommunications Commission
 Commonwealth Land - Defence Housing Authority
 Commonwealth Land - Defence Service Homes Corporation
 Commonwealth Land - Director of War Service Homes
 Defence - 1CAD ORCHARD HILLS KINGSWOOD
 Defence - PENRITH DEPOT (Army Stores)

Commonwealth Heritage Places [\[Resource Information \]](#)

Name	State	Status
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Natural

Orchard Hills Cumberland Plain Woodland	NSW	Listed place
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Listed Marine Species [\[Resource Information \]](#)

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

Name	Threatened	Type of Presence
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Birds

[Apus pacificus](#)

Fork-tailed Swift [678]		Species or species habitat likely to occur within area
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[Ardea alba](#)

Great Egret, White Egret [59541]		Species or species habitat known to occur within area
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[Ardea ibis](#)

Cattle Egret [59542]		Species or species habitat may occur within area
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[Calidris ferruginea](#)

Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
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[Cuculus saturatus](#)

Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat may occur within area
---	--	--

[Gallinago hardwickii](#)

Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
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[Haliaeetus leucogaster](#)

White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
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[Hirundapus caudacutus](#)

White-throated Needletail [682]		Species or species habitat known to occur within area
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[Lathamus discolor](#)

Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
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[Merops ornatus](#)

Rainbow Bee-eater [670]		Species or species habitat may occur within area
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[Monarcha melanopsis](#)

Black-faced Monarch [609]		Species or species habitat known to occur within area
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Name	Threatened	Type of Presence
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

Invasive Species [\[Resource Information \]](#)

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

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris European Greenfinch [404]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643] Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425] Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171] Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat likely to occur within area Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large- leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892] Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding		Species or species

Name	Status	Type of Presence
Pine [20780]		habitat may occur within area
Protasparagus densiflorus		
Asparagus Fern, Plume Asparagus [5015]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate		
Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla		
Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii		
Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta		
Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis		
Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus		
Gorse, Furze [7693]		Species or species habitat likely to occur within area

Reptiles		
Hemidactylus frenatus		
Asian House Gecko [1708]		Species or species habitat likely to occur within area

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-33.749077 150.712006,-33.749719 150.716126,-33.764348 150.711405,-33.775621 150.713637,-33.781115 150.712693,-33.78939 150.703852,-33.788534 150.699217,-33.783397 150.703852,-33.779402 150.709517,-33.774836 150.710547,-33.764705 150.708315,-33.749006 150.711192,-33.749077 150.712006

Acknowledgements

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

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

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

Please feel free to provide feedback via the [Contact Us](#) page.

Search Results

No results found.

Enter at least one search criterion.

[Search Hints](#)

<input type="button" value="Search"/> <input type="button" value="Reset form"/>	
Place name <input type="text"/>	
Street name <input type="text"/>	
Town or suburb kingswood	State --All-- ▼
Country <input type="text"/>	

Advanced search options

List All Lists ▼	
<i>Different lists will provide different status and class options</i>	
Local Government Area penrith	Place ID number <input type="text"/>
Legal status --All-- ▼	Class --All-- ▼
Keyword Search <input type="text"/>	
<input checked="" type="checkbox"/> Description <input checked="" type="checkbox"/> Statement of Significance <input checked="" type="checkbox"/> Place history	
Latitude/Longitude <div style="text-align: center;"> <p>N</p> <p>Latitude 1</p> <p>Longitude 1 <input type="text"/> S Longitude 2</p> <p>W <input type="text"/> E Latitude 2 <input type="text"/> E E</p> <p><input type="text"/> S</p> <p>S</p> </div> <p> <input type="radio"/> Wholly within region <input checked="" type="radio"/> Wholly or partially within region </p> <p><i>Longitude coordinates should be entered as ddd.mm.ss</i> <i>Latitude coordinates should be entered as dd.mm.ss</i></p>	
Map Ref No <input type="text"/>	
<i>1:100,000 eg 2357</i> <i>1:250,000 eg SF-50-01</i>	

Search Hints

- Not all fields need to be filled in. The fewer you fill in the more results you will get.

- If you cannot find a place, check spelling and try alternative names. Reduce the number of words that you include and use fewer fields.
- The Local Government field used on its own will provide a comprehensive list of places in an area.

Report Produced: Tue Dec 20 08:48:19 2016



Search Results

8 results found.

Combewood, Outbuildings and Garden 306 RMB Castlereagh Rd	Penrith, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
Museum of Fire Castlereagh Rd	Penrith, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
Penrith Courthouse (former) High St	Penrith, NSW, Australia	(Destroyed) Register of the National Estate (Non-statutory archive)
St Stephens Anglican Church & Graveyard 252 High St	Penrith, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
Thornton Hall & Surrounds 11 Mountain View Cr	Penrith, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
Thornton Hall & Surrounds 11 Mountain View Cr	Penrith, NSW, Australia	(Place removed from CHL) Commonwealth Heritage List
Thornton Hall and Surrounds (former Defence land) 11 Mountain View Cr	Penrith, NSW, Australia	(Place removed from CHL) Commonwealth Heritage List
Victoria Bridge Great Western Hwy	Penrith, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)

Report Produced: Tue Dec 20 08:47:52 2016



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Statutory listed items

Information and items listed in the State Heritage Inventory come from a number of sources. This means that there may be several entries for the same heritage item in the database. For clarity, the search results have been divided into three sections.

- **Section 1** - contains Aboriginal Places declared by the **Minister for the Environment** under the National Parks and Wildlife Act. This information is provided by the Heritage Division.
- **Section 2** - contains heritage items listed by the **Heritage Council of NSW** under the NSW Heritage Act. This includes listing on the State Heritage Register, an Interim Heritage Order or protected under section 136 of the NSW Heritage Act. This information is provided by the Heritage Division.
- **Section 3** - contains items listed by **local councils** on Local Environmental Plans under the Environmental Planning and Assessment Act, 1979 and **State government agencies** under s.170 of the Heritage Act. This information is provided by local councils and State government agencies.

Section 1. Aboriginal Places listed under the National Parks and Wildlife Act.

Your search did not return any matching results.

Section 2. Items listed under the NSW Heritage Act.

Your search did not return any matching results.

Section 3. Items listed by Local Government and State Agencies.

Your search returned 7 records.

Item name	Address	Suburb	LGA	Information source
<u>Federation House & Garden</u>	6 First Street South	Kingswood	Penrith	LGOV
<u>Kingswood Public School Classroom and Teachers Residence</u>	Second Avenue	Kingswood	Penrith	LGOV
<u>Penrith Brick Company (Former) (Demolished)</u>	Copeland Street	Kingswood	Penrith	LGOV
<u>Penrith General Cemetery</u>	Copeland Street	Kingswood	Penrith	LGOV
<u>St. Phillips Anglican Church</u>	Bringelly Road	Kingswood	Penrith	LGOV
<u>State Records Movable Heritage - Furniture</u>	143 O'Connell Street	Kingswood	Penrith	SGOV
<u>State Records Movable Heritage - Memorials</u>	143 O'Connell	Kingswood	Penrith	SGOV

	Street	ood	th	
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There was a total of 7 records matching your search criteria.

Key:

LGA = Local Government Area
GAZ= NSW Government Gazette (statutory listings prior to 1997), HGA = Heritage Grant Application, HS = Heritage Study,
LGOV = Local Government, SGOV = State Government Agency.
Note: While the Heritage Division seeks to keep the Inventory up to date, it is reliant on State agencies and local councils to provide their data. Always check with the relevant State agency or local council for the most up-to-date information.



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Statutory listed items

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- **Section 1** - contains Aboriginal Places declared by the **Minister for the Environment** under the National Parks and Wildlife Act. This information is provided by the Heritage Division.
- **Section 2** - contains heritage items listed by the **Heritage Council of NSW** under the NSW Heritage Act. This includes listing on the State Heritage Register, an Interim Heritage Order or protected under section 136 of the NSW Heritage Act. This information is provided by the Heritage Division.
- **Section 3** - contains items listed by **local councils** on Local Environmental Plans under the Environmental Planning and Assessment Act, 1979 and **State government agencies** under s.170 of the Heritage Act. This information is provided by local councils and State government agencies.

Section 1. Aboriginal Places listed under the National Parks and Wildlife Act.

Your search did not return any matching results.

Section 2. Items listed under the NSW Heritage Act.

Your search returned 14 records.

Item name	Address	Suburb	LGA	SHR
<u>Ahrens Fox PS2 Fire Engine (1929)</u>	1 Museum Drive	Penrith	Penrith	01717
<u>Craithes House</u>	34-40 Borec Road	Penrith	Penrith	00378
<u>Dennis Big 6 Fire Engine (1939)</u>	1 Museum Drive	Penrith	Penrith	01718
<u>Edward Smith Headquarters Switchboard (1909)</u>	1 Museum Drive	Penrith	Penrith	01901
<u>Emu Plains (Nepean River) Underbridge</u>	Off Bruce Neale Dr, Steel Trusses 1.3 Km Past Station	Penrith	Penrith	01830
<u>Fire and Rescue NSW Heritage Fleet</u>	Museum Drive	Penrith	Penrith	01902
<u>Ford 21W Fire Brigade Mobile Canteen (1942)</u>	Museum Drive	Penrith	Penrith	01900
<u>NSW Fire Brigades No 10 Vehicle Number Plates</u>	Castlereagh Road	Penrith	Penrith	01519
<u>Penrith Railway Station group</u>	Great Western Railway	Penrith	Penrith	01222

			th	
<u>Shand Mason 7 inch Manual Fire Engine (1869)</u>	1 Museum Drive	Penrith	Penrith	01898
<u>Shand Mason Curricule Ladders (1898)</u>	1 Museum Drive	Penrith	Penrith	01899
<u>Shand Mason Fire Engine (1891)</u>	Museum Drive	Penrith	Penrith	01716
<u>Torin Building</u>	26 Coombes Drive	Penrith	Penrith	01796
<u>Victoria Bridge</u>	Nepean River, Great Western Highway	Penrith	Penrith	01950

Section 3. Items listed by Local Government and State Agencies.

Your search returned 67 records.

Item name	Address	Suburb	LGA	Information source
<u>1841 Tilley 5 inch Manual Fire Engine</u>	1 Museum Drive	Penrith	Penrith	SGOV
<u>1869 Shand Mason 7" Manual Fire Engine</u>	1 Museum Drive	Penrith	Penrith	SGOV
<u>1891 Shand Mason Steamer Fire Engine</u>	1 Museum Drive	Penrith	Penrith	SGOV
<u>1898 Shand Mason Curricule Ladders - Fire Engine</u>	1 Museum Drive	Penrith	Penrith	SGOV
<u>1916 Garford Type 64 Chain Drive Fire Engine</u>	1 Museum Drive	Penrith	Penrith	SGOV
<u>1929 Ahrens Fox PS2 Fire Engine</u>	1 Museum Drive	Penrith	Penrith	SGOV
<u>1939 Dennis Big 6 Fire Engine</u>	1 Museum Drive	Penrith	Penrith	SGOV
<u>1942 Ford 21W Fire Brigade Mobile Canteen</u>	1 Museum Drive	Penrith	Penrith	SGOV
<u>1949 Dennis F1 Fire Engine (Scout Car)</u>	1 Museum Drive	Penrith	Penrith	SGOV
<u>Avenue and Garden Planting</u>	Lemko Place	Penrith	Penrith	LGOV
<u>Broadville Victorian House</u>	98 Station Street	Penrith	Penrith	LGOV
<u>Combewood House, garden and original entrance</u>	Coreen Avenue	Penrith	Penrith	LGOV
<u>Combewood Trees</u>	Coreen Avenue	Penrith	Pen	LGOV

			rith	
<u>Commissioner's Uniform (NSW Fire Brigades) - Ian Mac Dougall</u>	1 Museum Drive	Penrith	Penrith	SGOV
<u>Craithes House</u>	Borec Road	Penrith	Penrith	LGOV
<u>Cram Place - Cast Iron Fence</u>	338-340 High Street	Penrith	Penrith	LGOV
<u>Cram Place - Well and Pump</u>	338-340 High Street	Penrith	Penrith	LGOV
<u>Cram Place (Former CBC Bank)</u>	338-340 High Street	Penrith	Penrith	LGOV
<u>Cram Place (Former Coach House)</u>	338-340 High Street	Penrith	Penrith	LGOV
<u>Derby Street P33b Conservation Area Cottages</u>	Castlereagh Street	Penrith	Penrith	LGOV
<u>Derby Street P33c Conservation Area Cottages</u>	Derby Street	Penrith	Penrith	LGOV
<u>Dunheved Fire Station</u>	50 Christie Street	Penrith	Penrith	SGOV
<u>Edward Smith Headquarters Switchboard - 1909</u>	1 Museum Drive	Penrith	Penrith	SGOV
<u>Edwardian Cottage</u>	323 Castlereagh Road	Penrith	Penrith	LGOV
<u>Emu Plains (Nepean River) Underbridge</u>	Off Bruce Neale Dr, Steel Trusses 1.3 Km Past Station	Penrith	Penrith	SGOV
<u>Explorers Memorial</u>	Memorial Avenue	Penrith	Penrith	LGOV
<u>Governor Phillip Special Hospital Original Building</u>	Glebe Place	Penrith	Penrith	LGOV
<u>Kentucky</u>	146 Station Street	Penrith	Penrith	LGOV
<u>Memorial Park</u>	Woodriff Street	Penrith	Penrith	LGOV
<u>Methodist Church (Former)</u>	Henry Street	Penrith	Penrith	LGOV
<u>Museum of Fire Penrith (Former Penrith Power Station)</u>	Castlereagh Road	Penrith	Penrith	LGOV
<u>Nepean River</u>		Penrith	Penrith	LGOV
<u>NSW Fire Brigades Heritage Fleet</u>	1 Museum Drive	Penrith	Penrith	SGOV
<u>NSWFB 'No. 10' Vehicle Number Plates</u>	1 Museum Drive	Penrith	Pen	SGOV

			rith	
<u>Original building</u>	Glebe Place	Penrith	Penrith	SGOV
<u>Peach Tree Creek Bridge</u>	Great Western Highway	Penrith	Penrith	SGOV
<u>Penrith Ambulance Station</u>	High Street	Penrith	Penrith	LGOV
<u>Penrith Council Chambers</u>	Henry Street	Penrith	Penrith	LGOV
<u>Penrith Infants Department</u>	Henry Street	Penrith	Penrith	LGOV
<u>Penrith Public School Building</u>	High Street	Penrith	Penrith	LGOV
<u>Penrith Public School Palm Trees</u>	High Street	Penrith	Penrith	LGOV
<u>Penrith Railway Station</u>	Jane Street	Penrith	Penrith	LGOV
<u>Penrith Railway Station Group and Residence</u>	Station Street	Penrith	Penrith	SGOV
<u>Penrith Weir</u>	Nepean River	Penrith	Penrith	SGOV
<u>Rectory (Former)</u>	95 Glebe Place	Penrith	Penrith	LGOV
<u>St Aubin's Terrace</u>	255-265 High Street	Penrith	Penrith	LGOV
<u>St. Stehens Cemetery</u>	252 High Street	Penrith	Penrith	LGOV
<u>St. Stephens Church Hall</u>	252 High Street	Penrith	Penrith	LGOV
<u>St. Stephens Church of England</u>	252 High Street	Penrith	Penrith	LGOV
<u>Station Masters House (Former)</u>	57 Belmore Street	Penrith	Penrith	LGOV
<u>The Cottage</u>	39 Warwick Street	Penrith	Penrith	LGOV
<u>The Lodge</u>	54 Camden Road	Penrith	Penrith	LGOV
<u>Thornton Hall</u>	Mountain View Crescent	Penrith	Penrith	LGOV
<u>Timber Cottage</u>	71 Parker Street	Penrith	Penrith	LGOV
<u>Tree - The Cottage</u>	39 Warwick Street	Penrith	Pen	LGOV

			rith	
<u>Tree to Victorian House</u>	48 Warwick Street	Penrith	Penrith	LGOV
<u>Two Storey Brick Cottage (Destroyed)</u>	7 Lawson Street	Penrith	Penrith	LGOV
<u>Victoria Bridge</u>	Great Western Highway	Penrith	Penrith	LGOV
<u>Victoria Bridge</u>	Great Western Highway	Penrith	Penrith	GAZ
<u>Victoria Bridge over Nepean River</u>	Great Western Highway	Penrith	Penrith	SGOV
<u>Victorian House</u>	48 Warwick Street	Penrith	Penrith	LGOV
<u>Victorian House</u>	6 Rawson Avenue	Penrith	Penrith	LGOV
<u>Victorian House</u>	148 Station Street	Penrith	Penrith	LGOV
<u>Victorian House</u>	322 Castlereagh Road	Penrith	Penrith	LGOV
<u>Victorian Terrace</u>	219-221 High Street	Penrith	Penrith	LGOV
<u>Victorian Villa</u>	150 Lethbridge Street	Penrith	Penrith	LGOV
<u>Weir and Former Pumping Station</u>	Memorial Avenue	Penrith	Penrith	LGOV

There was a total of 81 records matching your search criteria.

Key:

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Your search for: LGA: Penrith City Council

Matched 23 notices
relating to 7 sites.[Search Again](#)[Refine Search](#)

Suburb	Address	Site Name	Notices related to this site
BERKSHIRE PARK	(Northern end of Compartment 5) The Northern ROAD	Castlereagh State Forest	6 former
COLYTON	88 Great Western HIGHWAY	Ampol Service Station	1 current
JAMISONTOWN	92 Mulgoa ROAD	7-Eleven Service Station	2 current
LUDDENHAM	Lot 4 The Northern ROAD	Elura Liquid Waste Disposal Site	1 current
MULGOA	Mulgoa ROAD	Penrith Waste Services	2 former
PENRITH	Castlereagh ROAD	Crane Enfield Metals	3 current and 3 former
ST MARYS	Vallance STREET	Drum Recycler	5 former

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20 December 2016

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Search results

Your search for: **POEO Licences** with the following criteria

Suburb - PENRITH

returned 19 results

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Number	Name	Location	Type	Status	Issued date
6357	ACI OPERATIONS PTY. LTD.	130-172 ANDREW ROAD, PENRITH, NSW 2750	POEO licence	Issued	07 Jun 2000
247	BORAL RESOURCES (NSW) PTY LTD	PEACHTREE ROAD, PENRITH, NSW 2750	POEO licence	No longer in force	22 Aug 2000
12405	CAPRAL LIMITED	2115 CASTLEREAGH ROAD, PENRITH, NSW 2750	POEO licence	Issued	09 Mar 2006
1098	CRANE ENFIELD METALS PTY. LIMITED	2115 CASTLEREAGH ROAD, PENRITH, NSW 2750	POEO licence	Issued	26 Jun 2000
10945	CUMMINS SOUTH PACIFIC PTY. LTD.	7 Andrews Road, PENRITH, NSW 2750	POEO licence	Surrendered	19 Jun 2000
308	DORF CLARK INDUSTRIES LIMITED	2101 CASTLEREAGH ROAD, PENRITH, NSW 2750	POEO licence	Surrendered	17 Jan 2000
11290	ENDEAVOUR ENERGY	96-120 Blaikie Road, PENRITH, NSW 2750	POEO licence	No longer in force	08 Jan 2001
12132	GULF WESTERN PREMIUM QUALITY LUBRICATING OILS (MANUFACTURING) PTY LIMITED	1 COOMBES DRIVE, PENRITH, NSW 2750	POEO licence	Surrendered	01 Oct 2004
6472	JAMES KEITH COSGROVE	8 HOYLE PLACE, PENRITH, NSW 2750	POEO licence	Surrendered	21 Jun 2000
7019	JAMISON PRIVATE HOSPITAL PROPERTY PTY LTD	366 JAMISON ROAD, PENRITH, NSW 2750	POEO licence	Surrendered	20 Mar 2001
2869	LD&D MILK PTY LTD	2257 - 2265 CASTLEREAGH ROAD, PENRITH, NSW 2750	POEO licence	Issued	05 Jun 2000
3741	NAREX AUSTRALIA PTY LTD	LOT D FROGMORE ROAD, PENRITH, NSW 2750	POEO licence	Surrendered	31 Jan 2001
2818	PANASONIC AVC NETWORKS AUSTRALIA PTY LTD	164 STATION STREET, PENRITH, NSW 2750	POEO licence	Surrendered	24 Mar 2000
10349	SYDNEY OLYMPIC PARK AUTHORITY	CASTLEREAGH ROAD, PENRITH, NSW 2750	POEO licence	Surrendered	06 Jan 2000
1409	SYDNEY WATER CORPORATION	CASTLEREAGH ROAD, PENRITH, NSW 2750	POEO licence	Issued	25 May 2000
11461	TOTAL CONCRETE SOLUTIONS PTY LIMITED	261 COOMBES DRIVE, PENRITH, NSW 2750	POEO licence	No longer in force	19 Oct 2001
1294	VICARY CORPORATION PTY LIMITED	60-62 REGENTVILLE ROAD, PENRITH, NSW 2750	POEO licence	Surrendered	22 Aug 2000
12106	VIP STEEL PACKAGING PTY LTD	182-184 Andrews Road, PENRITH, NSW 2750	POEO licence	Surrendered	28 Apr 2004
5269	VIRBAC (AUSTRALIA) PTY LTD	2152 CASTLEREAGH ROAD, PENRITH, NSW 2750	POEO licence	Issued	10 Aug 2000

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Search results

Your search for: **General Search** with the following criteria

Suburb - KINGSWOOD

returned 6 results

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Number	Name	Location	Type	Status	Issued date
11417	HEALTHSCOPE LIMITED	9 Barber Avenue, KINGSWOOD, NSW 2747	POEO licence	No longer in force	11 Apr 2001
1034673	HEALTHSCOPE LIMITED	9 Barber Avenue, KINGSWOOD, NSW 2747	s.58 Licence Variation	Issued	19 Feb 2004
11253	SYDNEY WEST AREA HEALTH SERVICE	CNR DERBY STREET AND PARKER STREET, KINGSWOOD, NSW 2750	POEO licence	No longer in force	13 Nov 2000
1034831	SYDNEY WEST AREA HEALTH SERVICE	CNR DERBY STREET AND PARKER STREET, KINGSWOOD, NSW 2750	s.58 Licence Variation	Issued	24 Feb 2004
6195	WESTERN SYDNEY AUTOMOTIVES PTY LTD	107-121 GREAT WESTERN HIGHWAY, KINGSWOOD, NSW 2747	POEO licence	Surrendered	17 Jan 2000
1044810	WESTERN SYDNEY AUTOMOTIVES PTY LTD	107-121 GREAT WESTERN HIGHWAY, KINGSWOOD, NSW 2747	s.58 Licence Variation	Issued	02 Apr 2005

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20 December 2016

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Appendix D

Specialist Noise Report

Our Ref pl_E077_170815_01JM.docx

Contact: Julie McDonagh



Tuesday, 10 July 2012

Cardno (NSW/ACT) Pty Ltd
Level 9, The Forum
203 Pacific Highway
St Leonards NSW 2065

Cardno (Qld) Pty Ltd
ABN 57 051 074 992

Level 11
515 St Paul's Terrace
Fortitude Valley QLD 4064
Australia

Locked Bag 4006
Fortitude Valley QLD 4006
Australia

Phone: 61 7 3369 9822
Fax: 61 7 3369 9722

www.cardno.com.au

Attention: Belinda Crichton

Dear Belinda,

NORTHERN ROAD INTERSECTIONS UPGRADE ROAD TRAFFIC NOISE MODELLING RESULTS

Noise Modelling has been carried out to determine whether the proposed intersection upgrade works for the Northern Road upgrade are likely to result in increases in road traffic noise level of 2 dB(A) or more, thus triggering the need for a detailed road traffic noise impact assessment in accordance with RMs requirements.

1.0. Relevant Assessment Criteria

1.1. NSW Road Noise Policy

The NSW Road Noise Policy (DECCW, 2011) (NSW RNP) is a guideline for use in planning approvals by local councils and licenses issued by the Environmental Protection Authority (NSW EPA).

The NSW Road Noise Policy contains strategies to address the issue of road traffic noise from traffic-generating developments.

Quantitative criteria stated in the RNP associated with road traffic noise have now been superseded by those detailed in the RMS Noise Criteria Guideline (RMS, 2014). However, section 3.4.1 of the RNP does state the following in relation to the consideration of feasible and reasonable application of mitigation, relevant to assessment of this project:

"Where existing traffic noise levels are above the noise assessment criteria, the primary objective is to reduce these through feasible and reasonable measures to meet the assessment criteria. A secondary objective is to protect against excessive decreases in amenity as the result of a project by applying the relative increase criteria.

In assessing feasible and reasonable mitigation measures, an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person."

1.2. NSW RMS Noise Criteria Guideline

1.2.1. Target Criteria

The NSW Noise Criteria Guideline (Roads and Maritime 2014) (NSW NCG) provides RMS' approach to establishing project specific criteria, with particular detail to establishing transition zones between new, redeveloped, and existing roads.

The applicable NCG target criteria for residential receivers located near to arterial and sub-arterial roads are shown for information in Table 1.

Table 1: NCG Road Traffic Noise Assessment Criteria for Residential Land Uses

Road category	Type of project/land use	Assessment criteria – dB(A)	
		Day (7am–10pm)	Night (10pm–7am)
Freeway/arterial/sub-arterial roads	1. Existing residences* affected by noise from new freeway/ arterial/sub-arterial road corridors	L _{Aeq} , (15 hour) 55 (external)	L _{Aeq} , (9 hour) 50 (external)
	2. Existing residences* affected by noise from redevelopment of existing freeway/arterial/ sub-arterial roads	L _{Aeq} , (15 hour) 60 (external)	L _{Aeq} , (9 hour) 55 (external)

1.2.2. Minor Works

The NCG states the following with regard to minor works:

- Some works may be primarily to improve safety. This may include minor straightening of curves, installing traffic control devices, intersection widening and turning bay extensions or making minor road realignments.
- These works are not considered redeveloped or new as they are not intended to increase the traffic carrying capacity of the overall road or accommodate a significant increase in heavy vehicle traffic.
- Roads and Maritime applies existing road criteria where the minor works increase noise levels by more than 2.0dBA relative to the existing noise levels at the worst affected receiver.
- The noise catchment area should include all receivers where noise levels increase. A 600 metre noise catchment may not be required.
- Transition zones (where new roads meet existing, and where redeveloped meet new roads) are not applicable to minor works.

2.0. Noise Modelling Methodology

SoundPLAN 7.4 3D noise modelling software was used to predict noise impacting residential receivers from the realigned road segments at the upgraded intersections. Separate noise models were constructed for each of the following intersections:

- Northern Road / Derby Street
- Northern Road / great Western Highway

A noise model was constructed for each intersection for a “*with project*” and “*no project*” scenario. The results of the “*no project*” scenario were then subtracted from the “*with project*” scenario to obtain a relative increase due to the project realignment alone. All other modelling details remained the same, as shown below in Table 2.

The noise models were constructed to provide a relative increase only, rather than absolute values, as hourly traffic data was not available to allow calculation of predicted $L_{Aeq15hr}$ and $L_{Aeq, 9hr}$ in accordance with the RMS requirements.

The following inputs were adopted for the modelling:

Table 2: Noise Modelling Inputs

Modelling Element	Input / Assumption . Source Reference
Ground Elevation Geometry	Provided by Cardno Civil
Road Alignment	Provided by Cardno Civil
Predicted Traffic Flow Data	Provided by Cardno Traffic and detailed in Figure 1
Road Traffic Speed	As posted
Road pavement surfaces	All were assumed to be DGA with no pavement correction factors added.
Ground Absorption	50% over soft ground
Assessment Algorithm	Haulage noise Impact: Calculation of Road Traffic Noise, UK Department of Transport, 1988
Weather conditions	Calm Conditions
Facade Reflection	+2.5 dB(A) – applied to traffic prediction models, as all receivers are located at facades of receiver.
Correction to CoRTN for Façade Corrected Australian Conditions	-1.7 dB(A) CoRTN correction for Australian conditions (with reference to AustRoads.)
Receiver Height	Assumed to be 1.8 & 4.6 metres above ground for ground and first floors respectively.

The AADT traffic flows were calculated by adding the am and pm peak flows for each road segment and multiplying by 10. The 18 hour flow was then obtained by multiplying the AADT by 0.94 as advised by the Cardno traffic division.

The following peak flow traffic figures were provided for the modelling:

Figure 1: Existing Peak Flow Traffic Figures for the Northern Road Intersections Upgrade

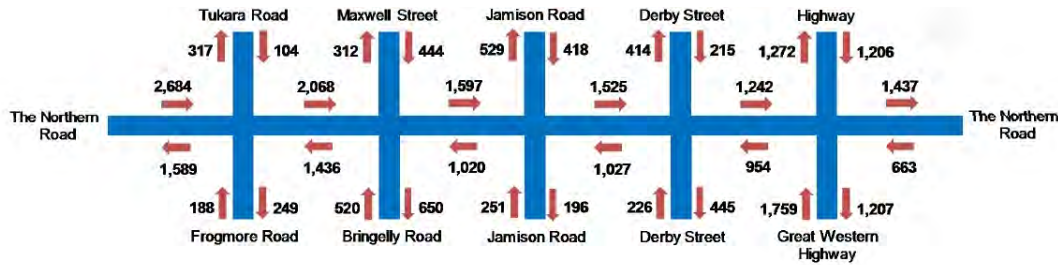


Figure 3.1 : Traffic volumes on The Northern Road corridor, average weekday morning peak (7.45 am to 8.45 am)

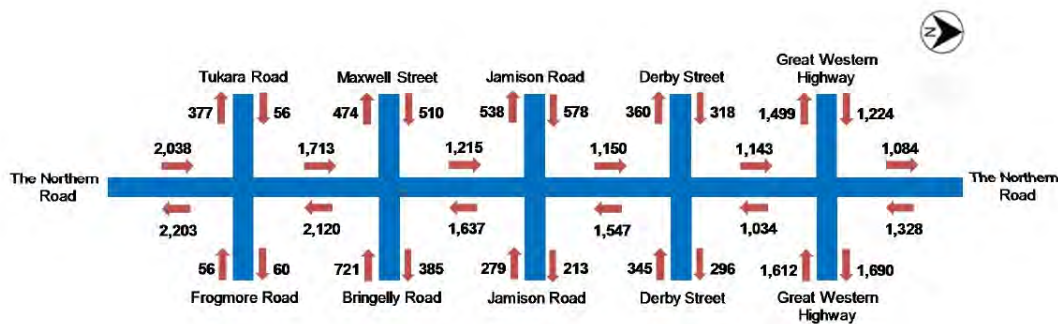


Figure 3.2 : Traffic volumes on The Northern Road corridor, average weekday evening peak (4.45 pm to 5.45 pm)

3.0. Noise Modelling Results

The noise modelling results for each intersection are shown in attached Figure 2 to Figure 5.

In summary, the relative modelling results indicate that there are no predicted increases in noise level of 2 dB(A) or more as a result of the project, which can therefore be defined as minor works. For this reason it is recommended that a detailed noise impact assessment of road traffic noise is not likely to be required in accordance with RMS current practice.

We trust that the above is constructive. Please do not hesitate to contact the undersigned if you require anything further.

Yours sincerely

Julie McDonagh
Manager Acoustics
for Cardno

Enc: Noise Contour Maps Figure 2 to Figure 5

Figure 2: Predicted Road Traffic Noise Level Increase for the Northern Road Intersections Upgrade – Derby Street Intersection



Figure 4: Predicted Road Traffic Noise Level Increase for the Northern Road Intersections Upgrade – Great Western Highway Intersection



Appendix E

Heritage Clearance

About this document

Reference number	EIA-P05-G02-T03
Title	EIA template: Review of Environmental Factors
Parent procedure	EIA-P05-2 Project REF procedure - roads

Approval and authorisation	
Prepared by	Environment Officer Senior Environmental Specialist (Planning & Assessment)
Approved by	Principal Manager Environmental Policy, Planning & Assessment

Objective location
Global Folder \ RMS Global Folder \ ENVIRONMENT \ Procedures \ Environment Planning and Assessment Procedures \ EIA-P05-2 Project REF Roads

Document status	Date
3.4	August 2014

Version	Date	Revision Description
1.0	03/10/08	First issue
1.1	12/12/08	Executive summary outline revised
2.0	30/06/10	EIA-P05-2 changes, general best practice updates
2.1	25/01/11	Addition of clause 228(2)(p)
3.0	09/09/11	Incorporation of trial version comments. Legal review complete. Third issue.
3.1	13/07/12	Addition of Growth Centres SEPP consultation
3.2	10/07/13	Minor amendments to safeguards table & Section 4.1
3.3	15/07/13	Update to Commonwealth Minister portfolio
3.4	21/08/14	Updated titles, roles, responsibilities and processes following internal restructure. Update to logo and report template. Update to State and Australian Government department titles. Document made web accessible (WCAG). Change to document location (G drive to Objective).

Your comments and suggestions to improve this or any of the EIA guidelines may be sent to:

Senior Environmental Specialist (Planning and Assessment)
Environmental Policy, Planning and Assessment
Environment Branch, Roads and Maritime Services
Level 17, 101 Miller Street, North Sydney, NSW 2060
Ph: 8588 5726