

Item 4.2 - Traffic - 12/06/20

N O R T H S Y D N E Y C O U N C I L



To the General Manager

- Attach** 1. Concept Plans
2. Design Basis Report
3. Informal Consultation Report
4. Road Safety Audit Report

SUBJECT: (4.2) Spofforth Street at Holt Avenue and Rangers Road – Traffic Facilities Design Update

AUTHOR: Report of Traffic & Transport Engineer, Nathan Wu

DESCRIPTION/SUBJECT MATTER:

At its meeting on 7 February 2020, the North Sydney Traffic Committee made the following recommendation which was subsequently adopted at the Council meeting held on 6 April 2020:

1. THAT pedestrian safety on Spofforth Street be an item on the next Traffic Committee agenda, and that the senior staff member as well as Mosman Traffic Committee Chair, Councillor Simon Menzies from Mosman Council be invited to the next meeting to discuss the pedestrian crossing.

RECOMMENDATION:

1. **THAT** the information concerning pedestrian safety on Spofforth Street be received.
2. **THAT** Council proceed with community consultation for Spofforth Street/Holt Avenue intersection once the concept plans are updated to reflect all the feedback from Council's Traffic Engineer, Mosman Council, Sydney Buses and North Sydney Traffic Committee for the following options:
 - a) Roundabout.
 - b) Kerb extensions.
 - c) Refuge islands.
3. **THAT** Council proceed with community consultation for Spofforth Street/Rangers Road intersection once the concept plans are updated to reflect all the feedback from Council's Traffic Engineer, Mosman Council, Sydney Buses and North Sydney Traffic Committee for the following options:
 - a) Roundabout.
 - b) Traffic and pedestrian signals.
 - c) Re-alignment with optional Pedestrian Actuated Crossing.

CONSULTATION REQUIREMENTS

Consultation will be undertaken in accordance with Council's Community Engagement Protocol

Relates to ECM No: 8094434

Standard or Guideline Used: AS1742.10; RMS Supplement to Australian Standards 1742.10.

Signs & Lines Priority: 2

Precinct and Ward: Harrison, Victoria

Impact on Bicycles: Nil

Impact on Pedestrians: Pedestrian safety improvement

Impact on Parking: Construction of pedestrian crossing facilities to comply with the Australian Standard may result in loss of parking around the facilities. However, the parking loss will be offset by the increase of existing parking spaces in the surrounding area.

DETAIL

At its meeting on 7 February 2020, the North Sydney Traffic Committee made the following recommendation which was subsequently adopted at the Council meeting held on 6 April 2020:

“1. THAT pedestrian safety on Spofforth Street be an item on the next Traffic Committee agenda, and that the senior staff member as well as Mosman Traffic Committee Chair, Councillor Simon Menzies from Mosman Council be invited to the next meeting to discuss the pedestrian crossing.”

Background

Following expressions of community concern, Council at its meeting on 10 December 2018 resolved to adopt the following Traffic Committee recommendation:

“1. THAT Council investigate the design for Spofforth Street shopping area including traffic calming, roundabouts, pedestrian access, public domain, landscaping and the current bus routes and location of stops.

2. THAT public consultation be undertaken regarding the proposed design.

3. THAT the Mayor consult with the Mayor of Mosman regarding cost sharing between the two Councils on this project.”

Upon discussion with officers from Mosman Council, it was agreed that the traffic study be extended to the intersection of Spofforth Street and Holt Avenue. This re-design, whilst primarily driven by a desire to enhance safety, has been taken as an opportunity to encourage active transportation and to deliver better urban design outcomes for residents and local businesses.

Subsequently, Tonkin Consulting was engaged by North Sydney Council to undertake concept work and have subsequently formulated three (3) concept treatment options for each intersection.

SPOFFORTH STREET & HOLT AVENUE

For the intersection of Spofforth Street and Holt Avenue, the provided vehicle collision data indicated that the principal hazard was in the form of cross traffic, specifically vehicles entering the intersection from the eastern arm of Holt Avenue.

A site visit by Tonkin, North Sydney Council, and Mosman Council personnel indicated that this was likely a product of poor sight distance and the dominant north-south flow of traffic on Spofforth Street. There were also concerns expressed about the general safety of pedestrians navigating this intersection. To remedy this, the following three (3) treatment options have been formulated:

- 1. Roundabout** – A conventional roundabout with a semi-mountable, landscaped central island to help facilitate the north-south movement of busses. Each arm is provided with a splitter/refuge island to maximise pedestrian safety in all directions of travel. Where possible, the kerb line has been extended into the carriageway to minimise the crossing distance for pedestrians and to provide new landscaping opportunities. The northbound bicycle lane is proposed to merge with the vehicular lane prior to the roundabout, with an optional ramp being provided for cyclists who wish to instead re-join the footpath.

Implementing this treatment option will result in the loss of seven (7) parking spaces. The existing raised threshold on the eastern arm of Holt Avenue would also be demolished as part of this proposal.

This is illustrated in Drawing 100 of the attachments.

- 2. Kerb Buildouts** – The extension of the kerb line to occupy the unusable shoulder space within 10 metres of the intersection, this narrowed carriageway significantly improves sight distance for vehicles on Holt Avenue and prompts through traffic on Spofforth Street to slow down. East-west pram ramps and a new raised threshold/continuous footpath treatment on the western arm of Holt Avenue will improve safety and mobility for pedestrians.

The corresponding raised threshold treatment on the eastern arm of Holt Avenue will be retained and extended in line with the new kerbing. The northbound bicycle lane continues uninterrupted through the intersection and is visually flagged by a green painted surface treatment.

Implementing this treatment option will not result in the loss of any existing parking.

This is illustrated in Drawing 101 of the attachments.

- 3. Refuge Islands** – Similar to the Kerb Buildouts option, this involves extending the kerb line into the unused shoulder space within 10 metres of the intersection. This is in conjunction with a central refuge island provided on Spofforth Street either side of the intersection. Provision of pedestrian crossing was considered however the site does not appear to meet the RMS warrants and it may impact on traffic flow on Spofforth St.

Implementing this treatment will result in the loss of four (4) parking spaces.

This is illustrated in Drawing 102 of the attachments.

SPOFFORTH STREET & RANGERS ROAD

Despite only two (2) reports of collisions in the past eight (8) years, feedback from the community indicated the presence of significant issues at the intersection of Spofforth Street and Rangers Road. These included pedestrians feeling unsafe, motorists failing to indicate when turning from Spofforth Street southbound into Rangers Road, motorists struggling to safely enter the intersection from the southern arm of Spofforth Street, and general concerns about excessive vehicle speeds. To resolve these concerns, the following three (3) treatment options have been formulated:

- 1. Roundabout** – A conventional roundabout with refuge islands for pedestrians provided on the Rangers Road and southern Spofforth Street arms of the intersection. Where possible, the kerb line has been extended into the intersection to minimise pedestrian crossing distances, maximise vehicle deflection, and provide new landscaping opportunities. The central island features a large mountable portion to facilitate the movement of buses through the intersection, with a small landscaped area included. A westbound and northbound bicycle lane is provided on Rangers Road and the northern arm of Spofforth Street respectively.

Implementing this option results in the removal of ten (10) existing parking spaces. With the removal or relocation of the existing bus stops south of the intersection and the provision of 45-degree angled parking, a minimum of twelve (12) new parking spaces can be provided.

There is scope to provide an additional space, for a net increase in parking spaces of three (3).

This is illustrated in Drawing 103 of the attachments.

- 2. Signalisation** – The implementation of a signal-controlled intersection, with pedestrian crossings on Rangers Road and the southern arm of Spofforth Street. A turning lane for vehicles travelling from Rangers Road to the southern arm of Spofforth Street is proposed to prevent traffic blockages. The stop line for southbound traffic on Spofforth Street is positioned as far into the intersection as practical, to minimise the possibility of vehicles becoming stranded in the intersection. The parking space made unusable by this treatment is proposed to be occupied by new kerb buildouts, which has the dual benefit of minimising crossing distances for pedestrians and of providing extensive new landscaping opportunities. This could come in the form of plantings, street furnishings, etc.

This option results in the removal of thirteen (13) existing parking spaces. With the removal or relocation of the existing bus stops south of the intersection and the provision of 45-degree angled parking, a minimum of twelve (12) new parking spaces can be provided.

There is scope to provide an additional three (3) spaces, for a net increase in parking spaces of two (2).

This is illustrated in Drawing 104 of the attachments.

- 3. Re-alignment with optional PAC** – This option proposes introducing a pedestrian refuge island on Rangers Road, along with a general re-alignment and adjustment of the intersection configuration. Where possible, the kerb line has been extended into the intersection to minimise pedestrian crossing distances and provide new landscaping opportunities. A westbound and northbound bicycle lane is provided on Rangers Road and the northern arm of Spofforth Street respectively. This could be readily adjusted to become a Pedestrian Actuated Crossing (PAC). A mid-block pedestrian crossing was considered however vehicle and pedestrian count results indicate that the site does not meet the RMS warrant for a marked crossing.

This option results in the removal of thirteen (13) existing parking spaces. With the removal or relocation of the existing bus stops south of the intersection and the provision of 45-degree angled parking, a minimum of fourteen (14) new parking spaces can be provided.

There is scope to provide an additional two (2) spaces, for a net increase in parking spaces of three (3).

This is illustrated in Drawing 105 of the attachments.

Consultation

Shopping Precinct

An informal consultation was undertaken with the affected shop owners/keepers in the vicinity of Spofforth Street and Rangers Road intersection.

The consultation with the shopping precinct concluded that:

- Parking is critical and the number of car parks cannot be reduced.
- A local relocation of the parking would be acceptable
- The main traffic issues are
 - Congestion influenced by the school traffic at peak times
 - Vehicles have trouble entering the intersection from the South
- The bus is not frequently used by shop customers, apart from the hairdressers.

For details, please see attached “Spofforth Street Public Realm Upgrade Local Shopping Precinct Consultation” report.

Mosman Council

Mosman Council were consulted on the draft concept plans. Please see following comments from Mosman Council including responses from North Sydney Council.

1. *Spofforth Street / Rangers Road intersection*

In general, some primary concerns are:

- *Implementation of the proposed treatments result in the removal more than 10 parking spaces on Spofforth Street. Mosman Council will not support any loss of parking as a result of the proposal. (NSC response: Reference is made to the consultant's drawing (103-105) as well as Summary Tables that indicate a net parking gain of 2-3 spaces)*
- *Each option assumes the relocation or removal of the existing bus stop on Spofforth Street at Reginald Street. (NSC response: This will be consulted with the STA.)*
- *The proximity to local shops suggests the bus stop serves a valuable purpose, and removal or relocation will need TfNSW, STA (Sydney Buses) and local community support and strong justification. (NSC response: Subject to consultation with the STA it is intended to remove the Bus Stop. Otherwise it can be relocated approx. 60m further south from its current location)*
- *The proposed 45^o angle parking design must be endorsed by TfNSW (RMS). (NSC response: This will be consulted with the TfNSW)*

With the above in mind however, comments on each of the Spofforth Street/ Rangers Road treatments are below:

Signalisation

- *Good opportunity to provide landscaping buffer for shops, and relocate parking to a quieter section of road (Noted by NSC)*
- *Addressed safety considerably (Noted by NSC)*
- *Feasibility for 3rd pedestrian crossing at northern leg should be considered if not already. (Noted by NSC)*
- *Spofforth southbound lane should be more strongly aligned towards Rangers Road, with more horizontal displacement to slow down left turning traffic. (Noted by NSC)*

PAC

Similar reasons as above, yet the PAC:

- *Has limited improvement for Spofforth Street (south) traffic entering the intersection. (Noted by NSC)*
- *Does little to slow/separate pedestrians crossing Spofforth Street South from southbound traffic on Spofforth Street which travels are reportedly high speeds. Some measures may help improve this within the same option, however. (NSC response: Noted – can you suggest additional measures?)*
- *PAC is very proximate to left turning traffic from Spofforth Street South – potential conflict as this traffic is moving from Stop and not a linked signal. (Noted by NSC)*
- *No ability for traffic to turn right into Spofforth Street South from Rangers Road without blocking traffic. (Noted by NSC)*

Roundabout

- *Reduction in buffer between traffic and local shops. Highly undesirable. (Noted by NSC)*
- *Limited deflection for Rangers Road traffic northbound to Spofforth Street to slow traffic. (Noted by NSC)*
- *As above, for southbound traffic continuing south on Spofforth St. (Noted by NSC)*

- *Roundabouts are least desirable for cyclists, and to an extent, pedestrians.* (Noted by NSC)
2. Spofforth Street / Holt Avenue intersection

New Option

It is considered that construction of a central median on Spofforth, limiting Holt Ave East and West to left-in and left-out will eliminate most vehicle conflict points, improving road safety with minimal enforcement.

This option will strongly discourage rat-running in Holt Ave, which has been identified as an issue. A refuge island can be maintained to the north of the intersection as in 102 to maintain pedestrian safe accessibility.

(NSC response: A similar proposal to close Holt Avenue and Spencer Road at Military Road was consulted with residents of Holt Ave and Spencer Road in 2011 which was not supported by the community. This may be the case if Closure of Holt Ave at Spofforth Street is proposed)

Kerb Build Outs

- *Improves cyclist's priority and safety at intersection.* (Noted by NSC)
- *No loss of parking.* (Noted by NSC)
- *Does not encourage rat running.* (Noted by NSC)
- *Improves visibility and encourages slower speeds to a limited extent, improving road safety.* (Noted by NSC)

Refuge Islands

- *As with Kerb-Build out options, however, a notable improvement for pedestrian safety, and a lesser improvement for traffic (cars and bikes) safety at the cost of 2 lost parking spaces in Mosman.* (Noted by NSC)
- *Consideration must be given for heavy vehicle manoeuvring from Holt Ave E+W.* (Noted by NSC)

Roundabout

- *Does not address rat running via Holt Ave.* (Noted by NSC)
- *Potential conflict/pinch point at existing bus stop on northern approach of Spofforth St.* (Noted by NSC)
- *Whilst roundabout will mitigate vehicle collisions to an extent and discourage speeding, is least safe for cyclists, and pedestrians.* (Noted by NSC)
- *Results in loss of 2 parking spaces in Mosman.* (Noted by NSC)

Sydney Buses

Consultation was undertaken with Sydney Buses on the relocation of the bus stop south of the intersection of Spofforth Street and Rangers Road to provide additional parking for the businesses. Sydney Buses was supportive of the removal of the bus stop given the low commuter figures subject to community consultation undertaken by Council.

Consultant Responses to Council Comments

Additional comments provided by North Sydney Council to the consultant in relation to the concept plans and responses from the consultant are summarised in the table below.

Drawin g no.	Comment	Comment by	Tonkin response
100	Delete the option for bicycle path joining the footpath	North Sydney	Noted - will adjust so bicycles travel exclusively within the roundabout
101	Reduce bike lane buffer from 1.0m to 0.5m and change the parking lane on the other side from 2.1m to 2.6m	North Sydney	Noted - will amend accordingly
101	Remove the raised threshold as it may encourage pedestrians to use it as a crossing	North Sydney	Noted - will delete raised threshold and provide pram ramps instead
102	Reduce bike lane buffer from 1.0m to 0.5m and change the parking lane on the other side from 2.1m to 2.6m	North Sydney	Noted - will amend accordingly
102	Remove the raised threshold as it may encourage pedestrians to use it as a crossing	North Sydney	Noted - will delete raised threshold and provide pram ramps instead
102	Check the travel lane width on either side of the refuge island to meet the rms technical direction. Rms requires minimum 3.7m width for the travel lane at the refuge. The plan shows 3m	North Sydney	Noted - will amend accordingly by narrowing kerb buildouts
102	Align the kerb line on northern side of holt avenue west of Spofforth St to match with the kerb line on the eastern leg.	North Sydney	Noted - will amend accordingly
103	Reduce bike lane buffer from 1.0m to 0.5m and change the parking lane on the other side from 2.1m to 2.6m	North Sydney	Noted - will amend accordingly
104	Remove the bicycle storage. It may not comply with NSW Bike Plan and guidelines	North Sydney	Noted - will remove bicycle storage
105	Remove the bicycle storage. It may not comply with NSW Bike Plan and guidelines	North Sydney	Noted - will remove bicycle storage

N/a	It is considered that construction of a central median on Spofforth, limiting Holt Ave east and west to left-in and left-out will eliminate most vehicle conflict points, improving road safety with minimal enforcement. This option will strongly discourage rat-running in Holt Ave, which has been identified as an issue. A refuge island can be maintained of the north of the intersection as in 102 to maintain pedestrian safe accessibility	Mosman	A left-in/left-out treatment was considered, but discounted. Doing so would create a new, parallel rat run on Spencer Rd, effectively shifting the problem. Additionally, this option has limited landscaping potential and fails to address pedestrian safety across holt avenue on either leg or general sight distance concerns on Spofforth Street.
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Traffic Committee

Any additional comments provided at the Traffic Committee Meeting will be incorporated in the final revision of the concept plans for community consultation.

Road Safety Audit

A Road Safety Audit (RSA) has been undertaken to assess the concept design plans in the context of the existing conditions, and the interface between existing and proposed works.

For details, please see attached Road Safety Audit Report prepared by AMWC-RSA.

CONCEPT CIVIL PLANS INTERSECTION UPGRADES SPOFFORTH STREET, NORTH SYDNEY



LOCATION PLAN-IMAGE COURTESY OF METROMAP

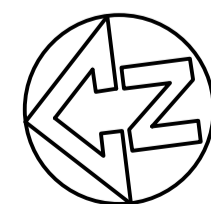
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SHEET INDEX	
NUMBER	TITLE
001	LOCATION PLAN & DRAWING SCHEDULE
002	GENERAL ARRANGMENT & CONTEXT PLAN
003	SUMMARY TABLES
100	SPOFFORTH STREET & HOLT AVENUE - ROUNDABOUT
101	SPOFFORTH STREET & HOLT AVENUE - KERB BUILDOUTS
102	SPOFFORTH STREET & HOLT AVENUE - REFUGE ISLANDS
103	SPOFFORTH STREET & RANGERS ROAD - ROUNDABOUT
104	SPOFFORTH STREET & RANGERS ROAD - SIGNALISATION
105	SPOFFORTH STREET & RANGERS ROAD - RE-ALIGNMENT WITH OPTIONAL PAC

SHEET SIZE
A1

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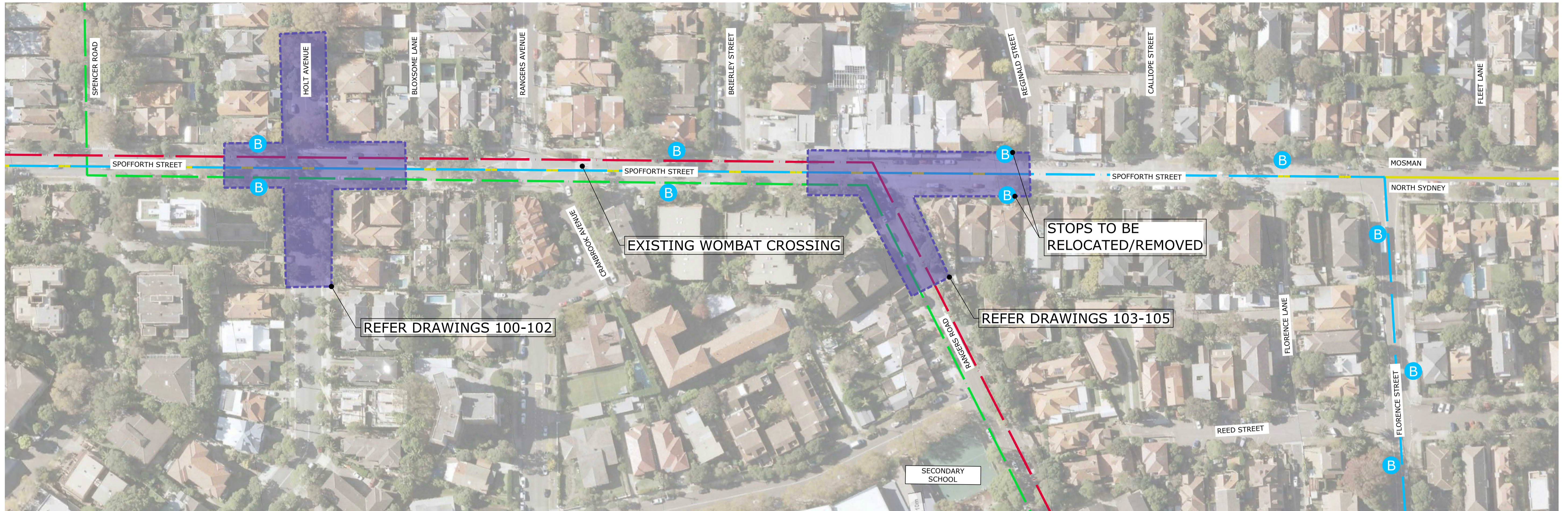
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PRELIMINARY

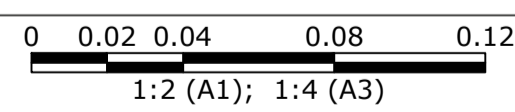
NORTH SYDNEY COUNCIL
SPOFFORTH STREET UPGRADES
LOCATION PLAN & DRAWING SCHEDULE

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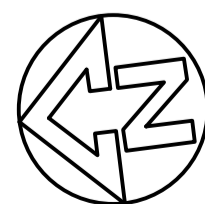
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- DESIGN AREA
- LGA BOUNDARY
- RMS REGIONAL ROAD
- BUS ROUTE (225)
- BICYCLE ROUTE
- B EXISTING BUS STOP



SHEET SIZE
A1

COORDS: MGA94 ZONE 54
DATUM: ALL LEVELS TO A.H.D.
SCALE: N.T.S.
SURVEYED: PROJECT SURVEYORS
SURVEY DATE: 13/08/2019
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PRELIMINARY

NORTH SYDNEY COUNCIL
SPOFFORTH STREET UPGRADES
GENERAL ARRANGEMENT & CONTEXT PLAN

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20190977_002_GENERAL_ARRANGEMENT.DWG	20190977	002	A

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LEGEND

- GOOD OUTCOME
- BETTER OUTCOME
- BEST OUTCOME

SHEET	TREATMENT OPTION	CAR SPACES				SAFETY OUTCOMES			LANDSCAPING OPPORTUNITIES
		LOST	WON	POTENTIAL	NET	PEDESTRIAN	BICYCLISTS	MOTORISTS	
100	ROUNDBABOUT	-7	0	0	-7	•	•	•••	•
101	KERB BUILDOUTS	0	0	0	0	•••	•••	••	•••
102	REFUGE ISLANDS	-2	0	0	-2	••	••	•	••
103	ROUNDBABOUT	-10	12	1	3	•	•	•	••
104	SIGNALISATION	-13	12	3	2	•••	•••	•••	•••
105	RE-ALIGNMENT WITH OPTIONAL PAC	-13	14	2	3	••	••	••	••

SHEET	TREATMENT OPTION	PROS	CONS
100	ROUNDBABOUT	EFFECTIVELY ADDRESSES VEHICLE COLLISION CONCERNS	RESULTS IN SIGNIFICANT LOSS OF PARKING & MAY NOT FUNCTION OPTIMALLY WITH DOMINANT NORTH-SOUTH TRAFFIC FLOW
101	KERB BUILDOUTS	EFFECTIVELY ADDRESSES SIGHT DISTANCE CONCERNS & OFFERS IMPROVED PEDESTRIAN SAFETY	DOES NOT FULLY ADDRESS SAFETY FOR EAST-WEST VEHICULAR MOVEMENTS
102	REFUGE ISLANDS	ADDRESSES SIGHT DISTANCE CONCERNS & OFFERS IMPROVED PEDESTRIAN SAFETY	DOES NOT FULLY ADDRESS SAFETY FOR EAST-WEST VEHICULAR MOVEMENTS & RESULTS IN SIGNIFICANT LOSS OF PARKING
103	ROUNDBABOUT	IMPROVES INTERSECTION LEGIBILITY & ADDRESSES VEHICLE COLLISION CONCERNS	MAY NOT FUNCTION OPTIMALLY WITH DOMINANT WEST-NORTH TRAFFIC. DOES NOT OFFER ADEQUATE VEHICLE DEFLECTION FOR ALL MOVEMENTS. NOT OPTIMAL FOR PEDESTRIAN OR BICYCLIST SAFETY
104	SIGNALISATION	OFFERS EXCELLENT SAFETY OUTCOMES FOR ALL USERS	RESULTS IN A NON-DOMINANT INTERSECTION LEG RECEIVING PRIORITY, POTENTIALLY EXACERBATING CONGESTION
105	RE-ALIGNMENT WITH OPTIONAL PAC	IMPROVES INTERSECTION LEGIBILITY & OFFERS IMPROVED SAFETY OUTCOMES FOR ALL USERS	

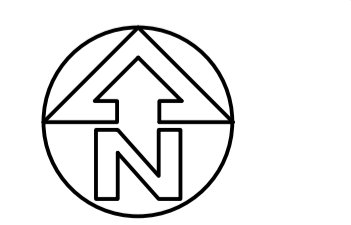
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PRELIMINARY

SHEET SIZE
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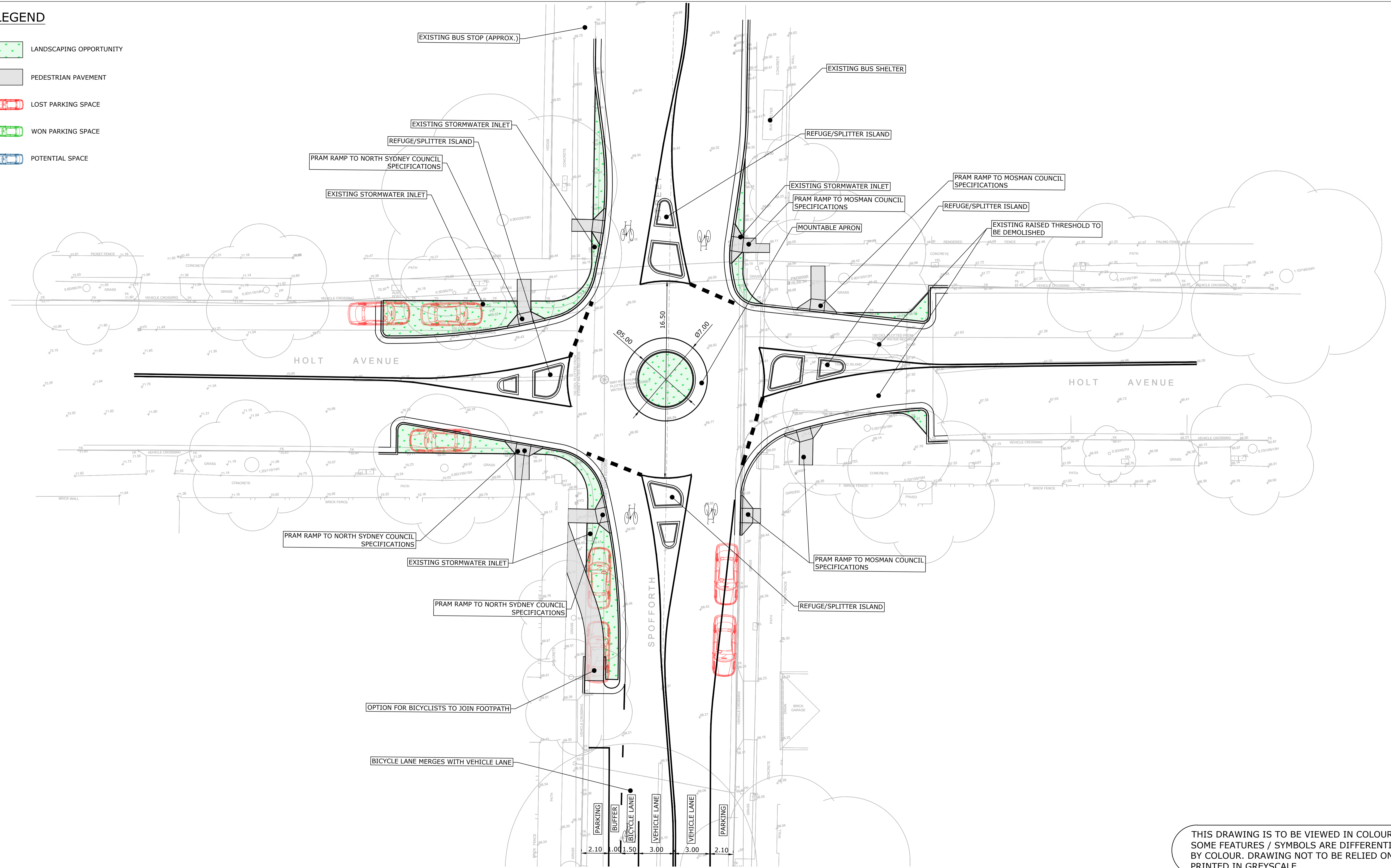
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NORTH SYDNEY COUNCIL
SPOFFORTH STREET UPGRADES
SUMMARY TABLES

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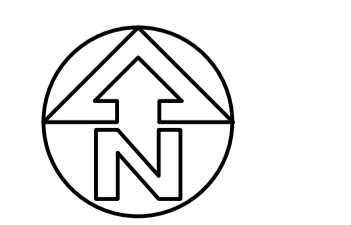
-  LANDSCAPING OPPORTUNITY
-  PEDESTRIAN PAVEMENT
-  LOST PARKING SPACE
-  WON PARKING SPACE
-  POTENTIAL SPACE



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PRELIMINARY
NORTH SYDNEY COUNCIL
SPOFFORTH STREET UPGRADES
SPOFFORTH STREET & HOLT AVENUE
ROUNDBOUT

LEGEND

-  LANDSCAPING OPPORTUNITY
-  PEDESTRIAN PAVEMENT
-  LOST PARKING SPACE
-  WON PARKING SPACE
-  POTENTIAL SPACE

EXISTING BUS STOP (APPROX.)

EXISTING BUS SHELTER

PRAM RAMP TO NORTH SYDNEY COUNCIL SPECIFICATIONS

EXISTING STORMWATER INLET

PRAM RAMP TO MOSMAN COUNCIL SPECIFICATIONS

EXTEND EXISTING RAISED THRESHOLD TO MEET NEW KERBLINE

EXISTING STORMWATER INLET

HOLT AVENUE

HOLT AVENUE

STREET

RAISED THRESHOLD TO NORTH SYDNEY PUBLIC DOMAIN MANUAL SPECIFICATION

MAKE SMOOTH MATCH WITH EXISTING KERB

EXISTING RAISED THRESHOLD TO BE PRESERVED

EXISTING STORMWATER INLET

PRAM RAMP TO NORTH SYDNEY COUNCIL SPECIFICATIONS

PRAM RAMP TO MOSMAN COUNCIL SPECIFICATIONS

EXISTING STORMWATER INLET

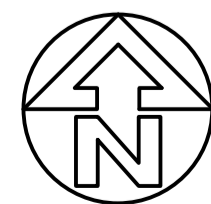
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 PARKING BUFFER BICYCLE LANE SPOFFORTH STREET VEHICLE LANE VEHICLE LANE PARKING

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SHEET SIZE
A1

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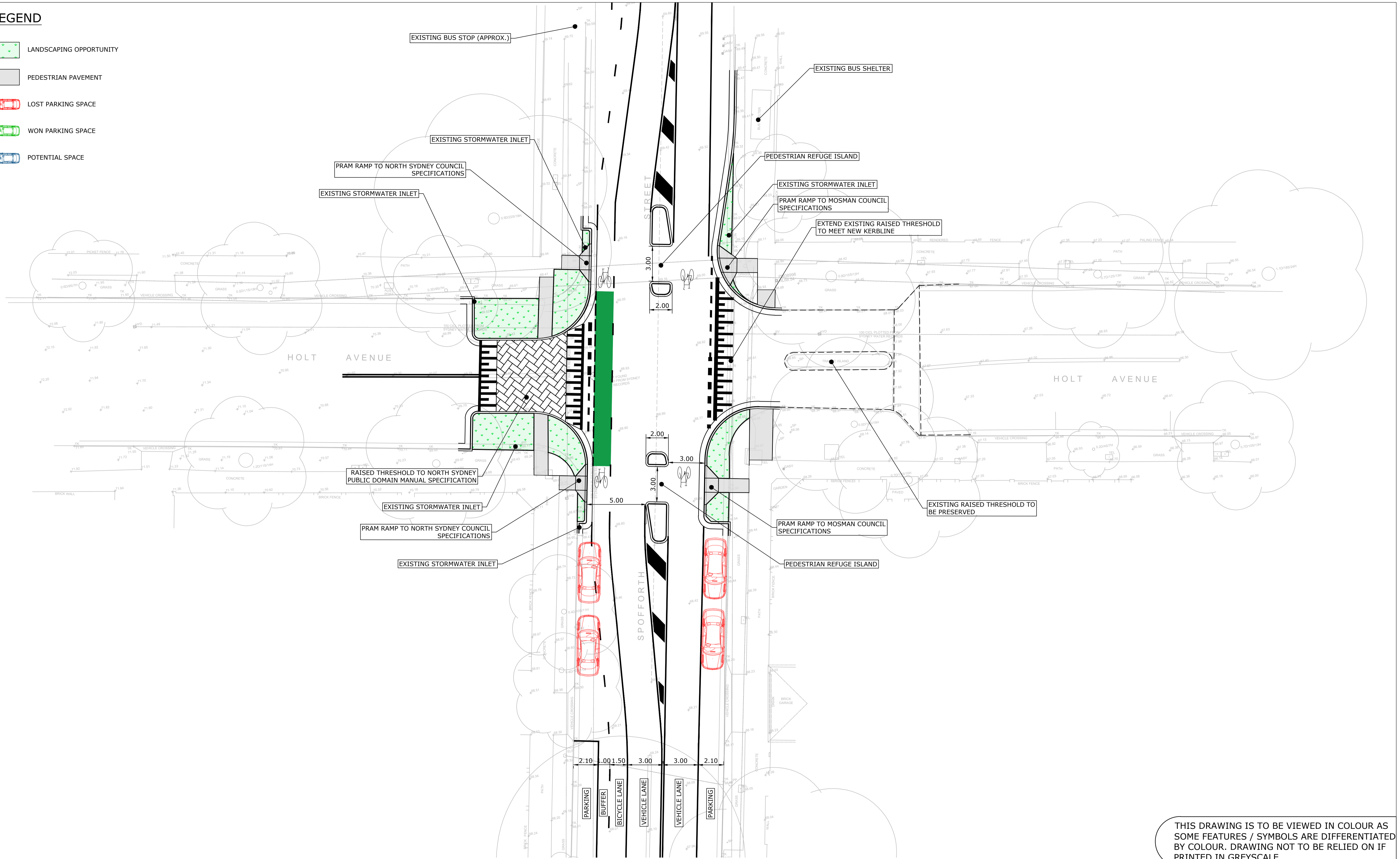


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 SPOFFORTH STREET UPGRADES
 SPOFFORTH STREET & HOLT AVENUE
 KERB BUILDOUTS

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LEGEND

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-  PEDESTRIAN PAVEMENT
-  LOST PARKING SPACE
-  WON PARKING SPACE
-  POTENTIAL SPACE



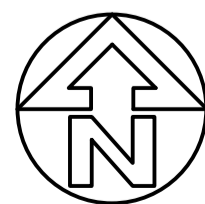
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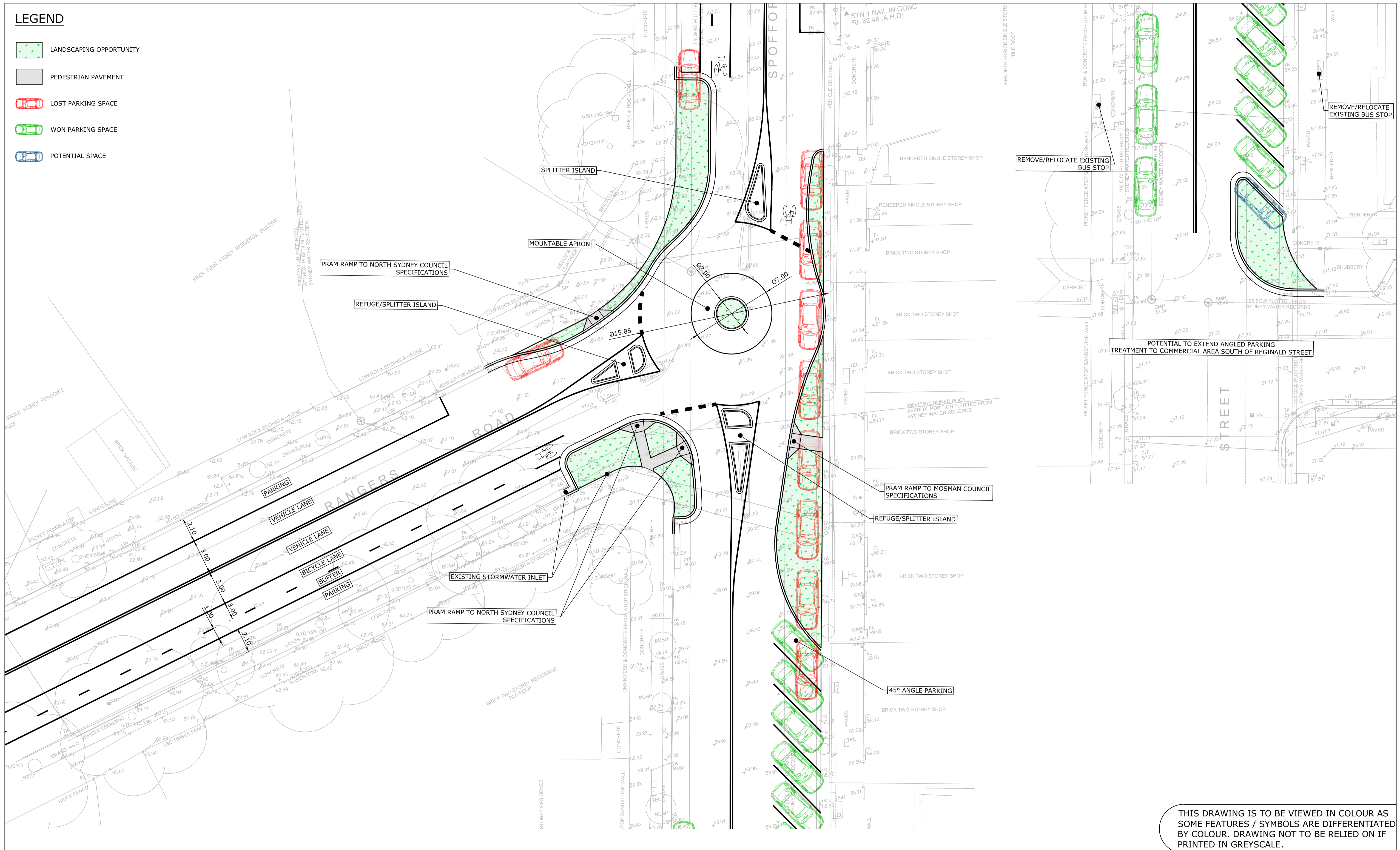
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B	REVISED ISSUE - FOR DISCUSSION ONLY	180919	NS	NS
A	PRELIMINARY ISSUE - FOR INFORMATION ONLY	290819	NS	NS

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LEGEND

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-  WON PARKING SPACE
-  POTENTIAL SPACE



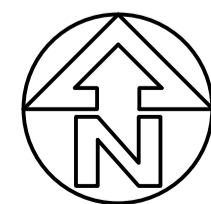
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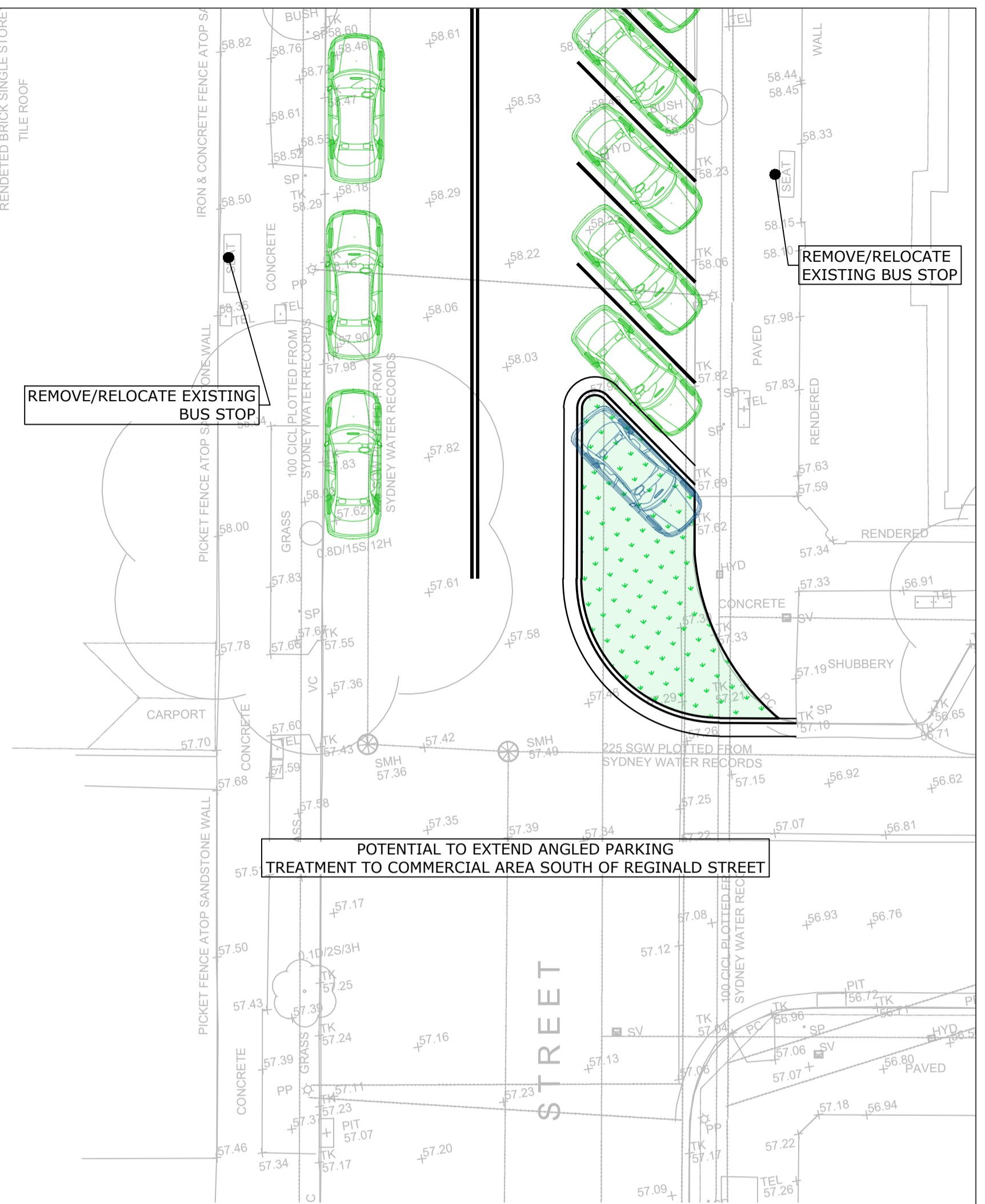
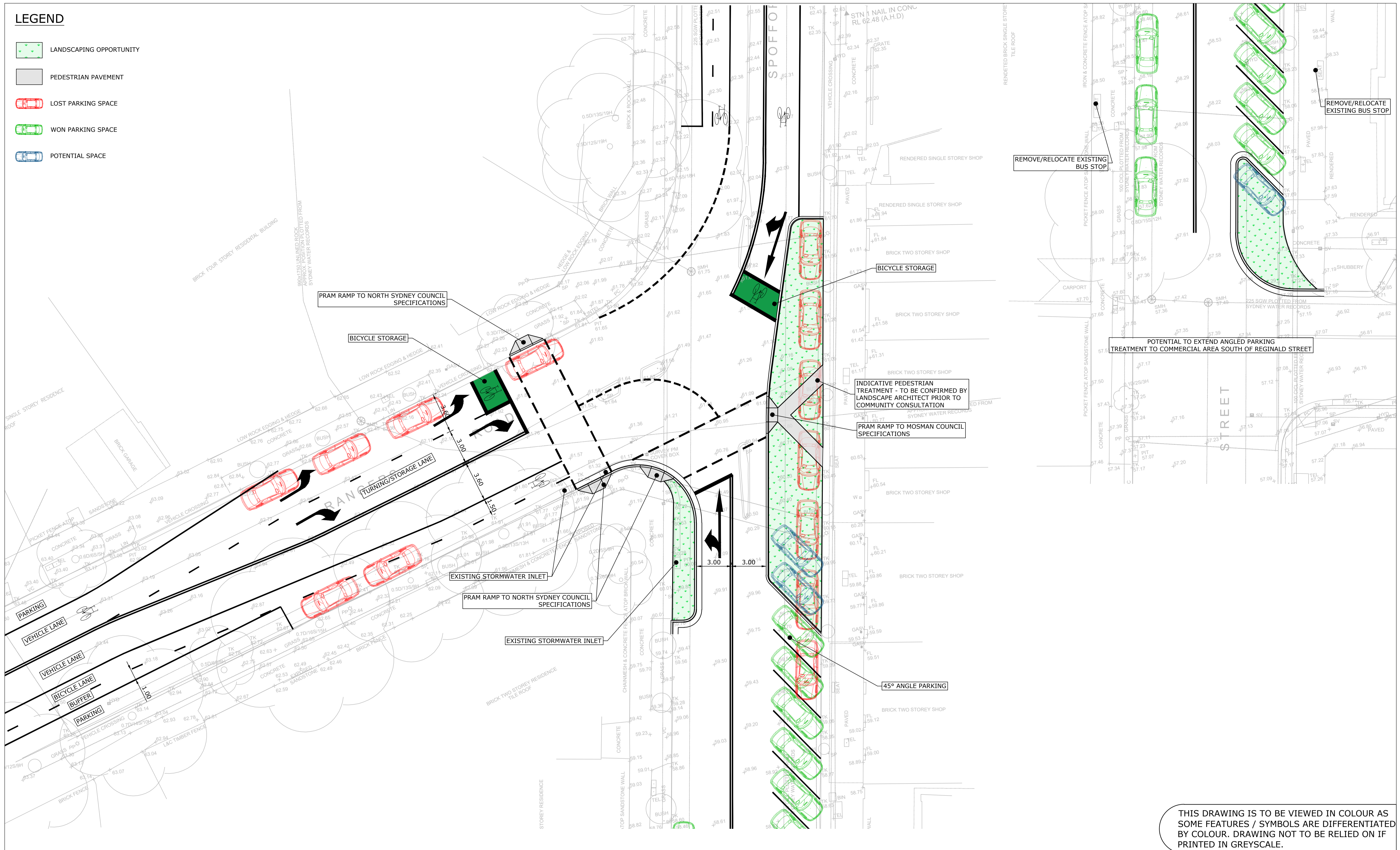
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SPOFFORTH STREET & RANGERS ROAD
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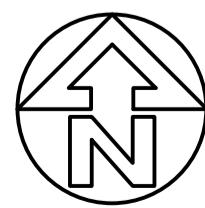
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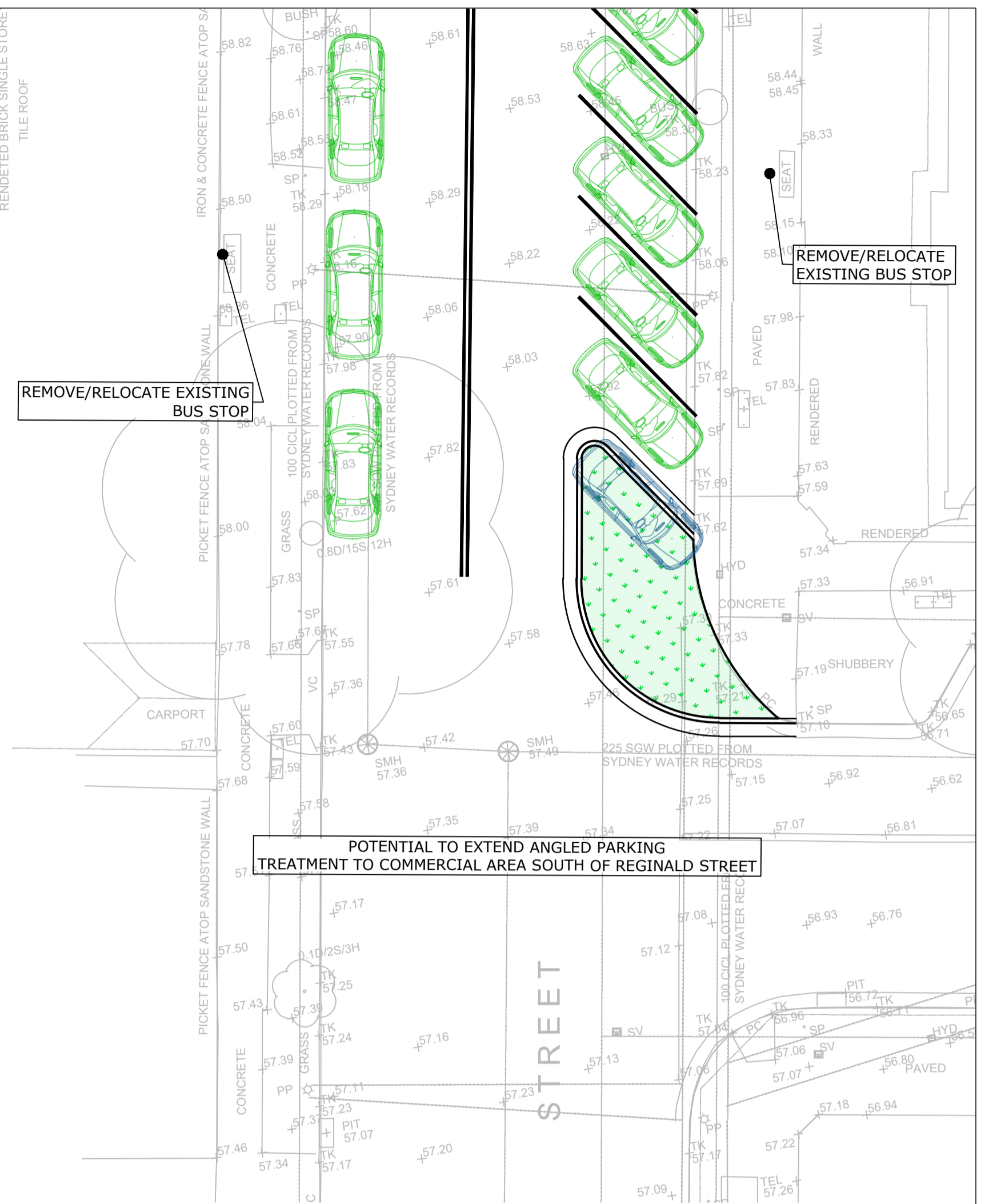
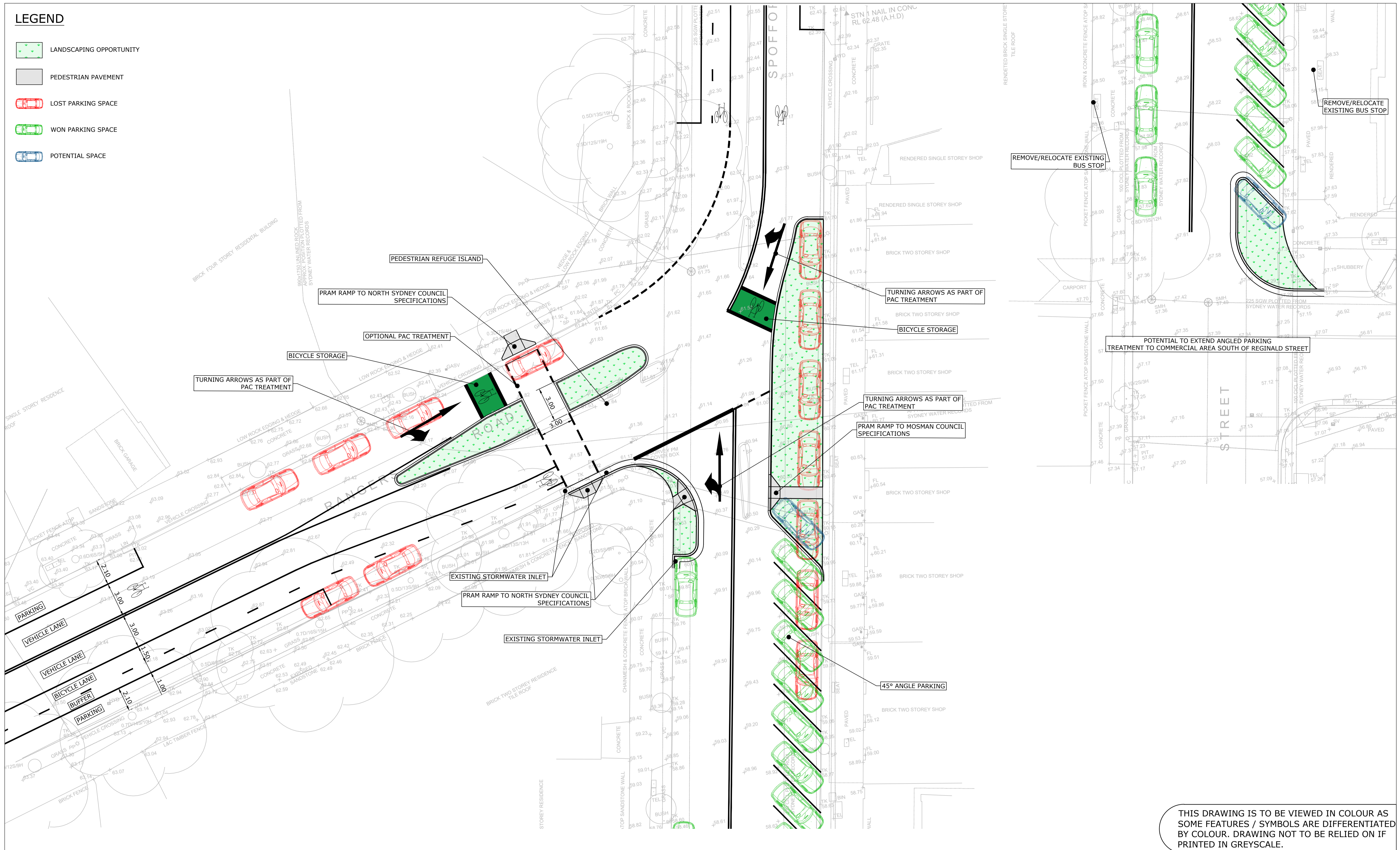
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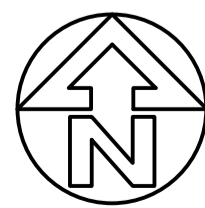


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SPOFFORTH STREET & RANGERS ROAD
RE-ALIGNMENT WITH OPTIONAL PAC

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Spofforth Street Upgrades

Design Basis Report

North Sydney Council

10 December 2019
Ref: 20190977R01B



Building exceptional
outcomes together



Document History and Status

Rev	Description	Author	Reviewed	Approved	Date
A	Internal Issue	NS	-	-	09/08/2019
B	Revised Issue	NS	BA	BA	10/12/2019

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Client: North Sydney Council
Ref: 20190977R01B

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1 Executive Summary

Spofforth Street is a significant road in the North Sydney suburb of Cremorne. Recently, two intersections on this road (at Holt Avenue and Rangers Road) have been subject to increased community concern. There have been anecdotal reports of more frequent traffic collisions at the former intersection, and there is concern about general safety at the latter. Consequently, Tonkin Consulting have been engaged by North Sydney Council to propose three concept designs for each of these intersections, with a view to enhancing safety for motorists, cyclists, and pedestrians. This re-design process is also being taken as an opportunity to encourage active transportation and to enhance the somewhat dated urban design of the area.

Spofforth Street forms the boundary between the North Sydney and Mosman *Local Government Areas (LGA)*, meaning that coordination and consensus between the two organisations is required. Additionally, businesses on the eastern side of Spofforth Street have previously objected to re-design proposals that would have seen reduced on-street parking. These represent two significant design constraints.



Figure 1.1 - Aerial view of Spofforth Street (in white) with the study areas highlighted (in purple)



2 Design Context

This chapter outlines the background information underwriting the proposed intersection treatments on Spofforth Street.

2.1 Road Hierarchy

The *Roads & Maritime Service* (RMS) classify Spofforth Street, between Rangers Road and Military Road, as a Secondary Road (SR). This means that it is a Regional, as opposed to State or Local, road.

This is as per Figure 2.1 below:

2019	From the intersection of the Pacific Highway (HW10) and Alfred Street at North Sydney, via Alfred Street, High Street, Clark Road, Kurraba Road, Bannerman Road, Murdoch Street, Rangers Road and Spofforth Street to Military Road (MR164) at Cremorne Junction.	Regional	GG102 1/8/30
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Figure 2.1 - Excerpt from RMS *Schedule of Classified Roads and Unclassified Regional Roads*

This route is illustrated in Figure 2.2 below:



Figure 2.2 – Secondary Road 2019 shown running from North Sydney to Cremorne via Spofforth Street

Spofforth Street therefore forms part of locally significant route between North Sydney and Cremorne, and by extension to the City and Northern Beaches beyond. This classification means that the road is under the authority of North Sydney Council as opposed to the RMS, although the expectation is that there will be substantive RMS input via North Sydney Council's *Local Traffic Committee* (LTC).

2.2 Traffic Data

Traffic data was provided by North Sydney Council, based off previously completed traffic volume & speed surveys. This was used in conjunction with new data collected on behalf of Tonkin by Austraffic.

A graphical summary of the North Sydney Council data is presented as Appendix A.



2.3 Collision Data

Collision data for the North Sydney LGA during the years 2010-2018 has been provided by North Sydney Council. During this time frame, there have been a total of twenty-one (21) reported collisions on Spofforth Street. Eleven (11) of these occurred at the intersection of Spofforth Street and Holt Avenue, and two (2) at the intersection of Spofforth Street and Rangers Road.

Of the eleven (11) crashes to have occurred immediately within the Spofforth Street and Holt Avenue intersection between 2010 & 2018:

- Eight (8) incidents (73%) involved vehicles approaching from the eastern arm of Holt Avenue
- Every incident involved the collision of cross-traffic
- All but one of the accidents occurred during daylight hours (91%)
- The median crash time was 12:50PM, with an IQR of 4.5 hours (i.e. 12:00PM to 4:30PM)
- Only two (2) (18%) of the crashes occurred during periods of wet weather
- The majority (82%) of crashes were non-casualty events, with just one (1) incident resulting in a minor injury, and one (1) resulting in a serious injury
- Saturday is the worst day (46% of all crashes), followed by Sunday (18%) and then Monday, Wednesday, Thursday, and Friday (each with a single crash, or 9% of incidents each)
- All crashes occurred during the school term, but only two of the incidents occurred during school zone times (Wednesday and Thursday morning, at 8:31 & 8:30 respectively). The majority of collisions occur on the weekend (64%) or non-school-peak weekdays (18%, for a total of 82%)
- These crashes have been occurring with reasonable consistency since 2010
- All vehicles involved were typical cars (sedans, hatchbacks, SUVs etc)

To summarise, a typical collision at the intersection of Spofforth Street & Holt Avenue occurs on a clear, weekend afternoon and involves a car approaching the intersection from the eastern arm of Holt Avenue before colliding at right angles with cross-traffic. It does not typically result in injuries.

The two recorded collisions at the intersection of Spofforth Street and Rangers Road involved a crash between a parking and travelling vehicle, and a vehicle mounting the kerb and striking an unidentified object.

Of all the collisions on Spofforth Street, only one resulted in injury to a pedestrian. It involved a distracted driver colliding with an emerging pedestrian near the intersection of Spofforth Street and Military Road resulting in moderate injury. There are no reported incidents of vehicles colliding with cyclists.

A graphical view of the locations of these collisions is presented as Appendix B.

2.4 Regional Cycle Strategies

North Sydney Council have formulated a regional cycle strategy, which includes an alignment (Route 5) connecting North Sydney with Cremorne. The current revision illustrates this running along Rangers Road, turning northwards onto Spofforth Street before terminating before Cranbrook Avenue. This has the potential to be extended along Spofforth Street from Rangers Road, subject to further investigation. Based on discussions with Council, the arrangement presented in Revision B has been adopted, as opposed to the more recent Revision C. An excerpt from this plan is presented overleaf as Figure 2.3:

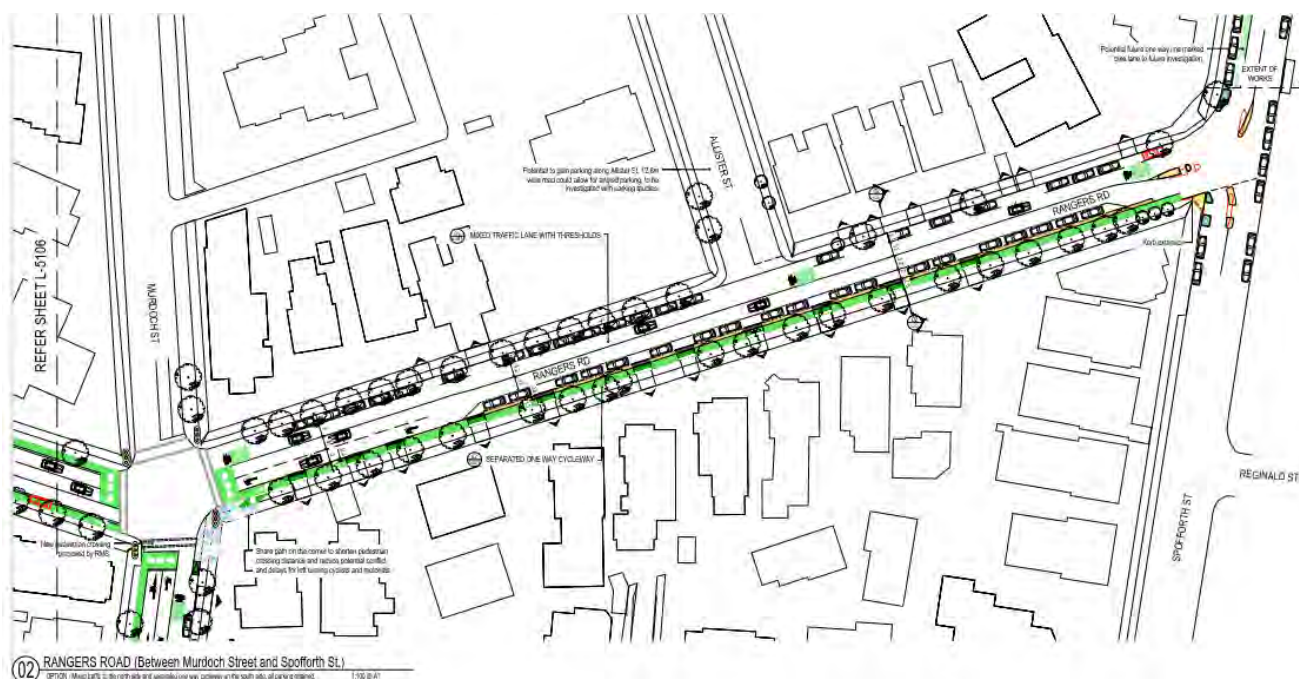


Figure 2.3 - Excerpt from *North Sydney Cycle Strategy - Route 5*, showing the intersection of Rangers Road & Spofforth Street

It is assumed that there is scope to amend this scheme in line with whatever treatment is ultimately applied to the intersection of Spofforth Street and Rangers Road.

Mosman Council have also prepared a cycling network map, which incorporates the entire length of Spofforth Street. This document suggests that the Spofforth Street route will pass through the Holt Avenue intersection before turning eastwards along Spencer Road. The intersection designs have been formulated in accordance with this document also.

The entire *North Sydney Cycle Strategy - Route 5* document, as well as the Mosman Cycling Map, is presented as Appendix C.

2.5 Previous Investigations

It is Tonkin's understanding that both a roundabout and a signalised treatment have been previously proposed for the intersection of Spofforth Street and Rangers Road. These were both rejected based on community objection to the loss of on-street parking facilities.

2.6 Additional Context

Preservation of on-street parking is a key design outcome. A summary of the existing parking restrictions is presented as Appendix D.

The local businesses comprising the Spofforth Street commercial core are key stakeholders in the design process. A plan showing the relevant local businesses is presented as Appendix E.



2.7 Reference Document & Data Summary

This is a summary of the documents comprising the informational base for the concept civil designs:

- *Public Domain Style Manual & Design Codes* – North Sydney Council – **15/02/2019**
- *Route 5: Proposed Cycleway – Concept Design Package* – Group GSA – **12/11/2015**
- *Detail Survey* – Project Surveyors – **13/08/2019**
- *Traffic Survey* – Austraffic – **07/08/2019**
- *Spofforth Street Public Realm Upgrade – Local Shopping Precinct Consultation* – Tonkin Consulting – **05/12/2019**
- *Traffic Count Summary Report* – CFE Information Technologies – **Various Dates**
- *North Sydney Crashes 2010-2018* – RMS/North Sydney Council - **2019**
- *Standard Details* – Mosman Council – **03/2014**
- *Watch This Space – Mosman Council's Parking Innovation Journey 2019* – ptc. – **12/2019**
- *Traffic Committee Minutes* – North Sydney Council – **05/09/2014, 06/02/2015, & 23/11/2018**



3 Design Concepts

This chapter summarises the rationale for each proposed concept design treatment and explains their intended functioning.

3.1 Spofforth Street & Holt Avenue

For the intersection of Spofforth Street and Holt Avenue, the provided vehicle collision data indicated that the principal hazard was in the form of cross traffic, specifically vehicles entering the intersection from the eastern arm of Holt Avenue. A site visit by Tonkin, North Sydney Council, and Mosman Council personnel indicated that this was likely a product of poor sight distance and the dominant north-south flow of traffic on Spofforth Street. There are also concerns about the general safety of pedestrians navigating this intersection.

To resolve these issues, the following three (3) treatment options have been formulated:

3.1.1 Roundabout

This is a conventional roundabout, with refuge islands provided on each arm to facilitate safer pedestrian movement in all directions. The northbound bicycle lane merges with the vehicular lane on the approach to the intersection, with a ramp providing cyclists with the option of instead returning to the footpath. Where possible, the kerb line has been extended into the carriageway to minimise pedestrian crossing distances and provide the opportunity for enhanced visual amenity through new landscaping treatments. These buildouts on the northern side of the intersection are tapered to accommodate bus movements in and out of their respective stops. The central island is provided with a mountable portion to facilitate through movements by buses and is proposed to incorporate a landscaped central portion.

This option is intended to ameliorate the risk of vehicle collision by reducing the number of conflict points and by encouraging through traffic on Spofforth Street to slow down. It does not, however, significantly improve sight distance for vehicles trying to enter the intersection from the eastern arm of Holt Avenue. This treatment option also results in the loss of seven (7) on-street parking spaces.

This is illustrated in Drawing 100, presented in Appendix F.

3.1.2 Kerb Buildouts

This option proposes extending the kerb line into the carriageway to occupy the buffer space 10m from the intersection which is unusable for parking. The buildouts provide large areas suitable for landscaping and enhanced visual amenity whilst simultaneously minimising pedestrian crossing distances in all directions. The buildouts on the northern side of the intersection are tapered to accommodate bus movements in and out of their respective stops. The northbound bicycle lane continues through the intersection and is visually flagged by a green painted surface treatment. The existing continuous footpath treatment on the eastern arm of Holt Avenue will be retained and extended to meet the new kerb line while a corresponding treatment will be provided on the western arm of Holt Avenue.

This design aims to reduce the risk of collision by allowing vehicles on Holt Avenue to move further into the intersection before committing to entering, significantly improving their sight of incoming vehicles up Spofforth Street and vice versa. This treatment does not result in the loss of any existing parking spaces.

This is illustrated in Drawing 101, presented in Appendix F.

3.1.3 Refuge Islands

This is functionally similar to the option presented in Section 3.1.2, however it also involves the provision of pedestrian refuge islands on Spofforth Street on either side of its intersection with Holt Avenue. The kerb buildouts are less pronounced here, because of the need to dedicate space to the 2m wide refuge medians. These could be potentially extended on the southern side of the intersection to also occupy the space made unusable by the no stopping area adjacent to the refuge island.



This design aims to reduce the risk of collision by allowing vehicles on Holt Avenue to move further into the intersection before committing to entering, significantly improving their sight of incoming vehicles up Spofforth Street and vice versa. This treatment results in the loss of four (4) existing parking spaces.

This is illustrated in Drawing 102, presented in Appendix F.

3.2 Spofforth Street & Rangers Road

Despite only two (2) reports of collisions in the past eight (8) years, feedback from the community indicated the presence of significant issues at the intersection of Spofforth Street and Rangers Road. These included pedestrians feeling unsafe, motorists failing to indicate when turning from Spofforth Street southbound into Rangers Road, motorists struggling to safely enter the intersection from the southern arm of Spofforth Street, and general concerns about excessive vehicle speeds. To resolve these concerns, the following three (3) treatment options have been formulated:

3.2.1 Roundabout

This is a conventional roundabout with refuge islands for pedestrians provided on the Rangers Road and southern Spofforth Street arms of the intersection. Where possible, the kerb line has been extended into the intersection to minimise pedestrian crossing distances, maximise vehicle deflection, and provide new landscaping opportunities. The central island features a large mountable portion to facilitate the movement of buses through the intersection, with a small landscaped area included. A westbound and northbound bicycle lane is provided on Rangers Road and the northern arm of Spofforth Street respectively.

This treatment aims to address concerns about vehicular collisions by minimising the number of conflict points. The presence of a roundabout should also significantly improve intersection legibility, resolving the issue of motorists not indicating their intention to turn. The circulating motion, along with the splitter islands, should also encourage vehicles to slow down. It may not, however, function optimally with the dominant north-west flow of traffic making it difficult for vehicles on the southern arm of Spofforth Street to enter the intersection. Furthermore, because of the broad angle between Rangers Road and the northern arm of Spofforth Street, it is difficult to produce adequate vehicle deflection for all movements.

This option results in the removal of ten (10) existing parking spaces. With the removal or relocation of the existing bus stops south of the intersection and the provision of 45-degree angled parking, a minimum of twelve (12) new parking spaces can be provided. There is scope to provide an additional space, for a net increase in parking spaces of three (3).

This is illustrated in Drawing 103, presented in Appendix F.

3.2.2 Signalisation

This option proposes converting the existing stop sign controlled intersection into a traffic signal controlled intersection. Where possible, the kerb line will be extended into the carriageway to occupy the space not required for the functioning of the intersection. This minimises pedestrian crossing distances, provides opportunities for enhanced landscaping and street furnishing, and provides a physical buffer between the busy carriageway and the shop frontages. A westbound and northbound bicycle lane is provided on Rangers Road and the northern arm of Spofforth Street respectively. These will be complemented by bicycle storage spaces at the hold line at the intersection, providing bicycles with a head-start on other vehicles during signal phase changes.

A turning lane will be provided for vehicles turning from Rangers Road into the southern arm of Spofforth Street. This has been designed to store two (2) waiting vehicles and to thereby prevent delays for the priority turning movement.

Signal controlled pedestrian crossings will be provided on the Rangers Road and southern Spofforth Street arms of the intersection, but not the northern arm of Spofforth Street. This is because of the phasing difficulties presented by having crossings on all three arms, the surveyed pedestrian movements, and the presence of an existing wombat crossing to the north of the intersection.



This design aims to address concerns about vehicular collisions and difficulties entering the intersection by providing dedicated signal phases for each turning movement. The provision of painted turning arrows should also improve intersection legibility and encourage motorists to indicate their intention to turn.

This option results in the removal of thirteen (13) existing parking spaces. With the removal or relocation of the existing bus stops south of the intersection and the provision of 45-degree angled parking, a minimum of twelve (12) new parking spaces can be provided. There is scope to provide an additional three (3) spaces, for a net increase in parking spaces of two (2).

This is illustrated in Drawing 104, presented in Appendix F.

It should be noted that the relevant RMS warrant for signalisation provides the following benchmarks:

- For each of four one-hour periods of an average day, the major road flow exceeds 600 vehicles/hour in each direction
- For each of four one-hour periods of an average day, the minor road flow exceeds 200 vehicles/hour in one direction

Based on the conducted traffic survey, minor road flow exceeds 200 vehicles/hour in one direction for four one-hour periods, satisfying the second condition. For the major road, flows exceed 600 vehicles/hour in one direction for four hours and for three hours in the other. For one additional hour, 596 vehicles/hour are recorded, very nearly satisfying the first condition. Since this is within typical margins of error, it is not unreasonable to suggest that this condition is effectively satisfied.

A summary of the RMS warrant conditions for signalisation is included as part of Appendix G.

3.2.3 Re-Alignment with Optional PAC

This option proposes introducing a pedestrian refuge island on Rangers Road, along with a general re-alignment and adjustment of the intersection configuration. Where possible, the kerb line has been extended into the intersection to minimise pedestrian crossing distances and provide new landscaping opportunities. A westbound and northbound bicycle lane is provided on Rangers Road and the northern arm of Spofforth Street respectively.

The pedestrian refuge island could be readily reconfigured as a *Pedestrian Actuated Crossing (PAC)*. This would enhance pedestrian safety while at the same time providing an opportunity for northbound traffic on the southern arm of Spofforth Street to enter the intersection. If the PAC option is pursued, bicycle storage areas would also be provided adjacent to the hold lines, as in the signalisation option.

This option addresses concerns about vehicle collisions by providing an opportunity for northbound vehicles on the southern arm of Spofforth Street to enter the intersection when the PAC is in operation. It does not, however, provide this opportunity for similar vehicles attempting to turn onto Rangers Road. Despite this, this treatment should improve intersection legibility and encourage motorists to indicate their intention to turn.

This option results in the removal of thirteen (13) existing parking spaces. With the removal or relocation of the existing bus stops south of the intersection and the provision of 45-degree angled parking, a minimum of fourteen (14) new parking spaces can be provided. There is scope to provide an additional two (2) spaces, for a net increase in parking spaces of three (3).

This is illustrated in Drawing 105, presented in Appendix F.

It should be noted that the pedestrian numbers at the intersection are not sufficient to satisfy the RMS warrant for a PAC. However, because of the proximity of the site to Redlands Junior Campus and a locally significant commercial centre, a special case could be argued with RMS.

A summary of the RMS warrant conditions for PACs is provided as part of Appendix G.



4 Future Considerations

In addition to further developing the options presented in Chapter 3 based on community feedback, there are several other areas that are worth investigating further:

4.1 Additional Parking

Each option in Section 3.2 assumes the provision of 45-degree angled parking on Spofforth Street between Rangers Road and Reginald Street. Subject to community feedback, it may be worthwhile investigating the extension of this treatment to the commercial area south of Reginald Street and north of Calliope Street. This could be incorporated as part of a broader streetscape upgrade for the entire Spofforth Street commercial area.

In Section 3.2, there are repeated reference to potential additional spaces that could be provided. These are potential spaces that exist because of contextual ambiguities in the typical requirement for a no-parking zone extending 10m from an intersection. Their implementation would need to be confirmed during the detailed design phase.

It should be noted that if angled parking is not implemented at all, then there is still scope to provide four (4) spaces through the removal or relocation of the existing bus stop alone, although this is unlikely to fully compensate for the spaces lost as a consequence of modifying the intersection.

4.2 Timed Parking & Enforcement

A common complaint expressed during the informal community consultation with the Spofforth Street businesses was that a significant portion of the existing unrestricted street parking was being used by staff at the nearby schools. The application of time restrictions to these spaces could free them up for store patrons. Similarly, there is scope for more stringent enforcement of the existing timed spaces, either through inspections by Council rangers or the implementation of parking sensors, as have been rolled out in parts of the Mosman LGA.

It may also be worth investigating tailoring the parking time restrictions to the nature of the adjacent businesses e.g. 15 minute restrictions for bottle shop and butcher shop patrons with longer 2 hour restrictions for hairdresser patrons.

4.3 Loading Zones

Another complaint expressed during the informal community consultation process was the difficulty of unloading goods. This could be resolved by designating an area of on-street as being a loading zone during certain hours of the day (e.g. between 9am and 12pm, which is outside of the morning peak). The exact location of this zone, along with the times for this loading, would need to be confirmed during detailed design.

4.4 Bus Stop Relocation & Consolidation

Each option in Section 3.2 assumes the relocation or removal of the existing bus stop on Spofforth Street between Reginald Street and Rangers Road. It will need to be determined whether this stop is removed outright or consolidated with other nearby stops. There are two stops in very close proximity to each other on Florence Street, one of which could be combined with the relocated Spofforth Street stop, potentially sited near to the intersection of Florence Lane and Spofforth Street (refer Drawing 002, in Appendix F).

This would naturally need to be subject to detailed design following specific community consultation and discussions with *Transport for New South Wales* (TfNSW).



4.5 School Congestion

Much of the observed traffic congestion coincides with the opening and closing of school each week day. To help resolve this without over-engineering any intersection or road treatments, it would be worthwhile to investigate what measures can be implemented at the source to help manage school time congestion.

4.6 Speed Reduction

Currently, the posted speed limit on Spofforth Street is 50km/h. Because of the repeated complaints about vehicles speeding, it may be worth considering reducing the speed limit to 40 km/h and taking the necessary steps to re-design the street to encourage drivers to conform to this.

4.7 Bicycle Lane Integration

Presently, the North Sydney and Mosman cycling strategies are uncoordinated. Because of Spofforth Streets function as a boundary road, it would be worthwhile investigating ways to better integrate these.

4.8 Stormwater Impacts

All the options described in Chapter 3 involve some modification of the existing kerb line. This will naturally have an impact on the behaviour of the road during storm events, especially when these buildouts impinge on existing stormwater inlets. There is therefore a need to investigate this in more detail at a later date and to recommend resolutions as appropriate.

Generally, the location of impacted stormwater pits is highlighted on the drawings presented in Appendix F.

4.9 Public Realm Enhancements

The re-design of these intersections, and of Spofforth Street and Rangers Road in particular, offer an opportunity for the substantive redesign of the public realm. By extending the scope of future studies to incorporate the commercial area on Spofforth Street south of Reginald Street, it may be possible to create a more cohesive, more pedestrian friendly area with updated street furnishings and material finishes.



5 Summary

Summarily, the intention of this report is to document the informational and physical context for the proposed upgrades to Spofforth Street, along with describing the potential upgrades themselves. Pending consultation with the North Sydney LTC and the relevant local residents, it will be possible to advance the most appropriate of these designs to a more detailed state, and to give further consideration to the points explored in Chapter 4.



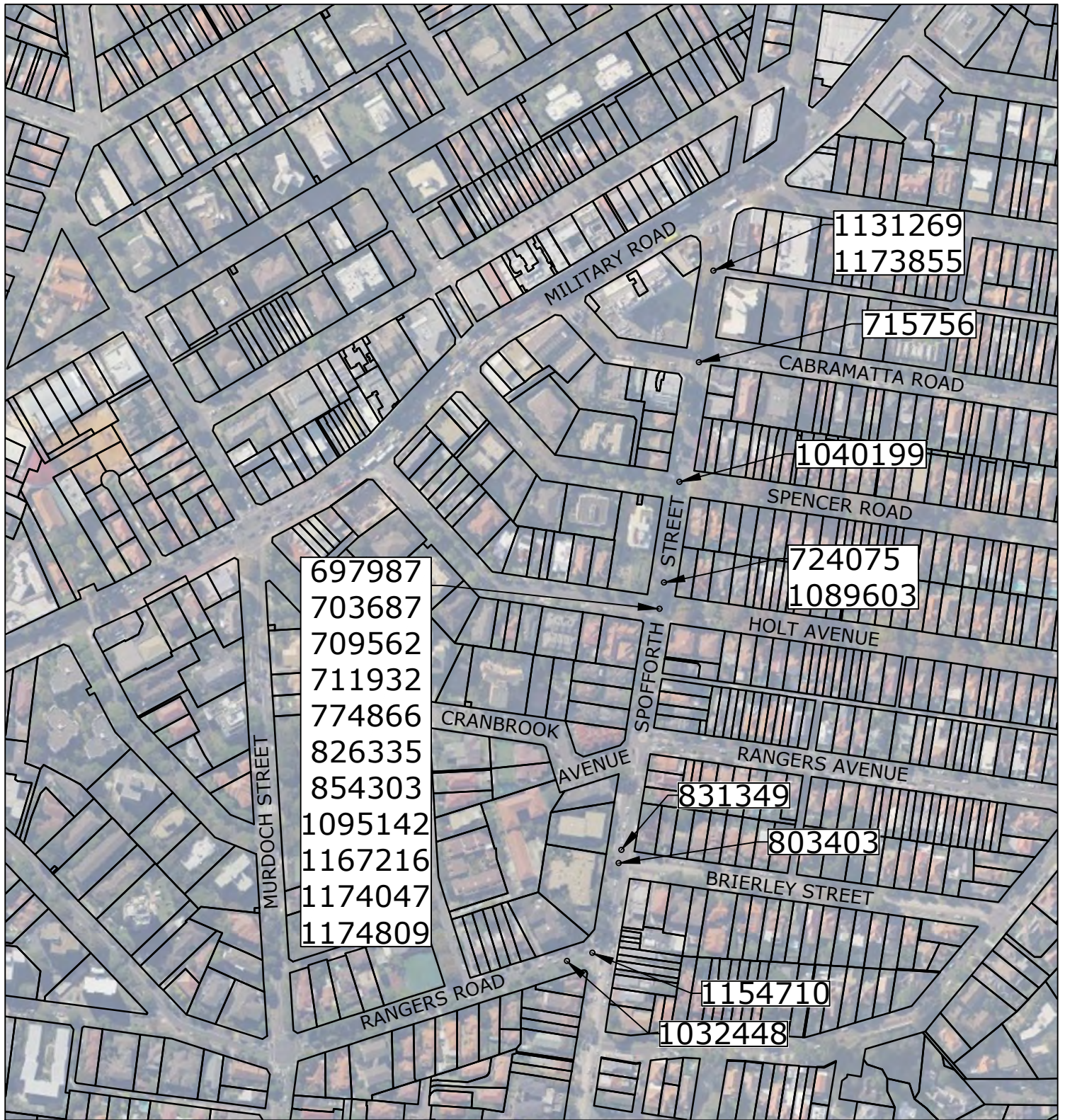
Appendix A – Traffic Data Plan

KEY: WEEKLY 50TH PERCENTILE SPEED, WEEKLY 85TH PERCENTILE SPEED, 5 DAY AAPT, 7 DAY AAPT





Appendix B – Collision Data Plan



1131269
1173855

715756

1040199

724075
1089603

697987
703687
709562
711932
774866
826335
854303
1095142
1167216
1174047
1174809

831349

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1154710

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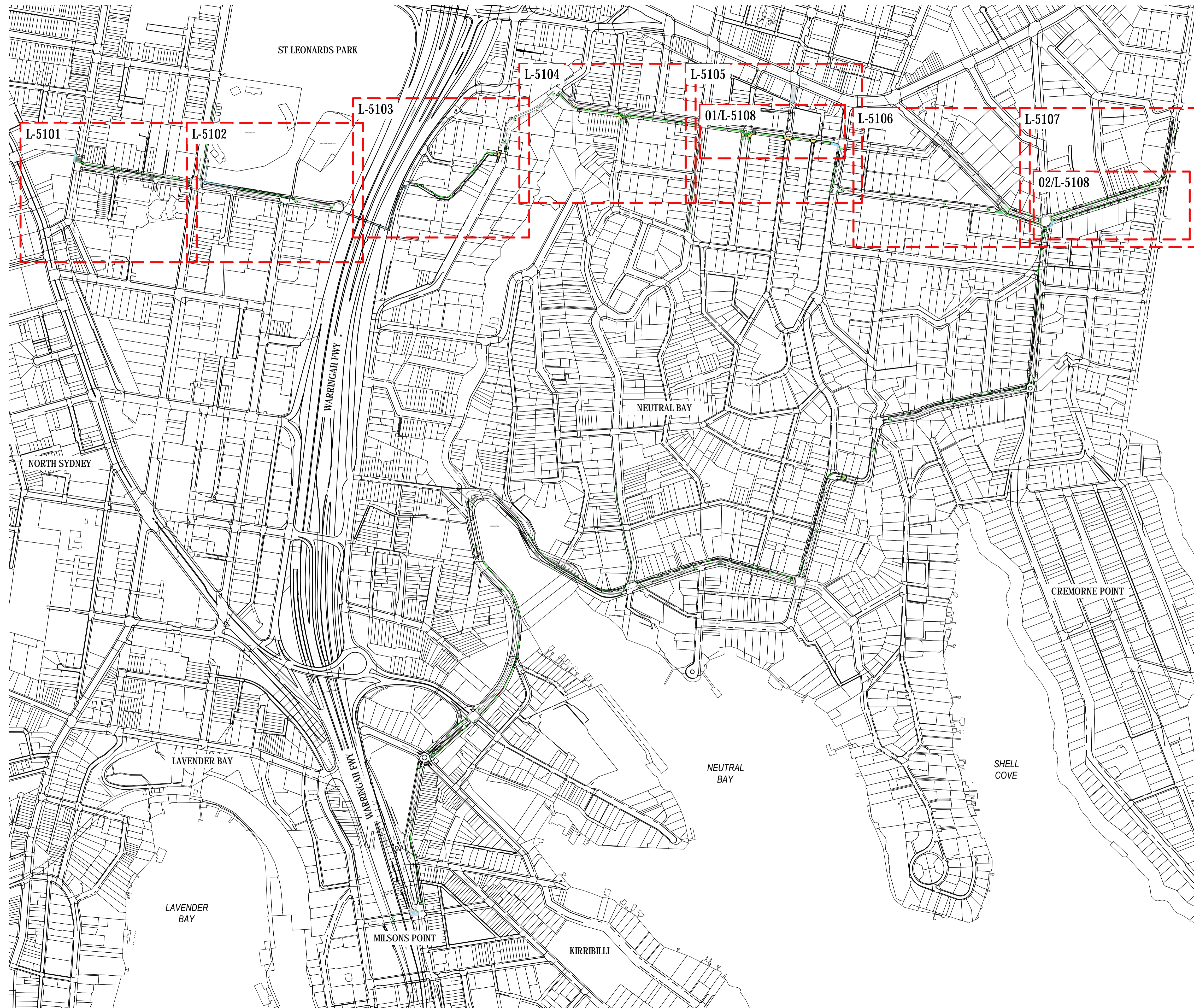
Appendix C – North Sydney Cycle Strategy - Route 5 & Mosman Council Cycling Map

ROUTE 5: PROPOSED CYCLEWAY - CONCEPT DESIGN PACKAGE

NORTH SYDNEY TO CREMORNE

DRAWING LIST

DRAWING NAME	DRAWING NO.
Overall Plan	L-5000
Cycleway Strategy Plan	L-5001
Bus Route Plan	L-5002
Concept Plan	
1 - Ridge St	L-5101
2 - Ridge St	L-5102
3 - Bent St and Winter Ave	L-5103
4 - Yeo St and Bent St	L-5104
5 - Wycombe Rd and Yeo St	L-5105
6 - Rangers Rd and Harrison St	L-5106
7 - Rangers Rd	L-5107
8 - Options	L-5108
Sections	
Sheet 1	L-5201
Sheet 2	L-5202
Detail	
Sheet 1	L-5301
Sheet 2	L-5302



Amendments	Issue Description	Date
A	FOR INFORMATION	18/05/2016

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 nom architect M. Sheldon 3990

Project Title
**NORTH SYDNEY
 CYCLE STRATEGY**

Drawing Title
**Route 5
 Overall Plan**

Scale 1:4000 @A1

Drawing created (date) 12/11/2015

By LI

Plotted and checked by LI

Verified AB

Approved SH

Drawing No Issue
15234 - 5000 A

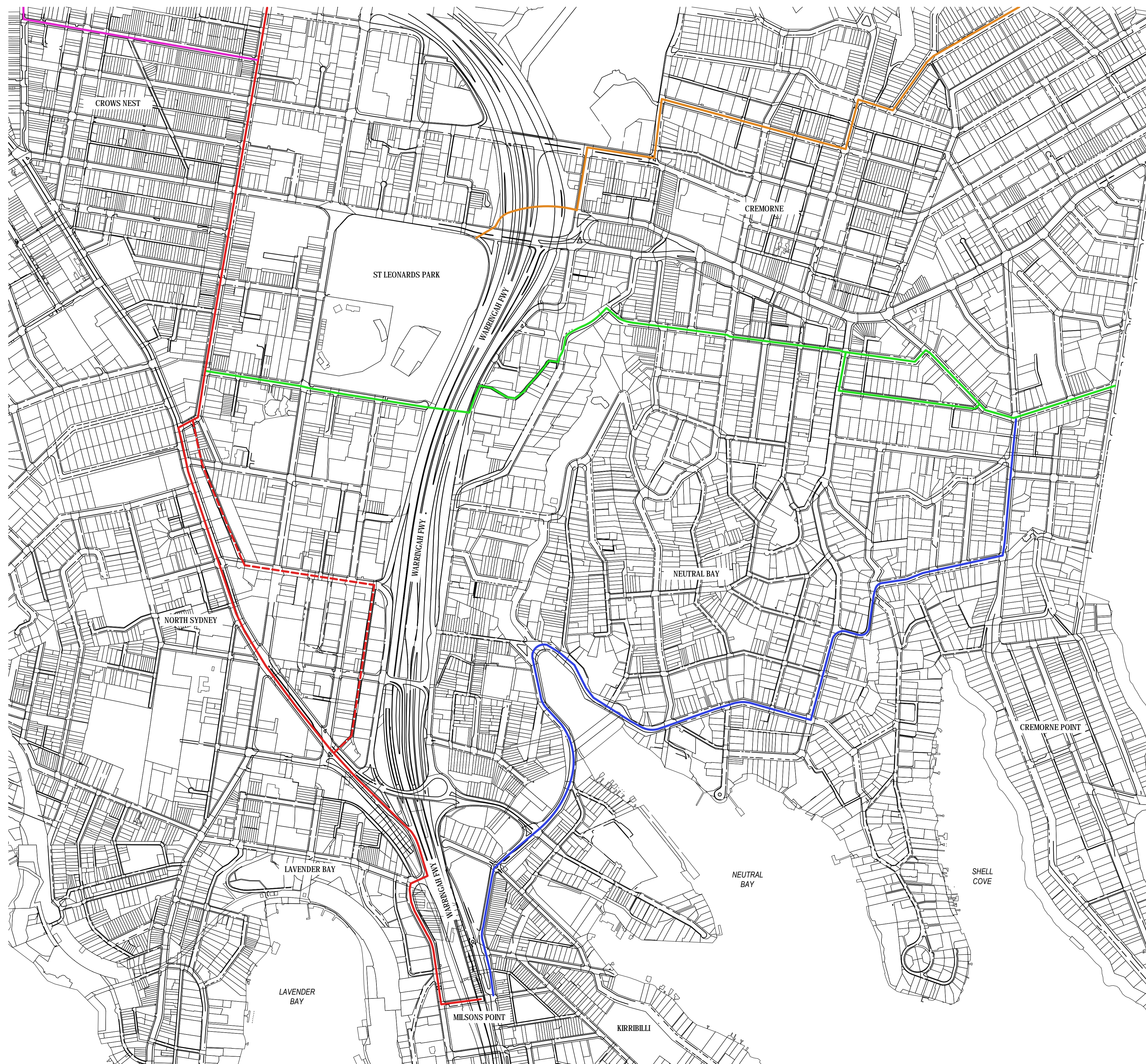
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NORTH SYDNEY INTEGRATED CYCLEWAY STRATEGY

LEGEND

- Route 1a:
Sydney Harbour Bridge to Cammeray ———
- Route 1b:
Sydney Harbour Bridge to Cammeray - - - - -
- Route 2:
Sydney Harbour Bridge to Neutral Bay ———
- Route 3:
North Sydney to Mosman ———
- Route 4:
North Sydney to Crows Nest ———
- Route 5:
North Sydney to Cremorne ———



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Project Title
**NORTH SYDNEY
CYCLE STRATEGY**

Drawing Title
**Route 5
CYCLEWAY
STRATEGY PLAN**

Scale 1:5000 @A1

Drawing created (date)	12/11/2015
By	LI
Plotted and checked by	LI
Verified	AB
Approved	SH
Drawing No	Issue
15234 - 5001	A
File	Plot Date
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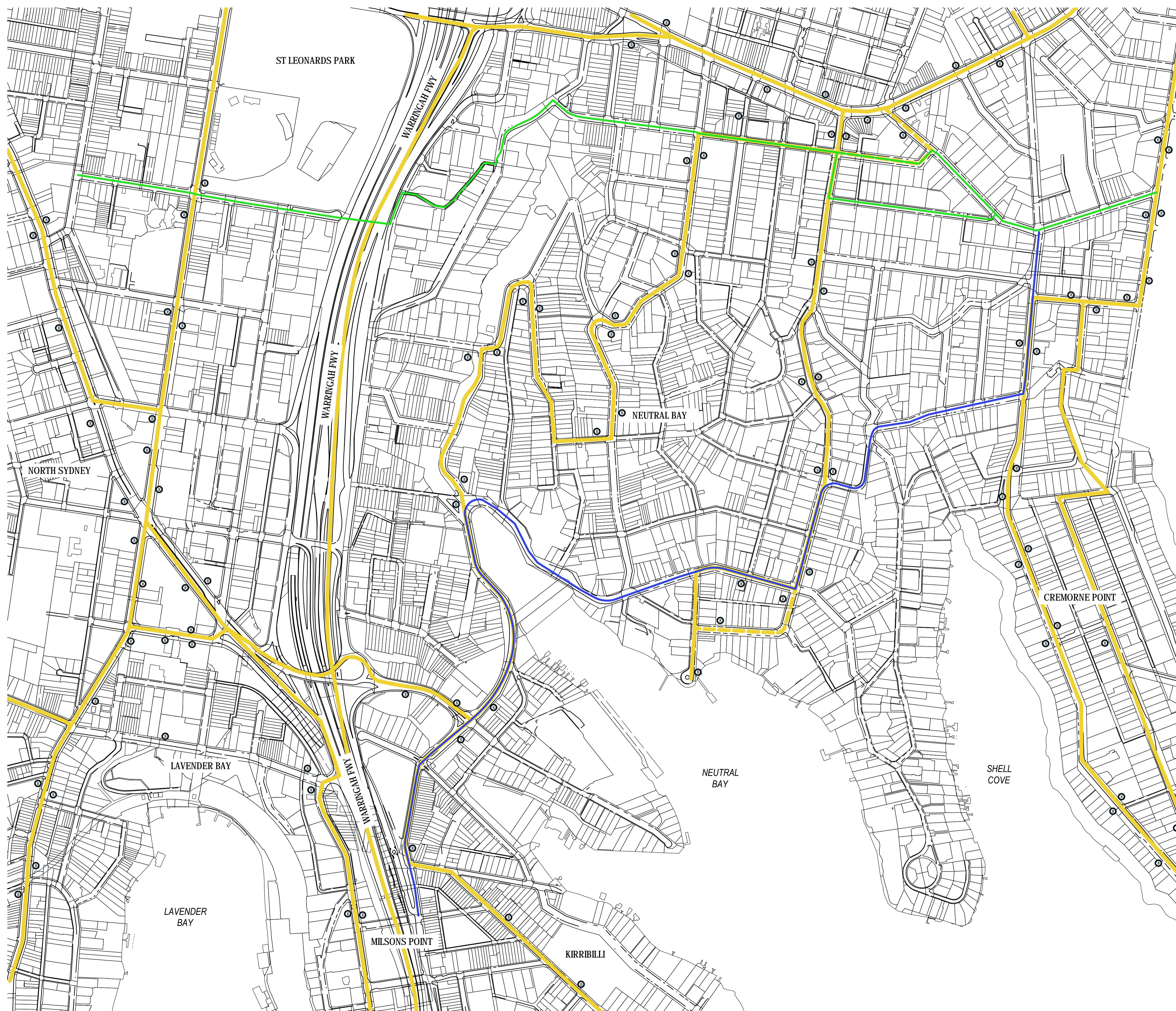
NORTH SYDNEY BUS ROUTE

LEGEND

- Bus Routes:
- Bus Route: One-way direction
- Bus Stop:

- Route 3:
North Sydney to Mosman

- Route 5:
North Sydney to Cremorne



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Project Title
**NORTH SYDNEY
 CYCLE STRATEGY**

Drawing Title
**Route 5
 Bus Route Plan**

Scale 1:4000 @A1

Drawing created (date) 12/11/2015

By LI

Plotted and checked by LI

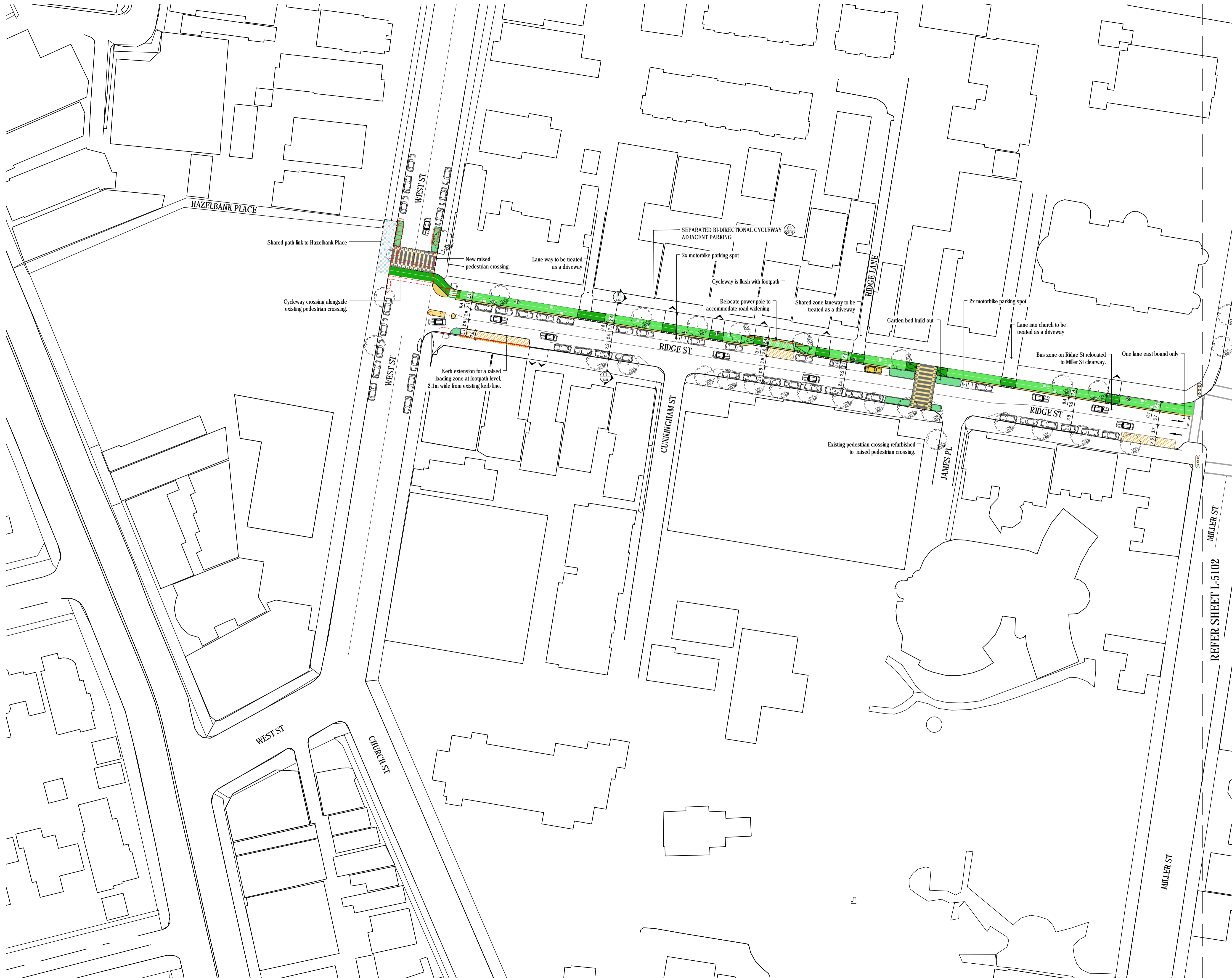
Verified AB

Approved SH

Drawing No Issue
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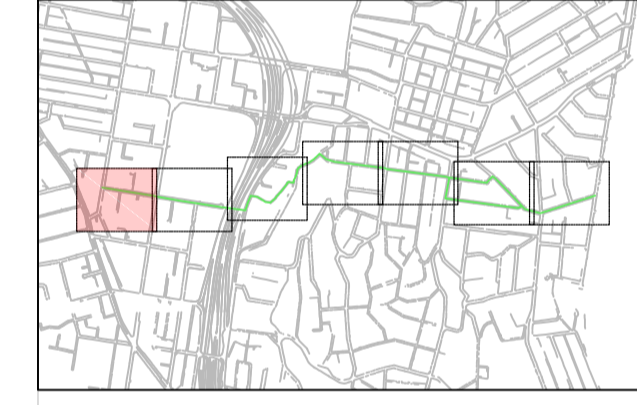
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Amendments Issue	Description	Date
A	REVIEW	26/02/2016
B	FOR INFORMATION	30/03/2016
C	FOR INFORMATION	18/05/2016

- LEGEND**
- EXISTING ITEM TO BE REMOVED
 - NEW CYCLEWAY WITH PHYSICAL SEPARATION
 - NEW CYCLEWAY WITH LINEMARKING SEPARATION
 - CYCLEWAY AT FOOTPATH LEVEL
 - SHARE PATH
 - BUS ZONE ON CYCLEWAY
 - MIXED TRAFFIC LEVEL THRESHOLD, REFER DETAIL.XXXX
 - NEW PAVEMENT
 - NEW RAISED THRESHOLD
 - EXISTING TREE RETAINED
 - NEW GARDEN BED
 - EXISTING PARKING RETAINED
 - EXISTING PARKING REMOVED
 - NEW PARKING SPACE
 - MINOR DRIVEWAY
 - MAJOR DRIVEWAY
 - BUS STOP / BUS ZONE
 - EXISTING TRAFFIC SIGNALS
 - LOADING ZONE
 - CLEARWAY
 - PEDESTRIAN CROSSING
 - SPEED CUSHION



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Project Title
NORTH SYDNEY CYCLE STRATEGY

Drawing Title
Route 5 Concept Plan 1 - Ridge Street

Scale 1:500 @A1

Drawing created (date) 12/11/2015
 By LI
 Plotted and checked by LI
 Verified AB
 Approved SH

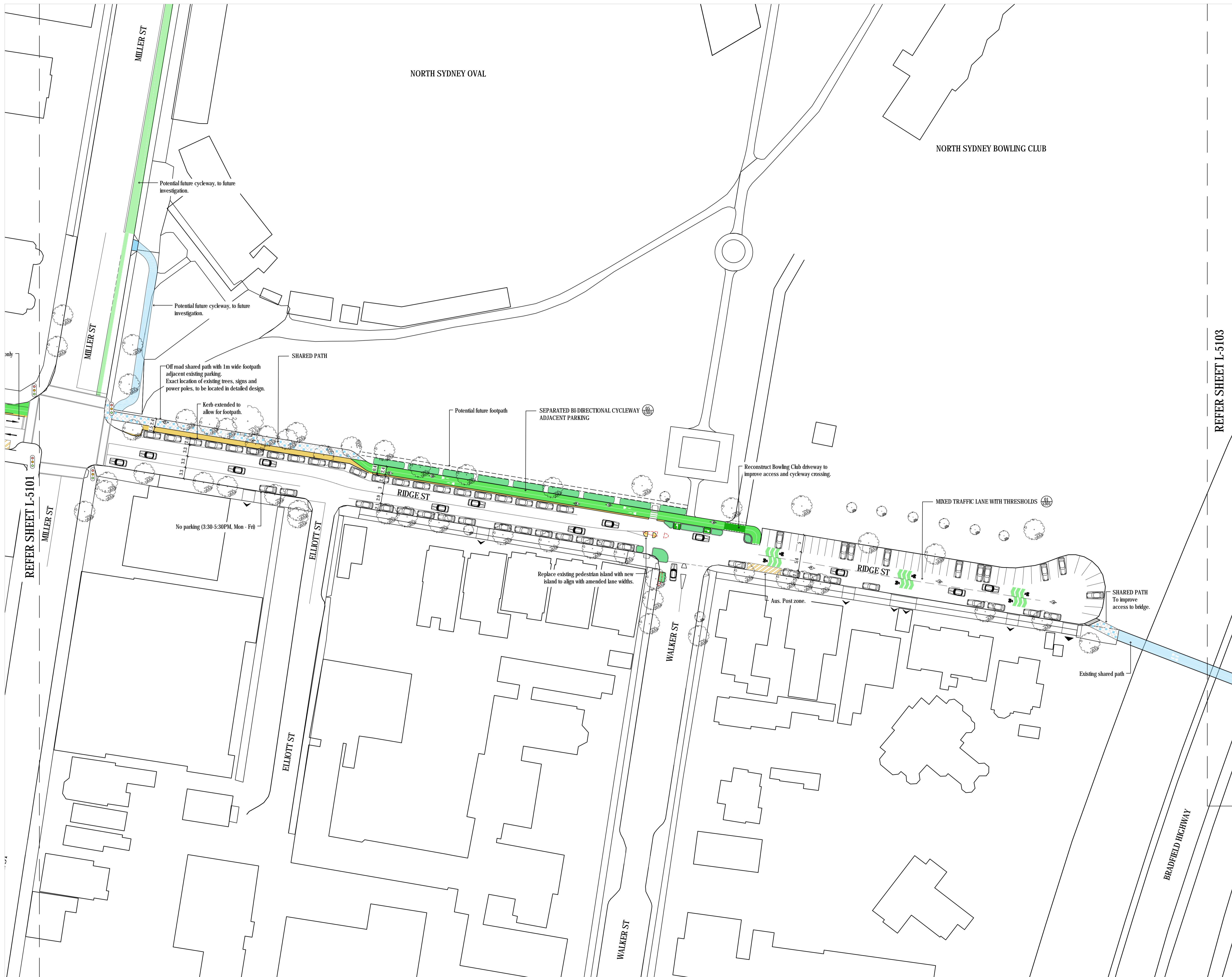
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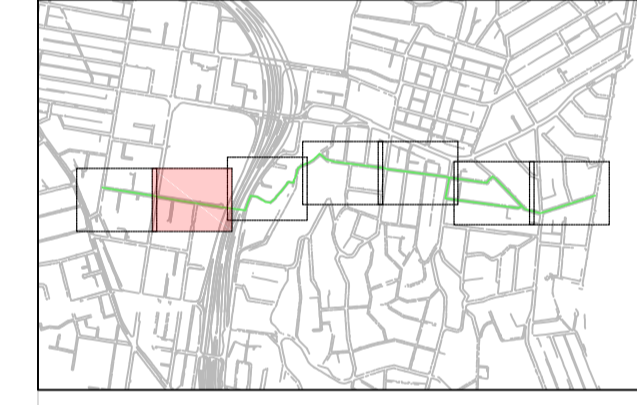
REFER SHEET L-5102

MILLER ST



Issue	Description	Date
A	REVIEW	26/02/2016
B	FOR INFORMATION	30/03/2016
C	FOR INFORMATION	18/05/2016

- LEGEND**
- EXISTING ITEM TO BE REMOVED
 - NEW CYCLEWAY WITH PHYSICAL SEPARATION
 - NEW CYCLEWAY WITH LINEMARKING SEPARATION
 - CYCLEWAY AT FOOTPATH LEVEL
 - SHARE PATH
 - BUS ZONE ON CYCLEWAY
 - MIXED TRAFFIC LEVEL THRESHOLD, REFER DETAIL XXXX
 - NEW PAVEMENT
 - NEW RAISED THRESHOLD
 - EXISTING TREE RETAINED
 - NEW GARDEN BED
 - EXISTING PARKING RETAINED
 - EXISTING PARKING REMOVED
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Project Title
NORTH SYDNEY CYCLE STRATEGY

Drawing Title
Route 5 Concept Plan 2 - Ridge Street

Scale 1:500 @A1

Drawing created (date) 12/11/2015

By LI

Plotted and checked by LI

Verified AB

Approved SH

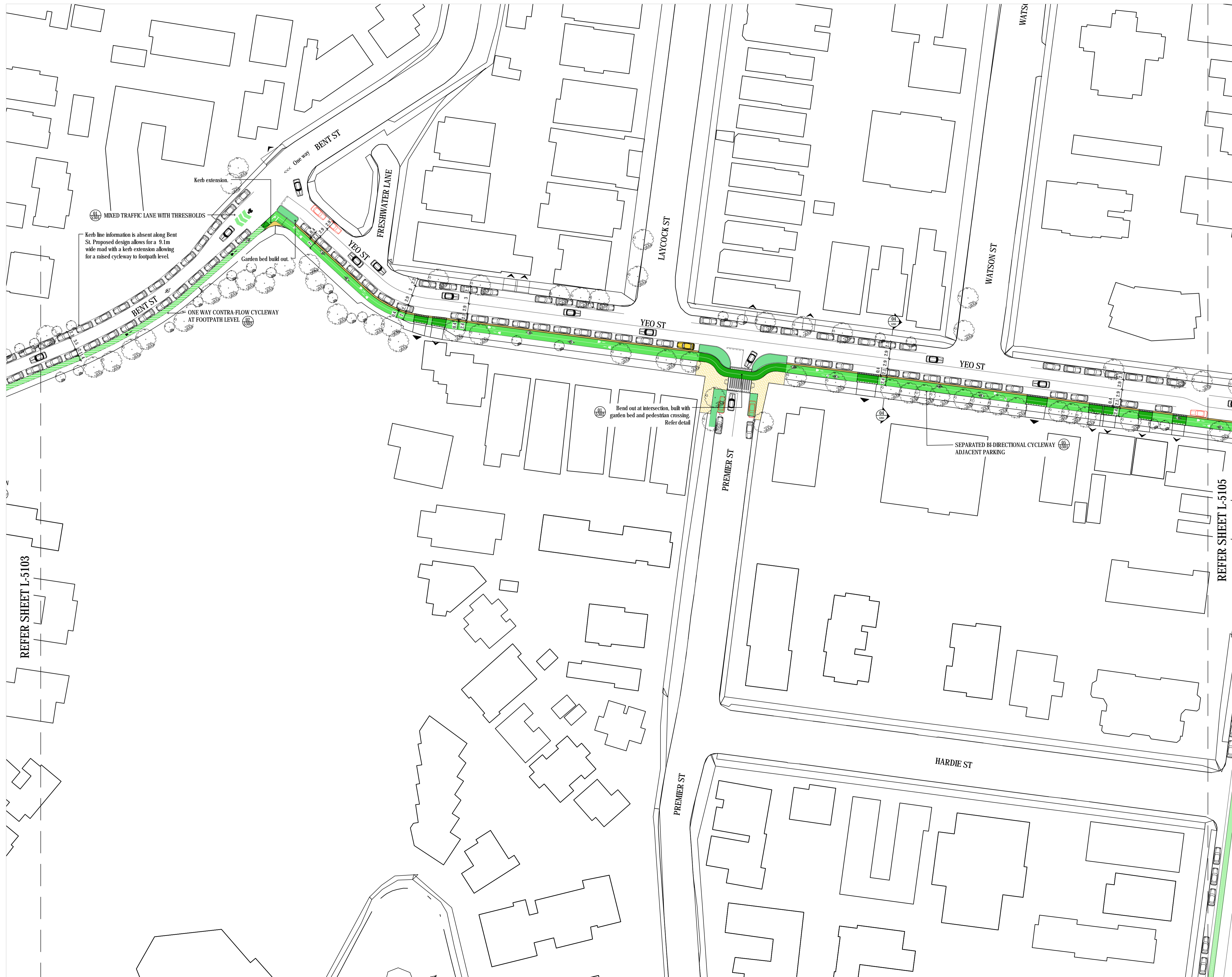
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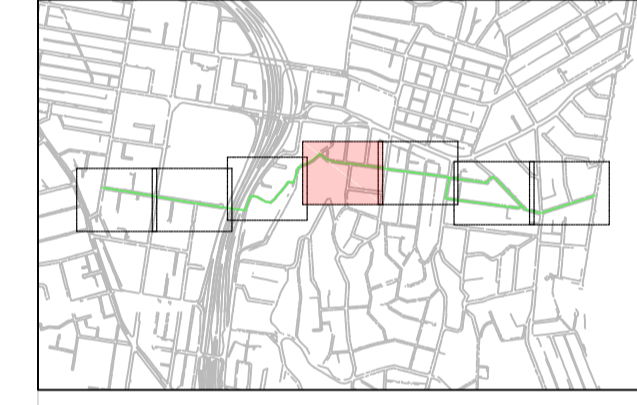
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Amendments Issue	Description	Date
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B	FOR INFORMATION	30/03/2016
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Project Title
NORTH SYDNEY CYCLE STRATEGY

Drawing Title
Route 5 Concept Plan 4 - Yeo Street and Bent Street

Scale 1:500 @A1

Drawing created (date) 12/11/2015

By LI

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Verified AB

Approved SH

Drawing No 15234 - 5104 Issue C

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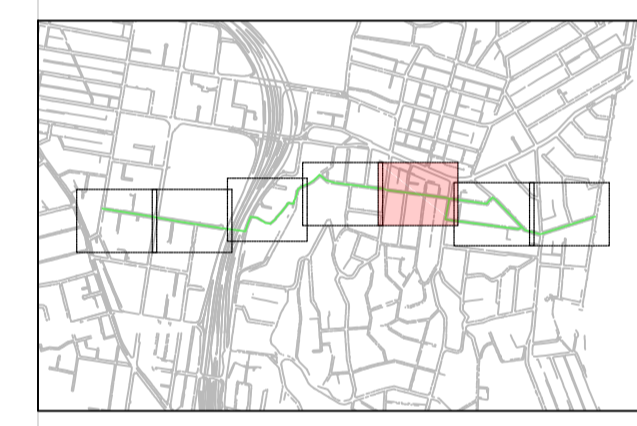
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REFER SHEET L-5105



Amendments Issue	Description	Date
A	REVIEW	26/02/2016
B	FOR INFORMATION	30/03/2016
C	FOR INFORMATION	18/05/2016

- LEGEND**
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 - SHARE PATH
 - BUS ZONE ON CYCLEWAY
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 - NEW RAISED THRESHOLD
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Project Title
NORTH SYDNEY CYCLE STRATEGY

Drawing Title
Route 5 Concept Plan 5 - Wycombe Road and Yeo Street

Scale 1:500 @A1

Drawing created (date)	12/11/2015
By	LI
Plotted and checked by	LI
Verified	AB
Approved	SH
Drawing No	Issue
15234 - 5105	C
File	Plot Date
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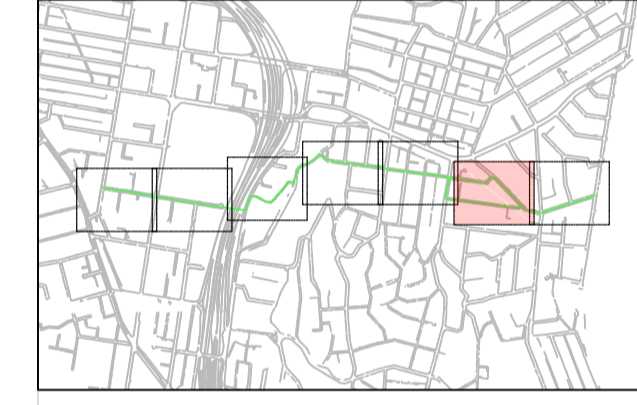
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Amendments Issue	Description	Date
A	REVIEW	26/02/2016
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Project Title
NORTH SYDNEY CYCLE STRATEGY

Drawing Title
Route 5 Concept Plan 6 - Rangers Road and Harrison Street

Scale
 1:500 @A1

Drawing created (date)
 12/11/2015

By
 LI

Plotted and checked by
 LI

Verified
 AB

Approved
 SH

Drawing No
15234 - 5106

Issue
C

File
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Plot Date
 SDATES

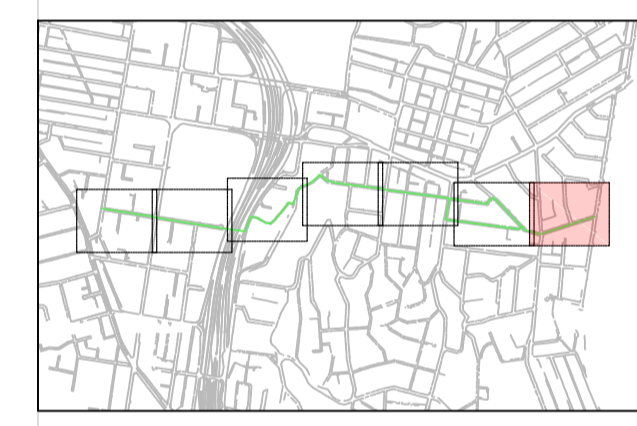
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Project Title
NORTH SYDNEY CYCLE STRATEGY

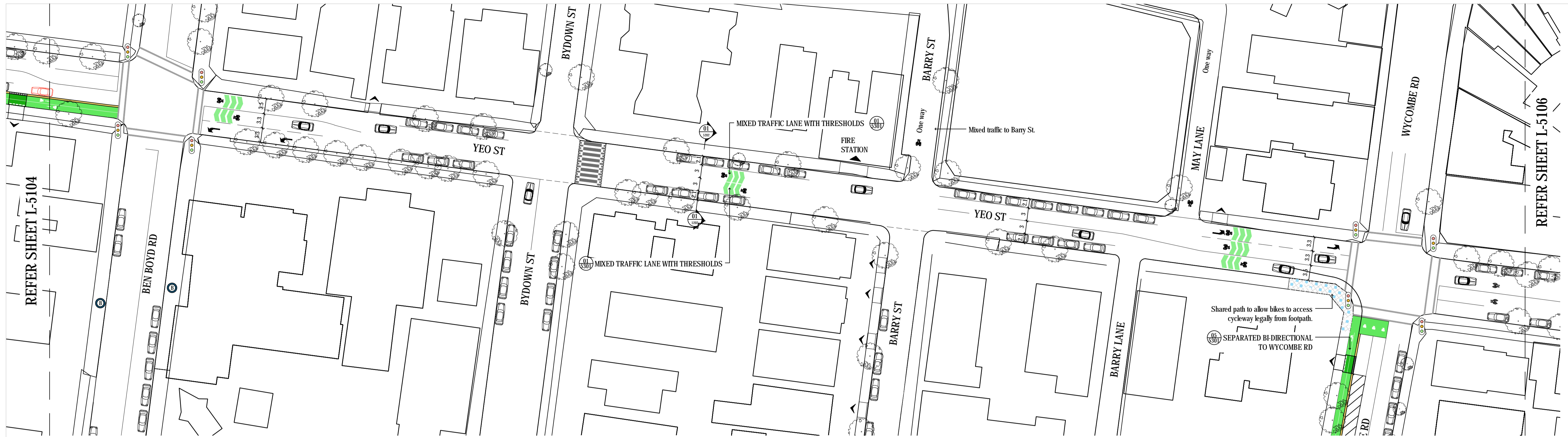
Drawing Title
Route 5 Concept Plan 7 - Rangers Road

Scale 1:500 @A1

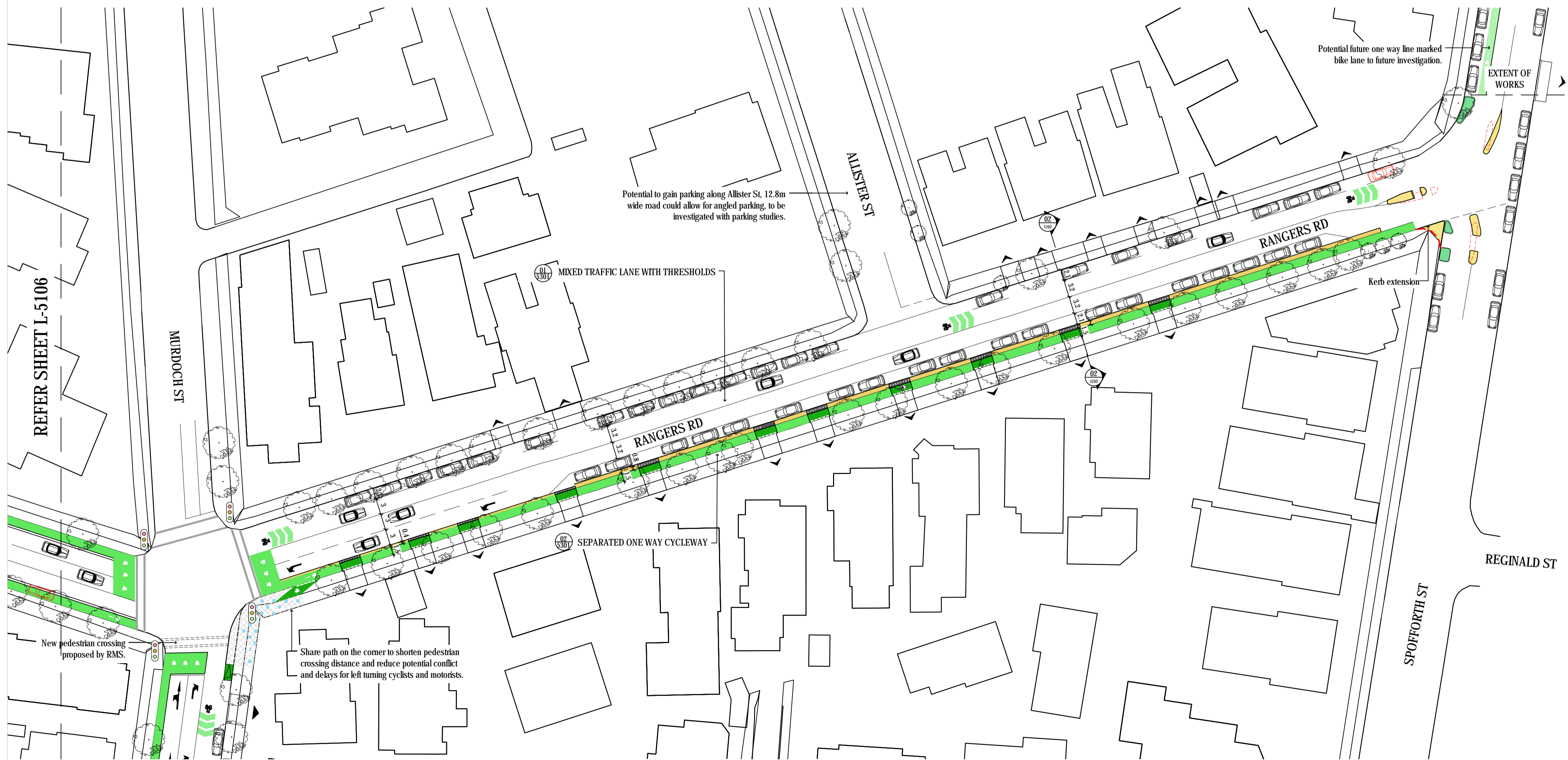
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JOINS ROUTE 3 - REFER ROUTE 3 CONCEPT DESIGN PACKAGE, SHEET L-3109

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01 YEO STREET (Between Ben Boyd Road and Wycombe Road.)
 OPTION - Mixed traffic in both directions, all parking retained. 1:100 @ A1



02 RANGERS ROAD (Between Murdoch Street and Spofforth St.)
 OPTION - Mixed traffic to the north side and separated one way cycleway on the south side, all parking retained. 1:100 @ A1

Amendments Issue	Description	Date
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 - CYCLEWAY AT FOOTPATH LEVEL
 - SHARE PATH
 - BUS ZONE ON CYCLEWAY
 - MIXED TRAFFIC LEVEL THRESHOLD, REFER DETAIL XXXX
 - NEW PAVEMENT
 - NEW RAISED THRESHOLD
 - EXISTING TREE RETAINED
 - NEW GARDEN BED
 - EXISTING PARKING RETAINED
 - EXISTING PARKING REMOVED
 - NEW PARKING SPACE
 - MINOR DRIVEWAY
 - MAJOR DRIVEWAY
 - BUS STOP / BUS ZONE
 - EXISTING TRAFFIC SIGNALS
 - LOADING ZONE
 - CLEARWAY
 - PEDESTRIAN CROSSING
 - SPEED CUSHION



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 nom architect M. Sheldon 3990

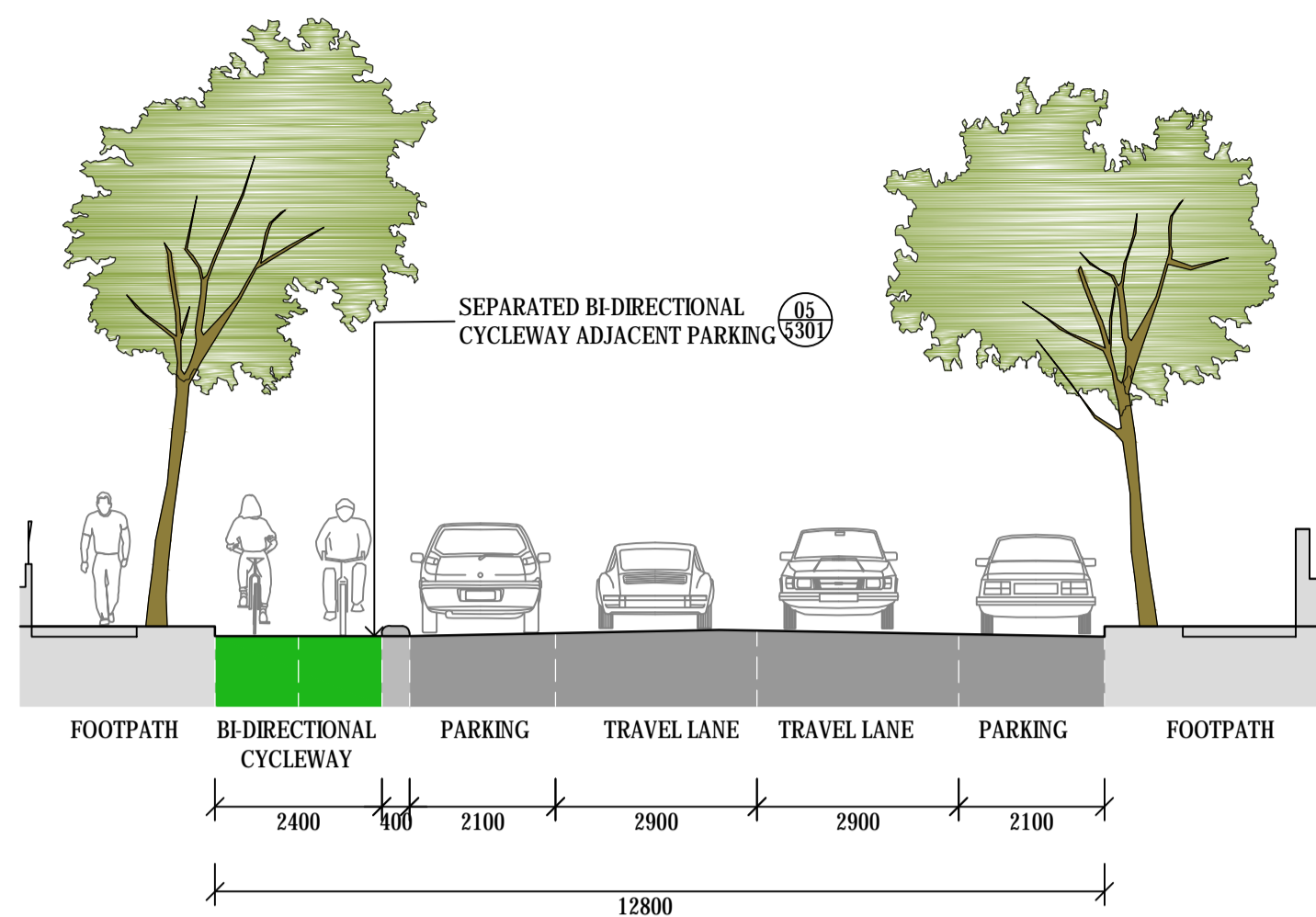
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NORTH SYDNEY CYCLE STRATEGY

Drawing Title
Route 5 Concept Plan - Options

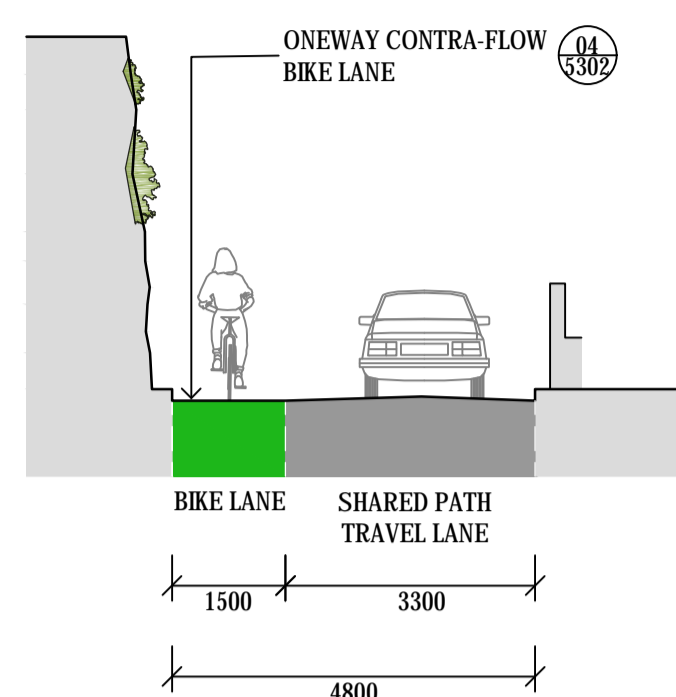
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By	LI
Plotted and checked by	LI
Verified	AB
Approved	SH
Drawing No	Issue
15234 - 5108	B
File	Plot Date
SFILES	SDATES

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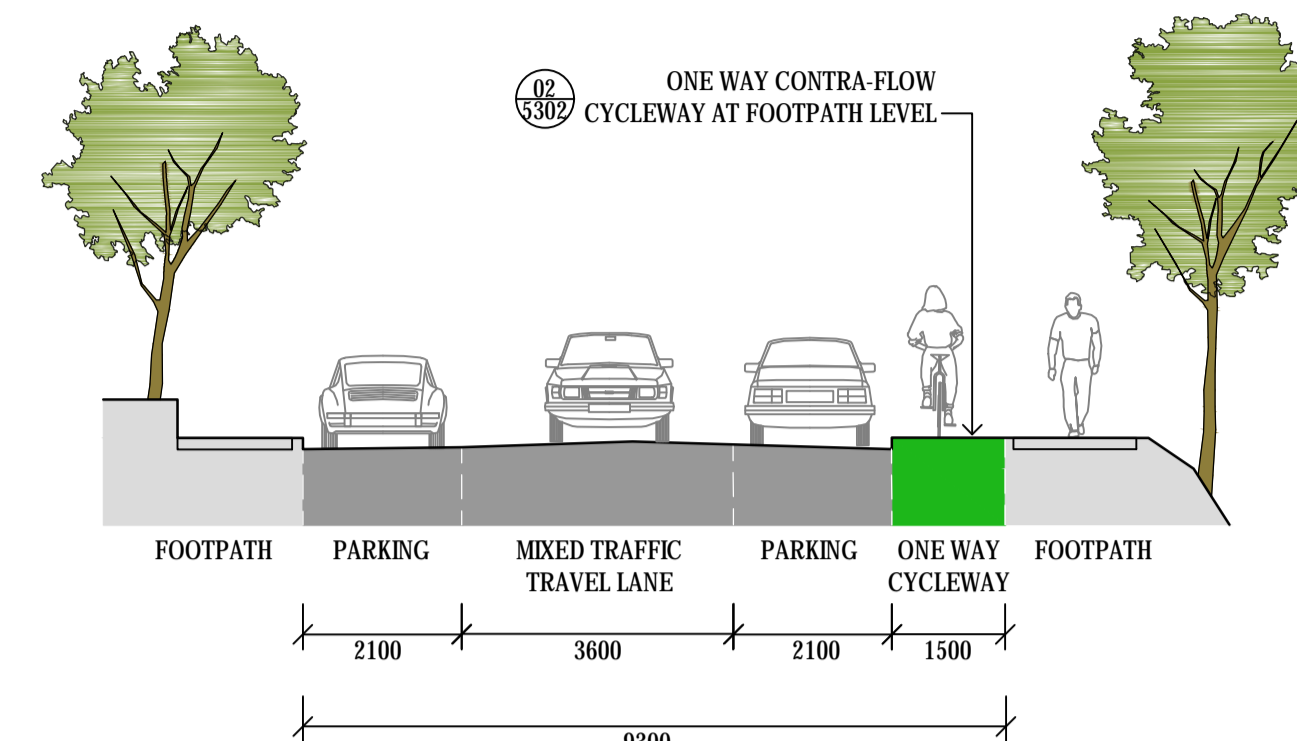
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B	FOR INFORMATION	18/05/2016



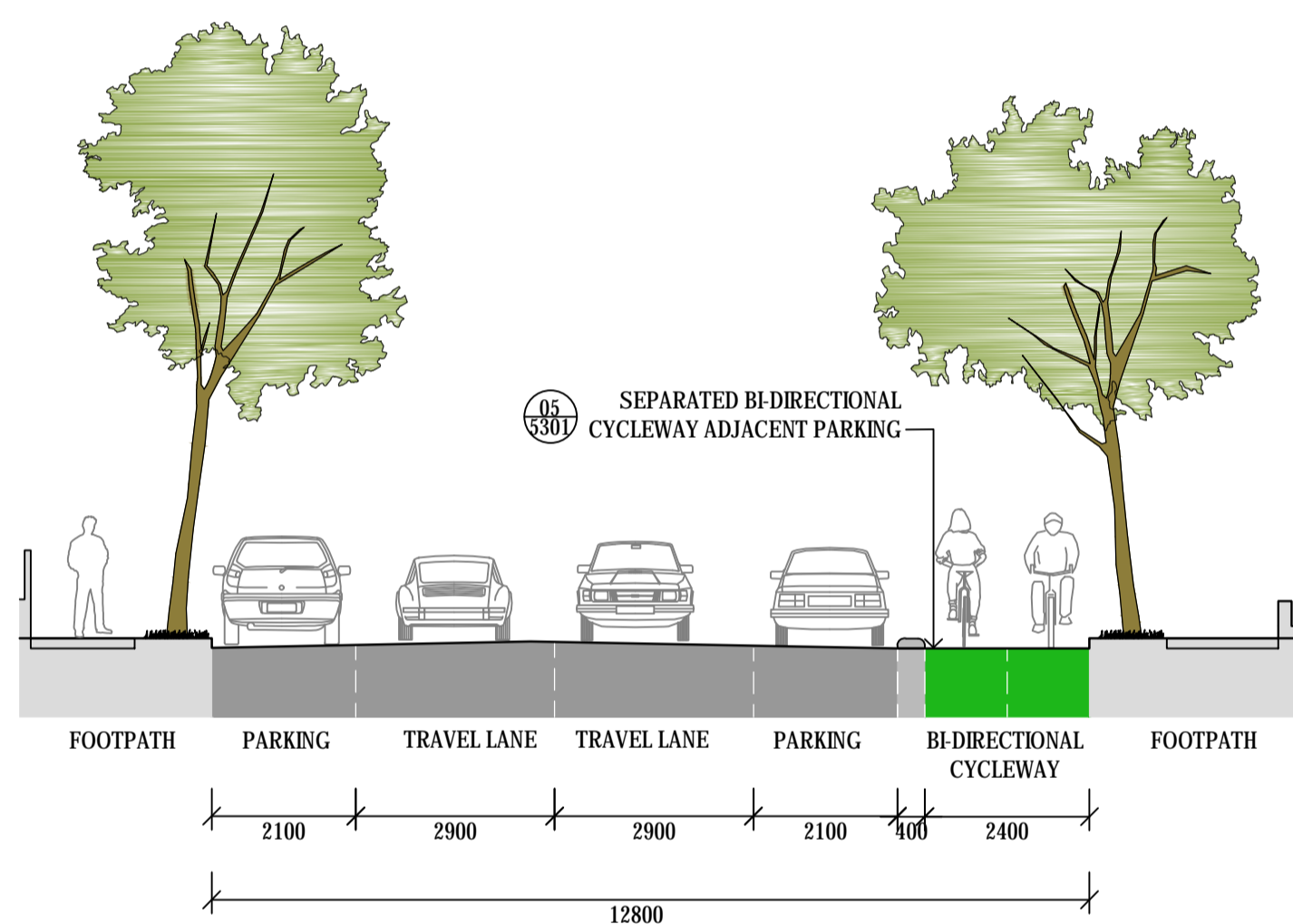
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1:100 @ A1



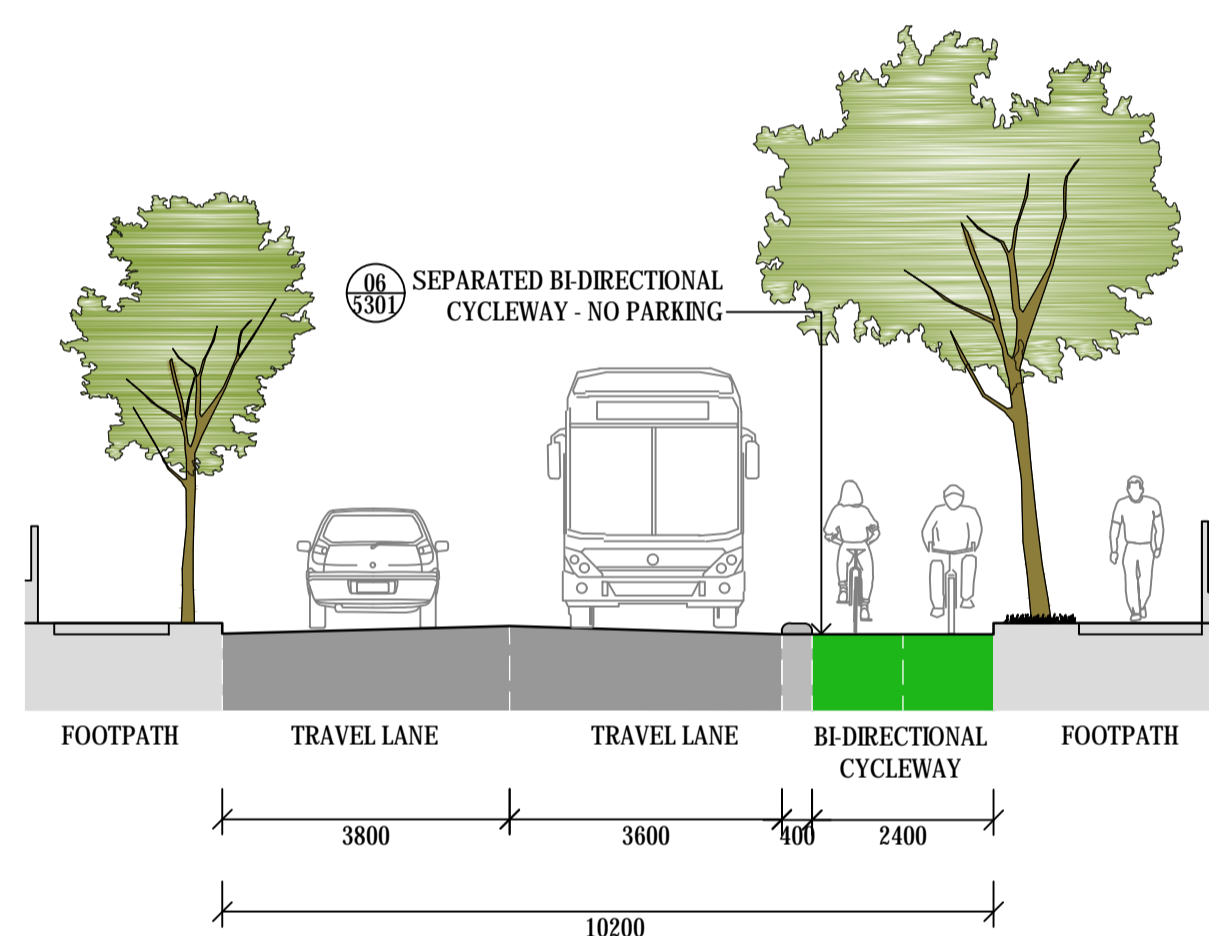
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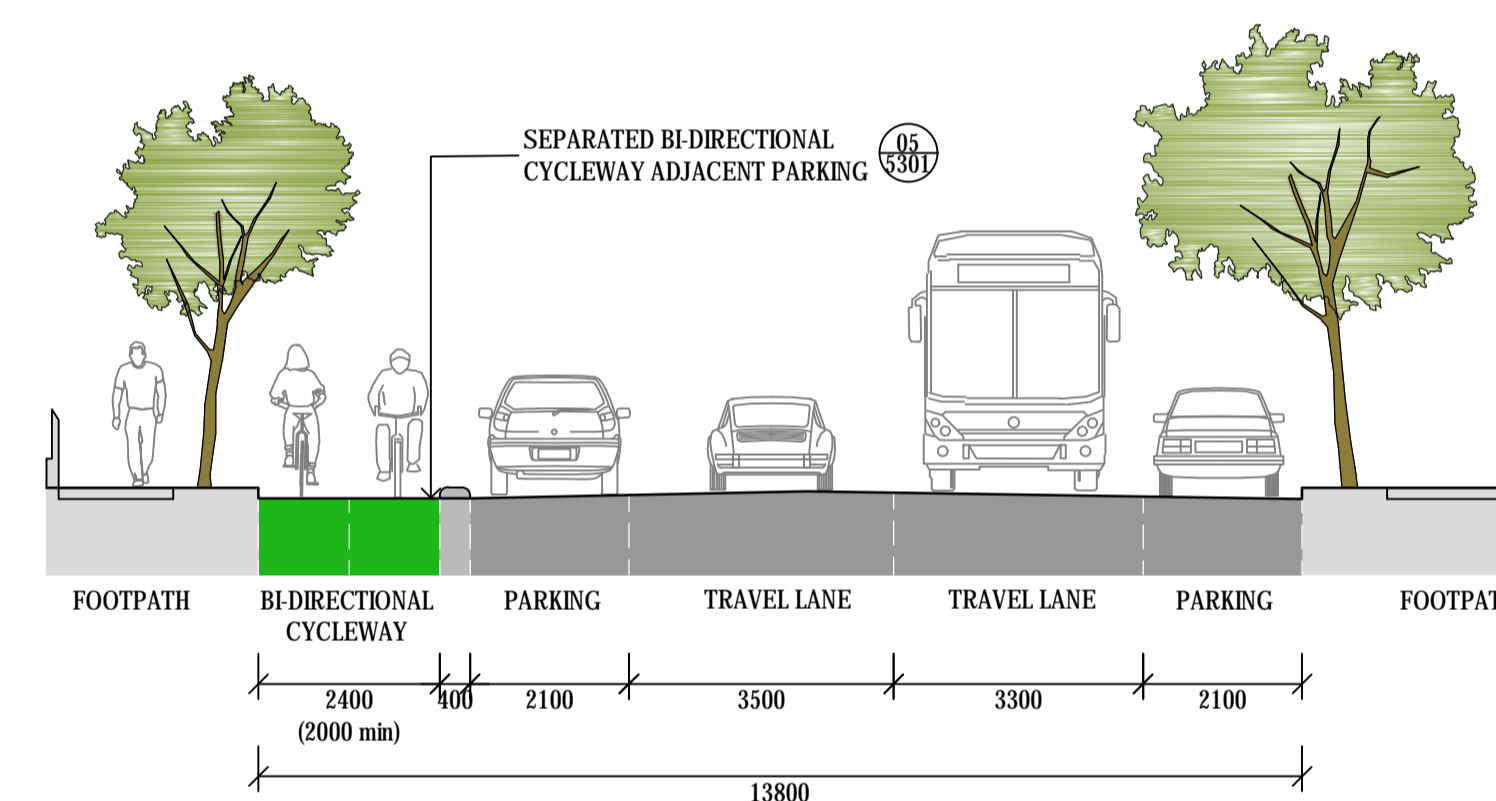
03 TYPICAL SECTION - BENT ST
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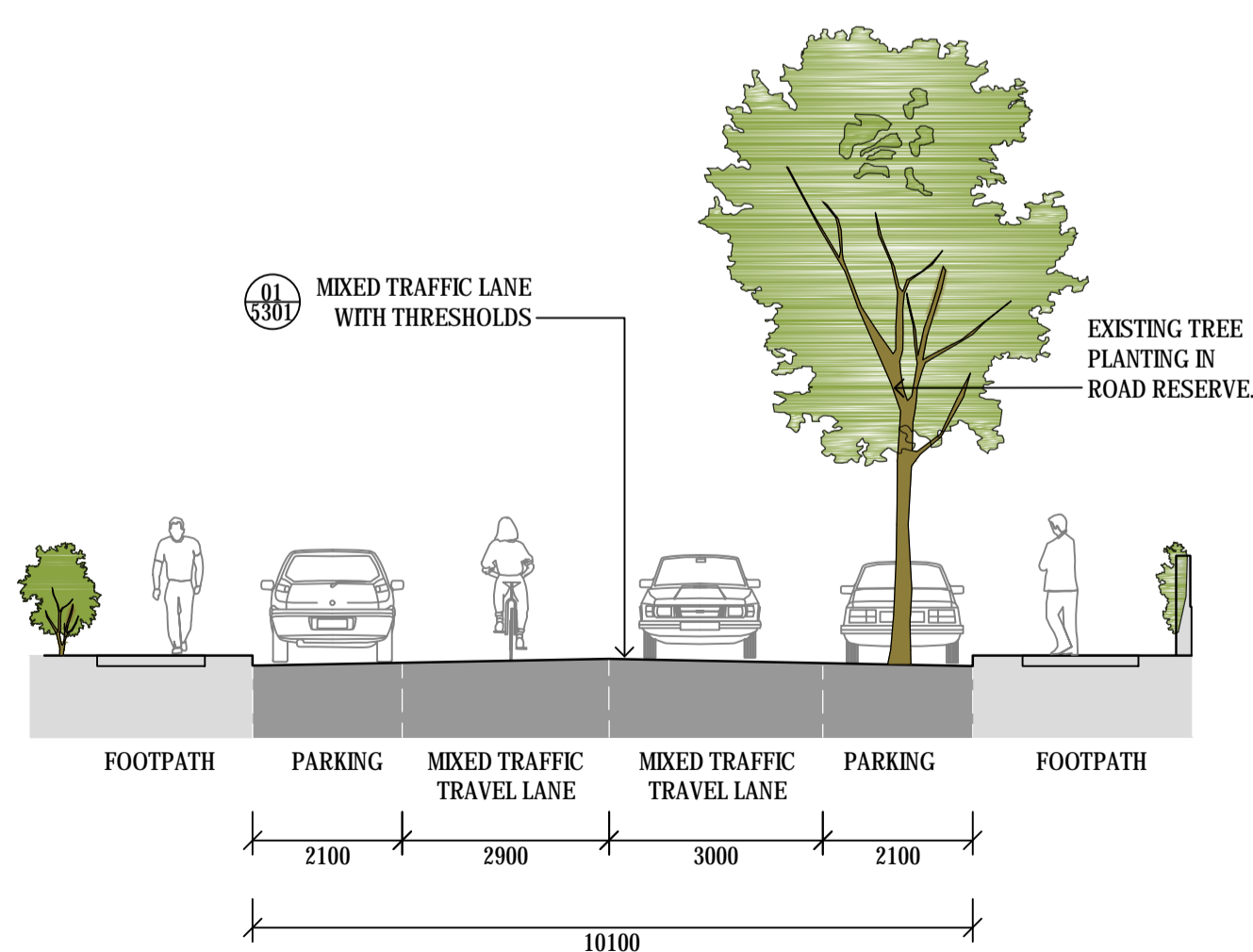
04 TYPICAL SECTION - YEO ST (WEST END)
1:100 @ A1



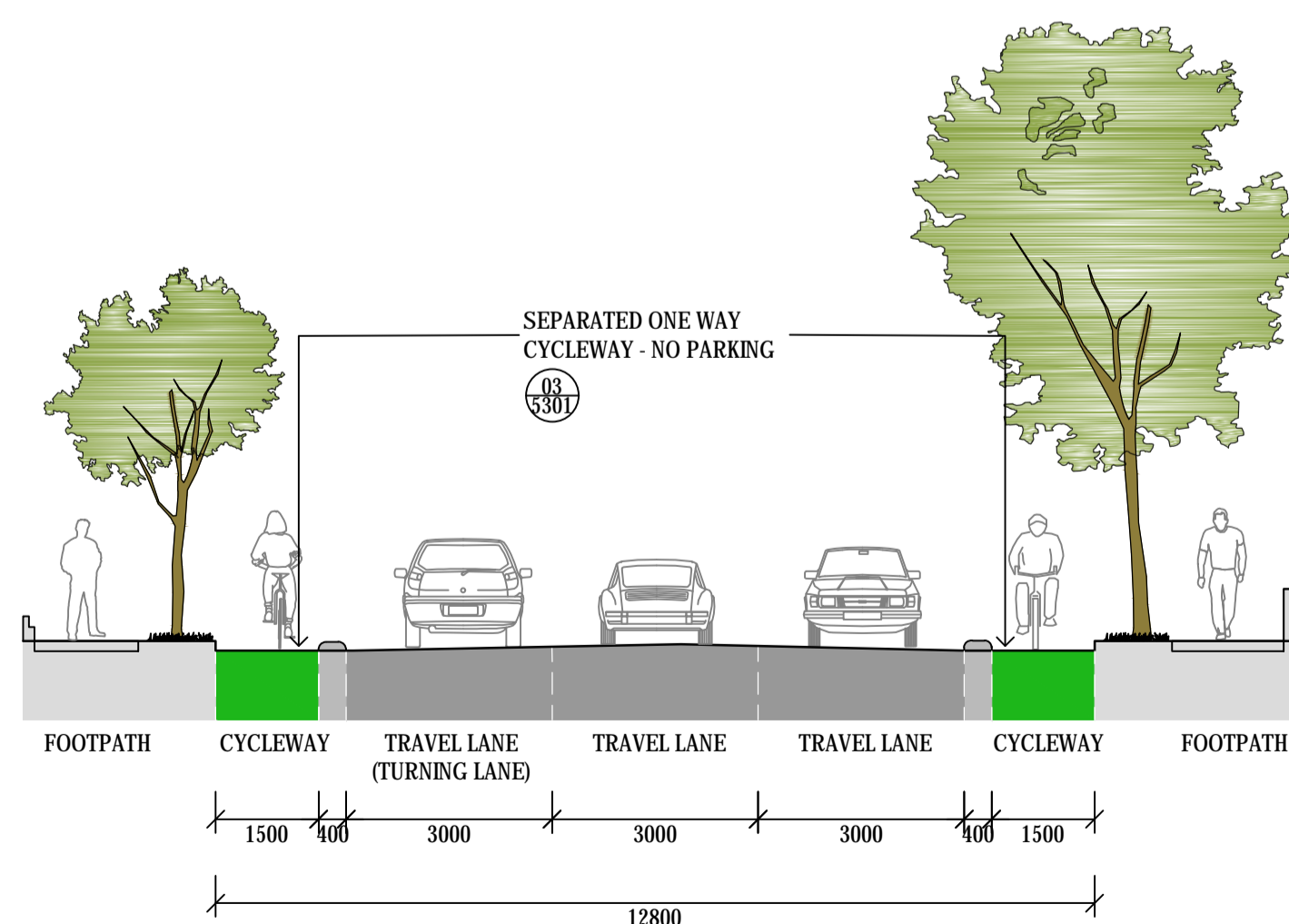
05 TYPICAL SECTION - YEO ST (EAST END)
1:100 @ A1



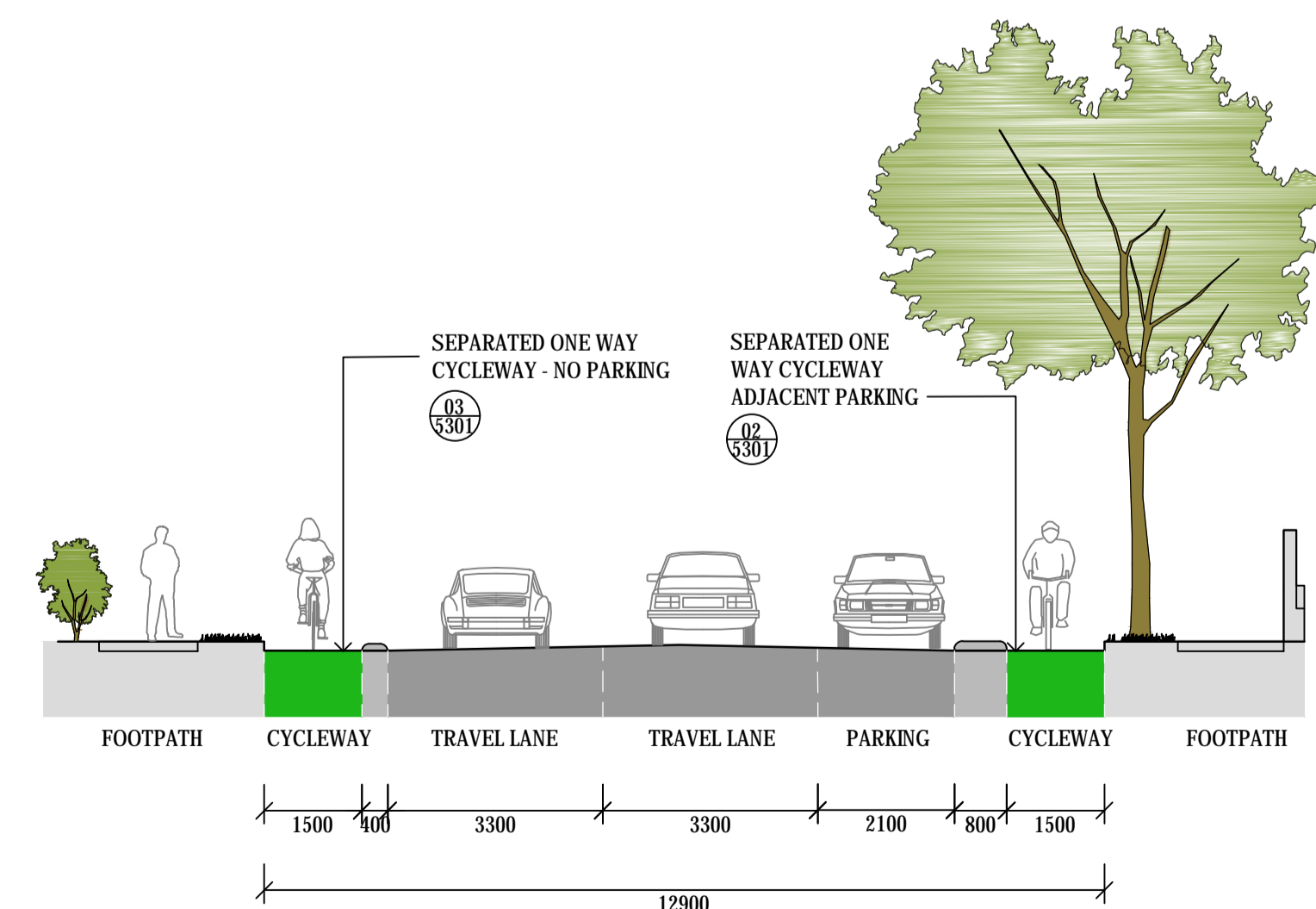
06 TYPICAL SECTION - WYCOMBE RD
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07 TYPICAL SECTION - HARRISON ST
1:100 @ A1



08 TYPICAL SECTION - RANGERS RD (NEAR MURDOCH INTERSECTION)
1:100 @ A1



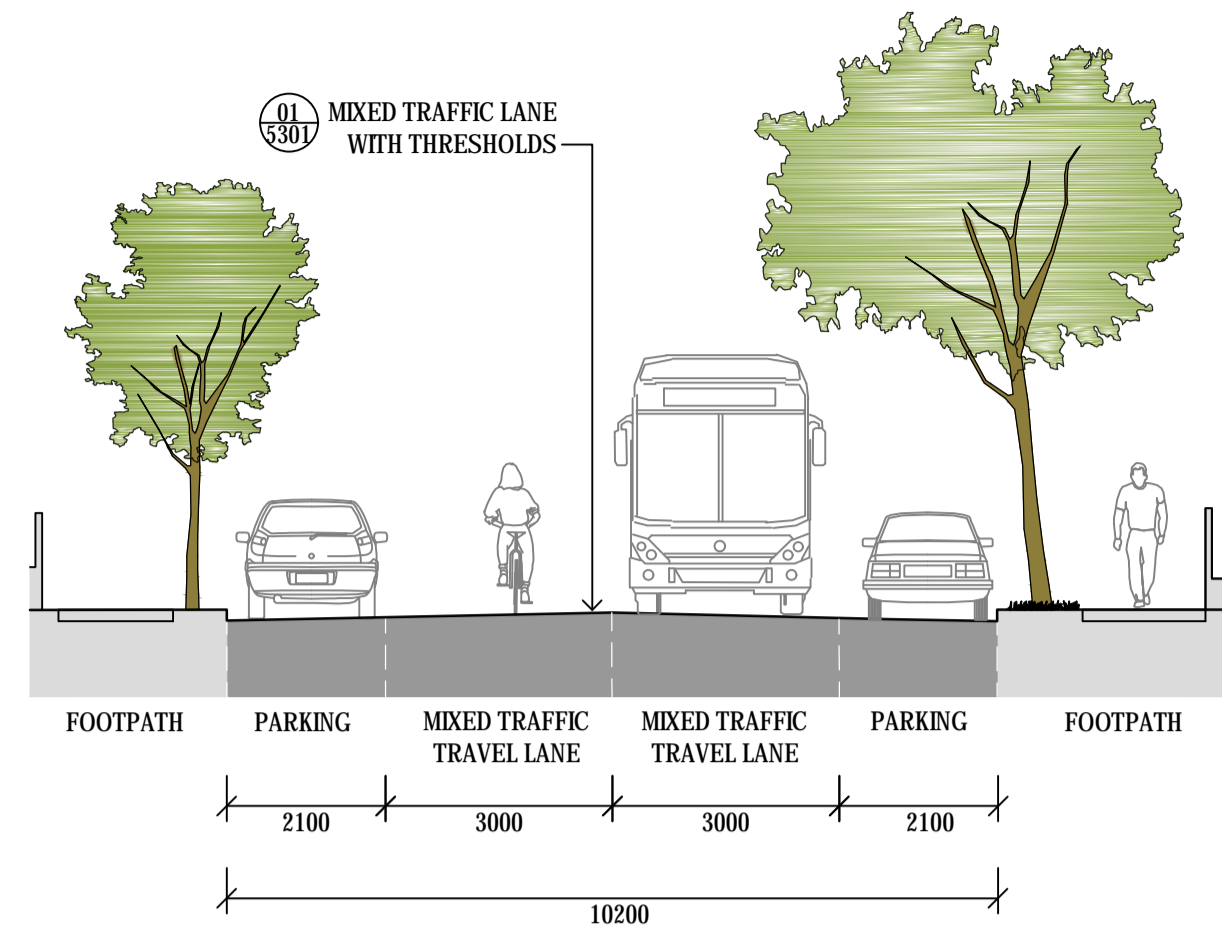
09 TYPICAL SECTION - RANGERS RD
1:100 @ A1

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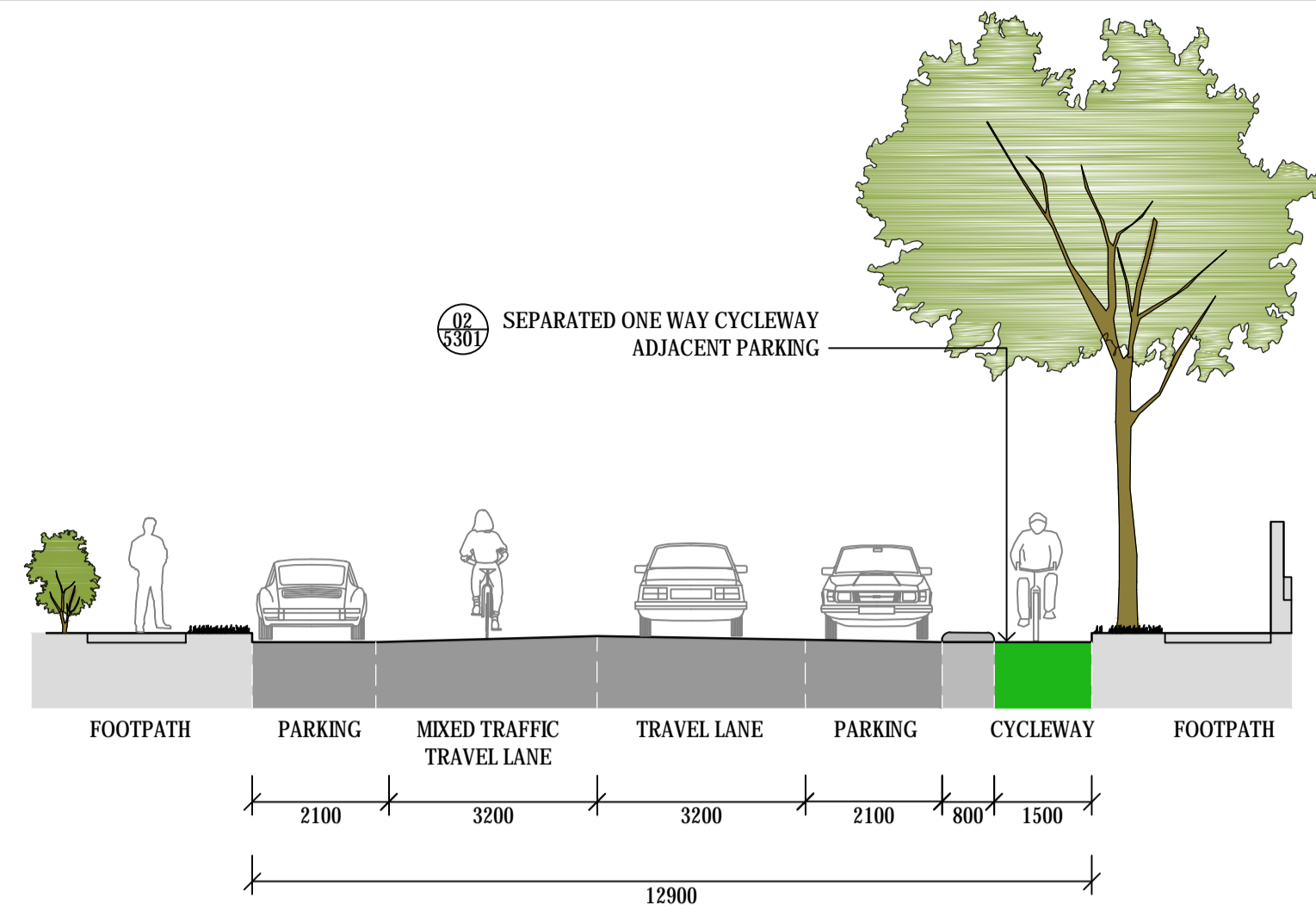
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Project Title
NORTH SYDNEY CYCLE STRATEGY
 Drawing Title
Route 5 Sections
 Scale 1:100 @ A1
 Drawing created (date) 12/11/2015
 By LI
 Plotted and checked by LI
 Verified AB
 Approved SH
 Drawing No Issue
15234 - 5201 B
 File Plot Date
 SFILES SDATES

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01 TYPICAL SECTION - YEO ST - OPTION
1:100 @ A1



02 TYPICAL SECTION - RANGERS RD - OPTION
1:100 @ A1

Amendments		
Issue	Description	Date
A	FOR INFORMATION	30/03/2016
B	FOR INFORMATION	18/05/2016

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 nom architect M. Sheldon 3990

Project Title
**NORTH SYDNEY
 CYCLE STRATEGY**

Drawing Title
**Route 5 Sections
 Option - Sheet 2**

Scale 1:100 @A1

Drawing created (date) 12/11/2015

By LI

Plotted and checked by LI

Verified AB

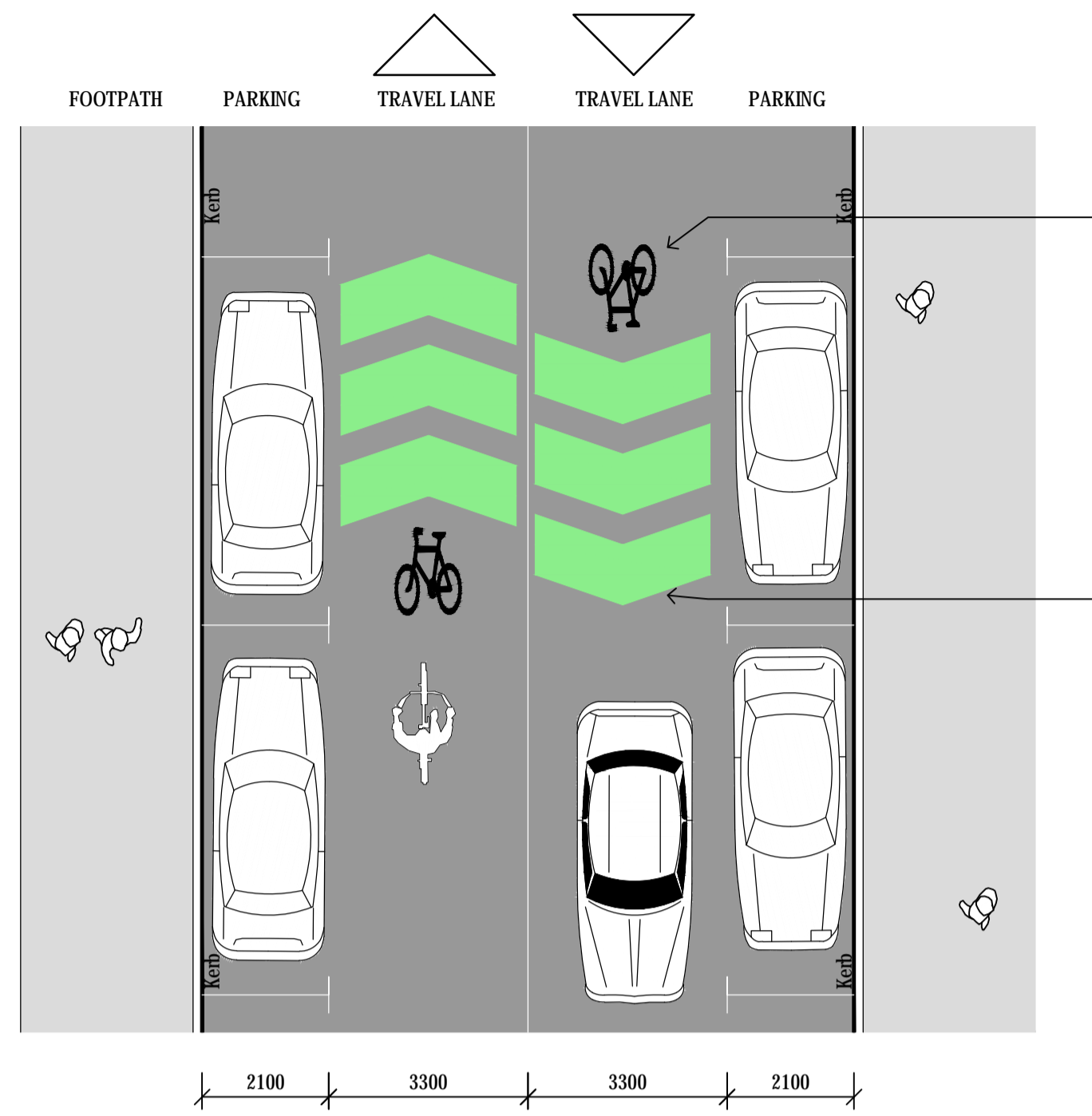
Approved SH

Drawing No Issue
15234 - 5202 B

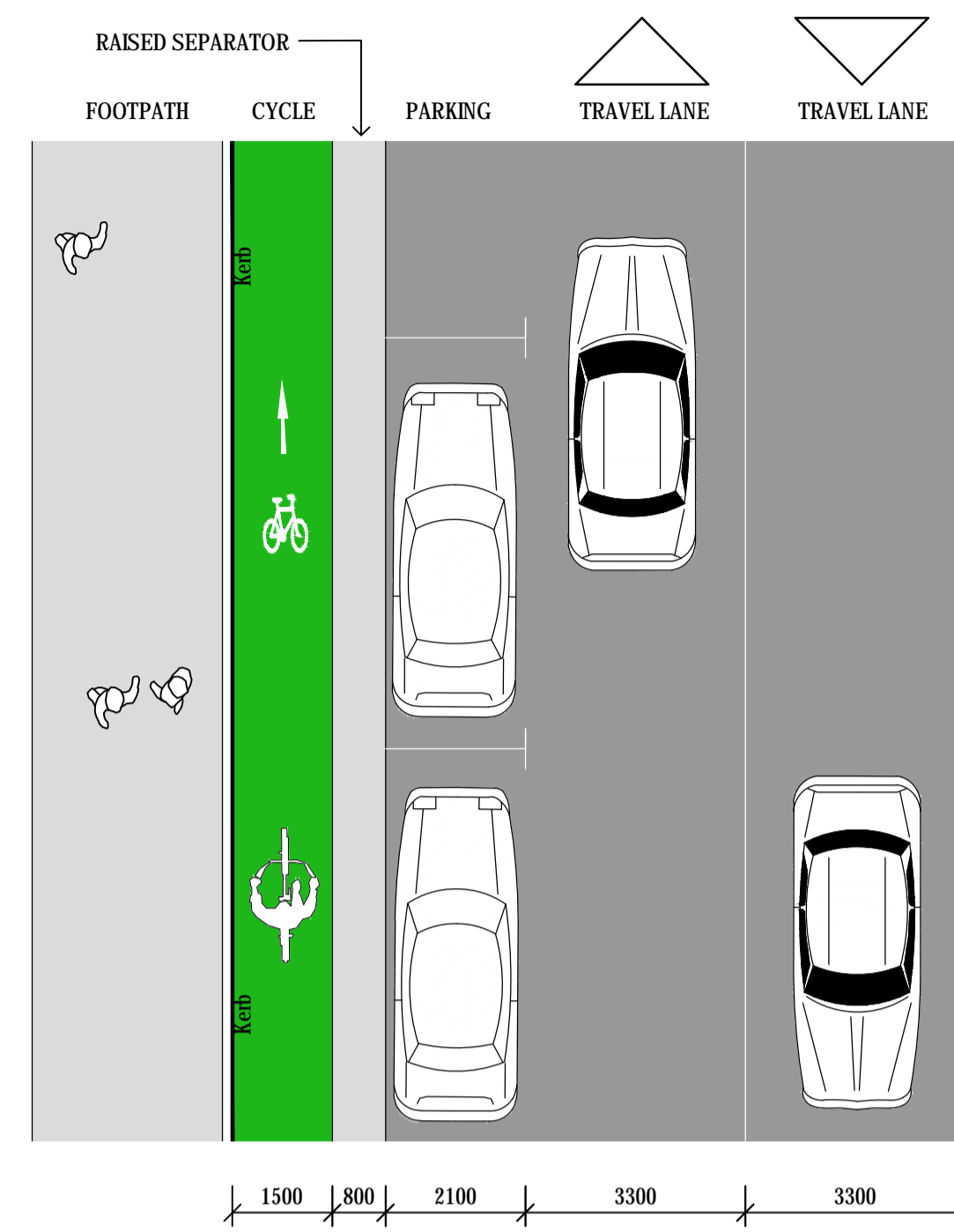
File Plot Date
 \$FILES \$DATES

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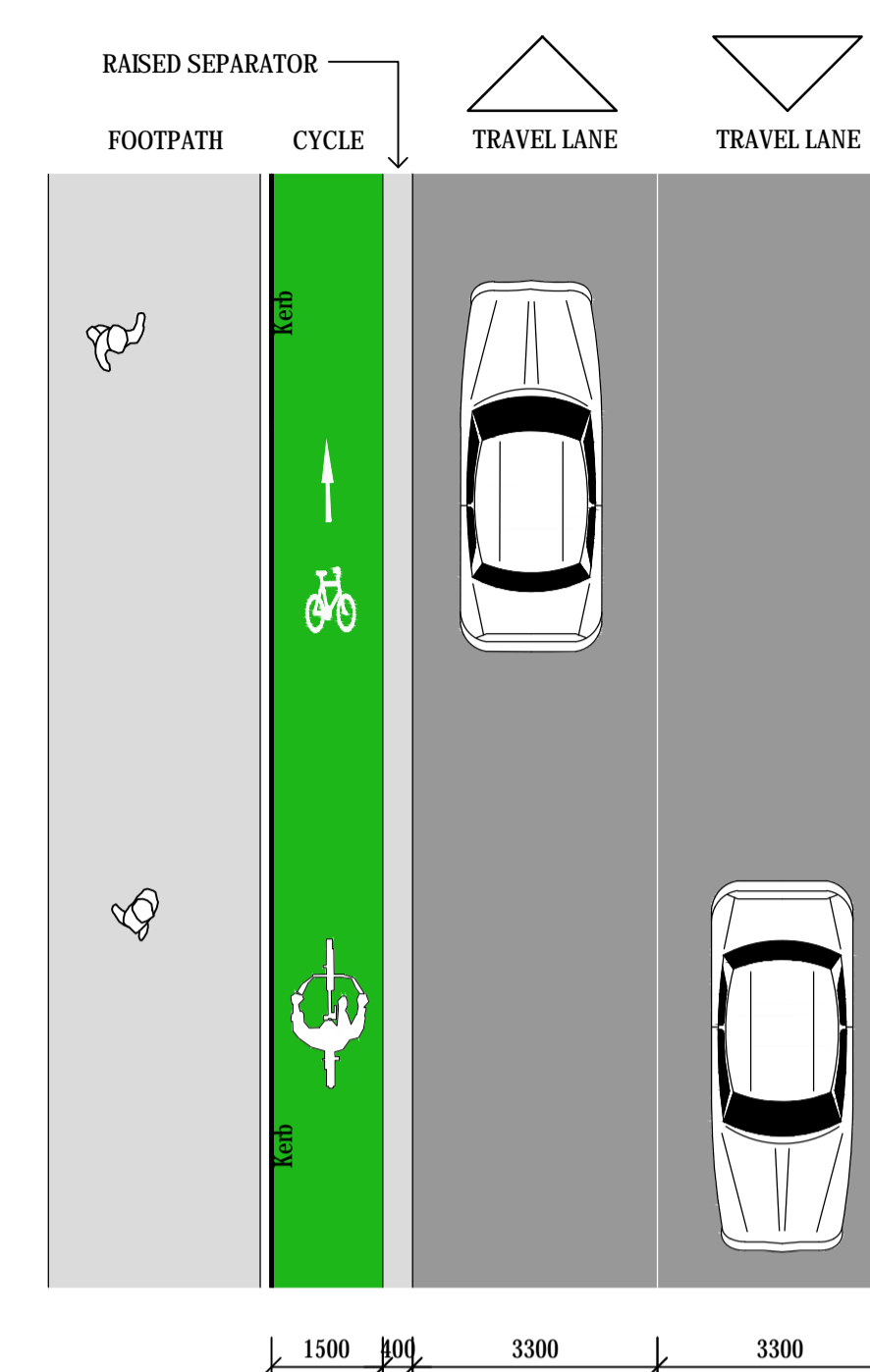
Amendments	Issue Description	Date
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B	FOR INFORMATION	18/05/2016



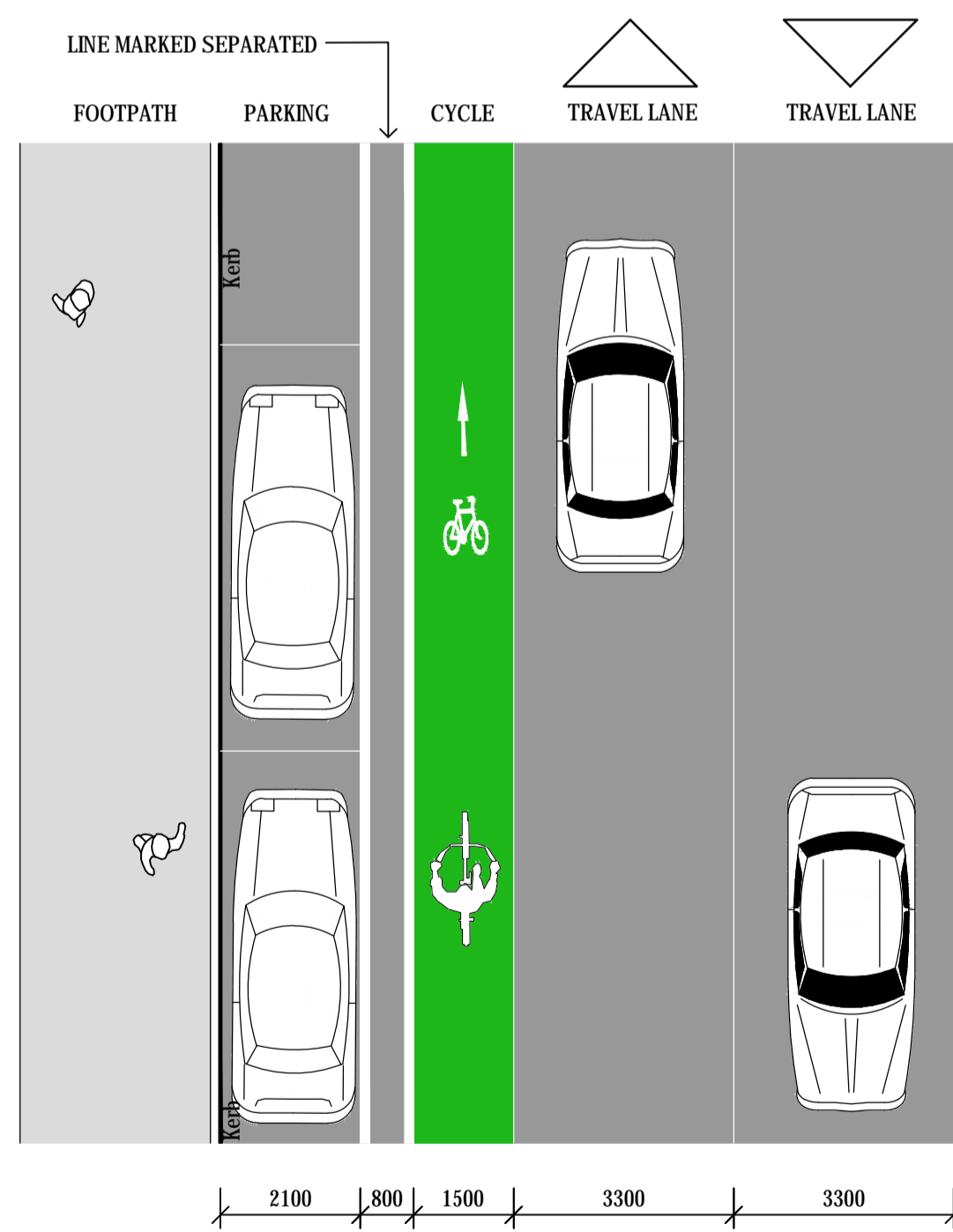
01 TYPICAL DETAIL - MIXED TRAFFIC LANE WITH THRESHOLDS
1:100 @ A1



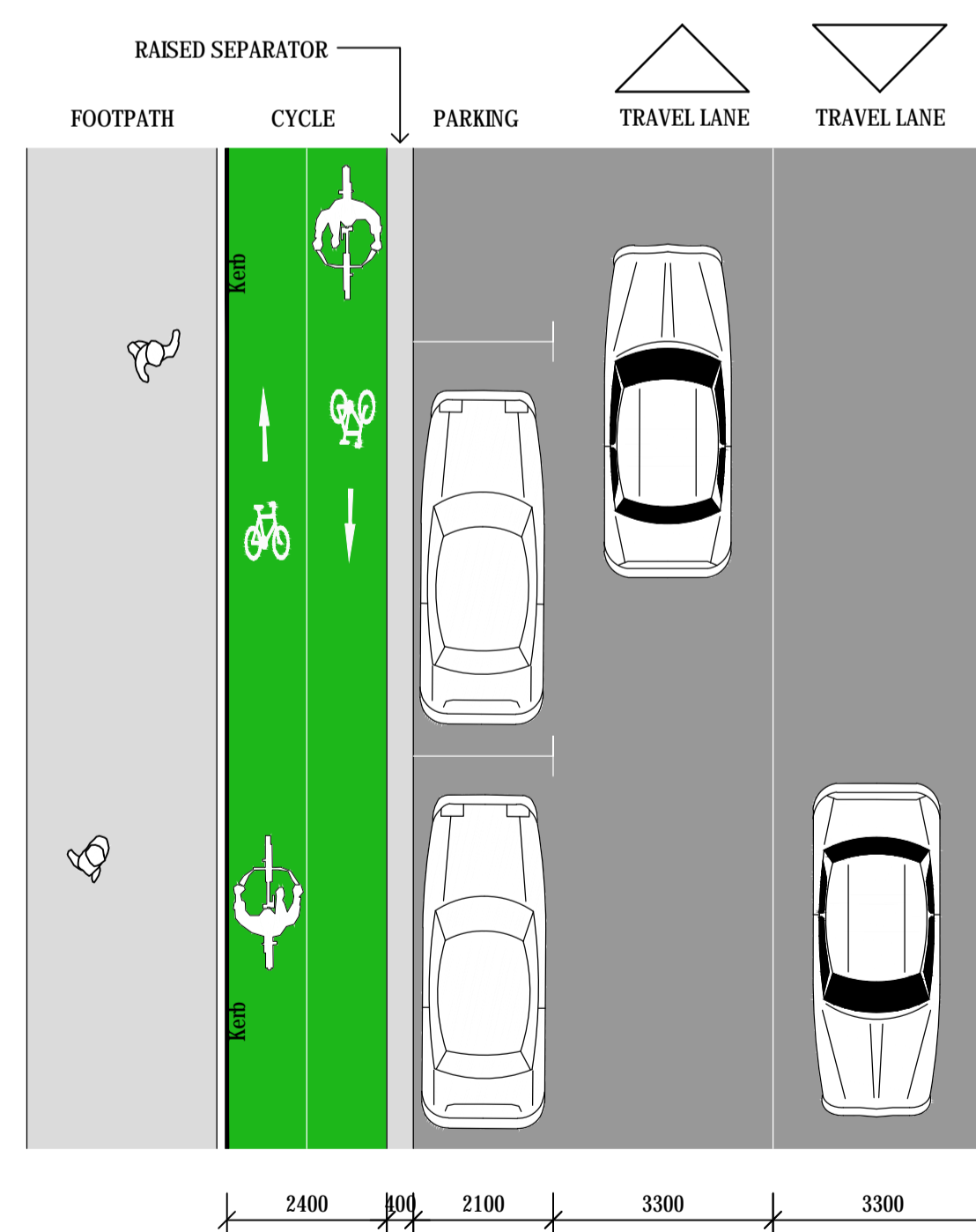
02 TYPICAL DETAIL - SEPARATED ONE WAY CYCLEWAY ADJACENT PARKING
1:100 @ A1



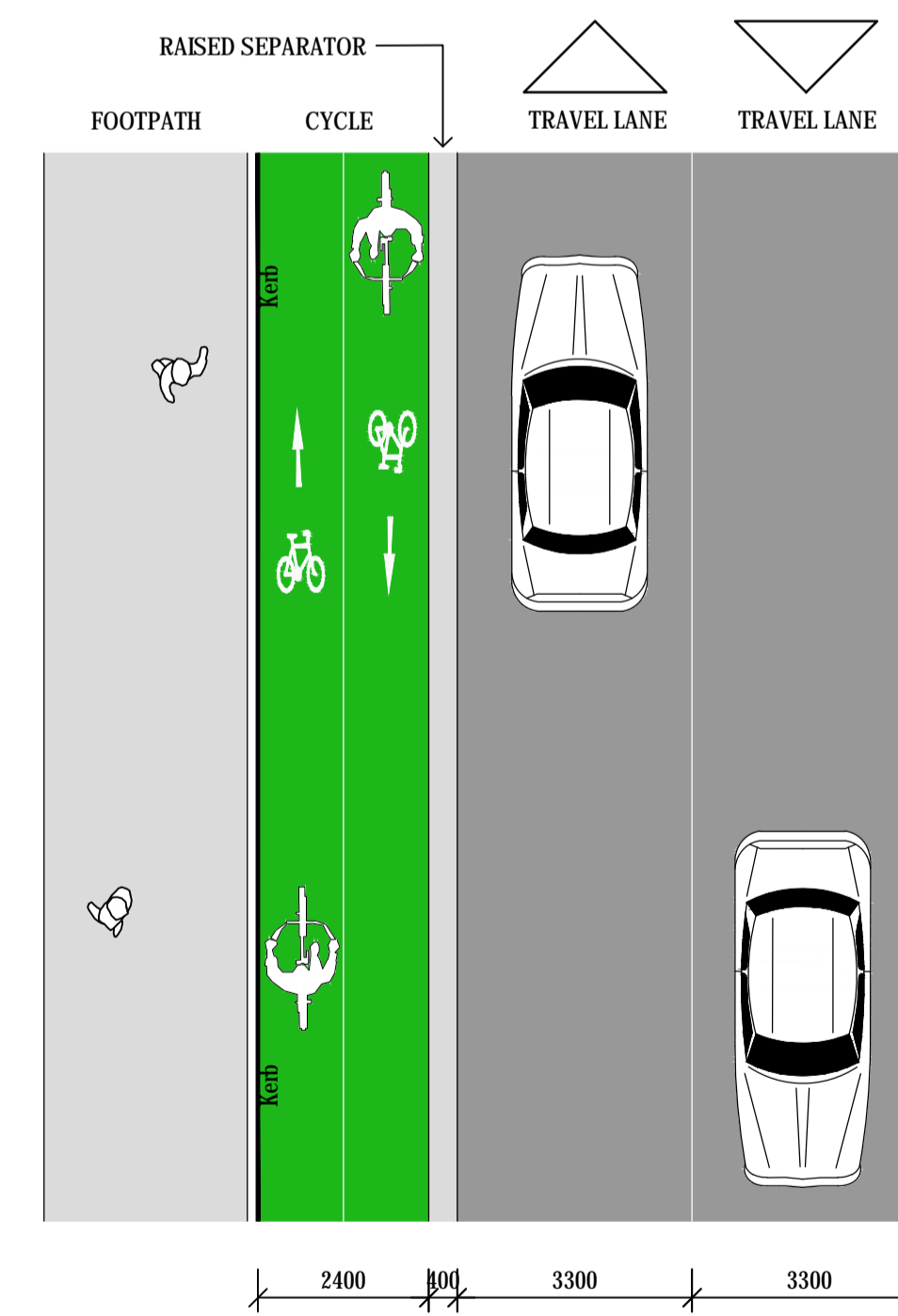
03 TYPICAL DETAIL - SEPARATED ONE WAY CYCLEWAY - NO PARKING
1:100 @ A1



04 TYPICAL DETAIL - ONE WAY LINE MARKED BIKE LANE ADJACENT PARKING
1:100 @ A1



05 TYPICAL DETAIL - SEPERATED BI-DIRECTIONAL CYCLEWAY ADJACENT PARKING
1:100 @ A1



06 TYPICAL DETAIL - SEPERATED BI-DIRECTIONAL CYCLEWAY - NO PARKING
1:100 @ A1

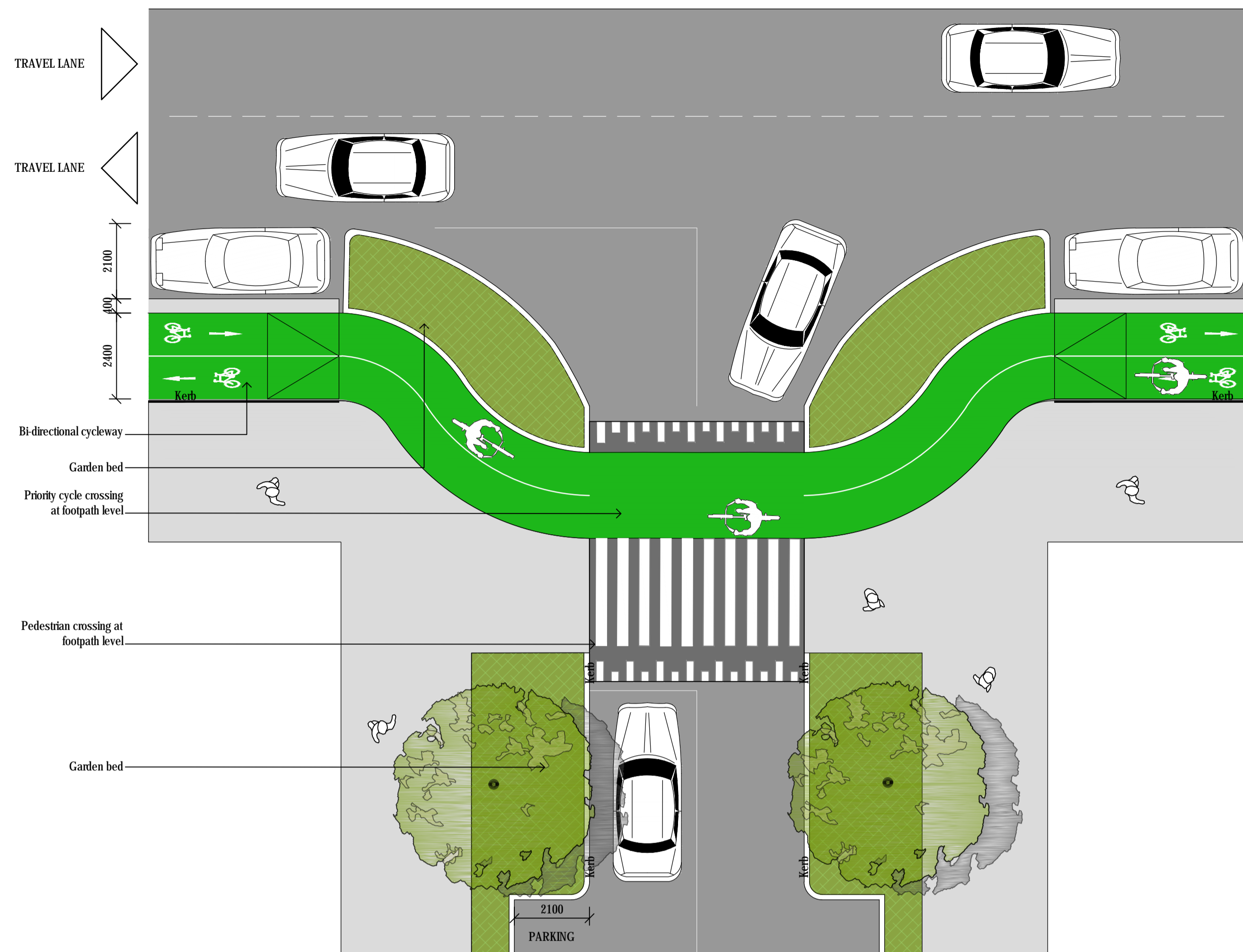
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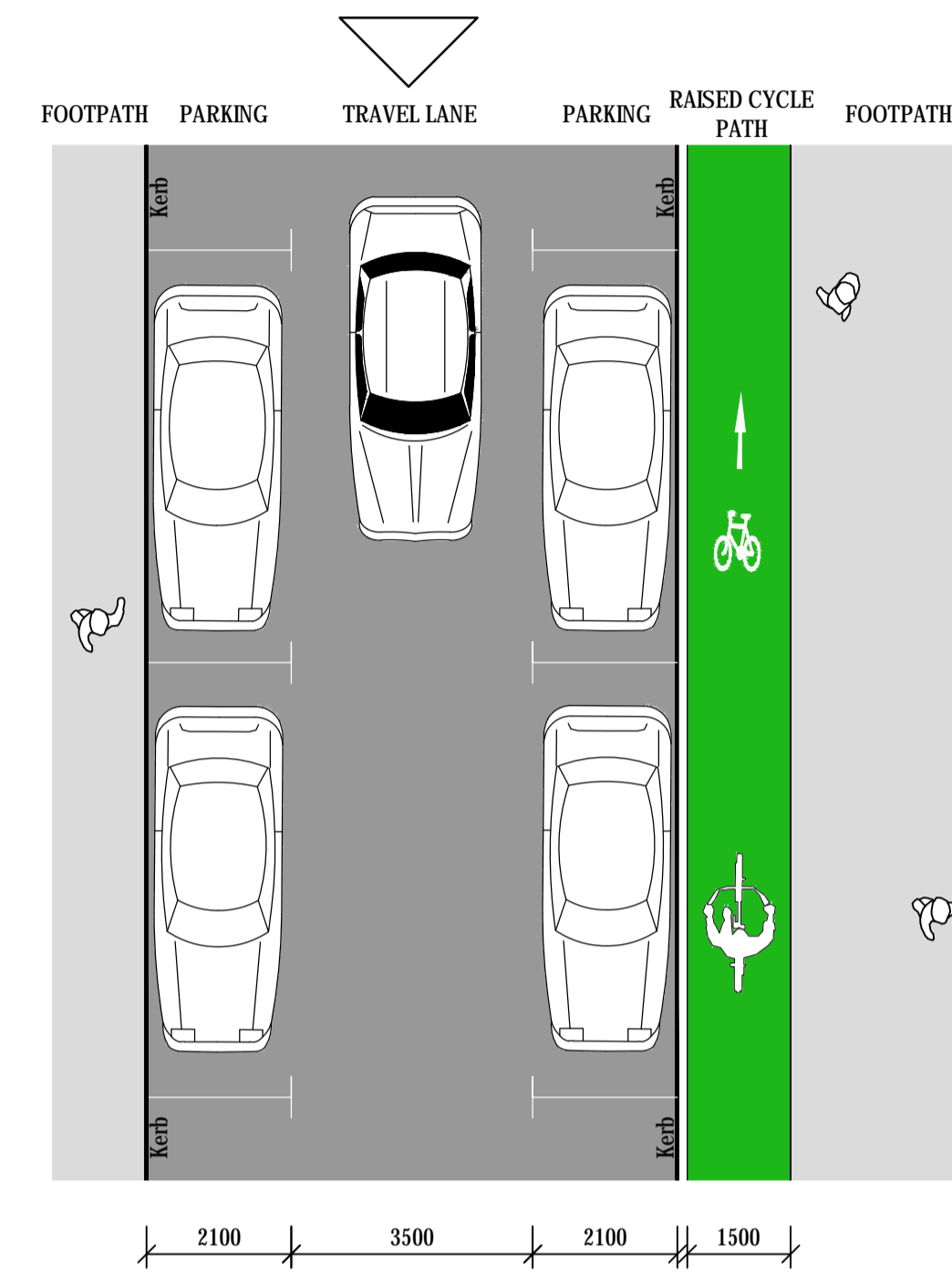
Project Title
NORTH SYDNEY CYCLE STRATEGY
 Drawing Title
Route 5 Detail Plans Sheet 1

Scale 1:100 @ A1
 Drawing created (date) 25/02/2016
 By LI
 Plotted and checked by LI
 Verified AB
 Approved SH
 Drawing No Issue
15234 - 5301 B
 File Plot Date
 \$FILES \$DATES

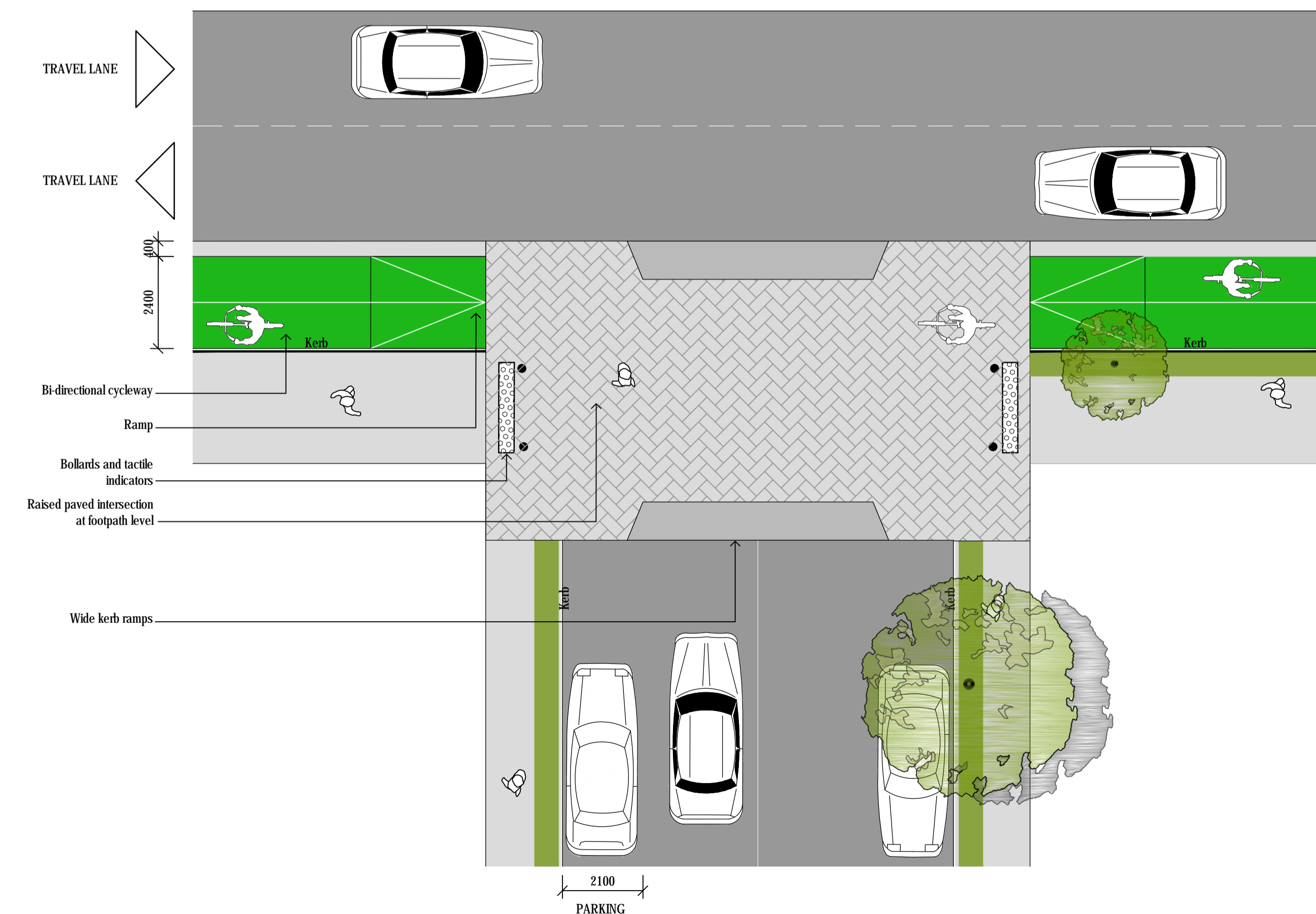
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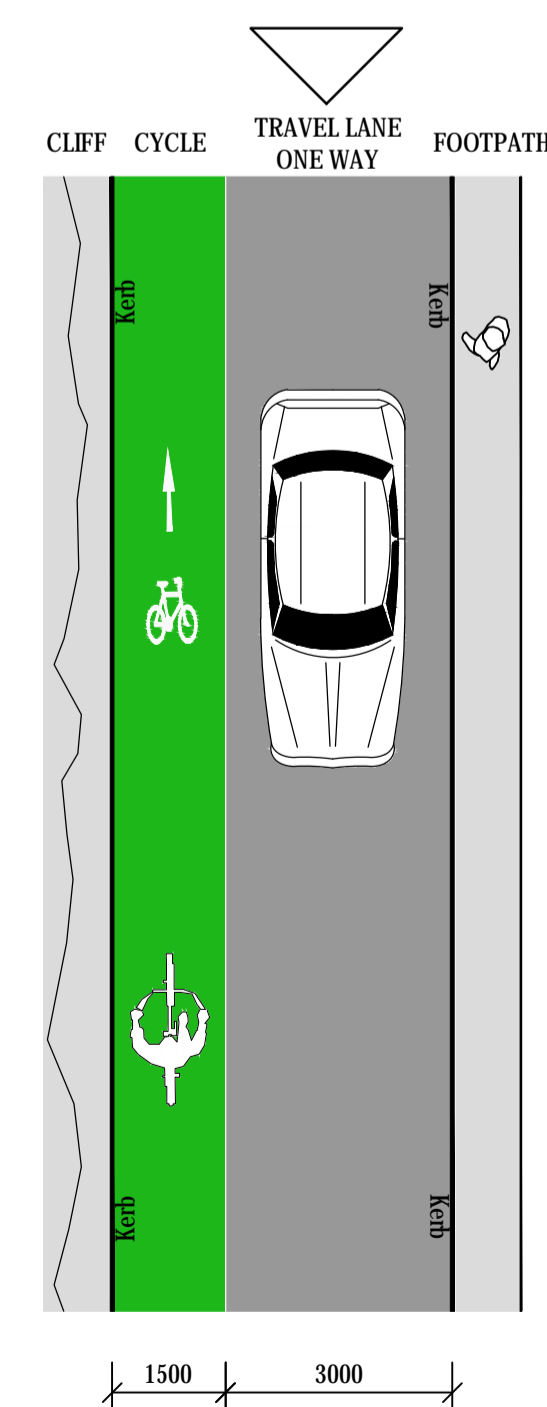
01 TYPICAL DETAIL - BEND OUT
1:100 @ A1



02 TYPICAL DETAIL - ONE WAY CONTRA FLOW CYCLEWAY AT FOOTPATH LEVEL
1:100 @ A1



03 TYPICAL DETAIL - SHARED INTERSECTION
1:100 @ A1



04 TYPICAL DETAIL - ONE WAY CONTRA FLOW BIKE LANE
1:100 @ A1

Issue	Description	Date
A	FOR INFORMATION	30/03/2016
B	FOR INFORMATION	18/05/2016

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Project Title
NORTH SYDNEY CYCLE STRATEGY

Drawing Title
Route 5 Detail Plans Sheet 2

Scale	1:100 @A1
Drawing created (date)	29/03/2016
By	LI
Plotted and checked by	LI
Verified	AB
Approved	SH
Drawing No	Issue
15234 - 5302	B
File	Plot Date
SFILES	SDATES

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LEGEND

- Existing
- Proposed
- On Road Bicycle Lane
- Off Road Bicycle Path
- On Road Marked Bicycle Route
- Shared Path / Zone
- - - Not a Part of Mosman Bicycle Network

MIDDLE HARBOUR

Beauty Point

PEARL BAY

Parriwi Point

Quakers Hat

SHELL COVE

QUAKERS HAT BAY

Chinamans Beach

REDDY BAY

Wyargine Point

MIDDLE HARBOUR

HUNTERS

Rocky Point

Balmoral Beach

Cobblers Beach

BAY

Beach

OBELISK BAY

Georges Head

MOSMAN BAY

CHOWDER BAY

LITTLE SIRIUS COVE

Chowder Head

SYDNEY

TARONGA ZOO

TAYLORS BAY

ATHOL BAY

Mosman COUNCIL

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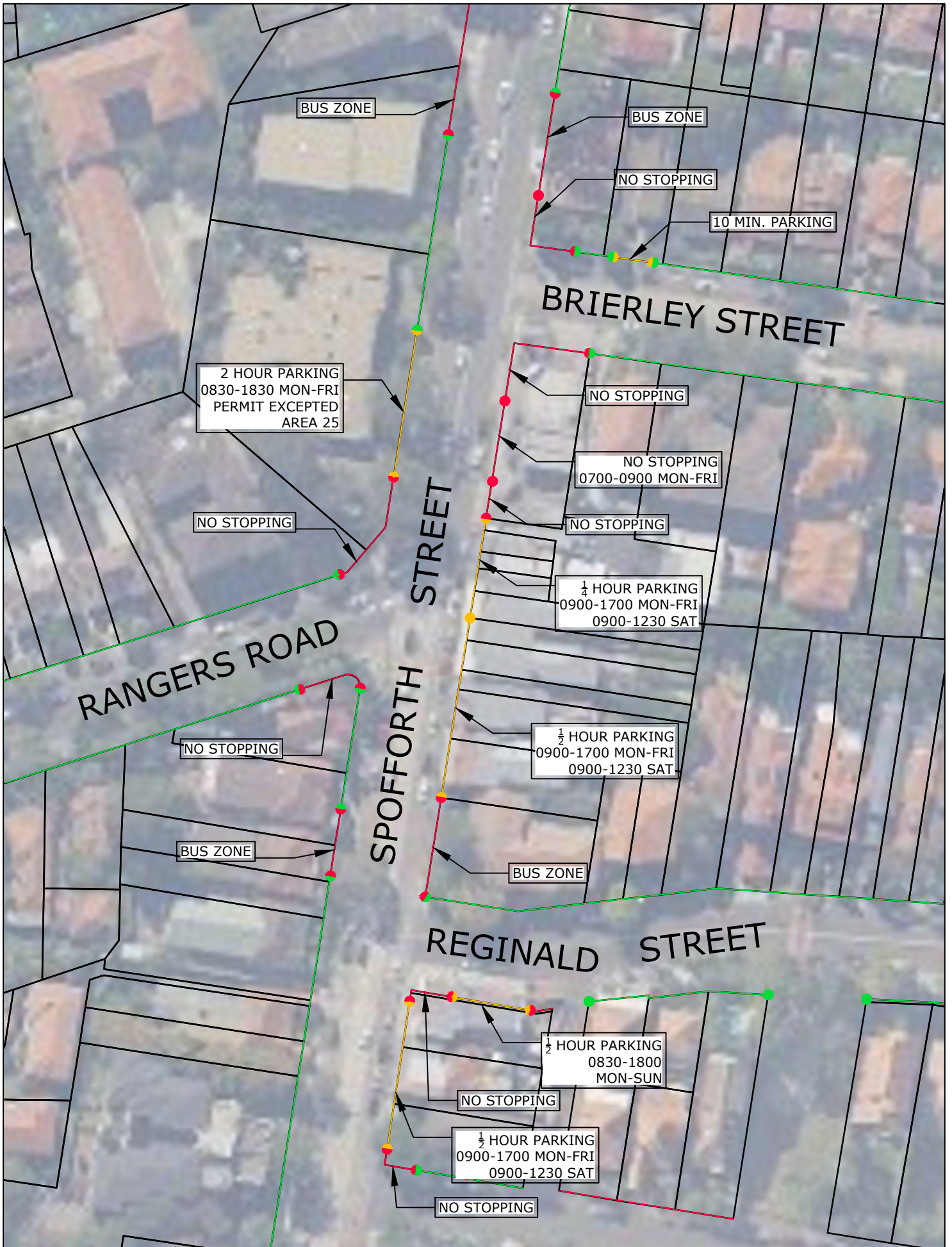
Q:\Mos Asset & Services\Road Safety BicycleRoutes_Network_2014_2019_v20140714.wor



Mosman Bicycle Network 2014 - 2019

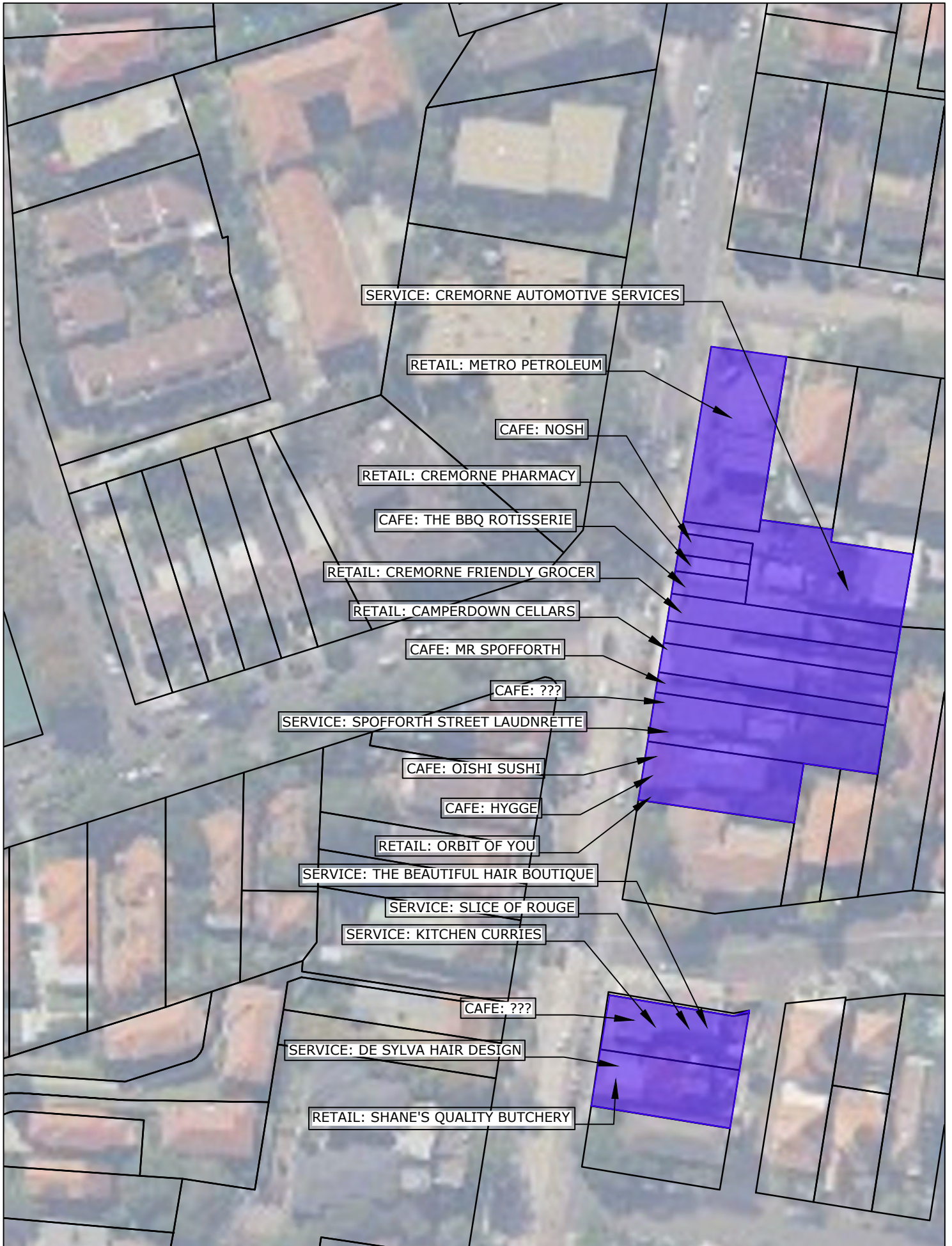


Appendix D – Existing Parking Restrictions





Appendix E – Existing Businesses



SERVICE: CREMORNE AUTOMOTIVE SERVICES

RETAIL: METRO PETROLEUM

CAFE: NOSH

RETAIL: CREMORNE PHARMACY

CAFE: THE BBQ ROTISSERIE

RETAIL: CREMORNE FRIENDLY GROCER

RETAIL: CAMPERDOWN CELLARS

CAFE: MR SPOFFORTH

CAFE: ???

SERVICE: SPOFFORTH STREET LAUDNRETTE

CAFE: OISHI SUSHI

CAFE: HYGGE

RETAIL: ORBIT OF YOU

SERVICE: THE BEAUTIFUL HAIR BOUTIQUE

SERVICE: SLICE OF ROUGE

SERVICE: KITCHEN CURRIES

CAFE: ???

SERVICE: DE SYLVA HAIR DESIGN

RETAIL: SHANE'S QUALITY BUTCHERY



Appendix F – Concept Civil Plans

CONCEPT CIVIL PLANS INTERSECTION UPGRADES SPOFFORTH STREET, NORTH SYDNEY



LOCATION PLAN-IMAGE COURTESY OF METROMAP

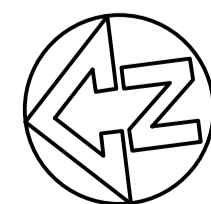
N.T.S.

SHEET INDEX	
NUMBER	TITLE
001	LOCATION PLAN & DRAWING SCHEDULE
002	GENERAL ARRANGMENT & CONTEXT PLAN
003	SUMMARY TABLES
100	SPOFFORTH STREET & HOLT AVENUE - ROUNDABOUT
101	SPOFFORTH STREET & HOLT AVENUE - KERB BUILDOUTS
102	SPOFFORTH STREET & HOLT AVENUE - REFUGE ISLANDS
103	SPOFFORTH STREET & RANGERS ROAD - ROUNDABOUT
104	SPOFFORTH STREET & RANGERS ROAD - SIGNALISATION
105	SPOFFORTH STREET & RANGERS ROAD - RE-ALIGNMENT WITH OPTIONAL PAC

SHEET SIZE
A1

100mm ON ORIGINAL DRAWING - DO NOT SCALE DRAWING

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					SCALE: N.T.S.
					SURVEYED:PROJECT SURVEYORS SURVEY DATE:13/08/2019
					APPROVED / PROJECT LEADER
C	TRAFFIC COMMITTEE ISSUE	091219	NS	NS	
B	REVISED ISSUE - FOR DISCUSSION ONLY	180919	NS	NS	
A	PRELIMINARY ISSUE - FOR INFORMATION ONLY	290819	NS	NS	
REV	AMENDMENT / REASON FOR ISSUE	DATE	DES.	DWN.	BRAYDON AMES



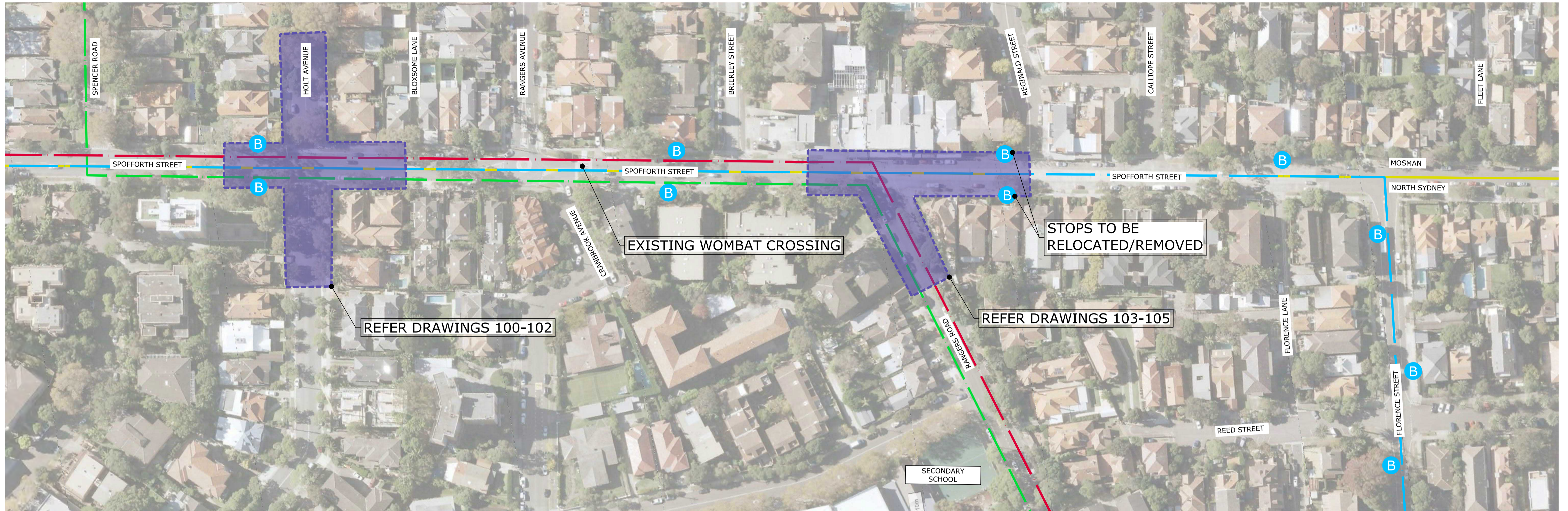
PUBLIC UTILITIES:
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PRELIMINARY

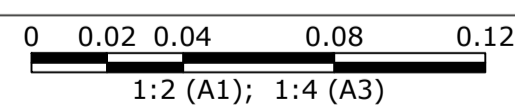
NORTH SYDNEY COUNCIL
SPOFFORTH STREET UPGRADES
LOCATION PLAN & DRAWING SCHEDULE

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REVISION
20190977_001.DWG	20190977	001	C



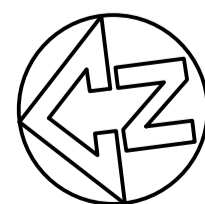
LEGEND

-  DESIGN AREA
-  LGA BOUNDARY
-  RMS REGIONAL ROAD
-  BUS ROUTE (225)
-  BICYCLE ROUTE
-  EXISTING BUS STOP



SHEET SIZE
A1

COORDS: MGA94 ZONE 54
DATUM: ALL LEVELS TO A.H.D.
SCALE: N.T.S.
SURVEYED: PROJECT SURVEYORS
SURVEY DATE: 13/08/2019
APPROVED / PROJECT LEADER
BRAYDON AMES



PUBLIC UTILITIES:
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PRELIMINARY
NORTH SYDNEY COUNCIL
SPOFFORTH STREET UPGRADES
GENERAL ARRANGEMENT & CONTEXT PLAN

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REVISION
20190977_002_GENERAL_ARRANGEMENT.DWG	20190977	002	A

THIS DRAWING IS TO BE VIEWED IN COLOUR AS SOME FEATURES / SYMBOLS ARE DIFFERENTIATED BY COLOUR. DRAWING NOT TO BE RELIED ON IF PRINTED IN GREYSCALE.

LEGEND

- GOOD OUTCOME
- BETTER OUTCOME
- BEST OUTCOME

SHEET	TREATMENT OPTION	CAR SPACES				SAFETY OUTCOMES			LANDSCAPING OPPORTUNITIES
		LOST	WON	POTENTIAL	NET	PEDESTRIAN	BICYCLISTS	MOTORISTS	
100	ROUNDBABOUT	-7	0	0	-7	•	•	•••	•
101	KERB BUILDOUTS	0	0	0	0	•••	•••	••	•••
102	REFUGE ISLANDS	-2	0	0	-2	••	••	•	••
103	ROUNDBABOUT	-10	12	1	3	•	•	•	••
104	SIGNALISATION	-13	12	3	2	•••	•••	•••	•••
105	RE-ALIGNMENT WITH OPTIONAL PAC	-13	14	2	3	••	••	••	••

SHEET	TREATMENT OPTION	PROS	CONS
100	ROUNDBABOUT	EFFECTIVELY ADDRESSES VEHICLE COLLISION CONCERNS	RESULTS IN SIGNIFICANT LOSS OF PARKING & MAY NOT FUNCTION OPTIMALLY WITH DOMINANT NORTH-SOUTH TRAFFIC FLOW
101	KERB BUILDOUTS	EFFECTIVELY ADDRESSES SIGHT DISTANCE CONCERNS & OFFERS IMPROVED PEDESTRIAN SAFETY	DOES NOT FULLY ADDRESS SAFETY FOR EAST-WEST VEHICULAR MOVEMENTS
102	REFUGE ISLANDS	ADDRESSES SIGHT DISTANCE CONCERNS & OFFERS IMPROVED PEDESTRIAN SAFETY	DOES NOT FULLY ADDRESS SAFETY FOR EAST-WEST VEHICULAR MOVEMENTS & RESULTS IN SIGNIFICANT LOSS OF PARKING
103	ROUNDBABOUT	IMPROVES INTERSECTION LEGIBILITY & ADDRESSES VEHICLE COLLISION CONCERNS	MAY NOT FUNCTION OPTIMALLY WITH DOMINANT WEST-NORTH TRAFFIC. DOES NOT OFFER ADEQUATE VEHICLE DEFLECTION FOR ALL MOVEMENTS. NOT OPTIMAL FOR PEDESTRIAN OR BICYCLIST SAFETY
104	SIGNALISATION	OFFERS EXCELLENT SAFETY OUTCOMES FOR ALL USERS	RESULTS IN A NON-DOMINANT INTERSECTION LEG RECEIVING PRIORITY, POTENTIALLY EXACERBATING CONGESTION
105	RE-ALIGNMENT WITH OPTIONAL PAC	IMPROVES INTERSECTION LEGIBILITY & OFFERS IMPROVED SAFETY OUTCOMES FOR ALL USERS	

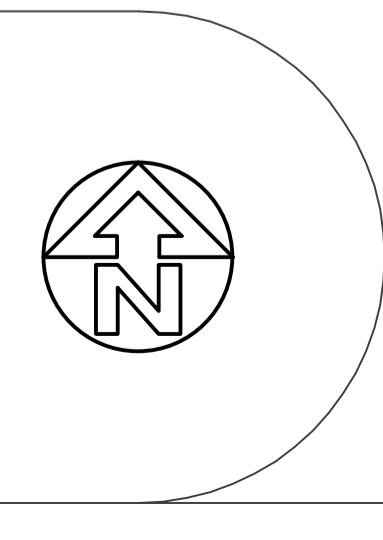
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PRELIMINARY

SHEET SIZE
A1

100mm ON ORIGINAL DRAWING - DO NOT SCALE DRAWING

COORDS: MGA94 ZONE 54	DATE	NS	NS	APPROVED / PROJECT LEADER
DATUM: ALL LEVELS TO A.H.D.	091219	DES.	DWN.	BRAYDON AMES
SCALE: N.T.S.				
SURVEYED: PROJECT SURVEYORS				
SURVEY DATE: 13/08/2019				



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NORTH SYDNEY COUNCIL

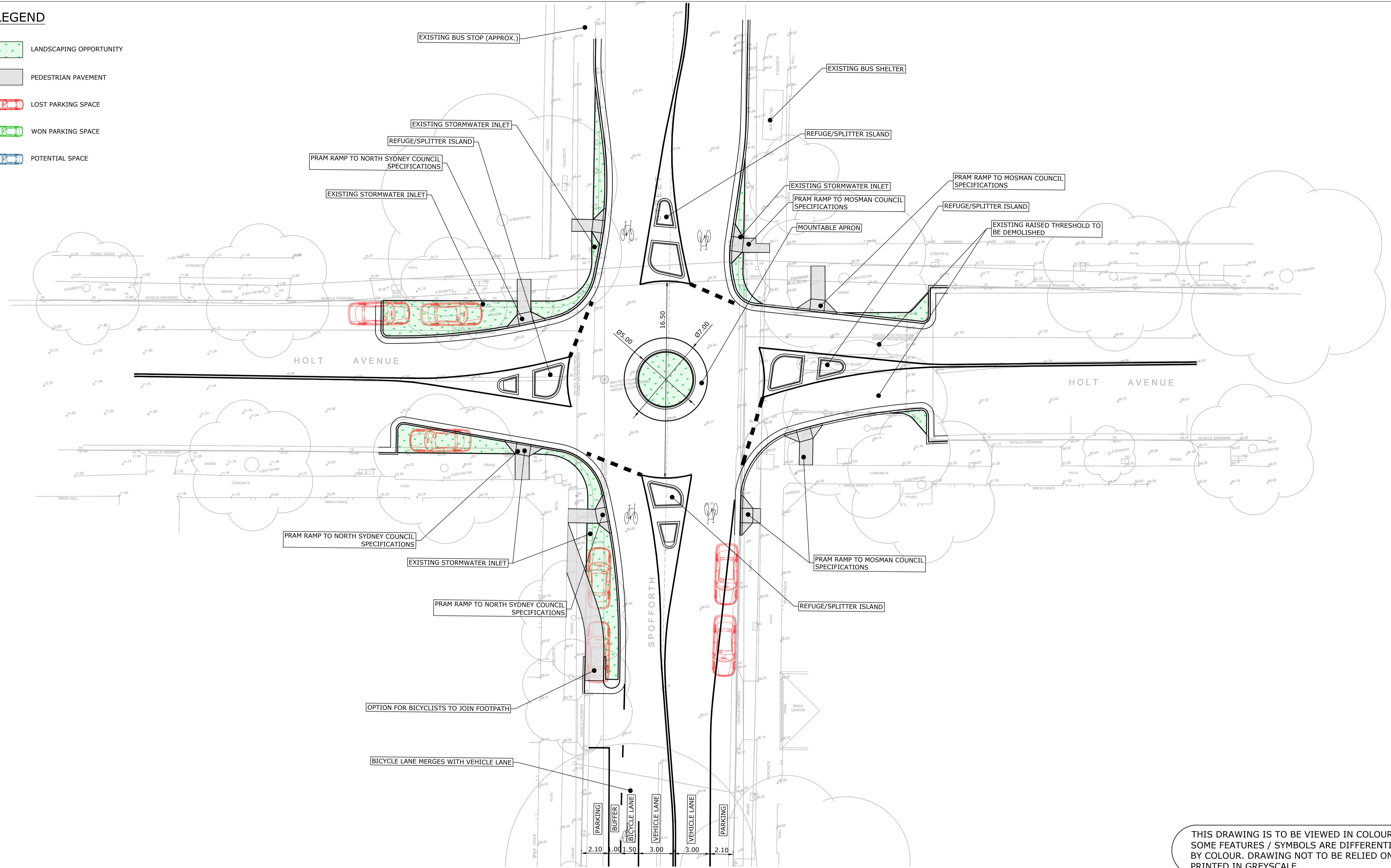
SPOFFORTH STREET UPGRADES

SUMMARY TABLES

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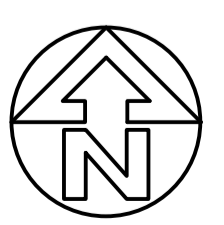
LEGEND

-  LANDSCAPING OPPORTUNITY
-  PEDESTRIAN PAVEMENT
-  LOST PARKING SPACE
-  WON PARKING SPACE
-  POTENTIAL SPACE



SHEET SIZE
A1

		COORDS: MGA94 ZONE 54	
		DATUM: ALL LEVELS TO A.H.D.	
		SCALE: 1:150	
		SURVEYED: PROJECT SURVEYORS	
		SURVEY DATE: 13/08/2019	
		APPROVED / PROJECT LEADER	
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B	REVISED ISSUE - FOR DISCUSSION ONLY	180919	NS NS
A	PRELIMINARY ISSUE - FOR INFORMATION ONLY	290819	NS NS
REV	AMENDMENT / REASON FOR ISSUE	DATE	DES. DWN.
		BRAYDON AMES	



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PRELIMINARY
NORTH SYDNEY COUNCIL
SPOFFORTH STREET UPGRADES
SPOFFORTH STREET & HOLT AVENUE
ROUNDBOUT

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REVISION
20190977_100.DWG	20190977	100	C

LEGEND

-  LANDSCAPING OPPORTUNITY
-  PEDESTRIAN PAVEMENT
-  LOST PARKING SPACE
-  WON PARKING SPACE
-  POTENTIAL SPACE

EXISTING BUS STOP (APPROX.)

EXISTING BUS SHELTER

PRAM RAMP TO NORTH SYDNEY COUNCIL SPECIFICATIONS

EXISTING STORMWATER INLET

EXISTING STORMWATER INLET

PRAM RAMP TO MOSMAN COUNCIL SPECIFICATIONS

EXTEND EXISTING RAISED THRESHOLD TO MEET NEW KERBLINE

HOLT AVENUE

HOLT AVENUE

RAISED THRESHOLD TO NORTH SYDNEY PUBLIC DOMAIN MANUAL SPECIFICATION

EXISTING STORMWATER INLET

MAKE SMOOTH MATCH WITH EXISTING KERB

EXISTING RAISED THRESHOLD TO BE PRESERVED

PRAM RAMP TO NORTH SYDNEY COUNCIL SPECIFICATIONS

PRAM RAMP TO MOSMAN COUNCIL SPECIFICATIONS

EXISTING STORMWATER INLET

STREET

SPOFFORTH

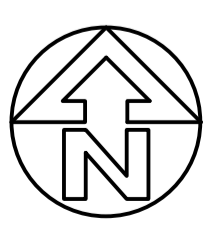
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 PARKING BUFFER BICYCLE LANE VEHICLE LANE VEHICLE LANE PARKING

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SHEET SIZE
A1

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 DATUM: ALL LEVELS TO A.H.D.
 SCALE: 1:150
 SURVEYED: PROJECT SURVEYORS
 SURVEY DATE: 13/08/2019
 APPROVED / PROJECT LEADER
 BRAYDON AMES



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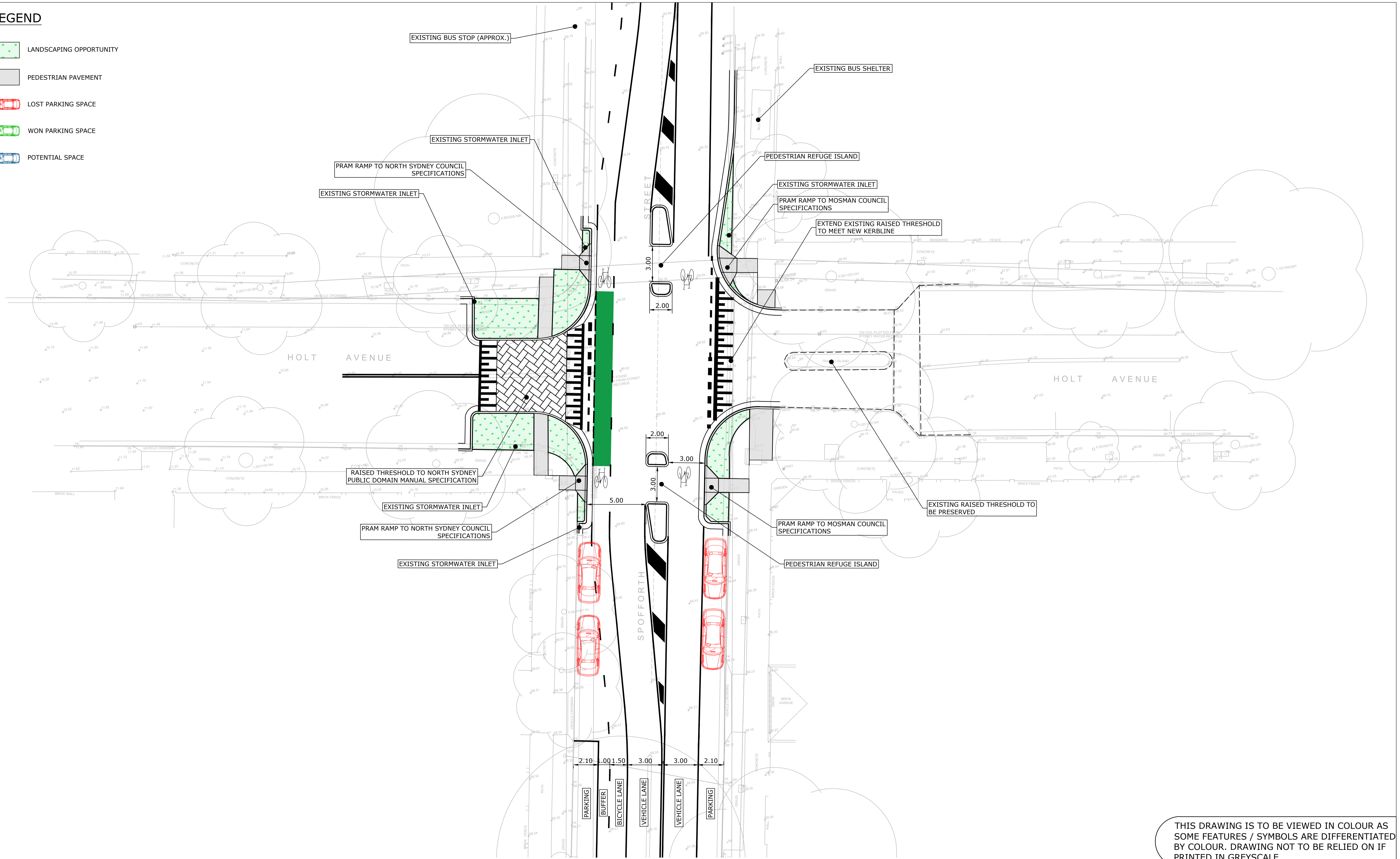
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NORTH SYDNEY COUNCIL
SPOFFORTH STREET UPGRADES
SPOFFORTH STREET & HOLT AVENUE
KERB BUILDOUTS

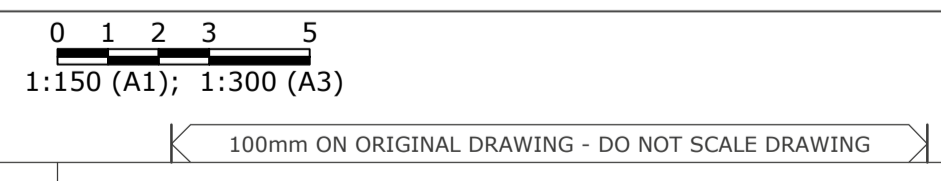
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-  LOST PARKING SPACE
-  WON PARKING SPACE
-  POTENTIAL SPACE

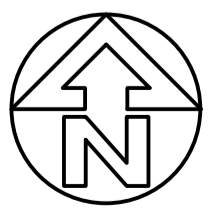


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		APPROVED / PROJECT LEADER	
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B	REVISED ISSUE - FOR DISCUSSION ONLY	180919	NS NS
A	PRELIMINARY ISSUE - FOR INFORMATION ONLY	290819	NS NS
REV	AMENDMENT / REASON FOR ISSUE	DATE	DES. DWN.
		BRAYDON AMES	



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NORTH SYDNEY COUNCIL

SPOFFORTH STREET UPGRADES

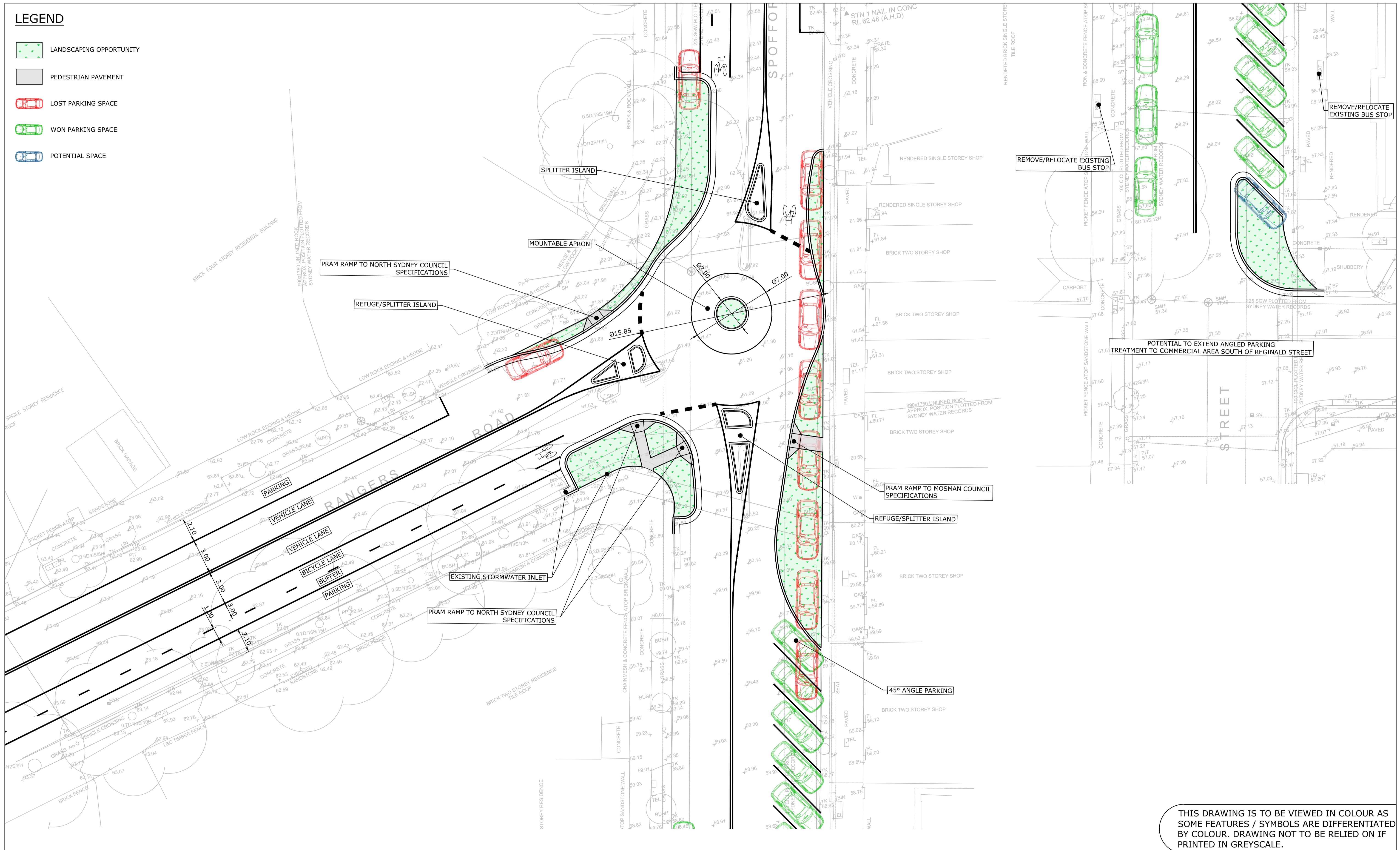
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-  LOST PARKING SPACE
-  WON PARKING SPACE
-  POTENTIAL SPACE

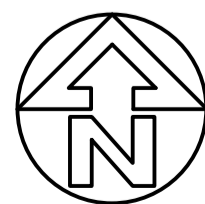


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SHEET SIZE
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SCALE: 1:150
SURVEYED: PROJECT SURVEYORS
SURVEY DATE: 13/08/2019
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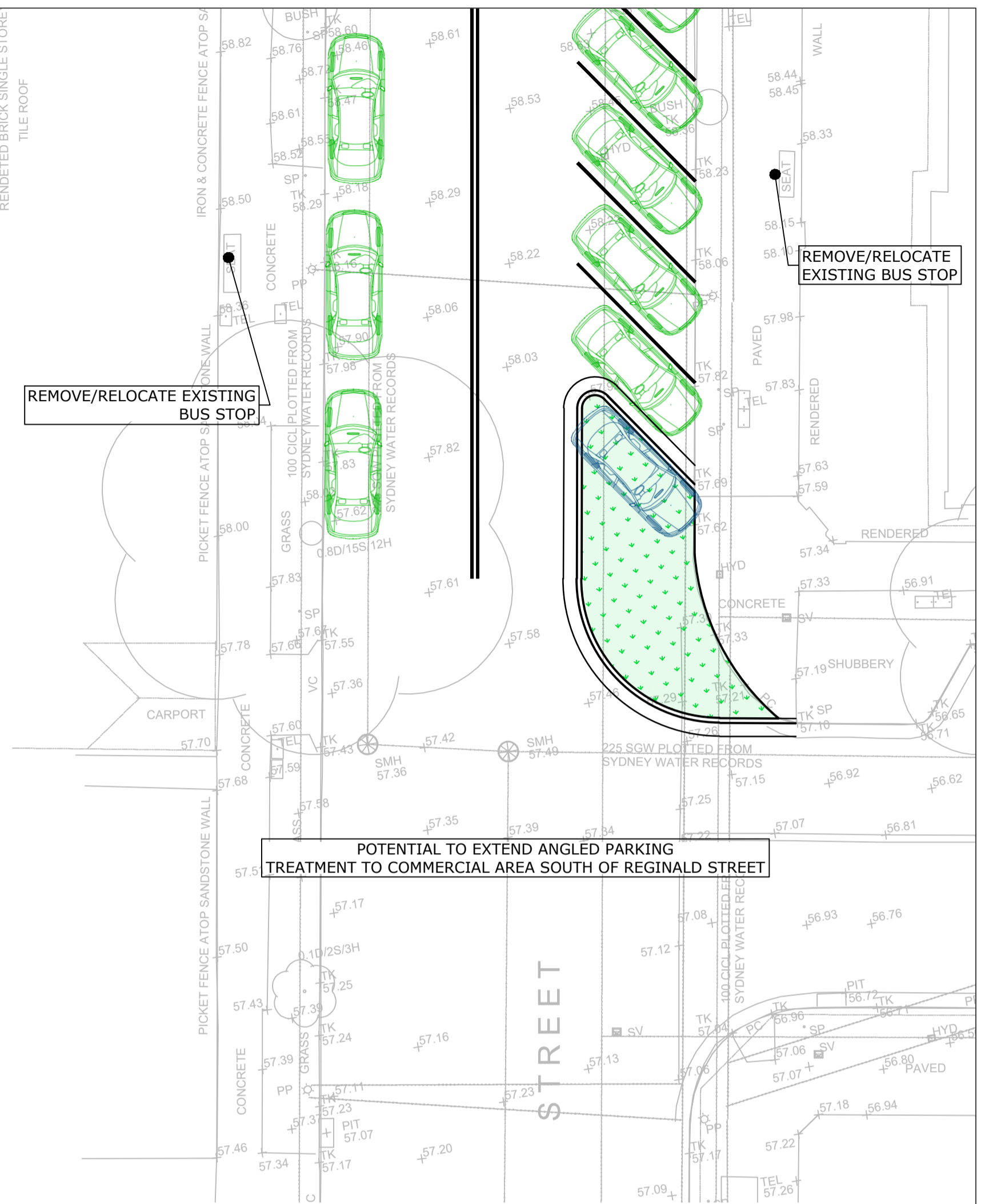
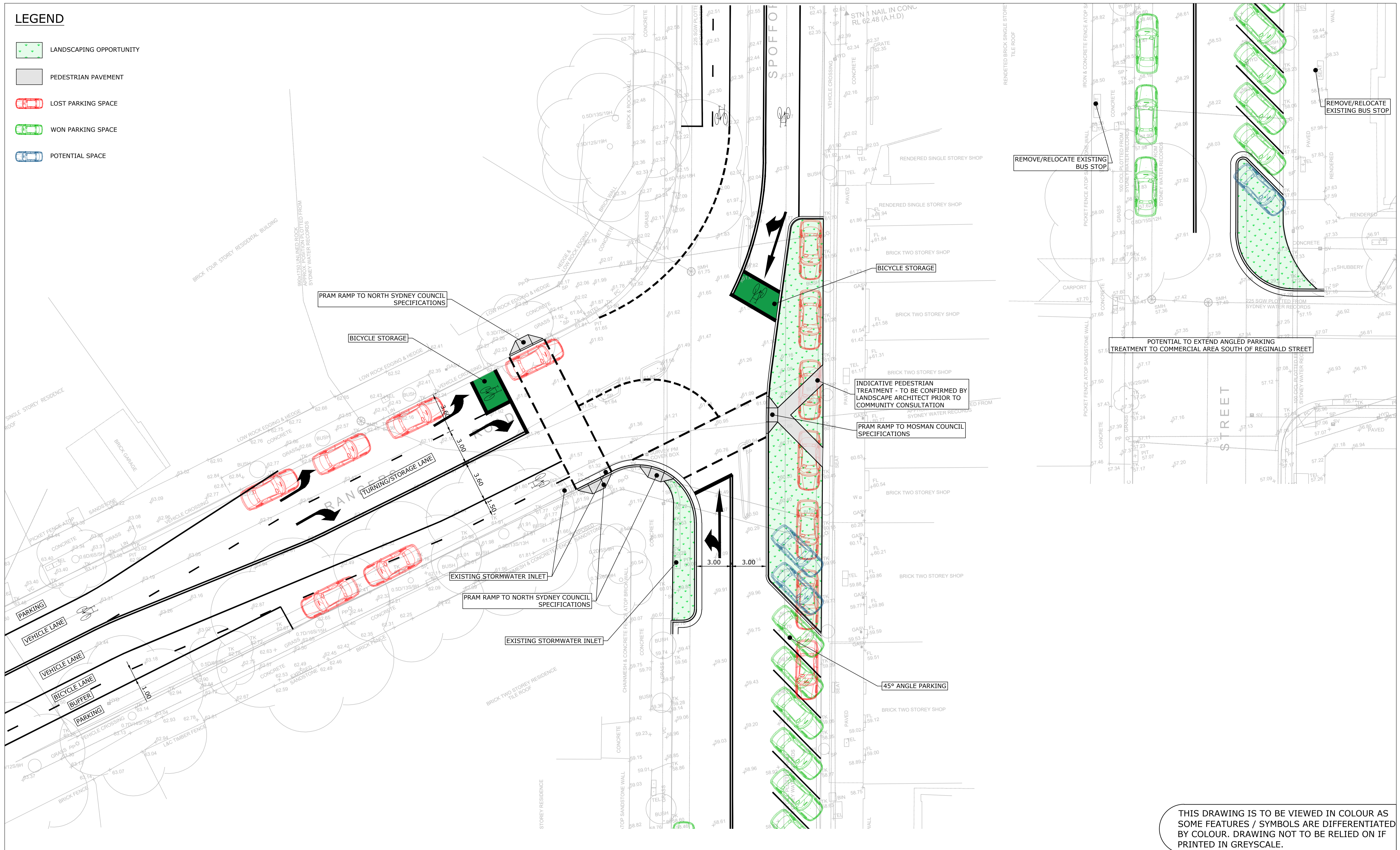
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NORTH SYDNEY COUNCIL
SPOFFORTH STREET UPGRADES
SPOFFORTH STREET & RANGERS ROAD
ROUNDBOUT

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B	REVISED ISSUE - FOR DISCUSSION ONLY	190919	NS	NS
A	PRELIMINARY ISSUE - FOR INFORMATION ONLY	290819	NS	NS

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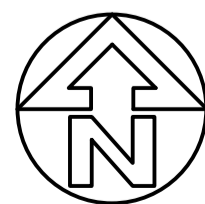
LEGEND

-  LANDSCAPING OPPORTUNITY
-  PEDESTRIAN PAVEMENT
-  LOST PARKING SPACE
-  WON PARKING SPACE
-  POTENTIAL SPACE



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B	REVISED ISSUE - FOR DISCUSSION ONLY	190919	NS	NS	
A	PRELIMINARY ISSUE - FOR INFORMATION ONLY	290819	NS	NS	



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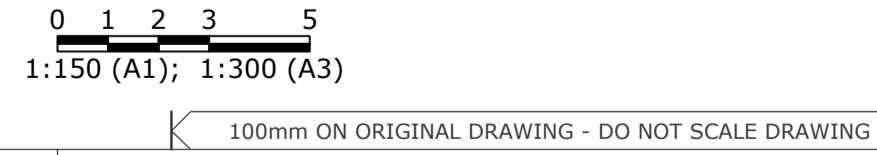
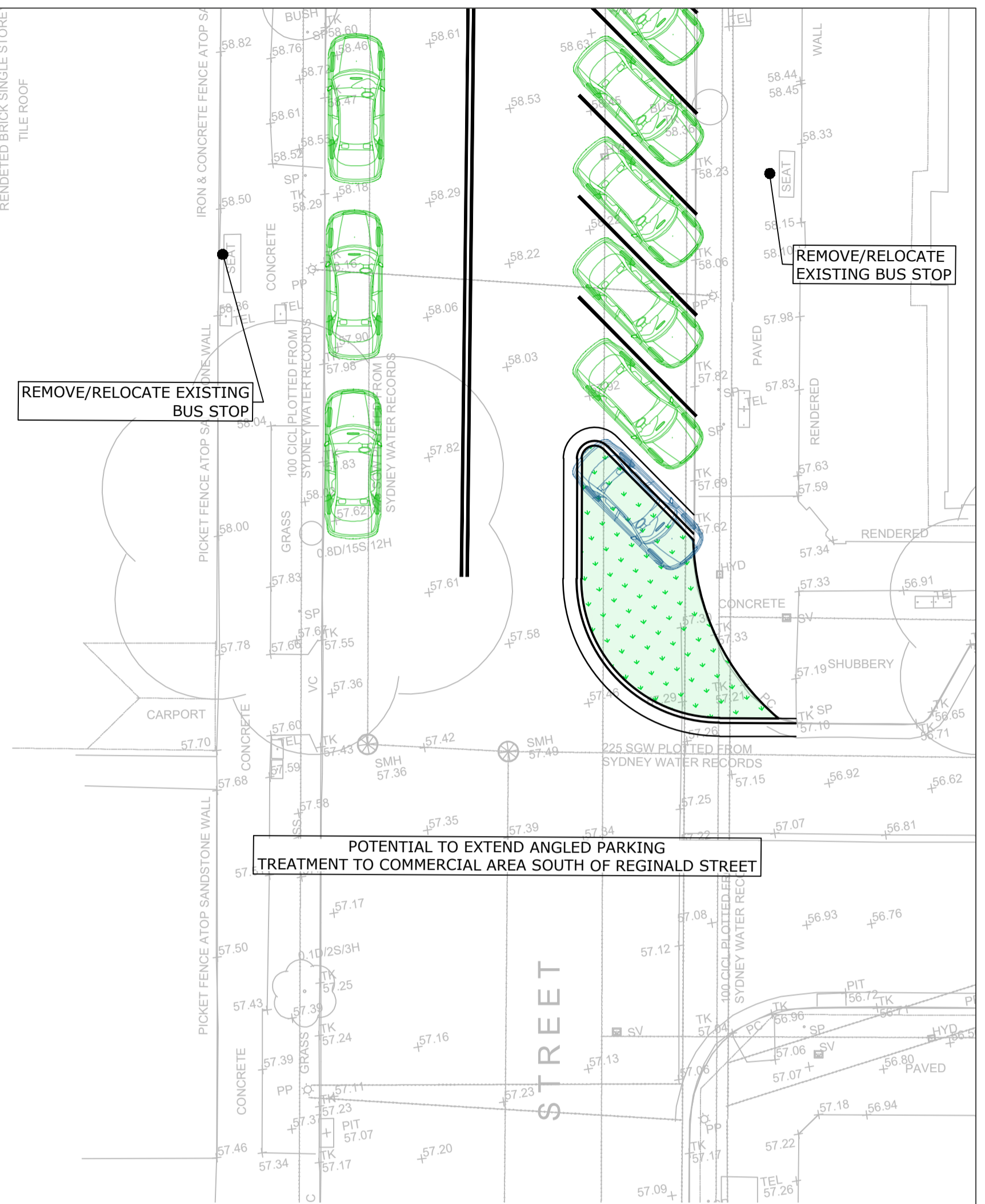
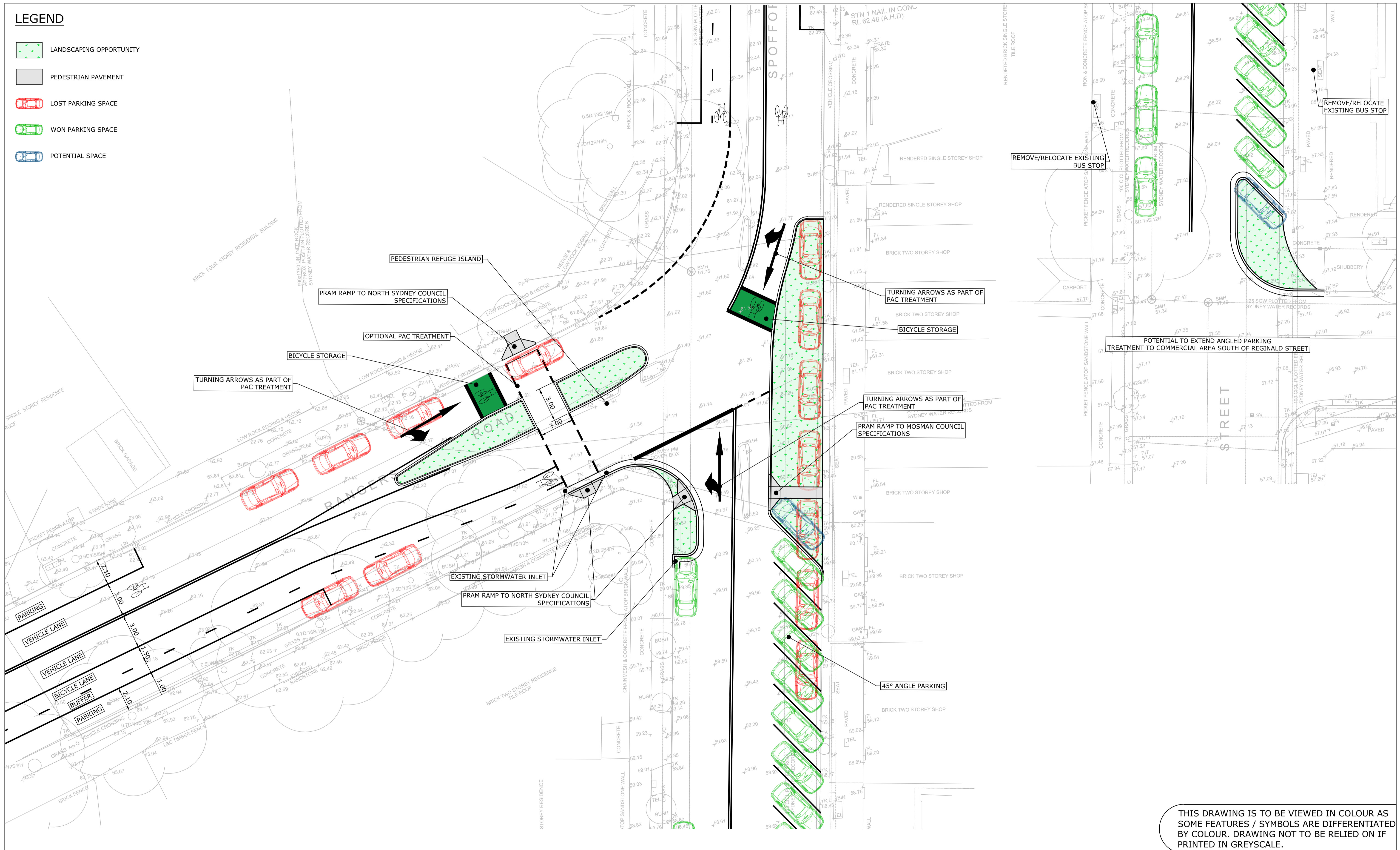
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NORTH SYDNEY COUNCIL
SPOFFORTH STREET UPGRADES
SPOFFORTH STREET & RANGERS ROAD
SIGNALISATION

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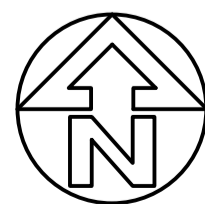
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LEGEND

-  LANDSCAPING OPPORTUNITY
-  PEDESTRIAN PAVEMENT
-  LOST PARKING SPACE
-  WON PARKING SPACE
-  POTENTIAL SPACE



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				APPROVED / PROJECT LEADER	
				BRAYDON AMES	
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SPOFFORTH STREET & RANGERS ROAD
RE-ALIGNMENT WITH OPTIONAL PAC

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REVISION
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Appendix G – RMS Warrants

Spofforth & Rangers - RMS Warrants				
Warrant	Condition	Surveyed Value	Condition Met?	Warrant Met?
Signalisation - Traffic Demand	For each of four one-hour periods of an average day, the major road flow exceeds 600 vehicles/hour in each direction	Major road flow exceeds 600 vehicles/hour in one direction for four hours, and for three hours in the other. For one additional hour, 596 vehicles/hour are recorded, very nearly satisfying this condition. Since this is within typical margins of error, this can be considered as approximately 600 vehicles/hour	Yes	Yes, arguably
	For each of four one-hour periods of an average day, the minor road flow exceeds 200 vehicles/hour in one direction	Minor road flow exceeds 200 vehicles/hour in one direction for four hours	Yes	
Signalisation - Continuous Traffic	For each of four one-hour periods of an average day, the major road flow exceeds 900 vehicles/hour in each direction	Vehicular flow never exceeds 900 vehicles/hour	No	No
	For each of four one-hour periods of an average day, the minor road flow exceeds 100 vehicles/hour in one direction	Minor road flow exceeds 100 vehicles/hour in one direction for eleven hours	Yes	
	The speed of traffic on the major road or limited sight distance from the minor road causes undue delay or hazard to the minor road vehicles	n/a	Yes	
	There is no other nearby traffic signal site easily accessible to the minor road vehicles	n/a	Yes	
Signalisation - Pedestrian Safety	For each of four one-hour periods of an average day, the pedestrian flow crossing the major road exceeds 150 persons/hour	Pedestrian flow never exceeds 150 persons/hour	No	No
	For each of four one-hour periods of an average day, the major road flow exceeds 600 vehicles/hour in each direction or, where there is a central median of at least 1.2m wide, 1000 vehicles/hour in each direction	Major road flow exceeds 600 vehicles/hour in one direction for four hours, and for three hours in the other. For one additional hour, 596 vehicles/hour are recorded, very nearly satisfying this condition. Since this is within typical margins of error, this can be considered as approximately 600 vehicles/hour	Yes	
Signalisation - Pedestrian Safety - High Speed Road	For each of four one-hour periods of an average day, the pedestrian flow crossing the major road exceeds 150 persons/hour	Pedestrian flow never exceeds 150 persons/hour	No	No
	For each of four one-hour periods of an average day, the major road flow exceeds 450 vehicles/hour in each direction or, where there is a central median of at least 1.2m wide, 750 vehicles/hour in each direction	Major road flow exceeds 450 vehicles/hour in each direction for six hours	Yes	
	The 85th percentile speed on the major road exceeds 75 km/h	The 85th percentile speed is 44 km/h	No	
Signalisation - Crashes	The intersection has been the site of an average of three or more reported tow-away or casualty traffic accidents per year over a three year period	There have been just two reported traffic incidents in the past 8 years	No	No
	The traffic flows are at least 80% of the appropriate flow warrants	n/a	Arguably yes	
Mid-Block Crossing	For each of four one-hour periods of an average day, the pedestrian flow crossing the major road exceeds 250 persons/hour	Pedestrian flow never exceeds 250 persons/hour	No	No
	For each of four one-hour periods of an average day, the major road flow exceeds 600 vehicles/hour in each direction or, where there is a central median of at least 1.2m wide, 1000 vehicles/hour in each direction	Major road flow exceeds 600 vehicles/hour in one direction for four hours, and for three hours in the other. For one additional hour, 596 vehicles/hour are recorded, very nearly satisfying this condition. Since this is within typical margins of error, this can be considered as approximately 600 vehicles/hour	Yes	

Spofforth & Rangers - RMS Warrants				
Warrant	Condition	Surveyed Value	Condition Met?	Warrant Met?
Signalisation - Traffic Demand	For each of four one-hour periods of an average day, the major road flow exceeds 600 vehicles/hour in each direction	Major road flow exceeds 600 vehicles/hour in one direction for four hours, and for three hours in the other. For one additional hour, 596 vehicles/hour are recorded, very nearly satisfying this condition. Since this is within typical margins of error, this can be considered as approximately 600 vehicles/hour	Yes	Yes, arguably
	For each of four one-hour periods of an average day, the minor road flow exceeds 200 vehicles/hour in one direction	Minor road flow exceeds 200 vehicles/hour in one direction for four hours	Yes	
Signalisation - Continuous Traffic	For each of four one-hour periods of an average day, the major road flow exceeds 900 vehicles/hour in each direction	Vehicular flow never exceeds 900 vehicles/hour	No	No
	For each of four one-hour periods of an average day, the minor road flow exceeds 100 vehicles/hour in one direction	Minor road flow exceeds 100 vehicles/hour in one direction for eleven hours	Yes	
	The speed of traffic on the major road or limited sight distance from the minor road causes undue delay or hazard to the minor road vehicles	n/a	Yes	
	There is no other nearby traffic signal site easily accessible to the minor road vehicles	n/a	Yes	
Signalisation - Pedestrian Safety	For each of four one-hour periods of an average day, the pedestrian flow crossing the major road exceeds 150 persons/hour	Pedestrian flow never exceeds 150 persons/hour	No	No
	For each of four one-hour periods of an average day, the major road flow exceeds 600 vehicles/hour in each direction or, where there is a central median of at least 1.2m wide, 1000 vehicles/hour in each direction	Major road flow exceeds 600 vehicles/hour in one direction for four hours, and for three hours in the other. For one additional hour, 596 vehicles/hour are recorded, very nearly satisfying this condition. Since this is within typical margins of error, this can be considered as approximately 600 vehicles/hour	Yes	
Signalisation - Pedestrian Safety - High Speed Road	For each of four one-hour periods of an average day, the pedestrian flow crossing the major road exceeds 150 persons/hour	Pedestrian flow never exceeds 150 persons/hour	No	No
	For each of four one-hour periods of an average day, the major road flow exceeds 450 vehicles/hour in each direction or, where there is a central median of at least 1.2m wide, 750 vehicles/hour in each direction	Major road flow exceeds 450 vehicles/hour in each direction for six hours	Yes	
	The 85th percentile speed on the major road exceeds 75 km/h	The 85th percentile speed is 44 km/h	No	
Signalisation - Crashes	The intersection has been the site of an average of three or more reported tow-away or casualty traffic accidents per year over a three year period	There have been just two reported traffic incidents in the past 8 years	No	No
	The traffic flows are at least 80% of the appropriate flow warrants	n/a	Arguably yes	
Mid-Block Crossing	For each of four one-hour periods of an average day, the pedestrian flow crossing the major road exceeds 250 persons/hour	Pedestrian flow never exceeds 250 persons/hour	No	No
	For each of four one-hour periods of an average day, the major road flow exceeds 600 vehicles/hour in each direction or, where there is a central median of at least 1.2m wide, 1000 vehicles/hour in each direction	Major road flow exceeds 600 vehicles/hour in one direction for four hours, and for three hours in the other. For one additional hour, 596 vehicles/hour are recorded, very nearly satisfying this condition. Since this is within typical margins of error, this can be considered as approximately 600 vehicles/hour	Yes	

Spofforth Street Public Realm Upgrade

Local Shopping Precinct Consultation

North Sydney Council

5 December 2018
Ref: 20190977R02



Building exceptional
outcomes together



Document History and Status

Rev	Description	Author	Reviewed	Approved	Date
0	Final	BA	AT	AT	5/12/2019



Contents

Project: Spofforth Street Public Realm Upgrade | Local Shopping Precinct Consultation
Client: North Sydney Council
Ref: 20190977R02

1	Background	4
2	Consultation	4
2.1	Letter Drop	4
2.2	Consultation Visit	4
3	Outcomes	5
4	Summary.....	5

Appendices

- Appendix A – Informal Consultation Plan
- Appendix B – Comments Summary Sheet



1 Background

Tonkin was engaged by North Sydney Council to undertake early consultation with the shopping precinct on Spofforth Street to investigate the potential impacts of parking modifications as a result of the Intersection upgrade between Spofforth Street and Rangers Road. These businesses are located within the Mosman Council area, and the consultation will assist Mosman Council in meeting their constituents' needs.

An Informal Consultation Plan was developed and approved by North Sydney Council on 26th November 2019. This also included an approved letter format and questions for the consultation. This plan can be found in Appendix A.

2 Consultation

2.1 Letter Drop

Letters were created on a dual logo header (Tonkin and North Sydney Council), addressed and dated for each shop in the precinct. The letters identified the need for consultation and a time to return to ask the owner/manager questions to assist in the development of the concept design.

Braydon Ames, Project Manager, commenced the letter drop on the afternoon of the 27th November 2019, however it was found that a high number of the managers/owners of the shops were present and willing to discuss the intersection at that time. The shops that were engaged on the 27th November included:

- Cremorne Pharmacy
- Camperdown Cellars
- Mr Spofforth
- Trio Thai
- The Boudoir of Hair
- Kitchen Curries
- Sunflower Lounge
- De Sylvia Hair Design
- Shane's Quality Butcher

The following was also observed at this time:

- Hygge was now out of business
- Tracy Diks Interior Design did not have an office, a card was taken. Tracy was rung on the 28th November (approx. 10am) and answered questions over the phone at that time.

2.2 Consultation Visit

Braydon visited the remaining Spofforth Street Shops on the 3rd of December. The following shops were consulted at this time:

- Nosh Café (over the phone)
- BBQ Rotisserie
- Orbit to you (receptionist was consulted, the manager may also call)

The remaining shops did not want to set a new time, however were given the option to call Braydon Ames should they wish to discuss the Concept Design of the Intersection. These shops include:

- Cremorne Friendly Grocer
- Spofforth Street Laundromat
- Oishi Sushi

At the time of finalising this report, no further contact has been made.



3 Outcomes

Whilst each shop owner had their own opinions on the Spofforth Street/Rangers Road intersection, there were some common themes. A full summary of the consultation comments can be found in Appendix B.

The common themes that arose throughout the consultation were:

- Any loss of total parking would not be acceptable
- The car park spaces recently removed by Mosman Council (five parks) have impacted the businesses South of Reginald St.
- There are sight distances for vehicles heading North on Spofforth Street at the intersection, and issues with these vehicles being able to enter the intersection at peak times.
- The bus stop is used, but infrequently, there would generally be no objections to relocating it
- Additional rubbish bins were the most frequently asked for public infrastructure item, it was identified that the one there overflows frequently.
- The need for more short term parking was identified by numerous shops, but with different time limits depending on the shop type – i.e. the take away shops wanted 15 – 30 minute limits, whereas the hairdressers preferred up to 2hr limits. This was also an issue raised for weekends, where there is only currently limited parking on Saturday mornings.
- There is an issue with local residents and other users (such as the school teachers) using the car parking in and around the shops, which created difficulties for local shop customers to find parking.
- There were a number of comments raised regarding the local residents and their needs being in conflict to the shops.
- Vehicle speed is an issue on Spofforth Street

4 Summary

The consultation with the shopping precinct was informative and a worthwhile exercise as it has generally confirmed our knowledge and assumptions that:

- Parking is critical and the number of car parks cannot be reduced.
- A local relocation of the parking would be acceptable
- The main traffic issues are
 - Congestion influenced by the school traffic at peak times
 - Vehicles have trouble entering the intersection from the South
- The bus is not frequently used by shop customers, apart from the hairdressers.

Therefore, we intend to proceed with the concept design options as they currently are.

Further to this, there are a number of comments/suggestions that we will make in our Design Report to potentially address additional concerns raised through this consultation to be further considered by Council and during the detailed design phase.



Appendix A – Informal Consultation Plan

Informal Consultation Plan

Contract Spofforth Street Concept Design Date of Issue 26/11/2019

Principal North Sydney Council Job No. 20190977

Background

We have been requested by North Sydney Council to undertake early consultation with the shopping precinct on Spofforth Street to investigate the potential impacts of parking modifications as a result of the Intersection upgrade between Spofforth Street and Rangers Road. These businesses are located within the Mosman Council area, and the consultation will assist Mosman Council in meeting their constituents' needs.

This Informal Consultation Plan details the process that we will undertake during this consultation.

There are 17 businesses to be consulted, as detailed in Attachment 1.

Methodology

Letter Drop

To inform the local businesses of the upcoming consultation, we will undertake an initial letter drop notifying the shops. This letter will include a nominated "drop in" time for them to be present and provide them with contact details should this time not suit.

A copy of the letter can be found in Attachment 2.

Consultation

It is proposed to undertake the consultation face-to-face with the manager or owner of each business. We will visit each premise up to two (2) times to undertake this consultation, at pre-notified times. If the business(es) are not responsive, we will endeavour to obtain the manager/owners contact details to call them to discuss. If they are still non-responsive, we will notify them that they will still be able to provide feedback at the upcoming community consultation.

At the time of consultation, we will ask targeted questions, without detailing what our proposed solutions are. We will ensure that we will not commit to any solution and will be clear that we are still in the early development stage. See Attachment 2 for our proposed talking notes during the consultation.

Review of Comments

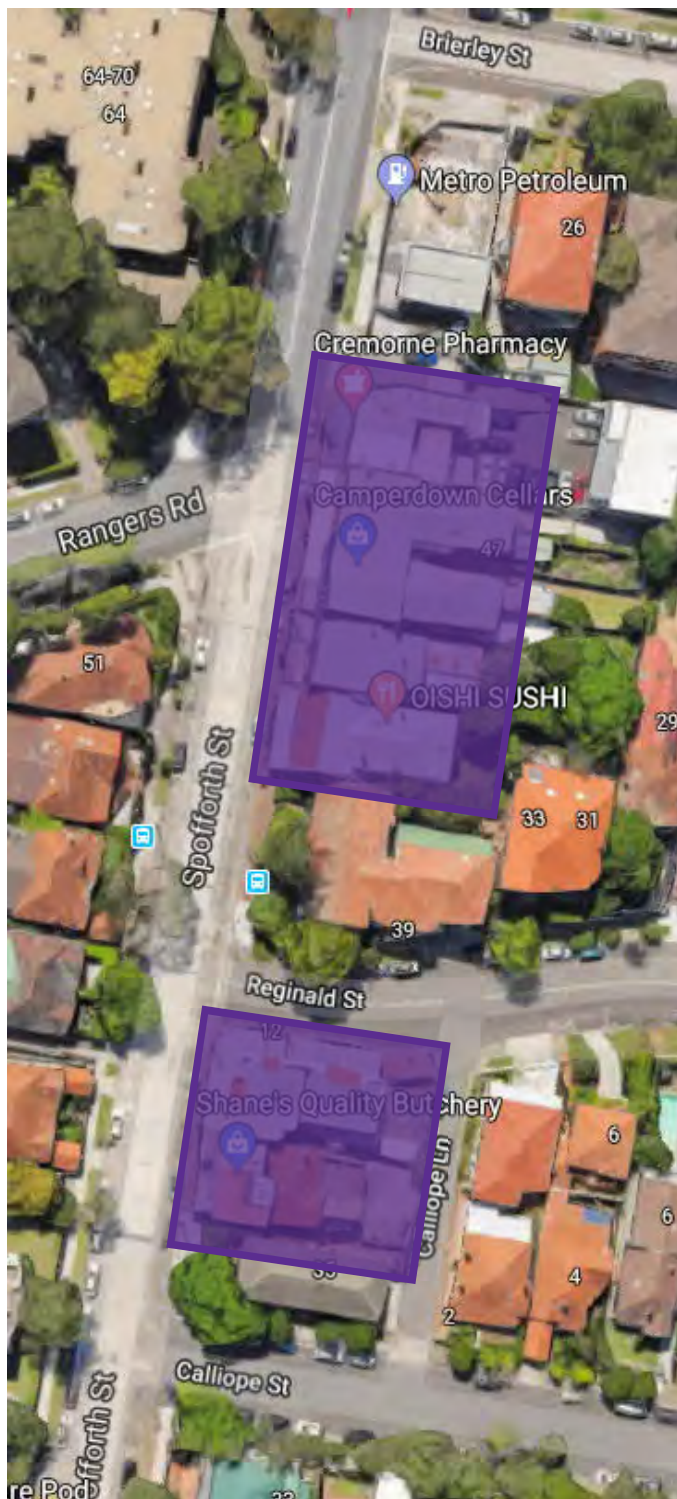
At the completion of the consultation, we will undertake a trend analysis to determine what commonalities exist at the shopping precinct. We will summarise these findings and discuss with North Sydney Council prior to finalising our Traffic Committee Concept Designs.

Deliverables

At the completion of the Consultation, we will provide a Consultation Summary Report.



Attachment 1



1. Nosh
2. Cremorne Pharmacy
3. The BBQ Rotisserie
4. Cremorne Friendly Grocer
5. Camperdown Cellars
6. Mr Spofforth
7. Trio Thai
8. Spofforth Street Laundrette
9. Oishi Sushi
10. Hygge (no longer there)
11. Orbit of You
12. The Boudoir of Hair
13. Tracy Diks Interior Design
14. Kitchen Curries
15. Sunflower Lounge
16. De Sylvia Hair Design
17. Shane's Quality Butchery



Attachment 2

Use North Sydney and Tonkin combined letterhead, refer separate attachment for letters, below is the standard wording to be adopted.

To Whom it May Concern,

My name is Braydon and I work for Tonkin, who has been engaged by North Sydney Council for the Spofforth Street/ Rangers Road Intersection Concept Design. I am the Project Manager for the development of the concept design.

As a part of this concept design development, community consultation is planned to be undertaken early next year with multiple proposed options. We are still in the process of developing these designs. It is important that we understand the needs of the local shopping precinct and are seeking your opinion on the current operation of the intersection to inform our community consultation designs.

This is an opportunity for you to be involved in the refinement of our design options. We have not yet completed our concept designs and we will not be discussing the design solutions at this time. You will have the opportunity to comment on the proposed design solutions at the time of the community engagement.

As we are extending this opportunity to all shops within the immediate shopping precinct, we have nominated the following time for me to stop in and ask you some questions.

Insert Time and Date here

Should this time not be suitable, PLEASE CALL ME on 02 8425 7580 to arrange an alternative time.

Regards,

Braydon Ames

Project Manager

Tonkin Consulting



Attachment 3

Talking Notes

My name is Braydon and I am the Project Manager. I work for Tonkin who has been engaged by North Sydney Council for the Spofforth Street/ Rangers Road Intersection Concept Design.

To let you know where we are at, we have a few options that we have been discussing with North Sydney Council who have commissioned this design. We are seeking your thoughts prior to progressing our designs before Christmas to send to the Council's Traffic Committee. The Traffic Committee will review early in the new year. Once we have updated the designs to meet the Traffic Committee's comments, the designs will go out to public consultation, most likely in March.

I would like to re-iterate that this is an opportunity for you to help us refine our design options for the Spofforth Street/Rangers Road intersection. It is not to discuss the potential design solutions. We have seven specific questions that we will be asking all of the shops. After the questions, we will ask for your general comments on the intersection.

We will be providing a summary report back to North Sydney Council, is it ok for us to use your name in directly quoting comments or would you prefer to remain anonymous?

Thanks, I'll start with the questions now.

1. What methods of transport do you patrons use? (prompt with cycling, walking, public transport or by car as required)
2. Do your patrons comment on the safety of the intersection? If so, what are their main concerns?
3. Would you support the removal of car parking spaces located in the intersection where they do not meet the relevant Australian Standards for the preferred intersection layout?
4. If we were to relocate car parking spaces from the intersection, where would you like to see car parking relocated to?
5. Would you be supportive if the bus stops were to be moved to facilitate the relocated car parking?
6. If additional footpath space was created by the removal car parks at the intersection, would you like to see any public infrastructure installed? (prompt with bike racks, seating, planting, as required)
7. Is there anything else that you would like us to take into account in our concept designs?

Thank you for your time, feel free to give me a call if you think of anything else.



Appendix B – Comments Summary Sheet

Date	3-Dec	27-Nov	3-Dec	27-Nov	3-Dec	27-Nov	3-Dec	3-Dec	27-Nov	3-Dec	27-Nov	27-Nov	27-Nov	27-Nov	27-Nov	28-Nov	
Questions	North	Cremonne Pharmacy	BBQ Rotisserie	Cremonne Cellars	Cremonne Friendly Grocer	Mr Spofforth	Spofforth Street Laundromat	Dishi Sushi	Trio Thai	Orbit to you	Dr. Sylvia Hair	Itchen Curries	sunflower	Boudoir of Hair	Shane's Quality Butcher	Tracy Diks Interior Design	
What methods of transport do you patrons use?	Car generally some cycling on weekends	Mainly cars, some bus, cars definitely in the peaks	Car/ute	mostly local, so drive or walk	N/A	Drive	N/A	N/A	Drive	Car or walk	Drive, some use bus, some locals walk or gets dropped off as there is no parking	drive, small number walk	a lot of foot traffic, some drive in am on their way to work	everythingolder generation around here use bus.	Didn't want to answer questions, see general comments at the bottom	Car	
Do your patrons comment on the safety of the intersection? If so, what are their main concerns?	Yes, it is unsafe. Unless you're a local people use it like a standard t-junction, which results in lots of swearing and beeping. People going up the hill find it difficult to get out, stick their nose out and create issues. Traffic heading down the hill dont give way to them. Crossing the road (as a pedestrian) is like putting your life on the line at times.	Always	not really	Yes, passing comments. Comment on constant noise, speed and lots of beeping. Bus knocks down the signs		hard to park, yes it is dangerous. The bus always knocks down the street sign.		No	Yes it is a bad intersection. There used to be lots of little crashes	Looking for parks is the issue	dangerous, fast, the through flow is a dangerous one	most go around the strip to generally avoid it. There are some back routes. Lots of people use Spofforth and Florence to get to Murdock and avoid Rangers	Redlands school is an issue, wouldn't be as bad if school parking was better. More school zone/drop off zone improvements.	-		No	
Would you support the removal of car parking spaces located in the intersection where they do not meet the relevant Australian Standards for the preferred layout?	No	Not really, competing already, it would impact busines	many shops, customers need the parking	No, we need it for business, would like a loading zone		No		No issues, people can go around. If a better intersection then it is fine	Yes, doesn't really impact us, it isnt too hard to find a car park in the side streets.	No, will kill shops.	No	personally its ok, but it would impact business and may have a flow on effect to him.	No	-		No	
If we were to relocate car parking spaces from the intersection, where would you like to see car parking relocated to?	On the Mosman side it is 15-30 min parking, some 2hr on North Sydney side, then some unrestricted. If you could change these limits, make them smaller, it would benefit parking. Or you could move the bus stops, there are too many on Spofforth Street, four all really close together.	As long as it is close and convenient. Would have to find somewhere easy	Yes, helps the traffic so its better	Ok, but not sure where. Short term parking is the issue. Would like loading zone before 12pm somewhere		Yes so long as it is close		people come because it is easy parking, needs to be easy still	not discussed	no where, Mosman Council just removed a whole heap of parks, bring them back. Issue will be with local residents with any parking change on side streets (angled parking, timing parks)	Yes, but no. depends on location. Options to look at re-working local parking that Mosman have just removed	10m from corner being yellow lines meant a loss in 4 parks already. Why is that. Put those parks back and it will be fine, especially in the side streets.	No	-		Not really	
Would you be supportive if the bus stops were to be moved to facilitate the relocated car parking?	Yes	Yes, if parking relocated provided same number of spaces	Not sure how my customers use it.	Yes, rarely used		have to ask locals, people use it.		move the bus it should be ok.	Yes, not many of our customers use it	Yes, some oldies use them but not too far to the next stop.	Yes	Yes	No	-		Yes	
If additional footpath space was created by the removal car parks at the intersection, would you like to see any public infrastructure installed?	more seating areas out the front of the shops. Bike parking, they would stop Saturday and Sunday mornings of there were bike racks. You should see the place on weekend mornings, cars and bike everywhere but all the parks are taken by people taking their kids to sports. The area isnt well maintained, so more planter blocks would be nice too.	Bike racks, some customers park them out the front	better to make clearing for traffic.	Loading zone space, but needs space around it for unloading. Need another rubbish bin		No idea		more seats, lots of walkers	not discussed	tables and chairs, bins, really would love a village atmosphere, slow people down.	not bike racks, seating does get used, none on Reginald. The current bin overflows	(didn't ask, ran out of time)	No	-		planting	
Is there anything else that you would like us to take into account in our concept designs?	The unlimited parks by the shops are taken up by Redlands teachers every day, which limits the parks for customers. Relocate the bus stops. Sat and Sunday parking bothers me the most, but you cant blame the local residents when there is no-where else to park.	Anything that will reduce possibility of accidents but keep the traffic flowing will be good. Visibility for traffic coming up from Spofforth turning onto Rangers has sight distance issues, heading from the South. They don't know when to proceed and results in long queues	Cars beep there horns all day, but not really the issue. Cars push in slowly from the South, they're not sure who should go. Give more space to the cars.	Too many accidents. Too many bus stops. Blind spot for traffic heading North of Spofforth. Sight distance issues that we see every day. Not many inspectors that inspect parking, so people park there longer than they should, even school mums. It effects business. Untimed parking across the Road could be timed or removed to increase sight distance. Sweep the road more often, footpath gets filthy.		angled parking could benefit safety		Safety is the main thing	The school is the issue, can be backed up for ages if you don't use the back streets. It is a long way around for school kids to use a pedestrian crossing, so should be improved.	Ideally have 1-2 hours parking spots, could have an issue with angled parking with locals, a paved road treatment would be great, and if you could restrict traffic (make Spofforth or Rangers one way) is would ease congestion. Calm down the traffic. Lots of u-turns on Reginald with people looking to find parks and also impacts pedestrians. A ped crossing on reginald would be ideal for safety. more signage, shared zone signs. cars come out of the garage really quickly. is there a way to give priority to cars heading North?	the recent Msoman Council changes in parking has impacted business. Council have gone too far in current removals. Extra parking back would be great. Use short time zones. Clearnace zone at time could be useful, especially around the school and would ease congestion.	Special signage, maybe a speed bump or 2, ped crossing on Reginald.	No speed humps congestion is the biggest issue. There are routes for people to go around, other crossings.	2hr parking on the other side of the road needed. Speeding is an issue, even the buses speed. No parking loss is acceptable	-		Not really, quite safe, I drive through it every day and not a problem for me.

Intersection Upgrades, Spofforth Street

Road Safety Audit

Concept Design Stage

31st January 2020

JN20005_Report01 Rev02 - Tonkin Spofforth

On Behalf of

Tonkin Consulting Pty Ltd



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NSW RSA Register Details

Final Signoff Date	31/01/2020
Title of Audit	Intersection Upgrades, Spofforth Street
Location of Audit	North Sydney
Project Description	The aim of this project is to upgrade the intersection of Spofforth Street and Holt Avenue, and the intersection of Spofforth Street and Rangers Road, in the North Sydney Suburb of Cremorne
Purpose of Audit	The aim of this Road Safety Audit (RSA) is to assess the concept design plans in the context of the existing conditions, and the interface between existing and proposed works
State of Audit	NSW
Stage of Audit	Detail Design Stage
Client Company	Tonkin Consulting Pty Ltd
Client Contact	Nicholas Stephens
Client Phone	02 9409 3300
Client Email	Nicholas.Stephens@tonkin.com.au
Audit Team Lead	Aaron Walton
Audit Team Member	Jose Villacorta

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5 Exclusions	2
6 Audit Team	2
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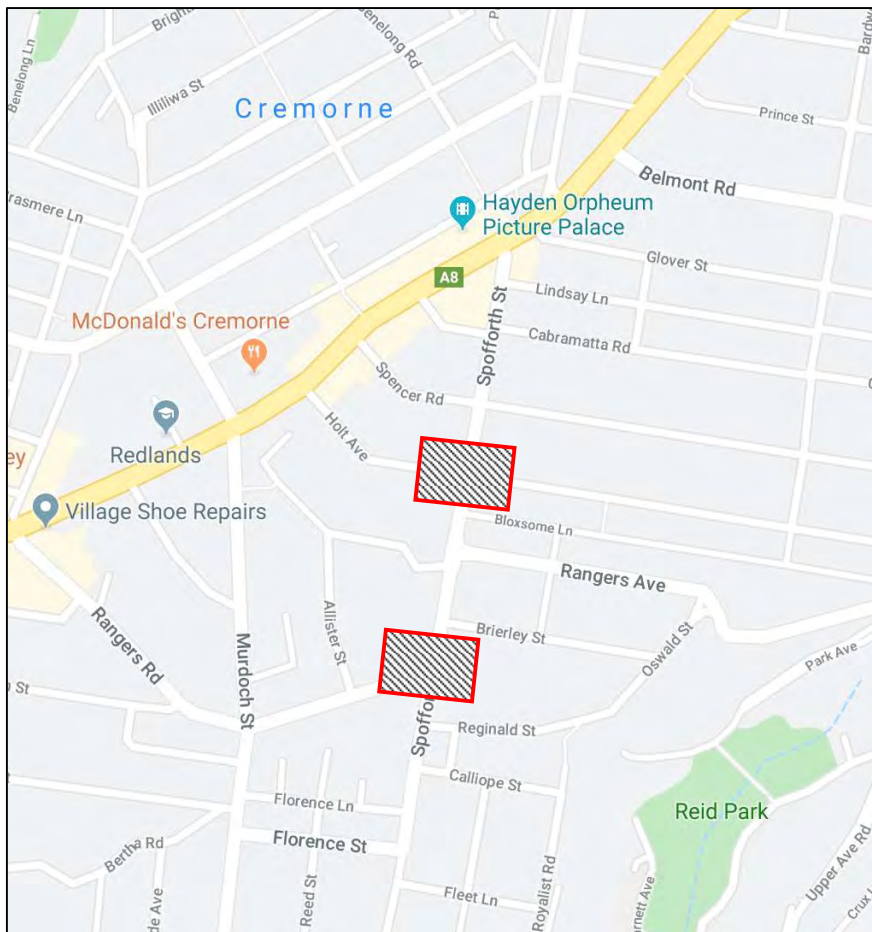
1 Project Description

The aim of this project is to upgrade the intersection of Spofforth Street and Holt Avenue, and the intersection of Spofforth Street and Rangers Road, in the North Sydney Suburb of Cremorne. The proposed concept design has provided 3 intersection upgrade options for each intersection.

The aim of this Road Safety Audit (RSA) is to assess the concept design plans in the context of the existing conditions, and the interface between existing and proposed works.

2 Study Area

The general audit location is shown below.



Source – Google Maps

3 Auditable Data

The following data was referenced during the audit:

- > Concept Civil Plans – Intersection Upgrades – Spofforth Street, North Sydney (Rev C – 09/12/2019)

4 Audit Stage

A Concept Design Stage Audit was carried out during a desktop assessment of concept design plans and subsequent site visit of proposed works during day and night conditions on 9th January 2020. At the time of the site visit weather was cloudy and traffic was light.

The audit was generally undertaken in accordance with 'TNSW Guidelines for Road Safety Audit Practices (2011)' and 'Austroads: Guide to Road Safety Part 6 and Part 6a (2019)'.

5 Exclusions

At the time of the audit there were no exclusions presented to the audit team.

6 Audit Team

The audit team and client details are shown below.

Table 6-1 Audit Team & Client Details

Role	Name	
Client (Sponsor)	Tonkin Consulting Pty Ltd	
Client Contact	Nicholas Stephens	Project Engineer
Client Email	Nicholas.Stephens@tonkin.com.au	
Lead Auditor	Aaron Walton	RSA-02-0501 - Level 3 Auditor
Lead Auditor Email	admin@amwc-rsa.com	
Team member	Jose Villacorta	RSA-02-0805 - Level 3 Auditor

7 Audit Program

The audit program details are shown below.

Table 7-1 Audit Program

Activity	Date	Attendees
Opening Meeting	18/12/2019	Aaron Walton, Nicholas Stephens
Site Inspection	09/01/2020	Aaron Walton, Jose Villacorta
Draft Report	20/01/2020	RSA Report (DRAFT for comment)
Completion Meeting	31/01/2020	Aaron Walton, Nicholas Stephens
Final Report	31/01/2020	RSA Report (Final for issue)

8 Audit Risk Assessment Technique

For each of the safety issues identified, the level of risk with each has been determined. The tables below are extracted from Austroads: Guide to Road Safety Part 6 and Part 6a (2019) and have been used in the assessment of risk for this audit.

Table 8-1 Incident Frequency

Frequency	Description
Frequent	Once or more per week
Probable	Once or more per year
Occasional	Once every five or ten years
Improbable	Less often than once every ten years

Table 8-2 Incident Severity

Severity	Description	Examples
Catastrophic	Likely multiple deaths	<ul style="list-style-type: none"> > High-speed, multi-vehicle crash on freeway. > Car runs into crowded bus stop. > Bus and petrol tanker collide. > Collapse of bridge or tunnel.
Serious	Likely death or serious injury	<ul style="list-style-type: none"> > High or medium-speed vehicle/vehicle collision. > High or medium-speed collision with a fixed roadside object. > Pedestrian or cyclist struck by a car.
Minor	Likely minor injury	<ul style="list-style-type: none"> > Some low-speed vehicle collisions. > Cyclist falls from bicycle at low speed. > Left-turn rear-end crash in a slip lane.
Limited	Likely trivial injury or property damage only	<ul style="list-style-type: none"> > Some low-speed vehicle collisions. > Pedestrian walks into object (no head injury). > Car reverses into post.

Table 8-3 Resulting Level of Risk Matrix

	Frequent	Probable	Occasional	Improbable
Catastrophic	Intolerable	Intolerable	Intolerable	High
Serious	Intolerable	Intolerable	High	Medium
Minor	Intolerable	High	Medium	Low
Limited	High	Medium	Low	Low

9 Audit Findings

Table 9-1 Audit Findings

Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
<u>Extent of Audit</u>					
1. Outstanding design items Extent of works	There are existing drainage pits, utility poles, utility pits and signage with insufficient design information provided. There is no vertical, horizontal, cross section or contour information provided. No further assessment has been carried out.	Note			
2. TCS design Extent of works	There is no information provided to the audit team of proposed TCS pole locations, sight to the signals, or conflicts with services or pedestrian desire lines. No further assessment has been carried out.	Note			
3. Parking design Extent of works	There is minimal information provided on existing or proposed parking sign arrangements. No further assessment has been carried out.	Note			
4. Turning paths Extent of works	There are no turning paths provided. No further assessment has been carried out.	Note			

Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
<p>5. Kerb ramp alignment Extent of works</p>	<p>There are opposing kerb ramps that do not align or are at a skewed angle.</p> <p>There is a risk that a visually impaired pedestrian may not have adequate cues to the direction of proposed travel resulting in trip/fall injuries or impacts with passing vehicles.</p>	Occasional	Minor	Medium	<ul style="list-style-type: none"> Noted; will investigate adjusting the pram ramps to enhance accessibility outcomes – NS 31/01/2020
<p>The image contains three technical diagrams illustrating kerb ramp alignments. The top diagram shows a side view of a kerb ramp with a red arrow pointing to a skewed angle. The middle diagram shows a top-down view of a kerb ramp with red arrows indicating skewed angles. The bottom diagram shows a top-down view of a kerb ramp with a red arrow pointing to a skewed angle and a dashed line indicating a proposed path.</p>					

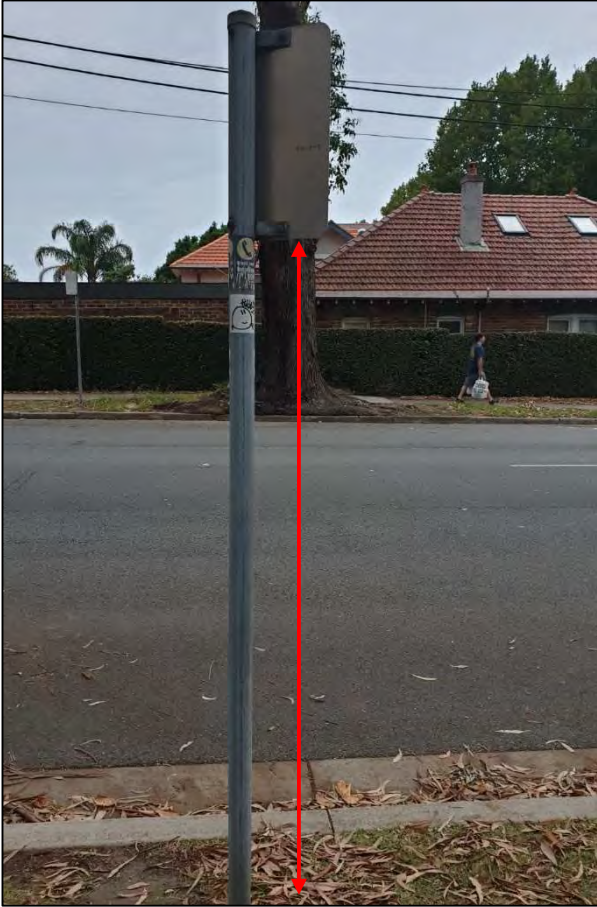
Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
<p>6. Trapped sag Extent of works</p>	<p>There are kerb extensions that appear to have a trapped sag point.</p> <p>There is a risk that water may pond in trapped sag points and encroach the travel lane resulting in aquaplaning; or encroach pedestrian crossing points resulting in slip/trip/fall incidents.</p>	Occasional	Minor	Medium	<ul style="list-style-type: none"> Acknowledged – it should be noted that stormwater drainage is not a point of consideration at this stage of design development. This will be addressed at a more advanced stage, either through angling the kerb buildouts, repositioning stormwater pits, providing gutter channels, or new pipework in lieu of the existing gutter - NS 20/01/2020


Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
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Holt Avenue Intersection General

<p>7. Speed sign South east corner</p>	<p>There is a '50' sign that is damaged at the south east extent of works.</p> <p>There is a risk that a motorist may not be aware of the proposed speed zone for design elements resulting in loss of control incidents; or that pedestrians may not expect a higher speed of an approaching vehicle and enter the travel lane resulting in pedestrian-vehicle collisions.</p>	<p>Improbable</p>	<p>Minor</p>	<p>Low</p>	<ul style="list-style-type: none"> Acknowledged – all existing signage will be reviewed from a design perspective during the detailed design phase. This will be addressed then - NS 20/01/2020
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Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
8. Bus sign North west corner	<p>There is a bus stop sign that is installed at a low height at the north west extent of works.</p> <p>There is a risk that a pedestrian may impact a low sign resulting in cut or blunt impact head injury.</p>	Improbable	Minor	Low	<ul style="list-style-type: none"> Acknowledged – all existing signage will be reviewed from a design perspective during the detailed design phase. This will be addressed then - NS 20/01/2020
					

Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
<p>9. Bus sign North east corner</p>	<p>There is a bus stop parking sign that is faded at the north east extent of works.</p> <p>Additionally, the bus stop flag and shelter is overgrown with vegetation.</p> <p>There is a risk that a pedestrian may impact overgrown branches resulting in head/eye injury.</p> <p>There is a risk that a motorist may park in a bus zone, limiting the manoeuvrability of an entering bus, requiring the bus to overhang into the travel lane resulting in sideswipe or rear end collisions from through vehicles; or requiring a bus to overhang the pedestrian path resulting in collisions with pedestrians or infrastructure.</p>	<p>Improbable</p>	<p>Minor</p>	<p>Low</p>	<ul style="list-style-type: none"> Acknowledged – all existing signage will be reviewed from a design perspective during the detailed design phase. This will be addressed then - NS 20/01/2020
					

Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
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Sheet 100

<p>10. Shared path South west corner</p>	<p>There is a cycle lane directed into a pedestrian path with insufficient warning, narrow path width and no reconnection point to on-road.</p> <p>There is a risk that a pedestrian may not anticipate an oncoming cyclist resulting in pedestrian-cyclist collisions.</p>	<p>Probable</p>	<p>Minor</p>	<p>High</p>	<ul style="list-style-type: none"> Acknowledged – will investigate ways of minimising pedestrian-cyclist collision risk – NS 31/01/2020
<p>The diagram is a technical site plan of a road intersection. It shows a road labeled 'SPOFFORTH' running vertically. A cycle lane is shown as a green-shaded area with a bicycle icon, curving from the top left towards the bottom right. A pedestrian path is shown as a grey-shaded area, also curving. A red starburst symbol is placed at the junction of the cycle lane and pedestrian path, with a red arrow pointing to it. Other features include a 'FORMWATER INLET', a 'RAMP TO NORTH SYDNEY COUNCIL SPECIFICATIONS', a 'TO JOIN FOOTPATH', and a 'WITH VEHICLE LANE'. The drawing includes various lines, curves, and annotations typical of a civil engineering plan.</p>					

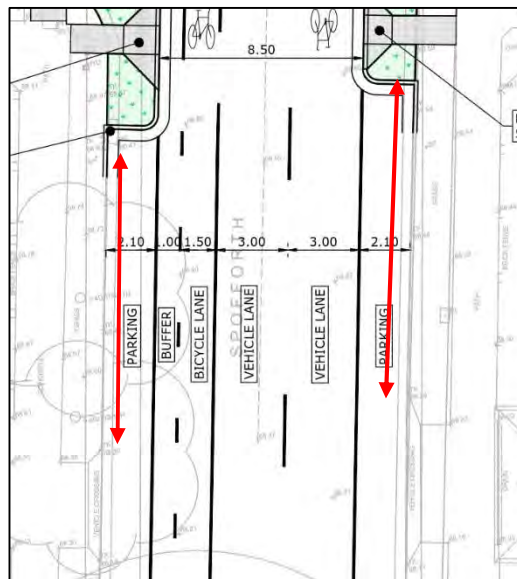
Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response	
<p>11. Ramp grade South west corner</p>	<p>There is a steep grade on a kerb ramp. There is a risk that a mobility impaired pedestrian may slip/trip/fall on steep grades; or attempt to access the path via a different ramp resulting in pedestrian-vehicle collisions.</p>	Occasional	Minor	Medium	<ul style="list-style-type: none"> Acknowledged – this will be considered at the detailed design stage – NS 28/01/2020 	
	<p>12. Cycle lane South west corner</p>	<p>There is a cycle lane merging with a vehicle lane with no warning. There is a risk that a motorist may not anticipate a merging cyclist resulting in vehicle-cyclist collisions.</p>	Probable	Minor	High	<ul style="list-style-type: none"> Noted – will consider ways to highlight this merge to motorists – NS 31/01/2020
						

Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
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Sheet 101

<p>13. Extent of works</p>	<p>It is unclear to the audit team of the extent of works. The proposed design extends past the page extents. No further assessment has been carried out.</p>	<p>Note</p>			
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<p>14. Parking Extent of works</p>	<p>There is no parking information provided. It appears that parking information provided on other sheets has not been provided on sheet 101. It is unclear to the audit team of proposed locations for retained, removed or additional parking, particularly for the south extents of work. No further assessment has been carried out.</p>	<p>Note</p>			
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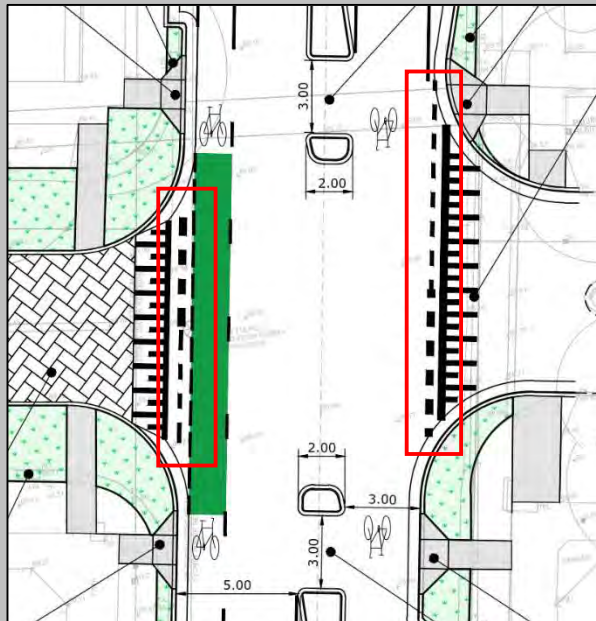


Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
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Sheet 102

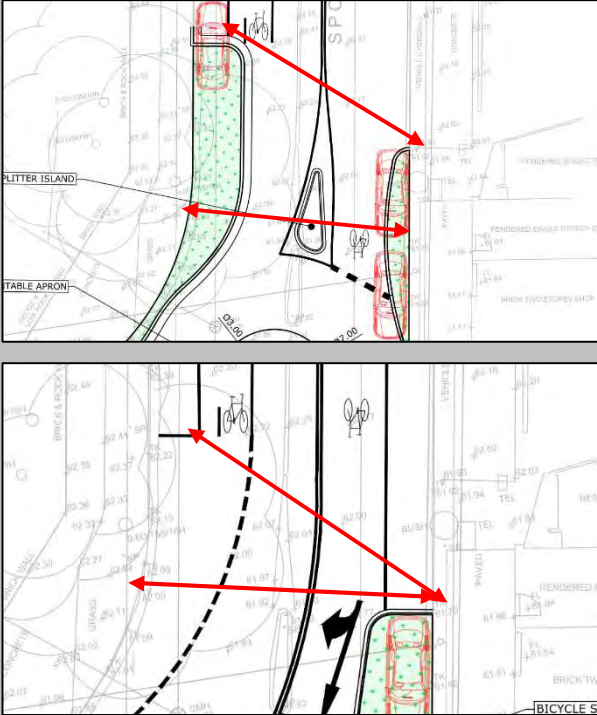
15. Extent of works	It is unclear to the audit team of the extent of works. The proposed design extends past the page extents. No further assessment has been carried out.	Note			
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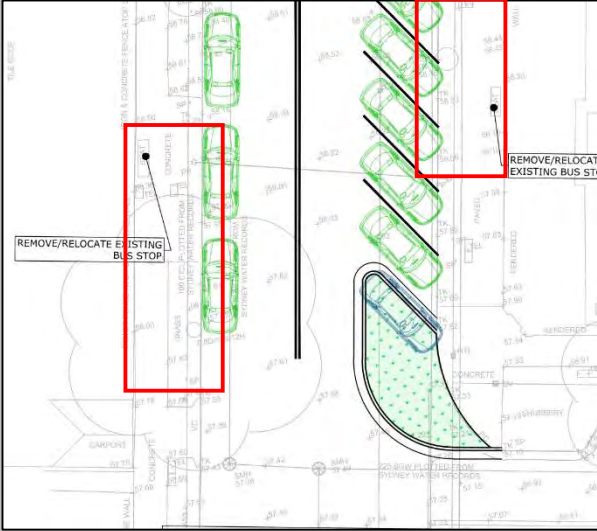
16. Hold line marking East and West approach on Holt Avenue	There is Give Way line marking provided where Stop signage is provided. There is a risk that a motorist may not come to a complete stop at the intersection and enter the through lanes without sufficient sight/appreciation to oncoming traffic resulting in side impact collisions.	Improbable	Minor	Low	<ul style="list-style-type: none"> It is our intention that the Stop signage will be replaced by Give-Way signage to reflect the functioning of the re-worked intersection – NS 28/01/2020
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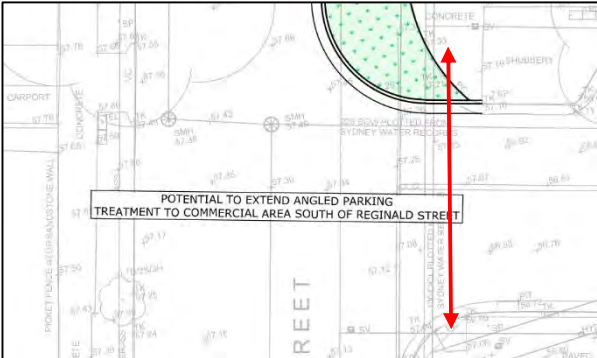


Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
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Rangers Road Intersection General

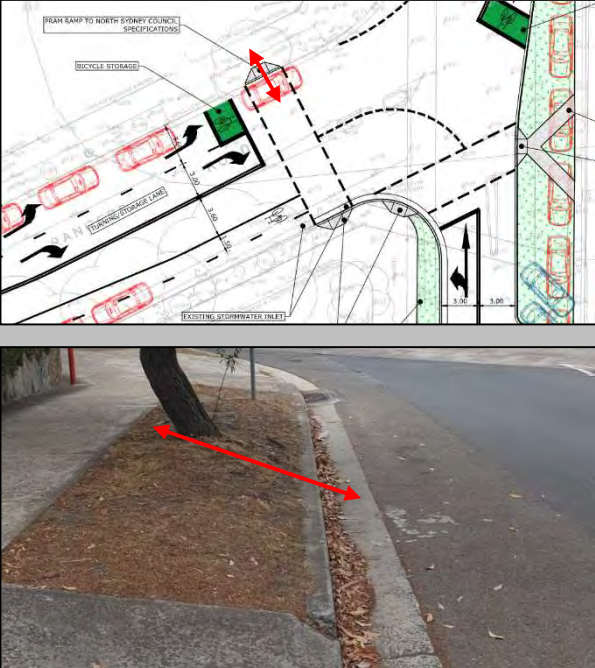
<p>17. Pedestrian desire Northern extent</p>	<p>There is no crossing proposed on the northern leg of the intersection.</p> <p>On site it was observed that multiple motorists were parking on the north western side of Spofforth Street and crossing to access the service station and shops.</p> <p>There is a risk that pedestrians may still attempt to cross at this location with insufficient protection resulting in pedestrian-vehicle collisions.</p> 	<p>Occasional</p>	<p>Serious</p>	<p>High</p>	<ul style="list-style-type: none"> The lack of a pedestrian crossing on the northern arm of Spofforth St is intended to minimise the number of potential collision points. Pedestrians are able to cross either Rangers Road, then Spofforth St, or just Spofforth St at the wombat crossing to the north. It is assumed that measures such as the landscaping or potentially fencing will discourage pedestrians from crossing here – NS 31/01/2020
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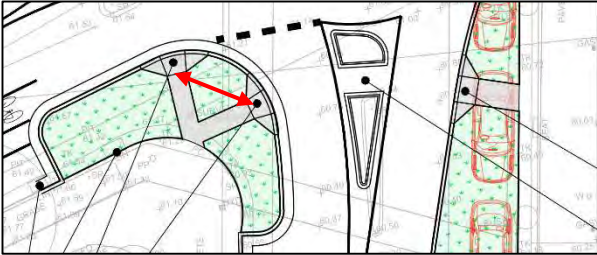
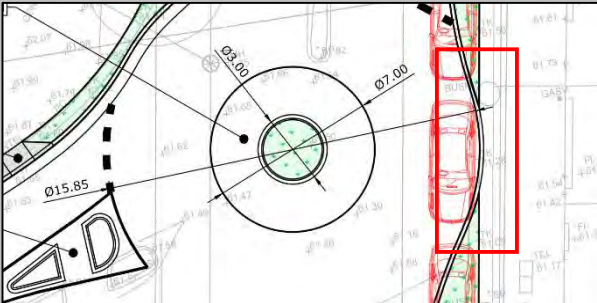
Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
18. Loading zones Eastern extent	It is unclear to the audit team where loading zones for commercial deliveries are existing or proposed. No further assessment has been carried out.	Note			
19. Bus stop relocation Southern extent	It is unclear to the audit team to the proposed bus stop relocation, pedestrian access or desire lines to the relocations, pedestrian travel distance between bus stops in the final arrangement, or any safety hazards present at the relocation points. No further assessment has been carried out.	Note			
					
20. Pavement arrows Extent of works	The pavement arrow (left-right-straight) arrangement does not appear to be representative of the through and turning movements. There is a risk that a vehicle indicating based on arrow direction may confuse an approaching or following motorist resulting in rear end or side swipe collisions.	Improbable	Minor	Low	<ul style="list-style-type: none"> Noted, will remove arrows as appropriate to avoid motorist confusion – NS 31/01/2020

Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response	
<p>21. Bus sign Western kerb line</p>	<p>There is a bus stop sign that is faded.</p> <p>There is a risk that a motorist may park in a bus zone, limiting the manoeuvrability of an entering bus, requiring the bus to overhang into the travel lane resulting in sideswipe or rear end collisions from through vehicles; or requiring a bus to overhang the pedestrian path resulting in collisions with pedestrians or infrastructure.</p>	Improbable	Minor	Low	<ul style="list-style-type: none"> It is currently proposed that this bus stop will be either removed or relocated. If this proceeds, this sign will be removed – NS 23/01/2020 	
	<p>22. Kerb ramp Reginald Street</p>	<p>There is no kerb ramp provided at the south eastern extent of works.</p> <p>There is a risk that a pedestrian may slip/trip/fall when traversing the kerb; or attempt to access the path via a different location resulting in pedestrian-vehicle collisions.</p>	Probable	Minor	High	<ul style="list-style-type: none"> This area was not subject to considered design and the buildout here is indicative only. The treatment of this intersection will be reviewed in more detail at a later date – NS 23/01/2020
						

Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
<p>23. Vehicle sight lines Reginald Street</p>	<p>There is no redesign proposed at the intersection of Spofforth and Reginald Street.</p> <p>There is a kerb build out that may result in reduced visibility to oncoming traffic due to the setback of the hold line from the intersection and the proposed vehicle parking spaces.</p> <p>There is a risk that a motorist may turn out of Reginald Street with insufficient sight distance to oncoming vehicles resulting in side impact or rear end collisions.</p>	Probable	Minor	High	<ul style="list-style-type: none"> This area was not subject to considered design and the buildout here is indicative only. The treatment of this intersection will be reviewed in more detail at a later date – NS 23/01/2020
<p>The diagram is a technical site plan showing a street layout. A red arrow points from a text box to a specific area on the plan. The text box contains the text: "POTENTIAL TO EXTEND ANGLED PARKING TREATMENT TO COMMERCIAL AREA SOUTH OF REGINALD STREET". The plan shows various street names, including "STREET" and "REGINALD STREET", and various engineering details like "SYDNEY WATER RECORDS", "CONCRETE", and "PAVED". There are also some green hatched areas and a blue-outlined area.</p>					

Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
24. Parking conflict Eastern kerb	<p>There are utility posts and trees in front of proposed vehicle parking spaces north of Reginald Street.</p> <p>There is a risk that a vehicle may impact a non-frangible object resulting in injury to vehicle occupants.</p> <p>There is a risk that a vehicle may not park fully within the carpark and overhang into the travel lane resulting in sideswipe collisions.</p>	Probable	Minor	High	<ul style="list-style-type: none"> Acknowledged, however this is not within our scope at present – NS 28/01/2020

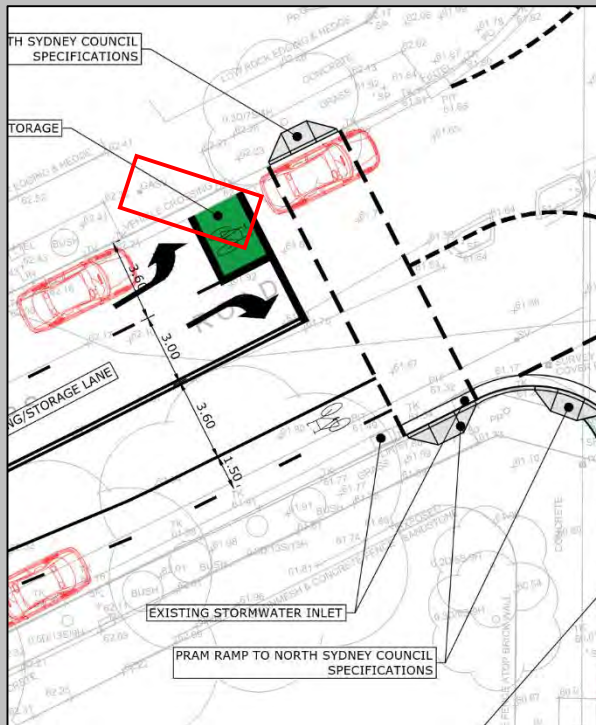
Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
<p>25. Ramp grade North west corner</p>	<p>There is a steep grade on a kerb ramp.</p> <p>There is a risk that a mobility impaired pedestrian may slip/trip/fall on steep grades; or attempt to access the path via a different ramp resulting in pedestrian-vehicle collisions.</p> <p>Additionally, it appears the alignment of the proposed new kerb ramp may clash with existing trees. It is not clear to the audit team if trees are to be removed.</p>	Occasional	Minor	Medium	<ul style="list-style-type: none"> Acknowledged – this will be considered at the detailed design stage – NS 28/01/2020
					
<p>26. Extent of works</p>	<p>It is unclear to the audit team of the extent of works.</p> <p>The proposed design extends past the page extents.</p> <p>No further assessment has been carried out.</p>	Note			

Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
Sheet 103					
<p>27. Pedestrian desire South west corner</p>	<p>There is vegetated infill provided in a pedestrian desire line on the South West corner.</p> <p>There is a risk that pedestrians may often traverse the vegetated area, damaging the vegetation and compacting loose material creating a trip hazard at the edge of the path.</p>	Probable	Limited	Medium	<ul style="list-style-type: none"> Noted; will amend proposed footpath accordingly – NS 31/01/2020
					
<p>28. Kerb alignment Eastern kerb</p>	<p>The eastern kerb of the roundabout impacts the existing kerb and shop awnings.</p> <p>There is a risk that a vehicle may impact the shop awning resulting in injury to vehicle occupants or pedestrians.</p>	Probable	Minor	High	<ul style="list-style-type: none"> Noted, however vehicles do presently park in this space without conflicting with the awning, so presumably moving vehicles will also safely navigate this space. This will be confirmed at the detailed design phase – NS 31/01/2020
					

Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
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Sheet 104

<p>29. Driveway Western leg</p>	<p>There is an existing driveway at the proposed western leg of the traffic signals, adjacent to the hold line and cycle storage area.</p> <p>There is a risk that a motorist exiting the access to travel north may conflict with cyclists.</p> <p>There is a risk that a motorist exiting the access to travel west may not have sufficient sight to oncoming traffic resulting in side impact collisions.</p>	<p>Occasional</p>	<p>Minor</p>	<p>Medium</p>	<ul style="list-style-type: none"> Sight lines for pedestrians and cyclists (travelling north) are reasonably uninhibited, noting that the nearest car parks to the driveway will be removed. Sight lines for traffic approaching from the north and heading west are already limited by the alignment of the road. The overall intent of the concept will be to slow traffic – PS 31/01/2020
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Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
<p>30. Line marking North west corner</p>	<p>The arrangement of a dashed edge line marking may be confusing to motorists and cyclists.</p> <p>There is a risk that a motorist travelling northbound may assume the cycle lane is a 2nd travel lane and cross the dashed line resulting in vehicle-cyclist collisions.</p> <p>This risk is increased as pedestrians were observed to be frequently crossing Spofforth Street at this location.</p>	Probable	Minor	High	<ul style="list-style-type: none"> Noted; will investigate adjusting the dashed line to clarify movement through the intersection – NS 31/01/2020

Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
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Sheet 105

**31.
Driveway
Western leg**

There is an existing driveway at the proposed western leg of the traffic signals, adjacent to the hold line and cycle storage area.

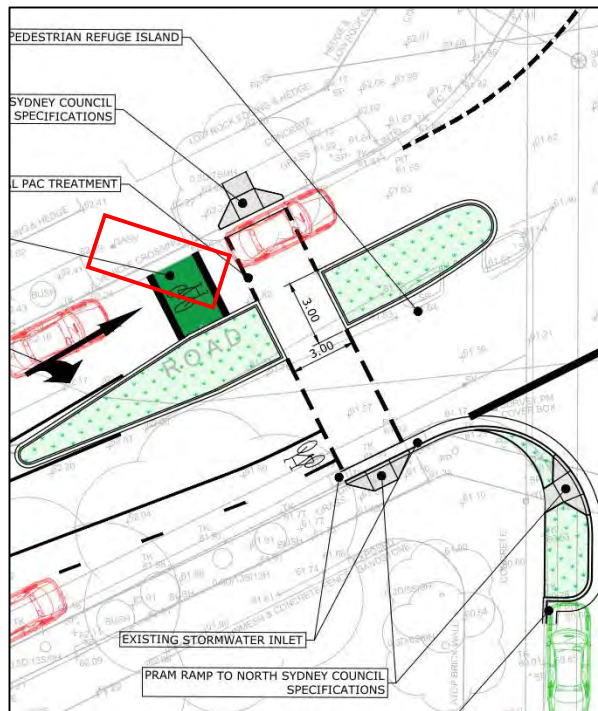
There is a risk that a motorist exiting the access to travel north may conflict with cyclists.

Improbable

Minor

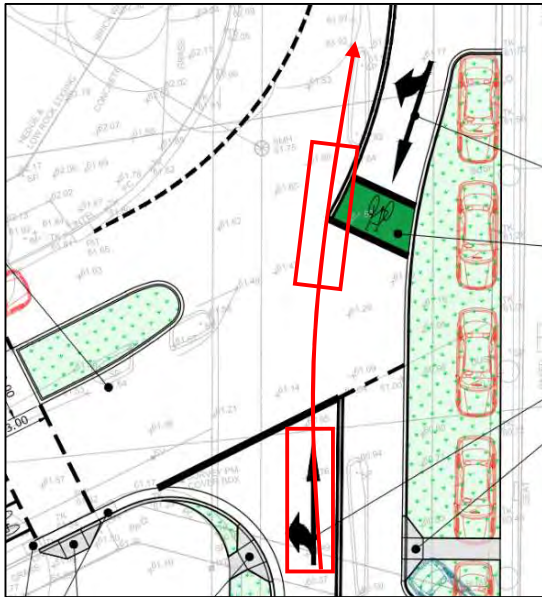
Low

- Sight lines for pedestrians and cyclists (travelling north) are reasonably uninhibited, noting that the nearest car parks to the driveway will be removed. Sight lines for traffic approaching from the north and heading west are already limited by the alignment of the road. The overall intent of the concept will be to slow traffic – PS 31/01/2020



Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
<p>32. Line marking North west corner</p>	<p>The arrangement of a dashed edge line marking may be confusing to motorists and cyclists.</p> <p>There is a risk that a motorist travelling northbound may assume the cycle lane is a 2nd travel lane and cross the dashed line resulting in vehicle-cyclist collisions.</p> <p>This risk is increased as pedestrians were observed to be frequently crossing Spofforth Street at this location.</p>	Probable	Minor	High	<ul style="list-style-type: none"> Noted; will investigate adjusting the dashed line to clarify movement through the intersection – NS 31/01/2020
<p>The diagram is a technical drawing of a road intersection. It shows a cycle lane on the right side of the road, marked with a green dotted pattern. A dashed line runs along the left edge of the cycle lane. A red arrow points from the cycle lane towards the left, indicating a potential crossing point. There are also black arrows showing traffic flow. Labels include 'TURNING PAC TREA' and 'PRAM RAMP SPECIFICA'.</p>					

Item - Location	Safety Hazard Finding	Frequency	Severity	Level Of Risk	Project Manager Response
<p>33. Movement conflict Northbound movement</p>	<p>The centreline north appears to cross the intersection of the centreline south. The positioning of vehicles for the northbound movement along Spofforth Street appears to conflict with the southbound bicycle storage area, requiring vehicles to negotiate away from the centreline of travel.</p> <p>There is a risk that a vehicle may be directed towards cyclists resulting in vehicle-cyclist collisions.</p> <p>There is a risk that a vehicle, in particular larger vehicles, may inadvertently track over that bicycle storage area resulting in vehicle-cyclist collisions.</p> <p>There is a risk that a vehicle may undertake a pseudo 'hook turn' to avoid conflict with line marking in the intersection resulting in sideswipes to adjacent road users such as cyclists.</p>	Probable	Minor	High	<ul style="list-style-type: none"> Noted; will investigate adjusting the centreline on the northern arm of Spofforth Street – NS 31/01/2020



10 Formal Statement

We, the undersigned, declare that we have reviewed the site and data listed in this report and identified the safety and operational deficiencies above.

It should be noted that while every effort has been made to identify potential safety hazards, no guarantee could be made that every deficiency has been identified.

A project sponsor is under no obligation to accept the findings outlined in this audit report. This report simply provides the opportunity to review potential safety issues highlighted by the auditors.

This audit will be recorded on the NSW Register of Road Safety Auditors and the project sponsor should expect email notification from the register to confirm the audit has been carried out.

We recommend that points of concern be investigated and necessary corrective actions undertaken.



Aaron Walton
Level 3 Road Safety Auditor
Team Leader



Jose Villacorta
Level 3 Road Safety Auditor
Team Member