



Randwick City Council

Proposed Eastern Suburbs Light Rail Project

On-Street Parking Appraisal

29th January 2015

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Table of contents

1.	Introduction	1
1.1	Introduction	1
1.2	Background.....	1
1.3	Study Area	2
1.4	Purpose of this report	2
1.5	Limitations and Assumptions	2
1.6	Report Structure	3
2.	Existing Conditions.....	5
2.1	Site Inspections.....	5
2.2	Existing Angle Parking with the Study Area.....	10
2.3	Typical Street Widths.....	11
2.1	Parking on Anzac Parade and Alison Road.....	11
2.2	Crash Data Review	12
3.	Review of Parking Standards for Angle Parking and Current Practice	13
3.1	Overview.....	13
3.2	Review of Parking Standards.....	13
3.3	Current Practice for Angle Parking.....	16
3.4	Angle Parking in Other Local Government Areas	18
3.5	Summary.....	24
4.	Proposed Angle Parking Arrangements.....	25
4.1	Proposed Typical Street Cross-sections for Angle Parking	25
4.2	Preliminary Proposed Angle Parking Arrangements and Road Safety Audit	27
4.3	Response to Road Safety Audit	28
4.4	Additional Spaces Provided by Angle Parking.....	31

4.5	Recommended Traffic Calming.....	31
4.6	Key Recommendations	34
4.7	Key Findings	34
5.	Summary and Recommendations.....	35
5.1	Key Findings	35
5.2	Recommendations	36

Table index

Table 1	Inventory of Existing Streets and Observed Car Parking Occupancy.....	6
Table 2	Typical Street Width Ranges	11
Table 3	Width of Parking Parallel Parking Space.....	13
Table 4	AS2890.5 Parking Space Dimensions for Angle Parking.....	14
Table 5	AS2890.5 Road and Traffic Lane Width Requirements	14
Table 6	AS2890.5 Standards for Centre of the Road Parking	15
Table 7	Merits of Front-to-kerb versus rear-to-kerb angle parking.....	17
Table 8	Examples of Angle Parking Dimensions and Road Widths	19
Table 9	Proposed Additional Parking Spaces	29
Table 10	Categories for Angle Parking	30
Table 11	Potential Additional Spaces by Parking Zone.....	31

Figure index

Figure 1	South East Light Rail Extension Route Map.....	1
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Figure 2	Study Area	2
Figure 3	Photo: Addison Street.....	5
Figure 4	Randwick City Bike Plan.....	9
Figure 5	Photo: Duke Street	10
Figure 6	Photo: Harbourn Road.....	10
Figure 7	Photo: Bruce Street	11
Figure 8	Existing Parking Provision on Anzac Parade and Alison Road	12
Figure 9	Arthur Street, Randwick.....	20
Figure 10	Trafalgar Street, Leichhardt	20
Figure 11	Photo: Elswick Street, Leichhardt	21
Figure 12	Photo: Catherine Street, Leichhardt	21
Figure 13	Photo: Catherine Street, Leichhardt	21
Figure 14	Photo: Frampton Street, Marrickville	22
Figure 15	Photo: Neptune Street, Coogee	22
Figure 16	Photo: Annandale Street, Annandale	23
Figure 17	Photo: Beach Street, Coogee	23
Figure 18	Nelson Street, Roselle.....	23
Figure 19	Wetherill Street, Leichhardt.....	24
Figure 20	Typical Street Cross-section – Type 1	25
Figure 21	Typical Street Cross-section – Type 2	26
Figure 22	Typical Street Cross-section – Type 3	27
Figure 23	Road Hump at an Intersection	32
Figure 24	Flat Top Road Hump – Typical Design.....	32
Figure 25	Road Cushion	33

Figure 26	Single Lane Angle Slow Point.....	33
Figure 27	Two Lane Angle Slow Point.....	33
Figure 28	Trafalgar Street, Leichhardt.....	34

Appendices

Appendix A – Angle Parking Concept Sketches

Appendix B – Crash Data Summary (2008 – 2012)

Appendix C – AS2890.5 Angle Parking Standards

Appendix D – Preliminary Angle Parking Concept Sketches (Superseded)

Appendix E – Road Safety Audit

1. Introduction

1.1 Introduction

Randwick City Council (RCC) have commissioned GHD to undertake a Parking Study to assess the potential for providing angled parking on local roads within the local government area. This local road angled parking would be provided in order to replace existing on-street car parking along Anzac Parade, Alison Road, Wansey Road and High Street, which would be removed as part of the Sydney CBD and South East Light Rail Project.

1.2 Background

The proposed light rail alignment along Anzac Parade, Alison Road, Wansey Road and High Street would require the removal of on-street parking. This on-street parking currently serves businesses and residential properties along these road corridors. RCC is seeking to offset this loss in parking by providing angle parking on the surrounding local streets. Initial site inspections undertaken by RCC identified that a number of the surrounding local streets do not provide sufficient road width to accommodate 90 degree angle parking on both sides of the carriageway.

This study will identify locations to provide angle parking, identify risks associated with providing parking dimensions below the Australian Standards and identify measures that could be implemented to mitigate potential risks associated with deviations from the relevant standards.

The draft South East Light Rail Extension Route Map is shown at Figure 1.

Figure 1 South East Light Rail Extension Route Map



Source: <http://lightrailtorandwick.com.au/>

1.3 Study Area

Randwick City Council identified 30 streets to be considered as part of this study for providing angle parking. The street sections within the study area are shown at Figure 2.

Figure 2 Study Area



Source: Google Maps (2014), modified by GHD

1.4 Purpose of this report

The purpose of this report is to:

- Review of on-street parking design requirements for angle parking provided from Australian Standards AS2890;
- Identify any risks associated with potential deviations from the Australian Standards and identify issues that would need to be considered, such as pedestrians, cyclists and public transport;
- Identify possible measures that could be implemented in order to mitigate impacts/risks;
- Provide examples of existing angle parking provided within other local government as a benchmark; and
- Identify if angle parking can be achieved in the local roads identified by Randwick City Council (shown at Figure 2).

1.5 Limitations and Assumptions

This study has been limited by the following:

- Parking occupancy surveys were limited to broad observations of current parking demand on streets within the study area during the site inspection;
- Further investigation is required to ascertain the potential number of additional parking spaces during the detailed design stage;
- No investigations on utility services were undertaken as part of the assessment;
- No topographical surveys were undertaken as part of the assessment;
- Details of the location of trees have not been provided for the study;

- No parking demand surveys or traffic surveys were undertaken for this study. However, parking occupancies were noted during the site inspection;
- GIS and crash data provided by Council;
- Where no line marking is provided, the number car parking spaces has been estimated based on site observations and measurements from aerial imagery provided by Council;
- No information of services within the footway and verge area was provided for this study. Proposed recommendations have been provided on the basis of minimising the need to relocate existing kerb lines where possible.

Concept sketches of proposed angle parking arrangements have been developed for each street within the study area and are provided at Appendix A. In developing these concept sketches, the following assumptions were made:

- Property boundaries based on areal GIS image provided by Randwick City Council and measurements undertaken during the site inspection;
- Kerb to kerb widths, footpath widths, verge widths and driveway locations based on site investigation measurements;
- Existing linemarking at intersections would remain as existing unless shown otherwise;
- Retaining walls may be required at some locations where road widening is proposed;
- Existing road linemarking and kerb alignments may need to be adjusted to accommodate the proposed angle parking arrangements; and
- The removal of trees may be required at some locations.

The number of proposed parking spaces provided through the introducing angle parking will be confirmed at the detailed design stage. Factors that may impact the proposed number of parking spaces include the following:

- Detailed topographical survey data and property boundary information;
- A review of services within the roadway/footpath;
- Relocation or retention of existing building infrastructure;
- Stormwater drainage considerations such as detention, WSUD and flooding;
- Requirement to retain protected trees;
- Recommendations from safety audits;
- Potential heritage constraints; and
- Stakeholder requirements, including RMS and TfNSW.

1.6 Report Structure

The remainder of this report is structured as follows:

- Section 2 *Existing Conditions* – this section reviews the existing road and parking characteristics of the streets within the study area, including the number of current car parking spaces and utilisation.
- Section 3 *Review of Angle Parking Standards and Current Practice* – this section summarises parking standards for angle parking and provides a review of angle parking best practice. Examples of angle parking within other Local Government areas are also provided.
- Section 4 *Proposed Angle Parking Recommendations* - outlines the recommendations for angle parking at each street within the study

area. This section also identifies the additional car parking that could potentially be provided within the study area.

- Section 6 *Summary and Recommendations* – this section provides a summary of the key findings and recommendations from the study.

2. Existing Conditions

This section details the existing traffic and parking conditions within the study area and provides an overview of the existing transport infrastructure.

2.1 Site Inspections

GHD undertook site inspections on Wednesday 29th January, Thursday 30th January and Wednesday 5th March 2014 for each of the subject streets. During the site inspection, the following street characteristics were noted for each of the streets within the study area:

- Broad observations of current parking demand;
- Parking restrictions;
- Type (i.e. 90 degree or 60 degree) and measurements of existing angle parking;
- Measurements of the road, footpath and verge widths;
- Cycle paths;
- Bus stop locations; and
- Locations of access driveways.

A summary of the road widths at different sections of each street within the study area is provided in Table 1. Measurements of existing angle parking within the study is also provided, along with the existing number of parking spaces and car parking occupancies, which were observed during the site inspections.

2.1.1 Existing Road Characteristics

All of the streets within the study area as local roads and have two-way traffic volumes of up to 400 vehicles per hour. The predominant land use along these streets is residential, with on-street parking

generally serving the residential properties along each street, along with some commercial development in close proximity to Anzac Parade.

The speed limit at each of the streets within the study area is either 40 km/h or 50 km/h, with the exception of Coogee Bay Road which is 60 km/h with a 40 km/h school zone.

A photograph of a typical local road with parallel parking serving primarily residential development is shown at Figure 3. The photograph of Addison Street shows parallel parking on both sides of the street and driveways to residential properties. Addison Road generally has a kerb to kerb road width of 12.8 metres.

Figure 3 Photo: Addison Street



Table 1 Inventory of Existing Streets and Observed Car Parking Occupancy

Street Name	Location	Kerb to Kerb Road Width (m)	Total Road Reserve Width (m) *	Total Parking Spaces	Number of Occupied Parking Spaces	Angle Parking Measurements			
						Angle Type (Deg.)	Bay Length (m)	Bay Width (m)	Angle Parking Description
Addison Street	East of Kensington Road	12.9	18.3	40	32				
	West of Anzac Parade	12.8	20.1						
Boronia Street	North of Duke Street	12.9	20.3	118	100				
	South of Anzac Parade	12.9	20.3						
Bowral Street	East of Anzac Parade	12.9	20.4	35	33				
	West of Doncaster Avenue	12.9	18.2						
Carlton Street	East of Anzac Parade	13.0	20.5	55	46				
	West of Doncaster Avenue	13.0	20.4						
Duke Street	East of Kensington Road	12.8	20.4	42	34	90	4.8	Unmarked	Unmarked rear to kerb angle parking provided on one-way section (northern side) of Duke Street between Anzac Parade and Boronia Street. Kerb blister provided at Anzac Parade end of parking aisle, no kerb blister provided at Boronia Street end or at trees.
	West of Anzac Parade	12.9	20.2						
Goodwood Street	East of Anzac Parade	13.0	20.5	39	32				
	West of Doncaster Avenue	13.0	20.5						
Kensington Road	North of Todman Avenue	13.0	19.4	117	78				
	South of Salisbury Road	12.8	20.1						
Roma Avenue	East Cottenham Avenue	13.0	20.0	45	32				
	West of Anzac Parade	12.8	20.2						
Salisbury Road	East of Balfour Road	13.0	20.3	48	32				
	West of Boronia Street	12.8	20.4						
Bradley Street	Bradley Street (southern end)	13.0	20.4	51	45				
	South of Alison Road	11.1	20.3						
Church Street	South of Frances Street	12.8	20.4	52	40				
	North of Alison Road	12.8	20.4						
Prince Street	North of Alison Road	12.8	20.4	43	40				
	South of Cowper Street	12.8	20.4						
William Street	North of Alison Road	13.0	20.4	34	26				
	South of King Street	13.0	20.4						

Street Name	Location	Kerb to Kerb Road Width (m)	Total Road Reserve Width (m) *	Total Parking Spaces	Number of Occupied Parking Spaces	Angle Parking Measurements			
						Angle Type (Deg.)	Bay Length (m)	Bay Width (m)	Angle Parking Description
Bruce Street	North of Gardeners Road	9.1	24.6	78	44	90	4.5	2.8	Rear to kerb angle Parking provided on both sides within the verge area
	South of Borrodale Road	9.1	24.6						
Doncaster Avenue	North of Gardeners Road	9.2	20.3	62	28				
	South of Borrodale Road	9.2	20.3						
Forsyth Street	North of Rainbows Road	9.8	24.3	40	29				
	South of Meeks Street	9.3	24.5						
Harbourne Road	North of Anzac Parade	9.3	24.5	97	79	90	4.8	2.8	Angle parking provided on both sides within the verge area. Marked bays provided on western side only. Western side bays front to kerb, eastern side bays rear to kerb.
	South of Middle Street	9.6	24.8						
Meeks Street	West of Forsyth Street	10.0	24.6	40	23	60	5.4	2.8	Rear to kerb angle parking provided on southern side (9 marked bays) within verge area
	Before Roundabout	9.1	24.5						
	East of Anzac Parade	13.2	24.5						
Middle Street	East of Anzac Parade	12.8	22.8	74	60	90	4.8	2.5	Rear to kerb angle parking on both sides of street. Kerb blisters provided at end of parking aisles
	East of Harbourne Rd	9.2	24.4						
	West of Forsyth Street	12.8	22.8						
See Street	East of Doncaster Ave	13.1	20.1	45	20				
	East of Day Lane	16.9	24.7						
	West of Houston Road	16.9	24.7						
Strachan Street	East of Houston Road	16.1	24.5	44	35	90	4.8	Unmarked	Unmarked rear to kerb angle parking provided on both sides of street. Kerb blisters provided at end of parking aisles
	West of Anzac Parade	16.6	24.4			90	4.8		
Sturt Street	East of Anzac Parade	12.7	20.5	19	14				
	West of Sturt Street	12.7	20.5						
Sturt Street	West of Bunnerong Road	9.1	20.3	36	27				
	East of Anzac Parade	9.1	20.3						
Wallace Street	East of Anzac Parade	9.2	20.0	67	44				
	West of Wallace Lane	9.2	20.0						
Willis Street	North of Rainbows Street	9.2	24.3	40	37				
	South of Meeks Street	9.2	24.3						
Arthur Street	West of Botany Street	12.9	23.8	42	33				
	West of Botany Street	13	21.7						

Street Name	Location	Kerb to Kerb Road Width (m)	Total Road Reserve Width (m) *	Total Parking Spaces	Number of Occupied Parking Spaces	Angle Parking Measurements			
						Angle Type (Deg.)	Bay Length (m)	Bay Width (m)	Angle Parking Description
Blenheim Street	East of Botany Street	13	20.7	58	49				
	West of Clara Street	12.9	21.7						
Eurimbla Avenue	South of High Street	13	20.7	53	39				
	South of High Street	12.9	21.7						
Mears Avenue	East of Avoca Street	12.9	20.3	47	33				
	West of Ada Street	12.9	20.3						
Soudan Street	East of Avoca Street	12.8	20.2	32	24				
	West of Perouse Road	12.8	20.2						
Coogee Bay Road	East of Perouse Road	19.6	26.7	41	32				
	West of Judge Street	18.9	26						

**Note: Total road reserve width includes footpath, verge, parking and traffic lanes*

2.1.2 Cycle Routes

Doncaster Avenue is identified as an on-road cycle route in the Randwick City Bike Plan. An extract from the Randwick City Bike Plan is shown at Figure 4.

All of the streets within the study area serve residential developments and function as local roads with low traffic volumes. As such, these streets are attractive routes for both recreational and commuter cycling trips. Accordingly, any design for introducing angle parking along these streets should therefore take account of cyclists.

Figure 4 Randwick City Bike Plan



Source: http://www.randwick.nsw.gov.au/Looking_after_our_environment/Sustaining_our_city/Greenhouse/sustainable_transport_options/index.aspx

2.2 Existing Angle Parking with the Study Area

As shown in Table 1, there are a number of streets within the study area which currently provide angle parking, including Duke Street, Bruce Street, Harbourne Road, Meeks Street, Middle Street and Strachan Street.

Examples of angle parking on streets within the study are provided in the following sections.

Duke Street

Figure 5 shows unmarked 90 degree rear-to-kerb angle parking provided on the one-way section of Duke Street between Anzac Parade and Boronia Street. The kerb-to-kerb road width of Duke Street at this location is 12.8 metres.

Figure 5 Photo: Duke Street



Harbourne Road

Figure 6 shows unmarked 90 degree angle parking provided in the verge area of a one-way section of Harbourne Road. A mix of rear-to-kerb and front-to-kerb parking was observed.

Figure 6 Photo: Harbourne Road



Bruce Street

Figure 7 shows marked 90 degree rear-to-kerb angle parking provided within the verge area on a two-way road. The road width at this location on Bruce Street is 9.1 metres (excluding parking bays).

Figure 7 Photo: Bruce Street



2.3 Typical Street Widths

Table 1 shows that there are a number of typical ranges for road widths within the study area. These typical road width ranges are summarised in Table 2.

Table 2 Typical Street Width Ranges

Kerb to Kerb Width (m)	Total Road Reserve Width (m)
9.1 to 10.0	20.0 – 21.0
9.1 to 10.0	24.4 – 24.6
12.7 to 13.2	18.3 - 20.5
12.7 to 13.2	24.4 - 24.5
16.6 to 16.9	24.4 – 24.7
18.9 to 19.6	26.0 – 26.7

2.1 Parking on Anzac Parade and Alison Road

As discussed in Section 1.2, Randwick City Council are seeking to offset the existing on-street parking along Anzac Parade and Alison

Road, which would be removed as part of the proposed South East Light Rail scheme. To identify the total number of spaces that would be required to be relocated, GHD undertook site investigations along Anzac Parade and Alison Road on Thursday 30th January 2014.

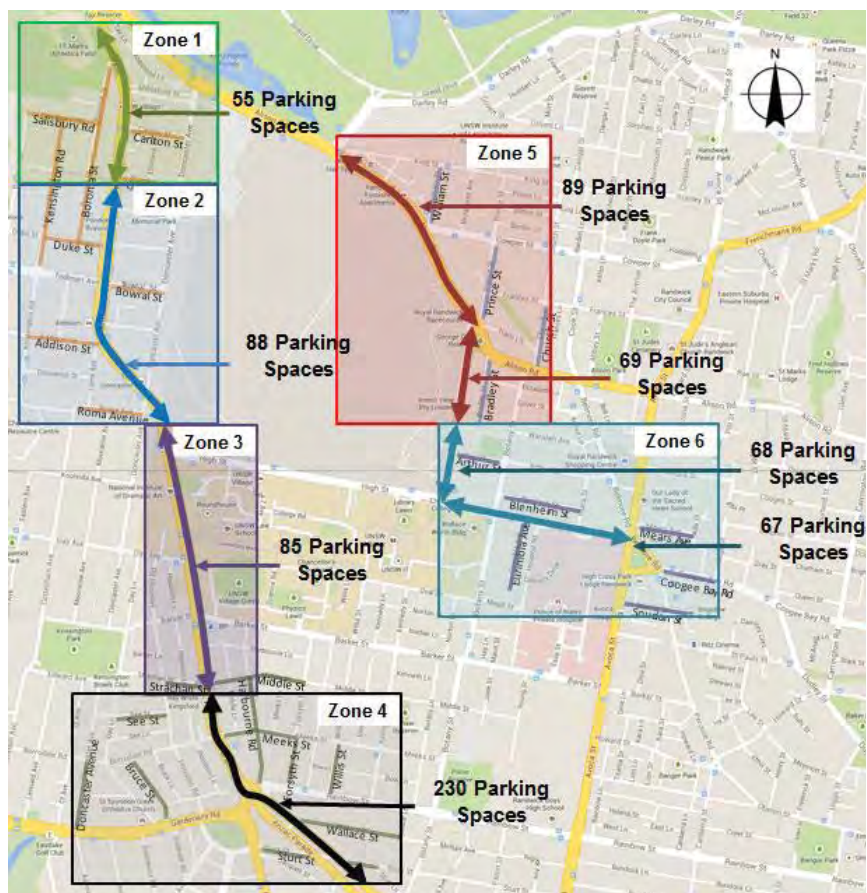
A plan showing the existing number of number on-street car parking spaces along sections Anzac Parade, Alison Road, Wansey Road and High Street is shown at Figure 8. As shown, there would be around 750 parking spaces removed as part of the light rail development, including:

- 458 spaces on Anzac Parade;
- 89 spaces on Alison Road;
- 137 Wansey Road; and
- 67 on High Street.

Randwick City Council have identified that the relocated car parking spaces, should be provided at locations that would still serve the businesses and properties along Anzac Parade, Alison Road, High Street and Wansey Road. As such, sections of Anzac Parade, Alison Road, Wansey Road and the streets within the study area have been grouped into parking zones, as shown at Figure 8.

For the purposes of this assessment, it has been assumed that the number of parking spaces that would be removed from these sections of Anzac Parade, Alison Road, Wansey Road and High Street are to be offset by providing additional parking (through the provision of angle parking) on streets within the same parking zone. The number of parking spaces on Anzac Parade, Alison Road, Wansey Road and High Street within each parking zone is shown at Figure 8.

Figure 8 Existing Parking Provision on Anzac Parade and Alison Road



Source: Google Maps (2014), modified by GHD

2.2 Crash Data Review

Randwick City Council supplied GIS data of crash statistics for roads within the study area over a 5-year period between 2008 and 2012.

The crash data identified that there were 32 incidents recorded during the 5 year period. Of these:

- 32 incidents involved cars/vehicles only
- 2 incidents involved pedestrians;
- 4 incidents involved cyclists; and
- 1 incident involved a motorcyclist.

Plans showing the location of crashes recorded during the 5 year period are provided at Appendix B. The location of these incidents includes:

- 8 incidents recorded at existing angle parking locations (none of these involving pedestrians or cyclists);
- 24 incidents recorded at intersections (3 incidents involving cyclists and 1 involving a pedestrian); and
- 7 at midblock locations (1 incident involving a pedestrian).

Based on limited amount of angle parking currently provided in the study area, the data indicates that some of the crashes which occurred at angle parking locations potentially involved vehicles parking. As such, it is recommended that traffic calming is provided at angle parking locations in order to reduce vehicle speeds and improve safety. This is further discussed in Section 4.5.

3. Review of Parking Standards for Angle Parking and Current Practice

3.1 Overview

This section of the report provides a review of the design standards and guidelines for angle parking and provides examples of existing angle parking within other local government areas that do not accord with Australian Standards. These examples will set precedents for angle parking within the study area.

3.2 Review of Parking Standards

A review of the design standards and guidelines for angle parking has been undertaken for the following documents:

- Randwick City Council's Development Control Plan (DCP) 2013;
- Australian Standards (AS) 2890.5 Parking Facilities Part 5 – On-Street Parking (1993); and
- Austroads Guide to Traffic Management Part 11 – Parking (2009).

3.2.1 Randwick Development Control Plan 2013

The Randwick DCP does not provide specific requirements on-street parking space dimensions. The DCP states that on-street parking spaces should accord with Australian Standards 2890.5 Parking Facilities Part 5 – On-Street Parking (1993) and Austroads Guidelines.

3.2.2 Australian Standards 2890.5

Australian Standards 2890.5 Parking Facilities Part 5 – On-Street Parking sets out requirements for the location, arrangement and dimensions for on-street parking facilities. It includes requirements for parallel parking, angle parking, centre of the road parking and parking

for people with disabilities. Parking bay and road dimension requirements for 45, 60 and 90 degree angle parking are provided at Appendix C, with a summary of the requirements provided in the following sections.

Parallel Parking Bay Widths

Australian Standards 2890.5 provides different minimum parking bay widths for parallel parking based on the proposed use. These standards are summarised in Table 3. Based on the standards shown in Table 3, the minimum parallel parking space width for cars and light vehicles of 2.3 metres has been adopted for this assessment or 2.1 metres if line marking is provided.

Table 3 Width of Parking Parallel Parking Space

Space usage	Minimum Space Width (m)
Cars and light commercial vehicles	2.3
Cars and light commercial vehicles, restricted roadway width, parking of wide vehicles unlikely and where a continuously marked narrow parking lane will aid traffic flow	2.1
Trucks and buses	2.6

Angle Parking Bay Dimensions

Australian Standards 2890.5 provides different parking dimensions (width and length) for parking bays depending on the classification/type of the car parking based on the proposed use. The assessment for parking bay dimensions for angle parking in Randwick is based on

medium use category parking spaces, which is defined as generally more than two hour parking but less than a full day, e.g. town centre parking.

A summary of the angle parking space dimension requirements from AS2890.5 is provided in Table 4. **As shown, 90 degree angle parking requires 2.5 metre wide parking bays.**

Table 4 AS2890.5 Parking Space Dimensions for Angle Parking

Parking Space Measurements	30° (m)	45° (m)	60° (m)	90° (m)
Space Width	2.3	2.5	2.5	2.5
Space Width Parallel to Kerb	4.6	3.5	2.9	2.5
Space Length - No overhang ¹	4.4	5.2	5.7	5.4
Space Length - With Overhang ²	4.1	4.8	5.1	4.8
Space Length With Wheelstops ³	4.7	5.6	6.0	5.4

Note: ¹ Where parking is to a wall or high kerb not allowing overhang

² Where parking is to a low kerb which allows 0.6 metres of overhang

³ Where parking is controlled by wheelstops at right angles to the direction of parking

Roadway Dimensions

Where on road parking with a parking angle of 90 degrees is proposed, AS2890.5 recommends a roadway width between the barrier line or edge of road/median and the kerb to be a minimum of 8.7 metres, as shown at Table 5.

Table 5 AS2890.5 Road and Traffic Lane Width Requirements

Minimum Road Widths	30° (m)	45° (m)	60° (m)	90° (m)
Kerb line to outer edge of moving traffic lane	5.2	6.8	8.1	8.7
Width of lanes for moving traffic (0-800 vehicles per hour)	3.5	3.5	3.5	3.5
Minimum overall width required, kerb line to separation line (0-800 vehicles per hour)*	8.7	10.3	11.6	12.2

Note: * kerb line to separation line includes angle parking and traffic lanes, but excludes any additional parking (e.g. parallel parking) provided on the adjacent side of the street.

The standards provided in AS2890.5 are design requirements that aim to minimise disruption to traffic flow from parking along higher order streets. To minimise disruption to traffic flow along roads from 90 degree parking, the standard requires a distance from kerb to median of 12.2 metres or a road width of 6.8 metres excluding parking bays.

The standard is typically set as a design requirement for higher order roads that have conflicting functions and aims to balance and accommodate both mobility and accessibility. The focus of the standards is to continue to support mobility (through traffic efficiency) and flow for some level of accessibility (access to kerbside parking space). It achieves this by creating additional width to allow vehicles to manoeuvre into parking areas, which minimises the impact on through traffic movement.

The functional classification of each of the streets within the study area is local roads. Local roads are not focussed on mobility (as a quick and efficient route for traffic), but instead its primary objective is to provide accessibility to residential properties located along each street. As such, the standard is not applicable as to minimise disruption to the through traffic flow is not regarded as a primary design consideration. It is instead deemed to be highly desirable to narrow the carriageway width

to help regulate traffic speeds and discourage excessive through traffic along these residential local roads. On this basis, not widening the road is in keeping with maintaining the local road character Design for Centre of the Road Parking

Centre of the road parking separates opposing traffic flows and is arranged as angle parking in a single row, or two rows separated by a median or footway. The central line of parked vehicles provides a continuous refuge for pedestrians, although generates additional pedestrian movements across the road.

Unprotected centre of the road parking should only be considered in streets with low speeds and with little through traffic. A combination of kerbside parking and centre of the road parking provides a large number of parking bays per unit length of road. However, it is rarely possible to combine angle kerbside parking with centre of the road parking because of the large roadway width required.

Australian Standards 2890.5 provides standards for kerb-to-kerb roads widths for centre of the road parking, as summarised in Table 6.

Table 6 AS2890.5 Standards for Centre of the Road Parking

One-way Traffic Flow Per Hour (Vehicles)	Minimum Road Width (m)
Up to 400	23.0
401-800	29.0

As shown in Table 6, a minimum kerb-to-kerb road width of 23 metres is required to provide centre of the road parking. Based on the road kerb-to-kerb road widths and total road reserve widths of the streets within the study area, it would not be possible to accommodate centre of the road parking on any other streets within the study area.

3.2.3 Austroads Guide to Traffic Management Part 11 – Parking (2009)

Austroads Guide to Traffic Management acknowledges the following advantages/disadvantages associated with angle parking:

- Advantages:
 - Angle parking can accommodate up to twice as many vehicles per unit length of kerb as parallel parking. This difference is a function of the angle used, where low angles of 30 degrees would provide less parking spaces compared to 90 degree angle parking.
 - The parking manoeuvre is easier for angle parking than parallel parking, especially for small angles.
- Disadvantages:
 - Additional roadway width is required for angle parking bays and associated parking manoeuvres. This requirement may present a problem for commercial vehicle parking as the increased length of those vehicles may encroach into traffic lanes.
 - All angle parking presents a greater hazard to road users than parallel parking. This situation is mainly because parking at an angle always requires reversing which causes bottleneck effects in the moving traffic and may lead to collisions.
 - Sight/visibility issues and increased conflict with pedestrians crossing midblock.

Austroads Guide to Traffic Management recommends that angle parking be avoided on higher speed (>50 km/h) roads. However, if angle parking is provided, it should be used in conjunction with other protective measures such as indented parking and manoeuvring space to lessen its negative effects. The decision whether to use angle parking should be based on consideration of:

- Width of road;

- Traffic volume;
- Type of traffic;
- Traffic speed characteristics;
- Vehicle dimensions;
- Expected turnover;
- Land use served; and
- Functional road classification.

3.3 Current Practice for Angle Parking

3.3.1 Advantages of Angle Parking

AS2890.5 states that angle parking can generally accommodate up to twice as many vehicles per unit length of kerb as parallel parking. 90 degree angle parking provides the greatest car parking capacity. Smaller angles, such as 30 degree angle parking, can provide little advantage over parallel parking for providing additional parking capacity, particularly if there are frequent driveways or kerbside interruptions such as trees.

90 degree angle parking provides the greatest car parking capacity. However, angle parking provides a greater hazard to road users than parallel parking, such as poor driver visibility of other road users when reversing out of front-to-kerb angle parking spaces. 90 degree parking is also the only angle suitable to be accessed from both approach directions.

It is generally easier to manoeuvre into angle parking spaces than parallel parking spaces, and is easier with small angles, than with large angles. The required roadway width to accommodate angle parking manoeuvres gets wider as the angle increases.

In order to provide orderly parking, AS2890.5 states that it is desirable to provide marked parking bays, particularly in areas of high parking turnover. This is true for both parallel and angle parking.

3.3.2 Front-to-kerb versus rear-to-kerb angle parking

Reversing out of front to kerb angle parking bays involves some room for the parked vehicle to protrude into the adjacent traffic lanes before the driver is able to see oncoming traffic. This affects safety and also interferes with traffic movement. The obstructed sight lines when reversing out of angle parking spaces are particularly dangerous for cyclists and motorcyclists, as they are less visible than cars and generally travel along the nearside of traffic lanes. As such, rear-to-kerb angle parking is preferable along designated bicycle routes or in areas with high bicycle use.

Reversing into rear-to-kerb angle parking bays may reduce many of the problems associated with forward parking entry. However, it can create a traffic hazard as vehicles must stop with the front end of the vehicle crossing into the adjacent traffic lane prior to reversing into the parking bay. Rear-to-kerb angle parking can also create obstructions for pedestrians if the rear ends of vehicles overhang across the footpath. Rear-to-kerb angle parking may also produce exhaust fumes onto the footpath, although this is less of an issue with newer vehicles.

The merits of front-to-kerb versus rear-to-kerb angle parking are summarised in Table 7.

Table 7 Merits of Front-to-kerb versus rear-to-kerb angle parking

Issue	Front-to-kerb parking situation	Rear-to-kerb parking situation	Preferred option
Exhaust emissions	Exhaust facing away from footpath.	Vehicle's exhaust directed onto pedestrian footpath causing discomfort and staining of footway paving from fuel emissions.	Front-to-kerb
Loading/unloading vehicles	Boot/rear hatch faces away from the footpath exposing the motorist/shopper to moving traffic.	Boot/rear hatch faces towards the footpath allowing for safer loading/unloading. This arrangement is preferable for disabled and parent and child parking.	Rear-to-kerb
Timing of reversing manoeuvre	Reversing occurs after the motorist has been away from the vehicle, most likely engaging in activities un-associated with the act of driving and road hazards.	Reversing occurs when the motorist is still tuned in to the traffic environment and its potential hazards.	Rear-to-kerb
Judgement in a reversing manoeuvre	Reversing occurs into a space relatively free of fixed obstructions (provided the motorist is able to observe approaching traffic or the approaching traffic poses no significant hazard).	Reversing occurs into a limited and obstructed space. Manoeuvring out of the space into the road is in a forward direction, which improves visibility of other road users.	Front-to-kerb
Motorist confusion	Vacant spaces are clearly visible and a motorist is able to slow down and move directly into a parking space in a single movement, causing little confusion to the following motorists.	It is more difficult to observe vacant spaces and a motorist needs to actually pass the parking space in order to reverse into it, potentially confusing a following motorist who may also wish to park in the same space.	Front-to-kerb
Disruption to passing traffic when reversing	Motorist reversing out from the parking bay can select a time when passing traffic will not be disrupted.	Stationary motorist about to reverse into the parking bay tends to disrupt passing traffic by trapping a vehicle behind.	Front-to-kerb
Traffic and cyclist safety	Motorist leaving a front-to-kerb space must reverse approximately 1m or more before gaining a clear view of approaching traffic and cyclists. This is aggravated by increasing numbers of large 4WD's and vans.	Motorist about to drive forward from a rear-to-kerb space has a relatively good view of approaching traffic and cyclists without moving forward significantly.	Rear-to-kerb
Impact with kerb obstructions	Motorist can more easily view high kerbs and footpath obstructions whilst moving in the normal forward motion into the parking space.	Motorist reversing into the parking space cannot easily view the obstructions, and the rear overhang is generally greater than the front overhang which results in greater footpath intrusion.	Front to kerb
Pedestrian safety	Motorist reverses into a vehicle based environment.	Motorist reverses into a pedestrian environment. Vehicle projections including tow bars, bicycle racks etc. may also pose an additional hazard for pedestrians.	Front to kerb

AS2890.5 states that any local authority applying for angle parking should be consistent in adopting one form or another. 90 degree rear-to-kerb angle parking is currently the most common type of angle parking in the Randwick City Council local government area. The streets within the study area generally serve residential development and are commonly used for cycling.

Based on the above, 90 degree rear-to-kerb angle parking is the preferred angle parking type to be provided on streets in the study area.

3.4 Angle Parking in Other Local Government Areas

GHD undertook site investigations on Tuesday 4th February 2014 at a number of locations within the Sydney metropolitan area where on-street angle parking is provided. Angle parking bay dimensions and the kerb-to-kerb road widths observed at each location are summarised in Table 8.

As shown in Table 8, a number of these locations where angle parking is provided do not accord with the standards provided in AS2890.5. For example, 90 degree angle parking is provided at a number of locations with kerb-to-kerb widths of 13.1 metres or less, including parallel parking on the adjacent side of the street. Based on the parallel parking width of 2.3 metres, this provides a width between kerb line and separation line of only 10.8 metres (i.e. not including angle parking on the adjacent side of the road), which is less than the 12.2 metre width required by Australian Standards 2890.5.

This kerb-to-kerb road width is similar to a number of streets within the study area (refer to Table 1). As such, the standards for angle parking provided in AS2890.5 are considered inappropriate for the streets within the study area.

Table 8 Examples of Angle Parking Dimensions and Road Widths

Street Name	Suburb	Kerb-to-Kerb Width (m)	Total Road Reserve Width (m)	Parallel Parking Width (m)	Carriageway Width (m)	Angle Parking Width Right Angle to Kerb (m)	Kerb line to separation line Width (m)*	One Way Street?	Angle Parking			
									Bays Marked	Angle (°)	Parking Bay Length (m)	Parking Bay Width (m)
Nelson Street	Rozelle	9.6	16.5	2.3	3.1	4.2	7.3	Yes	No	45	5.3	Unmarked
Merton Street	Rozelle	9.7	15.3	2.3	2.9	4.5	7.4	Yes	No	30	5.3	Unmarked
Neptune Street	Coogee	12.6	19.4	2.3	5.3	5.0	10.3		No	90	5.0	Unmarked
Wetherill Street	Leichhardt	12.7	20.0	2.3	5.1	5.3	10.4	Yes	Yes	90	5.3	3.0
Trafalgar Street	Leichhardt	12.7	20.0	2.3	6.1	4.3	10.4		No	45	4.5	Unmarked
Baach Street	Coogee	12.7	19.9	2.3	5.9	4.5	10.4		No	90	4.5	Unmarked
Alfreda Street	Coogee	12.8	19.3	2.3	5.7	4.8	10.5		No	90	4.8	Unmarked
Nelson Street	Leichhardt	12.9	20.1	2.3	6.3	4.3	10.6		Yes	45	5.6	2.6
National Street	Rozelle	12.9	20.1	2.3	5.5	5.1	10.6		No	60	5.6	Unmarked
The Avenue	Balmain	12.9	19.8	4.7 (60° Angle Parking)	3.7	4.5	8.2	Yes	No	60	5.7	Unmarked
Catherine Street	Leichhardt	13.0	19.8	2.3	6.2	4.5	10.7		No	90	4.5	Unmarked
Elswick Street	Leichhardt	13.1	20.0	2.3	6.3	4.5	10.8		No	60	5.3	Unmarked
Brooks Street	Coogee	14.0	19.9	2.3	6.8	4.9	11.7		No	90	4.9	Unmarked
Beach Street	Coogee	14.4	20.0	2.3	6.7	5.4	12.1		No	90	5.4	Unmarked
View Street	Leichhardt	14.5	20.4	2.3	6.7	5.5	12.2		No	45	5.5	Unmarked
Frampton Avenue	Marrickville	17.3	24.3	2.3	10.5	4.5	15.0		No	90	4.5	Unmarked
Annandale Street	Leichhardt	17.3	24.5	5.0 (90° Angle Parking)	7.3	5.0	12.3		No	90/45	5.0	Unmarked
Arthur Street	Randwick	13.2	23.2	1.9	8.5	4.8	13.2		Yes	90	4.8	2.5

Note: * kerb line to separation line includes angle parking and traffic lanes, but excludes any additional parking (e.g. parallel parking) provided on the adjacent side of the street.

3.4.1 Examples of Angle Parking

Arthur Street (East of Botany Street), Randwick

The photograph provided at Figure 9 shows existing 90 degree rear to kerb angle parking provided along Arthur Street in Randwick. Angled parking section is provided at staggered intervals of 22 vehicles on either side, with parallel parking provided on the adjacent side of the road. Traffic calming in the form of 'slow points' is provided where angle parking changes to the adjacent side of the street.

The street has a total kerb-to-kerb width of around 13 metres, with a total road reserve width of around 23 metres. The existing angle parking bay dimensions are 4.8 metres long and 2.5 metres wide.

Figure 9 Arthur Street, Randwick



Trafalgar Street, Leichhardt

Figure 10 shows traffic calming along Trafalgar Street in Leichhardt. As shown, the traffic calming measure provided at this location is a

two-way slow point, which provides kerb extensions to change the angle of the traffic lanes to enforce low vehicle speeds.

60 degree rear-to-kerb angle parking is provided at staggered intervals along either side of Trafalgar Street, with parallel parking provided on the adjacent side of the road. As 60 degree angle parking is only accessible from the direction a vehicle is travelling, this staggered angle parking arrangement along the street allows vehicles to access angle parking spaces from both directions.

Figure 10 Trafalgar Street, Leichhardt



Elswick Street, Leichhardt

Figure 11 shows another traffic calming in the form of a single lane slow point, provided along Elswick Street in Leichhardt. This arrangement narrows the road width and angles the roadway approach to intersections to slow traffic, therefore improving safety. The landscaped kerb blisters also provide added protection to parked vehicles.

60 degree rear-to-kerb angle parking is provided along one side of Elswick Street, with parallel parking provided on the adjacent side of the street. This street is also a cycle route.

Figure 11 Photo: Elswick Street, Leichhardt



Catherine Street, Leichhardt

Traffic calming in the form of a speed hump is shown Figure 12, provided on Catherine Street in Leichhardt. Signage is also provided warn vehicles to slow to 25 km/h at the speed hump, which is provided on a straight section of road.

90 degree angle parking is provided along one side of the Catherine Street, marked by a single white line along the traffic lane.

Figure 12 Photo: Catherine Street, Leichhardt



Road markings showing bicycles are provided along Catherine Street to remind drivers to be aware of cyclists. This is shown at Figure 13.

Figure 13 Photo: Catherine Street, Leichhardt



Frampton Street, Marrickville

The photograph provided at Figure 14 shows marked 90 degree rear-to-kerb angle parking bays and parallel parking provided on either side of the street.

Traffic calming is provided in the form of kerb blisters at the end of the angle parking aisle which narrows the street, creating a self-enforced low traffic speed environment. These kerb blisters form the ends of the parking aisles.

Figure 14 Photo: Frampton Street, Marrickville



Neptune Street, Coogee

Marked 90 degree rear-to-kerb angle parking bays are provided along one side of Neptune Street in Coogee, with unmarked parallel parking provided on either side of the street. A photograph of this parking arrangement is shown in Figure 15.

The kerb-to-kerb width of Neptune Street is 12.6 meters (including parallel parking and angle parking bays), which is narrower than many of the streets within the study area. This shows that there is already angle parking provided within the Randwick City Council local

government area which does not accord with Australian Standards 2890.5.

Figure 15 Photo: Neptune Street, Coogee



Annandale Street, Annandale

A photograph showing unmarked 90 degree rear-to-kerb angle parking along both sides of the street at Annandale Street, Annandale is shown at Figure 16. A mixture of angle parking types is provided along this street, with 45 degree angle parking also provided along some sections of Annandale Street.

Figure 16 Photo: Annandale Street, Annandale



Beach Street, Coogee

Marked 90 degree rear-to-kerb angle parking bays are provided on Beach Street in Coogee with parallel parking provided on the adjacent side of the street, as shown at Figure 17. The angle parking is provided on this steep section of the street, which provides a 14.4 metre kerb-to-kerb road width (including parking bays).

Figure 17 Photo: Beach Street, Coogee



Nelson Street, Roselle

Nelson Street provides 45 degree angle parking along one side of the street, with parallel parking provided along the other side of the street, as shown at Figure 18. Nelson Street is a one-way street with a kerb-to-kerb road width of 9.6 metres with traffic calming provided in the form of speed humps.

Figure 18 Nelson Street, Roselle



Wetherill Street, Leichhardt

Wetherill Street in Leichhardt is a one-way street, which provides a kerb-to-kerb road width of 12.7 metres (including parallel and angle parking bays). Marked 90 degree angle parking is provided along one side of the street, with marked parallel parking bays provided on the adjacent side of the road.

Traffic calming is provided along Wetherill Street in the form of speed humps, as shown at Figure 19.

Figure 19 Wetherill Street, Leichhardt



- Centre of the road parking is not considered appropriate, as sufficient road width is not provided.
- The standards provided in AS2890.5 are typically set as a design requirement for higher order roads that have conflicting functions and aims to balance and accommodate both mobility and accessibility.
- The function of all of the streets within the study area is not focussed on mobility (as a quick and efficient route for traffic), but instead its primary objective is to provide accessibility to residential properties located along each street.
- There are examples of angle parking provided within the Randwick City Council local government area which does not accord with Australian Standards 2890.5, including at Neptune Street in Coogee.

3.5 Summary

Australian Standards 2890.5 provides standards for on-street parallel, angle and centre of the road parking. A review of these standards identified the following requirements for parking on streets within the study area:

- Parallel parking space widths should be 2.3 metres wide;
- Rear-to-kerb 90 degree angle parking is recommended for angle parking.
- Parking bay dimensions for 90 degree angle parking should be:
 - 2.5 metres wide;
 - 5.4 metres long where no overhang is provided; and
 - 4.8 metres long where overhang is provided.
- Minimum overall width required between kerb-line to separation line is 12.2 metres.

4. Proposed Angle Parking Arrangements

This section of the report outlines typical angle parking arrangements at each street within the study area. This is based on concepts of typical street-cross sections to show general parking and traffic lane arrangements.

The additional number of car parking spaces that could potentially be provided by the introduction of angle parking is discussed.

Examples of traffic calming treatments are also provided in this section. The introduction of traffic calming measures in the vicinity of angle parking is recommended in order to reduce vehicle speeds and improve safety, where the available road width does not meet the required standards.

4.1 Proposed Typical Street Cross-sections for Angle Parking

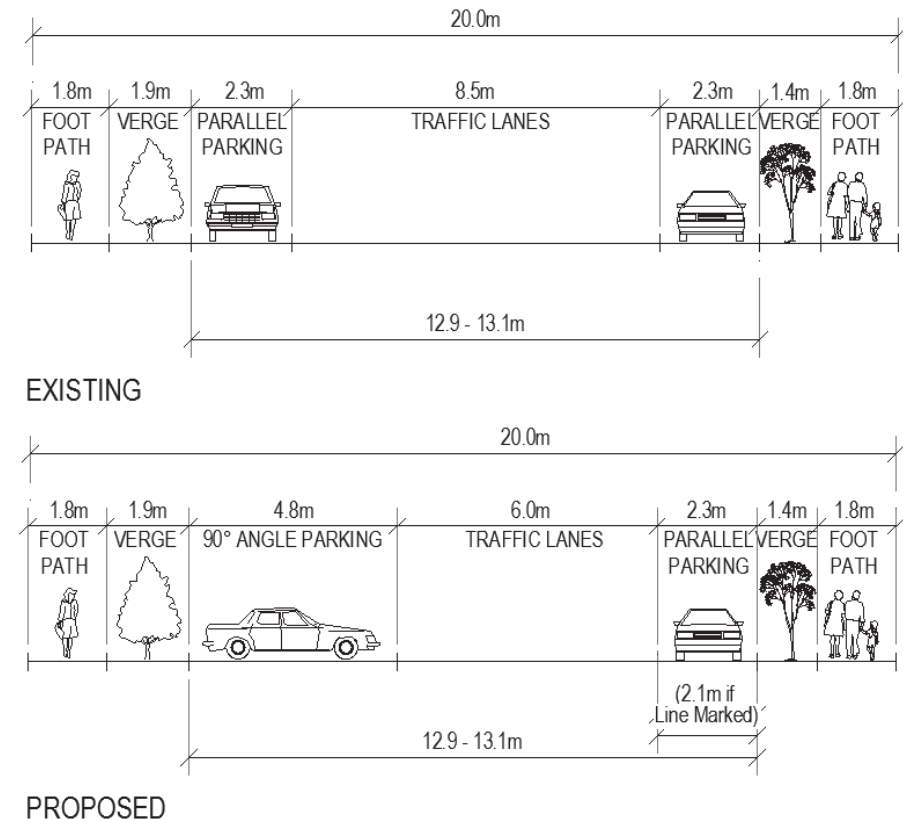
There are six typical road layout arrangements at streets within the study area, as summarised in Table 2. The following sections outline the proposed changes to each of these typical road arrangements in order to provide angle parking.

Typical Street Cross-section – Type 1

The existing and proposed Type 1 street cross-section is shown at Figure 20. The proposed parking arrangement would provide 90 degree angle parking on one side of the street, with parallel parking provided on the adjacent side of the street. This arrangement would require minimal engineering works, as the existing kerb-to-kerb road width would be retained. In certain cases, 2.1 metre line marked bays

will be required for parallel parking. This will help in maintaining a minimum required kerb to kerb width.

Figure 20 Typical Street Cross-section – Type 1

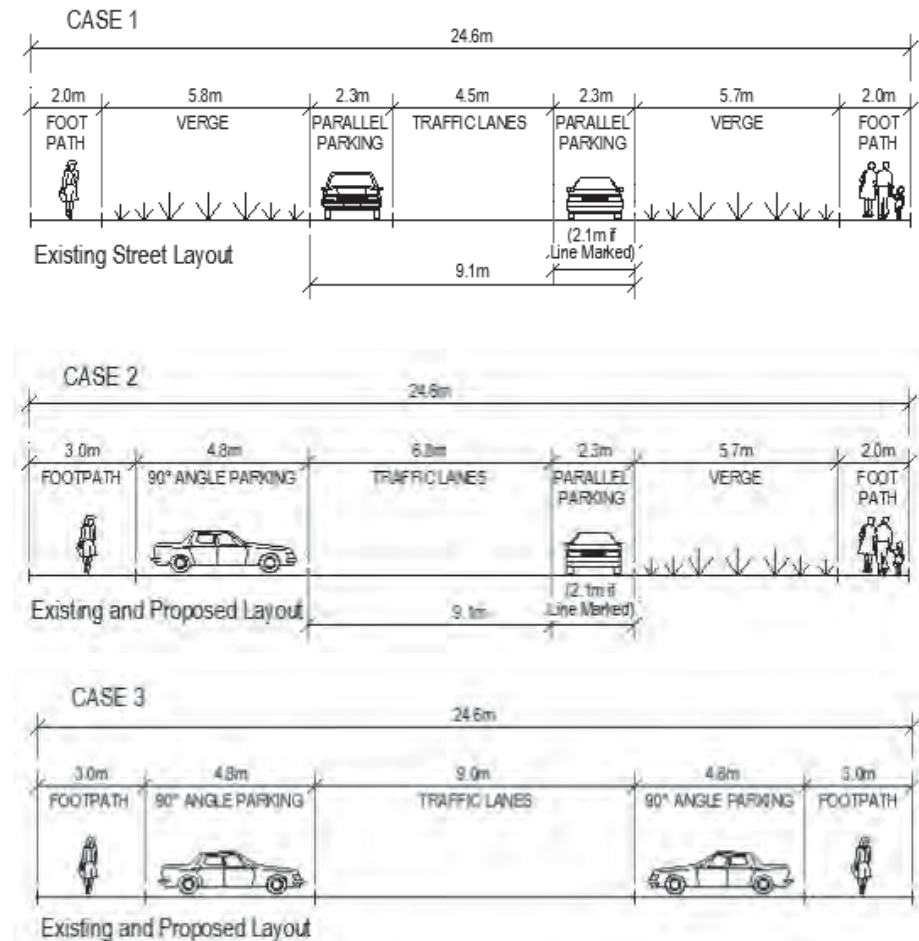


Typical Street Cross-section – Type 2

The existing and proposed parking and traffic lane arrangements to the typical street cross-section Type 2 is shown at Figure 21. The following street characteristics are shown for each cross-section:

- Case 1 provides parallel parking on both sides of the street, with a narrow width for traffic lane of 4.5 metres, for two-way road. A number of streets within the study area currently have this existing parking arrangement, including Harbourne Road, Strachan Street Willis Street, Forsyth Street, Middle Street and Meeks Street.
- Case 2 provides rear-to-kerb 90 degree angle parking on one side of the street, with parallel parking and a wide verge area provided on the adjacent side. This arrangement is currently provided at Bruce Street. Upgrading Case 1 type road sections to Case 2 would require the provision of angle parking within the verge area and widening the footpath on one side of the street.
- Case 3 provides rear-to-kerb 90 degree parking on each side of the street. This arrangement is currently provided at Harbourne Road. Upgrading Case 1 and Case 2 type road sections to Case 3 would require the provision of angle parking within the verge area and widening the footpaths on one or both sides of the street.

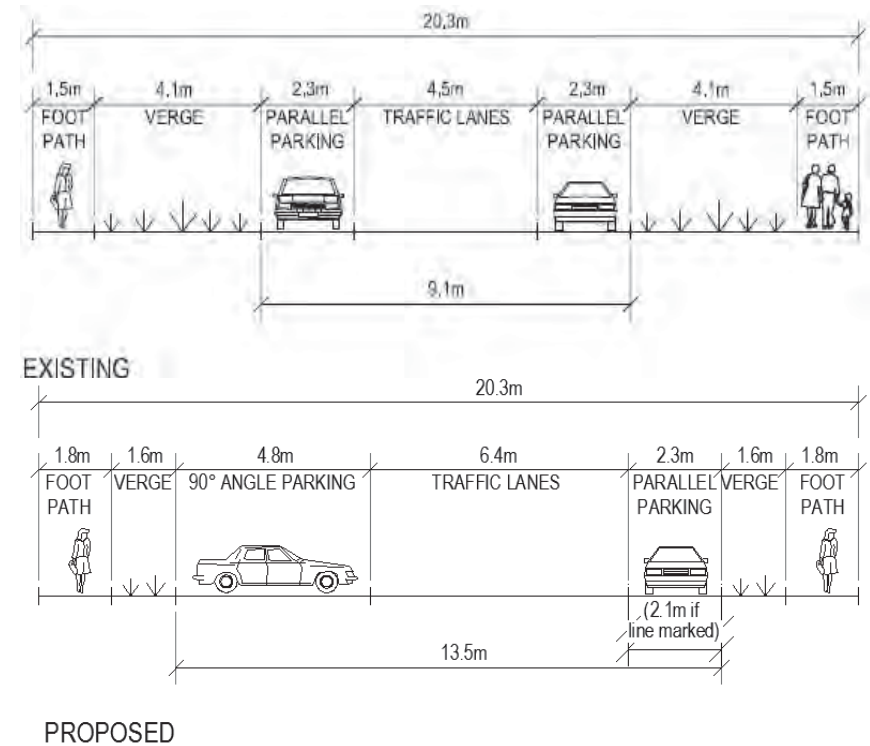
Figure 21 Typical Street Cross-section – Type 2



Typical Street Cross-section – Type 3

The existing and proposed Type 3 street cross-section is shown at Figure 22. As shown, the current arrangement provides parallel parking on both sides of the street, with the proposed arrangement providing 90 degree angle parking on one side of the street. The proposed arrangement would provide angle parking within the existing verge area and would require kerb works and footpath widening on both sides of the street.

Figure 22 Typical Street Cross-section – Type 3



4.2 Preliminary Proposed Angle Parking Arrangements and Road Safety Audit

Preliminary plans for angle parking along each street within the study area were prepared for this study, which are provided at Appendix D.

A Road Safety Audit (RSA) was undertaken for each of the preliminary angle parking plans, with the RSA identifying some areas that could be amended to further improve safety. This audit was performed by an independent team within GHD that has not previously been involved in the development of the parking plans.

Corrective actions were identified to respond to the RSA and the plans were amended accordingly. As such, the primary plans for angle parking provided at Appendix D have been superseded by the concept plans provided at Appendix A.

A summary table showing the preliminary arrangements for angle parking is also provided at Appendix D. This is based on the typical street cross-sections identified in Section 4.1. The expected additional number of parking spaces that can be provided through the introduction of angle parking is also summarised. The parking zone (refer to Figure 8) that each street is located within is also identified.

4.3 Response to Road Safety Audit

The RSA identified areas that required additional treatments to improve road safety for all road users. The project team has completed the *required action* section of the Corrective Action Request (CAR) forms to address the issues identified.

The RSA report and the CAR forms are provided at Appendix E.

The amended concept sketches for angle parking are provided at Appendix A.

The corrective actions would result in a loss of some proposed angle parking spaces, identified in the preliminary concept design plans. Where angle parking has been proposed in the preliminary concept designs, but is not recommended as part of the RSA, it is recommended that the existing parallel parking is retained. For this assessment, it has been assumed that three angle parking spaces would equal one parallel parking space.

A summary of the additional parking spaces for each street is provided in Table 9. The parking zone (refer to Figure 8) that each street is located within is also identified.

Table 9 Proposed Additional Parking Spaces

Street Name	Location	Parking Zone	Existing Parking Spaces	Proposed Parking Spaces	Additional Parking Spaces
Boronia Street (1)	Balfour Lane to Duke Street	2	40	55	15
Boronia Street (2)	Salisbury Road to Balfour Lane	1	41	64	23
Boronia Street (3)	Anzac Parade to Salisbury Road	1	40	61	21
Carlton Street	Anzac Parade to Doncaster Avenue	1	55	69	14
Kensington Road (1)	Salisbury Road to Balfour Lane	1	36	43	7
Kensington Road (2)	Duke Street to Balfour Lane	2	50	68	18
Salisbury Road	Balfour Road to Boronia Street	1	48	55	7
Addison Street	Kensington Road to Anzac Parade	2	40	60	20
Bowral Street	Anzac Parade to Doncaster Avenue	2	35	50	15
Duke Street	Kensington Road to Boronia Street	2	17	25	8
Goodwood Street	Anzac Parade to Doncaster Avenue	2	39	67	28
Roma Avenue	Doncaster Avenue to Lorne Avenue	2	45	54	9
Middle Street	Harbourne Road to Forsyth Street	3	40	75	35
Bruce Street	Gardeners Road to Borrodale Road	4	78	120	42
Doncaster Avenue	Gardeners Road to Borrodale Road	4	62	85	23
Forsyth Street	Meeks Street to Rainbow Street	4	40	57	17
Harbourne Road	Meeks Street to Middle Street	4	45	83	38
Meeks Street	Harbourne Road to Forsyth Street	4	27	34	7
See Street	Doncaster Avenue to Houston Road	4	45	77	32
Sturt Street (1)	Bunnarong Road to Anzac parade	4	36	52	16
Sturt Street (2)	Anzac Parade to Sturt Lane	4	19	49	30
Wallace Street	Anzac Parade to Wallace Lane	4	67	93	26
Willis Street	Meeks Street to Rainbow Street	4	40	69	29
Prince Street	Alison Road to Cowper Street	5	43	50	7
William Street	Alison Road to King Street	5	34	61	27
Bradley Street		5	51	72	21
Church Street	Alison Road to Frances Street	5	52	72	20
Arthur Street	Wansey Road to Botany Street	6	42	50	8
Blenheim Street	Botany Street to Clara Street	6	60	72	12
Eurimbla Avenue		6	53	63	10
Mears Avenue	Avoca Street to Ada Street	6	47	73	26
Soudan Street	Avoca Street to Prowse Road	6	32	54	22
Total			1,424	2,053	633

4.3.1 Recommendations for Implementing Angle Parking

GHD have categorised each of the local roads within the study area into four different recommendation categories for implementing angle parking. These categories are as follows:

Category One

- Roads where it is recommended that the installation of angle parking proceeds.

Category Two

- Roads where angle parking is recommended within the existing nature strip/verge. However, this could incur a high cost due to the requirement of retaining structures.

Category Three

- Roads where angle parking is recommended within the existing nature strip, where the location and size of mature trees needs to be assessed to determine the actual number of additional spaces.

Category Four

- Roads where it is recommended that the installation of angle parking does not proceed. This has been based on the recommendations provided from the RSA.

The recommendations for each local road within the study area, by category, are summarised in Table 10.

Table 10 Categories for Angle Parking

Category One Proceed with angle parking	Category Two Retaining structure requires a potential high cost	Category Three Further assessment of tree locations required	Category Four Not recommended to proceed with angle parking
Boronia Street	Harbourne Street	Meeks Street	Coogee Bay Road
Carlton Street	Wallace Street	Wallace Street	
Kensington Road		Willis Street	
Salisbury Road		Duke Street	
Addison Street			
Bowral Street			
Goodwood Street			
Roma Avenue			
Middle Street			
Bruce Street			
Doncaster Avenue			
Forsyth Street			
See Street			
Sturt Street			
Prince Street			
William Street			
Bradley Street			
Church Street			
Arthur Street			
Blenheim Street			
Eurimbla Avenue			
Mears Avenue			
Soudan Street			

4.4 Additional Spaces Provided by Angle Parking

The replacement car parking should be provided at locations that would still serve the existing business and properties along these road corridors. As such, the streets within the study area have been grouped into 6 parking zones for the purposes of this assessment, as shown at Figure 8. In total, there would be approximately 750 parking spaces removed along Anzac Parade and Alison Road as part of the proposed light rail scheme, including:

- 458 spaces on Anzac Parade;
- 89 spaces on Alison Road;
- 137 spaces on Wansey Road; and
- 67 spaces on High Street.

Parking spaces that would be removed from sections of Anzac Parade, Alison Road, Wansey Road and High Street may be offset by providing angle parking on streets within the same parking zone.

A summary of the number of additional car parking spaces that could be provided through the introduction of angle parking on streets within each parking zone is summarised in Table 11. A summary of the number of existing parking spaces that are required to be relocated within each parking zone is also provided.

As shown in Table 11, the introduction of angle parking can offset the parking spaces lost along the proposed light rail corridor at parking zones 1, 2, and 4. In parking zones 3, 5 and 6, there is expected to be a net loss of 50, 83 and 57 parking spaces respectively.

Overall introduction of angled parking could provide 633 additional parking spaces within the study area, with a net loss of 117 parking spaces following the introduction of light rail along Anzac Parade and Alison Road.

Table 11 Potential Additional Spaces by Parking Zone

Parking Zone	Additional Spaces by Providing Angle Parking	Number of Spaces Required to be Relocated	Difference
1	72	55	17
2	113	88	25
3	35	85	-50
4	260	230	30
5	75	158	-83
6	78	135	-57
Total	633	750	-117

4.5 Recommended Traffic Calming

Austrroads Guide to Traffic Management - Part 8 (2009) identifies a number of traffic calming measures that could be provided in order to reduce vehicle speeds and improve safety. It is recommended RCC consider introducing some of these traffic calming measures at locations where angle parking is proposed to be introduced, where roadway width does not accord to the relevant standards.

The following sections provide a brief overview these traffic calming measures.

Road Humps

A road hump is a traffic speed reduction device in the form of a raised curved profile extending across the roadway. Road humps should be installed at right angles to the direction of travel and should extend as close to the kerb as possible allowing sufficient opening for drainage. An example of a road hump is shown at Figure 23.

Figure 23 Road Hump at an Intersection

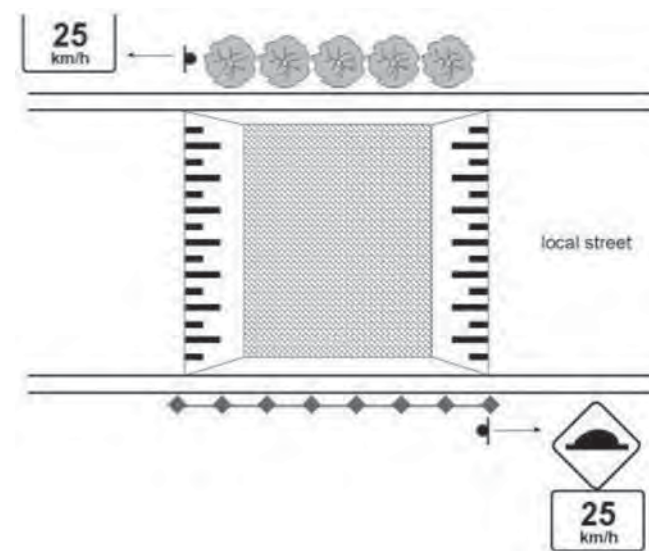


Austrroads Guide to Traffic Management Part 8 –Traffic Management (2009)

Flat Top Road Hump

A flat-top road hump or raised table is a raised surface, where the raised section (or platform) is flat instead of being curved as is the case with a round profile road hump. A typical layout of a flat-top road hump is shown at Figure 24.

Figure 24 Flat Top Road Hump – Typical Design



Austrroads Guide to Traffic Management Part 8 –Traffic Management (2009)

Road Cushions

A road cushion is another form of road hump that occupies only a part of the roadway. It is designed to be more sympathetic to cyclists, buses, and commercial vehicles than a standard full width road hump.

The most common form of road cushions are those made from moulded rubber segments but they can also be constructed from other material such as concrete or asphalt. In all cases the colour of the cushions should contrast with the adjacent street surface.

An example of a road cushion is shown at Figure 25. As shown, a bus can straddle the road cushion.

Figure 25 Road Cushion



Austrroads Guide to Traffic Management Part 8 –Traffic Management (2009)

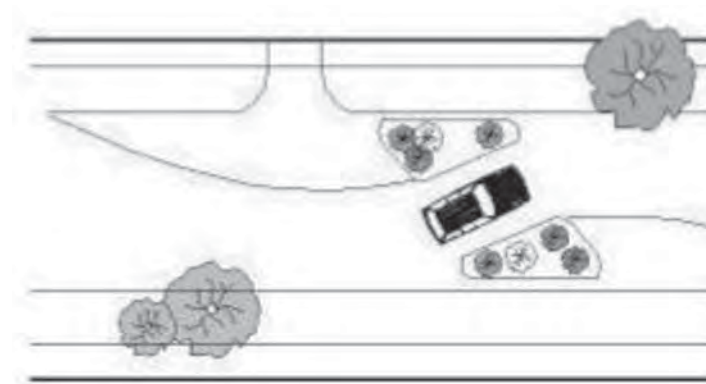
Slow Points

A slow point is intended to reduce vehicle speeds by providing a series of kerb extensions on alternating or opposite sides of a roadway, which narrow and/or angle the roadway.

Slow points can be either one or two lanes wide and can be angled. In a two lane slow point, a central median island is generally very effective in separating opposing traffic. This will also provide a greater visual restriction and it can be used as a pedestrian refuge if designed appropriately.

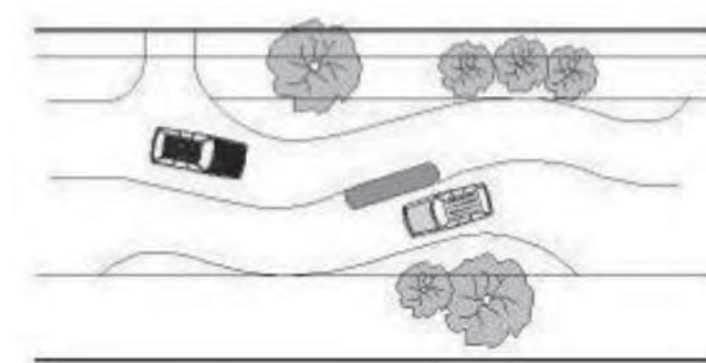
Two-lane slow points are usually less effective than one lane slow points in controlling speeds and providing an adequate visual obstruction. Single lane and two-lane slow points are shown at Figure 26 and Figure 27 respectively. It should be noted that slow points may reduce the overall parking supply along a street.

Figure 26 Single Lane Angle Slow Point



Austrroads Guide to Traffic Management Part 8 –Traffic Management (2009)

Figure 27 Two Lane Angle Slow Point



Austrroads Guide to Traffic Management Part 8 –Traffic Management (2009)

An example of a two-way slow point, provided at Trafalgar Street in Leichhardt, is shown at Figure 28

Figure 28 Trafalgar Street, Leichhardt



4.6 Key Recommendations

Key recommendations for angle parking include the following:

- Replacement car parking for the existing car parking on Anzac Parade and Alison Road should be provided at locations that would still serve the existing business and properties along these road corridors.
- 90 degree rear-to-kerb angle parking is the preferred type of angle parking.
- Recommended typical street cross-section arrangements for angle parking are shown in Section 4.1.
- The proposed arrangements for providing angle parking for each street is summarised in 4.3.
- Traffic calming should be provided at locations where angle parking is proposed, where the roadway width does not accord with the relevant standards. This includes the following types of traffic calming:

- Road humps;
- Flat top road humps;
- Road cushions; and
- Slow points.

4.7 Key Findings

The following key findings were identified:

- There would be approximately 750 parking spaces removed along Anzac Parade, Alison Road, Wansey Road and High Street as part of the light rail development, including:
 - 458 spaces on Anzac Parade;
 - 89 spaces on Alison Road;
 - 137 spaces on Wansey Road; and
 - 67 spaces on High Street.
- The additional parking spaces provided from introducing angle parking within the study area would be sufficient to offset the parking spaces lost along the proposed light rail corridor at parking zones 1, 2, and 4. In parking zones 3, 5 and 6, there is expected to be a net loss of 50, 83 and 57 parking spaces respectively.
- Overall introduction of angled parking could provide 633 additional parking spaces within the study area, with a net loss of 117 parking spaces following the introduction of light rail along Anzac Parade and Alison Road.

5. Summary and Recommendations

This Parking Study was undertaken to assess whether angled parking can be provided on a number of local roads within the Randwick City Council local government area.

This angled parking would be provided to replace existing on-street car parking along Anzac Parade and Alison Road which would be removed as part of the Sydney CBD and South East Light Rail Project, proposed by Transport for NSW.

5.1 Key Findings

The following key findings were identified as part of the traffic, transport and parking assessment:

Review of Parking Standards

Australian Standards 2890.5 provides standards for on-street parallel, angle and centre of the road parking. A review of these standards identified the following requirements for parking on streets within the study area:

- Parallel parking space widths should be 2.3 metres wide;
- Rear-to-kerb 90 degree angle parking is recommended for angle parking.
- Parking bay dimensions for 90 degree angle parking should be:
 - 2.5 metres wide;
 - 5.4 metres long where no overhang is provided; and
 - 4.8 metres long where overhang is provided.
- Minimum overall width required between kerb-line to separation line is 12.2 metres.

- Centre of the road parking is not considered appropriate, as sufficient road width is not provided.
- The standards provided in AS2890.5 are typically set as a design requirement for higher order roads that have conflicting functions and aims to balance and accommodate both mobility and accessibility.
- The function of all of the streets within the study area is not focussed on mobility (as a quick and efficient route for traffic), but instead its primary objective is to provide accessibility to residential properties located along each street.
- The standards for angle parking provided in AS2890.5 are not applicable to streets within the study area, as to minimise disruption to the through traffic flow is not regarded as a primary design consideration for these streets. However, any deviation from these standards will need to be agreed with RMS before implementation.

Angle Parking in other Local Government Areas

- Site investigations were undertaken at a number of locations where on-street angle parking is provided. This included locations within the Leichhardt Municipal Council, Marrickville Municipal Council and Randwick City Council local government areas.
- This found angle parking arrangements at a number of these locations did not accord with the standards provided in AS2890.5.
- There are examples of angle parking provided within the Randwick City Council local government area which do not

accord with Australian Standards 2890.5, including at Neptune Street in Coogee, and Arthur Street in Randwick.

Additional Spaces Provided by Angle Parking

- There would be approximately 750 parking spaces removed along Anzac Parade, Alison Road, Wansey Road and High Street as part of the light rail development, including:
 - 458 spaces on Anzac Parade;
 - 89 spaces on Alison Road;
 - 137 spaces on Wansey Road; and
 - 67 spaces on High Street.
- The additional parking spaces provided from introducing angle parking within the study area would be sufficient to offset the parking spaces lost along the proposed light rail corridor at parking zones 1, 2, and 4. In parking zones 3, 5 and 6, there is expected to be a net loss of 50, 83 and 57 parking spaces respectively.
- Overall introduction of angled parking could provide 633 additional parking spaces within the study area, with a net loss of 117 parking spaces following the introduction of light rail along Anzac Parade and Alison Road.

5.2 Recommendations

The key recommendations of this study are:

- 90 degree rear-to-kerb angle parking is the preferred type of angle parking;
- Recommended typical street cross-section arrangements for angle parking are shown in Section 4.1.
- The proposed arrangements for providing angle parking for each street is summarised in 4.3.

- Traffic calming should be provided at locations where angle parking is proposed. This includes the following types of traffic calming:
 - Road humps;
 - Flat top road humps;
 - Road cushions; and
 - Slow points.

Appendices

Appendix A – Angle Parking Concept Sketches



1:500 (at A3)
0 2.5 5 10 15 20 25
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1984
Grid: GDA 1984 MGA Zone 58



LEGEND

- canopy
- road_pavement
- road_other_mark
- Disabled
- footpath
- Asphalt
- Concrete
- Separation Barrier Line
- Lots



Randwick City Council
Randwick Light Rail Parking Study

Job Number 21-23260
Revision A
Date 28 Jan 2014

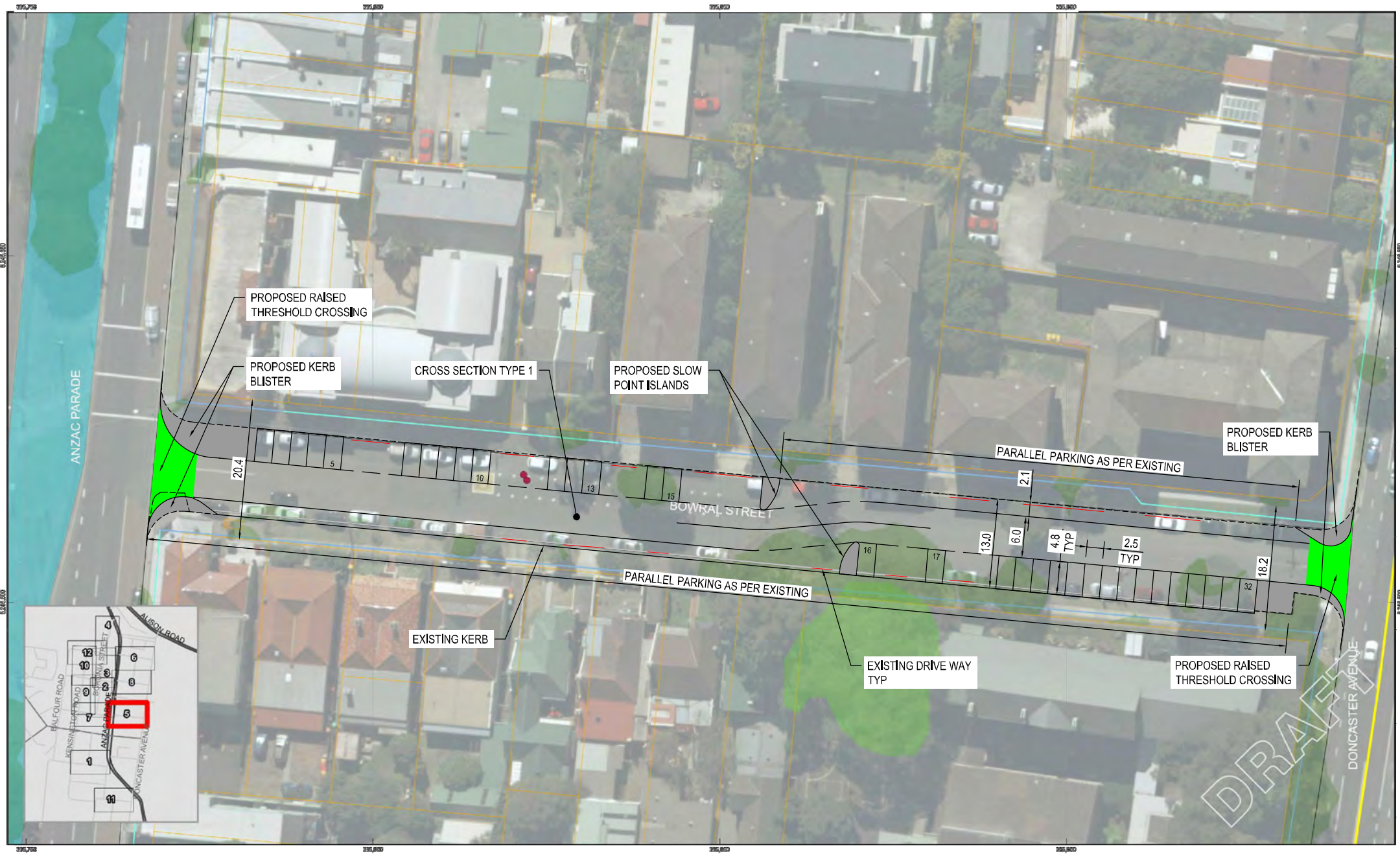
CONCEPT ANGLE PARKING PLAN BORONIA STREET 2

Figure 3

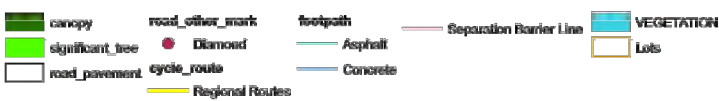
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LEGEND



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CONCEPT ANGLE PARKING PLAN BOWRAL STREET

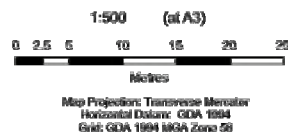
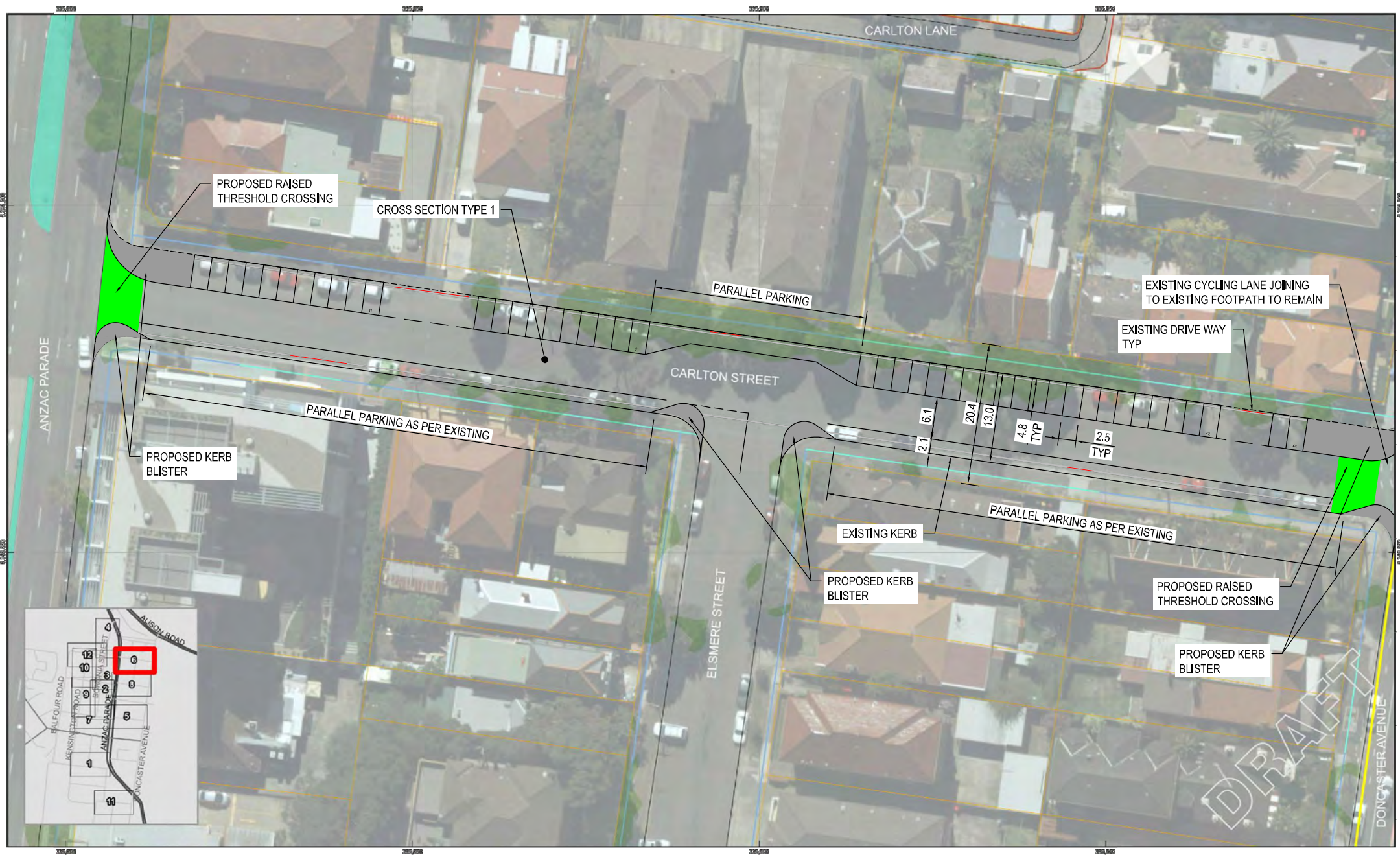
Figure 5

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CONCEPT ANGLE PARKING PLAN CARLTON STREET

Figure 6



1:500 (at A3)
0 2.5 5 10 15 20 25
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1984
Grid: GDA 1984 MGA Zone 58



LEGEND

- canopy
- significant tree
- road pavement
- cycle route
- Regional Routes
- footpath
- Asphalt
- Concrete
- Separation Barrier Line
- PAVEMENT
- Lots



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CONCEPT ANGLE PARKING PLAN GOODWOOD STREET Figure 8

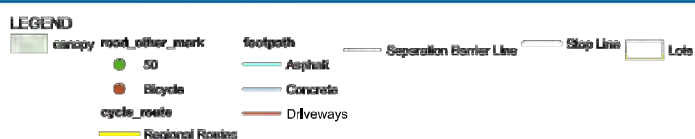
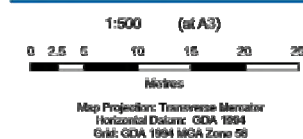
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CONCEPT ANGLE PARKING PLAN CHURCH STREET

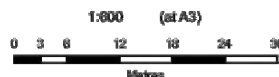
Figure 14

NSW\AU\Sydney\Projects\21023000\000000\Deliverables\123260_2001_Field_Journal_2_2014.mxd

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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1984
Grid: GDA 1984 MGA Zone 56



LEGEND

canopy	road_other_mark	footpath	Guard Rail	Holding Line	Lots
50	Asphalt	Edge Line	Stop Line		
cycle_route	Concrete	Separation Barrier Line	road_medium_mark		
Local Routes	Driveways				



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CONCEPT ANGLE PARKING PLAN PRINCE STREET

Figure 15

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1:550 (at A3)
0 2.25 4.5 9 13.5 18 22.5
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55



LEGEND

- | | | | | |
|---------------|-------------|-----------|--------------|------|
| canopy | cycle route | footpath | Holding Line | Lots |
| Regional Road | Brickblock | Stop Line | | |
| | Concrete | Driveways | | |



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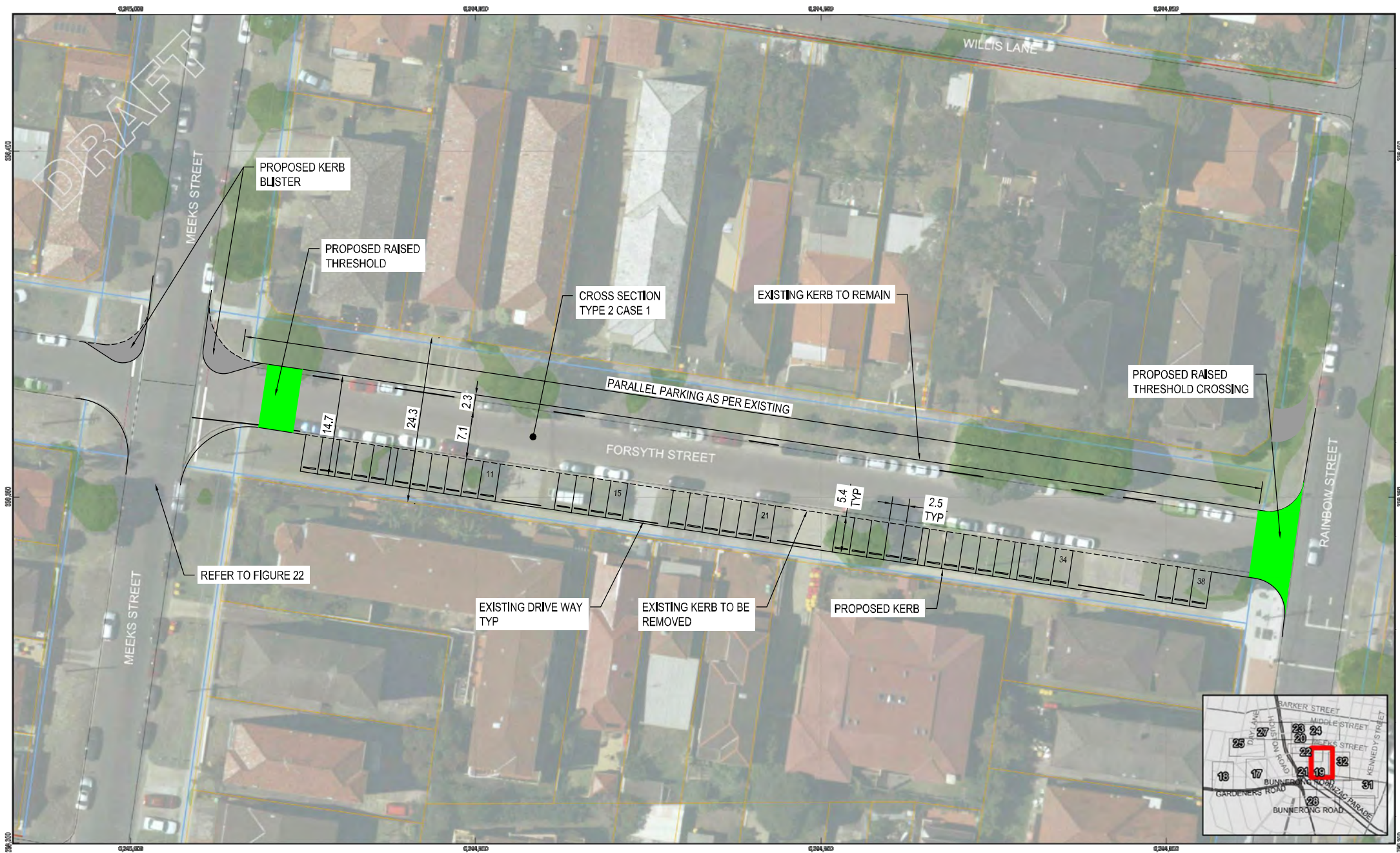
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Date 28 Jan 2014

CONCEPT ANGLE PARKING PLAN DONCASTER AVENUE Figure 18

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1:500 (at A3)
0 2 4 8 12 16 20
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



LEGEND

- | | | | |
|-----------|-----------|--------------|-----|
| canopy | footpath | Holding Line | Lot |
| Concrete | Stop Line | | |
| Driveways | | | |



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CONCEPT ANGLE PARKING PLAN FORSYTH STREET Figure 19

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1:500 (at A3)

0 2 4 8 12 16 20

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



LEGEND

canopy road_other_mark footpaths

50

Asphalt

Brick/Block

Concrete

Driveways

Separation Barrier Line

Holding Line

Pedestrian Crosswalk Line

Stop Line

PAVEMENT

Lois



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Date 28 Jan 2014

CONCEPT ANGLE PARKING PLAN

MIDDLE STREET 1

Figure 23

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1:600 (at A3)
0 2.5 5 10 15 20 25
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1984
Grid: GDA 1984 MGA Zone 56



LEGEND

- canopy cycle route
- footpath
- Concrete
- Separation Barrier Line
- Holding Line
- Loops
- Regional Routes
- Driveways



Randwick City Council
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Job Number 21-23260
Revision A
Date 26 Jan 2014

CONCEPT ANGLE PARKING PLAN
SEE STREET

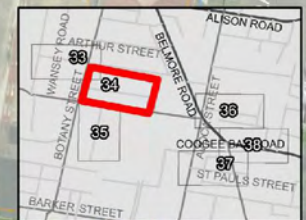
Figure 25

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1:650 (at A3)
0 2.75 5.5 11 16.5 22 27.5
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1984
Grid: GDA 1984 MGA Zone 56



LEGEND

- canopy
- cycle route
- footpath
- Local Routes
- Regional Routes
- Concrete
- Lane Line
- Separation Barrier Line



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Job Number 21-23280
Revision A
Date 04 Mar 2014

CONCEPT ANGLE PARKING PLAN
BLENHEIM STREET

Figure 34

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1:500 (at A3)
0 2.5 5 10 15 20 25
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 58



LEGEND

canopy cycle route footpath Lane Line Pedestrian Crosswalk Line
Local Routes Concrete Slop Line



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Job Number 21-23280
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CONCEPT ANGLE PARKING PLAN EURIMBLA AVENUE

Figure 35

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1:500 (at A3)
0 2 4 8 12 16 20
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND



cycle_routes

Local Routes

footpaths

Asphalt

Concrete

Concrete Slabs Small

Driveways

Separation Barrier Line



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Job Number 21-23260
Revision A
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CONCEPT ANGLE PARKING PLAN SUDAN STREET

Figure 37

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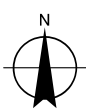
Appendix B – Crash Data Summary (2008 – 2012)



LEGEND

- | | | | | | | |
|---|---|--|--|--|--|--|
| ● Peddle cyclist Accident | cycle route | footpath | — Grass | road line | — Lane Line | transline |
| ● Pedestrian | — Local Routes | — Asphalt | — None | — Continuity Line | — Separation Barrier Line | - - - Holding Line |
| ● Car Involved | — Regional Routes | — Brick/Block | — Other | - . - . Edge Line | — Lots | — Pedestrian Crosswalk Line |
| | | — Concrete | | | — Selected Streets | — Stop Line |

Paper Size A4
0 12.5 25 50 75 100
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



Randwick City Council
Randwick Light Rail Parking Study

Job Number 21-23260
Revision A
Date 04 Mar 2014

Kensington
Year Crash Data (2008 -2012)

Figure 1

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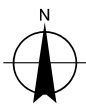
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Data Source: NSW Department of Lands: Cadastre - Jan 2012; Geoscience Australia: 250k Data - Jan 2012; NSW Department of Primary Industry - Jan 2012; Randwick City Council - Jan 2014 Created by: qjchung



LEGEND		cycle route		footpath		road line		transline	
●	Pedestrian	—	Local Routes	—	Asphalt	—	Concrete	—	Lane Line
●	Car Involved	—	Regional Routes	—	Brick/Block	—	Grass	—	Continuity Line
				—	Other	- - -	Edge Line	- - -	Parking Restriction Line
						- - -	Separation Barrier Line	- - -	Holding Line
							Lots		Pedestrian Crosswalk Line
							Selected Streets		Stop Line

Paper Size A4
0 12.5 25 50 75 100
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



Randwick City Council
Randwick Light Rail Parking Study

Job Number 21-23260
Revision A
Date 04 Mar 2014

Kensington
Year Crash Data (2008 -2012)

Figure 2

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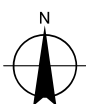
Data Source: NSW Department of Lands: Cadastre - Jan 2012; Geoscience Australia: 250k Data - Jan 2012; NSW Department of Primary Industry - Jan 2012; Randwick City Council - Jan 2014 Created by: qjchung



LEGEND

- | | | | | | | |
|---|---|--|--|--|--|---|
| ● Peddle cyclist Accident | cycle route | footpath | — Grass | road line | — Lane Line | transline |
| ● Car Involved | — Local Routes | — Asphalt | — Gravel | - - - Edge Line | — Separation Barrier Line | - - - Holding Line |
| | — Regional Routes | — Concrete | | — Lots | — Pedestrian Crosswalk Line | — Stop Line |
| | | | | — Selected Streets | | |

Paper Size A4
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Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



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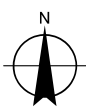
Job Number 21-23260
Revision A
Date 04 Mar 2014

Randwick
Year Crash Data (2008 -2012)

Figure 3



Paper Size A4
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Randwick City Council
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Revision A
Date 04 Mar 2014

Randwick
Year Crash Data (2008 -2012)

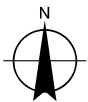
Figure 4



LEGEND

- | | | | | | | |
|---|--|--|--|--|--|--|
| ● Car Involved | — Local Routes | — Footpath | — Concrete Slabs Small | — road line | — Lane Line | — transline |
| | | — Asphalt | — Grass | — Continuity Line | — Separation Barrier Line | — Holding Line |
| | | — Brick/Block | — Garden | - - - Edge Line | — Lots | — Pedestrian Crosswalk Line |
| | | — Concrete | — Other | | — Selected Streets | — Stop Line |

Paper Size A4
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Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



Randwick City Council
Randwick Light Rail Parking Study

Job Number 21-23260
Revision A
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Randwick
Year Crash Data (2008 -2012)

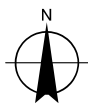
Figure 5



LEGEND

● Pedestrian	cycle route	footpath	— Brick/Block	road line	— Lane Line	transline
● Car Involved	— Local Routes	— Asphalt	— Concrete	— Continuity Line	— Separation Barrier Line	- - - Holding Line
	— Regional Routes	— Brick Pavers	— Grass	- · - · Edge Line	— Lots	— Pedestrian Crosswalk Line
					— Selected Streets	— Stop Line

Paper Size A4
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Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



Randwick City Council
Randwick Light Rail Parking Study

Job Number 21-23260
Revision A
Date 04 Mar 2014

Kingford
Year Crash Data (2008 -2012)

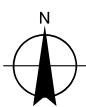
Figure 6



LEGEND

● Motorcycle Accident	cycle route	footpath	— Brick/Concrete	road line	— Lane Line	transline
● Pedestrian	— Regional Routes	— Asphalt	— Concrete	— Continuity Line	— Separation Barrier Line	- - - Holding Line
● Car Involved		— Brick Pavers	— Concrete Slabs Small	- · - · Edge Line	— Lots	— Keep Clear Line - Dashed
		— Brick/Block	— Grass		— Selected Streets	— Stop Line

Paper Size A4
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Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



Randwick City Council
Randwick Light Rail Parking Study

Job Number 21-23260
Revision A
Date 04 Mar 2014

Kingford
Year Crash Data (2008 -2012)

Figure 7

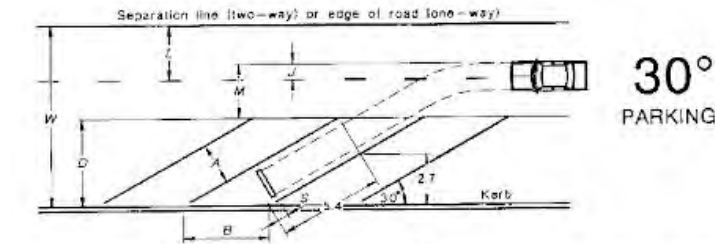
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Data Source: NSW Department of Lands: Cadastre - Jan 2012; Geoscience Australia: 250k Data - Jan 2012; NSW Department of Primary Industry - Jan 2012; Randwick City Council - Jan 2014 Created by: qjchung

Appendix C – AS2890.5 Angle Parking Standards

AS2890.5 Standards for 30 Degree Angle Parking



Dimensions		Use category (see Table 2.2)			
		Low	Medium	High	Disabled
A—space width (Note 7)		2.1	2.3	2.5	3.2
B—space width parallel to kerb		4.2	4.6	5.0	6.4
D—lateral depth of spaces (Note 1)	D ₁	4.4	4.4	4.4	4.4
	D ₂	4.1	4.1	4.1	4.1
	D ₃	4.5	4.7	4.9	5.4
M—manoeuvre space (Note 3)		3.1	3.0	2.9	2.9
J—allowable encroachment into adjacent traffic lanes (Note 4)		2.5	2.5	2.5	2.5
Minimum width required, kerb line to outer edge of a moving traffic lane = $D + M - J$		5.1	5.2	5.3	5.1
L—width of lane(s) for moving traffic:					
0-800 vehicles/hour (Note 5)		3.5	3.5	3.5	3.5
800-1600 vehicles/hour (Note 5)		6.5	6.5	6.5	6.5
W—minimum overall width required, kerb line to separation line = $D + M - J + L$:					
0-800 vehicles/hour (Note 5)		8.6	8.7	8.8	8.6
800-1600 vehicles/hour (Note 5)		12.1	12.2	12.3	12.1
S—wheelstop distance:					
Nose-in parking		0.6	0.6	0.6	0.6
Rear-in parking (Note 6)		0.9	0.9	0.9	0.9

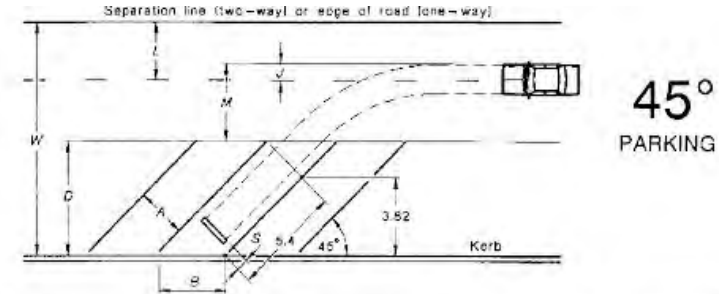
DIMENSIONS IN MILLIMETRES

NOTES:

- Dimension D is selected as follows (see Note 2):
 - D₁—where parking is to a wall or high kerb not allowing any overhang.
 - D₂—where parking is to a low kerb which allows 600 mm overhang.
 - D₃—where parking is controlled by wheelstops installed at right angles to the direction of parking.
- Formulae from which values of D₁, D₂ and D₃ have been calculated are given in AS 2890.1.
- Dimension M gives the lateral space required when manoeuvring into or out of a parking space. Roadway width limitations are dealt with further in Clause 2.4.
- Dimension J is the extent to which a vehicle can be allowed to obstruct the adjacent moving traffic lane while manoeuvring into or out of a parking space. The value J = 2.5 m is appropriate to traffic speeds of 60 km/h or less past the site. At higher speeds it is recommended that J be reduced by 1.0 m for each 10 km/h by which the speed exceeds 60 km/h, with a minimum value of J = 0.
- The quoted traffic volumes are one-way maximum hourly volumes, total of all lanes, during the times parking is permitted.
- Rear-in angle parking spaces slope in the opposite direction.
- Widths of 30 degree angle parking spaces are smaller than other angle parking spaces due to reduced conflict of open doors against adjacent vehicles.

Source: AS2890.5 Parking Facilities Part 5 – On-Street Parking (1993)

AS2890.5 Standards for 45 Degree Angle Parking



Dimensions		Use category (see Table 2.2)			
		Low	Medium	High	Disabled
A—space width		2.4	2.5	2.6	3.2
B—space width parallel to kerb		3.4	3.5	3.7	4.5
D—lateral depth of spaces (Note 1)	D ₁	5.2	5.2	5.2	5.2
	D ₂	4.8	4.8	4.8	4.8
	D ₃	5.5	5.6	5.7	6.1
M—manoeuvre space (Note 3)		3.9	3.7	3.5	3.5
J—allowable encroachment into adjacent traffic lanes (Note 4)		2.5	2.5	2.5	2.5
Minimum width required, kerb line to outer edge of a moving traffic lane = $D + M - J$		6.9	6.8	6.7	6.7
L—width of lane(s) for moving traffic:					
0-800 vehicles/hour (Note 5)		3.5	3.5	3.5	3.5
800-1600 vehicles/hour (Note 5)		6.5	6.5	6.5	6.5
W—minimum overall width required, kerb line to separation line = $D + M - J + L$:					
0-800 vehicles/hour (Note 5)		10.4	10.3	10.2	10.2
800-1600 vehicles/hour (Note 5)		13.9	13.8	13.7	13.7
S—wheelstop distance:					
Nose-in parking		0.6	0.6	0.6	0.6
Rear-in parking (Note 6)		0.9	0.9	0.9	0.9

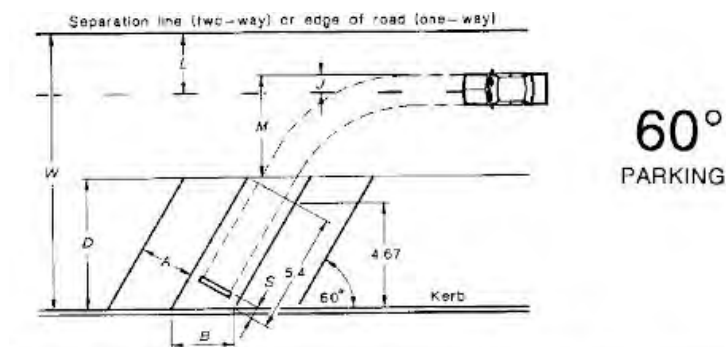
DIMENSIONS IN METRES

NOTES:

- Dimension D is selected as follows (see Note 2):
 - D₁—where parking is to a wall or high kerb not allowing any overhang.
 - D₂—where parking is to a low kerb which allows 600 mm overhang.
 - D₃—where parking is controlled by wheelstops installed at right angles to the direction of parking.
- Formulae from which values of D₁, D₂ and D₃ have been calculated are given in AS 2890.1.
- Dimension M gives the lateral space required when manoeuvring into or out of a parking space. Roadway width limitations are dealt with further in Clause 2.4.
- Dimension J is the extent to which a vehicle can be allowed to obstruct the adjacent moving traffic lane while manoeuvring into or out of a parking space. The value J = 2.5 m is appropriate to traffic speeds of 60 km/h or less past the site. At higher speeds it is recommended that J be reduced by 1.0 m for each 10 km/h by which the speed exceeds 60 km/h, with a minimum value of J = 0.
- The quoted traffic volumes are one-way maximum hourly volumes, total of all lanes, during the times parking is permitted.
- Rear-in angle parking spaces slope in the opposite direction.

Source: AS2890.5 Parking Facilities Part 5 – On-Street Parking (1993)

AS2890.5 Standards for 60 Degree Angle Parking



Dimensions		Use category (see Table 2.2)			
		Low	Medium	High	Disabled
A—space width		2.4	2.5	2.6	3.2
B—space width parallel to kerb		2.8	2.9	3.0	3.7
D—lateral depth of spaces (Note 1)	D_1	5.7	5.7	5.7	5.7
	D_2	5.1	5.1	5.1	5.1
	D_3	5.9	6.0	6.0	6.3
M—manoeuvre space (Note 3)		4.9	4.6	4.3	4.3
J—allowable encroachment into adjacent traffic lanes (Note 4)		2.5	2.5	2.5	2.5
Minimum width required, kerb line to outer edge of a moving traffic lane = $D + M - J$		8.3	8.1	7.8	7.8
L—width of lane(s) for moving traffic: 0-800 vehicles/hour (Note 5) 800-1600 vehicles/hour (Note 5)		3.5	3.5	3.5	3.5
		6.5	6.5	6.5	6.5
W—minimum overall width required, kerb line to separation line = $D + M - J + L$; 0-800 vehicles/hour (Note 5) 800-1600 vehicles/hour (Note 5)		11.8	11.6	11.3	11.3
		15.3	15.1	14.8	14.8
S—wheelstop distance: Nose-in parking Rear-in parking (Note 6)		0.6	0.6	0.6	0.6
		0.9	0.9	0.9	0.9

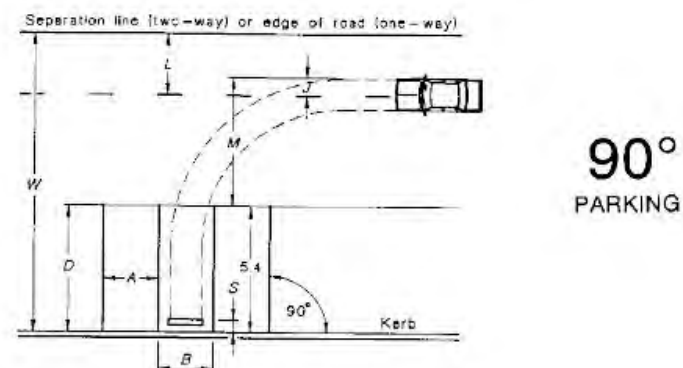
DIMENSIONS IN METRES

NOTES:

- Dimension D is selected as follows (see Note 2):
 D_1 —where parking is to a wall or high kerb not allowing any overhang.
 D_2 —where parking is to a low kerb which allows 600 mm overhang.
 D_3 —where parking is controlled by wheelstops installed at right angles to the direction of parking.
- Formulae from which values of D_1 , D_2 and D_3 have been calculated are given in AS 2890.1.
- Dimension M gives the lateral space required when manoeuvring into or out of a parking space. Roadway width limitations are dealt with further in Clause 2.4.
- Dimension J is the extent to which a vehicle can be allowed to obstruct the adjacent moving traffic lane while manoeuvring into or out of a parking space. The value $J = 2.5$ m is appropriate to traffic speeds of 60 km/h or less past the site. At higher speeds it is recommended that J be reduced by 1.0 m for each 10 km/h by which the speed exceeds 60 km/h, with a minimum value of $J = 0$.
- The quoted traffic volumes are one-way maximum hourly volumes, total of all lanes, during the times parking is permitted.
- Rear-in angle parking spaces slope in the opposite direction.

Source: AS2890.5 Parking Facilities Part 5 – On-Street Parking (1993)

AS2890.5 Standards for 90 Degree Angle Parking



Dimensions		Use category (see Table 2.2)			
		Low	Medium	High	Disabled
A—space width		2.4	2.5	2.6	3.2
B—space width parallel to kerb		Same as Dimension A			
D—lateral depth of spaces (Note 1)	D_1	5.4	5.4	5.4	5.4
	D_2	4.8	4.8	4.8	4.8
	D_3	5.4	5.4	5.4	5.4
M—manoeuvre space (Note 2)		6.2	5.8	5.4	5.4
J—allowable encroachment into adjacent traffic lanes (Note 3)		2.5	2.5	2.5	2.5
Minimum width required, kerb line to outer edge of a moving traffic lane = $D + M - J$		9.1	8.7	8.3	8.3
L—width of lane(s) for moving traffic: 0-800 vehicles/hour (Note 4) 800-1600 vehicles/hour (Note 4)		3.5	3.5	3.5	3.5
		6.5	6.5	6.5	6.5
W—minimum overall width required, kerb line to separation line = $D + M - J + L$; 0-800 vehicles/hour (Note 4) 800-1600 vehicles/hour (Note 4)		12.6	12.2	11.8	11.8
		16.1	15.7	15.3	15.3
S—wheelstop distance: Nose-in parking Rear-in parking		0.6	0.6	0.6	0.6
		0.9	0.9	0.9	0.9

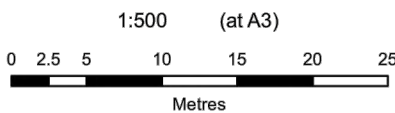
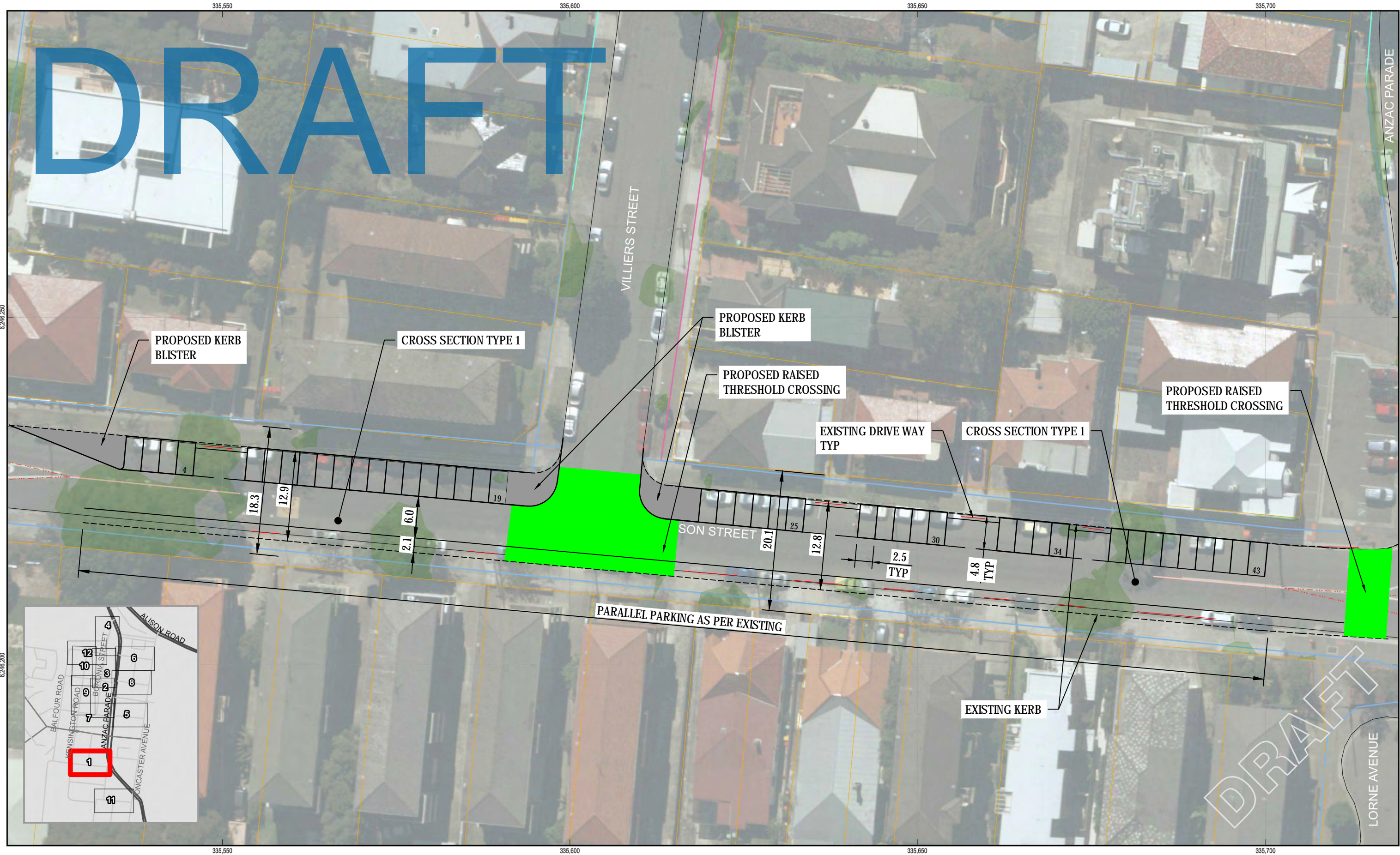
DIMENSIONS IN METRES

NOTES:

- Dimension D is selected as follows (see Note 2):
 D_1 —where parking is to a wall or high kerb not allowing any overhang.
 D_2 —where parking is to a low kerb which allows 600 mm overhang.
 D_3 —where parking is controlled by wheelstops installed at right angles to the direction of parking.
- Formulae from which values of D_1 , D_2 and D_3 have been calculated are given in AS 2890.1.
- Dimension M gives the lateral space required when manoeuvring into or out of a parking space. Roadway width limitations are dealt with further in Clause 2.4.
- Dimension J is the extent to which a vehicle can be allowed to obstruct the adjacent moving traffic lane while manoeuvring into or out of a parking space. The value $J = 2.5$ m is appropriate to traffic speeds of 60 km/h or less past the site. At higher speeds it is recommended that J be reduced by 1.0 m for each 10 km/h by which the speed exceeds 60 km/h, with a minimum value of $J = 0$.
- The quoted traffic volumes are one-way maximum hourly volumes, total of all lanes, during the times parking is permitted.

Source: AS2890.5 Parking Facilities Part 5 – On-Street Parking (1993)

Appendix D – Preliminary Angle Parking Concept Sketches (Superseded)



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- | | | | |
|---------------|-------------|-------------------------|------|
| canopy | footpath | Edge Line | Lots |
| road_pavement | Asphalt | Separation Barrier Line | |
| | Brick/Block | | |
| | Concrete | | |

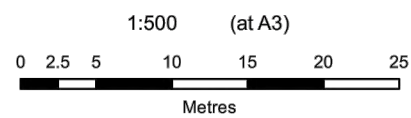
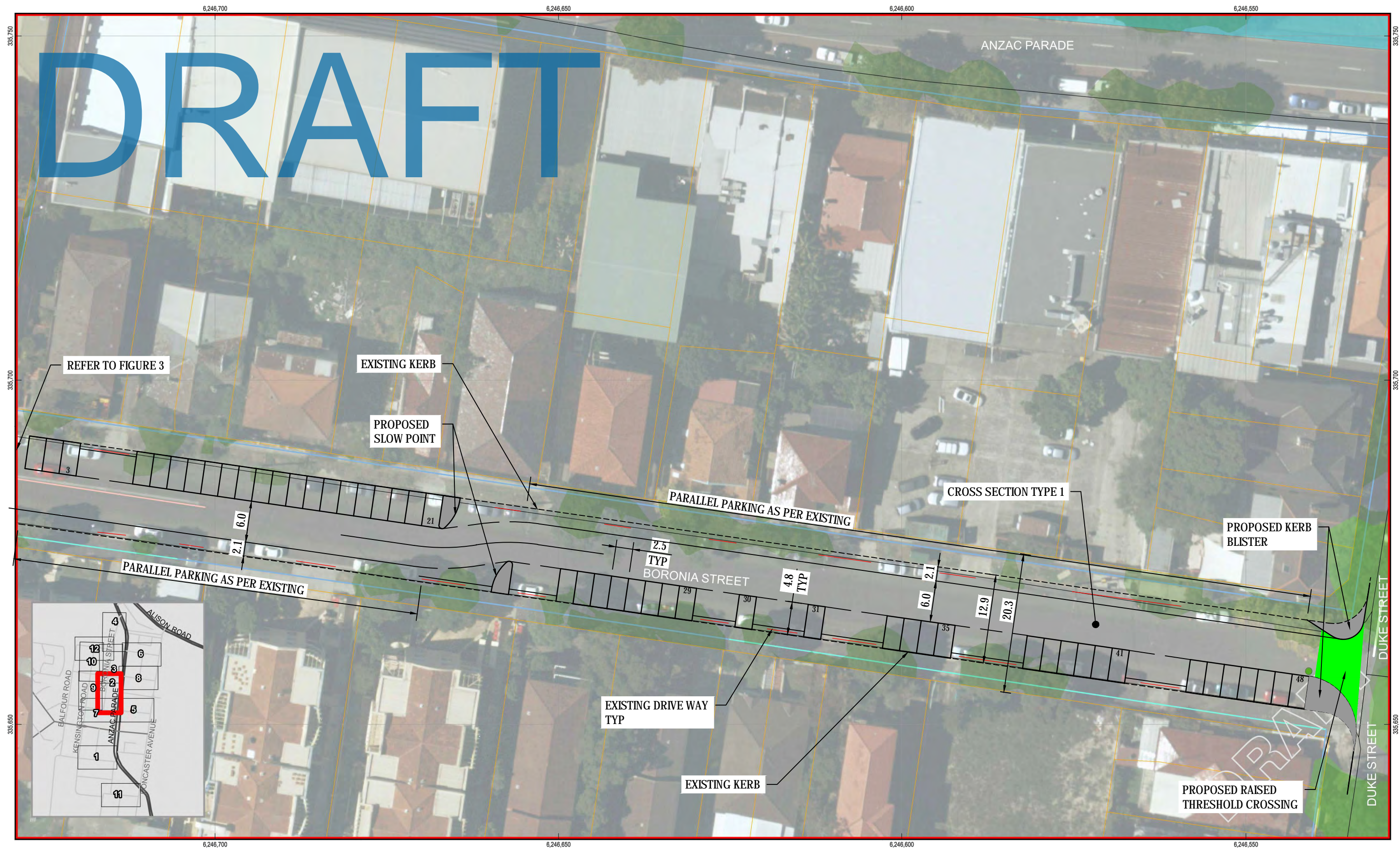


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Date	28 Jan 2014

FIELD MAPS
ADDISON STREET

Figure 1



LEGEND

canopy	road_other_mark 50	footpath	Separation Barrier Line	VEGETATION
significant_tree	Asphalt	Stop Line	Lots	
road_pavement	Concrete			



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Job Number 21-23260
Revision A
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FIELD MAPS BORONIA STREET 1

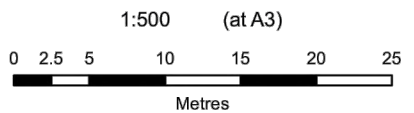
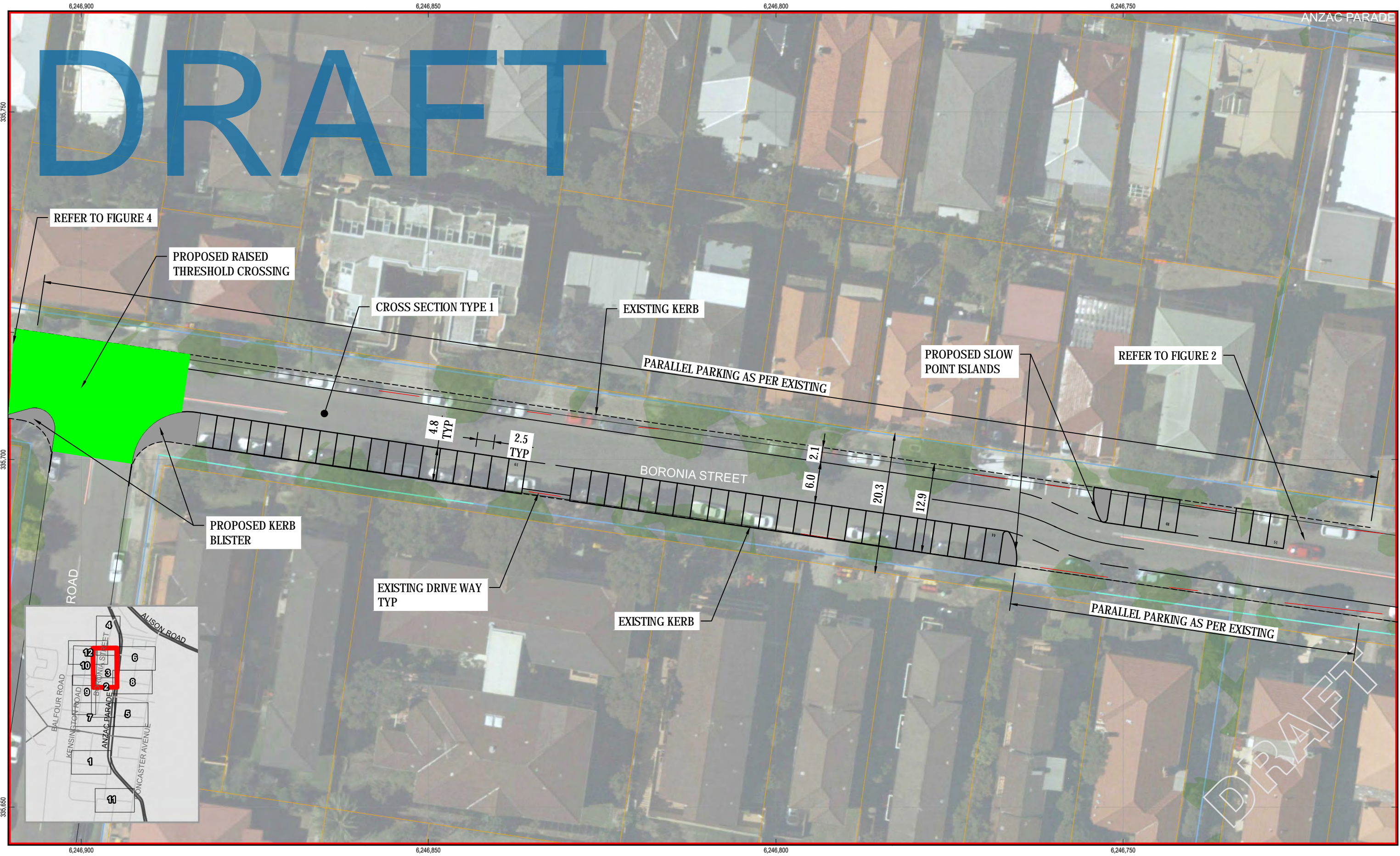
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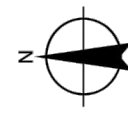
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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- | | | | | |
|---------------|----------|---------|-------------------------|------|
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| road_pavement | Concrete | | | |

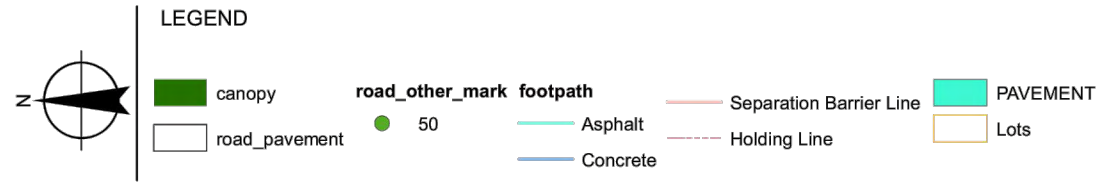
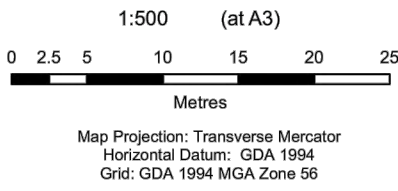
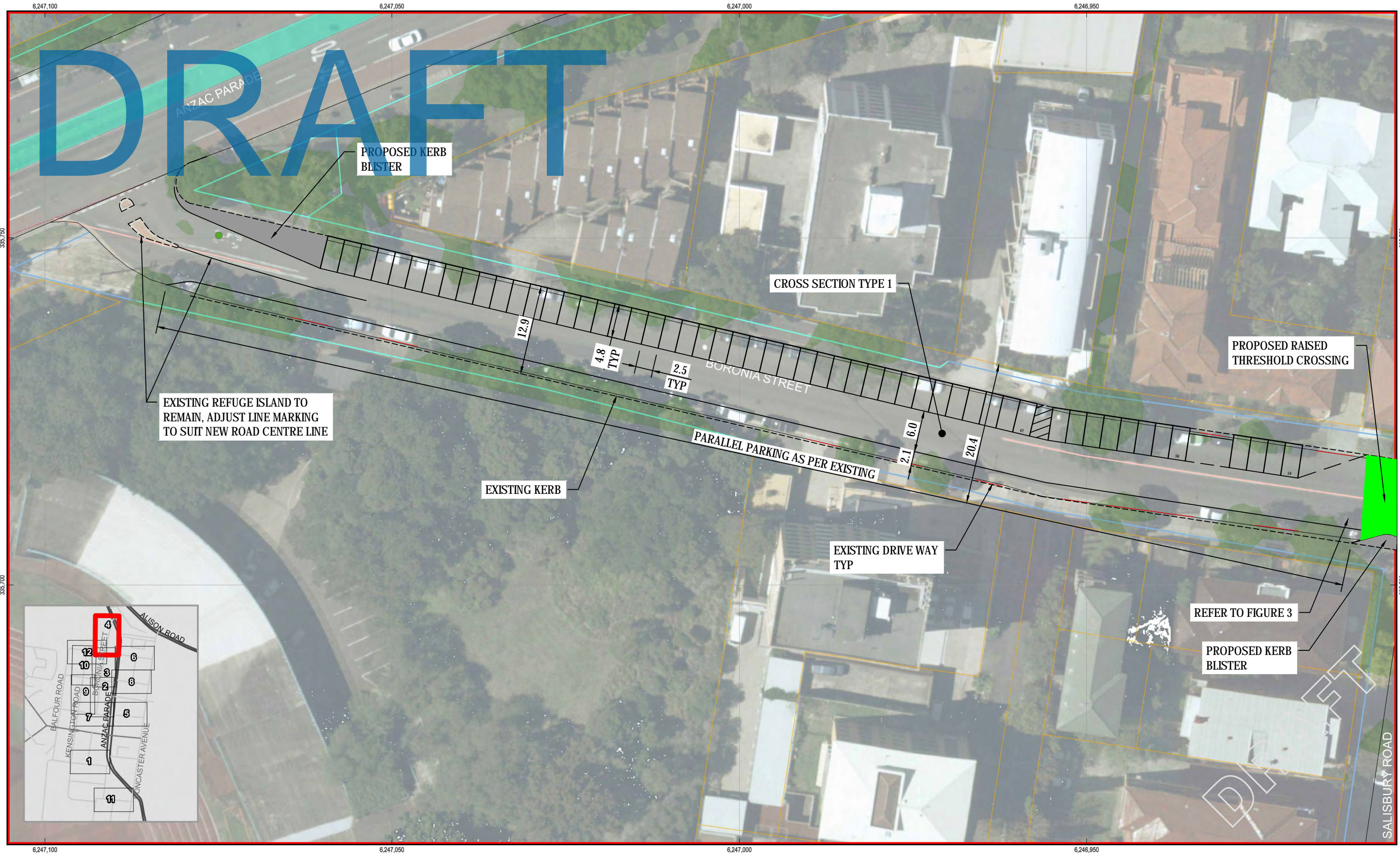


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Revision	A
Date	28 Jan 2014

FIELD MAPS
BORONIA STREET 2

Figure 3

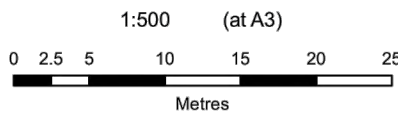
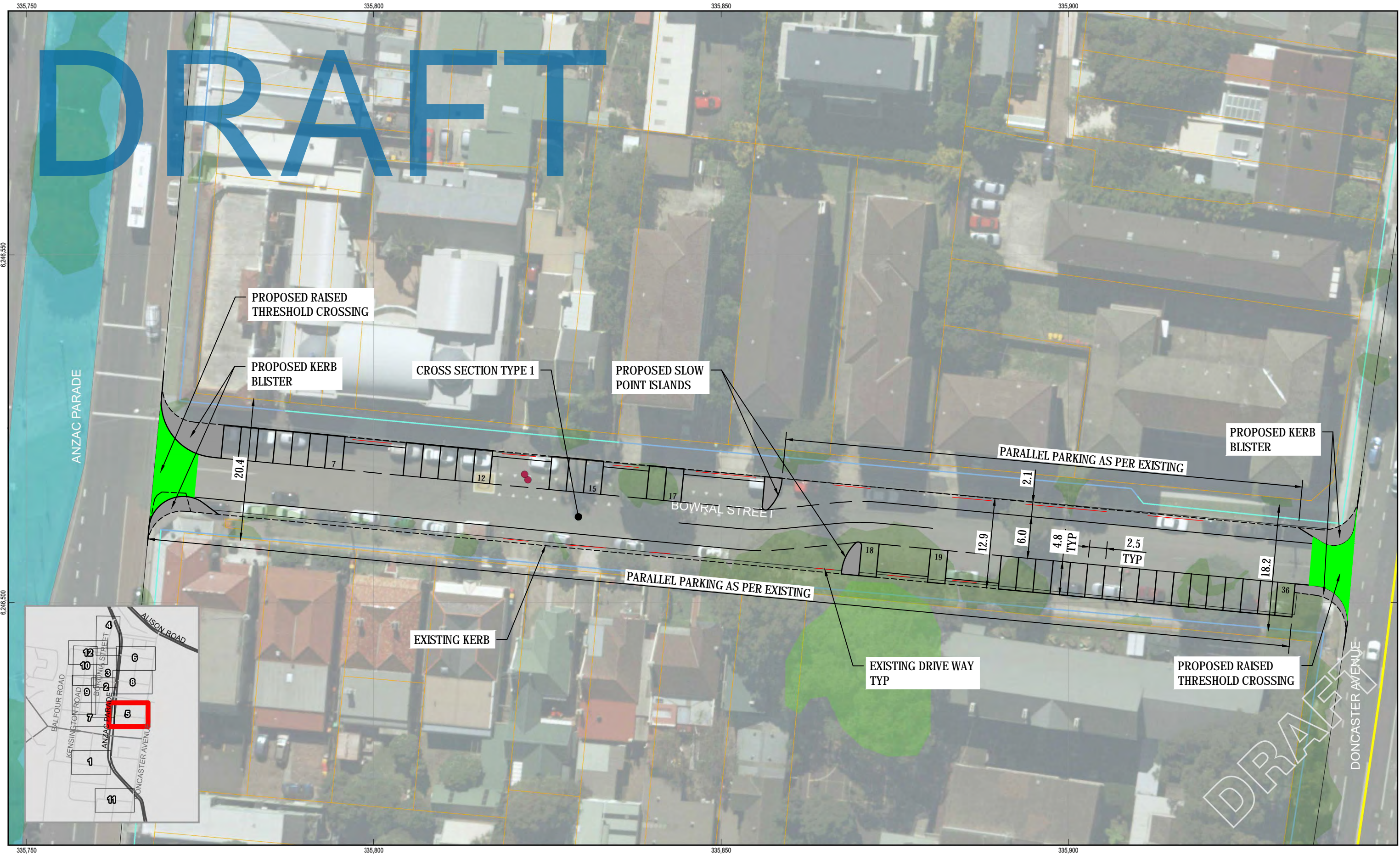


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Job Number 21-23260
Revision A
Date 28 Jan 2014

FIELD MAPS
BORONIA STREET 3

Figure 4



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND				
canopy	road_other_mark	footpath	Separation Barrier Line	VEGETATION
significant_tree	Diamond	Asphalt		Lots
road_pavement	cycle_route	Concrete		
	Regional Routes			

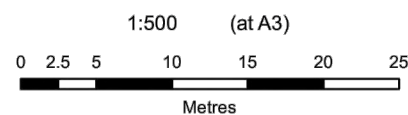
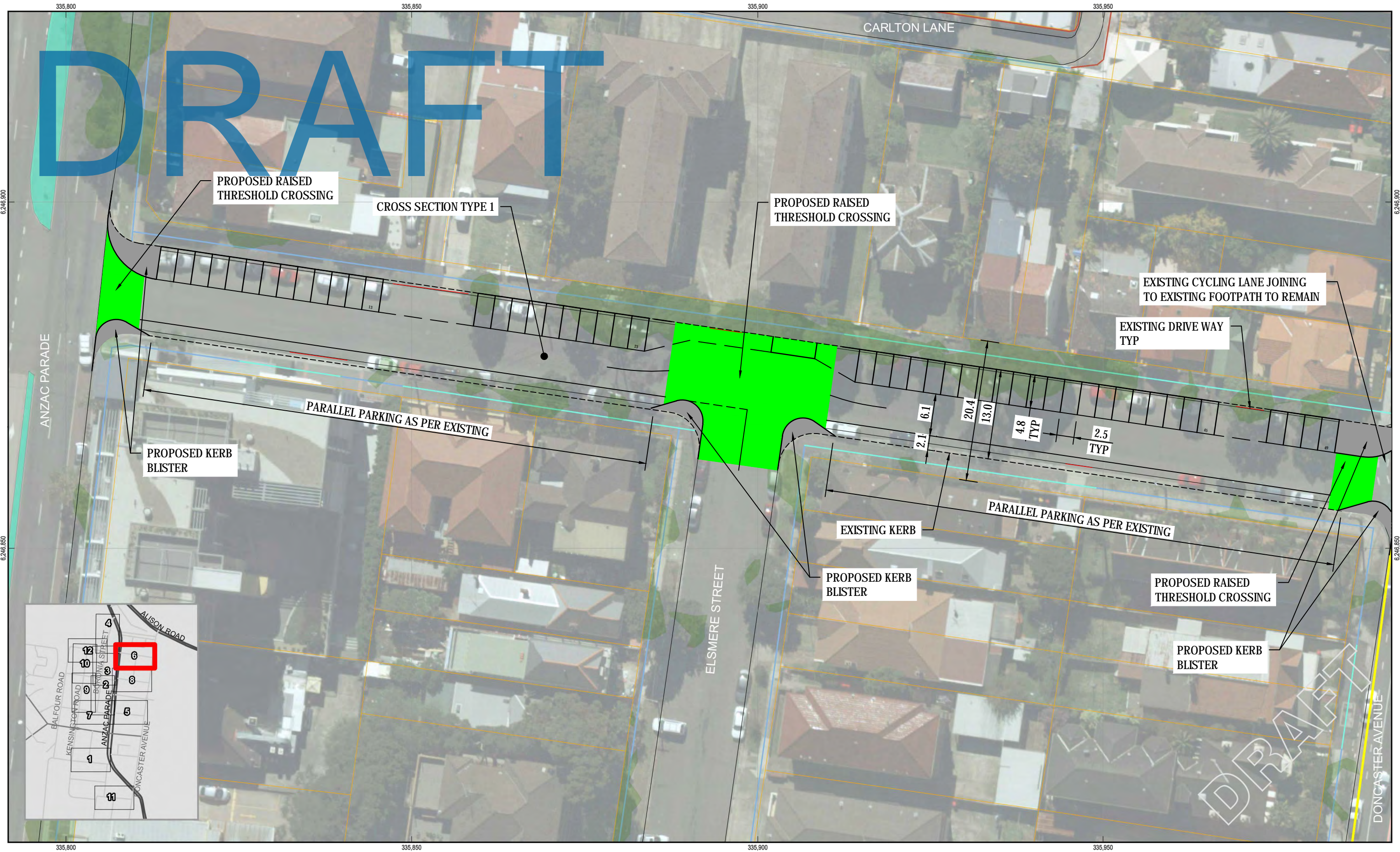


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Date	28 Jan 2014

FIELD MAPS BOWRAL STREET

Figure 5



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

 canopy	 cycle_route	 footpath	 Separation Barrier Line	 PAVEMENT
 road_pavement	 Regional Routes	 Asphalt		 Lots
		 Concrete		
		 Grass		



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Job Number 21-23260
Revision A
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FIELD MAPS
CARLTON STREET

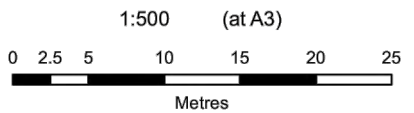
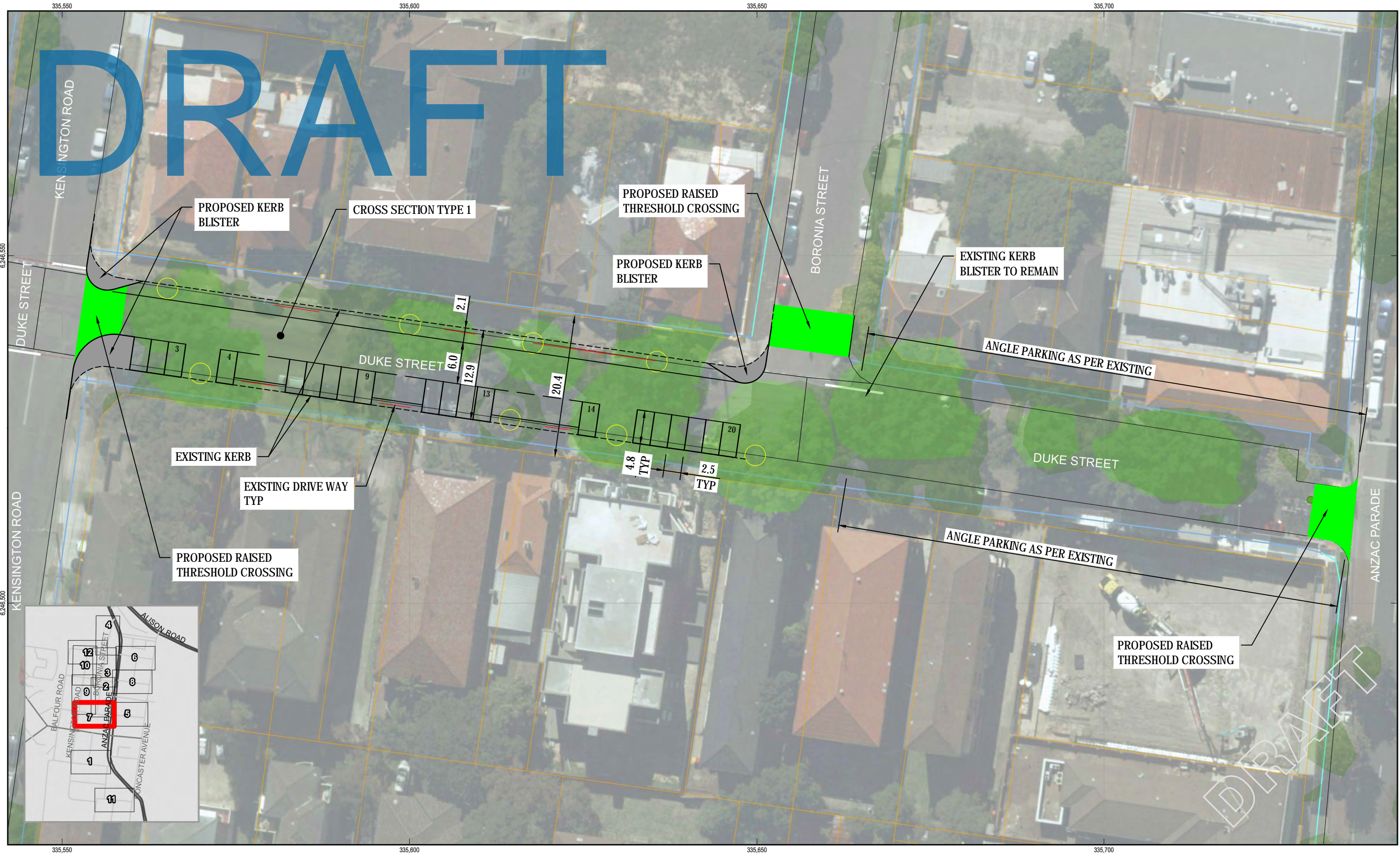
Figure 6

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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- | | | | | |
|------------------|-----------------|----------|--------------|------------|
| canopy | road_other_mark | footpath | Holding Line | VEGETATION |
| significant_tree | 50 | Asphalt | Stop Line | Lots |
| road_pavement | | Concrete | | |

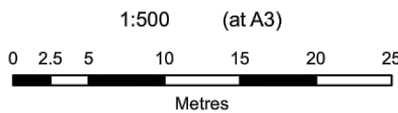
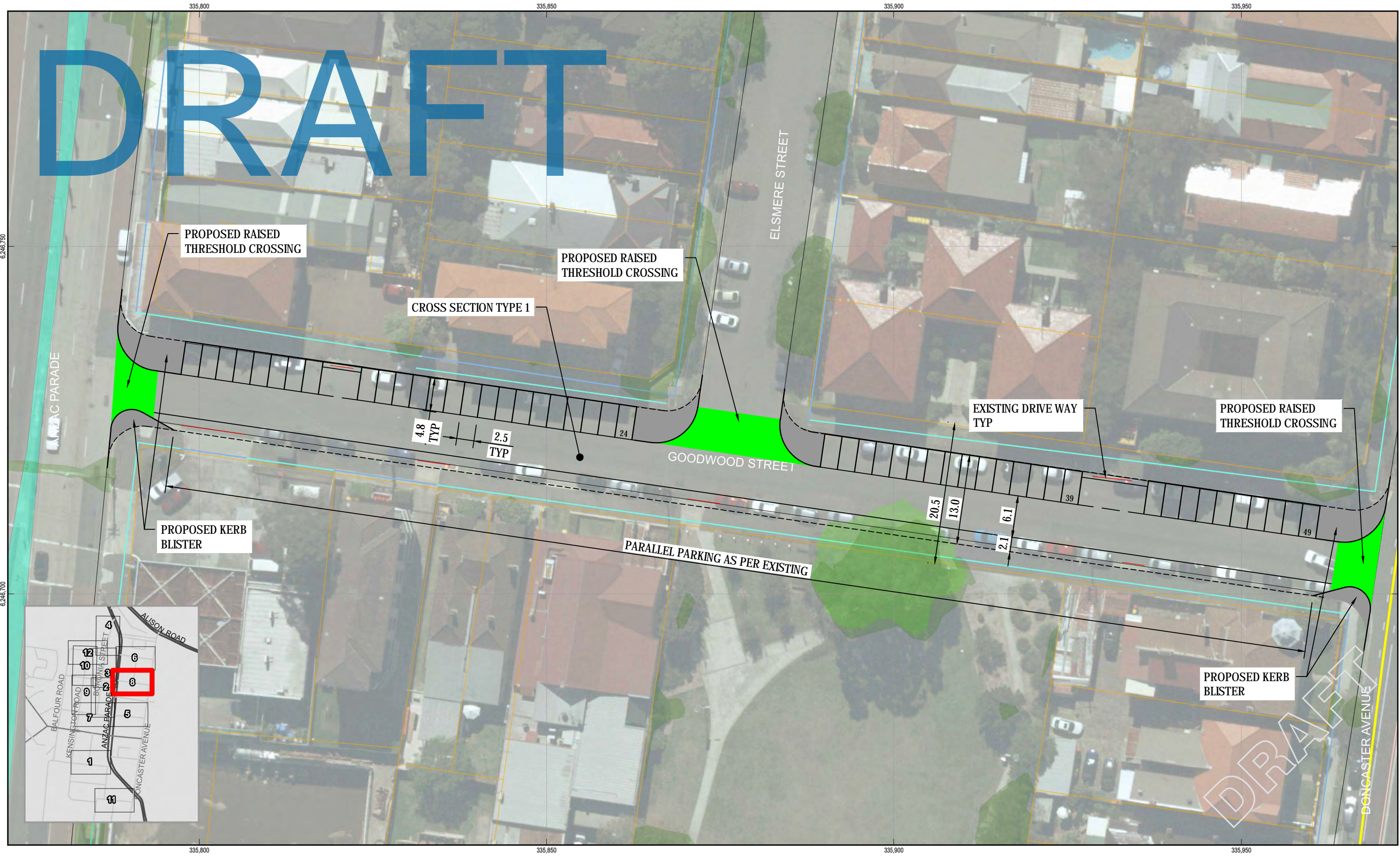


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FIELD MAPS DUKE STREET

Figure 7



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- | | | | | |
|------------------|--------------------|-----------------|-------------------------|----------|
| canopy | cycle_route | footpath | Separation Barrier Line | PAVEMENT |
| significant_tree | Regional Routes | Asphalt | | Lots |
| road_pavement | | Concrete | | |

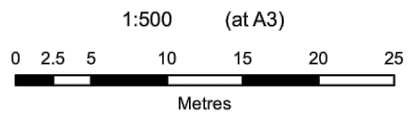
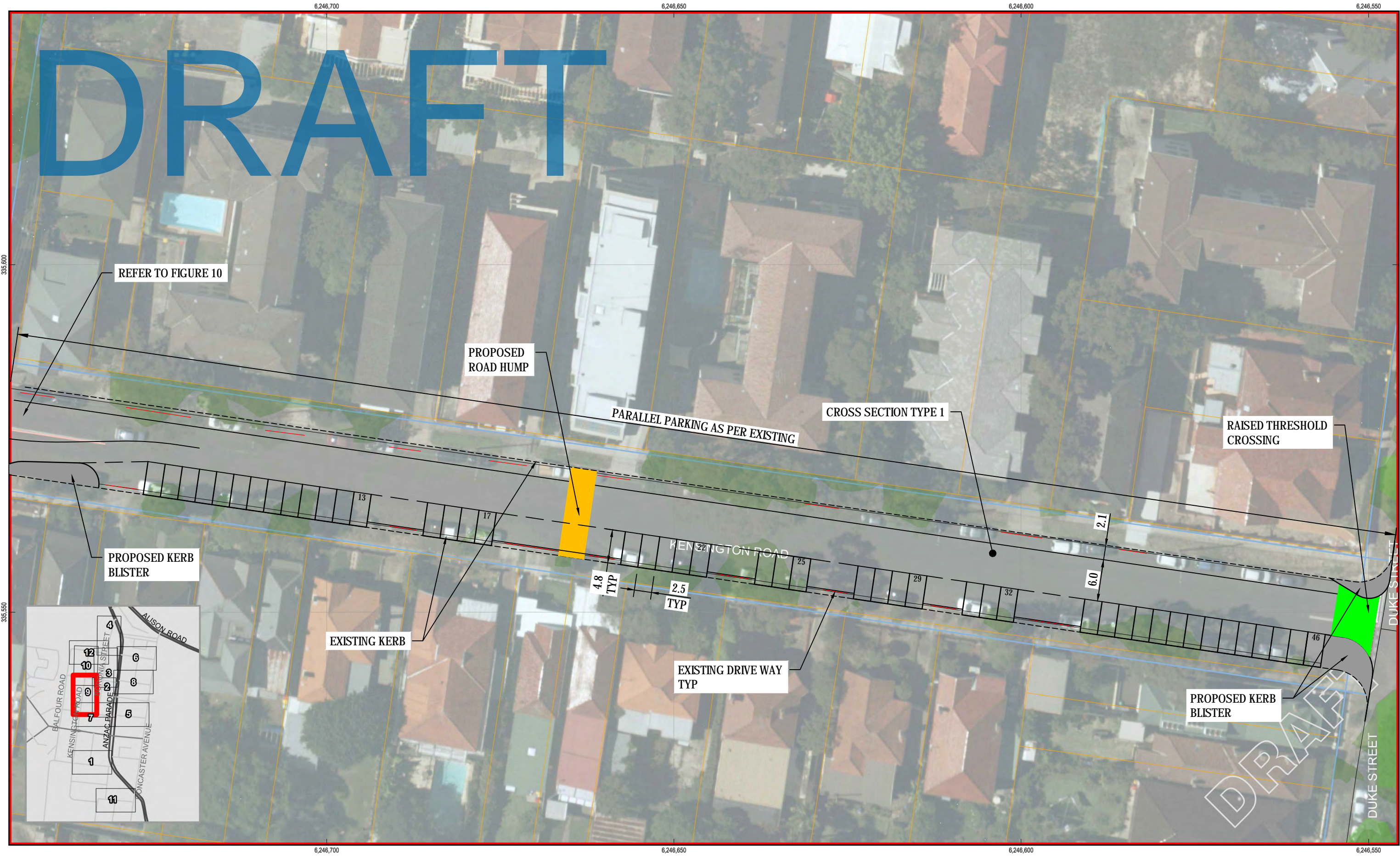


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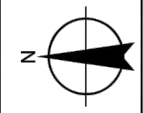
Job Number	21-23260
Revision	A
Date	28 Jan 2014

FIELD MAPS
GOODWOOD STREET

Figure 8



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- | | | | |
|------------------|----------|-------------------------|------|
| canopy | footpath | Separation Barrier Line | Lots |
| significant_tree | Concrete | Holding Line | |
| road_pavement | | Stop Line | |

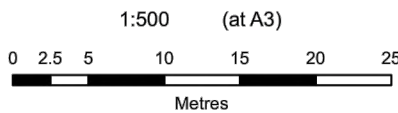
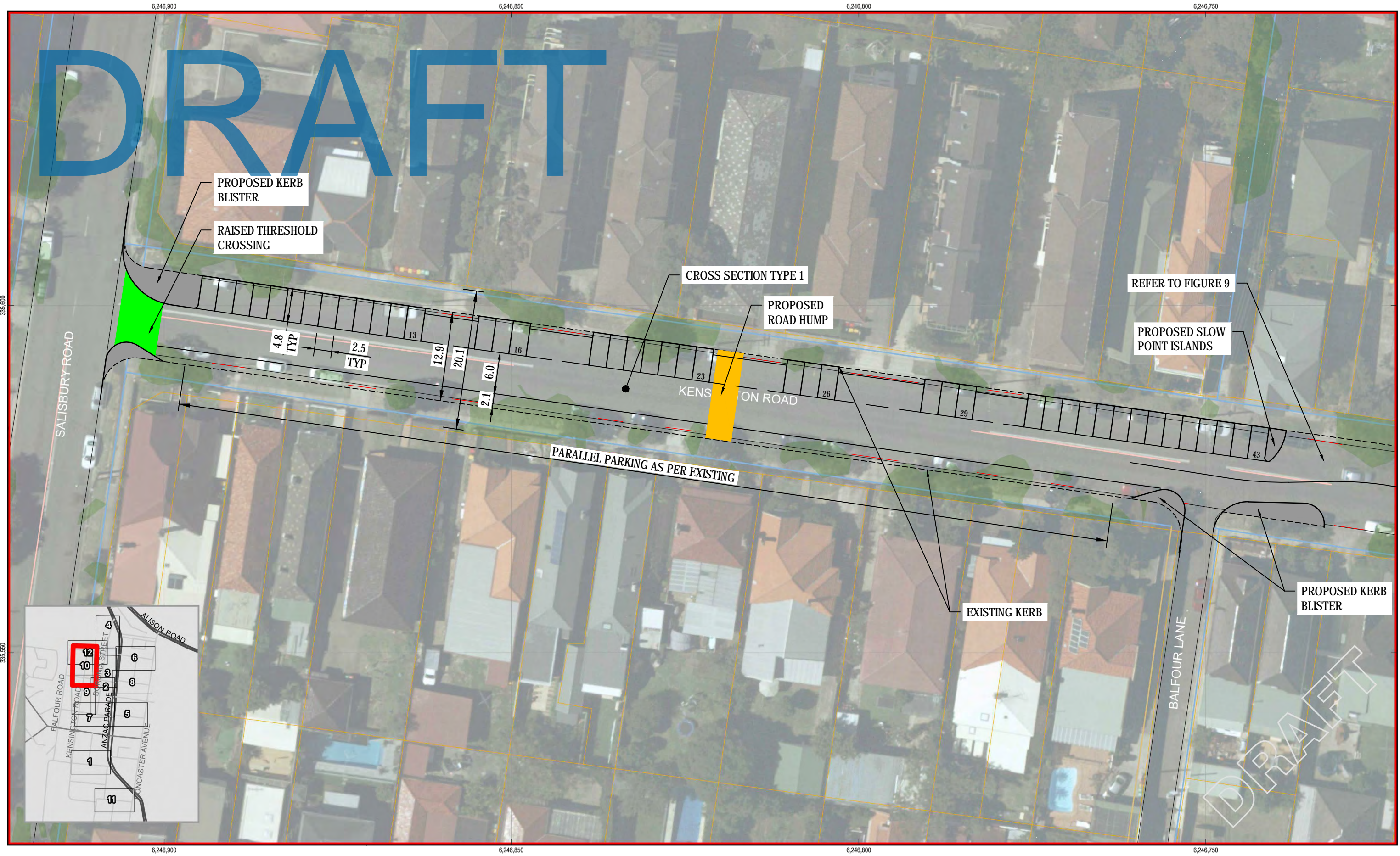


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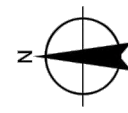
Job Number	21-23260
Revision	A
Date	28 Jan 2014

FIELD MAPS
KENSINGTON ROAD 1

Figure 9



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- canopy
- road_pavement
- footpath Concrete
- footpath None
- Separation Barrier Line
- Lots

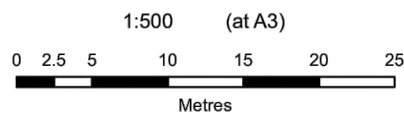
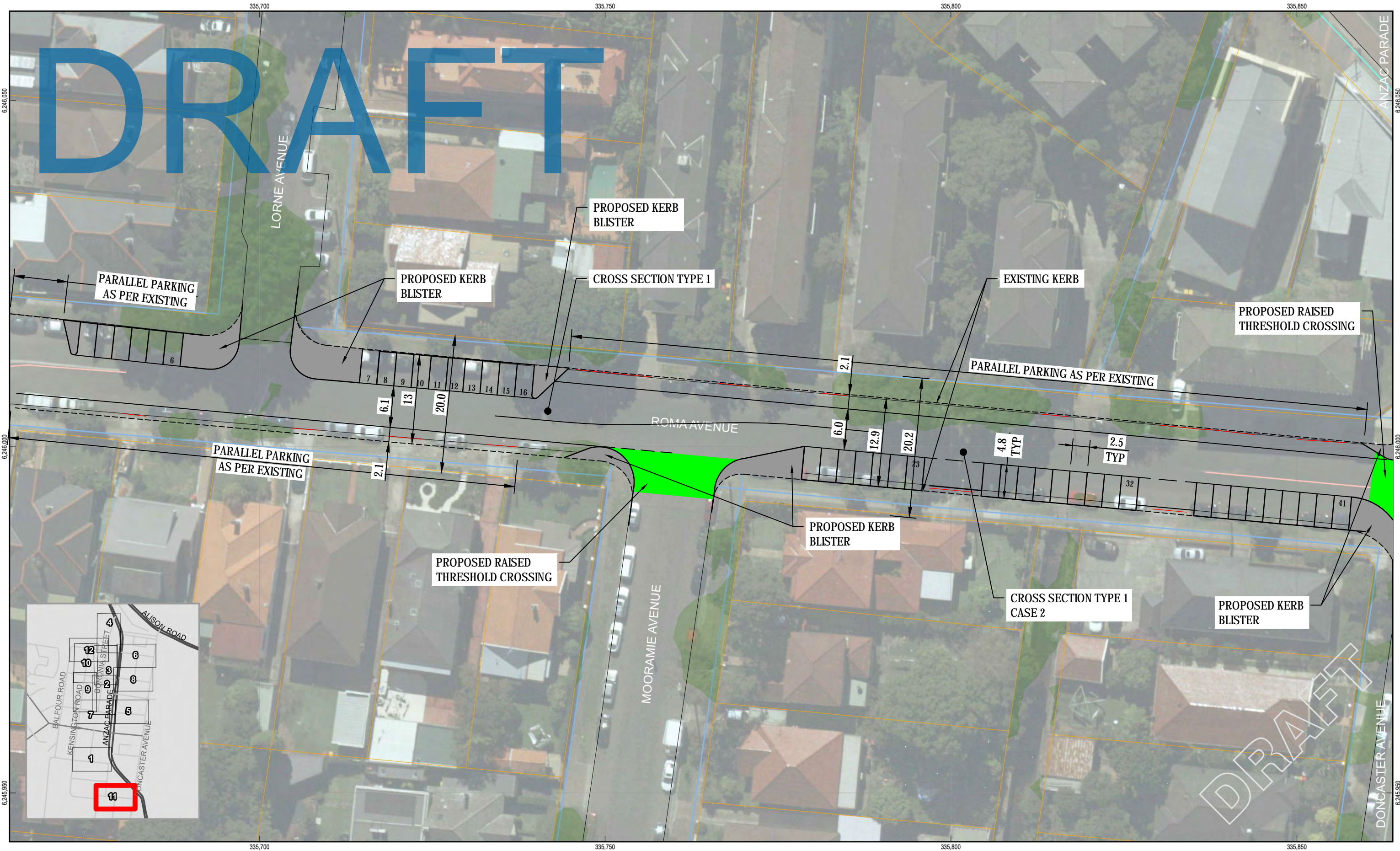


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FIELD MAPS
KENSINGTON ROAD 2

Figure 10



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- canopy
- road_pavement
- footpath
 - Asphalt
 - Brick/Block
 - Concrete
- Separation Barrier Line
- Lots



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Randwick Light Rail Parking Study

Job Number 21-23260
Revision A
Date 28 Jan 2014

FIELD MAPS ROMA AVENUE

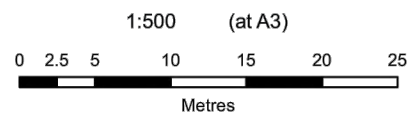
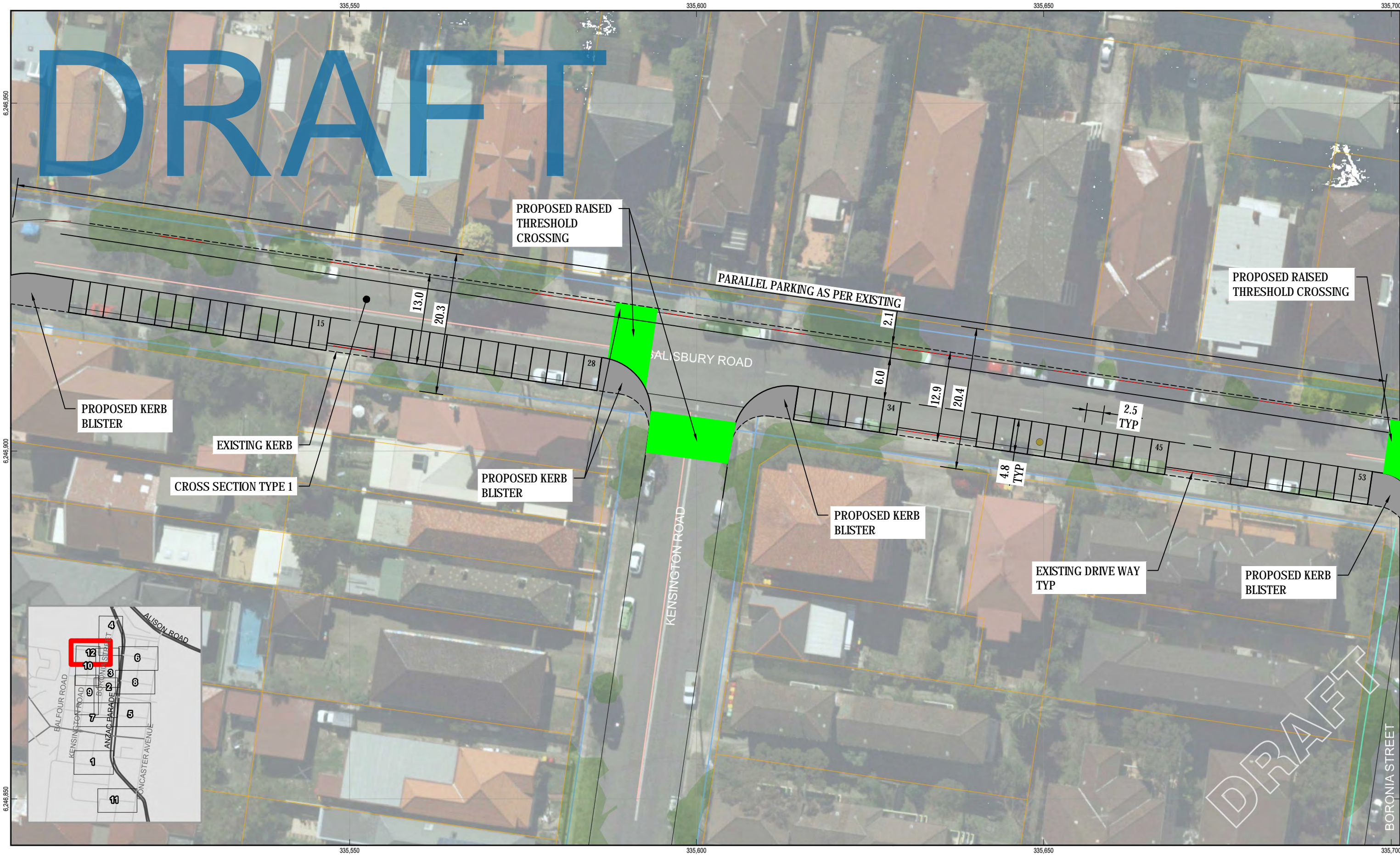
Figure 11

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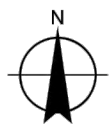
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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- canopy
- road_pavement
- Lots
- Disabled
- Asphalt
- Concrete
- Separation Barrier Line



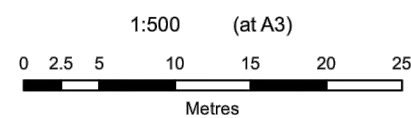
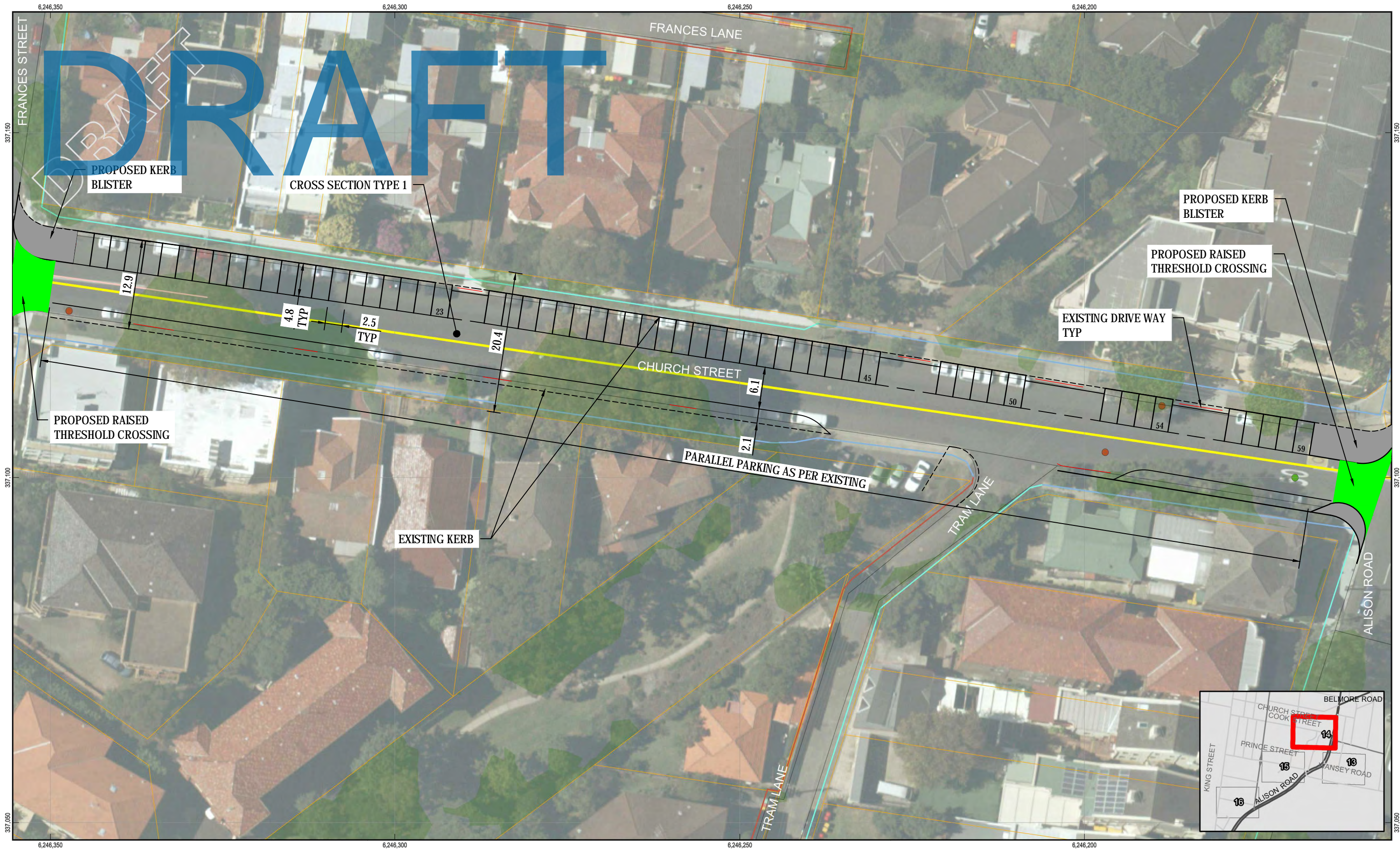
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Job Number 21-23260
Revision A
Date 28 Jan 2014

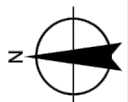
FIELD MAPS SALISBURY ROAD

Figure 12





Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- | | | | | | |
|-----------------------------|--------------------|------------------|-------------------------|-----------|------|
| canopy | road_other_mark 50 | footpath Asphalt | Separation Barrier Line | Stop Line | Lots |
| | Bicycle | Concrete | | | |
| cycle_route Regional Routes | | Grass | | | |



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Revision	A
Date	28 Jan 2014

FIELD MAPS CHURCH STREET

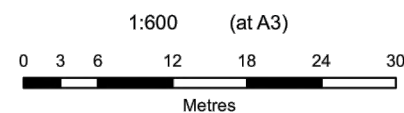
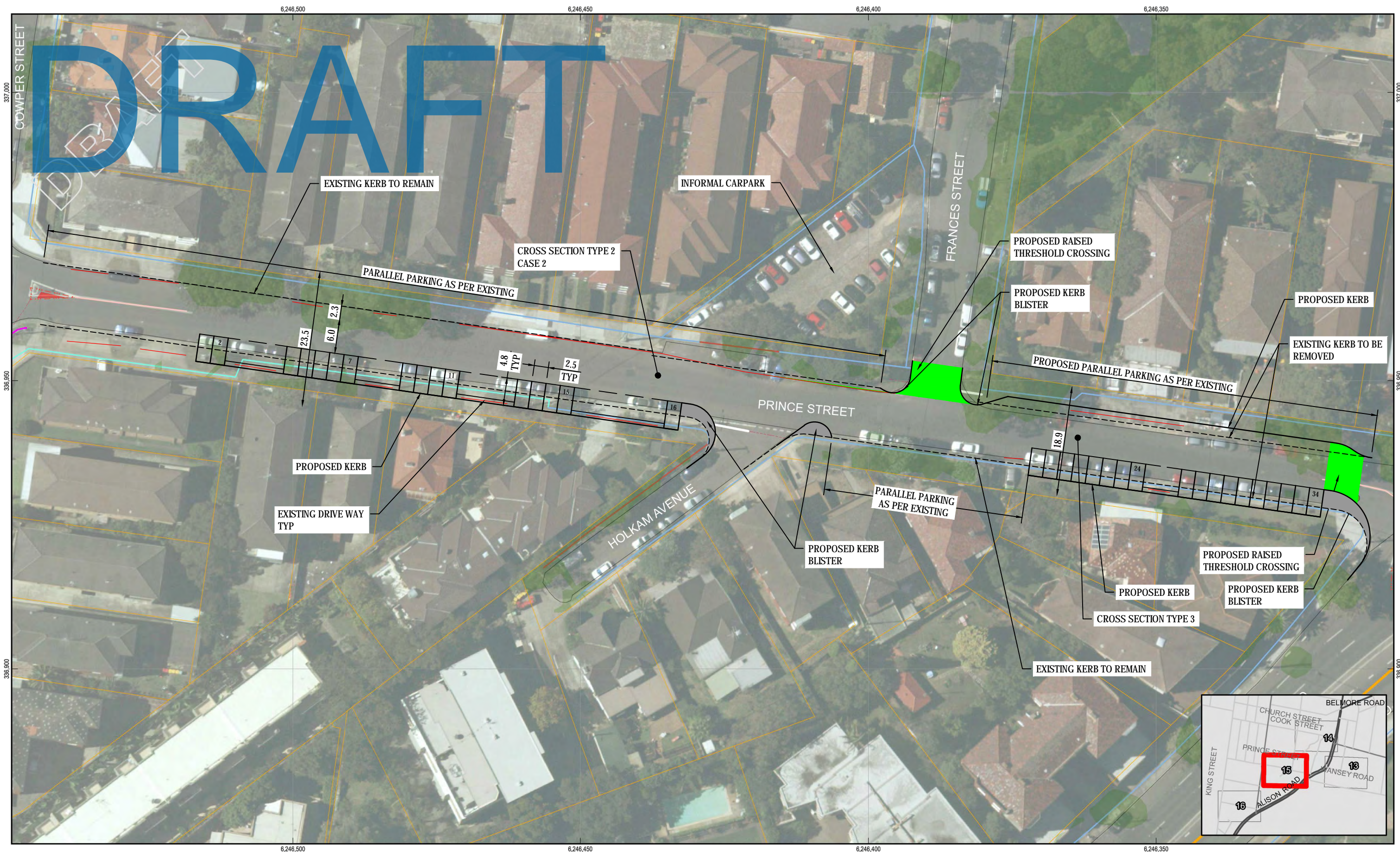
Figure 14

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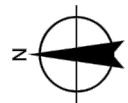
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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

canopy	road_other_mark	footpath	Guard Rail	Holding Line	Lots
50	cycle_route	Asphalt	Edge Line	Stop Line	
Local Routes	Grass	Concrete	Separation Barrier Line	road_medium_mark	



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Randwick Light Rail Parking Study

Job Number 21-23260
Revision A
Date 28 Jan 2014

FIELD MAPS PRINCE STREET

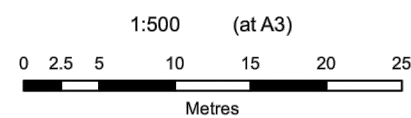
Figure 15

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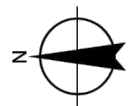
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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- | | | | | | |
|--------------|-----------------|-------------------------|-----------|---------------------------|------|
| canopy | road_other_mark | footpath | Edge Line | Pedestrian Crosswalk Line | Lots |
| 50 | Asphalt | Concrete | Lane Line | Stop Line | |
| Local Routes | Grass | Separation Barrier Line | | | |



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Job Number 21-23260
Revision A
Date 28 Jan 2014

FIELD MAPS WILLIAM STREET

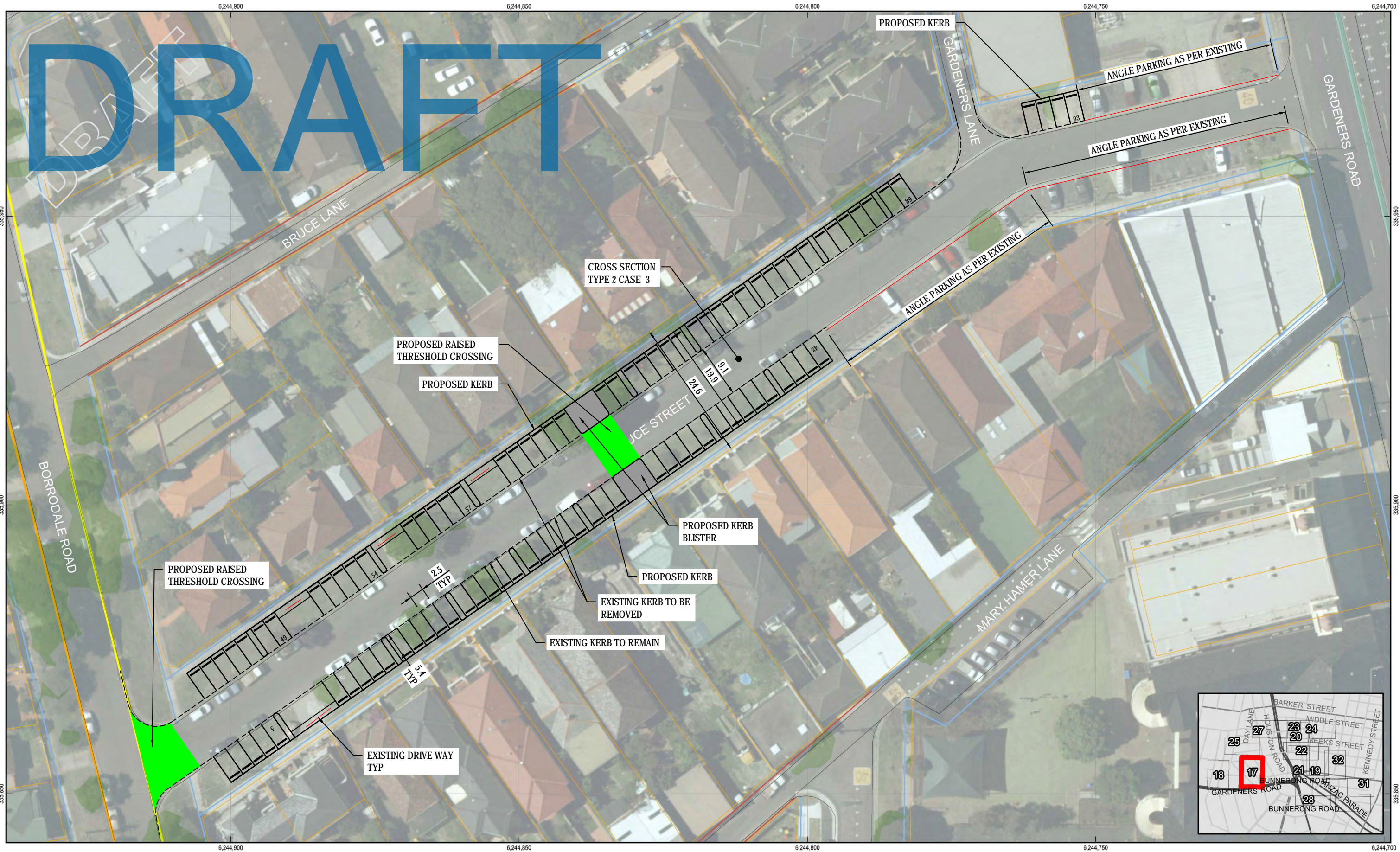
Figure 16

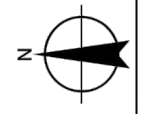
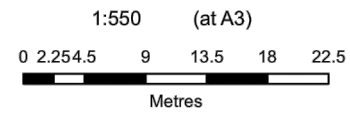
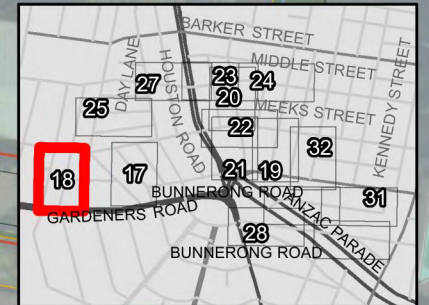
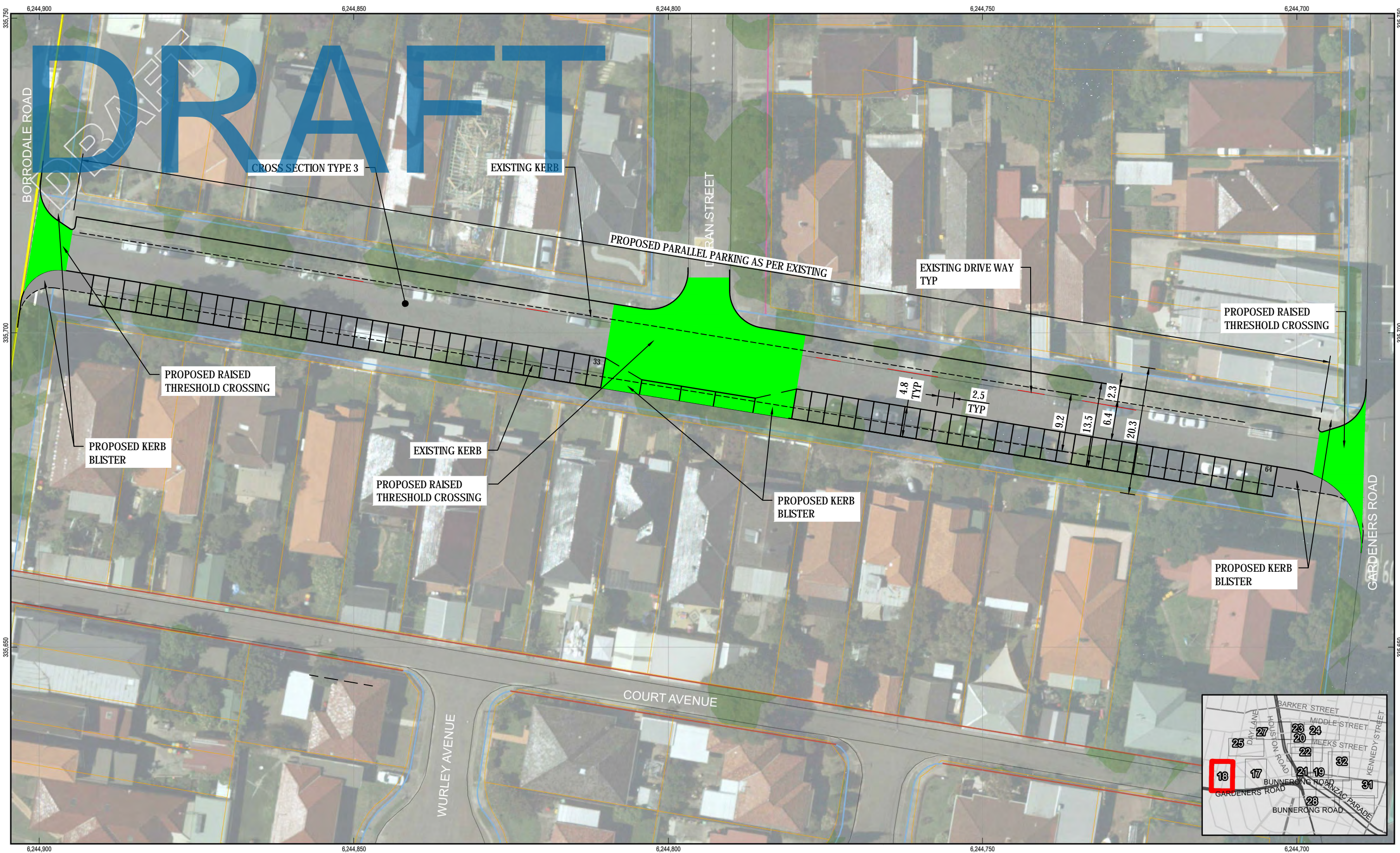
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LEGEND				
 canopy	 cycle_route	 footpath	 Holding Line	
	 Regional Routes	 Brick/Block	 Stop Line	 Lots
		 Concrete		
		 Grass		

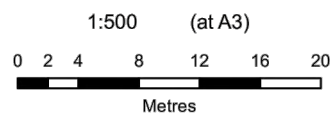
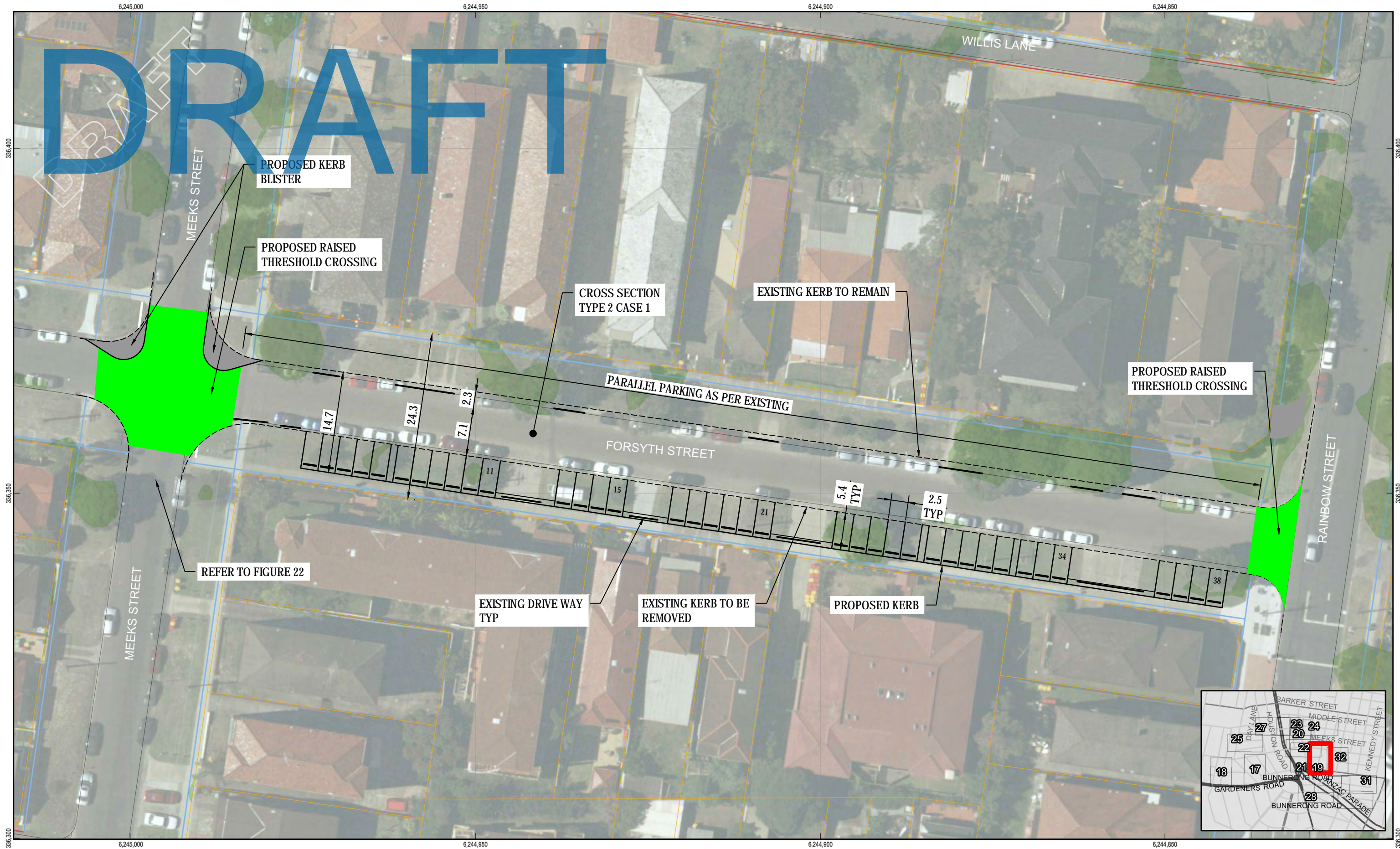


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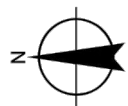
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Revision	A
Date	28 Jan 2014

FIELD MAPS DONCASTER AVENUE

Figure 18



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- | | | | |
|----------|-----------|--------------|------|
| canopy | footpath | Holding Line | Lots |
| Concrete | Stop Line | | |
| Grass | | | |



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Job Number	21-23260
Revision	A
Date	28 Jan 2014

FIELD MAPS FORSYTH STREET

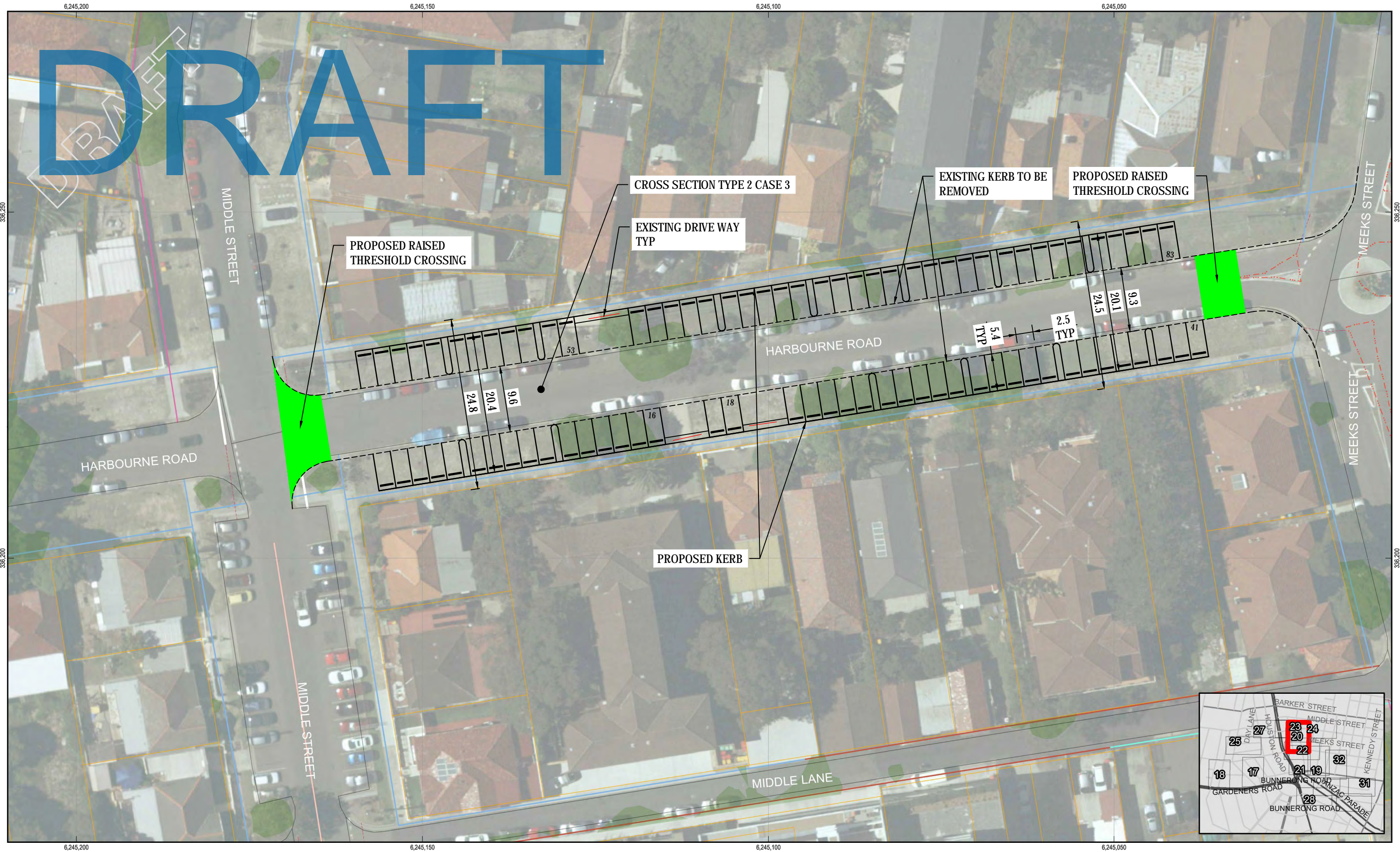
Figure 19

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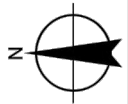
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1:500 (at A3)
0 2 4 8 12 16 20
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- | | | | | |
|-------------|-------------------------|-----------|--------------|------|
| canopy | footpath | Edge Line | Holding Line | Lots |
| Asphalt | Separation Barrier Line | Stop Line | | |
| Brick/Block | | | | |
| Concrete | | | | |
| Grass | | | | |

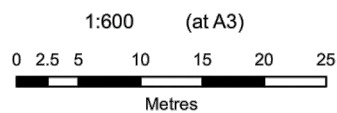
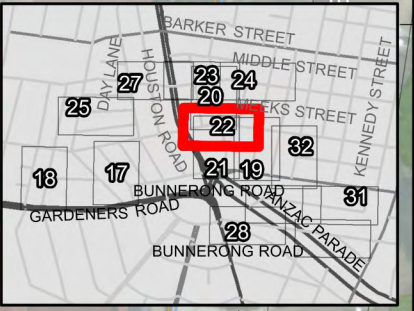
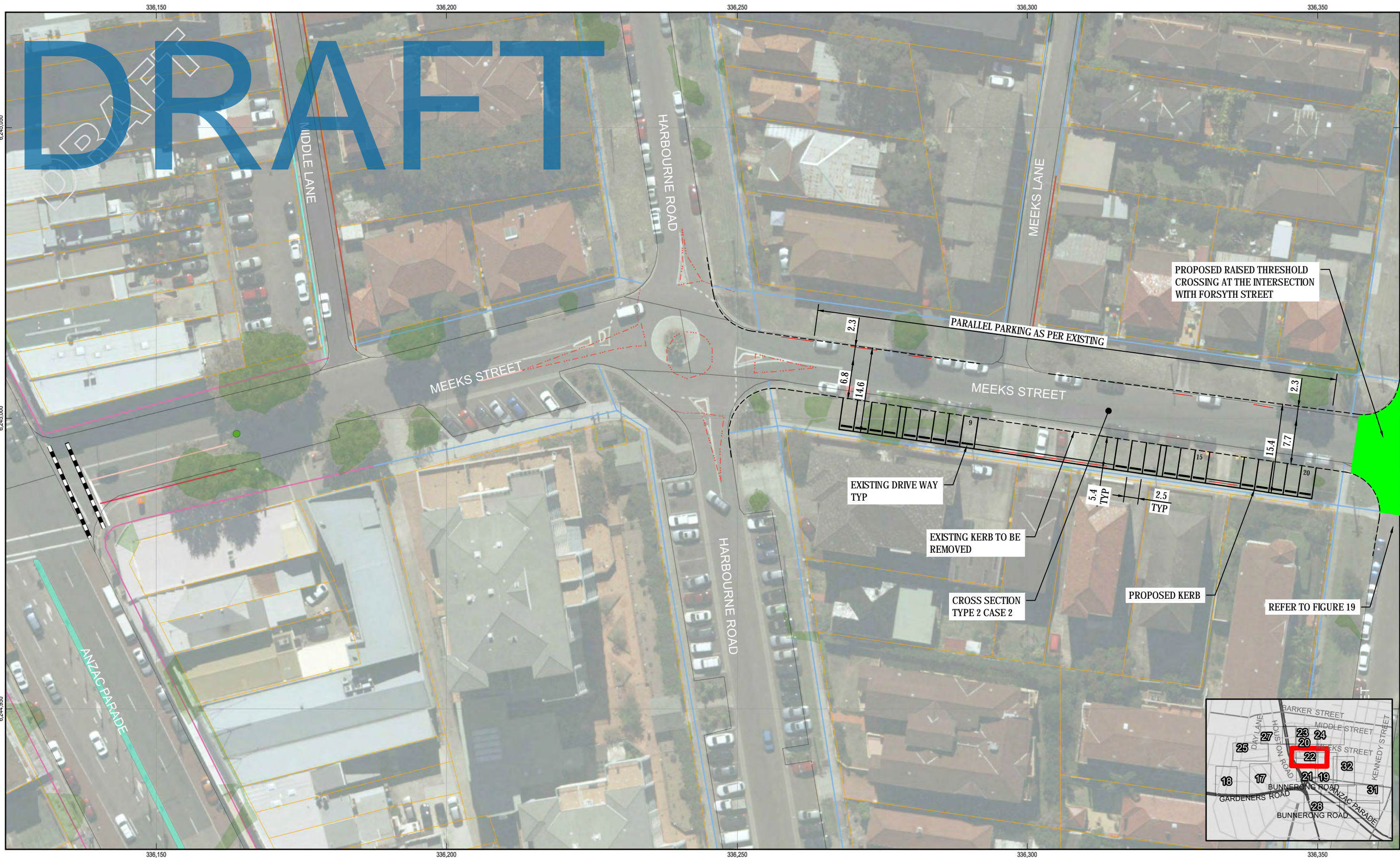


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Job Number 21-23260
Revision A
Date 28 Jan 2014

FIELD MAPS HARBOUR ROAD 1

Figure 20



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- | | | | | | |
|-------------|-------------------------|-----------|---------------------------|--------------|----------|
| canopy | road_other_mark | footpath | Edge Line | Holding Line | PAVEMENT |
| 50 | Asphalt | Lane Line | Pedestrian Crosswalk Line | Stop Line | Lots |
| Brick/Block | Separation Barrier Line | Grass | | | |



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Job Number 21-23260
Revision A
Date 28 Jan 2014

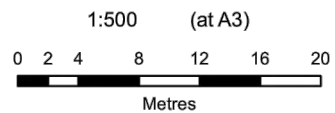
FIELD MAPS
MEEKS STREET

Figure 22

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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND					
canopy	road_other_mark	footpath	Separation Barrier Line	Holding Line	PAVEMENT
50	Asphalt	Brick/Block	Pedestrian Crosswalk Line	Stop Line	Lots
	Concrete	Grass			

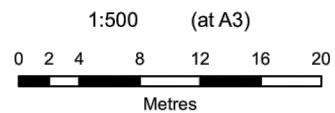
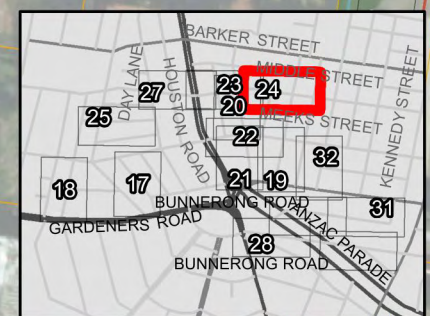


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Job Number	21-23260
Revision	A
Date	28 Jan 2014

FIELD MAPS MIDDLE STREET 1

Figure 23



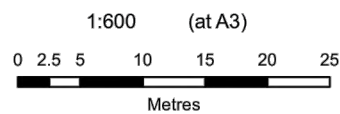
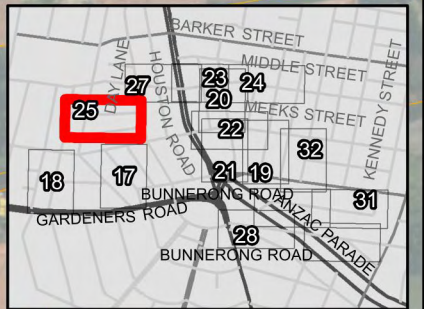
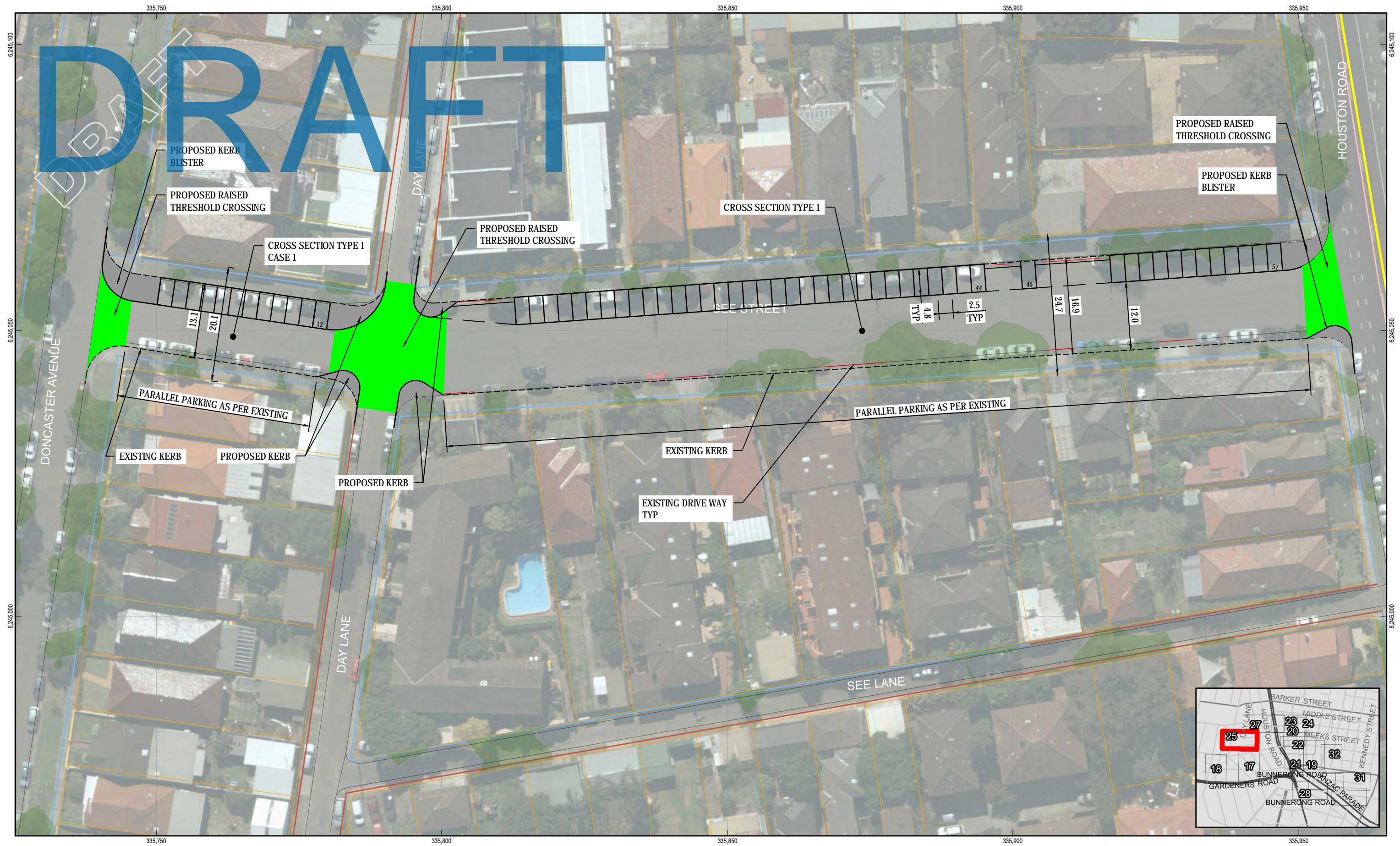
LEGEND			
canopy	footpath	Holding Line	Lots
	Brick/Block	Stop Line	
	Concrete		
	Grass		



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	Revision	A
	Date	28 Jan 2014

FIELD MAPS
MIDDLE STREET 2

Figure 24



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- | | | | | | |
|--------|-----------------|----------|-------------------------|--------------|------|
| canopy | cycle_route | footpath | Separation Barrier Line | Holding Line | Lots |
| | Regional Routes | Concrete | | | |
| | | Grass | | | |



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Randwick Light Rail Parking Study

Job Number 21-23260
Revision A
Date 28 Jan 2014

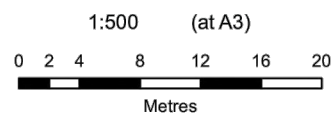
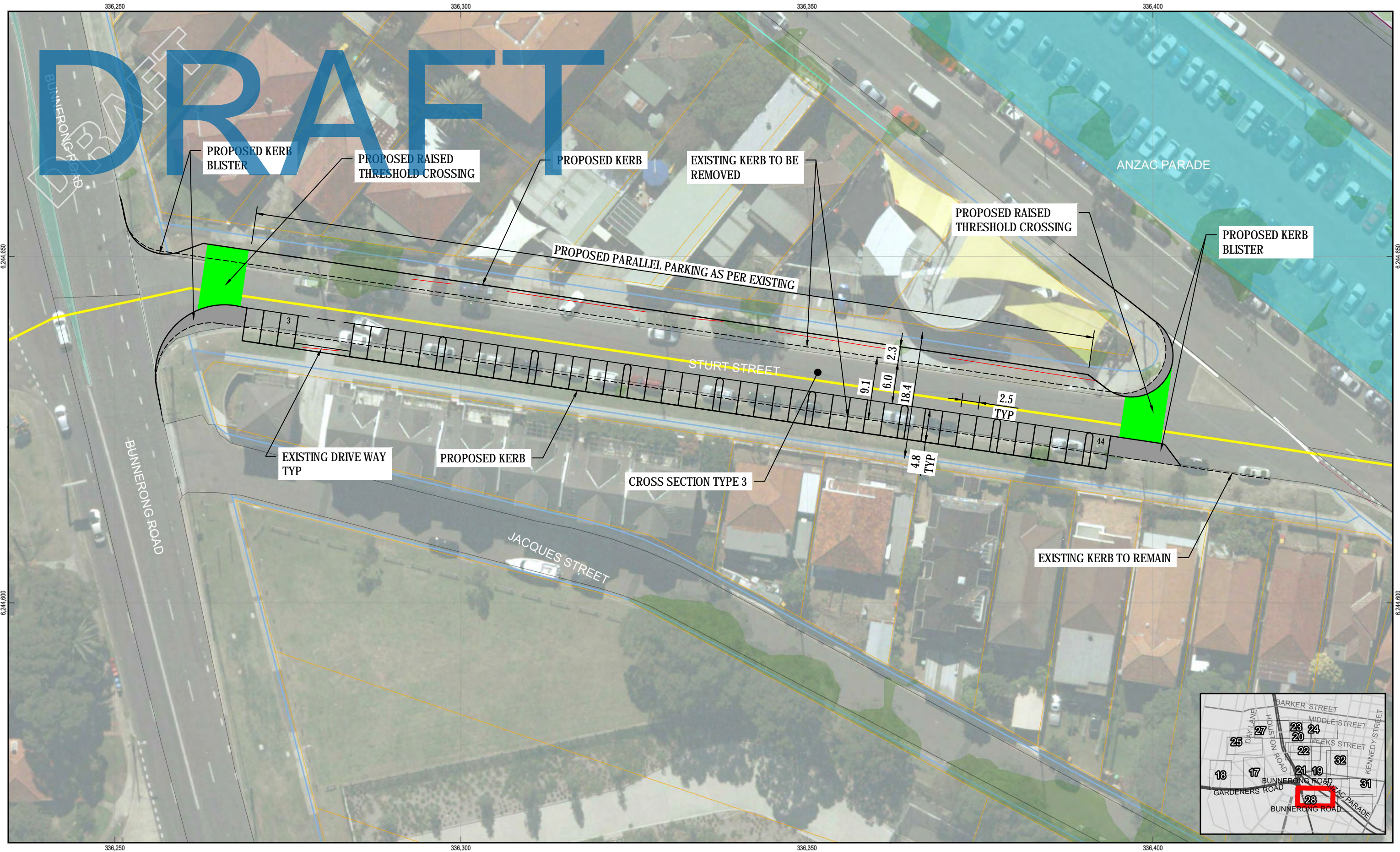
FIELD MAPS SEE STREET

Figure 25

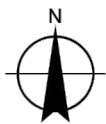
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Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- | | | | | |
|-----------------|--------------|-----------|--------------|------------|
| canopy | cycle_route | footpath | Holding Line | VEGETATION |
| Regional Routes | Asphalt | Stop Line | Lots | |
| | Brick Pavers | | | |
| | Concrete | | | |



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Job Number	21-23260
Revision	A
Date	28 Jan 2014

FIELD MAPS STURT STREET 1

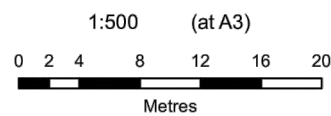
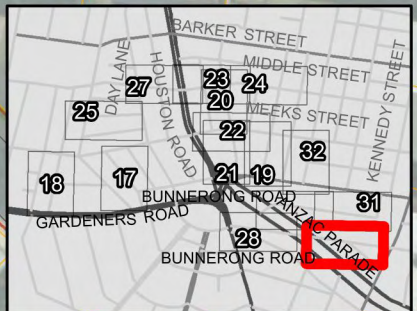
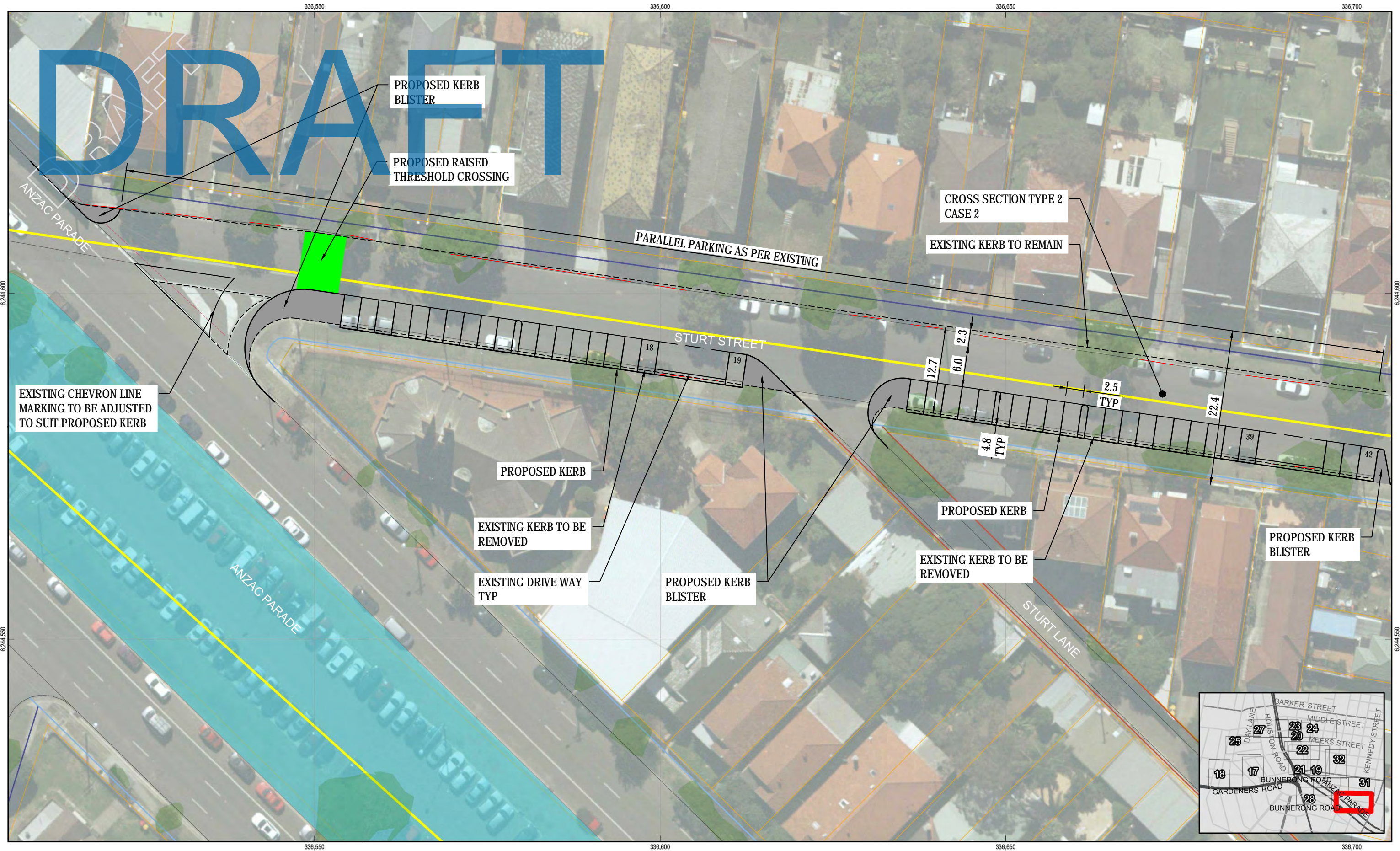
Figure 28

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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- | | | | | |
|-----------------|--------------------|----------------------|--------------|------------|
| canopy | cycle_route | footpath | Holding Line | VEGETATION |
| Regional Routes | Concrete | Concrete Slabs Small | | Lots |
| | Grass | | | |



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Randwick Light Rail Parking Study

Job Number	21-23260
Revision	A
Date	28 Jan 2014

FIELD MAPS STURT STREET 2

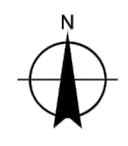
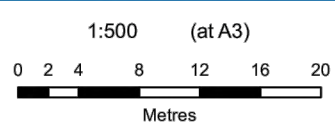
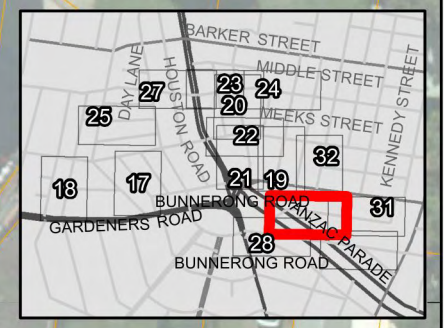
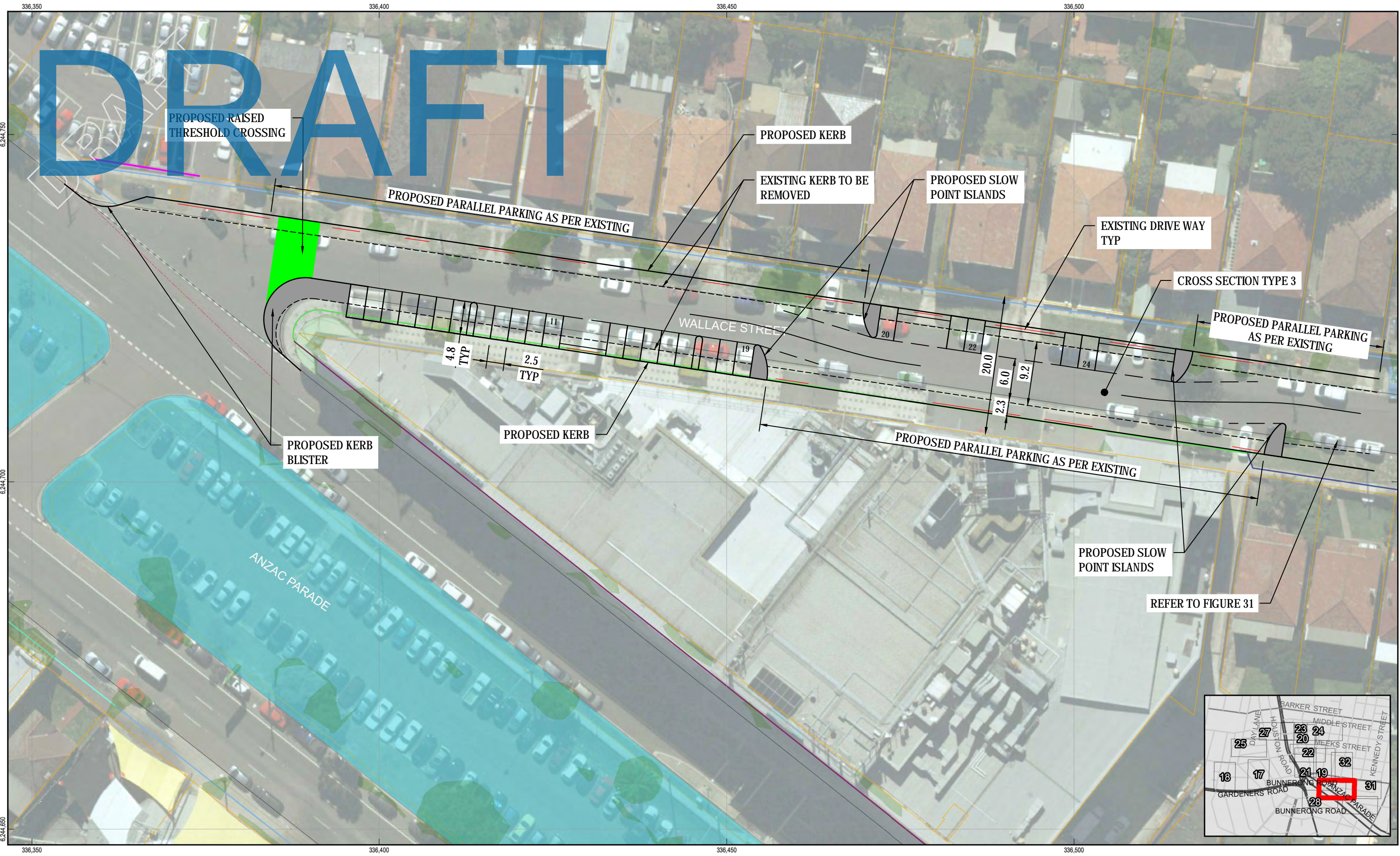
Figure 29

N:\AU\Sydney\Projects\2123260\GIS\Maps\Deliverables\2123260_2001_Field_location_3_2014.mxd

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- | | | | |
|----------------------|-------------------|---------------------|-------------------|
| Footpath | Guard Rail | Holding Line | VEGETATION |
| Asphalt | | | |
| Brick Pavers | | | |
| Brick/Concrete | | | |
| Concrete | | | |
| Concrete Slabs Small | | | |
- Other symbols:** **Lot** **Lot**

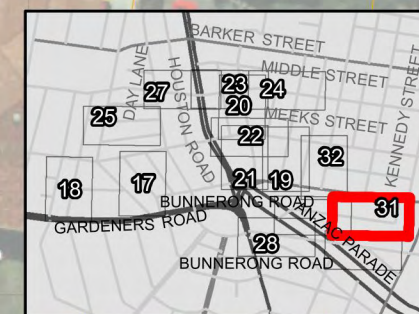


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Randwick Light Rail Parking Study

Job Number	21-23260
Revision	A
Date	28 Jan 2014

FIELD MAPS WALLACE STREET 1

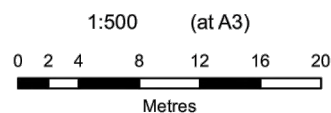
Figure 30



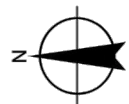
LEGEND



Figure 31



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- | | | | |
|----------|-----------|--------------|------|
| canopy | footpath | Holding Line | Lots |
| Concrete | Stop Line | | |
| Grass | | | |



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Revision	A
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FIELD MAPS WILLIS STREET

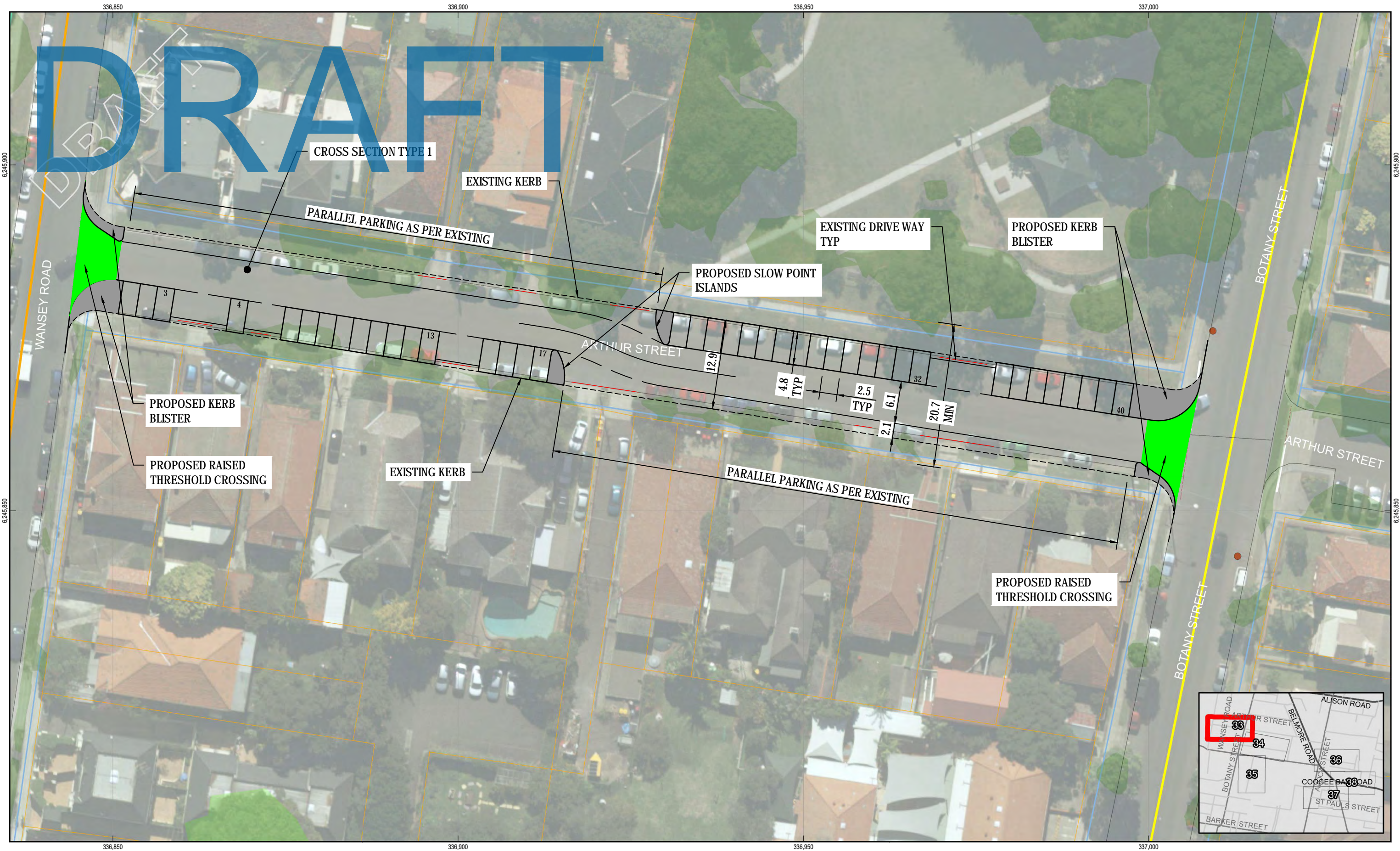
Figure 32

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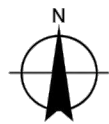
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1:500 (at A3)
0 2 4 8 12 16 20
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- | | | | |
|------------------|-----------------|----------|--------------|
| canopy | road_other_mark | footpath | Holding Line |
| significant_tree | Bicycle | Asphalt | Stop Line |
| Lots | cycle_route | Concrete | |
| | Local Routes | | |
| | Regional Routes | | |



Randwick City Council
Randwick Light Rail Parking Study

Job Number 21-23260
Revision A
Date 04 Mar 2014

FIELD MAPS ARTHUR STREET

Figure 33

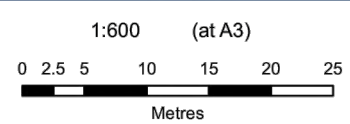
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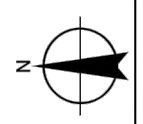
Data source: Data Custodian, Data Set Name/Title, Version/Date. Created by:qjchung

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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND	
	canopy
	cycle_route
	footpath
	Lane Line
	Pedestrian Crosswalk Line
	Lots
	Local Routes
	Concrete
	Stop Line

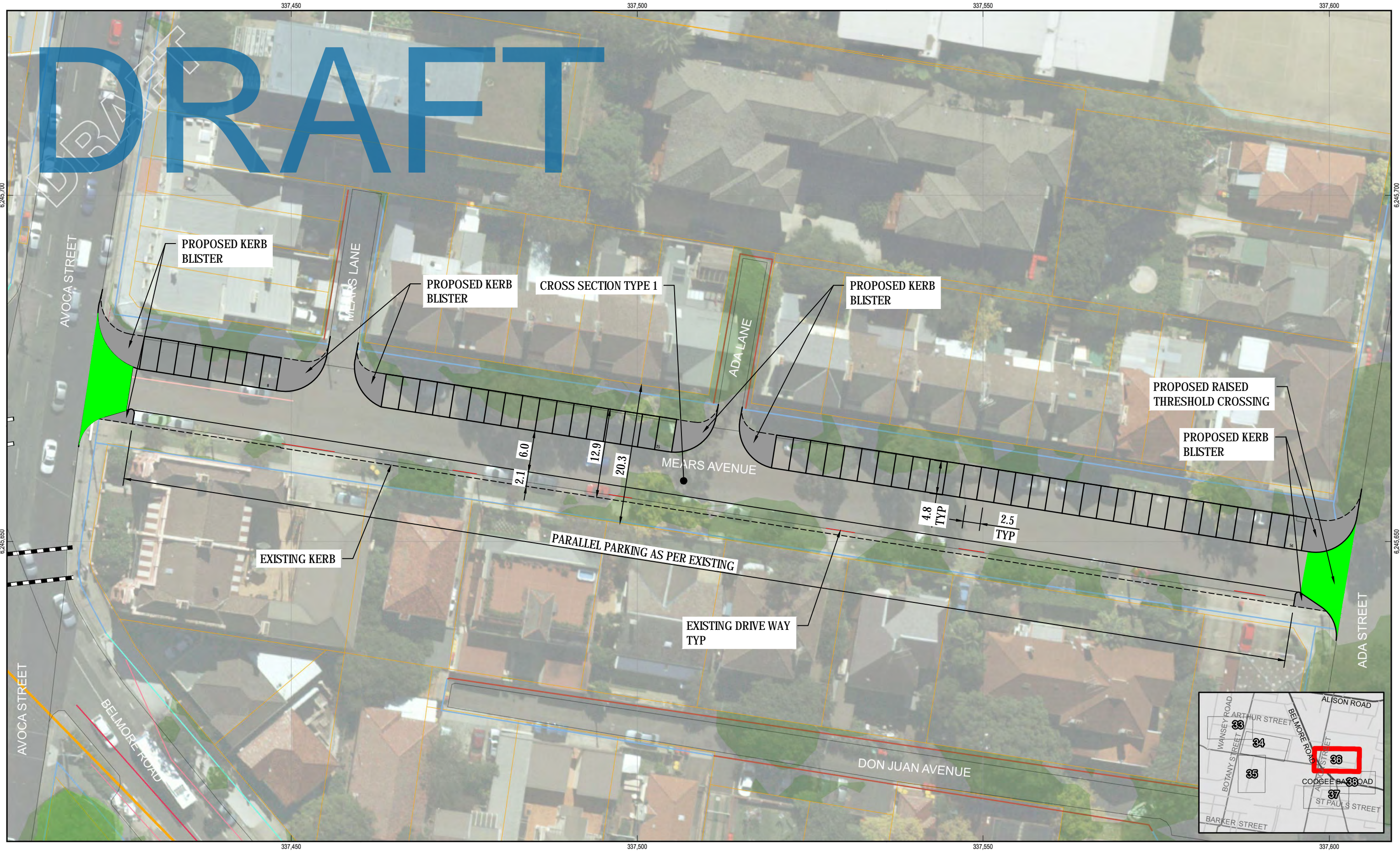


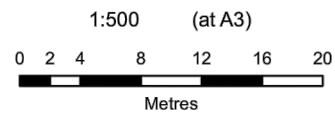
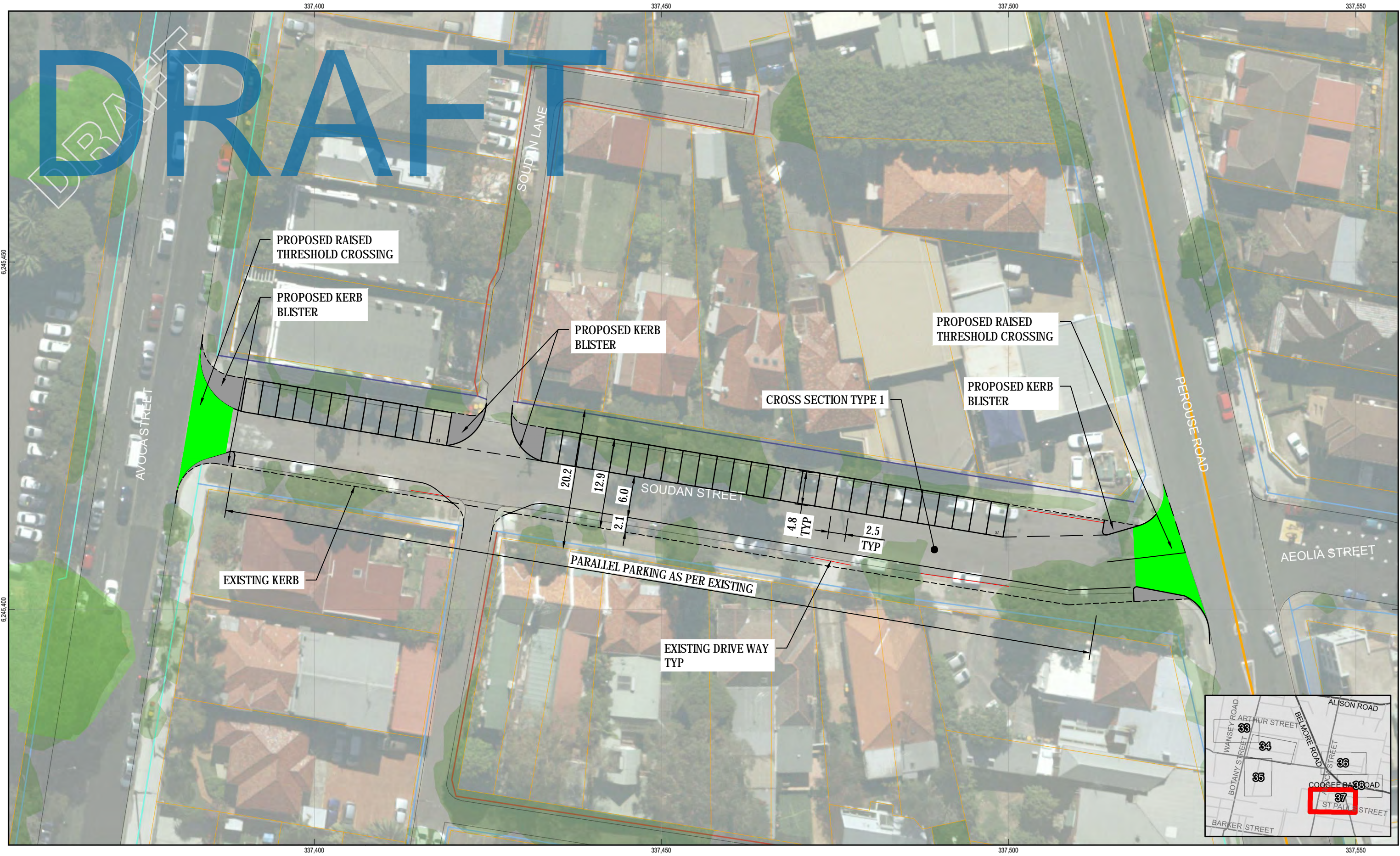
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Job Number 21-23260
Revision A
Date 04 Mar 2014

FIELD MAPS
EURIMBLA AVENUE

Figure 35





Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND		footpath	Separation Barrier Line
	canopy		
	significant_tree		
	Lots		
	cycle_route		
	Local Routes	Asphalt	
		Concrete	
		Concrete Slabs Small	
		Grass	

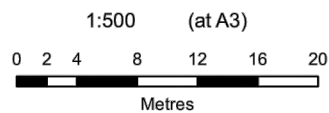
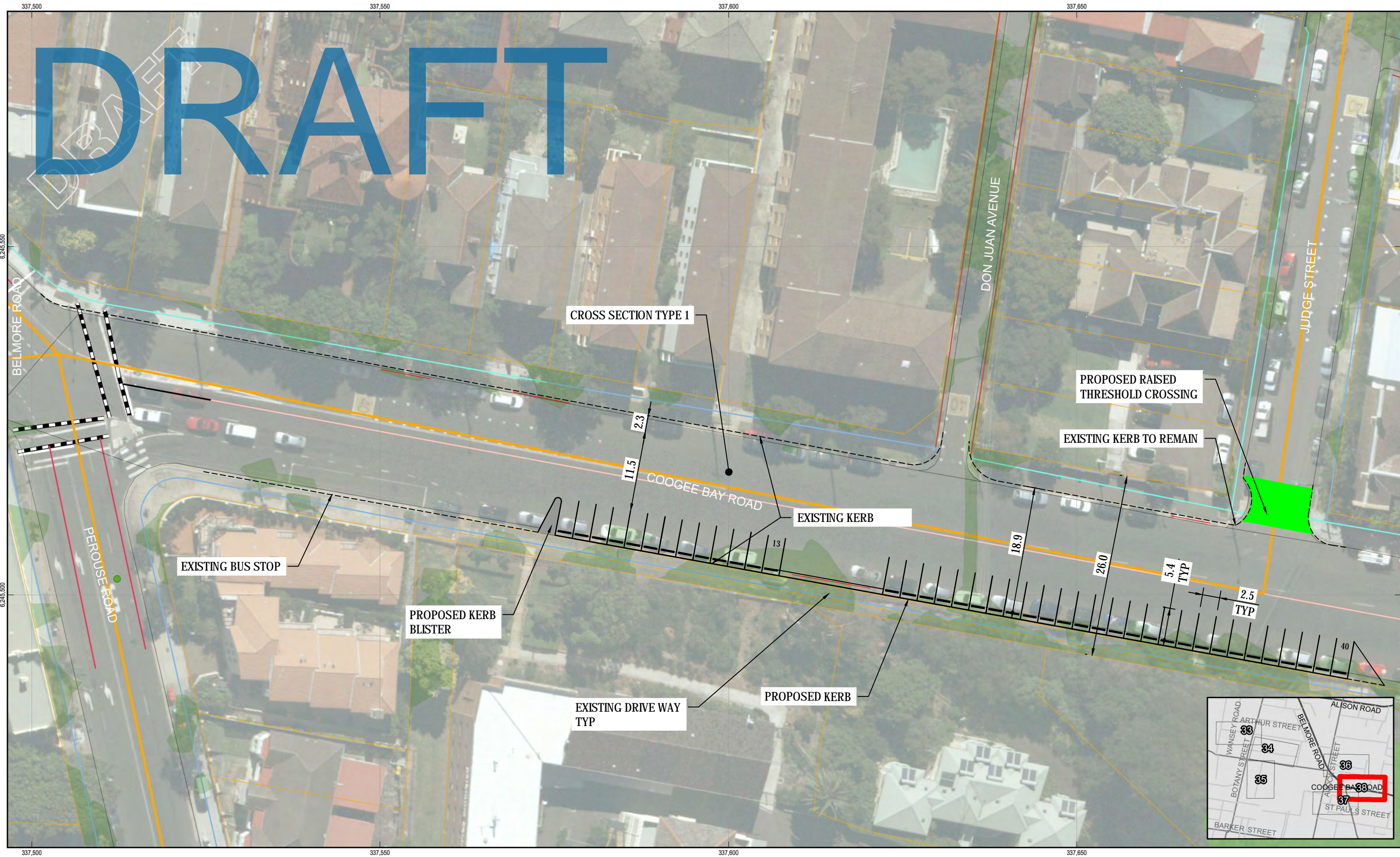


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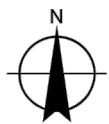
FIELD MAPS SOUDAN STREET

Job Number	21-23260
Revision	A
Date	04 Mar 2014

Figure 37



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- | | | | | |
|------------------|--------------------------|-------------------------|---------------|---------------------------|
| canopy | road_other_mark 50 | footpath Asphalt | Narrow Median | Pedestrian Crosswalk Line |
| significant_tree | cycle_route Local Routes | Concrete | Lane Line | Stop Line |
| Lots | Concrete Slabs Small | Separation Barrier Line | | |
| | Grass | | | |



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Job Number 21-23260
Revision A
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FIELD MAPS COOGEE BAY ROAD

Figure 38

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Data source: Data Custodian, Data Set Name/Title, Version/Date. Created by: zjchung

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Appendix E – Road Safety Audit



16th January 2015

Robert Rosadi
Randwick City Council
30 Frances Street
RANDWICK NSW 2031

Our ref: 21/23260
Your ref:

Dear Robert,

Proposed Eastern Suburbs Light Rail Project On-Street Parking Appraisal Road Safety Audit Response

1 Background

Preliminary concept design plans for angle parking on a number of local streets were provided in a report titled "Proposed Eastern Suburbs Light Rail Project On-Street Parking Appraisal" (GHD 2014). This local road angled parking would be provided in order to replace existing on-street car parking along Anzac Parade, Alison Road, Wansey Road and High Street, which would be removed as part of the Sydney CBD and South East Light Rail Project. The concept design plans were used to determine the number parking spaces that could be provided in order to offset the loss in parking resulting from the proposed Sydney CBD and South East Light Rail Project.

Further to the Proposed Eastern Suburbs Light Rail Project On-Street Parking Appraisal report, GHD provided an independent Road Safety Audit (RSA) report of the angle parking concept designs. Independently of the audit, GHD has completed the required action section of the CAR forms to address issues identified in the RSA report.

The RSA report and the Corrective Action Request (CAR) forms are provided at Attachment 1.

1.1 Purpose of this Letter

The corrective actions would result in a loss of some proposed angle parking spaces, identified in the concept design plans. This letter summarises this reduction in proposed angle parking, resulting from the corrective actions to the RSA.

2 Impacts to Proposed Angle Parking Spaces

Table 1 provides a summary of the number of parking spaces previously proposed in the Proposed Eastern Suburbs Light Rail Project on Street Parking Appraisal report (GHD, May 2014). The resulting loss in parking spaces and the revised number of additional spaces following the corrective actions to the RSA are also provided in Table 1.

Where angle parking has been proposed in the preliminary concept designs, but is not recommended as part of the RSA, it is recommended that the existing parallel parking is retained.



Table 1 Revised Number of Additional Parking Spaces following Corrective Action Request

Street Name	Location	Parking Zone	Existing Parking Spaces	Preliminary Concept Proposed Parking Spaces (with Angle Parking)	Revised Proposed Parking Spaces following RSA Corrective Actions (with Angle Parking)	Revised Additional Parking Spaces	Reduction of Proposed Angle Parking from RSA Corrective Actions
Boronia Street (1)	Balfour Lane to Duke Street	2	40	64	55	15	-9
Boronia Street (2)	Sailsbury Road to Balfour Lane	1	41	70	64	23	-6
Boronia Street (3)	Anzac Parade to Sailsbury Road	1	40	69	61	21	-8
Carlton Street	Anzac Parade to Doncaster Avenue	1	55	81	69	14	-12
Kensington Road (1)	Salisbury Road to Balfour Lane	1	36	62	43	7	-19
Kensington Road (2)	Duke Street to Balfour Lane	2	50	70	68	18	-2
Salisbury Road	Balfour Road to Boronia Street	1	48	83	55	7	-28
Addison Street	Kensington Road to Anzac Parade	2	40	69	60	20	-9
Bowral Street	Anzac Parade to Doncaster Avenue	2	35	59	50	15	-9
Duke Street	Kensington Road to Boronia Street	2	17	28	25	8	-3
Goodwood Street	Anzac Parade to Doncaster Avenue	2	39	73	67	28	-6
Roma Avenue	Doncaster Avenue to Lorne Avenue	2	45	62	54	9	-8
Middle Street	Harbourne Road to Forsyth Street	3	40	75	75	35	0
Bruce Street	Garderners Road to Borrodale Road	4	78	121	120	42	-1
Doncaster Avenue	Garderners Road to Borrodale Road	4	62	88	85	23	-3
Forsyth Street	Meeks Street to Rainbow Street	4	40	60	57	17	-3
Harbourne Road	Meeks Street to Middle Street	4	45	83	83	38	0
Meeks Street	Harbourne Road to Forsyth Street	4	27	54	34	7	-20
See Street	Doncaster Avenue to Houston Road	4	45	79	77	32	-2
Sturt Street (1)	Bunnarong Road to Anzac parade	4	36	52	52	16	0
Sturt Street (2)	Anzac Parade to Sturt Lane	4	19	58	49	30	-9

Street Name	Location	Parking Zone	Existing Parking Spaces	Preliminary Concept Proposed Parking Spaces (with Angle Parking)	Revised Proposed Parking Spaces following RSA Corrective Actions (with Angle Parking)	Revised Additional Parking Spaces	Reduction of Proposed Angle Parking from RSA Corrective Actions
Wallace Street	Anzac Parade to Wallace Lane	4	67	115	93	26	-22
Willis Street	Meeks Street to Rainbow Street	4	40	72	69	29	-3
Prince Street	Alison Road to Cowper Street	5	43	62	50	7	-12
William Street	Alison Road to King Street	5	34	64	61	27	-3
Bradley Street		5	51	75	72	21	-3
Church Street	Alison Road to Frances Street	5	52	84	72	20	-12
Arthur Street	Wansey Road to Botany Street	6	42	66	50	8	-16
Blenheim Street	Botany Street to Clara Street	6	60	75	72	12	-3
Eurimbla Avenue		6	53	63	63	10	0
Mears Avenue	Avoca Street to Ada Street	6	47	85	73	26	-12
Soudan Street	Avoca Street to Perouse Road	6	32	73	54	22	-19
Coogee Bay Road	Perouse Road to Judge Street	6	41	64	41	0	-23
Total			1,440	2358	2,073	633	-285



3 Recommendations for Implementing Angle Parking

GHD have categorised each of the local roads within the study area into four different recommendation categories for implementing angle parking. These categories are as follows:

Category One

- Roads where it is recommended that the installation of angle parking proceeds.

Category Two

- Roads where angle parking is recommended within the existing nature strip/verge. However, this could incur a high cost due to the requirement of retaining structures.

Category Three

- Roads where angle parking is recommended within the existing nature strip, where the location and size of mature trees needs to be assessed to determine the actual number of additional spaces.

Category Four

- Roads where it is recommended that the installation of angle parking does not proceed. This has been based on the recommendations provided from the RSA.

The recommendations for each local road within the study area, by category, are summarised in Table 2.

Table 2 Categories for Angle Parking

Category One	Category Two	Category Three	Category Four
Proceed with angle parking	Retaining structure requires a potential high cost	Further assessment of tree locations required	Not recommended to proceed with angle parking
Boronia Street	Harbourne Street	Meeks Street	Coogee Bay Road
Carlton Street	Wallace Street	Wallace Street	
Kensington Road		Willis Street	
Salisbury Road		Duke Street	
Addison Street			
Bowral Street			
Goodwood Street			
Roma Avenue			
Middle Street			
Bruce Street			
Doncaster Avenue			

Category One	Category Two	Category Three	Category Four
Proceed with angle parking	Retaining structure requires a potential high cost	Further assessment of tree locations required	Not recommended to proceed with angle parking
Forsyth Street			
See Street			
Sturt Street			
Prince Street			
William Street			
Bradley Street			
Church Street			
Arthur Street			
Blenheim Street			
Eurimbla Avenue			
Mears Avenue			
Soudan Street			

4 Conclusion

Installing angle parking at local roads within categories 1, 2 and 3, as shown in Table 2, would provide approximately 633 additional parking spaces along these roads. The Sydney CBD and South East Light Rail Project would require the removal of approximately 750 on-street car parking along Anzac Parade, Alison Road, Wansey Road and High Street. Therefore, the introduction of angle parking at streets categories 1, 2 and 3 would result in a net loss of 117 parking spaces within the study area.

Kind Regards
Owen Peel



Senior Transport Planner
02 9239 7299



Randwick City Council

Randwick Parking Study

Stage 2 Road Safety Audit

July 2014

Table of contents

1.	Introduction	1
1.1	Purpose of this Report	1
1.2	Background	1
1.3	Project Description	1
1.4	Project Location	1
2.	Objectives Process Evaluation Criteria	3
2.1	Objectives of the Road Safety Audit	3
2.2	Process of the Road Safety Audit	3
2.3	Criteria Used to Assess the Levels of Risk	3
2.4	Road Safety Categories	4
3.	Administration & Supporting Material	6
3.1	Road Safety Audit Team	6
3.2	Site Inspection and Audit	6
3.3	References & Documentation Audited	7
3.4	Limitations of this audit	8
4.	Road Safety Audit Findings	9
4.1	Generic Audit Findings	9
4.2	Site Specific Audit Findings	12
4.3	Site Specific Comments	16
5.	Audit Statement	17

Table index

Table 1	Summary of Frequency Descriptions	3
Table 2	Summary of Severity Description	3
Table 3	Summary of Levels of Risk	4
Table 4	Priority to Levels of Risk	4
Table 5	Road Safety Audit Categories	5

Figure index

Figure 1	Site Locality	2
Figure 2	Proposed Cross Section	10

Appendices

Appendix A – Site Notes

Appendix B – Corrective Action Request (CAR)

1. Introduction

1.1 Purpose of this Report

This report has been prepared to document the safety deficiencies identified during the Stage 2 Concept Design Audit of various roads in Randwick which have been identified to have 90 degree parking installed.

1.2 Background

This project is part of the Randwick City Council - *Proposed Eastern Suburbs Light Rail Project - On-Street Parking Appraisal*, which aims to improve parking within the Randwick LGA. The roads identified in the parking study have been designed to concept level on aerial photography.

1.3 Project Description

The project involves the concept design for 90 degree parking on around 30 roads within the Randwick LGA.

1.4 Project Location

For ease of undertaking the Road safety Audit the roads were separated into four areas as shown in Figure 1.

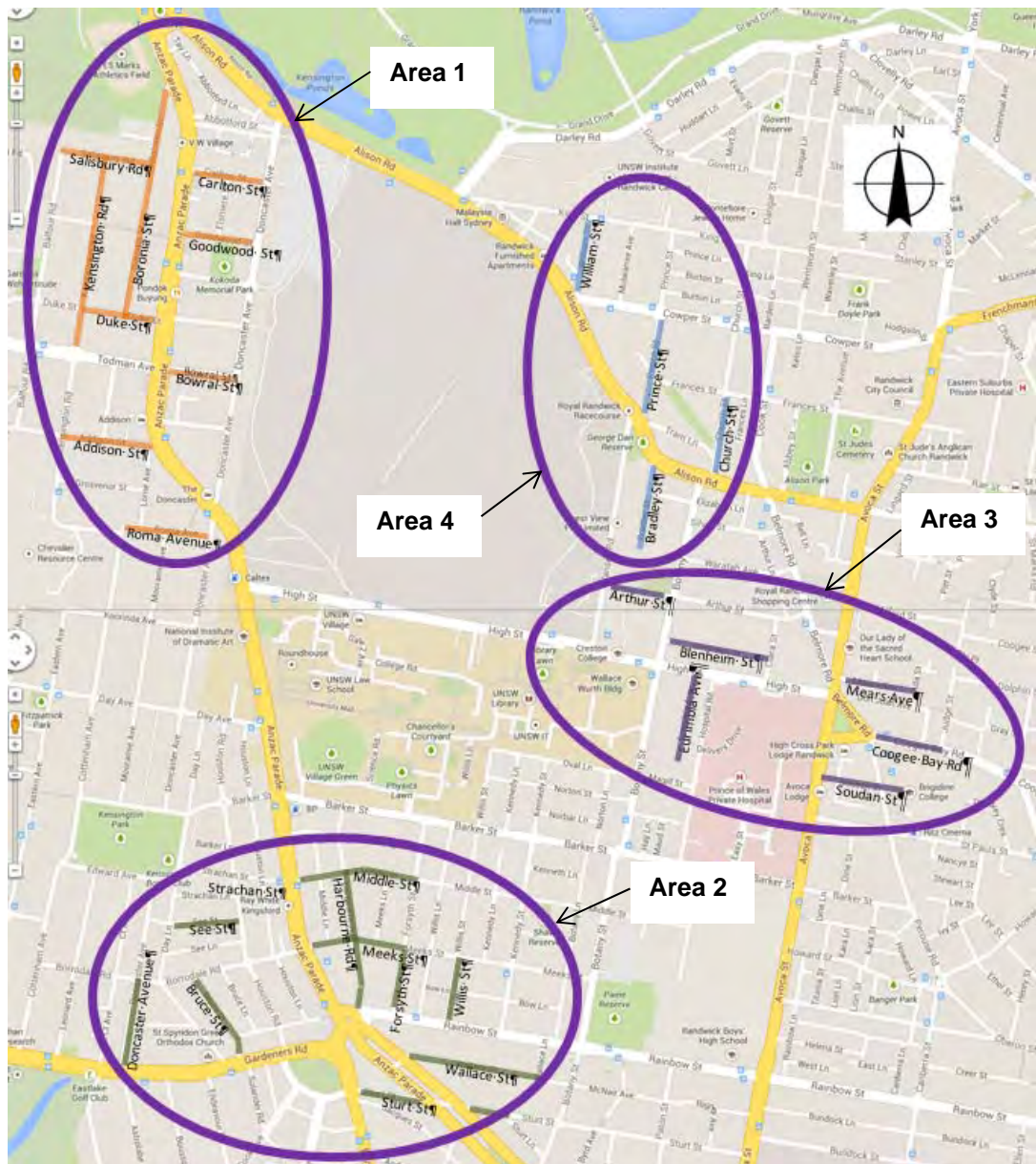


Figure 1 Site Locality

Source: Google Maps, modified by GHD

2. Objectives Process Evaluation Criteria

2.1 Objectives of the Road Safety Audit

A road safety audit (RSA) is “a formal examination of a future road or traffic project or an existing road, in which an independent, qualified team reports on the project’s crash potential and safety performance” (Austroads 2009).

2.2 Process of the Road Safety Audit

The road safety audit followed a standard practice in identifying safety related issues. It involved a site visit during both daylight and night conditions in addition to a desktop assessment of design documentation used to develop / construct the project. Previous RSA reports, if available, are reviewed for close out of findings and have been considered as part of this audit. Standard issues such as sight distance, speed zones, lighting, safety barriers, approach road alignment, delineation, line marking and signage, intersection layout and conditions (amongst others) were assessed with respect to safety. The audit is structured around a standard checklist provided in the Austroads “Guide to Road Safety: Part 6 – Road Safety Audits” and Roads and Maritime Services (RMS) Guidelines for Road Safety Audit Practices, July 2011”.

2.3 Criteria Used to Assess the Levels of Risk

Risk levels have been assigned for each deficiency identified along the route by the audit team and are based on the criteria set out in the Austroads Guide. These risk levels have been determined based on the deficiency’s frequency and severity. Definitions of the different levels of frequency and severity have been reproduced in Table 1 and Table 2 below from the Austroads Guide to Road Safety, Part 6: Road Safety Audit, 2009.

Table 1 Summary of Frequency Descriptions

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

Table 2 Summary of Severity Description

Severity	Description
Catastrophic	Likely multiple deaths
Serious	Likely death or serious injury
Minor	Likely minor injury
Limited	Likely trivial injury or property damage only

Austroads Guide to Road Safety, Part 6: Road Safety Audit, 2009, provides definitions for four different levels of risk, namely, “intolerable”, “high”, “medium” or “low”. Extracts of the risk assessment matrix from Austroads are provided in Table 3.

Table 3 Summary of Levels of Risk

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

It is noted that as a consequence of the Austroads Guide not adopting a more objective risk ratings process, the risk rating reported in all Road Safety Audits are subjective. As a result, the audit findings can be skewed towards reporting risks as “high” and “intolerable”. Care should be taken by the appropriate decision maker when using these results to justify an outcome.

Of the four possible risk ratings levels (i.e. Intolerable, high, medium or low) a description of their priority are defined below in Table 4.

Table 4 Priority to Levels of Risk

Level of Risk	Description of Priority to Risk Rating
Intolerable:	A significant road safety risk requiring immediate urgent attention.
High:	A high road safety risk requiring immediate or urgent attention.
Medium:	A road safety risk that may lead to crashes and that requires attention as soon as reasonably practicable.
Low:	A lower road safety risk that requires attention. Remedial action may be carried out on a non-urgent basis, such as in conjunction with routine road maintenance or other planned work.

2.4 Road Safety Categories

Road safety audit categories are utilised to assist the management of corrective actions and the monitoring of road safety deficiency trends. A list of the available categories is scheduled in Table 5 which have been derived from the RMS road safety categories information sheet.

Table 5 Road Safety Audit Categories

Category	Examples
Access Impact	Property developments, traffic generators, rest areas, emergency vehicles, service vehicles, maintenance, vehicles breakdowns, etc.
Auxiliary Lanes	Overtaking lanes, passing lanes, tapers, merges, etc.
Bridge Structures	Road bridge, pedestrian bridge, rail bridges etc.
Bus Infrastructure	Bus lanes, bus facilities, bus stops etc.
Cycle Infrastructure	Cycleways, on-road facilities, off-road facilities, cycle routes etc.
Delineation	Guide posts, pavement markings, reflectors, warning signs etc.
Heavy Vehicle Infrastructure	Inspection bays, facilities, provisions, routes etc.
Intersection	Roundabouts, T-junctions, cross junctions etc.
Landscaping	Shrubs, trees etc.
Lighting	Street lighting, tunnel lighting etc.
Miscellaneous	Matters not covered by categories listed.
Network Effects	Road function, traffic composition, traffic volume, traffic characteristics, route choice, impact of continuity with the existing network etc.
Special Road User Infrastructure	Trains, ferries, trams, equestrian, stock, special events etc.
Pedestrian Infrastructure	Pathways, pedestrian crossings, pedestrian fencing etc.
Road Alignment and Cross Section	Sight distance, visibility, readability by drivers, glare, widths, shoulders, crossfalls, batter slopes, drains etc.
Road Pavement	Pavement defects, skid resistance, ponding, loose stones material etc.
Roadside Activities	Roadside advertising, road side designs, vending etc.
Roadside hazards	Clearzones, utility poles, culverts, bridge structures, trees etc.
Speed Zones	Speed limits, speed zones, design speed, school zones etc
Traffic Management and Operation	Staging of works, temporary traffic control, detours, peak tidal flows, clearways, parking etc.
Traffic Management Devices	Threshold treatments, road humps, kerb extensions, slow points etc.
Traffic Signals	Signal phasing, bus signals, bicycle signals pedestrian signals etc.
Traffic Signs	Regulatory signs, warning signs, guide signs etc.
Tunnel Structures	Road tunnels, pedestrian tunnels, cycle tunnels etc.

3. Administration & Supporting Material

3.1 Road Safety Audit Team

The road safety audit team comprised of the following accredited auditors with the NSW Centre for Road Safety's Register of Road Safety Auditors:

Audit Team Leader

Marissa Piolin	GHD Pty Ltd, Parramatta.
Auditor ID:	RSA-02-0637
Level of Certification:	3
Certification Expiry Date:	1/11/2014

Audit Team Member(s)

Karen McNatty	GHD Pty Ltd, Sydney.
Auditor ID:	RSA-02-0229
Level of Certification:	2
Certification Expiry Date:	16/12/2014

3.2 Site Inspection and Audit

3.2.1 Time and Date

The site visit and audit was undertaken on Wednesday 9th July 2014 from 11:00 hours to 18:00 hours.

3.2.2 Weather Conditions

The weather condition was mostly fine with periods of light cloud cover. The road surface during the time of the audit was dry.

3.2.3 Commencement Meeting

A project commencement meeting was undertaken on Wednesday 9th July with project manager Owen Peel of GHD. The purpose of the meeting was to be inducted into the project, discuss the project scope, status, limitations, safety and any other relevant project information. This meeting was attended by the following people:

- Marissa Piolin, GHD Auditor;
- Karen McNatty, GHD Auditor; and
- Owen Peel, GHD Project Manager

The concept design plans for the project was obtained from Owen Peel of GHD on Thursday 3rd July 2014.

3.2.4 Completion Meeting

A completion meeting was undertaken at the submission of the draft report to discuss issues discovered during the road safety audit. This meeting was undertaken between Karen McNatty and Owen Peel at GHD Sydney office.

3.3 References & Documentation Audited

- Concept Drawings, revision A, issued 28 January 2014
 - Figure 1 Addison Street
 - Figure 2 Boronia Street 1
 - Figure 3 Boronia Street 2
 - Figure 4 Boronia Street 3
 - Figure 5 Bowral Street
 - Figure 6 Carlton Street
 - Figure 7 Duke Street
 - Figure 8 Goodwood Street
 - Figure 9 Kensington Road 1
 - Figure 10 Kensington Road 2
 - Figure 11 Roma Avenue
 - Figure 12 Salisbury Road
 - Figure 13 Bradley Street
 - Figure 14 Church Street
 - Figure 15 Prince Street
 - Figure 16 William Street
 - Figure 17 Bruce Street
 - Figure 18 Doncaster Avenue
 - Figure 19 Forsyth Street
 - Figure 20 Harbourne Road 1
 - Figure 22 Meeks Street
 - Figure 23 Middle Street 1
 - Figure 24 Middle Street 2
 - Figure 25 See Street
 - Figure 28 Sturt Street 1
 - Figure 29 Sturt Street 2
 - Figure 30 Wallace Street 1
 - Figure 31 Wallace Street 2
 - Figure 32 Willis Street
 - Figure 33 Arthur Street
 - Figure 34 Blenheim Street
 - Figure 35 Eurimbla Avenue
 - Figure 36 Mears Avenue
 - Figure 37 Soudan Street
 - Figure 38 Coogee Bay Road
- Randwick City Council - Proposed Eastern Suburbs Light Rail Project - On-Street Parking Appraisal 2nd May 2014;
- RTA Guidelines for Road Safety Audit Practices, July 2011;
- Austroads "Guide to Road Safety, Part 6: Road Safety Audit", 2009;
- State Transit Bus Infrastructure Guide – Issue 2;

- RTA “Road Design Guide”, 2002;
- Standards Australia “AS 1742 Series 2003: Manual of uniform traffic control devices”, 2003; and

3.4 Limitations of this audit

The following limitations are associated with this audit and report:

- Traffic signal control plans (TCS) – Plans have not been received and subsequently not been used for assessment.
- No proposed lighting plans were provided, lighting to be addressed as part of the detailed design.
- No signage plans were provided – to be addressed as part of the detailed design.
- No drainage plans were provided – to be addressed as part of the detailed design.
- No structural plan or details were provided for potential requirements of retaining structures – to be addressed as part of the detailed design.
- A specialist study to assess potential impact on existing mature trees was not provided – to be addressed as part of the detailed design.
- Community consultation to assess the impact on residences within the vicinity of proposed 90 degree parking not provided – to be addressed as part of the detailed design.
- The audit covers physical features of the project which may affect road user safety and it has sought to identify potential safety hazards. However, the auditors point out that no guarantee is made that every deficiency has been identified. Further, if all the recommendations in this report are adopted, this would not guarantee that the site is safe; rather, adoption of the recommendations should improve the level of safety of the facility.

4. Road Safety Audit Findings

The audit findings have been separated into two sections.

Section 4.1 Identifies audit findings that are generic across the project and need to be applied to all sites.

Section 4.2 Identifies site specific audit findings

4.1 Generic Audit Findings

4.1.1 Threshold Treatments

The reason for the proposed threshold treatments needs to be clearly defined.

Gateways or threshold treatments are used to mark a change in speed environment, including the transition from a high speed road to a lower speed environment such as a village. Gateway treatments usually include pavement markings to narrow the perceived width of road, large speed limit signs and pavement markings and other features (such as traffic islands and landscaping) to indicate that a threshold is being crossed.

Special attention needs to be made where threshold treatments are situated in locations where there is a pedestrian desire line. If a zebra crossing is already warranted then a wombat crossing should be used. However if a location does not warrant a zebra crossing careful consideration needs to be made to ensure that the threshold treatment does not look like a wombat crossing as there is a risk that pedestrians may assume they have right of way.

Road Safety Deficiency Category

Traffic Management Devices

Risk Rating

Severity: Serious

Frequency: Occasional

Risk: High

4.1.2 Parking spaces adjacent to BB Line

A large number of concept designs had 90 degree parking proposed adjacent to an existing BB Line. A BB Line is generally installed in areas of poor visibility and sight distance. BB Lines are not to be crossed and due to the proposed lane widths with the 90 degree parking installed it would be impossible to enter and exit the parking spaces without crossing the BB Line.

There is a risk of vehicles colliding with vehicles exiting parking spaces due to poor visibility.

It is recommended to remove proposed 90 degree parking spaces adjacent to BB Lines in the detailed design and considering retaining existing parallel parking spaces in these locations.

Road Safety Deficiency Category

Road Alignment and Cross Section

Risk Rating

Severity: Serious

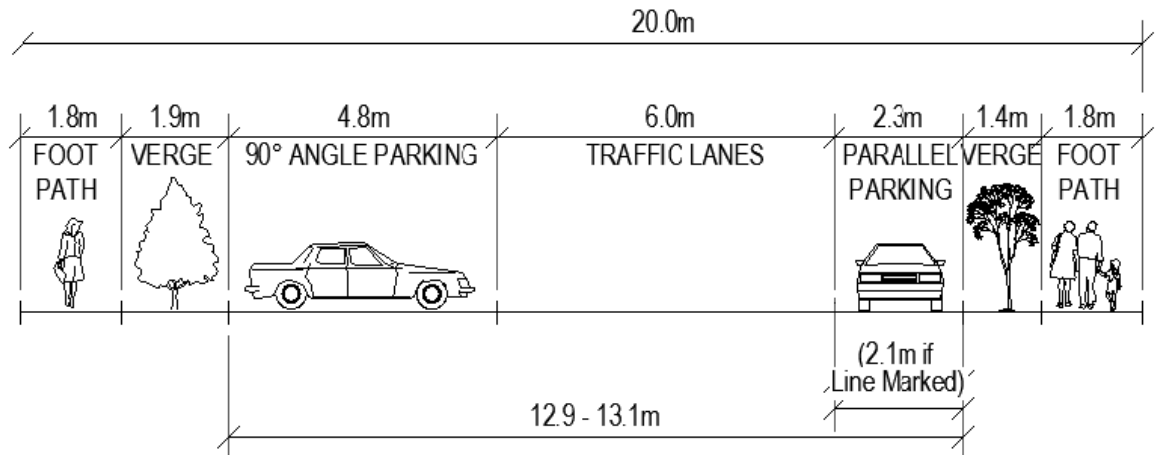
Frequency: Occasional

Risk: High

4.1.3 Proposed Road Width – Cross Section

- There are several roads where introducing the 90 degree angle parking would reduce the traffic lane width to 6 metres for two way flow as shown in Figure 2 (Figure 20 in the *Randwick City Council - Proposed Eastern Suburbs Light Rail Project - On-Street Parking Appraisal* 2nd May 2014).

Figure 2 Proposed Cross Section



PROPOSED

Where on road parking with a parking angle of 90 degrees is proposed, AS2890.5 recommends a roadway width between the barrier line or edge of road/median and the kerb to be a minimum of 8.7 metres. The proposed cross section on several roads would not comply with this standard. The *On-Street Parking Appraisal* highlights a number of existing situations where a reduced cross section width has already been implemented. We recommend that where the traffic lanes adjacent to 90 degree parking is 6.1 metres or less that centreline road marking should be installed to provide clear delineation that it is a two way street. Without the centre line there is a risk that vehicles will drive in the centre of the traffic lanes, assuming a one way environment due to the narrow carriageway.

Road Safety Deficiency Category

Road Alignment and Cross Section

Risk Rating

Severity: Serious

Frequency: Occasional

Risk: High

4.1.4 'No Stopping' near Intersections

Several concept plans show 90 degree parking spaces being implemented too close to intersections and within existing sign posted no stopping areas. There is a risk of vehicles turning into the road colliding with vehicles exiting parking spaces.

Parking bays near intersections need to be reassessed in detailed design with the appropriate No Stopping distances from intersections retained.

Road Safety Deficiency Category

Intersection

Risk Rating

Severity: Serious

Frequency: Occasional

Risk: High

4.1.5 Drainage

Several concept plans show the kerb being extended from the existing alignment to provide narrowing or kerb extended islands. No consideration has been given to the impacts on drainage and there are several roads where drainage issues could result. There is a risk of water collecting and ponding on the carriageway which could result in vehicles aquaplaning.

Drainage needs to be assessed in detailed design for all roads which propose changes to the existing kerb alignment.

Road Safety Deficiency Category

Road Alignment and Cross Section

Risk Rating

Severity: Serious

Frequency: Occasional

Risk: High

4.1.6 Existing trees

Several roads have large mature trees either within the carriageway or within the road reserve where parking is proposed. This needs to be addressed on a street by street basis to see if there is adequate room to provide the proposed parking spaces. These trees are within the clear zone and if not removed are considered a road side hazard and there is a risk of a vehicle colliding with the tree.

Road Safety Deficiency Category

Roadside Hazards

Risk Rating

Severity: Serious

Frequency: Occasional

Risk: High

4.1.7 Existing poles and services

Several roads have existing poles and services located in close proximity to the carriageway or within the road reserve where parking is proposed. This needs to be addressed on a street by street basis to see if there is adequate room to provide the proposed parking spaces. Some of the poles are within the clear zone or area that parking is proposed. If not relocated they may become a road side hazard and there is a risk of a vehicle colliding with the pole.

Road Safety Deficiency Category

Roadside Hazards

Risk Rating

Severity: Serious

Frequency: Occasional

Risk: High

4.2 Site Specific Audit Findings

This section identifies issues in addition to the generic findings above that are specific to certain locations.

4.2.1 Roma Avenue

Parking spaces numbered 1 to 6 are located in the vicinity of a short reverse curve with a tight radius. Sight distance is inadequate for these six parking spaces to be at 90 degrees. There is a risk of vehicles not having adequate visibility and colliding with vehicles exiting these parking spaces. It is recommended that the existing parallel parking spaces be retained in this location.

Road Safety Deficiency Category

Road Alignment and Cross Section

Risk Rating

Severity: Serious

Frequency: Occasional

Risk: High

4.2.2 Salisbury Road

Parking spaces numbered 1 to 28 from the corner of Kensington Road to Balfour Road are on a very steep grade and after a crest. Based on the site inspection and with reference to AS 2890.5 Sections 3.4 & 3.5 this is an unsafe parking location. There is a risk of vehicles not having adequate visibility and colliding with vehicles exiting these parking spaces.

Road Safety Deficiency Category

Road Alignment and Cross Section

Risk Rating

Severity: Serious

Frequency: Occasional

Risk: High

4.2.3 Kensington Road

The existing grade on Kensington Road where the parking is proposed is very steep.

It is recommended that parking spaces 45 & 46 near the corner of Duke Street be removed as there is an existing "No Stopping" sign this location.

The proposed parking bays 1 to 13 should be re-assessed as these spaces are located just beyond the crest which may create a hazard of oncoming traffic in the southbound direction.

There is a risk of vehicles not having adequate visibility and colliding with vehicles exiting these parking spaces. Similarly to the proposed parking bays 30 to 43.

Road Safety Deficiency Category

Road Alignment and Cross Section

Risk Rating

Severity: Serious

Frequency: Occasional

Risk: High

4.2.4 Boronia Street

The existing grade on Boronia Street (Figure 2) is on a steep grade where the proposed parking is located. It is recommended that parking spaces 1 to 21 be removed as these are located just beyond the crest, there is a potential risk that vehicles could collide with oncoming traffic, refer AS2890.5 Section 3.4.

Similarly for Boronia Street (Figures 3 & 4) parking spaces 45 to 51 and the northern end near Anzac Pde (4 spaces), should be removed as these spaces are located just beyond the crest which may create a hazard for oncoming traffic.

Road Safety Deficiency Category

Road Alignment and Cross Section

Risk Rating

Severity: Serious

Frequency: Occasional

Risk: High

4.2.5 Doncaster Avenue

The concept plan shows a raised intersection treatment with proposed parallel parking across the raised area. The purpose of this raised treatment needs to be defined, parking and speed treatment devices should be separated to avoid confusion and ensure adequate visibility and understanding of what the device is for.

Road Safety Deficiency Category

Traffic Management Devices

Risk Rating

Severity: Minor

Frequency: Occasional

Risk: Medium

4.2.6 Middle Street

The proposed parking space 11 is situated on a crest and curve alignment and therefore the sight distance could potentially be impacted. There is a potential risk that vehicles could collide with oncoming traffic, refer AS2890.5 Section 3.4.

Road Safety Deficiency Category

Road Alignment and Cross Section

Risk Rating

Severity: Minor

Frequency: Occasional

Risk: Medium

4.2.7 Harbourne Road

The proposed location of parking spaces on both sides of the road is on an existing embankment where there is a significant level difference. A retaining structure would be required to support the existing footpath. A detailed assessment would need to be done at the detailed design stage to address how parking users would be able to safely access the footpath. There is a risk that pedestrians would need to walk in the traffic lane and may not be able to assess the road reserve or footpath.

Road Safety Deficiency Category

Road Alignment and Cross Section

Risk Rating

Severity: Serious

Frequency: Occasional

Risk: High

4.2.8 Willis Street

There is a section of proposed parking spaces on the western side of the road that is on an existing embankment where there is a significant level difference. A retaining structure may be required and should be considered in the detailed design. There is a risk that pedestrians would need to walk in the traffic lane and may not be able to assess the road reserve or footpath.

Road Safety Deficiency Category

Road Alignment and Cross Section

Risk Rating

Severity: Serious

Frequency: Occasional

Risk: High

4.2.9 Wallace Street

There are proposed parking spaces directly before and after a crest where sight distances could potentially be impacted these parking spaces should be reassessed. There is a potential risk that vehicles could collide with oncoming traffic, refer AS2890.5 Section 3.4.

The proposed location of parking spaces on north eastern side of the road is on an existing embankment where there is a significant level difference. A retaining structure may be required and should be considered in the detailed design. There is a risk that pedestrians would need to walk in the traffic lane and may not be able to assess the road reserve or footpath.

Road Safety Deficiency Category

Road Alignment and Cross Section

Risk Rating

Severity: Serious

Frequency: Occasional

Risk: High

4.2.10 Eurimbla Avenue

There are proposed parking spaces near to the cul de sac in Eurimbla Avenue which would impede service vehicles turning around. The swept paths shown on the concept plans would not be feasible on site and would require vehicles to manoeuvre into a private property driveway to make the turn.

Road Safety Deficiency Category

Road Alignment and Cross Section

Risk Rating

Severity: Minor

Frequency: Occasional

Risk: Medium

4.2.11 Coogee Bay Road

The existing parallel parking is located adjacent to a retaining wall with no safe access for pedestrians who park there. Pedestrian movement is currently directed to the road which is unsafe. This would be exacerbated by changing the layout to 90 degree parking as this would result in pedestrians walking closer to the traffic lane. There is a risk of pedestrians being hit by vehicles on Coogee Bay Road.

Road Safety Deficiency Category

Road Alignment and Cross Section

Risk Rating

Severity: Serious

Frequency: Occasional

Risk: High

4.2.12 Bradley Street

There are proposed parking spaces near the cul de sac in Bradley Street which would impede service vehicles turning around. The swept paths shown on the concept plans would not be feasible on site.

Road Safety Deficiency Category

Road Alignment and Cross Section

Risk Rating

Severity: Minor

Frequency: Occasional

Risk: Medium

4.3 Site Specific Comments

This section provides site specific comments relating to drawing errors rather than risk issues.

4.3.1 Goodwood Street

Proposed parking spaces 20 to 24 are not feasible as there is a driveway at this location.

4.3.2 Bruce Street

Proposed parking spaces 90 to 93 are not feasible as there is a driveway at this location.

4.3.3 Forsyth Street

The intersection of Forsyth Street and Meeks Street is shown on the concept plans to be a raised intersection treatment. This intersection has a recently installed roundabout which provides added safety benefits than the proposed raised treatment. It is recommended to retain the existing roundabout.

5. Audit Statement

We certify that in carrying out this audit we have reviewed the available information and have endeavoured to identify features in order to improve safety, although it must be recognised that safety cannot be guaranteed since no road can be regarded as absolutely safe.

The problems identified have been noted in this report and readers are urged to seek further specific technical advice on matters raised and not rely solely on the report.

Signed



Date July 2014

Audit Team Leader

Marissa Piolin, GHD Pty Ltd, Parramatta.

Auditor ID: RSA-02-0637

Signed



Date July 2014

Karen McNatty, GHD Pty Ltd, Sydney.

Auditor ID: RSA-02- 0229

This road safety audit report ("Report"):

- has been prepared by GHD Pty Ltd ("GHD") for Randwick City Council;*
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The services undertaken by GHD in connection with preparing this Report: were limited to those specifically detailed in section 2 and 3.4 of this Report;

The opinions, conclusions and any recommendations in this Report are based on assumptions made by GHD when undertaking services and preparing the Report ("Assumptions").




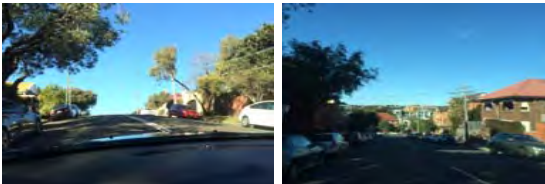

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Appendix A – Site Notes





**Randwick City Council - Proposed Eastern Suburbs Light Rail Project
On Street Parking Appraisal**

Stage 2 Concept Design Road Safety Audit

Item No.	Area	Street Name	Photo	Findings					
				Geometry	Line Marking	Drainage	Signage	Lighting	Others
1	1	Roma Avenue		<ul style="list-style-type: none"> - Sight distance and short reverse curve with tight radius prior to proposed parking bay 1 to 6 which will make the arrangement unsafe. - Proposed parking bay need to consider keeping the existing parallel parking instead of the 90 deg parking - Proposed parking bays 33 to 41 at the corner of Roma Ave & Doncaster Ave, has an existing BB line marking and "No Stopping" sign. The location of these parking bays are near a corner which can be unsafe to manoeuvre to be able to park. Parking bays near road corners need to be assessed in detailed design. 	<ul style="list-style-type: none"> - Existing BB line at this location is required to be considered at detailed design - Consider to provide a centreline pavement marking for road widths of 6.1m and less to provide clear delineation 	<ul style="list-style-type: none"> - Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection 	<ul style="list-style-type: none"> - no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design 	<ul style="list-style-type: none"> - no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design 	<ul style="list-style-type: none"> - proposed thresholds needs to be defined if for speed or pedestrian requirement. Thresholds should provide a minimum offset from lane lines at intersection - existing trees on the road need to be assessed at detailed design
2	1	Addison Street		<ul style="list-style-type: none"> - Proposed parking bays 35 to 43 at the corner of Addison & Anzac Pde, has an existing BB line marking and "No Stopping" sign. The location of these parking bays are near a corner which can be unsafe to manoeuvre to be able to park. Parking bays near road corners need to be assessed in detailed design and consider keeping the existing parallel parking instead of the 90 deg parking - existing posted speed is 50 km/hr 	<ul style="list-style-type: none"> - Existing BB line at this location is required to be considered at detailed design - Consider to provide a centreline pavement marking for road widths of 6.1m and less to provide clear delineation 	<ul style="list-style-type: none"> - Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection 	<ul style="list-style-type: none"> - no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design 	<ul style="list-style-type: none"> - no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design 	<ul style="list-style-type: none"> - proposed thresholds needs to be defined if for speed or pedestrian requirement. Thresholds should provide a minimum offset from lane lines at intersection. Thresholds need to be assessed in detailed design if warranted - existing trees on the road need to be assessed at detailed design
3	1	Salisbury Road		<ul style="list-style-type: none"> - The proposed parking bays 1 to 28 from corner of Kensington Road to Balfour Road is on a very steep grade and after a crest. By inspection and with reference to AS2890.5 Section 3.4 & 3.5, this is an unsafe parking location. 	<ul style="list-style-type: none"> - Existing BB line at this location is required to be considered at detailed design - Consider to provide a centreline pavement marking for road widths of 6.1m and less to provide clear delineation 	<ul style="list-style-type: none"> - Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection 	<ul style="list-style-type: none"> - no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design 	<ul style="list-style-type: none"> - no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design 	<ul style="list-style-type: none"> - proposed thresholds needs to be defined if for speed or pedestrian requirement. Thresholds need to be assessed in detailed design if warranted
4	1	Kensington Road 1 (Duke Street to Balfour Lane) Kensington Road 2 (Balfour Lane to Salisbury Road)		<ul style="list-style-type: none"> - The existing grade at Kensington Road is on a steep grade, where the proposed parking is located. Parking bays 45 & 46 near the corner of Duke Street recommended to be removed as there is an existing "No Stopping" sign this location. - Proposed parking bays 1 to 13 needs to be re-assessed as these parking spaces are just beyond the crest which may create a hazard of oncoming traffic at the southbound direction of Kensington Road. Similarly to the proposed parking bays 30 to 43 (Kensington Road 2) 	<ul style="list-style-type: none"> - Existing BB line at this location is required to be considered at detailed design - Consider to provide a centreline pavement marking for road widths of 6.1m and less to provide clear delineation 	<ul style="list-style-type: none"> - Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection 	<ul style="list-style-type: none"> - no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design 	<ul style="list-style-type: none"> - no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design 	<ul style="list-style-type: none"> - proposed thresholds needs to be defined if for speed or pedestrian requirement. Thresholds should provide a minimum offset from lane lines at intersection
5	1	Duke Street		<ul style="list-style-type: none"> - 	<ul style="list-style-type: none"> - Consider to provide a centreline pavement marking for road widths of 6.1m and less to provide clear delineation 	<ul style="list-style-type: none"> - Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection 	<ul style="list-style-type: none"> - no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design 	<ul style="list-style-type: none"> - no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design 	<ul style="list-style-type: none"> - existing mature trees on the road need to be assessed at detailed design for protection requirements




**Randwick City Council - Proposed Eastern Suburbs Light Rail Project
On Street Parking Appraisal**

Stage 2 Concept Design Road Safety Audit

Item No.	Area	Street Name	Photo	Findings					
				Geometry	Line Marking	Drainage	Signage	Lighting	Others
6	1	Boronia Street 1 (Duke Street to Balfour Lane) Boronia Street 2 (Balfour Lane to Salisbury Road) Boronia Street 3 (Salisbury Road to Anzac Parade)		- The existing grade at Boronia Street 1 is on a steep grade, where the proposed parking is located. Parking bays 1 to 21 are recommended to be removed as as these parkings are just beyond the crest which may create a hazard of oncoming traffic, refer AS2890.5 Section 3.4. - Similarly for Boronia Street 2 and 3 parking bays 45 to 51 and the northern end near Anzac Pde respectively, recommended to be removed as as these parkings are just beyond the crest which may create a hazard of oncoming traffic.	- Consider to provide a centreline pavement marking for road widths of 6.1m and less to provide clear delineation	- Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection	- no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design	- no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design	- existing mature trees on the road need to be assessed at detailed design for protection requirements
7	1	Carlton Street		-	- Consider to provide a centreline pavement marking for road widths of 6.1m and less to provide clear delineation	- Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection	- no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design	- no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design	- proposed thresholds needs to be defined if for speed or pedestrian requirement. Thresholds should provide a minimum offset from lane lines at intersection - existing tree overhang need to be assessed at detailed design
8	1	Goodwood Street		- Proposed parking bays 20-24 is not feasible as there is a driveway at this location. - Proposed parking bays 1 - 3 is right across a driveway of a service station which can create a hazard while manoeuvring to park and it may also cause to block off the intersection	- Consider to provide a centreline pavement marking for road widths of 6.1m and less to provide clear delineation	- Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection	- no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design	- no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design	- proposed thresholds needs to be defined if for speed or pedestrian requirement. Thresholds should provide a minimum offset from lane lines at intersection
9	1	Bowral Street		-	- Consider to provide a centreline pavement marking for road widths of 6.1m and less to provide clear delineation	- Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection	- no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design	- no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design	- proposed thresholds needs to be defined if for speed or pedestrian requirement. Thresholds should provide a minimum offset from lane lines at intersection - existing tree overhang need to be assessed at detailed design



**Randwick City Council - Proposed Eastern Suburbs Light Rail Project
On Street Parking Appraisal**

Stage 2 Concept Design Road Safety Audit

Item No.	Area	Street Name	Photo	Findings					
				Geometry	Line Marking	Drainage	Signage	Lighting	Others
10	2	Sturt Street 1 (West) and Sturt Street 2			- Consider to provide a centreline pavement marking for road widths of 6.1m and less to provide clear delineation	- Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection	- no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design	- no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design	
11	2	Bruce Street		- Proposed parking bays 90 - 93 are located within a driveway, this arrangement is not feasible.		- Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection	- no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design	- no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design	- proposed thresholds needs to defined if for speed or pedestrian requirement. Thresholds should provide a minimum offset from lane lines at intersection - existing mature trees need to be assessed at detailed design
12	2	Doncaster Avenue		- Proposed parallel parking within threshold area?		- Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection	- no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design	- no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design	- proposed thresholds needs to defined if for speed or pedestrian requirement. Thresholds should provide a minimum offset from lane lines at intersection - existing mature trees need to be assessed at detailed design
13	2	See Street		-	-	- Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection	- no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design	- no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design	- proposed thresholds needs to defined if for speed or pedestrian requirement. Thresholds should provide a minimum offset from lane lines at intersection - existing poles and services needs to considered in detailed design
14	2	Middle Street 1 and Middle Street 2		- Proposed parking bay 11 is on a crest and curve alignment, sight distance will potentially be impacted.	-	- Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection	- no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design	- no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design	- proposed thresholds needs to defined if for speed or pedestrian requirement. Thresholds should provide a minimum offset from lane lines at intersection - existing poles and services needs to considered in detailed design
15	2	Harbourne Road similar to Willis Street		- Proposed location of parking bays is on an existing embankment, significant level difference is anticipated which will require a retaining structure to support the existing path. Will require a detailed assessment at detailed design of how parking users will be able to safely access the pathways.	-	- Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection	- no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design	- no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design	- proposed thresholds needs to defined if for speed or pedestrian requirement. Thresholds should provide a minimum offset from lane lines at intersection - existing poles and services needs to considered in detailed design



**Randwick City Council - Proposed Eastern Suburbs Light Rail Project
On Street Parking Appraisal**

Stage 2 Concept Design Road Safety Audit

Item No.	Area	Street Name	Photo	Findings					
				Geometry	Line Marking	Drainage	Signage	Lighting	Others
16	2	Meeks Street		- existing roundabout not considered in the RSA, need to be considered at detailed design	-	- Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection	- no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design	- no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design	- proposed thresholds needs to be defined if for speed or pedestrian requirement. Thresholds should provide a minimum offset from lane lines at intersection - existing poles and services needs to be considered in detailed design
17	2	Forsyth Street		- proposed threshold at intersection with Meeks Street, is the intention of the design to change the existing movement via the roundabout?	-	- Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection	- no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design	- no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design	- proposed thresholds needs to be defined if for speed or pedestrian requirement. Thresholds should provide a minimum offset from lane lines at intersection - existing poles and services needs to be considered in detailed design - existing mature trees need to be assessed at detailed design
18	2	Wallace Street 1 and Wallace Street 2		- proposed parking bays on the northeastern side may require a retaining structure; need to be considered in detailed design - proposed parking bays right after a crest or prior to a crest need to be re-assessed as this can potentially be a hazard for oncoming traffic with limited sightlines. (AS2890.5 Sec 3.4) - interface transition of kerb near Wallace Lane need to re-assessed at detailed design, as it does appear to provide a smooth transition curve.	- Consider to provide a centreline pavement marking for road widths of 6.1m and less to provide clear delineation	- Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection	- no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design	- no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design	- proposed thresholds needs to be defined if for speed or pedestrian requirement. Thresholds should provide a minimum offset from lane lines at intersection - existing poles and services needs to be considered in detailed design - existing mature trees need to be assessed at detailed design
19	3	Arthur Street Blenheim Street Mears Avenue Soudan Street		-	- Consider to provide a centreline pavement marking for road widths of 6.1m and less to provide clear delineation	- Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection	- no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design	- no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design	- proposed thresholds needs to be defined if for speed or pedestrian requirement. Thresholds should provide a minimum offset from lane lines at intersection - existing poles and services needs to be considered in detailed design - existing mature trees need to be assessed at detailed design
20	3	Eurimbla Avenue		- The proposed parking bays towards the end of the road appears not feasible compared to the current condition on site. It will require for a service vehicle to manoeuvre onto private property's driveway to park and exit.	- Consider to provide a centreline pavement marking for road widths of 6.1m and less to provide clear delineation	- Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection	- no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design	- no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design	- proposed thresholds needs to be defined if for speed or pedestrian requirement. Thresholds should provide a minimum offset from lane lines at intersection - existing poles and services needs to be considered in detailed design - existing mature trees need to be assessed at detailed design



**Randwick City Council - Proposed Eastern Suburbs Light Rail Project
On Street Parking Appraisal**

Stage 2 Concept Design Road Safety Audit

Item No.	Area	Street Name	Photo	Findings					
				Geometry	Line Marking	Drainage	Signage	Lighting	Others
21	3	Coogee Bay Road		- The existing condition of parking is via parallel parking directly close a retaining wall with no safe access for pedestrians who will park. Pedestrian movement is directed to the road which is unsafe. This is exacerbated by changing the layout onto a 90 degree parking which will push the pedestrians walking closely to the traffic lane.	- Consider providing edgeline pavement marking for pedestrians	- Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection	- no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design	- no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design	-
22	4	Church Street William Street		-	- Consider to provide a centreline pavement marking for road widths of 6.1m and less to provide clear delineation	- Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection	- no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design	- no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design	- proposed thresholds needs to be defined if for speed or pedestrian requirement. Thresholds should provide a minimum offset from lane lines at intersection
23	4	Bradley Street		- The proposed parking bays towards the end of the road appears not feasible compared to the current condition on site. It will require for a service vehicle to manoeuvre onto private property's driveway to park and exit. - proposed parking bays right after a crest or prior to a crest need to be re-assessed as this can potentially be a hazard for oncoming traffic with limited sightlines. (AS2890.5 Sec 3.4)	-	- Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection	- no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design	- no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design	- proposed thresholds needs to be defined if for speed or pedestrian requirement. Thresholds should provide a minimum offset from lane lines at intersection - existing poles and services needs to be considered in detailed design - existing mature trees need to be assessed at detailed design

Randwick City Council - Proposed Eastern Suburbs Light Rail Project
On Street Parking Appraisal

Stage 2 Concept Design Road Safety Audit

Item No.	Area	Street Name	Photo	Findings					
				Geometry	Line Marking	Drainage	Signage	Lighting	Others
24	4	Prince Street		- Proposed parking bays 32 to 34 appears to be too close to the intersection, parking manoeuvring can be a hazard to oncoming traffic, considering there is an existing BB line in proximity	- Consider to provide a centreline pavement marking for road widths of 6.1m and less to provide clear delineation	- Road drainage runoff need to be assessed and considered in the detailed design to suit the proposed kerb blister at intersection	- no sign posting provided as part of the audit information; this needs to be assessed and considered in the detailed design	- no lighting information provided as part of the audit information; this needs to be assessed and considered in the detailed design	- proposed thresholds needs to be defined if for speed or pedestrian requirement. Thresholds should provide a minimum offset from lane lines at intersection - existing poles and services needs to be considered in detailed design - existing mature trees need to be assessed at detailed design
									

Appendix B – Corrective Action Request (CAR)

ROAD SAFETY AUDIT CORRECTIVE ACTION REQUEST			
PROJECT Randwick Parking Study			CAR No : 1
Randwick City Council Randwick Parking Study Concept Design Stage 2 Road Safety Audit		AUDIT NO N/A	
		AUDIT STAGE: 2	
		AUDIT DATE(START): 9-7-2014	
		AUDIT DATE (FINISH): 9-7-2014	
ROAD SAFETY DEFICIENCY:			
Threshold Treatments – Generic across majority of roads Refer to Section 4.1.1 GHD Randwick Parking Study Stage 2 Road Safety Audit Report		PRELIMINARY RISK ASSESSMENT <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <div style="text-align: left;"> INTOLERABLE HIGH MODERATE LOW </div> </div>	
SIGNATURE: (LEAD ROAD SAFETY AUDITOR) <div style="text-align: center; margin-top: 20px;"> </div>		DATE: 23-7-2014	
ACTION ON DEFICIENCY:			
CORRECTIVE ACTION:		Where an existing zebra crossing is present detailed design should be for a wombat crossing. Where threshold treatment is for speed reduction ensure design defines that the raised treatment is not a pedestrian crossing.	
REASON FOR NO ACTION:			
COMPLETION DATE FOR CORRECTIVE ACTION: When detailed design is undertaken			
PRIORITY FOR ACTIONS <input type="checkbox"/> IMMEDIATE <input checked="" type="checkbox"/> NECESSARY <input type="checkbox"/> DESIRABLE			
SIGNATURE: (PROJECT MANAGER) <div style="text-align: center; margin-top: 20px;"> </div>		DATE: 28/08/2014	
CLIENT REPRESENTATIVE CONCURRENCE			
SIGNATURE: (CLIENT REPRESENTATIVE)		DATE:	
ADMINISTRATION FOLLOW-UP AND CLOSE OUT:			
REASON FOR NO ACTION ACCEPTED		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REASON FOR NO ACTION ACCEPTED	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PROPOSED FOLLOW-UP DATE			
FOLLOW-UP ACTION			
CAR CLOSE OUT:			
SIGNATURE: (OPERATIONS AND SERVICE ROAD SAFETY)		DATE:	

ROAD SAFETY AUDIT CORRECTIVE ACTION REQUEST			
PROJECT Randwick Parking Study			CAR No : 2
Randwick City Council Randwick Parking Study Concept Design Stage 2 Road Safety Audit		AUDIT NO N/A	
		AUDIT STAGE: 2	
		AUDIT DATE(START): 9-7-2014	
		AUDIT DATE (FINISH): 9-7-2014	
ROAD SAFETY DEFICIENCY:			
Parking Spaces adjacent to the BB Line – Generic across majority of roads Refer to Section 4.1.2 GHD Randwick Parking Study Stage 2 Road Safety Audit Report		PRELIMINARY RISK ASSESSMENT <div style="display: flex; justify-content: space-between;"> <div style="width: 40px;"><input type="checkbox"/></div> <div>INTOLERABLE</div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 40px;"><input checked="" type="checkbox"/></div> <div>HIGH</div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 40px;"><input type="checkbox"/></div> <div>MODERATE</div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 40px;"><input type="checkbox"/></div> <div>LOW</div> </div>	
SIGNATURE: (LEAD ROAD SAFETY AUDITOR)		DATE: 23-7-2014	
ACTION ON DEFICIENCY:			
CORRECTIVE ACTION:		Parking spaces located adjacent to a BB line on the concept plans need to be removed from plans in detailed design stage	
REASON FOR NO ACTION:			
COMPLETION DATE FOR CORRECTIVE ACTION: When detailed design is undertaken			
PRIORITY FOR ACTIONS <input type="checkbox"/> IMMEDIATE		<input checked="" type="checkbox"/> NECESSARY <input type="checkbox"/> DESIRABLE	
SIGNATURE: (PROJECT MANAGER)		DATE: 28/08/2014	
CLIENT REPRESENTATIVE CONCURRENCE			
SIGNATURE: (CLIENT REPRESENTATIVE)		DATE:	
ADMINISTRATION FOLLOW-UP AND CLOSE OUT:			
REASON FOR NO ACTION ACCEPTED		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REASON FOR NO ACTION ACCEPTED	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PROPOSED FOLLOW-UP DATE			
FOLLOW-UP ACTION			
CAR CLOSE OUT:			
SIGNATURE: (OPERATIONS AND SERVICE ROAD SAFETY)		DATE:	

ROAD SAFETY AUDIT CORRECTIVE ACTION REQUEST			
PROJECT Randwick Parking Study			CAR No : 3
Randwick City Council Randwick Parking Study Concept Design Stage 2 Road Safety Audit		AUDIT NO N/A	
		AUDIT STAGE: 2	
		AUDIT DATE(START): 9-7-2014	
		AUDIT DATE (FINISH): 9-7-2014	
ROAD SAFETY DEFICIENCY:			
Proposed Road Width – Cross Section – Generic across majority of roads Refer to Section 4.1.3 GHD Randwick Parking Study Stage 2 Road Safety Audit Report		PRELIMINARY RISK ASSESSMENT <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <div style="text-align: left;"> INTOLERABLE HIGH MODERATE LOW </div> </div>	
SIGNATURE: (LEAD ROAD SAFETY AUDITOR)		DATE: 23-7-2014	
ACTION ON DEFICIENCY:			
CORRECTIVE ACTION:		Where the traffic lanes adjacent to 90 degree parking is 6.1 metres or less centreline road marking would be installed to provide clear delineation that it is a two way street.	
REASON FOR NO ACTION:			
COMPLETION DATE FOR CORRECTIVE ACTION: When detailed design is undertaken			
PRIORITY FOR ACTIONS <input type="checkbox"/> IMMEDIATE <input checked="" type="checkbox"/> NECESSARY <input type="checkbox"/> DESIRABLE			
SIGNATURE: (PROJECT MANAGER)		DATE: 28/08/2014	
CLIENT REPRESENTATIVE CONCURRENCE			
SIGNATURE: (CLIENT REPRESENTATIVE)		DATE:	
ADMINISTRATION FOLLOW-UP AND CLOSE OUT:			
REASON FOR NO ACTION ACCEPTED		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REASON FOR NO ACTION ACCEPTED	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PROPOSED FOLLOW-UP DATE			
FOLLOW-UP ACTION			
CAR CLOSE OUT:			
SIGNATURE: (OPERATIONS AND SERVICE ROAD SAFETY)		DATE:	

ROAD SAFETY AUDIT CORRECTIVE ACTION REQUEST			
PROJECT Randwick Parking Study			CAR No : 4
Randwick City Council Randwick Parking Study Concept Design Stage 2 Road Safety Audit		AUDIT NO N/A	
		AUDIT STAGE: 2	
		AUDIT DATE(START): 9-7-2014	
		AUDIT DATE (FINISH): 9-7-2014	
ROAD SAFETY DEFICIENCY:			
'No Stopping' Near Intersections – Generic across majority of roads Refer to Section 4.1.4 GHD Randwick Parking Study Stage 2 Road Safety Audit Report		PRELIMINARY RISK ASSESSMENT <div style="display: flex; justify-content: space-between;"> <div><input type="checkbox"/></div> <div>INTOLERABLE</div> </div> <div style="display: flex; justify-content: space-between;"> <div><input checked="" type="checkbox"/></div> <div>HIGH</div> </div> <div style="display: flex; justify-content: space-between;"> <div><input type="checkbox"/></div> <div>MODERATE</div> </div> <div style="display: flex; justify-content: space-between;"> <div><input type="checkbox"/></div> <div>LOW</div> </div>	
SIGNATURE: (LEAD ROAD SAFETY AUDITOR)		 DATE: 23-7-2014	
ACTION ON DEFICIENCY:			
CORRECTIVE ACTION:		Parking spaces located adjacent to no stopping signs on the concept plans need to be removed from plans in detailed design stage	
REASON FOR NO ACTION:			
COMPLETION DATE FOR CORRECTIVE ACTION: When detailed design is undertaken			
PRIORITY FOR ACTIONS <input type="checkbox"/> IMMEDIATE <input checked="" type="checkbox"/> NECESSARY <input type="checkbox"/> DESIRABLE			
SIGNATURE: (PROJECT MANAGER)		 DATE: 28/08/2014	
CLIENT REPRESENTATIVE CONCURRENCE			
SIGNATURE: (CLIENT REPRESENTATIVE)		DATE:	
ADMINISTRATION FOLLOW-UP AND CLOSE OUT:			
REASON FOR NO ACTION ACCEPTED		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REASON FOR NO ACTION ACCEPTED	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PROPOSED FOLLOW-UP DATE			
FOLLOW-UP ACTION			
CAR CLOSE OUT:			
SIGNATURE: (OPERATIONS AND SERVICE ROAD SAFETY)		DATE:	

ROAD SAFETY AUDIT CORRECTIVE ACTION REQUEST			
PROJECT Randwick Parking Study			CAR No : 5
Randwick City Council Randwick Parking Study Concept Design Stage 2 Road Safety Audit		AUDIT NO N/A	
		AUDIT STAGE: 2	
		AUDIT DATE(START): 9-7-2014	
		AUDIT DATE (FINISH): 9-7-2014	
ROAD SAFETY DEFICIENCY:			
Drainage – Generic across majority of roads Refer to Section 4.1.5 GHD Randwick Parking Study Stage 2 Road Safety Audit Report		PRELIMINARY RISK ASSESSMENT <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <div style="text-align: left;"> INTOLERABLE HIGH MODERATE LOW </div> </div>	
SIGNATURE: (LEAD ROAD SAFETY AUDITOR)		DATE: 23-7-2014	
ACTION ON DEFICIENCY:			
CORRECTIVE ACTION:		Drainage needs to be assessed in detailed design for all roads which propose changes to the existing kerb alignment.	
REASON FOR NO ACTION:			
COMPLETION DATE FOR CORRECTIVE ACTION: When detailed design is undertaken			
PRIORITY FOR ACTIONS <input type="checkbox"/> IMMEDIATE <input checked="" type="checkbox"/> NECESSARY <input type="checkbox"/> DESIRABLE			
SIGNATURE: (PROJECT MANAGER)		DATE: 28/08/2014	
CLIENT REPRESENTATIVE CONCURRENCE			
SIGNATURE: (CLIENT REPRESENTATIVE)		DATE:	
ADMINISTRATION FOLLOW-UP AND CLOSE OUT:			
REASON FOR NO ACTION ACCEPTED		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REASON FOR NO ACTION ACCEPTED	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PROPOSED FOLLOW-UP DATE			
FOLLOW-UP ACTION			
CAR CLOSE OUT:			
SIGNATURE: (OPERATIONS AND SERVICE ROAD SAFETY)		DATE:	

ROAD SAFETY AUDIT CORRECTIVE ACTION REQUEST			
PROJECT Randwick Parking Study			CAR No : 6
Randwick City Council Randwick Parking Study Concept Design Stage 2 Road Safety Audit		AUDIT NO N/A	
		AUDIT STAGE: 2	
		AUDIT DATE(START): 9-7-2014	
		AUDIT DATE (FINISH): 9-7-2014	
ROAD SAFETY DEFICIENCY:			
Existing Trees – Generic across majority of roads Refer to Section 4.1.6 GHD Randwick Parking Study Stage 2 Road Safety Audit Report		PRELIMINARY RISK ASSESSMENT <div style="display: flex; justify-content: space-between;"> <div style="text-align: center;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <div style="text-align: left;"> INTOLERABLE HIGH MODERATE LOW </div> </div>	
SIGNATURE: (LEAD ROAD SAFETY AUDITOR) <div style="text-align: center; margin-top: 10px;"> </div>		DATE: 23-7-2014	
ACTION ON DEFICIENCY:			
CORRECTIVE ACTION:		The actual location and size of trees need to be addressed on a street by street basis during the detailed design stage to see if there is adequate room to provide all proposed parking spaces.	
REASON FOR NO ACTION:			
COMPLETION DATE FOR CORRECTIVE ACTION: When detailed design is undertaken			
PRIORITY FOR ACTIONS <input type="checkbox"/> IMMEDIATE <input checked="" type="checkbox"/> NECESSARY <input type="checkbox"/> DESIRABLE			
SIGNATURE: (PROJECT MANAGER) <div style="text-align: center; margin-top: 10px;"> </div>		DATE: 28/08/2014	
CLIENT REPRESENTATIVE CONCURRENCE			
SIGNATURE: (CLIENT REPRESENTATIVE)		DATE:	
ADMINISTRATION FOLLOW-UP AND CLOSE OUT:			
REASON FOR NO ACTION ACCEPTED		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REASON FOR NO ACTION ACCEPTED	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PROPOSED FOLLOW-UP DATE			
FOLLOW-UP ACTION			
CAR CLOSE OUT:			
SIGNATURE: (OPERATIONS AND SERVICE ROAD SAFETY)		DATE:	

ROAD SAFETY AUDIT CORRECTIVE ACTION REQUEST			
PROJECT Randwick Parking Study			CAR No : 7
Randwick City Council Randwick Parking Study Concept Design Stage 2 Road Safety Audit		AUDIT NO N/A	
		AUDIT STAGE: 2	
		AUDIT DATE(START): 9-7-2014	
		AUDIT DATE (FINISH): 9-7-2014	
ROAD SAFETY DEFICIENCY:			
Existing Poles and Services – Generic across majority of roads Refer to Section 4.1.7 GHD Randwick Parking Study Stage 2 Road Safety Audit Report		PRELIMINARY RISK ASSESSMENT <div style="display: flex; justify-content: space-between;"> <div style="width: 40px; text-align: center;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <div style="width: 60%;"> INTOLERABLE HIGH MODERATE LOW </div> </div>	
SIGNATURE: (LEAD ROAD SAFETY AUDITOR) <div style="text-align: center; margin-top: 10px;"> </div>		DATE: 23-7-2014	
ACTION ON DEFICIENCY:			
CORRECTIVE ACTION:		The actual location of service poles needs to be addressed on a street by street basis during the detailed design stage to see if there is adequate room to provide all proposed parking spaces.	
REASON FOR NO ACTION:			
COMPLETION DATE FOR CORRECTIVE ACTION: When detailed design is undertaken			
PRIORITY FOR ACTIONS <input type="checkbox"/> IMMEDIATE <input checked="" type="checkbox"/> NECESSARY <input type="checkbox"/> DESIRABLE			
SIGNATURE: (PROJECT MANAGER) <div style="text-align: center; margin-top: 10px;"> </div>		DATE: 28/08/2014	
CLIENT REPRESENTATIVE CONCURRENCE			
SIGNATURE: (CLIENT REPRESENTATIVE)		DATE:	
ADMINISTRATION FOLLOW-UP AND CLOSE OUT:			
REASON FOR NO ACTION ACCEPTED		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REASON FOR NO ACTION ACCEPTED	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PROPOSED FOLLOW-UP DATE			
FOLLOW-UP ACTION			
CAR CLOSE OUT:			
SIGNATURE: (OPERATIONS AND SERVICE ROAD SAFETY)		DATE:	

ROAD SAFETY AUDIT CORRECTIVE ACTION REQUEST			
PROJECT Randwick Parking Study			CAR No : 8
Randwick City Council Randwick Parking Study Concept Design Stage 2 Road Safety Audit		AUDIT NO N/A	
		AUDIT STAGE: 2	
		AUDIT DATE(START): 9-7-2014	
		AUDIT DATE (FINISH): 9-7-2014	
ROAD SAFETY DEFICIENCY:			
Roma Avenue – location of parking spaces Refer to Section 4.2.1 GHD Randwick Parking Study Stage 2 Road Safety Audit Report		PRELIMINARY RISK ASSESSMENT <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <div style="text-align: left;"> INTOLERABLE HIGH MODERATE LOW </div> </div>	
SIGNATURE: (LEAD ROAD SAFETY AUDITOR) <div style="text-align: center; margin-top: 20px;"> </div>		DATE: 23-7-2014	
ACTION ON DEFICIENCY:			
CORRECTIVE ACTION:		Remove proposed angle parking spaces 1 to 6 – retain as parallel parking spaces as per existing	
REASON FOR NO ACTION:			
COMPLETION DATE FOR CORRECTIVE ACTION: When detailed design is undertaken			
PRIORITY FOR ACTIONS <input type="checkbox"/> IMMEDIATE <input checked="" type="checkbox"/> NECESSARY <input type="checkbox"/> DESIRABLE			
SIGNATURE: (PROJECT MANAGER) <div style="text-align: center; margin-top: 20px;"> </div>		DATE: 28/08/2014	
CLIENT REPRESENTATIVE CONCURRENCE			
SIGNATURE: (CLIENT REPRESENTATIVE)		DATE:	
ADMINISTRATION FOLLOW-UP AND CLOSE OUT:			
REASON FOR NO ACTION ACCEPTED		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REASON FOR NO ACTION ACCEPTED	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PROPOSED FOLLOW-UP DATE			
FOLLOW-UP ACTION			
CAR CLOSE OUT:			
SIGNATURE: (OPERATIONS AND SERVICE ROAD SAFETY)		DATE:	

ROAD SAFETY AUDIT CORRECTIVE ACTION REQUEST			
PROJECT Randwick Parking Study			CAR No : 9
Randwick City Council Randwick Parking Study Concept Design Stage 2 Road Safety Audit		AUDIT NO N/A	
		AUDIT STAGE: 2	
		AUDIT DATE(START): 9-7-2014	
		AUDIT DATE (FINISH): 9-7-2014	
ROAD SAFETY DEFICIENCY:			
Salisbury Road – location of parking spaces on crest Refer to Section 4.2.2 GHD Randwick Parking Study Stage 2 Road Safety Audit Report		PRELIMINARY RISK ASSESSMENT <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 40px; text-align: center;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> </div> <div style="width: 60%;"> INTOLERABLE HIGH MODERATE LOW </div> </div>	
SIGNATURE: (LEAD ROAD SAFETY AUDITOR)		DATE: 23-7-2014	
ACTION ON DEFICIENCY:			
CORRECTIVE ACTION:		Remove proposed angle parking spaces numbered 1 to 28 from the corner of Kensington Road to Balfour Road – retain as parallel parking spaces.	
REASON FOR NO ACTION:			
COMPLETION DATE FOR CORRECTIVE ACTION: When detailed design is undertaken			
PRIORITY FOR ACTIONS		<input type="checkbox"/> IMMEDIATE <input checked="" type="checkbox"/> NECESSARY	<input type="checkbox"/> DESIRABLE
SIGNATURE: (PROJECT MANAGER)		DATE: 28/08/2014	
CLIENT REPRESENTATIVE CONCURRENCE			
SIGNATURE: (CLIENT REPRESENTATIVE)		DATE:	
ADMINISTRATION FOLLOW-UP AND CLOSE OUT:			
REASON FOR NO ACTION ACCEPTED		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REASON FOR NO ACTION ACCEPTED	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PROPOSED FOLLOW-UP DATE			
FOLLOW-UP ACTION			
CAR CLOSE OUT:			
SIGNATURE: (OPERATIONS AND SERVICE ROAD SAFETY)		DATE:	

ROAD SAFETY AUDIT CORRECTIVE ACTION REQUEST			
PROJECT Randwick Parking Study			CAR No : 10
Randwick City Council Randwick Parking Study Concept Design Stage 2 Road Safety Audit		AUDIT NO N/A	
		AUDIT STAGE: 2	
		AUDIT DATE(START): 9-7-2014	
		AUDIT DATE (FINISH): 9-7-2014	
ROAD SAFETY DEFICIENCY:			
Kensington Road – location of parking spaces Refer to Section 4.2.3 GHD Randwick Parking Study Stage 2 Road Safety Audit Report		PRELIMINARY RISK ASSESSMENT <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <div style="text-align: left;"> INTOLERABLE HIGH MODERATE LOW </div> </div>	
SIGNATURE: (LEAD ROAD SAFETY AUDITOR)		DATE: 23-7-2014	
ACTION ON DEFICIENCY:			
CORRECTIVE ACTION:		The proposed parking bays 1 to 13 (Figure 9) and 30 to 43 (Figure 10). should be removed as these spaces are located just beyond the crest	
REASON FOR NO ACTION:			
COMPLETION DATE FOR CORRECTIVE ACTION: When detailed design is undertaken			
PRIORITY FOR ACTIONS <input type="checkbox"/> IMMEDIATE <input checked="" type="checkbox"/> NECESSARY <input type="checkbox"/> DESIRABLE			
SIGNATURE: (PROJECT MANAGER)		DATE: 28/08/2014	
CLIENT REPRESENTATIVE CONCURRENCE			
SIGNATURE: (CLIENT REPRESENTATIVE)		DATE:	
ADMINISTRATION FOLLOW-UP AND CLOSE OUT:			
REASON FOR NO ACTION ACCEPTED		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REASON FOR NO ACTION ACCEPTED	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PROPOSED FOLLOW-UP DATE			
FOLLOW-UP ACTION			
CAR CLOSE OUT:			
SIGNATURE: (OPERATIONS AND SERVICE ROAD SAFETY)		DATE:	

ROAD SAFETY AUDIT CORRECTIVE ACTION REQUEST			
PROJECT Randwick Parking Study			CAR No : 11
Randwick City Council Randwick Parking Study Concept Design Stage 2 Road Safety Audit		AUDIT NO N/A	
		AUDIT STAGE: 2	
		AUDIT DATE(START): 9-7-2014	
		AUDIT DATE (FINISH): 9-7-2014	
ROAD SAFETY DEFICIENCY:			
Boronia Street – location of parking spaces Refer to Section 4.2.4 GHD Randwick Parking Study Stage 2 Road Safety Audit Report		PRELIMINARY RISK ASSESSMENT <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <div style="text-align: left;"> INTOLERABLE HIGH MODERATE LOW </div> </div>	
SIGNATURE: (LEAD ROAD SAFETY AUDITOR) <div style="text-align: center; margin-top: 10px;"> </div>		DATE: 23-7-2014	
ACTION ON DEFICIENCY:			
CORRECTIVE ACTION:		Parking spaces 1 to 21 (Figure 2) and parking spaces 45 to 51 (Figure 3) be removed as these are located just beyond the crest – retain as existing parallel parking	
REASON FOR NO ACTION:			
COMPLETION DATE FOR CORRECTIVE ACTION: When detailed design is undertaken			
PRIORITY FOR ACTIONS <input type="checkbox"/> IMMEDIATE <input checked="" type="checkbox"/> NECESSARY <input type="checkbox"/> DESIRABLE			
SIGNATURE: (PROJECT MANAGER) <div style="text-align: center; margin-top: 10px;"> </div>		DATE: 28/08/2014	
CLIENT REPRESENTATIVE CONCURRENCE			
SIGNATURE: (CLIENT REPRESENTATIVE)		DATE:	
ADMINISTRATION FOLLOW-UP AND CLOSE OUT:			
REASON FOR NO ACTION ACCEPTED		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REASON FOR NO ACTION ACCEPTED	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PROPOSED FOLLOW-UP DATE			
FOLLOW-UP ACTION			
CAR CLOSE OUT:			
SIGNATURE: (OPERATIONS AND SERVICE ROAD SAFETY)		DATE:	

ROAD SAFETY AUDIT CORRECTIVE ACTION REQUEST			
PROJECT Randwick Parking Study			CAR No : 12
Randwick City Council Randwick Parking Study Concept Design Stage 2 Road Safety Audit		AUDIT NO N/A	
		AUDIT STAGE: 2	
		AUDIT DATE(START): 9-7-2014	
		AUDIT DATE (FINISH): 9-7-2014	
ROAD SAFETY DEFICIENCY:			
Doncaster Avenue – Intersection treatment Refer to Section 4.2.5 GHD Randwick Parking Study Stage 2 Road Safety Audit Report		PRELIMINARY RISK ASSESSMENT <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> </div> <div style="text-align: left;"> INTOLERABLE HIGH MODERATE LOW </div> </div>	
SIGNATURE: (LEAD ROAD SAFETY AUDITOR) <div style="text-align: center; margin-top: 10px;"> </div>		DATE: 23-7-2014	
ACTION ON DEFICIENCY:			
CORRECTIVE ACTION:		Remove proposed parallel parking spaces from proposed intersection threshold treatment	
REASON FOR NO ACTION:			
COMPLETION DATE FOR CORRECTIVE ACTION: When detailed design is undertaken			
PRIORITY FOR ACTIONS <input type="checkbox"/> IMMEDIATE <input checked="" type="checkbox"/> NECESSARY <input type="checkbox"/> DESIRABLE			
SIGNATURE: (PROJECT MANAGER) <div style="text-align: center; margin-top: 10px;"> </div>		DATE: 28/08/2014	
CLIENT REPRESENTATIVE CONCURRENCE			
SIGNATURE: (CLIENT REPRESENTATIVE)		DATE:	
ADMINISTRATION FOLLOW-UP AND CLOSE OUT:			
REASON FOR NO ACTION ACCEPTED		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REASON FOR NO ACTION ACCEPTED	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PROPOSED FOLLOW-UP DATE			
FOLLOW-UP ACTION			
CAR CLOSE OUT:			
SIGNATURE: (OPERATIONS AND SERVICE ROAD SAFETY)		DATE:	

ROAD SAFETY AUDIT CORRECTIVE ACTION REQUEST			
PROJECT Randwick Parking Study			CAR No : 13
Randwick City Council Randwick Parking Study Concept Design Stage 2 Road Safety Audit		AUDIT NO N/A	
		AUDIT STAGE: 2	
		AUDIT DATE(START): 9-7-2014	
		AUDIT DATE (FINISH): 9-7-2014	
ROAD SAFETY DEFICIENCY:			
Middle Street – location of parking spaces on crest Refer to Section 4.2.6 GHD Randwick Parking Study Stage 2 Road Safety Audit Report		PRELIMINARY RISK ASSESSMENT <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 40px; text-align: center;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> </div> <div style="width: 60%;"> INTOLERABLE HIGH MODERATE LOW </div> </div>	
SIGNATURE: (LEAD ROAD SAFETY AUDITOR) <div style="text-align: center; margin-top: 20px;"> </div>		DATE: 23-7-2014	
ACTION ON DEFICIENCY:			
CORRECTIVE ACTION:		Remove proposed parking space 11 as it is situated on a crest and curve alignment and therefore the sight distance could potentially be impacted	
REASON FOR NO ACTION:			
COMPLETION DATE FOR CORRECTIVE ACTION: When detailed design is undertaken			
PRIORITY FOR ACTIONS <input type="checkbox"/> IMMEDIATE		<input checked="" type="checkbox"/> NECESSARY <input type="checkbox"/> DESIRABLE	
SIGNATURE: (PROJECT MANAGER) <div style="text-align: center; margin-top: 20px;"> </div>		DATE: 28/08/2014	
CLIENT REPRESENTATIVE CONCURRENCE			
SIGNATURE: (CLIENT REPRESENTATIVE)		DATE:	
ADMINISTRATION FOLLOW-UP AND CLOSE OUT:			
REASON FOR NO ACTION ACCEPTED		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REASON FOR NO ACTION ACCEPTED	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PROPOSED FOLLOW-UP DATE			
FOLLOW-UP ACTION			
CAR CLOSE OUT:			
SIGNATURE: (OPERATIONS AND SERVICE ROAD SAFETY)		DATE:	

ROAD SAFETY AUDIT CORRECTIVE ACTION REQUEST			
PROJECT Randwick Parking Study			CAR No : 14
Randwick City Council Randwick Parking Study Concept Design Stage 2 Road Safety Audit		AUDIT NO N/A	
		AUDIT STAGE: 2	
		AUDIT DATE(START): 9-7-2014	
		AUDIT DATE (FINISH): 9-7-2014	
ROAD SAFETY DEFICIENCY:			
Harbourne Road – existing embankment Refer to Section 4.2.7 GHD Randwick Parking Study Stage 2 Road Safety Audit Report		PRELIMINARY RISK ASSESSMENT <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <div style="text-align: left;"> INTOLERABLE HIGH MODERATE LOW </div> </div>	
SIGNATURE: (LEAD ROAD SAFETY AUDITOR) <div style="text-align: center; margin-top: 20px;"> </div>		DATE: 23-7-2014	
ACTION ON DEFICIENCY:			
CORRECTIVE ACTION:		The proposed location of parking spaces on both sides of the road is on an existing embankment where there is a significant level difference. A retaining structure would be required to support the existing footpath. A detailed assessment would need to be done at the detailed design stage.	
REASON FOR NO ACTION:			
COMPLETION DATE FOR CORRECTIVE ACTION: When detailed design is undertaken			
PRIORITY FOR ACTIONS <input type="checkbox"/> IMMEDIATE		<input checked="" type="checkbox"/> NECESSARY <input type="checkbox"/> DESIRABLE	
SIGNATURE: (PROJECT MANAGER) <div style="text-align: center; margin-top: 20px;"> </div>		DATE: 28/08/2014	
CLIENT REPRESENTATIVE CONCURRENCE			
SIGNATURE: (CLIENT REPRESENTATIVE)		DATE:	
ADMINISTRATION FOLLOW-UP AND CLOSE OUT:			
REASON FOR NO ACTION ACCEPTED		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REASON FOR NO ACTION ACCEPTED	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PROPOSED FOLLOW-UP DATE			
FOLLOW-UP ACTION			
CAR CLOSE OUT:			
SIGNATURE: (OPERATIONS AND SERVICE ROAD SAFETY)		DATE:	

ROAD SAFETY AUDIT CORRECTIVE ACTION REQUEST			
PROJECT Randwick Parking Study			CAR No : 15
Randwick City Council Randwick Parking Study Concept Design Stage 2 Road Safety Audit		AUDIT NO N/A	
		AUDIT STAGE: 2	
		AUDIT DATE(START): 9-7-2014	
		AUDIT DATE (FINISH): 9-7-2014	
ROAD SAFETY DEFICIENCY:			
Willis Street – existing embankment Refer to Section 4.2.8 GHD Randwick Parking Study Stage 2 Road Safety Audit Report		PRELIMINARY RISK ASSESSMENT <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <div style="text-align: left;"> INTOLERABLE HIGH MODERATE LOW </div> </div>	
SIGNATURE: (LEAD ROAD SAFETY AUDITOR) <div style="text-align: center; margin-top: 10px;"> </div>		DATE: 23-7-2014	
ACTION ON DEFICIENCY:			
CORRECTIVE ACTION:		There is a section of proposed parking spaces on the western side of the road that is on an existing embankment where there is a significant level difference. A retaining structure would be required and should be considered in the detailed design.	
REASON FOR NO ACTION:			
COMPLETION DATE FOR CORRECTIVE ACTION: When detailed design is undertaken			
PRIORITY FOR ACTIONS		<input type="checkbox"/> IMMEDIATE	<input checked="" type="checkbox"/> NECESSARY
SIGNATURE:		DATE: 28/08/2014	
(PROJECT MANAGER) <div style="text-align: center; margin-top: 10px;"> </div>			
CLIENT REPRESENTATIVE CONCURRENCE			
SIGNATURE:		DATE:	
(CLIENT REPRESENTATIVE)			
ADMINISTRATION FOLLOW-UP AND CLOSE OUT:			
REASON FOR NO ACTION ACCEPTED		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REASON FOR NO ACTION ACCEPTED	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PROPOSED FOLLOW-UP DATE			
FOLLOW-UP ACTION			
CAR CLOSE OUT:			
SIGNATURE:		DATE:	
(OPERATIONS AND SERVICE ROAD SAFETY)			

ROAD SAFETY AUDIT CORRECTIVE ACTION REQUEST			
PROJECT Randwick Parking Study			CAR No : 16
Randwick City Council Randwick Parking Study Concept Design Stage 2 Road Safety Audit		AUDIT NO N/A	
		AUDIT STAGE: 2	
		AUDIT DATE(START): 9-7-2014	
		AUDIT DATE (FINISH): 9-7-2014	
ROAD SAFETY DEFICIENCY:			
Wallace Street – existing embankment and crest Refer to Section 4.2.9 GHD Randwick Parking Study Stage 2 Road Safety Audit Report		PRELIMINARY RISK ASSESSMENT <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <div style="text-align: left;"> INTOLERABLE HIGH MODERATE LOW </div> </div>	
SIGNATURE: (LEAD ROAD SAFETY AUDITOR)		 DATE: 23-7-2014	
ACTION ON DEFICIENCY:			
CORRECTIVE ACTION:		There are some sections of proposed parking spaces on the northern side of the road that may require a retaining structure this should be considered in the detailed design. Parking spaces 25 to 29 (Figure 31) need to be check for appropriate visibility in the detailed design due to a crest in the road at this location.	
REASON FOR NO ACTION:			
COMPLETION DATE FOR CORRECTIVE ACTION: When detailed design is undertaken			
PRIORITY FOR ACTIONS <input type="checkbox"/> IMMEDIATE <input checked="" type="checkbox"/> NECESSARY <input type="checkbox"/> DESIRABLE			
SIGNATURE: (PROJECT MANAGER)		 DATE: 28/08/2014	
CLIENT REPRESENTATIVE CONCURRENCE			
SIGNATURE: (CLIENT REPRESENTATIVE)		DATE:	
ADMINISTRATION FOLLOW-UP AND CLOSE OUT:			
REASON FOR NO ACTION ACCEPTED		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REASON FOR NO ACTION ACCEPTED	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PROPOSED FOLLOW-UP DATE			
FOLLOW-UP ACTION			
CAR CLOSE OUT:			
SIGNATURE: (OPERATIONS AND SERVICE ROAD SAFETY)		DATE:	

ROAD SAFETY AUDIT CORRECTIVE ACTION REQUEST			
PROJECT Randwick Parking Study			CAR No : 17
Randwick City Council Randwick Parking Study Concept Design Stage 2 Road Safety Audit		AUDIT NO N/A	
		AUDIT STAGE: 2	
		AUDIT DATE(START): 9-7-2014	
		AUDIT DATE (FINISH): 9-7-2014	
ROAD SAFETY DEFICIENCY:			
Eurimbla Avenue – cul de sac turning paths Refer to Section 4.2.10 GHD Randwick Parking Study Stage 2 Road Safety Audit Report		PRELIMINARY RISK ASSESSMENT <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 40px; text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> </div> <div style="width: 60%;"> INTOLERABLE HIGH MODERATE LOW </div> </div>	
SIGNATURE: (LEAD ROAD SAFETY AUDITOR)		 DATE: 23-7-2014	
ACTION ON DEFICIENCY:			
CORRECTIVE ACTION:		Remove proposed parking spaces 40 and 41 to ensure turning paths can be undertaken at the cul de sac	
REASON FOR NO ACTION:			
COMPLETION DATE FOR CORRECTIVE ACTION: When detailed design is undertaken			
PRIORITY FOR ACTIONS <input type="checkbox"/> IMMEDIATE <input checked="" type="checkbox"/> NECESSARY <input type="checkbox"/> DESIRABLE			
SIGNATURE: (PROJECT MANAGER)		 DATE: 28/08/2014	
CLIENT REPRESENTATIVE CONCURRENCE			
SIGNATURE: (CLIENT REPRESENTATIVE)		DATE:	
ADMINISTRATION FOLLOW-UP AND CLOSE OUT:			
REASON FOR NO ACTION ACCEPTED		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REASON FOR NO ACTION ACCEPTED	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PROPOSED FOLLOW-UP DATE			
FOLLOW-UP ACTION			
CAR CLOSE OUT:			
SIGNATURE: (OPERATIONS AND SERVICE ROAD SAFETY)		DATE:	

ROAD SAFETY AUDIT CORRECTIVE ACTION REQUEST			
PROJECT Randwick Parking Study			CAR No : 18
Randwick City Council Randwick Parking Study Concept Design Stage 2 Road Safety Audit		AUDIT NO N/A	
		AUDIT STAGE: 2	
		AUDIT DATE(START): 9-7-2014	
		AUDIT DATE (FINISH): 9-7-2014	
ROAD SAFETY DEFICIENCY:			
Coogee Bay Road – parking locations Refer to Section 4.2.10 GHD Randwick Parking Study Stage 2 Road Safety Audit Report		PRELIMINARY RISK ASSESSMENT <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 40px; text-align: center;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <div style="width: 60%;"> INTOLERABLE HIGH MODERATE LOW </div> </div>	
SIGNATURE: (LEAD ROAD SAFETY AUDITOR)		 DATE: 23-7-2014	
ACTION ON DEFICIENCY:			
CORRECTIVE ACTION:		Remove proposed angle parking – retain existing parallel parking spaces	
REASON FOR NO ACTION:			
COMPLETION DATE FOR CORRECTIVE ACTION:		When detailed design is undertaken	
PRIORITY FOR ACTIONS		<input type="checkbox"/> IMMEDIATE <input checked="" type="checkbox"/> NECESSARY <input type="checkbox"/> DESIRABLE	
SIGNATURE: (PROJECT MANAGER)		 DATE: 28/08/2014	
CLIENT REPRESENTATIVE CONCURRENCE			
SIGNATURE: (CLIENT REPRESENTATIVE)		DATE:	
ADMINISTRATION FOLLOW-UP AND CLOSE OUT:			
REASON FOR NO ACTION ACCEPTED		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REASON FOR NO ACTION ACCEPTED	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PROPOSED FOLLOW-UP DATE			
FOLLOW-UP ACTION			
CAR CLOSE OUT:			
SIGNATURE: (OPERATIONS AND SERVICE ROAD SAFETY)		DATE:	

ROAD SAFETY AUDIT CORRECTIVE ACTION REQUEST			
PROJECT Randwick Parking Study			CAR No : 19
Randwick City Council Randwick Parking Study Concept Design Stage 2 Road Safety Audit		AUDIT NO N/A	
		AUDIT STAGE: 2	
		AUDIT DATE(START): 9-7-2014	
		AUDIT DATE (FINISH): 9-7-2014	
ROAD SAFETY DEFICIENCY:			
Bradley Street – cul de sac turning paths Refer to Section 4.2.10 GHD Randwick Parking Study Stage 2 Road Safety Audit Report		PRELIMINARY RISK ASSESSMENT <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 40px; text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> </div> <div style="width: 60%;"> INTOLERABLE HIGH MODERATE LOW </div> </div>	
SIGNATURE: (LEAD ROAD SAFETY AUDITOR) <div style="text-align: center; margin-top: 20px;"> </div>		DATE: 23-7-2014	
ACTION ON DEFICIENCY:			
CORRECTIVE ACTION:		Remove proposed parking spaces 1 and 2 to ensure turning paths can be undertaken at the cul de sac	
REASON FOR NO ACTION:			
COMPLETION DATE FOR CORRECTIVE ACTION: When detailed design is undertaken			
PRIORITY FOR ACTIONS <input type="checkbox"/> IMMEDIATE <input type="checkbox"/> NECESSARY <input type="checkbox"/> DESIRABLE			
SIGNATURE: (PROJECT MANAGER) <div style="text-align: center; margin-top: 20px;"> </div>		DATE: 28/08/2014	
CLIENT REPRESENTATIVE CONCURRENCE			
SIGNATURE: (CLIENT REPRESENTATIVE)		DATE:	
ADMINISTRATION FOLLOW-UP AND CLOSE OUT:			
REASON FOR NO ACTION ACCEPTED		<input type="checkbox"/> YES	<input type="checkbox"/> NO
REASON FOR NO ACTION ACCEPTED	<input type="checkbox"/> N/A	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PROPOSED FOLLOW-UP DATE			
FOLLOW-UP ACTION			
CAR CLOSE OUT:			
SIGNATURE: (OPERATIONS AND SERVICE ROAD SAFETY)		DATE:	

GHD

133 Castlereagh St Sydney NSW 2000

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T: +61 2 9239 7100 F: +61 2 9239 7199 E: sydmail@ghd.com.au

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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
1	K McNatty	M Piolin		T Frodsham		23/07/14

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