Woollahra Municipal Council
Traffic Management Strategy

transportation planning, design and delivery

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GTAconsultants

Woollahra Municipal Council

Traffic Management Strategy

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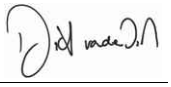
C	19/03/14	Final	Justin Murphy	Dick van den Dool	

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1. Executive Summary

The Woollahra Traffic Management Strategy provides Council with a prioritised and costed 10 – 20 year traffic capital works program for the local and collector road network managed by Council.

- The Strategy is a live document which details a replicable process to prioritise locations for Local Area Traffic Management (LATM) on local and collector roads in Woollahra LGA.
- A comprehensive LATM assessment process has been developed as part of the strategy which is informed by two separate assessments:
  - **Needs Based** – high vehicle speeds, vehicle crashes and areas of community concern
  - **Opportunistic** – identification of locations where LATM treatments can be incorporated into programmed works.
- To assist the management of local and collector roads, the LGA has been divided into 10 local traffic corridors and 27 local traffic precincts in line with Austroads Guidelines and current practice.
- An assessment tool and ranking spreadsheet has been developed which is an integral component of the Strategy and provides quantitative results to directly inform the prioritisation and allocation of Council resources. This is a replicable tool which can be easily updated on an annual basis with new data to provide rankings for the next year.

A key aim of the Woollahra Traffic Management Strategy is to identify the existing traffic and transport issues within the LGA and to recommend ways to improve conditions for all road users. These issues may be summarised as follows:

- Analysis of RMS CrashLink data for the most recent five years that data was available (2007-2011) revealed there was a total of 1,279 recorded vehicle crashes across Woollahra LGA with 505 (39%) of these occurring on the local and collector road network.
- There was a strong concentration of crashes along Edgecliff Road, with crash clusters at intersections along its eastern end between Queen Street and Adelaide Street.
- Based on the assessment process developed as part of this strategy, the top three ranked locations for LATM projects are the Edgecliff Road, Bellevue Road and Hopetoun Avenue traffic corridors.

2. Introduction

2.1 Background

The Woollahra Traffic and Transport Strategy was adopted by Council in 2001 and since this time many of the recommendations and actions identified in this strategy have been implemented. Council currently spends approximately $400,000 per annum on traffic capital works projects.

GTA Consultants was commissioned by Council to assist with the development of a strategy to inform and assist the management of traffic issues in the Local Government Area (LGA), including the implementation of traffic facilities.

The aim of the strategy is to identify the existing traffic and transport issues within the LGA and to recommend ways to improve conditions for all road users. The main objective is to provide Council with a prioritised 10 – 20 year traffic capital works program for the road network managed by Council.

2.2 Purpose of this Report

The purpose of this report is to:

i review the existing policies, plans and studies relevant to traffic management within Woollahra
ii identify the existing traffic and transport issues within the LGA
iii review the existing traffic management measures currently in place on roads managed by Council
iv describe the ranking system for traffic related works developed by GTA Consultants and provide guidance on the future management of data used in this system
v provide Woollahra Municipal Council with a 10 year capital works program for the implementation of traffic related works for the road network managed by Council.

2.3 References

In preparing this report, reference has been made to the following:

- Austroads Guide to Traffic Management, Part 8: Local Area Traffic Management, 2008
- Bellevue Hill Traffic Study, Arup, 2003
- Darling Point Precinct Traffic Study, Woollahra Municipal Council, 2005
- Paddington Pedestrian Access and Mobility Plan (PAMP), URaP – TTW, 2005
- RMS Guide to Road Design, 1991
- NSW Bicycle Guidelines, RMS, 2003
- Schedule of Classified Roads and State & Regional Roads (version 2011/1), RMS, 2011
- Woollahra Bicycle Strategy, GTA Consultants, 2009
- Woollahra Local Environmental Plan (LEP) 1995
- Woollahra Municipal Council Delivery Program (2009-2013) and Operational Plan (2012/13)
- Woollahra Traffic and Transport Study, Gutteridge Haskins & Davey, 2000
- other documents and data as referenced in this report.

3. Existing Conditions

3.1 Literature Review

GTA Consultants undertook a desktop review of the policies, plans and studies relevant to traffic management within Woollahra. A summary of these documents is provided below.

3.1.1 Woollahra Local Environmental Plan (LEP) 1995

LEP 1995 is the current planning instrument in use in Woollahra LGA and sets out the following objectives in relation to traffic and transport:

i to encourage the development of a balanced transport system, including the provision of safe and convenient facilities for pedestrians, cyclists, public transport users and other road users
ii to implement a rational and efficient distribution of vehicular traffic throughout the area of Woollahra by establishing a hierarchy of roads to service various transport functions
iii to ensure the adequate provision of car parking and servicing facilities within commercial areas
iv to improve the provision of car parking and reduce conflict between resident and visitor demands for car parking space in residential areas
v to minimise conflict between pedestrians and vehicles
vi to minimise conflict between transport and land use activities
vii to minimise the impact, on adjoining residential areas, of traffic and parking generated by commercial areas
viii to allow for contributions towards the provision of car parking and traffic management measures necessitated by any new development
ix to reserve land for the improvement of traffic flow
x to encourage the provision of adequate access for older people and people with a disability to safe and convenient car parking, footpaths and access to public transport facilities.

A new LEP is currently being prepared which will replace LEP 1995 and provide a guide to development in Woollahra LGA for the next 7 to 10 years. The draft LEP was placed on public exhibition in September and it is anticipated that the LEP will finalised in the second half of 2014.

3.1.2 Woollahra Bicycle Strategy (2009)

The Woollahra Bicycle Strategy was completed by GTA Consultants in 2009 and serves as a comprehensive strategy to facilitate cycling in the Woollahra LGA.

The Bicycle Strategy included a comprehensive review of the bicycle infrastructure recommended for implementation through the Woollahra Waverley Bike Plan 2000. The Bicycle Strategy provided a prioritised, costed action plan for the implementation of bicycle infrastructure across the Woollahra LGA.

3.1.3 Woollahra Municipal Council Delivery Program (2009-2013) and Operational Plan (2012/13)

The Delivery Program (2009-2013) and Operational Plan (2012-13) were adopted by Council in June 2012. The document sets out the following values and future goals for traffic and transport:

- Reduced traffic congestion
- Improved parking
- Good public transport.

The Delivery Program and Operational Plan set out the strategies related to traffic and transport to support the strategic theme/goal of 'Getting Around' as follows:

i Facilitate an improved network of accessible and safe transport options
ii Improve the management of public parking on-street and off-street
iii Promote provision of better, more integrated public and community transport
iv Reduce traffic congestion, noise and speeding.

The Delivery Program included a strategy to "reduce vehicle speed and traffic congestion through the introduction of traffic management facilities" (delivery program priority 6.4.1) while the Operational Plan contained two corresponding actions for implementation in 2012/13:

i Implement the annual Traffic Capital Works Program
ii Design, implement and install prioritised traffic management facilities, in consultation with the community.

A total of $478,000 has been allocated from the 2012/13 operational budget to implement projects related to traffic infrastructure in Woollahra as summarised in Table 3.1.

Table 3.1: Proposed Capital Works - Traffic Infrastructure (2012/13)

Project	Description	2012/13 Capital Budget	Grants & Contributions	Transfers from Reserves	Funding from Operating Budget
		$	$	$	$
933 - Traffic Infrastructure					
Glenmore Rd, Cascade St, Hampden St, Paddington	Roundabout	220,000	0	0	220,000
Carlotta Road, Double Bay	Median island & linemarking	5,000	0	0	5,000
Rose Bay Primary School	Traffic calming	30,000	0	0	30,000
Kincoppal School, Vaucluse Road, Vaucluse	Raised pedestrian crossing	35,000	0	0	35,000
Double Bay Primary School	Raised pedestrian crossing	30,000	0	0	30,000
Bicycle Route A6 - Old South Head Rd - Albemarle Ave to New South Head Rd	Shoulder bike lanes	78,000	0	0	78,000
Traffic Strategy Review	Consultant Review	80,000	0	0	80,000
Total for Traffic Infrastructure		478,000	0	0	478,000
Total for Getting around		478,000	0	0	478,000

Source: Woollahra Municipal Council Delivery Program (2009-2013) and Operational Plan (2012-13)

3.1.4 Traffic and Transport Studies

A range of traffic and transport related studies have been undertaken over the past decade. A review of these studies is provided below.

Woollahra Traffic and Transport Study (2000)

Gutteridge Haskins & Davey were commissioned by Woollahra Council with funding provided by Roads and Maritime Services (RMS) to undertake an LGA wide traffic and transport study with two main objectives:

- Examine and assess the performance of the existing traffic and transport system and identify and investigate issues related to traffic network performance, parking, public transport and land use changes.
- Develop strategies to improve the operation of the transport system and reduce the use of private cars in the long term.

The Traffic and Transport Study contained an Integrated Transport Strategy Action Plan which included 29 actions related to land use, transport services, road network/ traffic management and parking around the LGA.

Bellevue Hill Traffic Study (2003)

Arup Transportation Planning was commissioned by Woollahra Municipal Council to undertake a traffic study of O'Sullivan Road, Victoria Road and Bellevue Road in Bellevue Hill. The study identified and investigated safety issues and issues related to vehicle speeds.

The study identified and prioritised traffic management works in the Bellevue Hill precinct which included indicative construction costs.

Darling Point Precinct Traffic Study (2005)

The Darling Point Precinct Traffic Study was undertaken by the Technical Services Section of Woollahra Municipal Council with the following objectives:

- Identify and investigate issues related to through traffic, road safety and parking.
- Ensure an integrated approach to providing traffic management measures in the Darling Point area.

The study included a prioritised action plan for further investigations and traffic management measures within the Darling Point Precinct.

Paddington Pedestrian Access and Mobility Plan (2005)

Woollahra Council commissioned URaP – TTW (Urban Research and Planning - Taylor Thomson Whitting) to prepare a PAMP for Paddington with the following objectives:

- facilitate pedestrian improvements particularly in areas of high pedestrian activity
- reduce pedestrian access severance and enhance safe and convenient crossing opportunities on major roads
- identify and resolve pedestrian crash clusters.

Based on the investigations and analysis of PAMP, a range of pedestrian facilities and traffic management measures were proposed and prioritised including marked foot crossings, pedestrian refuges and kerb extensions.

3.2 Council Administrative Areas

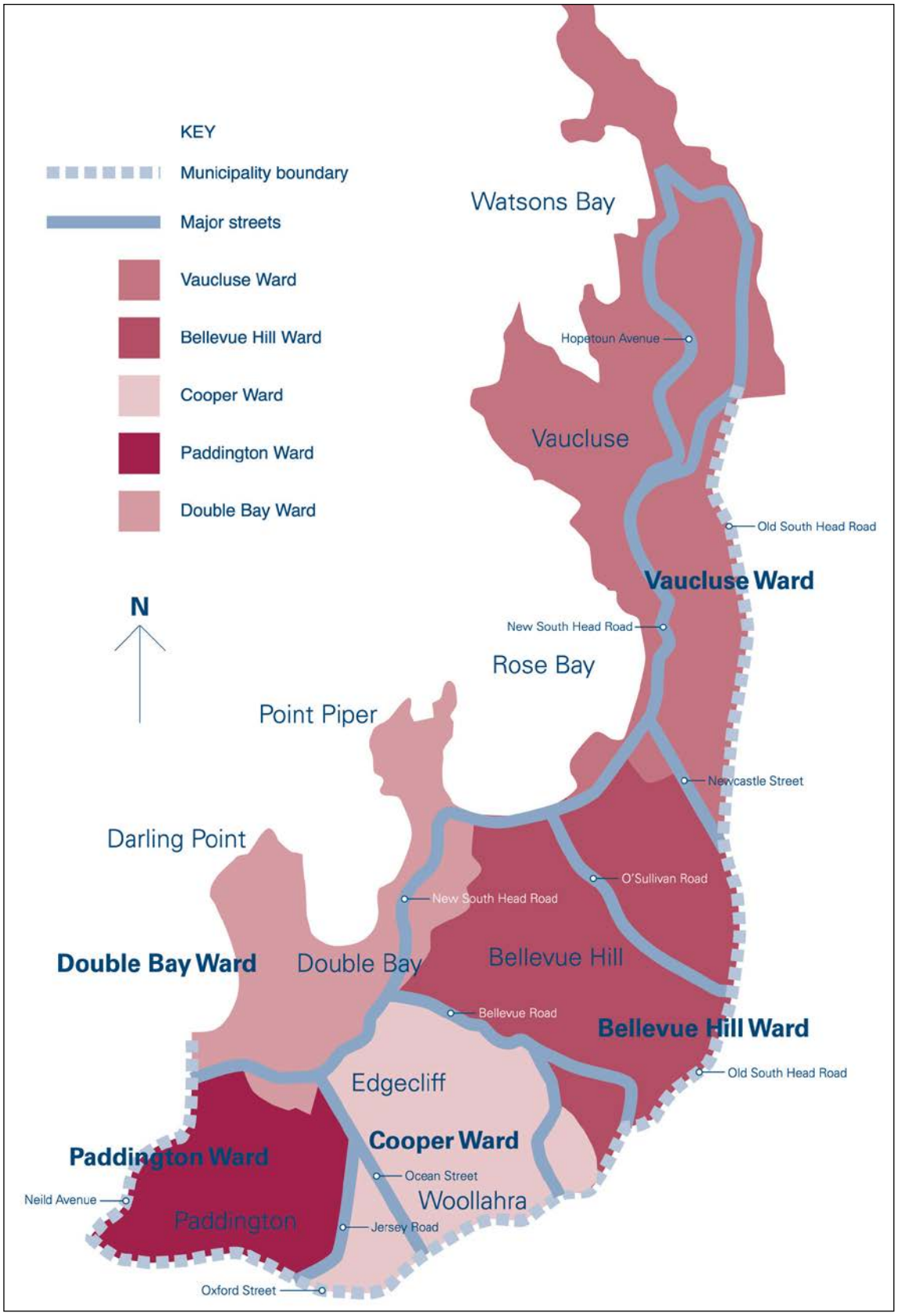
The Woollahra LGA is administered using electoral ward boundaries. There are five wards within Woollahra LGA:

- Vaucluse Ward
- Bellevue Hill Ward
- Cooper Ward
- Double Bay Ward
- Paddington Ward.

The electoral/ administrative ward boundaries are shown in Figure 3.1.

These wards have been used in the Traffic Management Strategy developed by GTA Consultants and described in this report.

Figure 3.1: Woollahra LGA Electoral and Administrative Wards



Source: Woollahra Municipal Council website (www.woollahra.nsw.gov.au/council/council_structure/area_covered_by_council)

3.3 Road Hierarchy

There are three main systems used for classifying roads in New South Wales Road:

- Legal Classification
- Functional Classification
- Administrative Classification.

3.3.1 Legal Classification

The legal system of road classification is controlled under *The Roads Act 1993* uses the following road classes:

- Highways
- Main Roads
- Secondary Roads
- Tourist Roads
- Transitways.

Table 3.2 provides a breakdown of Legal Road Classes and the associated numbering system.

Table 3.2: Key to Numbering of Legal Road Classes

Road Numbers	Legal Road Class	
1 – 31	Highway (HW) (*previously State Highway - SH*)	
51 – 694	Main Road (MR)	
2001 – 2114	Secondary Road (SR)	
4001 – 4056	Tourist Road (TO)	
8001	Transitway (TW)	
7000 series	Unclassified Regional Roads ie. Those Regional Roads (RR) that are not classified under the Roads Act	All classified roads under the Roads Act are designated as either State Road or Regional Road under agreements with councils. Additional roads, which are not classified under the Roads Act are also designated as Regional Roads under agreements with councils.

Source: Schedule of Classified Roads and State & Regional Roads (version 2011/1), RMS, 2011

3.3.2 Functional Classification

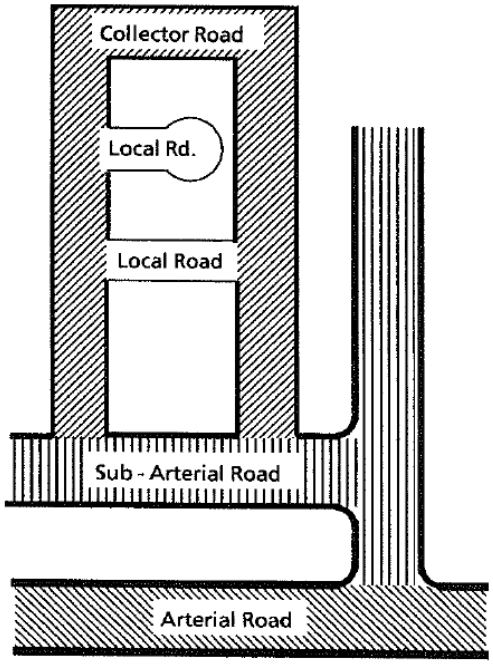
Functional classification is the process by which roads are grouped into classes or systems according to their function or the character of the service they are intended to provide.

The functional system uses a four tier classification system as follows:

- **Arterial Roads** – Predominantly carry through traffic and serve as a major inter-regional link
- **Sub-Arterial Roads** – Connect the arterial road network to areas of development carrying traffic within the same region
- **Collector Roads** – Connects sub-arterial roads with the local roads in developed areas
- **Local Roads** – Provides access to individual allotments.

A graphical representation of the functional classification system is shown in Figure 3.2.

Figure 3.2: Functional Classification Schematic Representation



Source: Roads and Maritime Services Guide to Road Design, 1991 (Figure 1.2.1)

3.3.3 Administrative Classification

The administrative system classifies roads into three categories as follows:

State Roads

- The State Road network (including the National Highways) is formed by the primary network of principal traffic carrying and linking routes for the movement of people and goods within and between urban centres.
- Have the greatest arterial significance to the State's commerce and industry.
- The NSW Government funds and through Roads and Maritime Services (RMS), manages State Roads and is accountable for the outcomes on these roads.
- Includes roads with a functional classification of 'arterial roads' (including freeways).

Regional Roads

- Regional Roads comprise the secondary network which together with State Roads provide for travel between smaller towns and districts and perform a sub-arterial function within major urban centres.
- Local Councils are responsible for Regional Roads. The NSW Government, through the RMS, contributes funding assistance towards Councils' management of Regional Roads because of their sub-arterial function as Council managed roads of regional significance to industry and the community.
- Includes roads with a functional classification of 'sub-arterial roads'.

Local Roads

- Provide for local circulation and access to properties
- Provide connection to the State and Regional Roads
- Are the responsibility of Local Councils with only limited funding assistance from the State Government
- Includes roads with a functional classification of 'collector roads' and 'local roads'.

3.3.4 Classification of Roads in Woollahra LGA

The Woollahra Traffic and Transport Study was adopted by Council in 2001. This study contained a high priority action for Council to adopt an accepted road hierarchy for Woollahra LGA.

The Woollahra Traffic and Transport Study identified a number of major local roads which carry substantial traffic volumes and play an important function in the road network within Woollahra LGA. These major local roads and their function are summarised in Table 3.3.

A recommendation was made via Council's Community and Environment Committee in May 2006 for Council to adopt the functional road hierarchy recommended in the Woollahra Traffic and Transport Study to serve as the basis for future planning and design.

Table 3.3: Major Local Roads

Precinct	Major Local Road	Function
Paddington	Glenmore Road Brown Street / Neild Avenue Cascade Street / Hargrave Street Gurner Street Jersey Road Macdonald Street	Major collector roads providing access from Oxford Street, New South Head Road and Ocean Street to Paddington
Woollahra	Queen Street Moncur Street Trelawney Street / Edgecliff Road Newland Street	Local link between Oxford Street and Ocean Street, and a major commercial street Important link between Hargrave Street and Queen Street Major collector for the Woollahra precinct and Bondi Junction Major connection between Edgecliff Road in Woollahra, and Bondi Junction
Darling Point	Darling Point Road New Beach Road / Thornton Street Mona Road Greenoaks Avenue	Main collectors for the Darling Point area Main collector for the residential area.
Bellevue Hill	Bellevue Road Victoria Road Birriga Road	These are the major links between New South Head Road and Old South Head Road, and provide access to the Bellevue Hill area
Double Bay	Manning Road Ocean Ave / William Street	Access road to Woollahra and Double Bay precincts Collector for Double Bay commercial centre (See Main Road Classification)
Point Piper	Wolseley Road / Wyuna Road / Wunulla Road	Collector for Point Piper precinct
Rose Bay	Newcastle Street Dover Road Albemarle Ave	Strategic links between New South Head Road and Old South Head Road A major link between Rose Bay centre and Old South Head Road
Vaucluse	Vaucluse Road / Hopetoun Avenue Towns Road Wentworth Rd/Fitzwilliam Rd	Both are collectors for Vaucluse area. Main Collector for recreation traffic

Source: Woollahra Traffic and Transport Study, 2000 (Table 2.3)

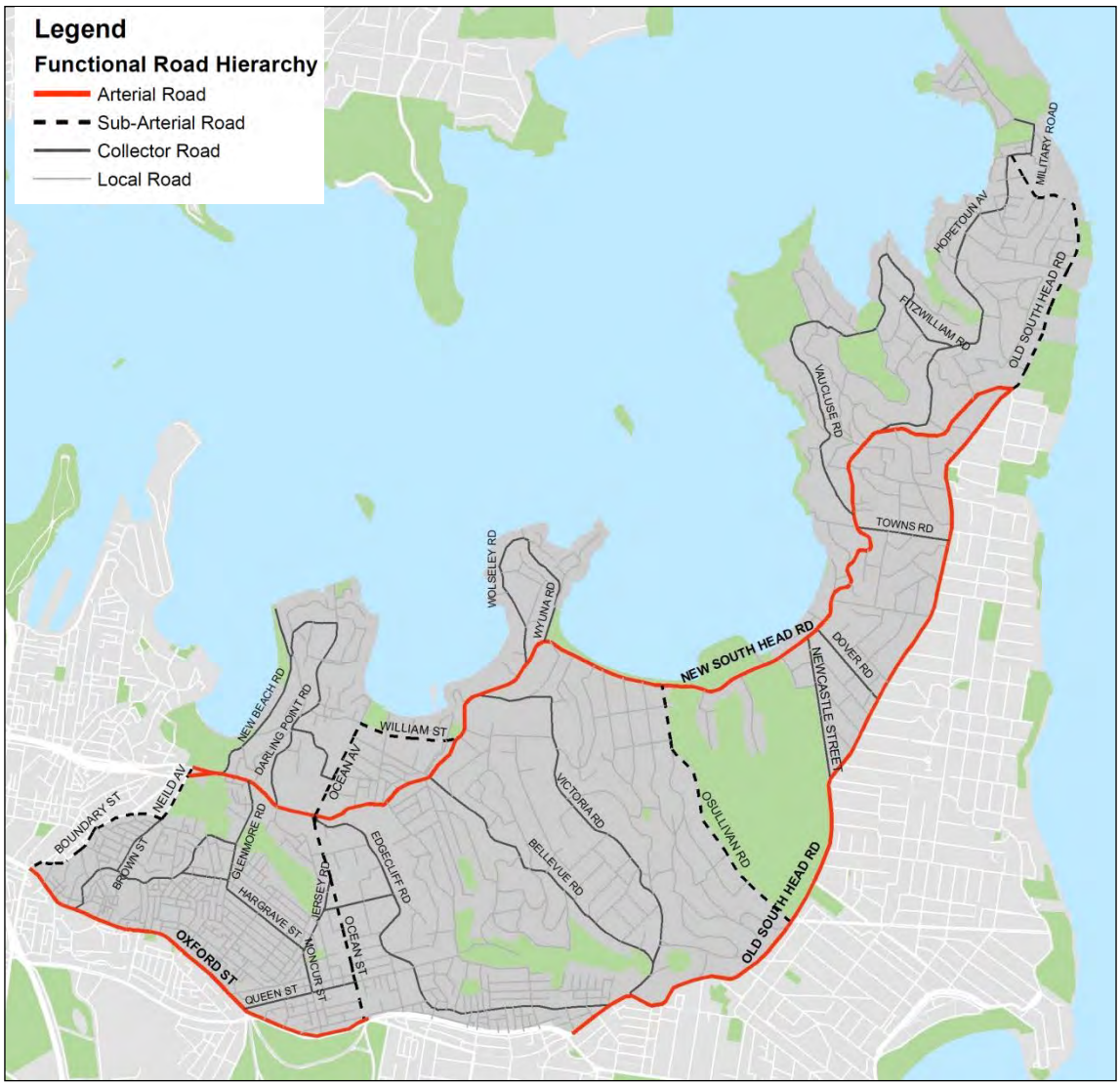
Table 3.4 summarises the road hierarchy developed by GTA Consultants for all roads in Woollahra LGA using legal, functional and administrative classification systems. The majority of roads identified as 'major local roads' in the Woollahra Traffic and Transport Study (Table 3.3) have been included as Collector Roads in this hierarchy. The system developed by GTA Consultants contains only one change to the proposed road hierarchy outlined in the Woollahra Traffic and Transport Study – Syd Einfeld Drive which has been omitted as it is now located outside Woollahra LGA.

The road hierarchy developed by GTA Consultants is shown graphically in Figure 3.3 with a full size plan contained in Appendix A.

Table 3.4: Woollahra LGA Road Hierarchy

Road Name	Legal Road Class & Number	Functional Classification	Administrative Classification	Responsible Authority
Oxford Street (west of Ocean Street)	MR 172	Arterial	State	RMS
New South Head Road	MR 173			
Old South Head Road (south of New South Head Road)	MR 339			
Old South Head Road (north of New South Head Road)	MR 399	Sub-Arterial		
Barcom Avenue	MR 625			
Nield Avenue				
Boundary Street				
Ocean Street	RR 7330		Regional	RMS/ Woollahra Municipal Council
O'Sullivan Road	RR 7336			
William Street	SR 2089			
Ocean Avenue	SR 2089			
Bellevue Road	N/A	Collector	Local	Woollahra Municipal Council
Brown Street				
Darling Point Road				
Dover Road				
Edgecliff Road				
Fitzwilliam Road				
Glenmore Road				
Greenoaks Avenue				
Gurner Street				
Hargrave Street				
Hopetoun Avenue				
Jersey Road				
Military Road				
Moncur Street				
Newcastle Street				
New Beach Road				
Queen Street				
Thornton Road				
Towns Road				
Trelawney Street				
Vaucluse Road				
Victoria Road				
Wentworth Road				
Wolseley Road				
Wyuna Road				
Yarranabbe Road				
ALL OTHER ROADS		Local		

Figure 3.3: Woollahra LGA Functional Road Hierarchy



Based on the above, Table 3.5 presents a summary of road network in Woollahra LGA and the total road lengths based on the functional road classification outlined above.

Table 3.5: Woollahra LGA Road Network Summary

Functional Road Hierarchy	Number of Roads	Total Road Length (km)
Arterial	3	14.4
Sub-Arterial	8	7.0
Collector	26	26.0
Local	473	112.2
TOTAL	**510**	**159.6**

As shown in Table 3.5, the total length of the local and collector road for which Council is the responsibility exceeds 138km.

3.4 Traffic Data

Woollahra Council has a wealth of traffic speed and volume data available which has been collected from State, Regional and Local roads. Woollahra Council provided GTA Consultants with data from approx. 250 traffic surveys from 2005 to 2012, all of which were 24 hour, 7 day, classified vehicle counts recording vehicle speeds and volumes. All of the traffic surveys were undertaken by CFEIT, resulting in a consistent data format.

3.4.1 Traffic Data Macro Tool

GTA Consultants developed a macro tool for use in Microsoft Excel to extract key traffic data parameters from the traffic data which Council possesses. The macro tool enables directional and bi-directional traffic volumes, heavy vehicle percentages and 85th percentile speeds to be extracted from the Microsoft Excel files for each traffic count location without any need for manipulation of the original data. The traffic data macro is a fully repeatable tool allowing new and historic traffic data to be easily summarised and analysed.

The use of a macro tool is possible due to the consistency of the traffic data format and as such further development would be required to apply the macro to traffic data collected by organisations other than CFEIT.

3.4.2 Traffic Data GIS Layer

Some recent traffic count data provided to GTA contained the latitude and longitude of the traffic count location however this information was only found in the bi-directional summary document in PDF format. It is recommended that for all future traffic counts, Council requests the latitude and longitude of each count location be included in Microsoft Excel format. The traffic data macro could be easily manipulated to extract this information allowing a traffic data GIS point layer to be created.

3.4.3 High Vehicle Speed Locations

One of the applications of the macro tool is to identify locations where high vehicle speeds have been recorded and to analyse changes in recorded speeds over time. Average, bi-directional 85th percentile speeds in excess of 50km/h were recorded on 23 local and collector roads in Woollahra LGA.

Table 3.6 presents a summary of the top 10 locations of vehicle speeds on the local and collector road network, based on the average, bi-directional 85th percentile speeds.

Table 3.6: High Vehicle Speed Locations (collector and local road network)

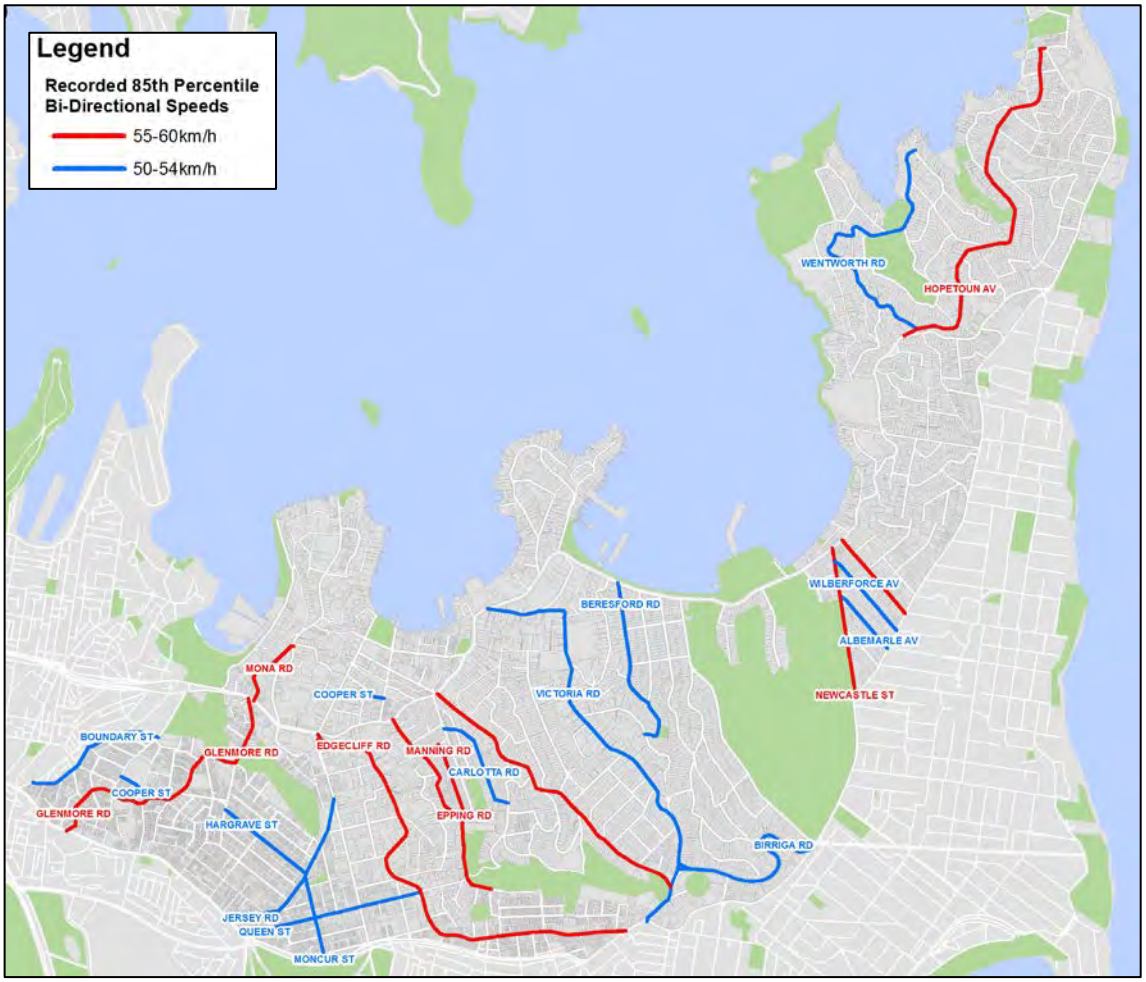
Rank	Road	Suburb	Functional Road Classification	Speed Limit (km/h)	85th%ile Bi-Directional Speed (km/h)	Count Date
1	Bellevue Road	Bellevue Hill	Collector	50	60.0	Aug-Sep 2008
					58.8	Jul-Aug 2008
					57.1	Mar 2007
					56.6	Nov 2012
					55.5	Nov 2005
					55.3	Nov 2005
					55.2	Aug-Sep 2008
					55.1	Nov 2005
					55.1	Aug 2005
					51.5	Nov 2011
2	Edgecliff Road	Edgecliff/ Woollahra	Collector	50	57.8	Nov 2005
					57.3	Nov 2005
					57.0	Nov 2005
					56.8	Mar 2007
					55.1	Nov 2005
					54.3	Nov 2010
3	Newcastle Street	Rose Bay	Collector	50	57.3	May-Jun 2012
4	Hopetoun Avenue	Vaucluse	Collector	50	57.0	Mar 2012
					55.1	Feb 2012
5	Dover Road	Rose Bay	Collector	50	56.9	May-Jun 2012
6	Manning Road	Double Bay	Local	50	56.5	Feb 2006
					55.8	Oct 2008
7	Epping Road	Double Bay	Local	50	56.2	Apr 2008
					55.6	Apr 2008
8	Mona Road	Darling Point	Collector	50	55.9	Oct 2008
					43.9	Jun 2011
9	Glenmore Road	Paddington	Collector	50	55.3	Nov 2005
					54.8	Nov 2005
					35.0	May-Jun 2011
10	Carlotta Road	Double Bay	Local	50	54.7	Aug 2012
					52.0	Feb 2010

Data Source: Traffic Survey Data supplied by Woollahra Municipal Council

As shown in Table 3.6, 85th percentage bi-directional speeds well in excess of the posted 50km/h speed limit have been consistently recorded on a number of key collector roads across the LGA.

Figure 3.4 has been prepared to show all of the local and collector roads in Woollahra LGA where 85th percentage bi-directional speeds over 50km/h have been recorded between 2005 and 2012. A full size version of the plan is included in Appendix B.

Figure 3.4: Woollahra LGA Recorded High Vehicle Speed Roads (Local & Collector Roads, 2007-2012)



Data Source: Traffic Survey Data supplied by Woollahra Municipal Council

3.5 Crash Data

RMS CrashLink data was provided to GTA Consultants by Woollahra Council for the seven years to 2011.The data was provided in geo-referenced GIS format which allowed spatial analysis of all recorded vehicle crashes to be undertaken and accident clusters to be identified.

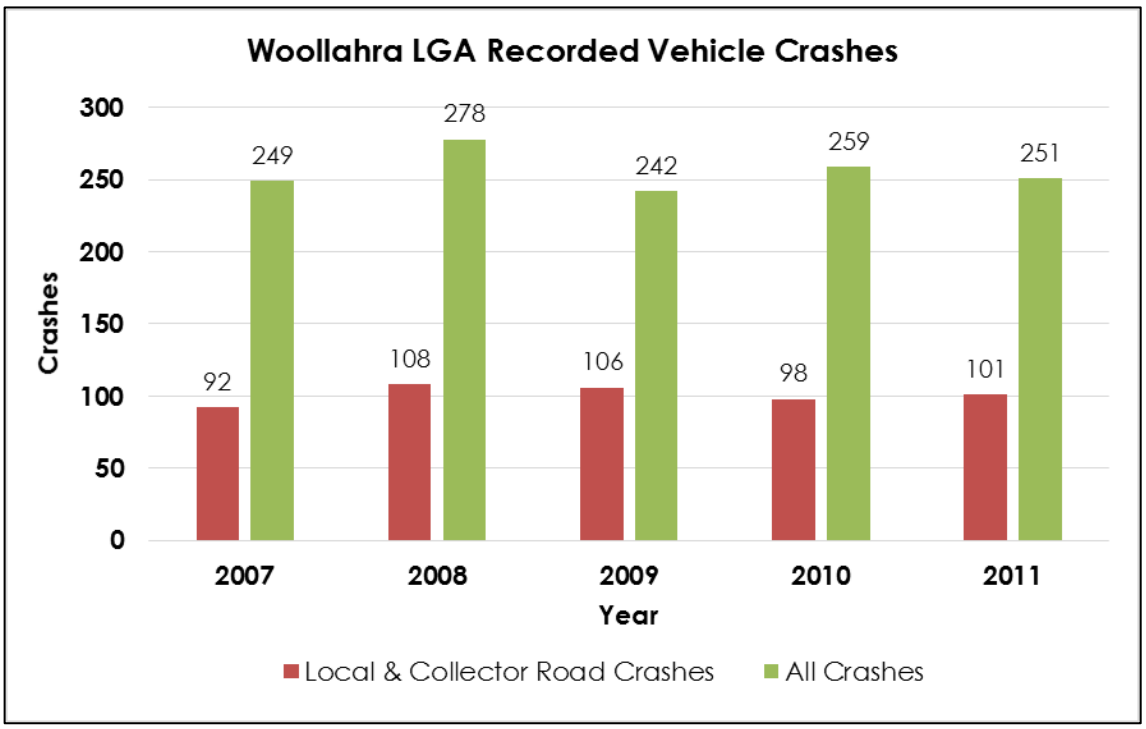
3.5.1 5 Year Crash Data Analysis

Detailed crash analysis was undertaken for the most recent five year period that complete data was available; 2007 to 2011. A total of 1,279 vehicle crashes were recorded in Woollahra LGA in the five year period analysed, 505 of which (39%) occurred on the local and collector road network. There was little variation in both the overall number of recorded crashes and crashes which occurred on local and collector roads over the five year period analysed as shown in Figure 3.5. Crashes were recorded on 137 of the 499 local and collector roads in Woollahra LGA.

On analysing the CrashLink data from 2007 to 2011 it was found that 113 crashes were erroneously included in the Woollahra LGA crash data. This is due to these crashes occurring outside of Woollahra LGA in the suburbs of Bondi Junction, Darlinghurst and Centennial Park as well as a small number of

accidents from 2006 recorded in 2007. As such, the number of crashes presented in this report is less than that contained in the RMS CrashLink summary reports.

Figure 3.5: Woollahra LGA Recorded Crashes, 2007-2011



Data Source: RMS CrashLink data as provided by Woollahra Municipal Council

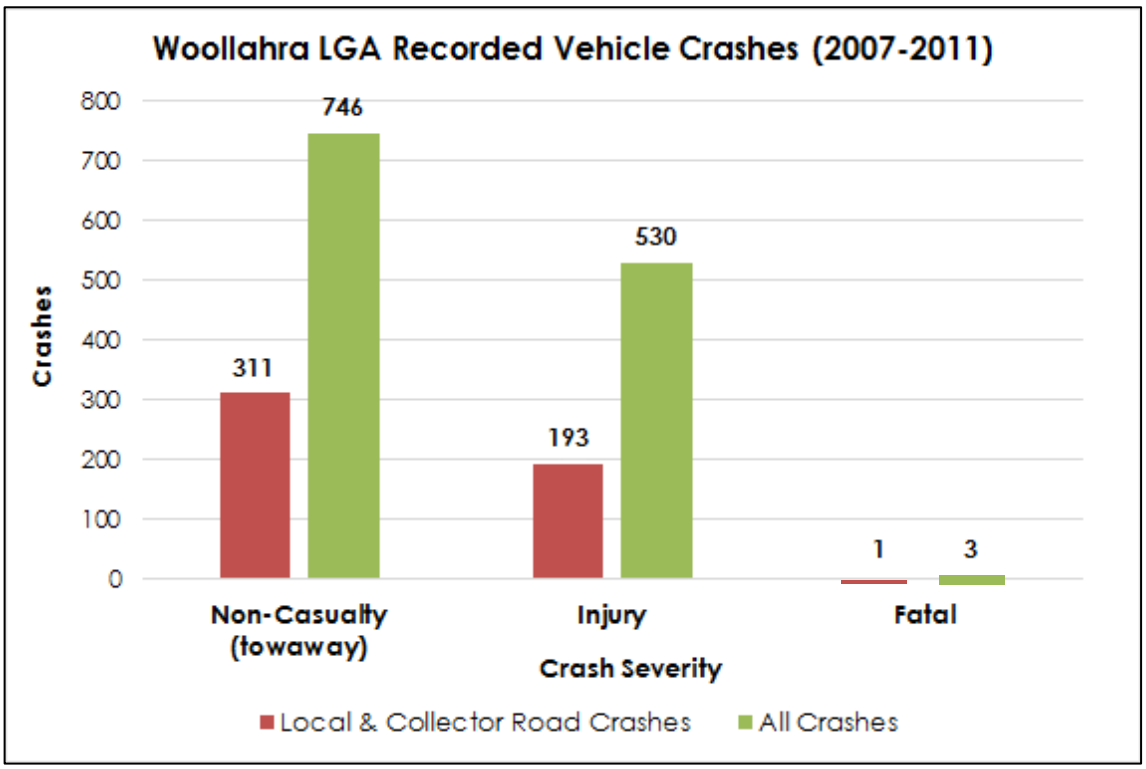
Crash Severity

The severity of crashes in Woollahra LGA was also investigated. The RMS CrashLink system uses three severity categories for reporting crashes:

i fatal
ii injury
iii non-injury (towaway).

Figure 3.6 summarises the severity of recorded crashes in Woollahra LGA from 2007 to 2011. The location of these crashes, categorised by crash severity is shown in the crash location maps contained in Appendix C. These maps show that the majority of recorded crashes in Woollahra LGA between 2007 and 2011 were concentrated along arterial and sub-arterial roads.

Figure 3.6: Woollahra LGA Recorded Crashes (2007-2011) By Severity



As shown in Figure 3.6, three fatality crashes were recorded in the five year period analysed. Two of these occurred on the arterial road network (New South Head Road and Oxford Street), while one fatality crash occurred on Edgecliff Road, a collector road. The crash on Edgecliff Road involved two vehicles travelling in the same direction and occurred in the vicinity of an intersection. Excessive speed was a contributing factor in the accident which resulted in one fatality and one injury.

The location of vehicle crashes was also analysed to identify roads where a high number of vehicle crashes occurred. Table 3.7 presents a summary of the 20 local and collector roads with the highest number of recorded crashes within Woollahra LGA from 2007 to 2011. A full list of local and collector road crashes is contained in Appendix C.

Table 3.7 shows that Edgecliff Road had considerably more vehicle crashes in the period analysed than other local and collector roads. As shown in the crash maps contained in Appendix C, crash clusters can be identified at intersections along the eastern end of Edgecliff Road between Queen Street and Adelaide Street.

Table 3.7: Vehicle Crashes by Road 2007-2011 (collector and local roads only)

Rank	Road	Suburb	Functional Road Classification	Recorded Crashes (2007-2011)				Road Length (km)	Average no. of casualty crashes per km/per annum
				Non-injury (towaway)	Injury	Fatal	Total		
1	Edgecliff Road	Edgecliff/ Woollahra	Collector	22	23	1	46	2.5	1.9
2	Glenmore Road	Paddington	Collector	17	9	0	26	1.6	1.1
3	Bellevue Road	Bellevue Hill	Collector	12	9	0	21	1.8	1.0
4	Victoria Road	Bellevue Hill	Collector	11	9	0	20	2.1	0.9
5	Hopetoun Avenue	Vaucluse	Collector	15	3	0	18	2.3	0.3
6	New Beach Road	Darling Point	Collector	8	8	0	16	1.1	1.5
7	Queen Street	Woollahra	Collector	4	10	0	14	1.0	2.0
8	Jersey Road	Paddington/ Woollahra	Collector	8	6	0	14	1.0	1.2
9	Birriga Road	Bellevue Hill	Local	9	4	0	13	1.1	0.7
10	Manning Road	Double Road	Local	6	4	0	10	0.7	1.1
11	Darling Point Road	Darling Point	Collector	6	3	0	9	1.4	0.4
12	Moncur Street	Woollahra	Collector	7	2	0	9	0.5	0.8
13	Newcastle Street	Rose Bay	Collector	9	0	0	9	0.8	0.0
14	Dover Road	Rose Bay	Collector	4	4	0	8	0.6	1.3
15	Balfour Road	Bellevue Hill	Local	6	1	0	7	1.0	0.2
16	Wentworth Road	Vaucluse	Local	3	3	0	6	0.9	0.7
17	Elizabeth Street	Paddington	Local	4	2	0	6	1.0	0.4
18	Holdsworth Street	Woollahra	Local	4	2	0	6	0.4	1.0
19	Cross Street	Double Bay	Local	1	4	0	5	0.5	1.6
20	Adelaide Street	Edgecliff	Local	2	3	0	5	0.4	1.5

Data Source: RMS CrashLink data as provided by Woollahra Municipal Council

RMS Black Spot Funding

Councils can seek funding for the treatment of accident black spots under the federal Nation Building Black Spot Program and the NSW Government's black spot program. Funding applications for both streams are administered by RMS.

The minimum criteria for funding eligibility is a minimum of 3 casualty/ injury crashes in the most recent 5 years of available crash data. For black length locations (longer than 3km), the minimum requirement for funding eligibility is an average of 0.2 casualty (injury and fatality) crashes per kilometre in the most recent 5 years of crash data. As there are no local or collector roads in Woollahra LGA over 3km in length, funding could only be sought for black spot locations.

Analysis of crashes over the 2007 – 2011 period revealed there are 19 local and collector roads across Woollahra LGA where 3 or more injury crashes were recorded and therefore meet the minimum criteria for black spot funding.

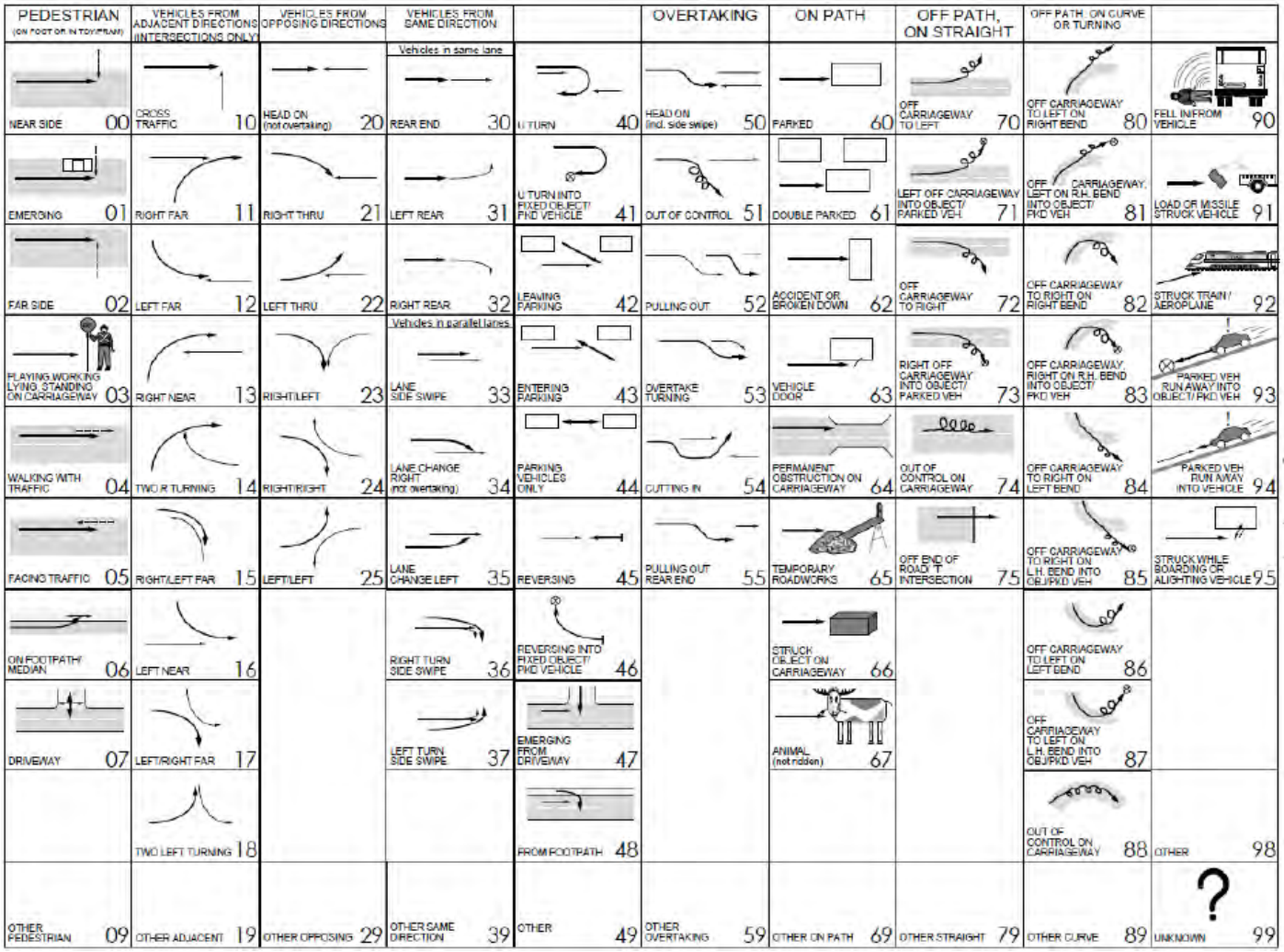
Further details of local and collector road crashes are contained in Appendix C.

Road User Movement (RUM) Code Analysis

RUM codes are key factors used in crash reporting which describe the movement of the vehicles involved in the first impact that occurred during the crash. The RUM codes used in RMS crash reporting are shown graphically in Figure 3.7. The RUM codes used are also grouped together in tens to reflect similar movements as shown by the column headings in Figure 3.7, e.g. RUM codes 50 to 59 are related to overtaking.

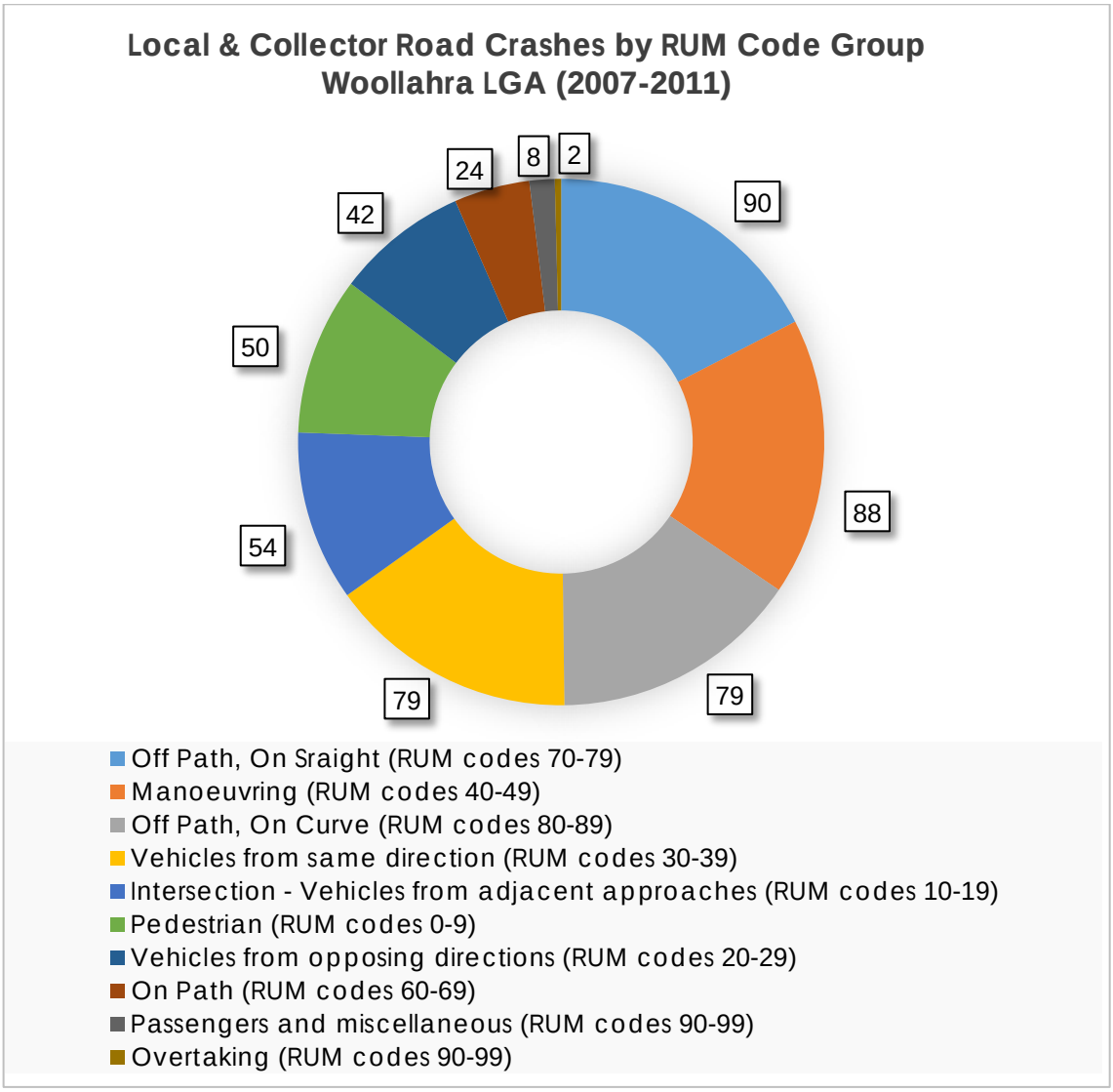
Analysis of the RUM codes for local and collector road crashes in Woollahra LGA for the five year period from 2007 to 2011 was undertaken. A summary of crashes by RUM code group is presented in Figure 3.8.

Figure 3.7: Road User Movement (RUM) Code Diagrams



Source: RMS CrashLink Reports notes (version 2, October 2011)

Figure 3.8: Local and Collector Road Crashes by RUM Code Group (2007-2011)



Data Source: RMS CrashLink data as provided by Woollahra Municipal Council

As shown in Figure 3.8, the most dominant RUM code groups in local and collector road crashes were 'Off Path, On Straight' (RUM codes 70-79), 'Manoeuvring' (RUM codes 40-49), 'Off Path, On Curve' (RUM codes 80-89) and 'Vehicles from same direction' (RUM codes 30-39). Alarmingly 50 pedestrian crashes were recorded on local and collector roads between 2007 and 2011 in Woollahra LGA.

Further analysis of individual crash RUM codes was undertaken, the results of which are summarised in Table 3.8.

Table 3.8: Local and Collector Road Crashes by RUM Code (2007-2011)

RUM Code	RUM Code Description	No. of Crashes	Percentage of Local & Collector Road Crashes
71	Off road left – object	67	13%
30	Rear End	43	9%
10	Cross Traffic	37	7%
81	Off left/right bend	35	7%
0	Pedestrian Nearside	28	6%
21	Right Through	21	4%
42	Leaving Parking	21	4%
63	Vehicle Door	20	4%
40	U-turn	18	4%
87	Off left/left bend – object	17	3%
20	Head On	16	3%

Data Source: RMS CrashLink data as provided by Woollahra Municipal Council

As shown in Table 3.8, 'Off road left - object' crashes (RUM code 71) was the dominant accident type over the five year period examined comprising 13% of all accidents on the local and collector road network. A total of 28 'Pedestrian Nearside' crashes (RUM code 0) were recorded on local and collector roads between 2007 and 2011 which comprised 6% of all local and collector road crashes.

3.6 Community Concerns/ Complaints

Correspondence received by Woollahra Council from members of the community related to traffic and transport issues was provided to GTA Consultants. Over 500 individual pieces of correspondence were received from 1999, the majority of which related to issues such as vehicle speeds, pedestrian safety and general traffic related safety concerns.

GTA compiled and sorted this correspondence by road and suburb and then attributed a key traffic issue (speeding, pedestrian safety etc.) to each piece of correspondence. It was found that the highest number of concerns/ complaints received related to collector roads as shown in the top 10 ranked roads as summarised in Table 3.9 and shown graphically in Figure 3.9. A number of concerns and complaints were received in relation to Arterial roads such as Old South Head Road and New South Head Road, however these have been excluded from the rankings.

It should be noted that some of the issues raised in the correspondence may have been addressed through by Council through local traffic works and pedestrian improvements.

The community concerns and complaints received by Council are summarised in Appendix D.

Table 3.9: Community Concerns/ Complaints Rankings by Road

Rank	Road	Suburb	Functional Road Classification	No. of concerns/ complaints	Key Issues
1	Edgecliff Road	Edgecliff/ Woollahra	Collector	28	• High vehicle speeds • Pedestrian safety • Dangerous/unsafe driving
2	Darling Point Road	Darling Point	Collector	28	• High vehicle speeds • Pedestrian safety when crossing • Requests for traffic calming
3	Bellevue Road	Bellevue Hill	Collector	27	• High vehicle speeds • Pedestrian safety when crossing • Dangerous/unsafe driving • Requests for traffic calming
4	Mona Road	Darling Point	Collector	17	• High vehicle speeds • Pedestrian safety
5	Carlotta Road	Double Bay	Local	16	• High vehicle volumes • High vehicle speeds • Pedestrian safety • Requests for traffic calming
6	Manning Road	Woollahra	Local	15	• High vehicle speeds • Requests for traffic calming • Pedestrian safety
7	Glenmore Road	Paddington	Collector	14	• High vehicle speeds • Pedestrian safety
8	Birriga Road	Bellevue Hill	Local	11	• High vehicle speeds • Pedestrian safety • Dangerous intersections
9	Victoria Road	Bellevue Hill	Collector	9	• High vehicle speeds • Pedestrian safety
10	Bay Street	Double Bay	Local	7	• Pedestrian safety

3.7 Existing Local Area Traffic Issues

The key local area traffic issues in Woollahra LGA as reflected through correspondence from the local community (Section 3.6) are associated with high vehicle speeds, high vehicle volumes, pedestrian safety, dangerous/ unsafe driving and amenity including heavy vehicles.

Figure 3.9: Top 10 Ranked Roads of Community Concerns/ Complaints

3.8 Environmental Capacity Assessment

The environmental capacity of an area is determined by the impact of a number of traffic and road layout characteristics including the volume of traffic, vehicle speed, road width, gradient and the proportion of heavy vehicles. Environmental capacity considerations are relevant to residential areas, some retail precincts and educational precincts where pedestrian safety and amenity are of primary concern.

The *RMS Guide to Traffic Generating Developments* (2002) sets out the recommended environmental capacity performance standards for residential streets based on a functional road classification. These standards relate mainly to streets with direct access to residential properties and are summarised in Table 3.10.

Table 3.10: Environmental Capacity Performance Standards on Residential Streets

Road class	Road type	Maximum Speed (km/hr)	Maximum peak hour volume (veh/hr)
Local	Access way	25	100
	Street	40	200 environmental goal
			300 maximum
Collector	Street	50	300 environmental goal
			500 maximum

Source: RMS Guide to Traffic Generating Developments, 2002 (Table 4.6)

A comparison of recorded traffic volumes along a sample of residential roads in Woollahra LGA against RMS environmental capacity standards is summarised in Table 3.11.

Table 3.11: Assessment of Environmental Capacity Performance Standards

Road	Suburb	Functional Road Classification	Survey Date	Maximum Peak Hour Volume (Two way, veh/hour)	RMS Recommended Environmental Capacity (max. veh/hr)
Birriga Road	Bellevue Hill	Local	March 2012	833	300
Carlotta Road	Double Bay		February 2010	350	
Manning Road	Woollahra		April 2008	732	
Edgecliff Road	Edgecliff/ Woollahra	Collector	November 2010	1,376	500
Darling Point Road	Darling Point		October 2008	676	
Bellevue Road	Bellevue Hill		November 2011	1,110	
Mona Road	Darling Point		October 2008	621	
Victoria Road	Bellevue Hill		November 2005	590	
Glenmore Road	Paddington		October 2005	555	

As shown in Table 3.10, the surveyed peak hour traffic volumes on a sample of roads in Woollahra LGA were found to exceed the environmental capacity standards for maximum peak hour volumes outlined in the *RMS Guide to Traffic Generating Developments.* This is not uncommon in eastern Sydney where residential frontages are located along 'major' Local Roads and Collector Roads. The road network layout within Woollahra LGA also contributes to high traffic volumes where residential roads extend across significant lengths of the LGA and thereby attract significant through traffic volumes.

3.9 Activity Centres

Identification of key activity centres in Woollahra is crucial in understanding the traffic flow characteristics and patterns of the LGA, and in determining future LATM treatment locations. Key activity centres are areas of high pedestrian activity and include retail precincts, transport hubs, recreational areas such as parks and harbour foreshore areas and schools. Other major trip attractors outside of the LGA but in close proximity include Bondi Junction CBD and transport interchange, Centennial Park, Moore Park and the Sydney CBD.

4. Local Area Traffic Management (LATM)

LATM is concerned with the planning and management of road space usage on local and collector roads which is primarily the responsibility of local government. LATM is often concerned with modifying streets and road networks which were originally designed in ways that are now no longer considered appropriate to the needs of residents and users of a local area.

This section reviews the typology of existing LATM measures in Woollahra and recommends objectives and principles to guide the delivery of LATM measures in the LGA.

4.1 LATM Principles

The primary aim of LATM is to change driver behaviour, both directly by physical influence on vehicle operation, and indirectly by influencing the driver's perceptions of what is appropriate behaviour in that street. The objective of LATM is to reduce traffic volumes and speeds in local streets to increase liveability and improve safety and access for pedestrians and cyclists.

LATM involves the use of physical devices, streetscaping treatments and other measures (including regulations and other non-physical measures) to influence vehicle operation in order to create safer and more pleasant streets in local areas.

The need for LATM usually arises from:

- an intent to reduce traffic-related problems
- a need to modify transport behaviour
- orderly traffic planning and management
- a desire to improve the community space
- a desire to improve environmental, economic and social outcomes
- traffic impacts associated with new development.

The following principles are reflected in the Woollahra Traffic and Transport Plan (2000):

- Measures should reflect the environment, character and historical significance of the area
- Prioritise measures which improve pedestrian, bicycle and public transport passenger safety and accessibility
- Avoid measures which have a significant impact on parking.

4.2 Local Traffic Areas and Local Traffic Precincts

Understanding the distinction between local traffic areas and local traffic precincts is important in determining the extents of LATM treatment areas. Austroads Guide to Traffic Management Part 8: LATM defines local traffic areas as follows:

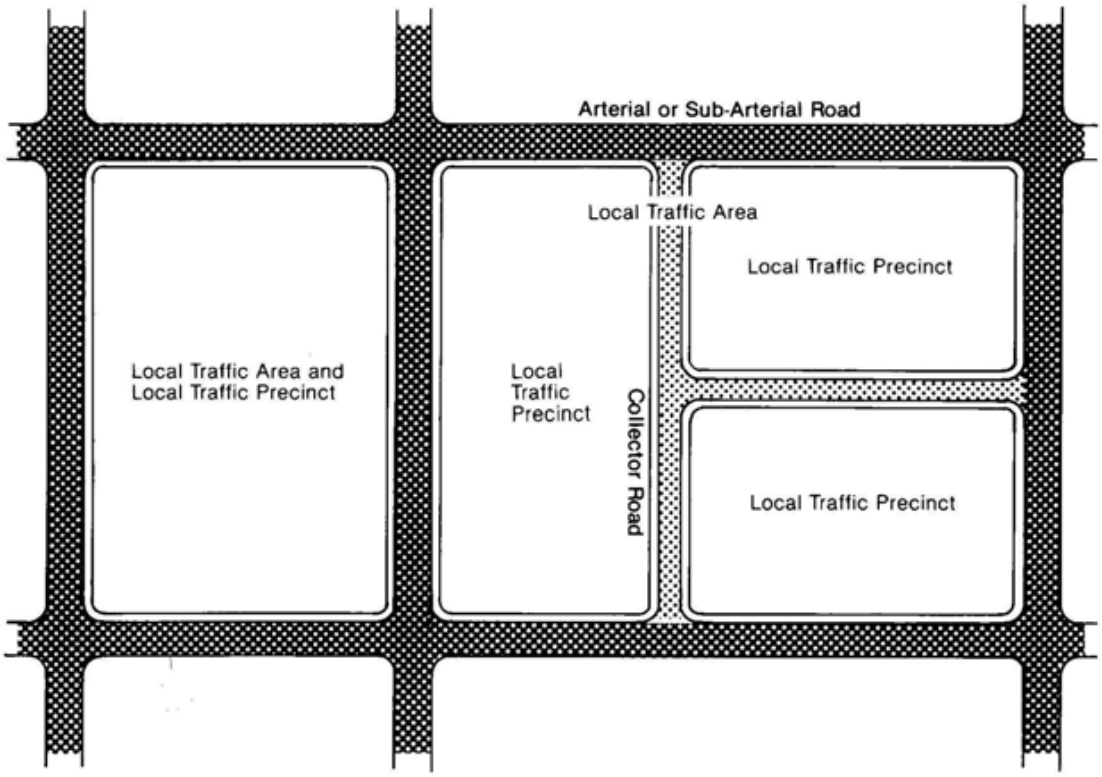
"An urban area containing local and collector roads bounded by arterial and sub-arterial roads or other limiting features." (Commentary 3, pg. 158)

Local precincts are defined as:

"Areas within a local area where specific local problems exist related to the speed of traffic and/or pedestrian crossing difficulties" (Commentary 3, pg. 158)

The differences between local traffic areas and local traffic precincts are shown graphically in Figure 4.1.

Figure 4.1: Local Traffic Areas and Local Traffic Precincts



Source: Austroads Guide to Traffic Management Part 8: LATM, commentary 3, pg. 159 (2008)

4.3 LATM Measures

An analysis of traffic volumes and speeds, together with input from the stakeholders generally informs the selection of the most suitable traffic control devices.

Two types of control devices are available - regulatory and geometric. Regulatory controls can be used as alternatives to or in addition to the geometric controls where necessary.

4.3.1 Geometric Controls

Geometric controls suitable to LATM schemes include:

- Road closures
- Restriction/ channelization
- T-Intersection priority
- Thresholds, both at entries and mid-block locations
- Staggered T-intersection
- Carriageway narrowing
- Slow points
- Speed Humps
- Kerb Extensions

- Wombat Crossings
- Roundabouts
- Medians
- Pedestrian crossings, refuges/ mid-block islands.

4.3.2 Regulatory Controls

Regulatory signs (Type R) are used to regulate the movement of traffic by indicating where or when a legal requirement applies. Failure to comply with regulatory signs constitutes an offence.

Signage as well as linemarking can be used to regulate traffic movements and/ or calm traffic. It may discourage speeding, prevent vehicle conflicts, and prevent through traffic from short-cutting along a street. The primary aims of signs and linemarking are to aid in the safe and orderly movement of traffic.

4.4 Existing LATM Treatments in Woollahra LGA

There are a wide range of LATM treatments currently in place on local roads within the Woollahra LGA. Figure 4.2 presents a summary of some of these LATM treatments.

Figure 4.2: LATM Treatments Typology in Woollahra LGA

Flat-Top Road Humps A flat-top road hump or raised table is a raised surface approximately 75-100 mm high and typically with a 2m to 6m long platform ramped up from the normal level of the street *Example: Goodhope Street, Paddington*	
Wombat Crossings Wombat crossings are generally in the form of a flat top road hump with a marked pedestrian crossing on the raised flat surface. Though similar to flat top road humps, wombat crossings give priority to pedestrians while flat top road humps give priority to vehicles. *Example: Greenoaks Avenue, Darling Point*	

Watts Profile Road Humps

A watts profile road hump is a speed reduction device with a curved profile extending across the roadway. Road humps are typically 70mm to 120mm high with a total length of 3m to 4m.

Example: Pine Hill Avenue, Double Bay

Road Cushions

Road cushions are another form of road hump that occupies only part of the carriageway. Road humps are designed to be more sympathetic to cyclists, buses, and commercial vehicles than a standard full width road hump.

Example: Mona Road, Darling Point

Lane Narrowings

Lane narrowings involves narrowing of the trafficable carriageway to reduce speeds, improve delineation and in some cases minimising pedestrian crossing distances.

Example: Manning Road, Double Bay

Kerb Extensions

Kerb extensions are similar to lane narrowings in that they narrow the trafficable carriageway reducing vehicle speeds, improving delineation and minimising pedestrian crossing distances.

Example: Ormond Street ,Paddington

Median Islands

Kerb extensions are similar to lane narrowings and kerb extensions narrowing the trafficable carriageway and reducing vehicle speeds, improving delineation and minimising pedestrian crossing distances.

Example: Median Island with kerb extensions

Court Road, Double Bay

Pedestrian Refuge Islands

Pedestrian refuge islands provide a safe crossing point for pedestrians and can be combined with a number of LATM devices including kerb extensions.

Example: Pedestrian refuge island with kerb extensions
Darling Point Road, Darling Point

Slow Points

A slow point is a series of kerb extensions on alternating or opposite sides of a roadway, which narrow and/or angle the roadway. Slow points are intended to reduce vehicle speeds and can be either one or two lanes wide and can be angled.

Example: Single-lane angled slow point
Ormond Street , Paddington
(Aerial photo source: NearMap)

Road Closures

Diversion treatments such full or half road closures are physical means of redirecting vehicle movements or eliminating through traffic volumes.

Example: Half Road Closure

Roundabouts

A roundabout is an effective form of intersection control and reduces the relative speeds of conflicting vehicles by providing impedance to all vehicles entering the roundabout.

Example: Single lane, three leg roundabout
Bellevue Road/ Fairweather Street ,Bellevue Hill

(Aerial photo source: NearMap)

Bicycle Shoulder Lanes

Bicycle shoulder lanes are one-way facilities which are shared between parked cars and cyclists. Bicycle shoulder lanes narrow the available carriageway width thereby reducing vehicle speeds as well as providing a dedicated facility for cyclists.

Example: Shared bicycle shoulder lanes
Edgecliff Road ,Woollahra

Shared Zones

Shared zones are roads or network of roads where the road space is shared by pedestrians and vehicles. The maximum speed limit in a shared zone in 10km/h and drivers must give way to pedestrians at all times.

Example: Pine Hill Avenue, Double Bay

4.5 LATM Treatment Costs

The cost of LATM treatments varies considerably with the type, size and length of treatment as well as location. Costs vary from site to site and are heavily dependent on materials and landscaping as well as the extent to which existing infrastructure, particularly drainage, utility poles and underground services have to be modified. Treatment costs, landscaping and the construction method (staged or complete construction) are generally interrelated, for example:

- low maintenance cost requires higher initial cost
- improved streetscapes require permanent works and higher up-front costs
- temporary works require upgrading, usually at greater total cost.

Maintenance costs are also important factors in the costing of LATM schemes, for example:

- devices constructed in concrete are considered to have the lowest ongoing maintenance cost

- devices using bitumen or pavers have a much higher ongoing maintenance cost, particularly when subject to under heavy loads
- street furniture, signs and landscaping are all susceptible to damage and therefore contribute to the ongoing maintenance cost
- horizontal deflection devices often require the pavement to be reinforced to allow for the side pressures exerted by vehicle tyres
- whilst devices such as road markings and signs are relatively cheap to install, their effectiveness relies on their upkeep to a suitable standard.

The most reliable source of cost estimates for LATM treatments is Council's own experience in LATM schemes, however a comparison of the relative cost of LATM treatments is presented in Table 4.1.

Table 4.1: LATM Device Relative Construction Costs

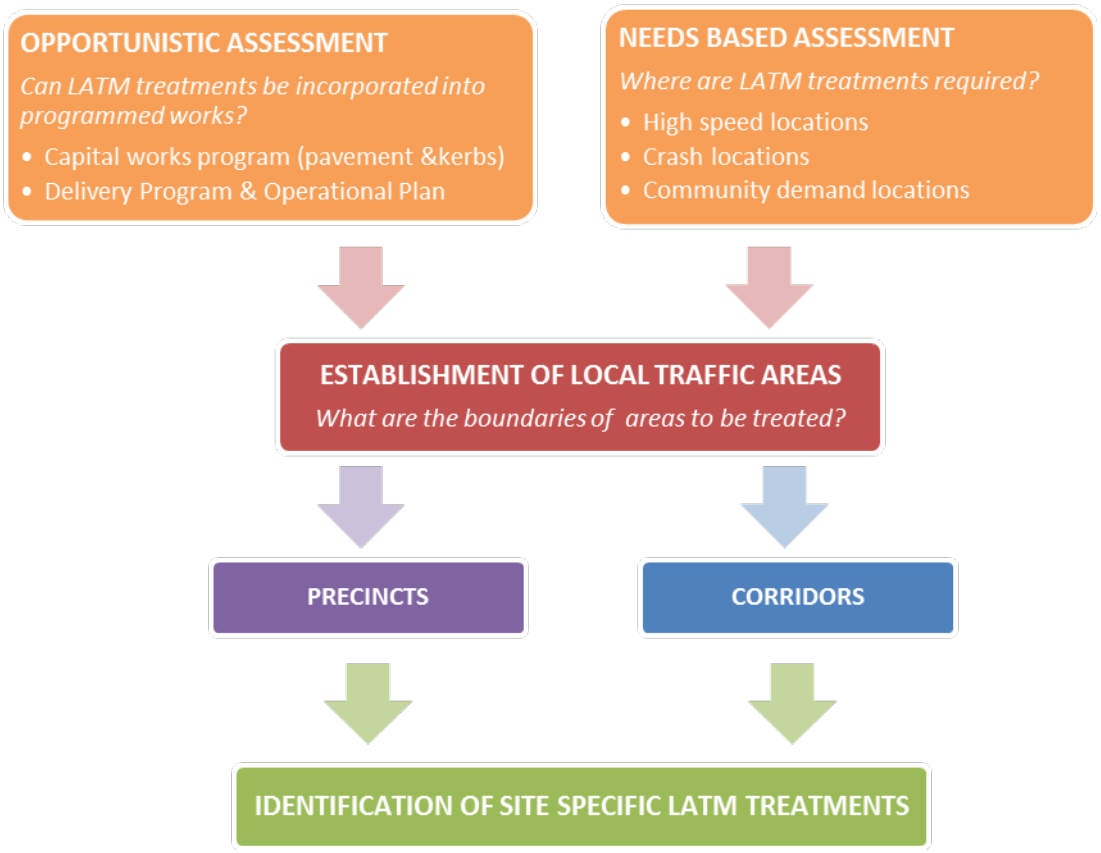
Local Area Traffic Management Device	Construction Cost (2007 AUD$)	Comparison Chart $0 $10,000 $20,000 $30,000 $40,000 $50,000 $60,000 $70,000 $80,000 $90,000
Road humps (round profile)	800 - 10,000	
Flat-topped road humps	3,000 - 20,000	
Wombat crossings	3,000 - 30,000	
Road cushions	1,000 - 10,000	
Raised intersection pavements	8,000 - 50,000	
Kerbside lane narrowings / kerb extensions - per 100 m	2,500 - 50,000	
Slow points (angled or straight)	2,000 - 40,000	
Blister islands	1,000 - 30,000	
Driveway links - per 100 m	3,000 - 60,000	
Median treatments - per 100 m	500 - 50,000	
Roundabouts	5,000 - 400,000	
Full road closure	500 - 50,000	
Half / part / diagonal road closure	1,500 - 50,000	
Modified "T" intersection	5,000 - 250,000	
Pedestrian crossings	500 - 50,000	
Perimeter threshold treatments	1,000 - 45,000	
Tactile surface treatments - per 100 m	1,000 - 25,000	
Bicycle lanes / bypasses - per 100 m	500 - 25,000	
Bus only links / bus bypasses - per 100 m	1,000 - 100,000	
Shared zones - per 100 m	1,000 - 15,000	

Source: Austroads Guide to Traffic Management, Part 8: Local Area Traffic Management (Figure 3.5, 2008)

4.6 LATM Assessment Process

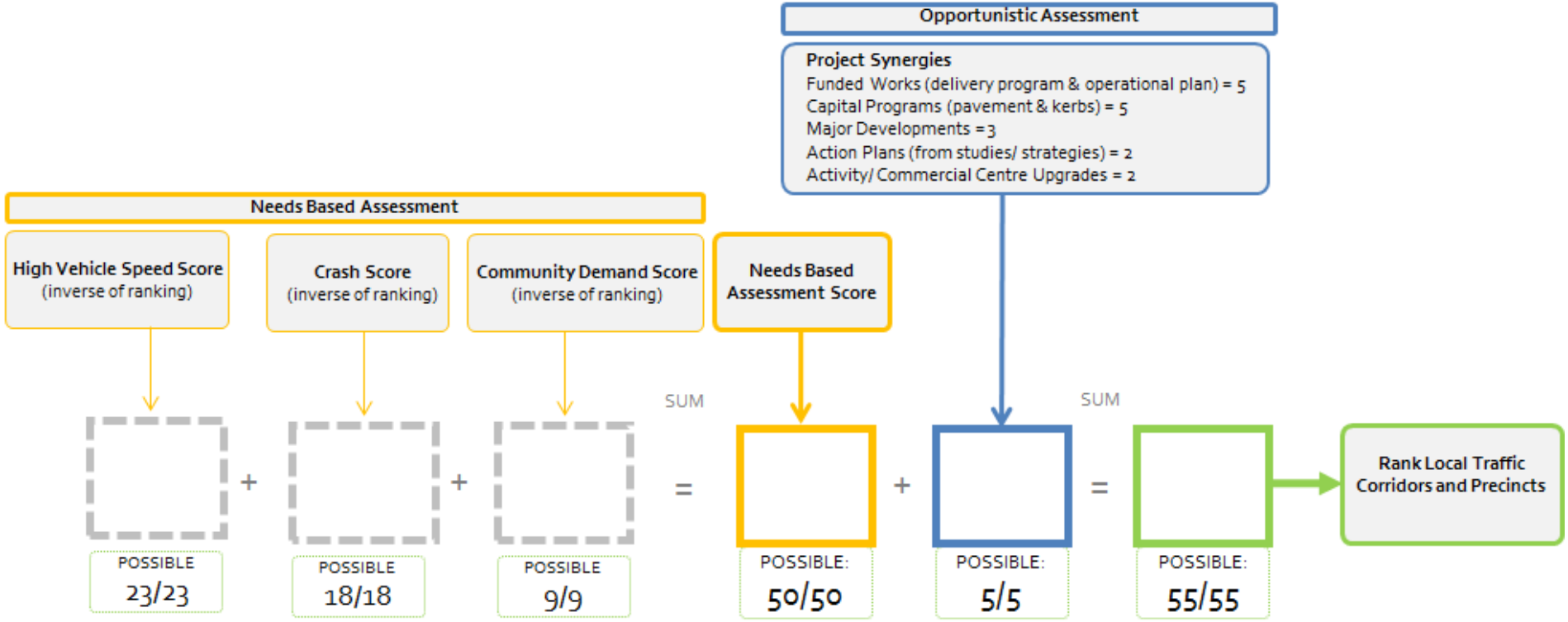
The overall LATM assessment process is informed by two separate assessments; needs based and opportunistic. A flow chart of the LATM assessment process at a broad scale is shown in Figure 4.3.

Figure 4.3: LATM Assessment Process Flow Chart



Details of the needs based assessment process and opportunistic assessment process including the scoring criteria for each process is shown in Figure 4.4 with a description of the processes outlined below.

Figure 4.4: Needs and Opportunistic Assessment Process



4.6.1 Needs Based Assessment

The needs based assessment aims to identify where LATM treatments are required based on three key factors:

i high vehicle speeds based on traffic count data
ii vehicle crash locations
iii community demand, known problem locations reported to Council by residents and members of the community.

Two other factors also influence where LATM treatments are required:

- high traffic volumes based on traffic count data
- proximity to activity centre locations and areas of high pedestrian activity (schools, shopping, community facilities).

The needs based assessment should reflect the LATM principles outlined in Section 4.1 and prioritise measures which improve pedestrian, bicycle and public transport passenger safety and accessibility, while avoiding measures which have a significant impact on parking.

4.6.2 Opportunistic Assessment

The opportunistic assessment seeks to identify locations where LATM treatments can be incorporated into previously identified and programmed works which can include:

i Funded works - delivery program and operational plan
ii Capital Programs - capital works program (pavement and kerbs)
iii Action Plans from relevant strategies - Woollahra Bicycle Strategy (2009), Paddington PAMP (2005), Darling Point Precinct Traffic Study (2005) and Bellevue Hill Traffic Study (2003)
iv Activity Centre/ Commercial Centre Upgrades
v Major Developments.

Incorporating LATM works into programmed works can result in significant cost savings in scheme design, construction and traffic management.

4.6.3 Establishment of Local Traffic Areas

A key component of developing a traffic management strategy for the LGA is determining local traffic area boundaries. This process was undertaken in line with Austroads Guide to Traffic Management Part 8 (Section 4.2) using arterial and sub-arterial roads as boundaries. The local traffic area boundaries coincide with Council administrative boundaries of wards and suburbs where possible, however the overriding determinant of local traffic areas is the road network. The 13 proposed local traffic area boundaries are shown in Figure 4.5 with a detailed map of the areas contained in Appendix E.

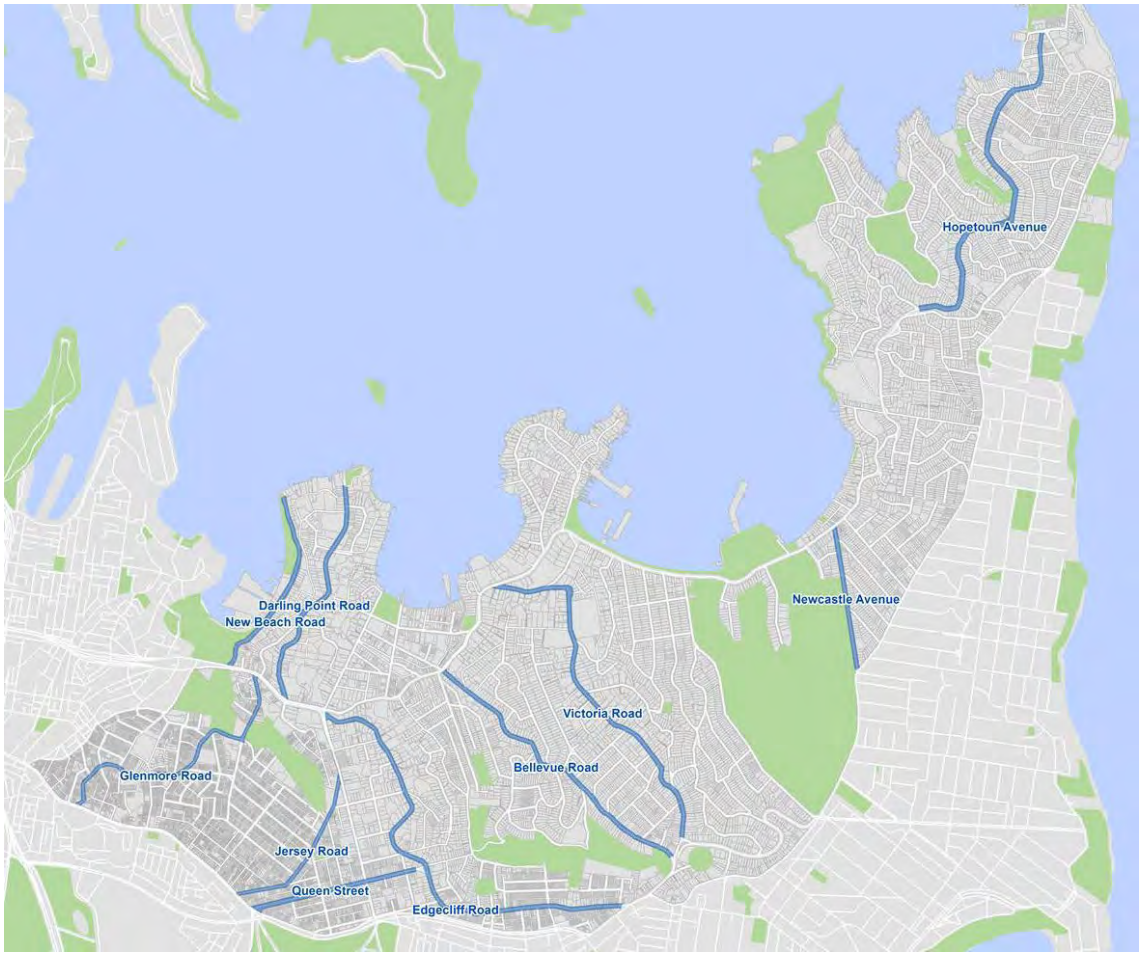
Figure 4.5: Local Traffic Areas

4.6.4 Local Traffic Corridors

Local traffic corridors are roads that require special consideration along their length which is beyond the scope of a normal local traffic area. Developing treatments for these roads in 'sections' through individual LATM projects is not entirely appropriate or effective in dealing with each roads specific issues. As such, a corridor approach whereby the road is assessed along its length is considered to be more appropriate and effective.

The local traffic corridors were identified through analysis of community feedback, speed and volume data and vehicle crashes. The 10 local traffic corridors identified are key collector roads and are shown graphically in Figure 4.6 with a detailed map contained in Appendix E.

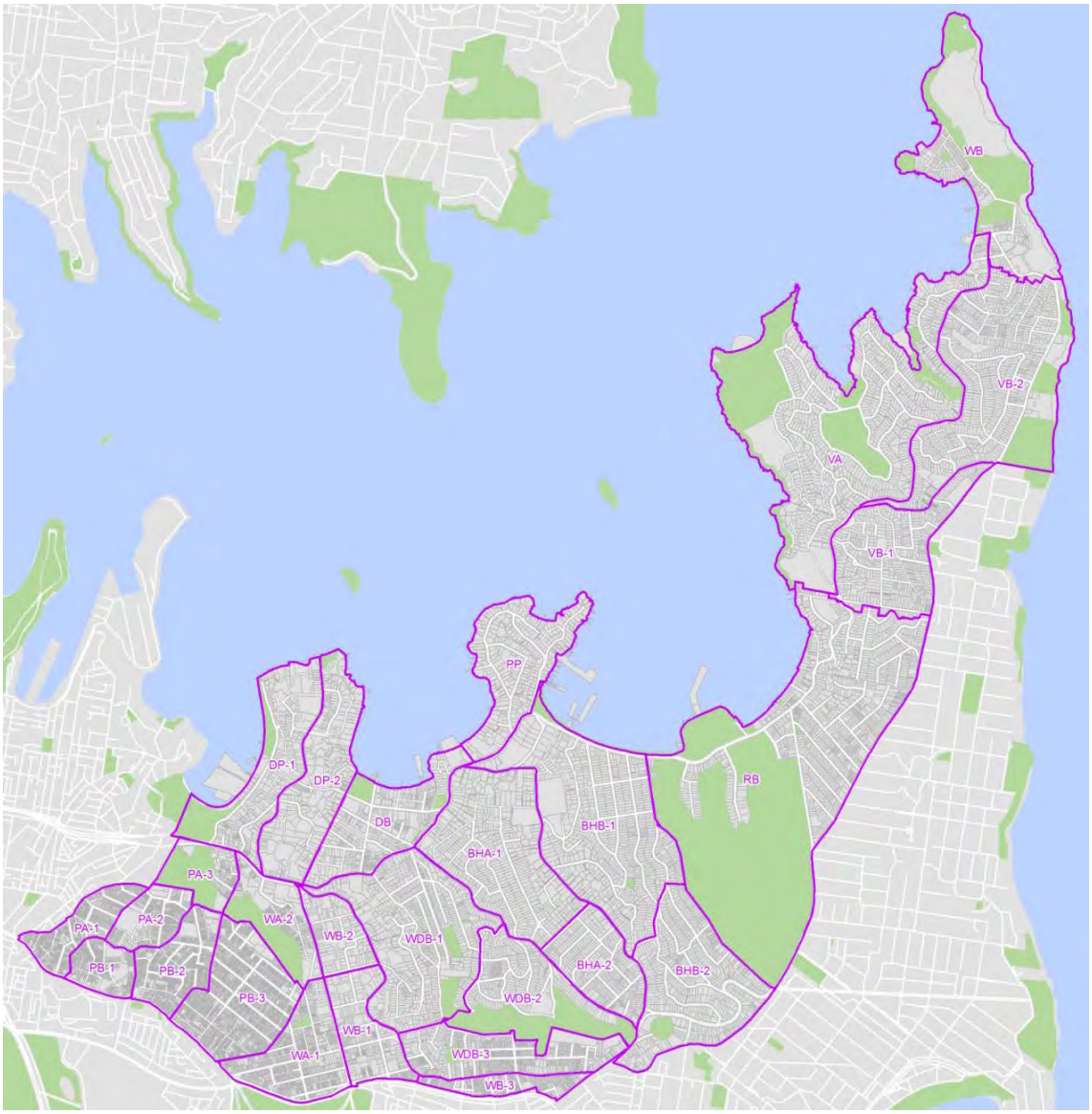
Figure 4.6: Local Traffic Corridors



4.6.5 Local Traffic Precincts

Local traffic precincts are areas within a local traffic area where specific local traffic problems are likely to occur. The development of local traffic precincts was undertaken in line with Austroads Guide to Traffic Management Part 8 (Section 4.2) using the local traffic areas shown in Figure 4.5 as overall boundaries. The 27 local traffic precincts developed as part of the process are shown in Figure 4.7 with a detailed map contained in Appendix E. The codes assigned to the precincts refer to local traffic areas the precincts were derived from, i.e. precincts PA-1, PA-2 and PA-3 were derived from the Paddington (A) local traffic area.

Figure 4.7: Local Traffic Precincts



4.7 Assessment Tool and Ranking Spreadsheet

An LATM assessment tool and ranking spreadsheet has been developed as the central component of the Traffic Management Strategy to provide a replicable method of prioritising precincts and corridors for LATM treatments in Woollahra LGA. The spreadsheet incorporates the opportunistic and needs based assessment processes outlined in Figure 4.3 with inputs based on three key data sources: vehicle speeds, crashes and community demand. The assessment spreadsheet provides quantitative results enabling local traffic precincts and corridors to be ranked to directly inform the selection and prioritisation of LATM projects in Woollahra LGA and in turn the allocation of Council resources.

The assessment tool and ranking spreadsheet have been developed to be a 'live' and replicable system that can be updated annually once new speed, crash and community concern data is available. This spreadsheet can be easily updated to yield the current year's scores and rankings by:

- Replacing the oldest year of vehicle speed and crash data with the most recent year's data to enable five year analysis (i.e. replacing 2007 data with 2012 data).
- Including the current year of community concerns and complaints.
- Updating the opportunistic assessment based on updated capital works programs, action plans and major developments.

4.8 LATM Assessment Results

Results and scores of the LATM assessment process are summarised below. A ranking system has been applied to the results, which directly informs the selection and prioritisation of LATM projects in Woollahra LGA and in turn the allocation of Council resources.

Table 4.2: LATM Assessment Results

Rank	Precinct/ Corridor Typology	Precinct/ Corridor Name	Needs Based Assessment Score				Opportunistic Assessment Score (5/5)	Combined Needs & Opportunistic Score (55/55)
			High Vehicle Speed Score (23/23)	Crash Score (18/18)	Community Demand Score (9/9)	Total (50/50)		
1	Corridor	Edgecliff Road	22	18	8	48	5	53
2	Corridor	Bellevue Road	23	16	7	46	5	51
3	Corridor	Hopetoun Avenue	20	14	4	38	5	43
4	Corridor	Glenmore Road	15	17	5	37	5	42
5	Precinct	Woollahra-Double Bay 1 (WDB-1)	18	10	6	34	5	39
6	Corridor	Victoria Road	13	15	4	32	5	37
7	Precinct	Rose Bay (RB)	19	8	2	29	5	34
8	Corridor	Newcastle Street	21	9	1	31	2	33
9	Precinct	Bellevue Hill B-2 (BHB-2)	10	11	5	26	5	31
10	Precinct	Double Bay (DB)	14	5	6	25	5	30
11	Precinct	Darling Point 1 (DP-1)	16	1	7	24	5	29
12	Precinct	Woollahra A-1 (WA-1)	11	9	1	21	5	26
13	Corridor	Jersey Road	8	12	2	22	2	24
14	Corridor	Queen Street	4	12	2	18	5	23
15	Precinct	Vaucluse A (VA)	12	4	2	18	5	23
16	Corridor	Darling Point Road	0	9	8	17	5	22
17	Precinct	Paddington B-3 (PB-3)	9	4	3	16	5	21
18	Corridor	New Beach Road	0	13	5	18	2	20
19	Precinct	Bellevue Hill B-1 (BHB-1)	5	2	3	10	5	15
20	Precinct	Paddington B-2 (PB-2)	0	5	3	8	5	13
21	Precinct	Darling Point 2 (DP-2)	0	5	3	8	5	13
22	Precinct	Watsons Bay (WB)	0	5	1	6	5	11
23	Precinct	Point Piper (PP)	0	5	1	6	5	11
24	Precinct	Woollahra A-2 (WA-2)	0	4	2	6	5	11
25	Precinct	Woollahra-Double Bay 2 (WDB-2)	0	3	2	5	5	10
26	Precinct	Woollahra-Double Bay 3 (WDB-3)	0	5	0	5	5	10

27	Precinct	**Woollahra B-1 (WB-1)**	0	4	1	5	5	10
28	Precinct	**Paddington A-2 (PA-2)**	0	2	3	5	5	10
29	Precinct	**Woollahra B-3 (WB-3)**	0	3	1	4	5	9
30	Precinct	**Bellevue Hill A-1 (BHA-1)**	0	1	3	4	5	9
31	Precinct	**Vaucluse B-1 (VB-1)**	0	2	2	4	5	9
32	Precinct	**Paddington B-1 (PB-1)**	0	3	0	3	5	8
33	Precinct	**Paddington A-1 (PA-1)**	0	2	1	3	5	8
34	Precinct	**Vaucluse B-2 (VB-2)**	0	1	2	3	5	8
35	Precinct	**Bellevue Hill A-2 (BHA-2)**	0	1	0	1	5	6
36	Precinct	**Paddington A-3 (PA-3)**	0	0	1	1	5	6
37	Precinct	**Woollahra B-2 (WB-2)**	0	0	1	1	5	6

5. Recommended LATM Program

Based on the analysis undertaken as part of this study, Table 5.1 has been prepared to detail the recommended program of LATM works in the top ten ranked local traffic corridors and precincts in Woollahra LGA. The supplementary actions recommended for each of the corridors and precincts are based on the full range of data analysed as part of the study and in particular crash data, and speed and volume data and a subject to detailed engineering design. The indicative costs of these supplementary actions are based primarily on LATM device construction costs outlined in Austroads Guide to Traffic Management, Part 8: Local Area Traffic Management (Table 5.1). A full list containing all 37 local traffic corridors and precincts is contained in Appendix F.

Table 5.1: Recommended LATM Program

Rank/ Priority	Precinct/ Corridor Typology	Precinct/ Corridor Name	Proposed Actions from existing Council programs	Recommended Supplementary Actions	Indicative Construction Cost of Supplementary Actions
1	Corridor	Edgecliff Road	• CWP Kerbs (2013/14) • Alleviate bicycle pinch points along length and at intersections (2009 Bike Strategy)	**Kerb extensions and pedestrian refuges at the following 10 priority-controlled intersections:** Albert Street, Rosemont Avenue, Trelawney Street/ Roslyndale Avenue, Wellington Street, Stanley Street, Wallis Street, Magney Street, Vernon Street, Rowe Street, Kendall Street.	$400,000
				Signalised Intersection Upgrades: Grosvenor Street, Junction Street and Adelaide Street.	$75,000
				Kerb extensions, pedestrian refuges and linemarking upgrades at 2 roundabouts: Harkness Street/ Newland Street, Bathurst Street.	$30,000
				Signalised mid-block intersection upgrade (adjacent to Holy Cross Primary School and Reddam House)	$10,000
				Bicycle Safety Treatments: Bicycle shoulder lane linemarking and green coloured surfacing at intersections to improve delineation and alleviate pinch points.	$5,000
				SUB-TOTAL	**$520,000**
2	Corridor	Bellevue Road	• CWP Kerb works (2013/14) • CWP Pavement works (2014/15) • On-road cycle route as part of 40km/h HPAA (2009 Bike Strategy) • Linemarking, kerb extensions and roundabout (Bellevue Hill Traffic Study, 2003)	**Kerb extensions and pedestrian refuges at the following 8 priority-controlled intersections:** Fairfax Road, Yamba Road, Arthur Street, Kambala Road, Cooper Park Road, Rosslyn Street, Rivers Street, Riddell Street	$320,000
				Bicycle Safety Treatments: Bicycle shoulder lane linemarking to improve delineation and alleviate pinch points.	$5,000
				SUB-TOTAL	**$325,000**
3	Corridor	Hopetoun Avenue	• CWP Kerb works (2013/14) • CWP Pavement works (2013/14) • Wentworth Avenue intersection treatment (CWP wish list) • On-road mixed-traffic treatment (2009 Bike Strategy)	**Kerb extensions, kerb ramps and pedestrian refuges at 9 intersections:** Wentworth Road, The Crescent (x2), Cambridge Avenue, Wharf Road, Russell Street, Gladstone Street, Salisbury Street, Robertson Place.	$360,000
				Kerb extensions, pedestrian refuges and linemarking upgrades at 2 roundabouts: Serpentine Parade and Fitzwilliam Road.	$20,000
				Bicycle Safety Treatments: Refresh bicycle shoulder lane and mixed-traffic (PS-2 symbol) linemarkings as well as green coloured surfacing at intersections to improve delineation and alleviate pinch points.	$5,000
				SUB-TOTAL	**$385,000**
4	Corridor	Glenmore Road	• Roundabout – Glenmore Rd/ Cascade St/ Hampden St (Delivery Program 2009-13 and Operational Plan 2012-13) • CWP Kerbs (2013/14) • Kerb extensions, marked foot crossing and urban design scheme (Paddington PAMP, 2005) • On-road cycle route (2009 Bike Strategy) • Pedestrian refuge upgrade (CWP wish list)	**Bus friendly raised platforms on approaches to 7 priority-controlled intersections:** South Street, Walker Avenue, Cambridge Street, Flinton Street, Campbell Avenue, Liverpool Street, Gipps Street	$210,000
				Kerb extensions and pedestrian refuges across 6 wide priority-controlled intersections: South Street, Walker Avenue, Cambridge Street, Flinton Street, Liverpool Street & Gipps Street.	$240,000
				SUB-TOTAL	**$450,000**
5	Precinct	Woollahra-Double Bay 1 (WDB-1)	• CWP Kerb works (2013/14 – 2017/18) • CWP Pavement works (2013/14 – 2017/18) • Carlotta Road median island and linemarking (Delivery Program 2009-13 and Operational Plan 2012-13) • Carlotta Road Traffic Calming (CWP wish list) • On and off-road cycle routes (various locations, 2009 Bike Strategy)	**Bus friendly raised platforms on approaches to 20 intersections along:** Carlotta Road, Manning Road, Kiaora Road and Epping Road.	$600,000
				Kerb extensions and pedestrian refuges across 10 wide priority-controlled intersections along: Carlotta Road, Manning Road, Kiaora Road and Epping Road.	$400,000
				Bicycle Safety Treatments: Bicycle shoulder lane and mixed-traffic (PS-2 symbol) linemarkings to improve delineation and alleviate pinch points.	$5,000
				SUB-TOTAL	**$1,005,000**
6	Corridor	Victoria Road	• CWP Pavement works (2014/15) • Kerb extensions and linemarking (Bellevue Hill Traffic Study, 2003)	**Kerb extensions at 6 wide priority-controlled intersections:** Rose Bay Avenue, Aston Gardens, Cranbrook Road, Drumalbyn Road, March Street and Rivers Street.	$240,000
				Bundarra Road intersection: Kerb ramp and footpath widening (eastern side of Bundarra Road), pedestrian refuge across Bundarra Road.	$40,000
				Birriga Road intersection: Footpath widening and new kerb ramp (northern side), pedestrian refuge across Victoria Road.	$40,000
				Bicycle Safety Treatments: Refresh bicycle shoulder lane and mixed-traffic (PS-2 symbol) linemarkings to improve delineation and alleviate pinch points.	$5,000
				SUB-TOTAL	**$325,000**

7	Precinct	Rose Bay (RB)	• Bicycle Route A6: Bondi Beach to Rose Bay and Vaucluse – on-road shoulder lanes (2009 Bike Strategy) • Rose Bay Primary School (Albermarle Avenue) Traffic Calming (Delivery Program 2009-13 and Operational Plan 2012-13) • CWP Pavement works (2013/14 – 2017/18)	**Kerb extensions and pedestrian refuges across 10 wide priority-controlled intersections along:** Norwich Road, Dover Road and Hamilton Street.	$400,000
				Bicycle Safety Treatments: Bicycle shoulder lane and mixed-traffic (PS-2 symbol) linemarkings to improve delineation and alleviate pinch points.	$5,000
				SUB-TOTAL	**$405,000**
8	Corridor	Newcastle Street	• Bicycle Route A6: Bondi Beach to Rose Bay and Vaucluse – on-road shoulder lanes (2009 Bike Strategy)	**Kerb extensions and pedestrian refuges at 5 priority-controlled intersections:** Wilberforce Avenue, Richmond Road, Albermarle Avenue, Faraday Avenue and Old South Head Road.	$200,000
				Footpath construction: Formalise footpath along western side to provide missing link between Old South Head Road and Albermarle Avenue (approximately 550m).	$25,000
				Bicycle Safety Treatments: Refresh bicycle shoulder lane linemarkings to improve delineation.	$2,000
				SUB-TOTAL	**$227,000**
9	Precinct	Bellevue Hill B2 (BHB-2)	• CWP Kerb works (2015/16 – 2016/17) • CWP Pavement works (2015/16 – 2016/17)	**Kerb extensions and pedestrian refuges at 10 wide priority-controlled intersections along:** Latimer Road, Boronia Road and Blaxland Road.	$400,000
				Kerb ramps and pedestrian refuges at 3 roundabouts: Birriga Road/Benelong Crescent, Birriga Raod/Bundarra Road, Drumalbyn/Bundarra Road	$30,000
				Bicycle Safety Treatments: Refresh bicycle shoulder lane and mixed traffic linemarkings along Birriga Road to improve delineation.	$5,000
				SUB-TOTAL	**$435,000**
10	Precinct	Double Bay (DB)	• CWP Pavement works (2013/14 – 2017/18) • CWP Kerb works (2013/14 – 2017/18) • Bicycle Route A7: Bondi to Double Bay – on-road mixed traffic linemarking (2009 Bike Strategy)	**Kerb extensions and pedestrian refuges at 2 priority-controlled intersections:** Ocean Avenue/Cross Street and South Avenue/ Cooper Street.	**$80,000**

5.1 Recommended LATM Treatments

The LATM treatments identified as supplementary actions in Table 5.1have been proposed with the broad aim of improving the safety and amenity of all road users along local and collector roads. The measures proposed will achieve this by:

- Reducing vehicle speeds
- Improving pedestrian amenity and safety by increasing the crossability of roads
- Improve the safety of cyclists by providing designated bicycle facilities, particularly at intersections.

5.2 Generic Treatments

Schematic diagrams of generic treatments identified as supplementary actions in Table 5.1 are shown below to provide an indication of treatment types. It is important to note that the diagrams are schematics only and consideration of site specific factors such as sight distance, drainage and on-street parking is required.

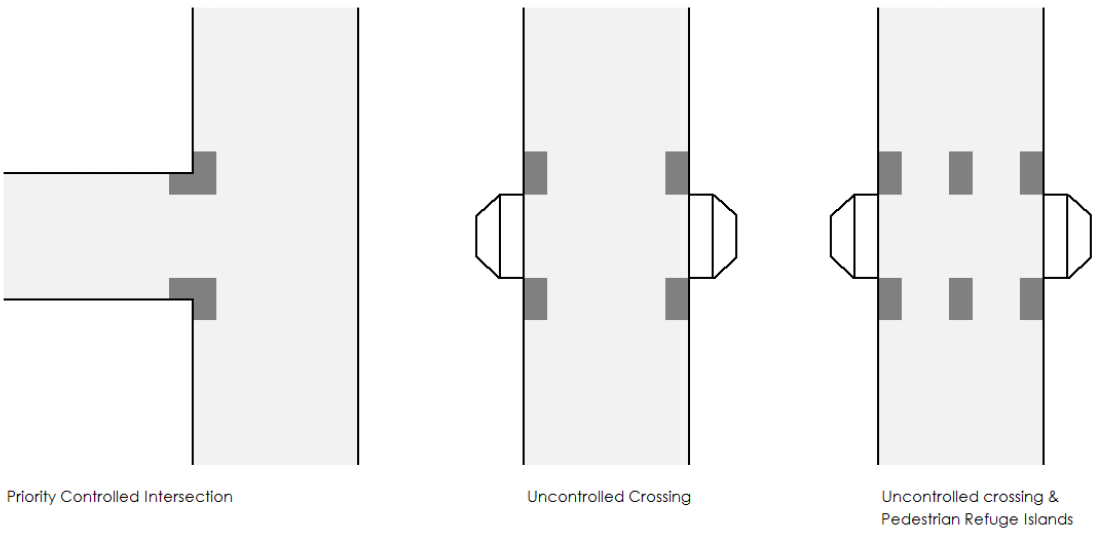
5.2.1 Kerb Extensions and Pedestrian Refuges

Kerb extensions and pedestrian refuges can be implemented in residential and retail areas and provide significant benefit to pedestrians by:

- improving delineation (laminar flow)
- reducing vehicle speeds
- reducing the pedestrian crossing distance by narrowing the trafficable carriageway.

Examples of common kerb extension and pedestrian refuge treatments which are applicable to many locations in Woollahra LGA are shown in the schematic diagrams in Figure 5.1.

Figure 5.1: Schematic Kerb Extension and Pedestrian Refuge Treatments



5.2.2 Signalised Intersection Treatments

There a number of treatment options available to improve the safety of different road users at signalised intersections. This is particularly relevant to Edgecliff Road where accident clusters were identified at the signalised intersections at Grosvenor Street, Junction Street and Adelaide Street.

Figure 5.2 and Figure 5.3 present examples of treatment options to improve safety for cyclists at signalised intersections through the implementation of bicycle shoulder lanes and advanced stop lines. These examples are relevant to the signalised intersections along Edgecliff Road where bicycle shoulder lanes are in place on approach to the intersections.

Figure 5.2: Bicycle shoulder lanes at a signalised intersection 1

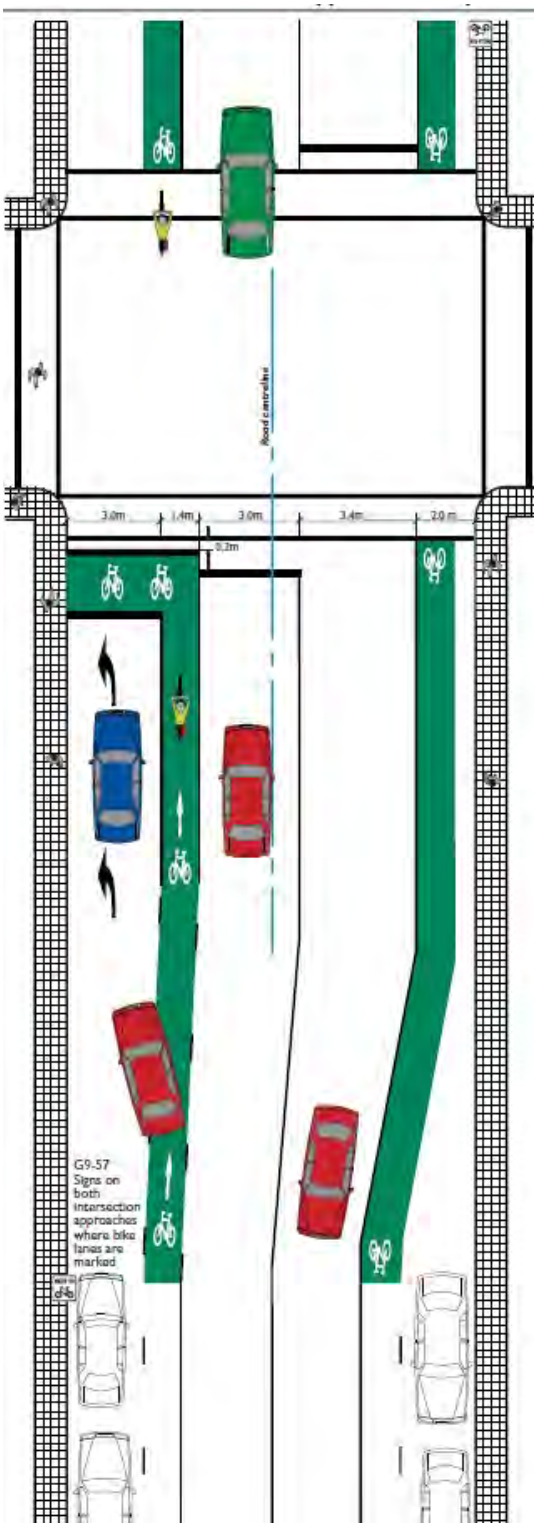
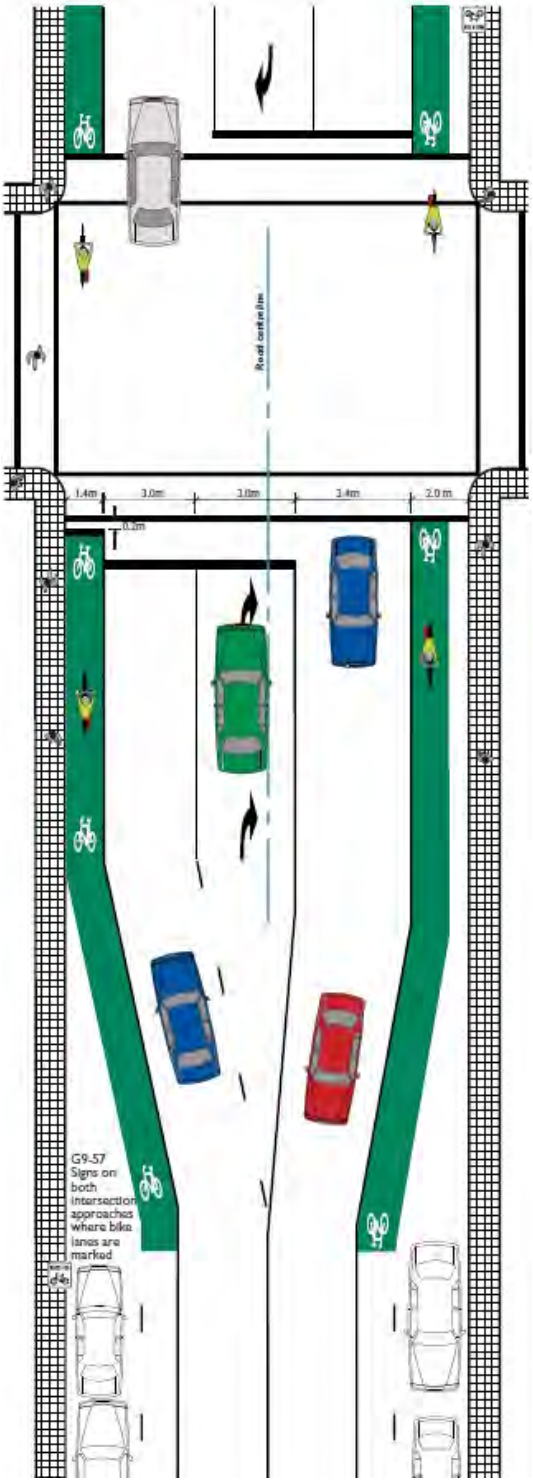


Figure 5.3: Bicycle shoulder lanes treatment at a signalised intersection 2



Source: NSW Bicycle Guidelines Figure 7.16 and 7.17, pg. 56 (RMS, 2003)

6. Conclusion and Recommendations

Based on the analyses and discussions presented within this report, the following summary and conclusions are made:

i It is recommended that Council adopt the road hierarchy presented in this report.

ii It is recommended for all future traffic counts that Council request the latitude and longitude of each count location be included in the Microsoft Excel format data files. The traffic data macro could be easily manipulated to extract this information allowing a traffic data GIS point layer to be created.

iii To assist the management of local and collector roads, the LGA was divided into 10 local traffic corridors and 27 local traffic precincts in line with Austroads Guidelines and current practice.

iv Local traffic precincts are areas where specific local traffic problems are likely to occur.

v Local traffic corridors are key collector roads that require special consideration along their length which is generally beyond the scope of a normal local traffic area. These corridors were identified through analysis of vehicle speed and volume date, crashes and community feedback.

vi A Local Area Traffic Management (LATM) assessment process was developed as part of this study which is informed by two separate assessments:

- **Needs Based** – high vehicle speeds, vehicle crashes and areas of community concern
- **Opportunistic** – identification of locations where LATM treatments can be incorporated into programmed works.

vii Analysis of RMS CrashLink data for the most recent five years that data is available (2007-2011) revealed there was a total of 1,279 recorded vehicle crashes across Woollahra LGA, the 505 (39%) occurring on the local and collector road network. Of the local and collector road crashes there were significantly more crashes on Edgecliff Road with crash clusters at intersections along its eastern end between Queen Street and Adelaide Street.

viii Based on the assessment process developed as part of this study, the top 3 ranked locations for LATM projects are Edgecliff Road, Bellevue Road and Hopetoun Avenue.

ix Based on the LATM assessment process, a prioritised program of recommended LATM works has been developed for the LGA which includes indicative construction costs.

x The prioritised project list will be used as "living" document and sites identified by council officers and requests received from the community will be investigated against the criteria and added to the list on an ongoing basis.

xi The project list and priorities will be reviewed annually as part of the budget preparation process.

Appendix A

Functional Road Hierarchy

Legend

Functional Road Hierarchy

- Arterial Road
- Sub-Arterial Road
- Collector Road
- Local Road

P1	21-03-13	JCM	RTL	DVD

Issue	Date	By	Chkd	Appd

Kilometers

0 0.5 1

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Client

Woollahra Municipal Council

Job Title

Traffic Management Strategy

Drawing Title

Functional Road Hierarchy

Scale at A3

1:20,000

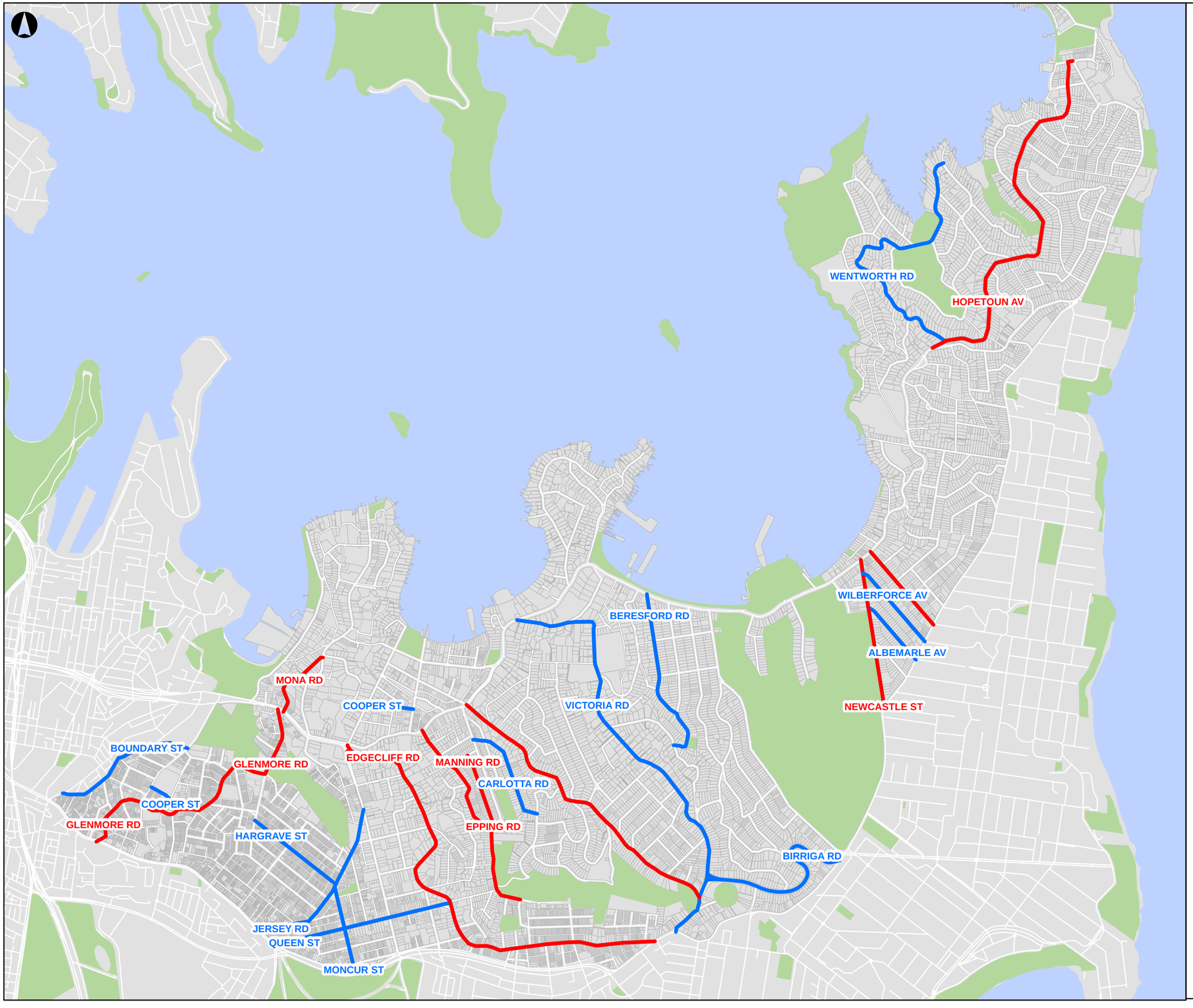
Drawing Status

Preliminary

Job No	Drawing No	Issue
13S1164000	**001**	**P1**

Appendix B

High Vehicle Speed Location Map



Legend

Recorded 85th Percentile Bi-Directional Speeds

- 55-60km/h
- 50-54km/h

P1	28-06-13	JCM	RTL	DVD

Issue	Date	By	Chkd	Appd

Metres

0 195 390 780

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Client

Woollahra Council

Job Title

Local Traffic Management Strategy

Drawing Title

Recorded High Vehicle Speed Roads

Scale at A3

1:20,000

Drawing Status

Preliminary

Job No	Drawing No	Issue
13S1164000	015	P1

Appendix C

Crash Summary Table and Maps

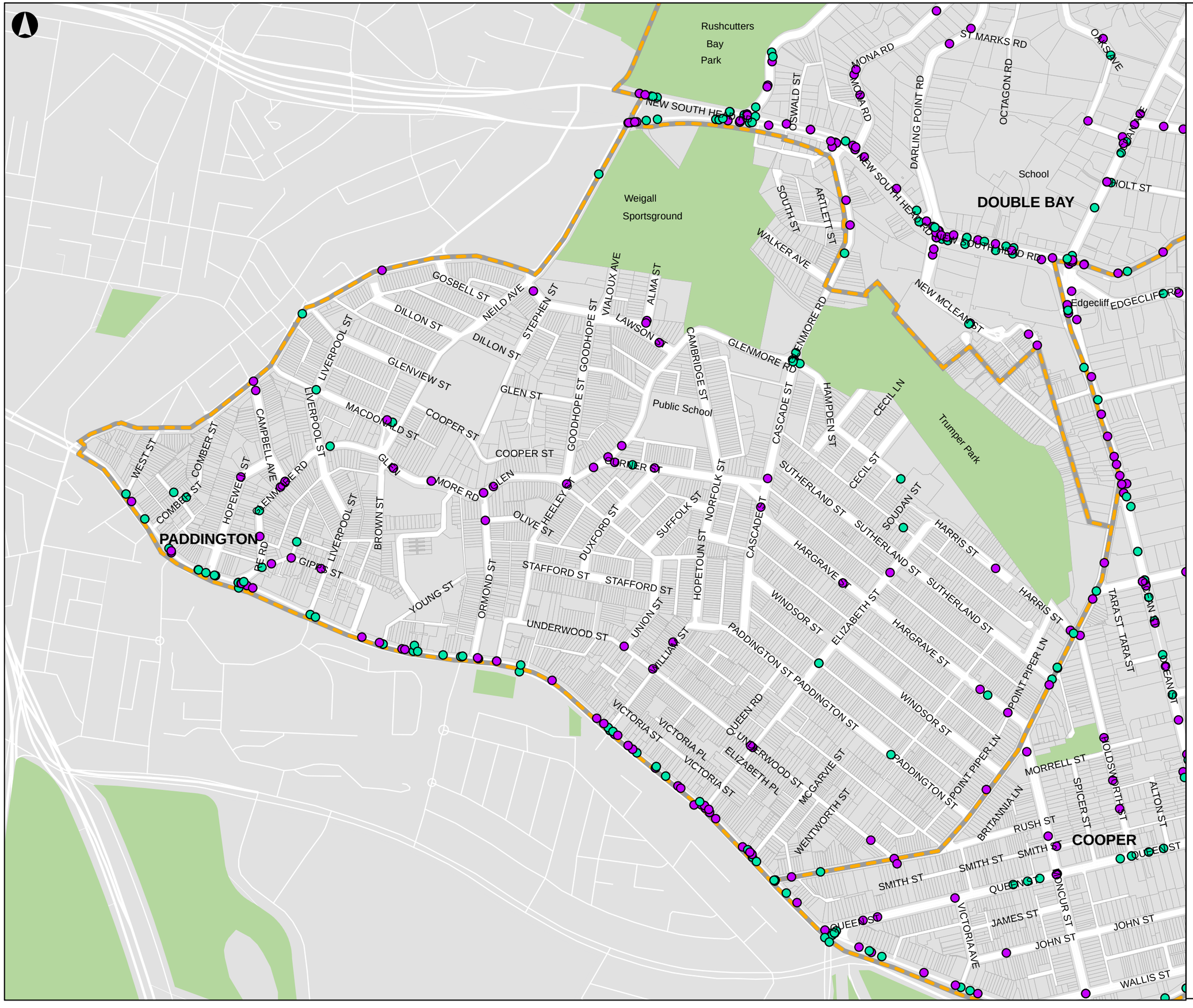
Vehicle Crashes by Road 2007-2011 (collector and local roads only)

Road	Suburb	Functional Road Classification	Recorded Crashes (2007-2011)			
			Non-injury (towaway)	Injury	Fatal	Total
Edgecliff Road	Edgecliff/ Woollahra	Collector	22	23	1	46
Glenmore Road	Paddington	Collector	17	9	0	26
Bellevue Road	Bellevue Hill	Collector	12	9	0	21
Victoria Road	Bellevue Hill	Collector	11	9	0	20
Hopetoun Avenue	Vaucluse	Collector	15	3	0	18
New Beach Road	Darling Point	Collector	8	8	0	16
Jersey Road	Paddington/ Woollahra	Collector	8	6	0	14
Queen Street	Woollahra	Collector	4	10	0	14
Birriga Road	Bellevue Hill	Local	9	4	0	13
Manning Road	Double Road	Local	6	4	0	10
Darling Point Road	Darling Point	Collector	6	3	0	9
Moncur Street	Woollahra	Collector	7	2	0	9
Newcastle Street	Rose Bay	Collector	9	0	0	9
Dover Road	Rose Bay	Collector	4	4	0	8
Balfour Road	Bellevue Hill	Local	6	1	0	7
Elizabeth Street	Paddington	Local	4	2	0	6
Holdsworth Street	Woollahra	Local	4	2	0	6
Wentworth Road	Vaucluse	Collector	3	3	0	6
Adelaide Street	Edgecliff	Local	2	3	0	5
Carlotta Road	Double Bay	Local	3	2	0	5
Cascade Street	Paddington	Local	4	1	0	5
Cooper Street	Double Bay	Local	2	3	0	5
Cross Street	Double Bay	Local	1	4	0	5
Drumalbyn Road	Bellevue Hill	Local	4	1	0	5
Greenoaks Avenue	Darling Point	Collector	3	2	0	5
Kiaora Road	Double Bay	Local	3	2	0	5
Military Road	Watsons Bay	Collector	3	2	0	5
Plumer Road	Rose Bay	Local	3	2	0	5
Wunulla Road	Point Piper	Local	3	2	0	5
Bay Street	Double Bay	Local	2	2	0	4
Cranbrook Road	Bellevue Hill	Local	3	1	0	4
Hargrave Street	Paddington	Collector	3	1	0	4
Knox Street	Double Bay	Local	0	4	0	4
Mona Road	Darling Point	Collector	4	0	0	4
New Mclean Street	Edgecliff	Local	3	1	0	4
Vaucluse Road	Vaucluse	Collector	4	0	0	4
Wallis Street	Woollahra	Local	4	0	0	4
Wilberforce Avenue	Rose Bay	Local	0	4	0	4
Arthur Street	Edgecliff	Local	3	0	0	3
Attunga Street	Double Bay	Local	1	2	0	3
Banksia Road	Bellevue Hill	Local	2	1	0	3
Bundarra Road	Bellevue Hill	Local	2	1	0	3
Gipps Street	Paddington	Local	3	0	0	3
Gurner Street	Paddington	Local	2	1	0	3
Junction Street	Woollahra	Local	1	2	0	3
Latimer Road	Bellevue Hill	Local	0	3	0	3
Olola Avenue	Vaucluse	Local	2	1	0	3
Powell Road	Rose Bay	Local	1	2	0	3

Suttie Road	Bellevue Hill	Local	3	0	0	3
Thornton Street	Darling Point	Collector	3	0	0	3
Underwood Street	Paddington	Local	3	0	0	3
Wolseley Road	Point Piper	Collector	1	2	0	3
Albemarle	Rose Bay	Local	1	1	0	2
Alma	Paddington	Local	2	0	0	2
Bathurst	Woollahra	Local	0	2	0	2
Benelong	Bellevue Hill	Local	2	0	0	2
Beresford	Bellevue Hill	Local	2	0	0	2
Billong	Vaucluse	Local	2	0	0	2
Bunyula	Bellevue Hill	Local	1	1	0	2
Caledonian	Rose Bay	Local	1	1	0	2
Captain Pipers	Vaucluse	Local	1	1	0	2
Fitzwilliam	Vaucluse	Collector	2	0	0	2
Fletcher	Woollahra	Local	2	0	0	2
Forth	Woollahra	Local	0	2	0	2
Fullerton	Woollahra	Local	2	0	0	2
Hamilton	Rose Bay	Local	1	1	0	2
Hampden	Paddington	Local	0	2	0	2
Kent	Rose Bay	Local	1	1	0	2
Lawson	Paddington	Local	2	0	0	2
Macdonald	Paddington	Local	1	1	0	2
Northland	Bellevue Hill	Local	2	0	0	2
Norwich	Rose Bay	Local	2	0	0	2
Towns	Vaucluse	Collector	1	1	0	2
Weeroona	Woollahra	Local	2	0	0	2
Albermarle	Rose Bay	Local	1	0	0	1
Anderson	Double Bay	Local	0	1	0	1
Beach	Double Bay	Local	1	0	0	1
Boambillee	Vaucluse	Local	1	0	0	1
Boronia	Bellevue Hill	Local	0	1	0	1
Bulkara	Bellevue Hill	Local	1	0	0	1
Cambridge	Vaucluse	Local	1	0	0	1
Campbell	Paddington	Local	1	0	0	1
Carlisle	Rose Bay	Local	1	0	0	1
Cecil	Vaucluse	Local	1	0	0	1
Chiswick	Woollahra	Local	1	0	0	1
Comber	Paddington	Local	0	1	0	1
County	Paddington	Local	0	1	0	1
Derby	Vaucluse	Local	1	0	0	1
Dudley	Rose Bay	Local	1	0	0	1
Dyson	Woollahra	Local	0	1	0	1
Fairfax	Bellevue Hill	Local	1	0	0	1
Forest	Double Bay	Local	0	1	0	1
Ginagulla	Bellevue Hill	Local	0	1	0	1
Girilang	Vaucluse	Local	0	1	0	1
Glendon	Darling Point	Local	1	0	0	1
Guilfoyle	Double Bay	Local	0	1	0	1
Harris	Paddington	Local	1	0	0	1
Henrietta	Double Bay	Local	1	0	0	1
Hillside	Vaucluse	Local	1	0	0	1

Holt	Double Bay	Local	0	1	0	1
Hopewell	Paddington	Local	1	0	0	1
Ian	Rose Bay	Local	1	0	0	1
Icasia	Woollahra	Local	0	1	0	1
John	Woollahra	Local	1	0	0	1
Laguna	Vaucluse	Local	0	1	0	1
Lennox	Bellevue Hill	Local	1	0	0	1
Little Comber	Paddington	Local	0	1	0	1
Liverpool	Paddington	Local	0	1	0	1
Longworth	Point Piper	Local	1	0	0	1
Magney	Woollahra	Local	1	0	0	1
Marine	Watsons Bay	Local	1	0	0	1
Mitchell	Rose Bay	Local	1	0	0	1
Moore Park	Woollahra	Local	1	0	0	1
Nelson	Woollahra	Local	0	1	0	1
Nulla	Vaucluse	Local	0	1	0	1
Ormond	Paddington	Local	1	0	0	1
Pacific	Vaucluse	Local	1	0	0	1
Paddington	Paddington	Local	0	1	0	1
Palmerton	Vaucluse	Local	1	0	0	1
Peaker	Woollahra	Local	1	0	0	1
Petrarch	Vaucluse	Local	1	0	0	1
Prospect	Paddington	Local	0	1	0	1
Quarry	Woollahra	Local	1	0	0	1
Richmond	Rose Bay	Local	1	0	0	1
Robertson	Watsons Bay	Local	0	1	0	1
Salisbury	Bellevue Hill	Local	1	0	0	1
Serpentine	Vaucluse	Local	1	0	0	1
Spicer	Woollahra	Local	0	1	0	1
Streatfield	Bellevue Hill	Local	1	0	0	1
Sutherland	Paddington	Local	0	1	0	1
Tindale	Woollahra	Local	0	1	0	1
Trelawney	Woollahra	Collector	1	0	0	1
Wallaroy	Woollahra	Local	1	0	0	1
Wiston Garden	Double Bay	Local	1	0	0	1
Yarranabbe	Darling Point	Collector	1	0	0	1

Data Source: RMS CrashLink data as provided by Woollahra Municipal Council



Legend

Council Wards

Recorded Crashes 2007-2011

Severity

- Fatal
- Injury
- Non-injury (towaway)

Issue	Date	By	Chkd	Appd
P2	02-07-2013	JCM	RTL	DVD

Metres

0 80 160 320

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Client

Woollahra Council

Job Title

Traffic Management Strategy

Drawing Title

Recorded Crashes (2007-2011) Paddington Ward

Scale at A3

1:6,000

Drawing Status

Preliminary

Job No	Drawing No	Issue
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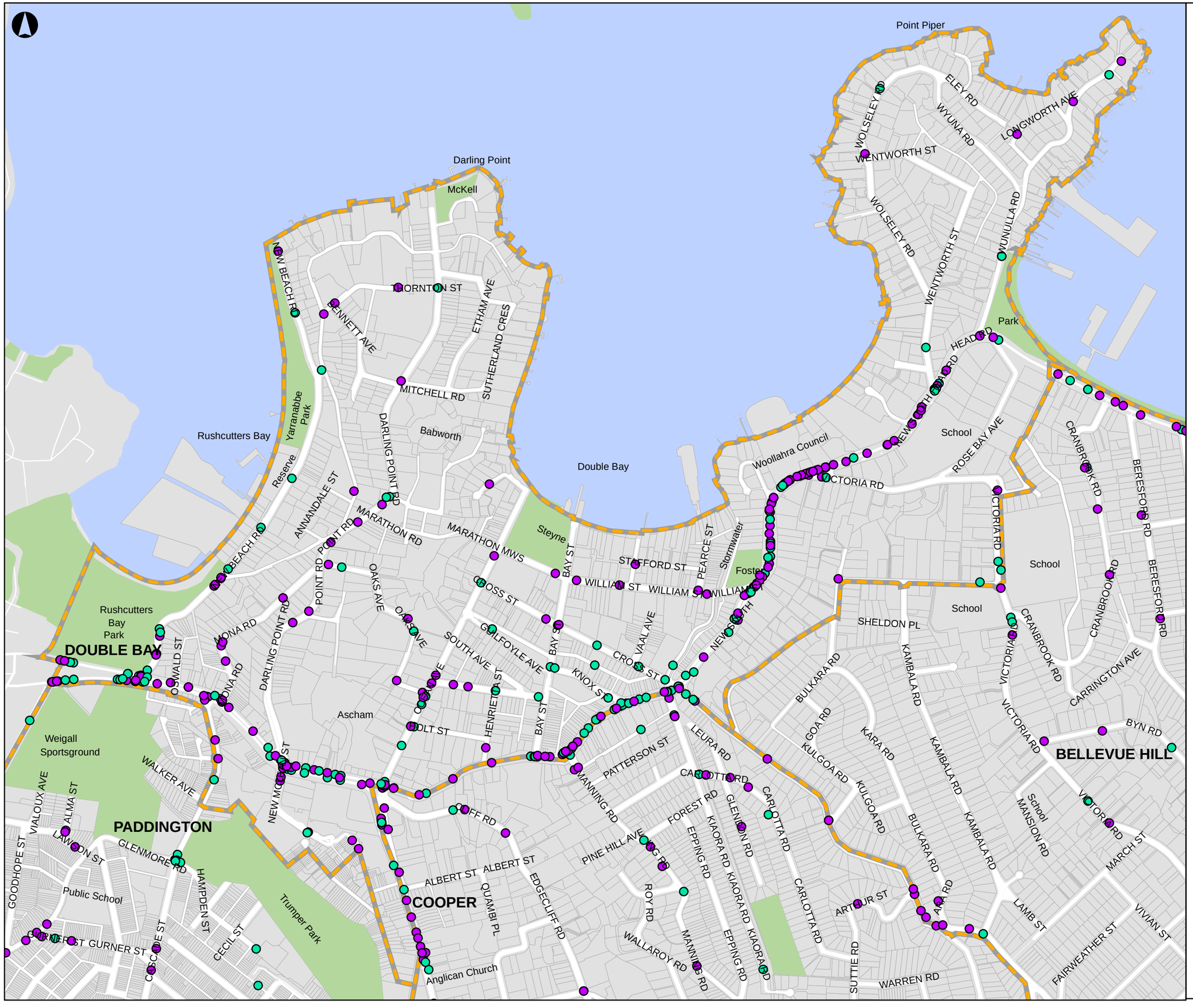

Legend

Council Wards

Recorded Crashes 2007-2011

Severity

- Fatal
- Injury
- Non-injury (towaway)

Issue	Date	By	Chkd	Appd
P2	02-07-2013	JCM	RTL	DVD

Metres

0 110 220 440

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Client

Woollahra Council

Job Title

Traffic Management Strategy

Drawing Title

Recorded Crashes (2007-2011) Double Bay Ward

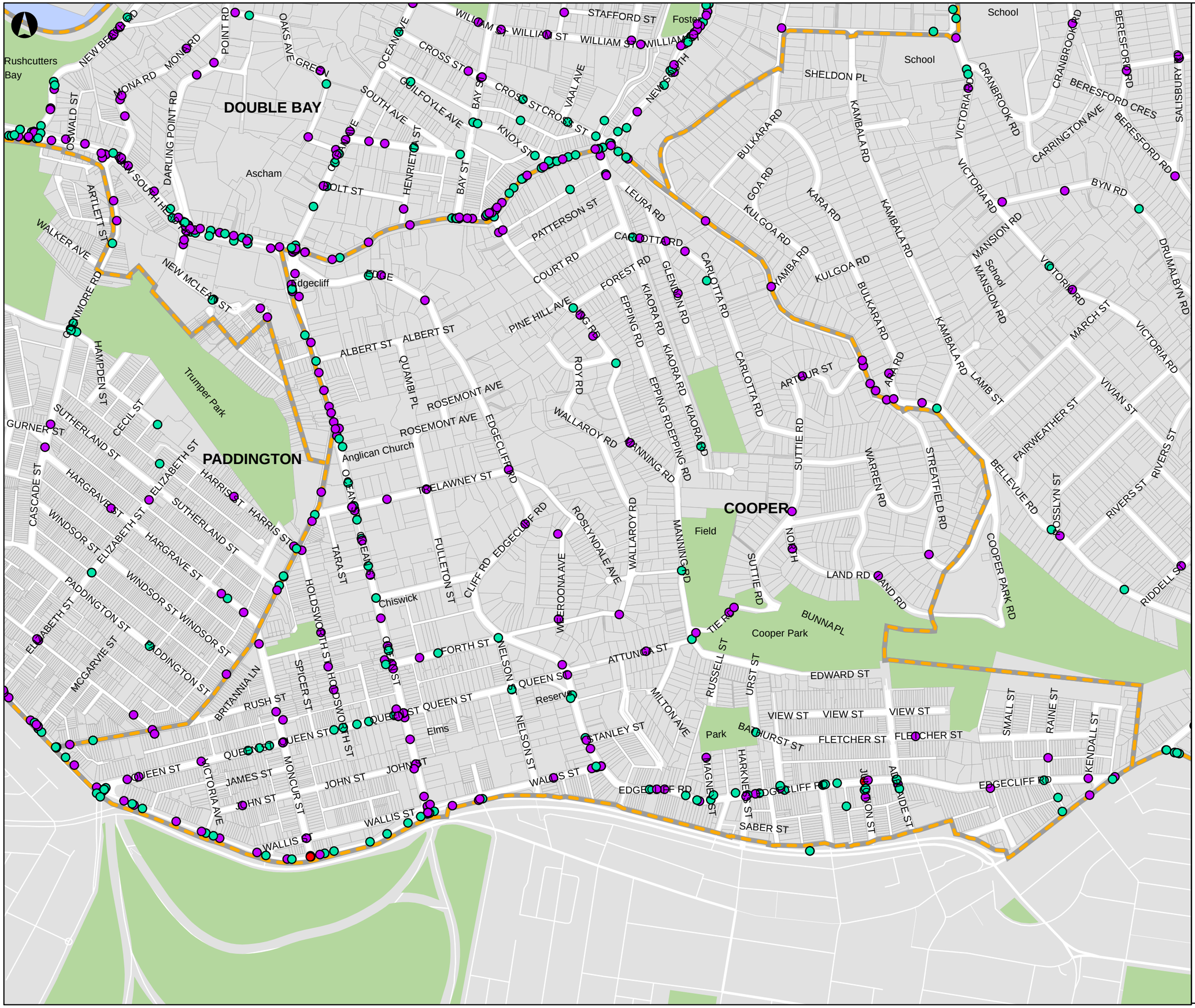
Scale at A3

1:8,000

Drawing Status

Preliminary

Job No	Drawing No	Issue
13S1164000	**003**	**P2**



Legend

Council Wards

Recorded Crashes 2007-2011

Severity

- Fatal
- Injury
- Non-injury (towaway)

Issue	Date	By	Chkd	Appd
P2	02-07-2013	JCM	RTL	DVD

Metres: 0 105 210 420

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Client
Woollahra Council

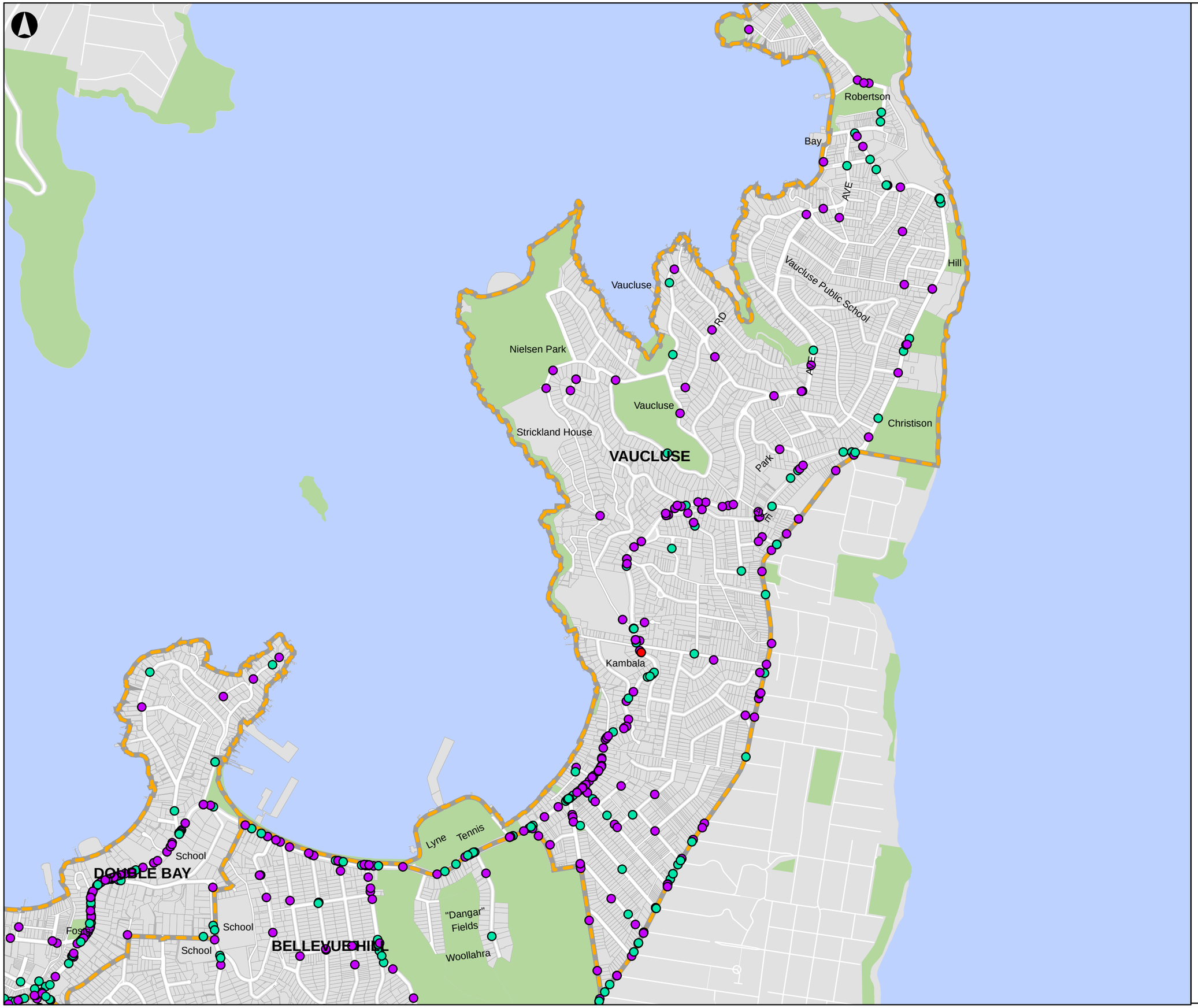
Job Title
Traffic Management Strategy

Drawing Title
Recorded Crashes (2007-2011) Cooper Ward

Scale at A3
1:7,500

Drawing Status
Preliminary

Job No	Drawing No	Issue
13S1164000	004	P2



Legend

Council Wards

Recorded Crashes 2007-2011

Severity

- Fatal
- Injury
- Non-injury (towaway)

Issue	Date	By	Chkd	Appd
P2	02-07-2013	JCM	RTL	DVD

Metres

0 210 420 840

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Client

Woollahra Council

Job Title

Traffic Management Strategy

Drawing Title

Recorded Crashes (2007-2011) Vaucluse Ward

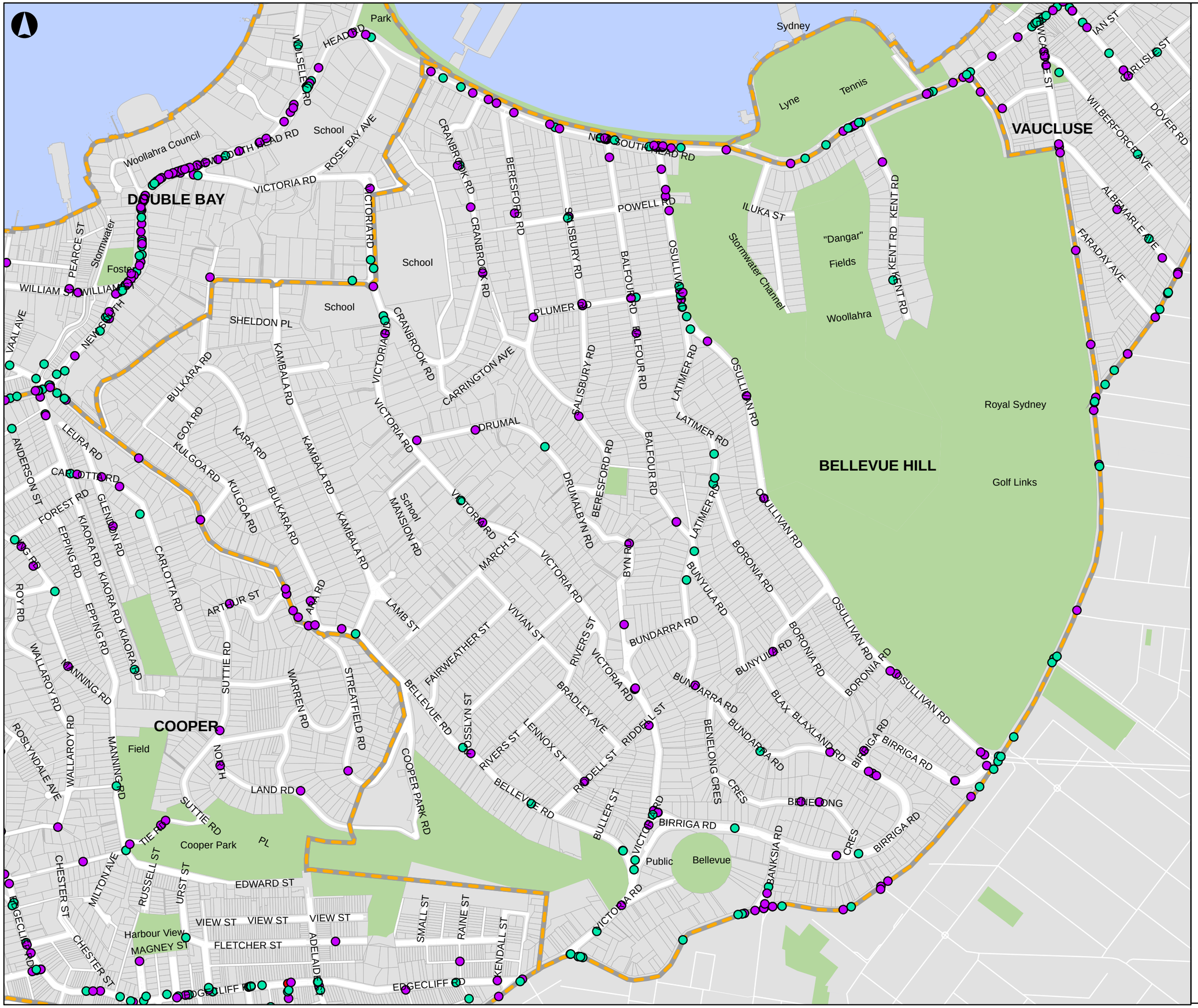
Scale at A3

1:15,000

Drawing Status

Preliminary

Job No	Drawing No	Issue
13S1164000	005	P2



Legend

Council Wards

Recorded Crashes 2007-2011

Severity

- Fatal
- Injury
- Non-injury (towaway)

Issue	Date	By	Chkd	Appd
P2	02-07-2013	JCM	RTL	DVD

Metres

0 110 220 440

GTAconsultants

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Client

Woollahra Council

Job Title

Traffic Management Strategy

Drawing Title

Recorded Crashes (2007-2011)
Bellevue Hill Ward

Scale at A3

1:8,000

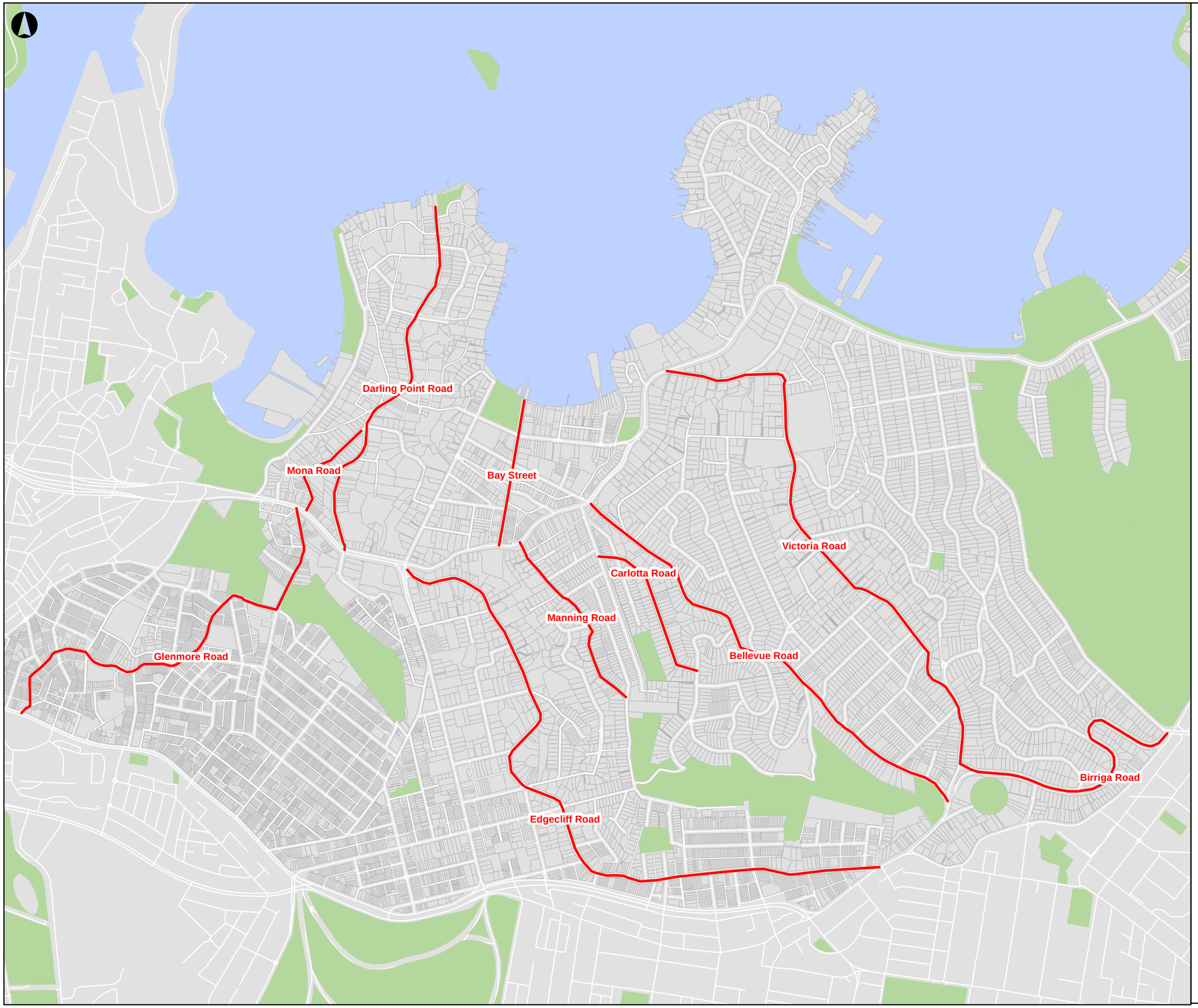
Drawing Status

Preliminary

Job No	Drawing No	Issue
13S1164000	006	P2

Appendix D

Community Complaints/Correspondence Location Map and Register



Legend

Top 10 Roads

1. Edgecliff Road
2. Darling Point Road
3. Bellevue Road
4. Mona Road
5. Carlotta Road
6. Manning Road
7. Glenmore Road
8. Birriga Road
9. Victoria Road
10. Bay Street

Issue	Date	By	Chkd	Appd
P1	28-06-13	JCM	RTL	DVD

Metres
0 125 250 500

GTAconsultants
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Client
Woollahra Council

Job Title
Local Traffic Management Strategy

Drawing Title
Top 10 Roads of Community Concern/ Complaints

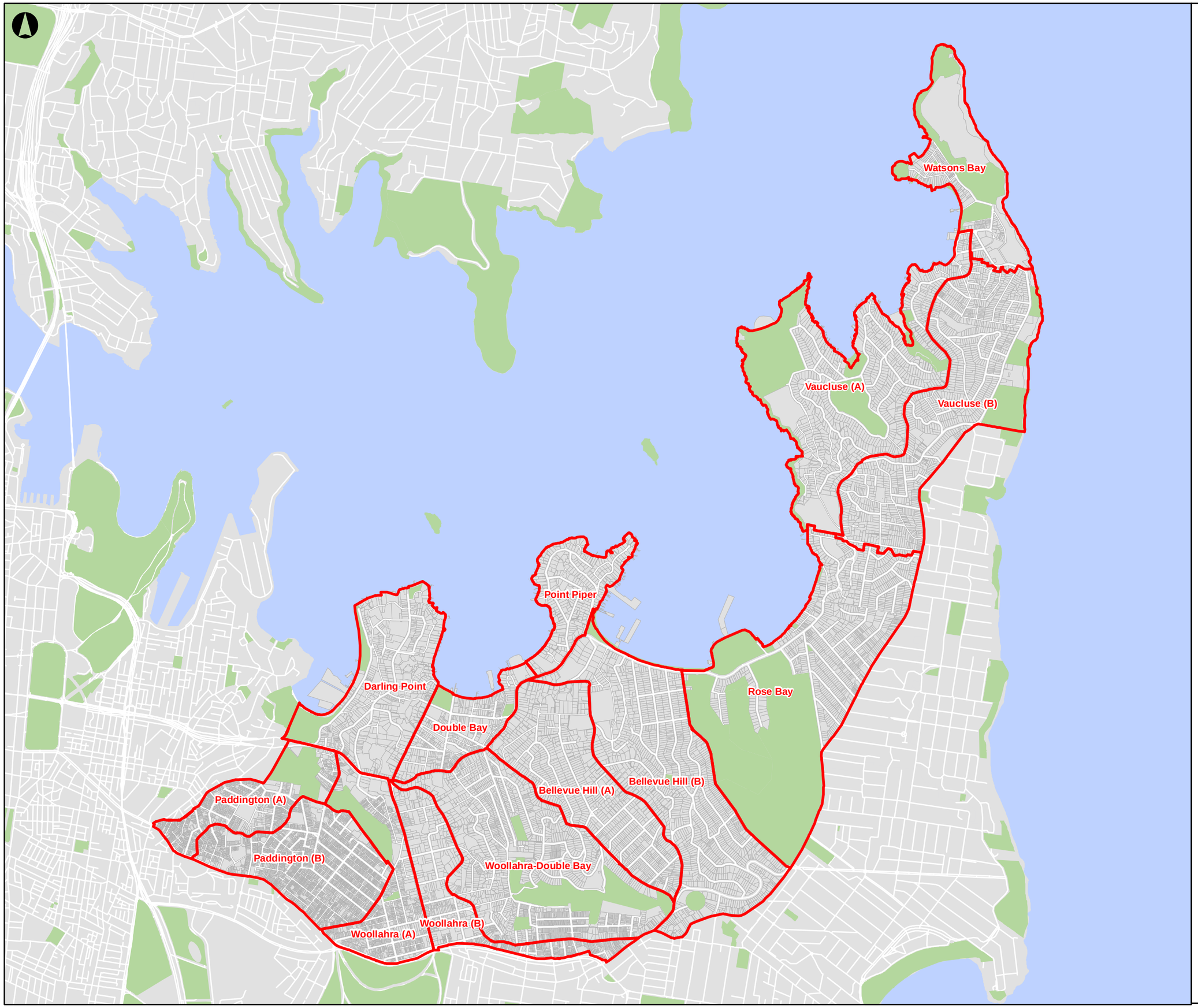
Scale at A3
1:13,000

Drawing Status
Preliminary

Job No	Drawing No	Issue
13S1164000	014	P1

Appendix E

Local Traffic Area, Precinct and Corridor Maps



Legend

Local Traffic Areas

Issue	Date	By	Chkd	Appd
P1	01-08-13	JCM	RTL	DVD

Metres

0 250 500 1,000

GTAconsultants

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Client

Woollahra Council

Job Title

Local Traffic Management Strategy

Drawing Title

Local Traffic Areas

Scale at A3

1:25,000

Drawing Status

Preliminary

Job No	Drawing No	Issue
13S1164000	010	P2

Legend

Local Traffic Corridors

Issue	Date	By	Chkd	Appd
P1	01-08-13	JCM	RTL	DVD

Metres

0 250 500 1,000

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Client

Woollahra Council

Job Title

Local Traffic Management Strategy

Drawing Title

Local Traffic Corridors

Scale at A3

1:20,000

Drawing Status

Preliminary

Job No	Drawing No	Issue
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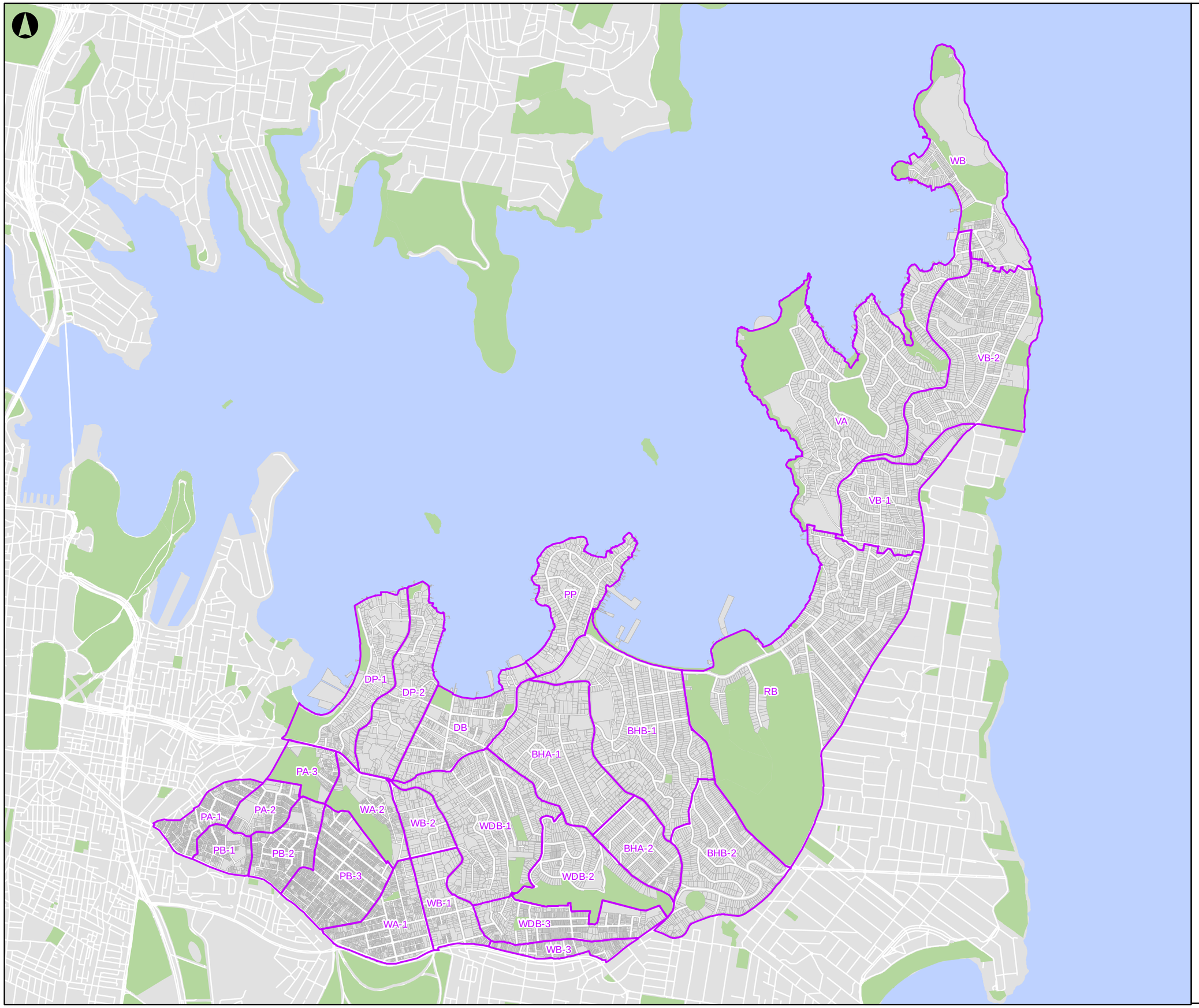

Legend

Local Traffic Precincts

Issue	Date	By	Chkd	Appd
P1	01-08-13	JCM	RTL	DVD

Metres

0 250 500 1,000

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Client

Woollahra Council

Job Title

Local Traffic Management Strategy

Drawing Title

Local Traffic Precincts

Scale at A3

1:25,000

Drawing Status

Preliminary

Job No	Drawing No	Issue
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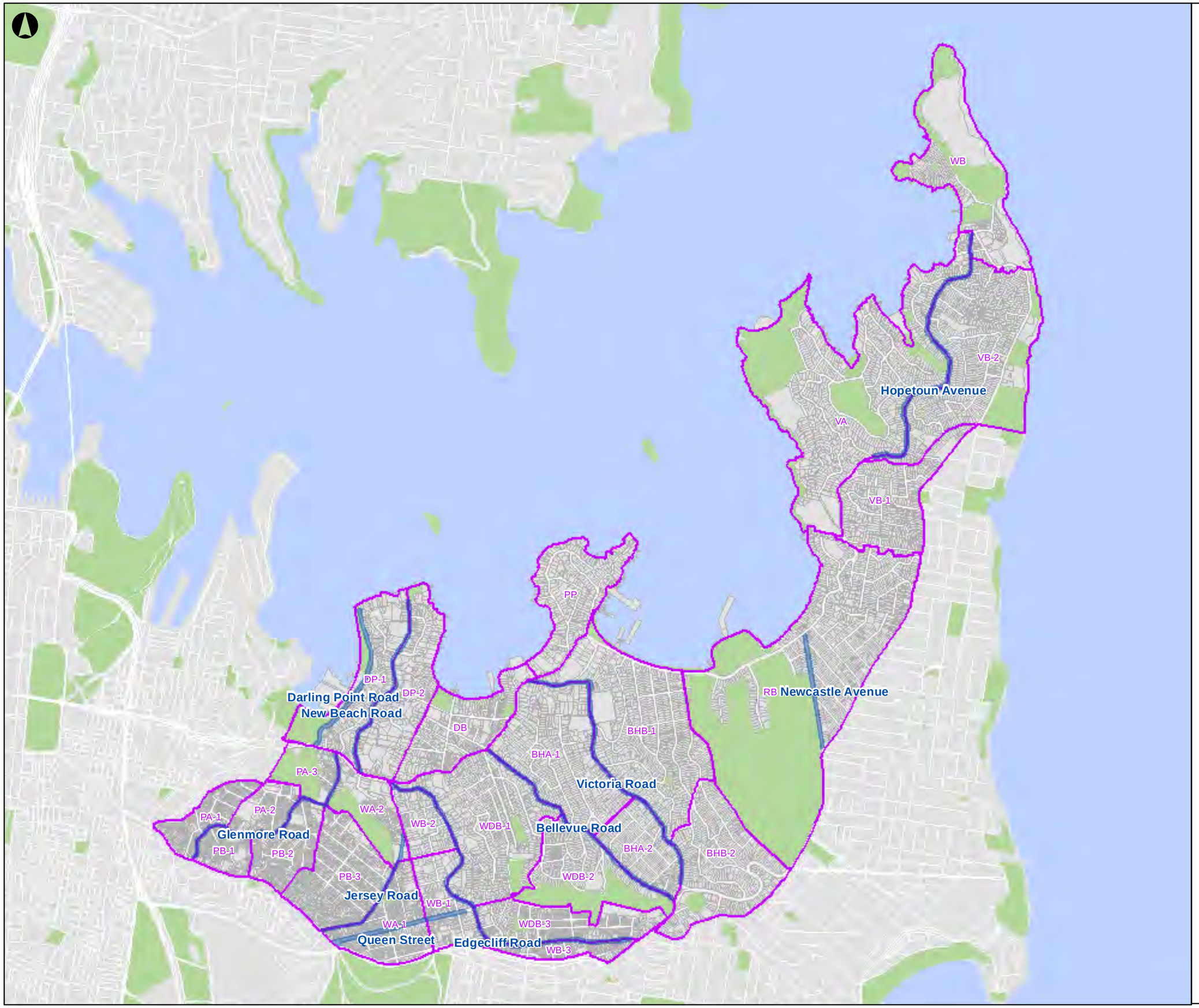

Legend

- Local Traffic Precincts
- Local Traffic Corridors

Issue	Date	By	Chkd	Appd
P1	01-08-13	JCM	RTL	DVD

Metres
0 250 500 1,000

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Client
Woollahra Council

Job Title
Local Traffic Management Strategy

Drawing Title
Local Traffic Precincts & Corridors

Scale at A3
1:25,000

Drawing Status
Preliminary

Job No	Drawing No	Issue
13S1164000	012	P2

Appendix F

Recommended LATM Program

Rank/ Priority	Precinct/ Corridor Typology	Precinct/ Corridor Name	Proposed Actions from existing Council programs	Recommended Supplementary Actions	Indicative Construction Cost of Supplementary Actions
1	Corridor	Edgecliff Road	CWP Kerbs (2013/14) Alleviate bicycle pinch points along length and at intersections (2009 Bike Strategy)	**Kerb extensions and pedestrian refuges at the following 10 priority-controlled intersections:** Albert Street, Rosemont Avenue, Trelawney Street/ Roslyndale Avenue, Wellington Street, Stanley Street, Wallis Street, Magney Street, Vernon Street, Rowe Street, Kendall Street.	$400,000
				Signalised Intersection Upgrades: Grosvenor Street, Junction Street and Adelaide Street.	$75,000
				Kerb extensions, pedestrian refuges and linemarking upgrades at 2 roundabouts: Harkness Street/ Newland Street, Bathurst Street.	$30,000
				Signalised mid-block intersection upgrade (adjacent to Holy Cross Primary School and Reddam House)	$10,000
				Bicycle Safety Treatments: Bicycle shoulder lane linemarking and green coloured surfacing at intersections to improve delineation and alleviate pinch points.	$5,000
				SUB-TOTAL	**$520,000**
2	Corridor	Bellevue Road	CWP Kerb works (2013/14) CWP Pavement works (2014/15) On-road cycle route as part of 40km/h HPAA (2009 Bike Strategy) Linemarking, kerb extensions and roundabout (Bellevue Hill Traffic Study, 2003)	**Kerb extensions and pedestrian refuges at the following 8 priority-controlled intersections:** Fairfax Road, Yamba Road, Arthur Street, Kambala Road, Cooper Park Road, Rosslyn Street, Rivers Street, Riddell Street	$320,000
				Bicycle Safety Treatments: Bicycle shoulder lane linemarking to improve delineation and alleviate pinch points.	$5,000
				SUB-TOTAL	**$325,000**
3	Corridor	Hopetoun Avenue	CWP Kerb works (2013/14) CWP Pavement works (2013/14) Wentworth Avenue intersection treatment (CWP wish list) On-road mixed-traffic treatment (2009 Bike Strategy)	**Kerb extensions, kerb ramps and pedestrian refuges at 9 intersections:** entworth Road, The Crescent (x2), Cambridge Avenue, Wharf Road, Russell Street, Gladstone Street, Salisbury Street, Robertson Place.	$360,000
				Kerb extensions, pedestrian refuges and linemarking upgrades at 2 roundabouts: Serpentine Parade and Fitzwilliam Road.	$20,000
				Bicycle Safety Treatments: Refresh bicycle shoulder lane and mixed-traffic (PS-2 symbol) linemarkings as well as green coloured surfacing at intersections to improve delineation and alleviate pinch points.	$5,000
				SUB-TOTAL	**$385,000**
4	Corridor	Glenmore Road	Roundabout – Glenmore Rd/ Cascade St/ Hampden St (Delivery Program 2009-13 and Operational Plan 2012-13) CWP Kerbs (2013/14) Kerb extensions, marked foot crossing and urban design scheme (Paddington PAMP, 2005) On-road cycle route (2009 Bike Strategy) Pedestrian refuge upgrade (CWP wish list)	**Bus friendly raised platforms on approaches to 7 priority-controlled intersections:** South Street, Walker Avenue, Cambridge Street, Flinton Street, Campbell Avenue, Liverpool Street, Gipps Street	$210,000
				Kerb extensions and pedestrian refuges across 6 wide priority-controlled intersections: South Street, Walker Avenue, Cambridge Street, Flinton Street, Liverpool Street & Gipps Street.	$240,000
				SUB-TOTAL	**$450,000**
5	Precinct	Woollahra-Double Bay 1 (WDB-1)	CWP Kerb works (2013/14 – 2017/18) CWP Pavement works (2013/14 – 2017/18) Carlotta Road median island and linemarking (Delivery Program 2009-13 and Operational Plan 2012-13) Carlotta Road Traffic Calming (CWP wish list) On and off-road cycle routes (various locations, 2009 Bike Strategy)	**Bus friendly raised platforms on approaches to 20 intersections along:** Carlotta Road, Manning Road, Kiaora Road and Epping Road.	$600,000
				Kerb extensions and pedestrian refuges across 10 wide priority-controlled intersections along: Carlotta Road, Manning Road, Kiaora Road and Epping Road.	$400,000
				Bicycle Safety Treatments: Bicycle shoulder lane and mixed-traffic (PS-2 symbol) linemarkings to improve delineation and alleviate pinch points.	$5,000
				SUB-TOTAL	**$1,005,000**
6	Corridor	Victoria Road	CWP Pavement works (2014/15) Kerb extensions and linemarking (Bellevue Hill Traffic Study, 2003)	**Kerb extensions at 6 wide priority-controlled intersections:** Rose Bay Avenue, Aston Gardens, Cranbrook Road, Drumalbyn Road, March Street and Rivers Street.	$240,000
				Bundarra Road intersection: Kerb ramp and footpath widening (eastern side of Bundarra Road), pedestrian refuge across Bundarra Road.	$40,000
				Birriga Road intersection: Footpath widening and new kerb ramp (northern side), pedestrian refuge across Victoria Road.	$40,000
				Bicycle Safety Treatments: Refresh bicycle shoulder lane and mixed-traffic (PS-2 symbol) linemarkings to improve delineation and alleviate pinch points.	$5,000
				SUB-TOTAL	**$325,000**

7	Precinct	Rose Bay (RB)	Bicycle Route A6: Bondi Beach to Rose Bay and Vaucluse – on-road shoulder lanes (2009 Bike Strategy) Rose Bay Primary School (Albermarle Avenue) Traffic Calming (Delivery Program 2009-13 and Operational Plan 2012-13) CWP Pavement works (2013/14 – 2017/18)	**Kerb extensions and pedestrian refuges across 10 wide priority-controlled intersections along:** Norwich Road, Dover Road and Hamilton Street.	$400,000
				Bicycle Safety Treatments: Bicycle shoulder lane and mixed-traffic (PS-2 symbol) linemarkings to improve delineation and alleviate pinch points.	$5,000
				SUB-TOTAL	**$405,000**
8	Corridor	Newcastle Street	Bicycle Route A6: Bondi Beach to Rose Bay and Vaucluse – on-road shoulder lanes (2009 Bike Strategy)	**Kerb extensions and pedestrian refuges at 5 priority-controlled intersections:** Wilberforce Avenue, Richmond Road, Albermarle Avenue, Faraday Avenue and Old South Head Road.	$200,000
				Footpath construction: Formalise footpath along western side to provide missing link between Old South Head Road and Albermarle Avenue (approximately 550m).	$25,000
				Bicycle Safety Treatments: Refresh bicycle shoulder lane linemarkings to improve delineation.	$2,000
				SUB-TOTAL	**$227,000**
9	Precinct	Bellevue Hill B2 (BHB-2)	CWP Kerb works (2015/16 – 2016/17) CWP Pavement works (2015/16 – 2016/17)	**Kerb extensions and pedestrian refuges at 10 wide priority-controlled intersections along:** Latimer Road, Boronia Road and Blaxland Road.	$400,000
				Kerb ramps and pedestrian refuges at 3 roundabouts: Birriga Road/Benelong Crescent, Birriga Raod/Bundarra Road, Drumalbyn/Bundarra Road	$30,000
				Bicycle Safety Treatments: Refresh bicycle shoulder lane and mixed traffic linemarkings along Birriga Road to improve delineation.	$5,000
				SUB-TOTAL	**$435,000**
10	Precinct	Double Bay (DB)	CWP Pavement works (2013/14 – 2017/18) CWP Kerb works (2013/14 – 2017/18) Bicycle Route A7: Bondi to Double Bay – on-road mixed traffic linemarking (2009 Bike Strategy)	**Kerb extensions and pedestrian refuges at 2 priority-controlled intersections:** Ocean Avenue/Cross Street and South Avenue/ Cooper Street.	**$80,000**
11	Precinct	Darling Point 1 (DP-1)	CWP Pavement works (2013/14 – 2017/18) CWP Kerb works (2013/14 – 2017/18) Pedestrian refuge (Darling Point Precinct Traffic Study, 2005)	**Speed reducing measures along Mona Road:** Bus friendly raised platforms (including replacement of plastic road hump)	$150,000
				Kerb extensions and pedestrian refuges at 6 priority-controlled intersections along: Goomerah Crescent, Hampden Avenue, Bennet Avenue.	$240,000
				Bicycle Safety Treatments on Mona Road: Install new uphill bicycle shoulder lane and downhill mixed-traffic (PS-2 symbol) linemarkings.	$3,000
				SUB-TOTAL	**$393,000**
12	Precinct	Woollahra A-1 (WA-1)	CWP Kerb works (2015/16 – 2016/17) CWP Pavement works (2015/16 – 2016/17)	**Kerb extensions and pedestrian refuges at 6 wide priority-controlled intersections along:** Moncur Street, John Street, Victoria Avenue, Wallis Street and Holdsworth Street.	$240,000
				Bicycle Safety Treatments: Install new bicycle shoulder linemarkings along Moncur Street.	$2,500
				SUB-TOTAL	**$242,500**
13	Corridor	Jersey Road	Pedestrian refuges, kerb extensions and marked foot crossing (Paddington PAMP) Bicycle Route A6: Bondi Beach to Rose Bay and Vaucluse – on-road shoulder lanes (2009 Bike Strategy).	**Raise existing zebra crossing to reduce vehicle speeds and increase pedestrian visibility (convert to Wombat Crossing):** North of Paddington Street	$40,000
				Kerb extensions and pedestrian refuges at 2 priority-controlled intersections: Rush Street and Windsor Street.	$80,000
				Bicycle Safety Treatments: Install new mixed-traffic (PS-2 symbol) linemarkings.	$2,000
				SUB-TOTAL	**$122,000**
14	Corridor	Queen Street	CWP Kerb works (2013/14) Kerb extension and marked foot crossing (Paddington PAMP, 2005)	**Signalised Intersection Upgrades:** Moncur Street and Ocean Street.	$25,000
				Raise 3 existing zebra crossings to reduce vehicle speeds and increase pedestrian visibility (convert to Wombat Crossings): East of Victoria Avenue, west of Holdsworth Street and west of Nelson Street.	$90,000
				Kerb extensions and pedestrian refuges at 2 wide priority-controlled intersections: Victoria Avenue, Holdsworth Street and Nelson Street (south side).	$80,000
				Bicycle Safety Treatments: Refresh bicycle shoulder lane linemarkings to improve delineation.	$2,000
				SUB-TOTAL	**$197,000**

15	Precinct	Vaucluse A (VA)	CWP Kerb works (2013/14 – 2017/18) CWP Pavement works (2013/14 – 2017/18) Raised pedestrian crossing (Delivery Program 2009-13 & Operational Plan 2012-13) On-road mixed-traffic treatment, signage and linemarking (2009 Bike Strategy) Traffic calming, kerb extensions and pedestrian refuge (CWP wish list)	**Kerb extensions and pedestrian refuges at 7 wide priority-controlled intersections along Vaucluse Road and Wentworth Road:** Gilliver Road, Greycliffe Avenue, Olola Avenue (x2), Coolong Road, Chapel Road, Fitzwilliam Road.	$280,000
				Bicycle Safety Treatments: Refresh bicycle shoulder lane linemarkings to improve delineation.	$5,000
				SUB-TOTAL	**$285,000**
16	Corridor	Darling Point Road	CWP Kerb works (2014/15) CWP Pavement works (2014/15) Bicycle Route B12: Darling Point Road – on-road mixed traffic linemarking (2009 Bike Strategy) Redesign of existing roundabouts, pedestrian refuges, provision of coach loading, parking meters and linemarking (Darling Point Precinct Traffic Study, 2005)	**Kerb extensions, kerb ramps and pedestrian refuges at 3 priority-controlled intersections:** Goomerah Crescent, Mitchell Road, Etham Road.	$120,000
				Bicycle Safety Treatments: Install new bicycle shoulder lane linemarkings with green coloured surfacing at intersections to improve delineation.	$5,000
				SUB-TOTAL	**$125,000**
17	Precinct	Paddington B-3 (PB-3)	CWP Kerb works (2015/16) CWP Pavement works (2016/17) Kerb extensions and marked foot crossings (Paddington PAMP, 2005)	**Kerb extensions, kerb ramps and pedestrian refuges at 2 wide priority-controlled intersections with Cascade Street:** Paddington Street and Windsor Street	$80,000
				Kerb extensions, pedestrian refuges and linemarking upgrades at 2 roundabouts on Elizabeth Street: Hargrave Street and Paddington Street	$20,000
				Raise 3 existing zebra crossing to reduce vehicle speeds and increase pedestrian visibility (convert to Wombat Crossing): Hargrave Street, Elizabeth Street, Windsor Street,	$90,000
				Remove painted median on Hargrave Street: Install new BB linemarking in combination with bicycle shoulder lane linemarkings.	$5,000
				Bicycle Safety Treatments (in addition to Hargrave St shoulder lane linemarkings): Cascade Street (north of Gurner Street): refresh bicycle shoulder lane linemarkings Cascade Street (south of Gurner Street): install new shoulder lane linemarking and intersection treatments with green coloured surfacing to improve delineation.	$5,000
				SUB-TOTAL	**$200,000**
18	Corridor	New Beach Road	CWP Kerb works (2014/15) CWP Pavement works (2014/15) Pedestrian refuge (Darling Point Precinct Traffic Study, 2005)	**Kerb extensions and pedestrian refuges (3 x mid-block locations)**	$120,000
				Replace bolt-down road cushions (16 in total)	$80,000
				Bicycle Safety Treatments: Install new bicycle shoulder lane linemarkings with green coloured surfacing at intersections to improve delineation.	$4,000
				SUB-TOTAL	**$204,000**
19	Precinct	Bellevue Hill B-1 (BHB-1)	CWP Kerb works (2013/14 – 2016/17) CWP Pavement works (2013/14 – 2016/17)	**Kerb extensions, kerb ramps and pedestrian refuges at 2 wide priority-controlled intersections along New South Head Road:** Rose Bay Avenue and Beresford Road.	**$80,000**
20	Precinct	Paddington B-2 (PB-2)	CWP Kerb works (2013/14 – 2016/17) CWP Pavement works (2013/14 – 2017/18) Kerb extensions and marked foot crossings (Paddington PAMP, 2005) Sub-Regional & Local Bicycle Route B6: William Street on-road mixed traffic linemarking (Woollahra Bike Strategy, 2009)	**Kerb extensions, kerb ramp, pedestrian refuges and linemarking upgrades along Gurner Street**	**$40,000**
21	Precinct	Darling Point 2 (DP-2)	CWP Kerb works (2013/14 – 2015/2016) CWP Pavement works (2013/14) Raised platforms, pedestrian refuges and linemarking (Darling Point Precinct Traffic Study, 2005)	**Kerb extensions, kerb ramps, pedestrian refuges and linemarking upgrades at Ocean Avenue/ William Street/ Spring Street priority-controlled intersection.**	$40,000
				Kerb extensions, pedestrian refuges and linemarking upgrades at Greenoaks Avenue/Ocean Avenue roundabout intersection.	$10,000
				Linemarking and signage improvements along Greenoaks Avenue	$5,000
				SUB-TOTAL	**$55,000**
22	Precinct	Watsons Bay (WB)	CWP Pavement works (2013/14 – 2016/17) Regional Bicycle Route A10: Watsons Bay to Vaucluse – Crossing treatment at Military Road and shared path signage (Woollahra Bike Strategy, 2009)	**Kerb extensions, kerb ramps and pedestrian refuges across 2 wide priority-controlled intersections:** Dunbar Street (at Military Road), Salisbury Street (at Old South Head Road)	$80,000
				Upgrade existing raised zebra crossing on Military Road (north of Gap Road).	$40,000
				SUB-TOTAL	**$120,000**
23	Precinct	Point Piper (PP)	CWP Kerb works (2013/14) CWP Pavement works (2013/14 – 2016/17)	**Kerb extensions, kerb ramps and pedestrian refuges at 4 wide priority-controlled intersections along:** Wolseley Road, Wyuna Road, Wentworth Street.	**$160,000**

24	Precinct	Woollahra A-2 (WA-2)	CWP Pavement works (2015/16) Recreational Bicycle Route C2: Trumper Park – shared path signage (Woollahra Bike Strategy, 2009) Regional Bicycle Route A9: Woollahra to Edgecliff – on-road mixed traffic linemarking (Woollahra Bike Strategy, 2009)	**Raise existing zebra crossing to increase pedestrian visibility (convert to Wombat Crossing):** New McLean Street (opposite Edgecliff Centre).	**$40,000**
25	Precinct	Woollahra-Double Bay 2 (WDB-2)	CWP Pavement works (2014/15 – 2017/18)	**Kerb extensions, kerb ramps and pedestrian refuges at 3 wide priority-controlled intersections:** Cooper Park Road/ Bellevue Road, Arthur Street/ Bellevue Road intersection (both included in Bellevue Road corridor) and Cooper Park Road/Streatfield Road intersection.	**$120,000**
26	Precinct	Woollahra-Double Bay 3 (WDB-3)	CWP Kerb works (2013/14 – 2016/17) CWP Pavement works (2013/14 – 2016/17) Regional Bicycle Route A8: Bondi Junction to Double Bay – Bicycle shoulder lanes - Edward Street and Bathurst Street (Woollahra Bike Strategy, 2009)	**Bicycle Safety Treatments:** Refresh bicycle shoulder lane linemarkings to improve delineation along Bathurst Street.	**$1,500**
27	Precinct	Woollahra B-1 (WB-1)	CWP Kerb works (2013/14 – 2016/17) CWP Pavement works (2013/14 – 2016/17) Sub-Regional & Local Route B11: Nelson Street – kerb ramps, signage and mixed traffic linemarking (Woollahra Bike Strategy, 2009)	**Raise existing zebra crossing to reduce vehicle speeds and increase pedestrian visibility (convert to Wombat Crossing):** Forth Street (outside Woollahra Public School).	$40,000
				Kerb extensions and pedestrian refuges at 2 wide priority-controlled intersections: Nelson Street (south side, Included in Queen Street corridor) and Wallis Street	$40,000
				Bicycle Safety Treatments: Refresh bicycle shoulder lane and mixed-traffic (PS-2 symbol) linemarkings to improve delineation along Nelson Street. Install new mixed-traffic (PS-2 symbol) linemarkings along Albert Street	$3,000
				SUB-TOTAL	**$83,000**
28	Precinct	Paddington A-2 (PA-2)	CWP Kerb works (2017/18) CWP Pavement works (2015/16 – 2017/18)	**Kerb extensions, pedestrian refuges and linemarking upgrades at Lawson Street/Goodhope Street/Vialoux Avenue roundabout.**	$40,000
29	Precinct	Woollahra B-3 (WB-3)	CWP Pavement works (2016/17)	**Signalised Intersection Upgrades included in Edgecliff Road corridor:** Grosvenor Street, Junction Street and Adelaide Street.	Included in Edgecliff Road corridor
30	Precinct	Bellevue Hill A-1 (BHA-1)	CWP Kerb works (2013/14 – 2017/18) CWP Pavement works (2013/14 – 2017/18)	**Kerb extensions and pedestrian refuges at Bellevue Road/ Arthur Street priority-controlled intersection included in Bellevue Road corridor**	Included in Bellevue Road corridor
31	Precinct	Vaucluse B-1 (VB-1)	CWP Kerb works (2017/18) CWP Pavement works (2017/18) Sub-Regional & Local Route B17: Towns Road – on-road mixed traffic line marking • Sub-Regional & Local Route B18: Captain Pipers Road-Clarendon Street – on-road mixed traffic line marking	**Towns Road/ New South Head Road intersection:** Change intersection from give-way control to stop control. Install signage and install necessary linemarkings at intersection. Extend BB line through bend and refresh linemarkings on approach to intersection.	$5,000
				Kerb extensions, pedestrian refuges and linemarking at: Laguna Street intersections with New South Head Road and Old South Head Road to improve delineation.	$80,000
				Bicycle Safety Treatments: Refresh mixed-traffic (PS-2 symbol) linemarkings to improve delineation along Captain Pipers Road, Clarendon Road and Towns Road.	$1,500
				SUB-TOTAL	**$86,500**
32	Precinct	Paddington B-1 (PB-1)	CWP Kerb works (2013/14 – 2016/17) CWP Pavement works (2016/17) Pedestrian refuges (Paddington PAMP, 2005)	**Kerb extensions and pedestrian refuges across 2 wide priority-controlled intersections:** Liverpool Street and Gipps Street (included in Glenmore Road corridor).	Included in Glenmore Road corridor
33	Precinct	Paddington A-1 (PA-1)	CWP Kerb works (2015/16) CWP Pavement works (2013/14 - 2016/17) Sub-Regional and Local Bicycle Route B1: Boundary Street/ Campbell Ave to Nield Ave Marked foot crossings and pedestrian refuges (Paddington PAMP, 2005)	**Kerb extensions and pedestrian refuges across 3 wide priority-controlled intersections:** Dillon Street (at Nield Avenue), Gosbell Street (at Nield Avenue), MacDonald Street (at Brown Street).	$120,000
				Kerb extensions, kerb ramps, pedestrian refuge and linemarking upgrades at Campbell Avenue/Boundary Street intersection.	$40,000
				SUB-TOTAL	**$160,000**
34	Precinct	Vaucluse B-2 (VB-2)	CWP Kerb works (2014/15 – 2016/17) CWP Pavement works (2014/15 - 2016/17) Sub-Regional & Local Bicycle Route B19: Laguna St and Petrarch Ave - on-road mixed traffic line marking	**Kerb extensions, kerb ramps and pedestrian refuges at 2 wide priority-controlled intersections:** Kings Road (at Village High Road) and Serpentine Parade (at New South Head Road).	$80,000
				Signage and linemarking improvements on approach to raised zebra crossing at Cambridge Avenue/ Palmerston Street intersection (opposite Vaucluse Public School.	$1,500
				SUB-TOTAL	**$81,500**
35	Precinct	Bellevue Hill A-2 (BHA-2)	CWP Kerb works (2014/15 – 2017/18) CWP Pavement works (2014/15 - 2017/18)	**Kerb extensions and pedestrian refuges across Rivers Street (at Victoria Road, included in Victoria Road corridor)**	Included in Victoria Road corridor
36	Precinct	Paddington A-3 (PA-3)	CWP Pavement works (2015/16)	**Kerb extensions and pedestrian refuges across 2 wide priority-controlled intersections:** South Street, Walker Avenue (included in Glenmore Road corridor).	Included in Glenmore Road corridor
37	Precinct	Woollahra B-2 (WB-2)	CWP Kerb works (2013/14) CWP Pavement works (2013/14)	**Kerb extensions, pedestrian refuges and linemarking at 2 priority-controlled intersections:** Albert Street (at Ocean Street), Wellington Street, Fullerton Street,	$80,000

				Bicycle Safety Treatments: Refresh bicycle shoulder lane and mixed-traffic (PS-2 symbol) linemarkings to improve delineation along Trelawney Street. Install new mixed-traffic (PS-2 symbol) linemarkings along Rosemont Avenue, Wellington Street,	$3,000
				SUB-TOTAL	**$83,000**
				Total	**$6,996,500**

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