



**15 Jubilee Avenue, Warriewood  
Rezoning Planning Proposal**  
Traffic Impact Assessment Report

Prepared for:  
Blackmores Limited  
25/08/2016

The Transport Planning Partnership  
ACN: 607 079 005




# 15 Jubilee Avenue, Warriewood Rezoning Planning Proposal Traffic Impact Assessment Report

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## 1 INTRODUCTION

Blackmores Limited (Blackmores) is seeking approval to rezone a parcel of land located at 15 Jubilee Avenue Warriewood to allow, amongst other uses, office facilities.

The vacant site at 15 Jubilee Avenue, is currently zoned IN2 Light Industrial which prohibits the use of the site for "office" uses.

Blackmores is seeking to have the site rezoned to B7 Business Park to allow the site to accommodate office use and to match the zoning of their existing facility across the road at 20 Jubilee Avenue.

It is intended that a B7 zoning on 15 Jubilee Avenue would allow Blackmores to development (with DA approval) an office facility to supplement their existing office uses on the site.

The Transport Planning Partnership Pty Ltd (TPPP) has been engaged by Blackmores to undertake a traffic assessment of the Planning Proposal to rezone 15 Jubilee Avenue.

In preparing the traffic impact assessment consideration has been given to the following development scenarios for the site:

- Predominately office use as envisaged by Blackmores; and
- Other permissible B7 land uses with high traffic generating potential.

The purpose of the above considerations is to assessment the traffic implications of both the likely uses for the site along with other potential implications that could be associated with the change in permissible land uses resulting from a change to the site's zoning from IN2 to B7.

In addition to the type of land uses, the assessment presented herein has considered the traffic implications associated with an increase in the permissible floor space on the site from an FSR of 1.0:1 to 1.5:1.

The findings of the traffic assessment are presented in this report.

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

- an inspection of the site and its surrounds
- traffic movement surveys undertaken 30 June 2016
- Pittwater Local Environmental Plan (2011)
- Pittwater Development Control Plan (2011)
- Warriewood Roads Master Plan 2013
- Warriewood Valley Section 94 Contributions Plan (plan No. 15, amendment No. 16 Revision No. 1)
- RMS Guide to Traffic Generating Developments (2002)
- RMS technical direction TDT 2013/04a Updated Traffic Surveys (2013)
- other documents and data as referenced in this report.

## 2 EXISTING CONDITIONS

### 2.1 Site Location and Conditions

The location of the proposed rezoning site at 15 Jubilee Avenue, Warriewood is shown in Figure 1. As shown in Figure 1 the site is located directly adjacent to the existing Blackmores facility at 20 Jubilee Avenue.

**Figure 1 Site Location**



Source: SIX Maps (modified by TTPP)

15 Jubilee Avenue has a single road frontage to the southern side of Jubilee Avenue extending 101 metres. A concrete footpath extends from the Site's eastern boundary and along the Site's frontage to the intersection with Ponderosa Parade.

The Site, which is vacant, has no formal vehicle access driveway although a wire fence gate with an opening capable of accommodating a vehicle is located approximately mid-way along the site boundary fronting to Jubilee Avenue.

Along the Site's frontage to Jubilee Avenue on street parking is not permitted except for an indented bay providing on street parking for some 4 vehicles.

### 2.2 Warriewood Valley Roads Master Plan and Section 94 Contributions Plan

The Site is located within the area defined by Pittwater Council as the *Warriewood Valley Urban Land Release Area*.

The Warriewood Valley Urban Land Release project was announced in 1997 and identified land for release for residential purposes and industrial/commercial land with associated community facilities and infrastructure.

The aim of the Warriewood Urban Release Area project is to establish a coordinated framework for integrated development to occur in the valley. The project is supported by a range of technical and policy documents which set out the principles and funding arrangements for development.

These documents include:

- Pittwater DCP;
- Warriewood Valley Roads Master Plan (2013 Review); and
- Warriewood Valley Section 94 Contributions Plan.

The Warriewood Valley Roads Master Plan is intended to be a checklist for developers as to the technical requirements for road and traffic measures required with the Valley. The document sets out road cross sections, traffic calming and management measures along with pedestrian, cyclist and parking facilities for the various types of roads.

Within the Warriewood Valley Roads Master Plan, Jubilee Avenue is defined as a “**Collector Street**”.

Under the Plan a Collector Street is to have the following characteristics (extract from the Plan):

Collector Street cross section guidelines:

- Minimum two traffic lanes plus parking bays on both sides of carriageway
- Minimum one on street visitor parking space per two dwellings to be provided
- Kerb extensions between parking bays to be of minimum size to allow large trees to be planted (minimum 5.0 metres length along edge of traffic lane)
- Allow for provision of bus shelter.
- No more than 8 parallel parking spaces to be provided between successive kerb extensions
- Minimum 1.0 m to be maintained between carriageway and cycleways/footpaths except at bus stops where footpath should be directly adjacent to kerb
- Bus stops on either side of carriageway to be staggered so that they are not directly opposite
- Bicycle symbols to be painted on carriageway adjacent to gutter at 100 metre spacings
- Footpaths/Shared paths as per Cycle Plan

Other characteristics of Collector Streets are:

- Traffic Volume 5,000 vehicles per day – approximate upper limit
- Design Speed 50 km/h
- Speed Limit 50 km/h
- Traffic Lane Width 3.7 m
- Cycle Lane Width bicycles share traffic lane
- Parking Lane Width = 2.0 m
- Bus Bay Width = 3.0 m
- Footpath Width = 2.1m shared footpath/cycleway both sides of carriageway
- Road Reserve Width = 20m minimum

Typical road plan and cross sections for Collector Roads as specified in the Warriewood Valley Roads Master Plan are reproduced in Appendix A.

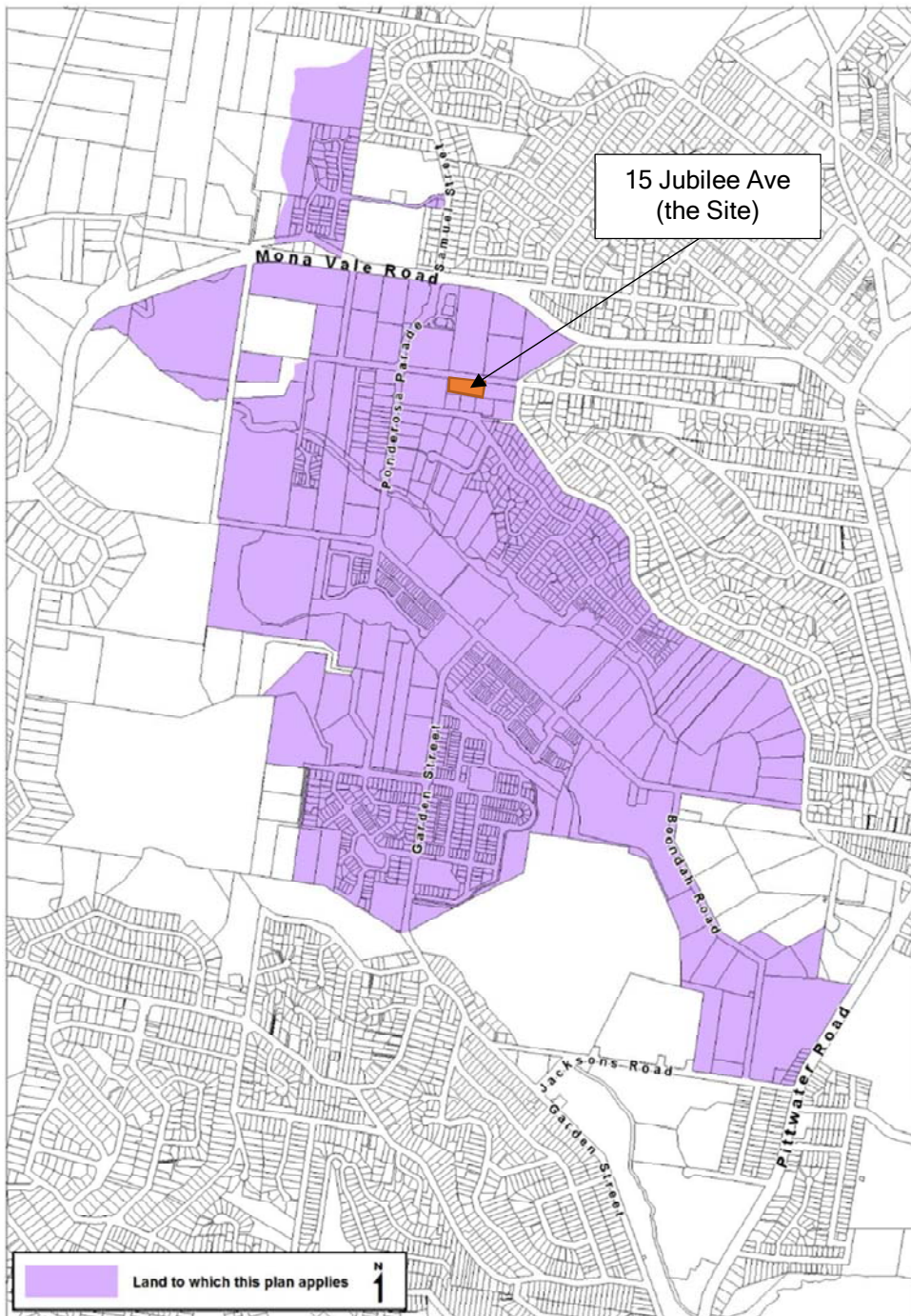


The Warriewood Valley Section 94 Contributions Plan establishes the nexus and means of calculating contributions for identified future works including:

- traffic and transport works; and
- pedestrian and cycleway network works.

Figure 2 shows the land to which the Section 94 Plan applies and includes the proposed rezoning site at 15 Jubilee Avenue. Details of the Section 94 works are set out in Appendix B.

**Figure 2 Land to Which the Warriewood Valley Section 94 Plan Applies**



Source: Pittwater Council Warriewood Valley Section 94 Contributions Plan

As the proposed rezoning site at 15 Jubilee Avenue is located within the Warriewood Valley Section 94 area, development of the site would be expected to contribute to Section 94 works as prescribed in the Plan.

Contributions rates for Section 94 works are determined utilising trip (ie. traffic) generation rates for specific development forecast in the Roads and Maritime Services (RMS) *Guide for Traffic Generating Development*. Contributions are based upon the daily traffic generation rate of a standard detached residential dwelling.

For industrial / commercial development, the Section 94 Plan specifies the term "Equivalent Dwelling" which enables industrial and commercial development traffic generation to be converted to an Equivalent Dwelling.

The Section 94 rates are:

- Standard Residential Dwelling = 9.0 vehicles / day / dwelling
- Commercial = 5.3 vehicles / day / 100m<sup>2</sup>
- Industrial = 4.6 vehicles / day / 100m<sup>2</sup>

With regard to the proposed rezoning application of 15 Jubilee Avenue, it is noted that there is currently in place a mechanism to calculate and collect funding for identified future works with the Warriewood Valley for both the existing and proposed future zoning of the Site.

Furthermore, the assessment presented herein considers the implications of the potential Site development on the ability to implement the:

- characteristics of a Collector Street and thus be consistent with the aims of the Warriewood Valley Roads Master Plan; and
- specific road, pedestrian and cyclist works identified in the Section 94 Contributions Plan.

## 2.3 Surrounding Road Network Operation

In order to determine the existing operation of the surrounding road network, peak period traffic surveys were undertaken at the intersection of Ponderosa Parade and Jubilee Avenue on Thursday 30 June 2016.

The results of the traffic survey are shown in Figure 3.

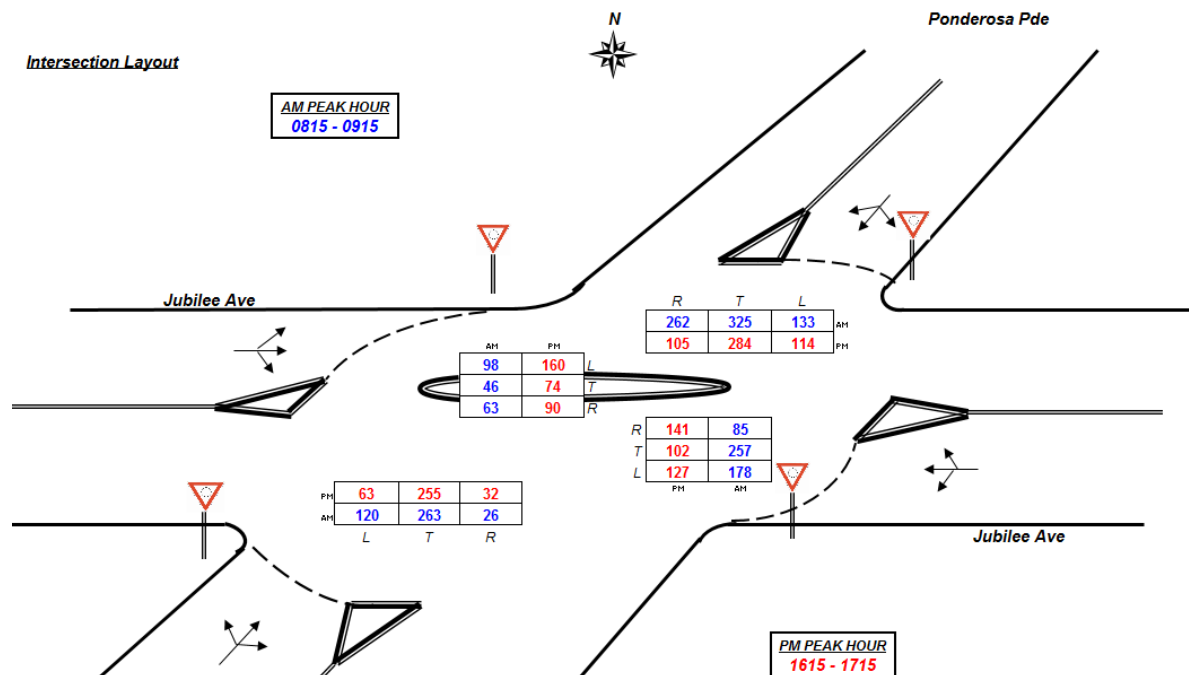
The traffic surveys indicate that Jubilee Avenue (east of Ponderosa Parade) carries approximately:

- AM Peak Hour: 725 vehicles per hour (two way)
- PM Peak Hour: 590 vehicles per hour (two way)

These surveyed traffic flows are consistent with the daily traffic flow characteristics for a "Collector Street" as set out in the *Warriewood Valley Roads Master Plan (2013 Review)*.



Figure 3 Surveyed Traffic Flows (June 2016)



The operation of the Ponderosa Parade / Jubilee Avenue roundabout intersection has been assessed using SIDRA Network 7, a computer based modelling package which calculates intersection performance. Intersection configurations were sourced from site inspections and aerial photography and utilised surveyed peak period traffic flows as presented in Figure 3.

The SIDRA models were validated to the conditions observed during the surveys.

SIDRA utilises standard RMS criteria, typically referred to as "Level of Service". The description of Level of Service indicators are summarised in Table 1.

Table 1 Level of Service Criteria for Intersections

Level of Service	Average Delay (seconds per vehicle)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	Less than 14	good operation	good operation
B	15 to 28	good with acceptable delays and spare capacity	acceptable delays and spare capacity
C	29 to 42	satisfactory	satisfactory, but accident study required
D	43 to 56	operating near capacity	near capacity and accident study required
E	57 to 70	at capacity At signals, incidents will cause excessive delays.	at capacity, requires other control mode
F	Greater than 71	unsatisfactory with excessive queuing	unsatisfactory with excessive queuing; requires other control mode

Source: RMS Guide to Traffic Generating Developments, 2002

The results of the SIDRA for the existing conditions are presented in Table 2.

**Table 2 Ponderosa Parade / Jubilee Avenue Roundabout – Existing Peak Period Operation**

	AM Peak Hour	PM Peak Hour
Level of Service (LoS)	B	A
Degree of Saturation (DoS)	0.85	0.50
Average Vehicle Delay (seconds / vehicle)	28	12
Maximum Queue Length (m) 95 <sup>th</sup> percentile	97	27

The SIDRA analysis indicates that the Ponderosa Parade / Jubilee Avenue intersection is currently operating satisfactorily as a single lane roundabout with good levels of service and spare intersection capacity.

### 3 DESCRIPTION OF REZONING PROPOSAL

As described above, it is proposed that the existing IN2 Light Industrial zoning be changed to a B7 Business Park zoning in order to accommodate "office" uses on the site at 15 Jubilee Avenue.

Blackmores who owns the site, is seeking to have the site rezoned to B7 Business Park to allow the site to accommodate office uses which would be ancillary the existing Blackmores facility across the road at 20 Jubilee Avenue.

It is intended that a B7 zoning on 15 Jubilee Avenue would allow Blackmores to development (with DA approval) an office facility to supplement their existing office uses on the site.

Urban design concept plans have been prepared for Blackmores by WMK Architecture (dated 11 August 2016). These plans have been developed with the purpose of demonstrating how the potential uses and floor space ratios could be accommodated on the site.

The urban design concepts show the following features:

- Vehicle access via a single two way driveway at Jubilee Avenue;
- Driveway to be located within the vicinity of the existing property gate (vehicle access);
- Basement car parking facilities;
- Pedestrian access to the building separated from vehicle access; and
- On site loading dock facility located at the rear of the site.

Effectively the features described above indicate that the building, car parking and loading dock facilities can be provided on site within the Site's existing boundaries.

## 4 TRAFFIC IMPACT ASSESSMENT OF REZONING PROPOSAL

This section of the report presents the findings of the traffic assessment undertaken for the proposed rezoning of 15 Jubilee Avenue, Warriewood.

In order to obtain a relative appreciation of the traffic generation potential of the different Precinct zoning a comparative analysis of potential traffic generation has also been undertaken.

### 4.1 Potential Land Uses of Rezoned Site and Traffic Generation Comparison

The Site at 15 Jubilee Avenue is currently vacant and generating no vehicle traffic to and from the surrounding road network. As such any development of the Site will increase the traffic demands to the road network.

It is the additional traffic flows generated by development of sites such as 15 Jubilee Avenue that the Warriewood Valley Roads Mater Plan and associated Section 94 Plan anticipated and has planned for with the identification of road works and funding strategies.

In this regard the potential traffic generation of the site at 15 Jubilee Avenue zoned as IN2 has been considered. The impacts of the proposed rezoning of the Site to B7 is therefore the net change in traffic generation potential of the likely uses (ie. office) and also other potential site uses.

Table 3 provides a summary of the permissible land uses for each of the IN2 and B7 zonings and relevant RMS traffic generation rates for these uses for the scenario where the site is developed with a Floor Space Ratio (FSR) of 1:1.

The comparative analysis indicates that the potential traffic generation of the Site if developed under its current IN2 zoning could vary substantially depending upon the type of permissible land uses developed on the site.

Similarly, there would be potential variations in potential traffic generation for the proposed B7 zoning.

The variations of traffic generation are summarised to be:

- Existing IN2 zoning = 23 – 410 vehicles per hour
- Proposed B7 zoning = 42 – 91 vehicles per hour

The development of the site for predominately office uses would be comparable with developing the site under current zoning for the permissible uses of a:

- Hardware / building supplies facility;
- Plant Nursey; or
- Take away food and beverage / restaurant.

The comparative assessment presented in Table 3 highlights the nett change in traffic generation potential of the site at its highest intensity land use would be negligible.

Table 3 Comparison of Traffic Generation Potential - IN2 versus B7 Land Uses (FSR 1:1) - Site Area = 4,555m<sup>2</sup>

Current LEP Controls IN2			Proposed Rezoning Controls B7		
Land Use	RMS Traffic Generation Rate veh/hr/100m <sup>2</sup>	Traffic Generation veh/hr	Land Use (in addition to those also permitted in IN2)	RMS Traffic Generation Rate veh/hr/100m <sup>2</sup>	Traffic Generation veh/hr
Warehouse / Distribution	0.5	23	Commercial (Office)	2.0	91
Factory	1.0	46	Business Park (GFLA)	1.1	45
Hardware / Building Supplies (GLFA)	2.5	102	Child Care Centre (Trips / child assume 60 / 90 children)	0.7	42
Recreational (Indoor) Facility (Gym)	9.0	410			
Road Transport Terminal	1.0	46			
Car Tyre Retail (rate per 100m <sup>2</sup> of Site Area)	1.0	46			
Vehicle Sales (rate per 100m <sup>2</sup> of Site Area)	0.7	32			
Plant Nursey	57+0.7/100m <sup>2</sup> site area	89			
Take Away Food & Drink GFA 50% of Site	5	114			

Furthermore, it is noted that an industrial / warehouse / distribution centre land use as would be permissible under the current IN 2 land use would potentially generate a significant portion of heavy vehicles movements. Development of the site for office uses would not generate such a significant volume of heavy vehicle trips.

In summary the comparative assessment indicates that with regard to traffic generation potential of a to be developed site, both current and proposed land use zoning control will generate additional traffic within the surrounding road network. The variations in the volume of traffic generate will be similar for each of the land use zones.

As such the development potential of the site as either a IN2 or B7 zone has been considered within the future road network planning as identified in the Warriewood Valley Roads Master Plan.

Notwithstanding the above, any future development of the site will need to be considered through a development application process whereby the proposed land uses are determined and the implications assessed, including the impact of site generated traffic on the surrounding road network.

## 4.2 Traffic Impact Assessment of Potential "Office" Uses

As the likely future use of the Site with a B7 zoning is as an office facility the traffic generation implications of such a development use has been assessed.

It is noted that of the additional uses permitted by a B7 zoning compared to the IN2 zoning, office uses has the higher traffic generation potential.

Two development scenarios have been considered, namely:

- Office land use with a FSR = 1.0 : 1
- Office land use with a FSR = 1.5 : 1

RMS guidelines<sup>1</sup> estimate traffic generation potential for office land use to be 2.0 vehicle trips per peak hour per 100m<sup>2</sup> GFA.

This rate has been applied to the two FSR scenarios as set out in Table 4.

**Table 4 Peak Hour Traffic Generation Potential for Office Land Use Scenarios**

	FSR 1.0:1	FSR 1.5:1
GFA (m <sup>2</sup> )	4,555	6,833
RMS Traffic Generation Rate (vehicles / hour / 100m <sup>2</sup> )	2.0	2.0
Traffic Generation (vehicles / hour)	91	137

Utilising the same traffic distributions as surveyed for the existing Blackmores facility, the potential traffic generation of the 1.5:1 office land use scenario was assigned to the surrounding road network and re-assessed using the SIDRA intersection analysis modelling tool.

<sup>1</sup> RMS (2002) Guide to Traffic Generating Developments.



The results of the SIDRA analysis for the 1.5:1 scenario are presented in Table 5.

**Table 5 Ponderosa Parade / Jubilee Avenue Roundabout – Existing Peak Period Operation**

	AM Peak Hour		PM Peak Hour	
	Existing	With Office Development (1.5:1)	Existing	With Office Development (1.5:1)
Level of Service (LoS)	B	C	A	A
Degree of Saturation (DoS)	0.85	0.87	0.50	0.59
Average Vehicle Delay (seconds / vehicle)	28	31	12	13
Maximum Queue Length (m) 95 <sup>th</sup> percentile	97	109	27	37

The SIDRA analysis indicates that the Ponderosa Parade / Jubilee Avenue intersection would continue to operate satisfactorily as a single lane roundabout with good levels of service and spare intersection capacity with the development of the Site with office uses at a FSR of 1.5:1.

The analysis indicates that the proposed rezoning to allow B7 land use including offices would not trigger the need for upgrades to the Ponderosa Parade / Jubilee Avenue intersection and that rezoning of the Site would be consistent with the road network capacity as envisaged in the Warriewood Valley Roads Master Plan.

### 4.3 Implications to Characteristics of Collector Street

As described in Section 2 of this report, the Warriewood Valley Roads Master Plan sets out certain design characteristics for Collector Streets such as Jubilee Avenue.

These characteristics include features such as lane widths, indented parking bays, on road cycle provisions and footpaths.

The Collector Street characteristics can be seen only the northern side of Jubilee Avenue between the Blackmore facility and Ponderosa Parade where recent development has facilitated the implementation of the desired street characteristics.

Like these recent developments, the development of 15 Jubilee Avenue will facilitate further implementation of the Collector Street characteristics. The proposed rezoning would not restrict the implementation of these characteristics.

### 4.4 Vehicle Site Access

Jubilee Avenue at the Site has a straight road alignment which affords good sight lines for vehicles accessing or approaching the Site.

Thus safe intersection sight distances can be provided for a vehicle access at any point along the Site's frontage to Jubilee Avenue.

#### **4.5 Car Parking Provisions**

Car parking provisions for the development would need to be provided on site and in accordance with the Pittwater LEP / DCP controls for each proposed land use to ensure that sufficient car parking is provided and on street implication mitigated.

The Urban Concept Plan for the proposed rezoning indicates that sufficient car parking can be provided on site within a basement facility.

#### **4.6 Public Transport**

The potential development of the Site along with other sites in the Warriewood Valley Urban Release Area has the potential to increase the demand for public transport services, thus enabling the provision of viable additional and increased frequency of public transport services, namely bus routes.

The development concept would not prohibit the provision of future bus routes or bus stops along Jubilee Avenue or the Warriewood Valley Urban Release Area generally.

## 5 CONCLUSIONS

The assessment presented in this report has considered the potential traffic implications of the proposed rezoning application of the vacant site at 15 Jubilee Avenue, Warriewood.

In undertaking the assessment, consideration has been undertaken of the relative traffic implications of future potential development of the Site with the various land uses permissible under both the current IN2 zoning and proposed B7 zoning.

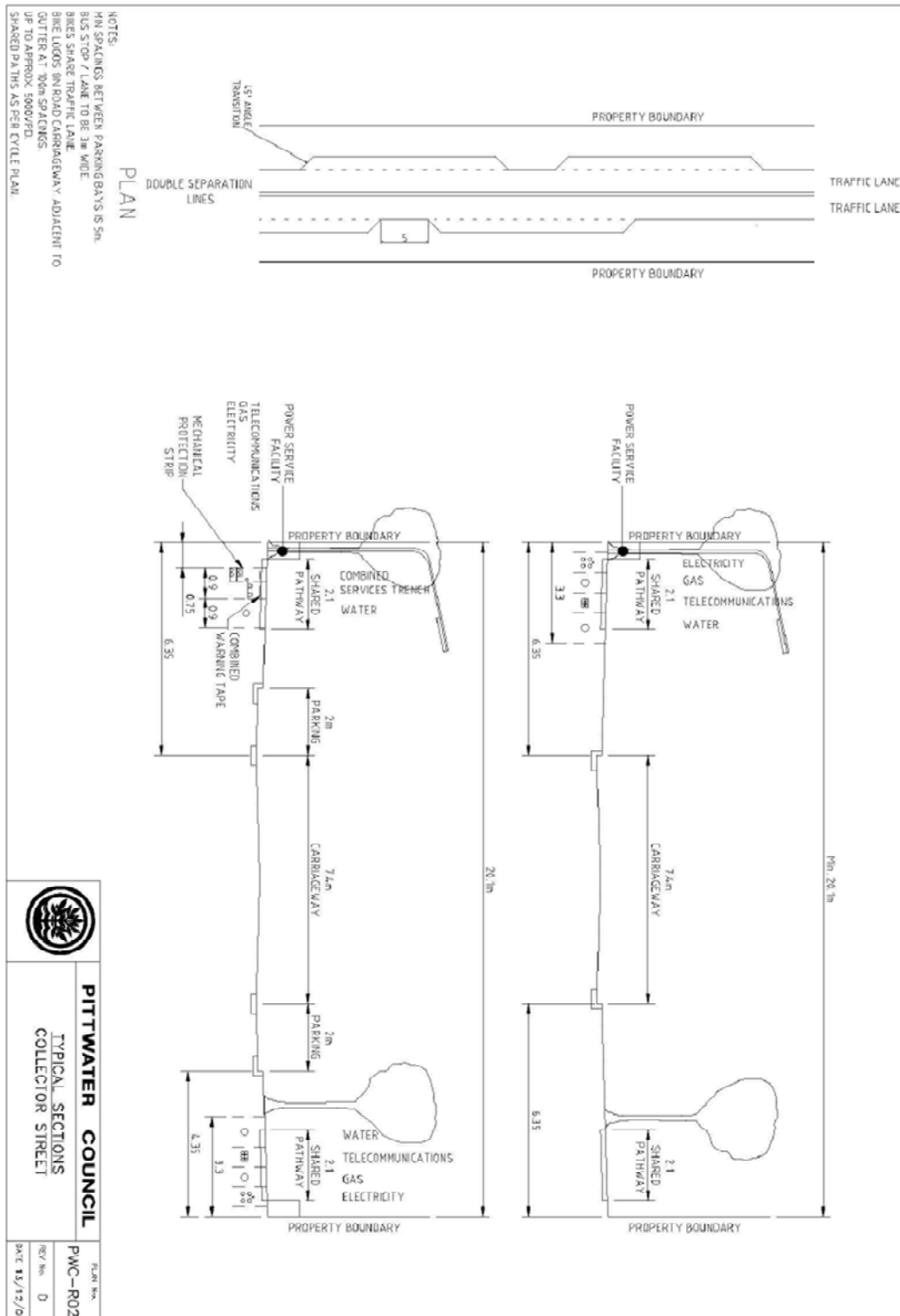
The traffic analysis has demonstrated that development of the Site with the proposed B7 zoning would not adversely affect the existing operation of the surrounding road network.

Furthermore the proposed B7 zoning would not restrict the implementation of future infrastructure provision as envisaged by the Warriewood Valley Roads Master Plan and associated Section 94 Plan.

# APPENDIX A COLLECTOR STREET DETAILS

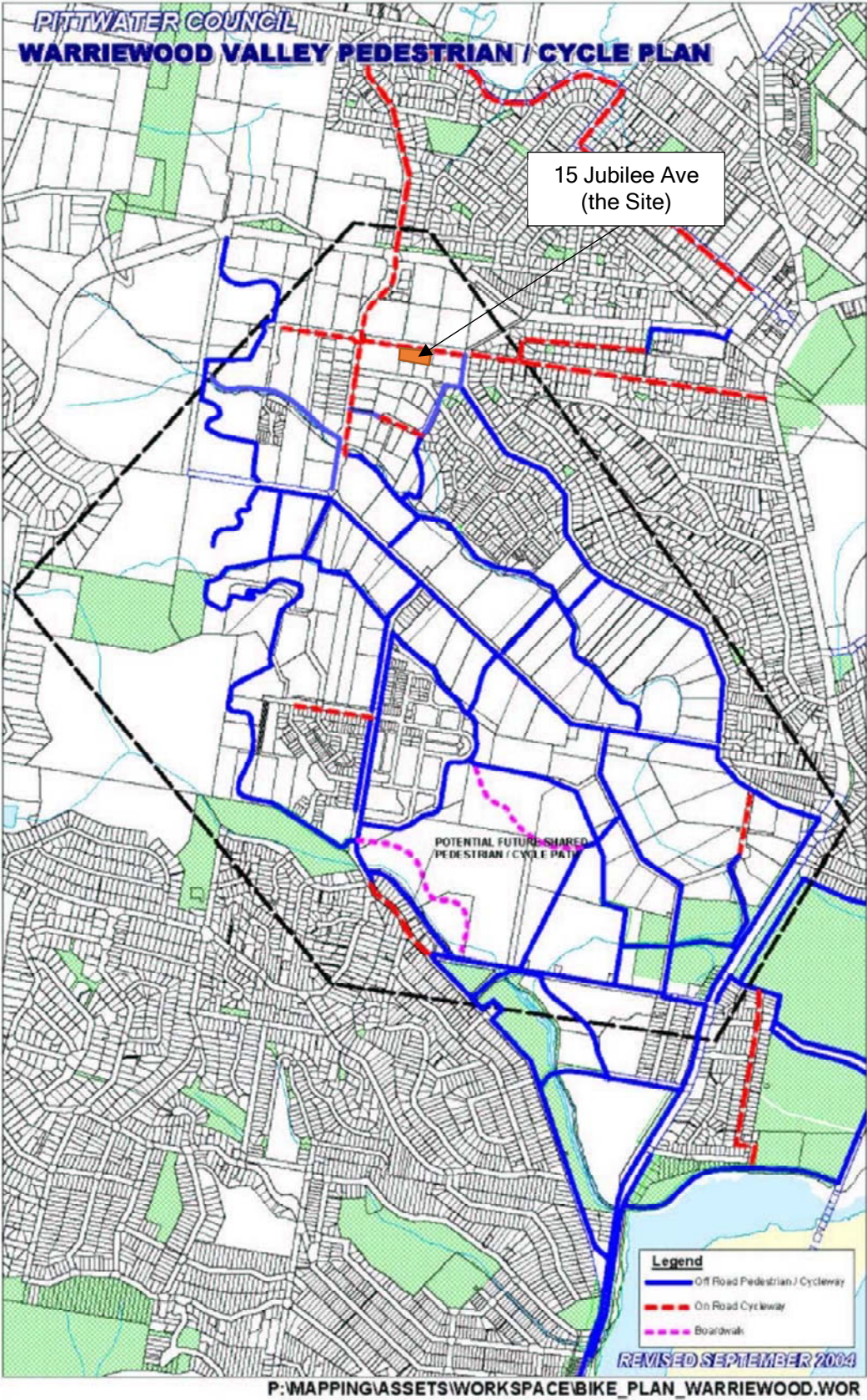
Extract from Pittwater Council Warriewood Valley Roads Master Plan (2013 Review)

## Typical Road Plans and Cross Sections Collector Streets



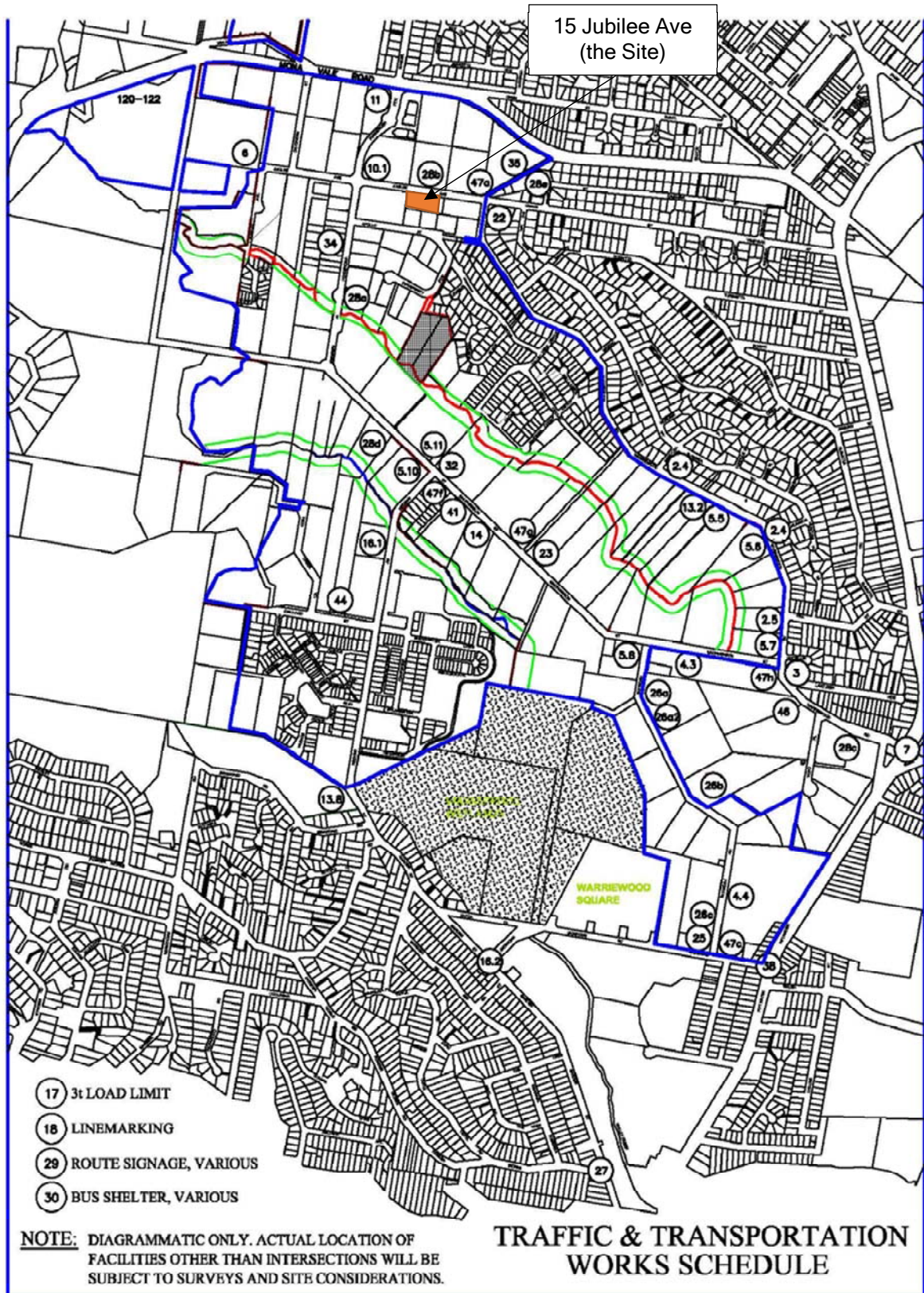


Cycling Routes





Roads Master Plan Drawing





## APPENDIX B    WARRIEWOOD VALLEY S94

Extracts from Pittwater Council Warriewood Valley Section 94 Contributions Plan (Plan No 15, Amendment No 16, Revision No 1).

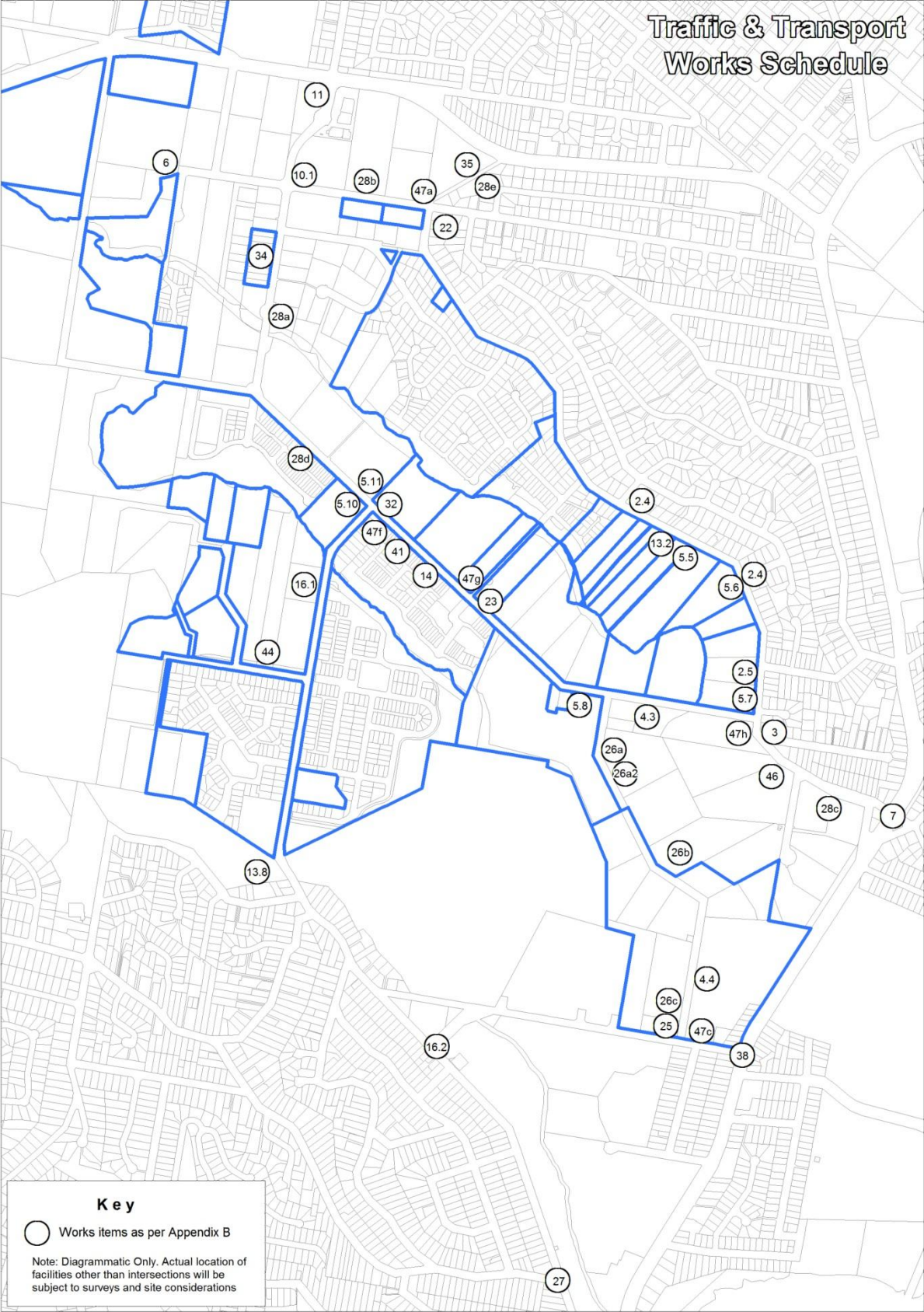
Road Works and Cyclist / Pedestrian Facilities

## Appendix B – Proposed Future Works Scheduled (2012/13 Dollars)

Element	Location /Code	Project	Expenditure
<b>Traffic &amp; Transport (to be read with Figure 10)</b>			
	2.4	Traffic calming Islands (Alameda/Manooka Place)	\$142,922
	2.5	Traffic calming Islands (Realignment of Hill St Intersection)	\$41,969
	3	Roundabout Construction, Underground Power and Service Adjustments	\$906,513
	4.3 - Design	Bridge and Culverts, Road Raising, Power and Utility Relocation (Stage 1 and Design MacPherson Street)	\$480,192
	4.3 - Stage 1	Bridge and Culverts, Road Raising, Power and Utility Relocation MacPherson St (Construction Stage 2)	\$5,089,880
	4.4	Culvert to Increase Capacity under Boondah Road	\$592,533
	5.5	Bus Bay and Shelter - Warriewood Road between Manooka Place and Alameda Way	\$30,000
	5.6	Bus Bay and Shelter - Warriewood Road at Alameda Way	\$30,000
	5.7	Bus Bay and Shelter - Warriewood Road at Macedon Place	\$30,000
	5.8	Bus Bay (x 2) and Shelter - MacPherson Street, Boondah Road	\$30,000
	5.10	Bus Bay and Shelter - Garden Street at MacPherson Street	\$30,000
	5.11	Bus Bay and Shelter - MacPherson Street (north side) at Garden Street	\$30,000
	6	Design and Construct New Median - Jubilee Ave	\$40,272
	7	Intersection Upgrade - Improve Left Turn and Produce 2 Right Turn Lanes into Pittwater Rd at Warriewood Rd	\$453,871
	10.1	Construct Traffic Islands and Roundabout - Jubilee Avenue / Ponderosa Parade (Stage 2)	\$40,564
	11	Construct Traffic lights and Intersection - Mona Vale Road / Ponderosa Parade	\$517,500
	13.2	Pedestrian refuge (Concrete) Warriewood Rd Between Manooka Place and Alameda Way	\$26,542
	13.8	Pedestrian Refuge (Small) - Garden Street at Mullet Creek	\$26,542
	14	Pedestrian Refuge (Small) - MacPherson Street Between Garden Street and Brands Lane	\$26,542
	16.1	Pedestrian Refuge (Small) - Garden Street at Fern Creek	\$26,452
	16.2	Intersection Major Upgrade - Garden Street and Jacksons Road	\$235,095

22	Roundabout Construction (New) - Jubilee Avenue and Warriewood Road	\$201,415
23	Roundabout - MacPherson Street and Brands Lane	\$61,370
25	Roundabout - Boondah Road and Jacksons Road	\$70,639
26a	Upgrade - Boondah Road from MacPherson Street to Approximately Chainage 300 - Eastern Side Only (Design and Q&S)	\$73,184
26a (2)	Upgrade - Boondah Road from MacPherson Street to Approximately Chainage 300 - Eastern Side Only (Construction)	\$993,736
26b	Upgrade - Boondah Road from Chainage 300 to Chainage 600 (Design and Construction)	\$1,530,000
26c	Upgrade - Boondah Road from Chainage 600 to Jacksons Road (Design and Construction)	\$1,985,361
27	Traffic Lights Upgrade and Parking Improvement - Cnr Garden St and Powderworks Rd	\$248,337
28A	Shared Paths - Ponderosa Pde, MacPherson St	\$173,420
28B	Shared Paths - Jubilee Ave, Ponderosa Pde to Warriewood Rd	\$106,720
28C	Shared Paths - Warriewood Rd, Vuko Pl to Pittwater Rd	\$86,710
28D	Shared Paths - MacPherson St, Forest to Garden	\$120,060
28E	Path - Foley St, Jubilee to Mona Vale Rd	\$34,155
32	Roundabout - MacPherson Street and Garden Street (including Undergrounding of Power)	\$960,795
34	Pavement Strengthening and Kerb and Guttering - Ponderosa Parade from Jubilee Ave to MacPherson Street (Western Side)	\$631,584
35	Pavement Correction and Strengthening - Foley Street	\$222,768
38	Intersection Upgrade - Jacksons Road and Pittwater Road	\$373,359
41	Road Upgrade Macpherson St (Garden St to Sector 8 and Garden St to Macpherson St to Fern Creek Eastern Side only. Undergrounding of Power included.	\$1,169,516
44	Central Median - Orchard Road, Garden Street to Fern Creek	\$129,355
46	Road Upgrade Including Undergrounding Power- Warriewood Road (MacPherson St to Vuko Place). Excludes Undergrounding Power.	\$332,577
47a	Splay Corner Purchase - Warriewood Road and Jubilee Avenue (3 Off)	\$180,000
47c	Splay Corner Purchase - Boondah Road and Jacksons Road (2 Off)	\$120,000
47f	Splay Corner Purchase - Garden Street and MacPherson Street	\$60,000
47g	Splay Corner Purchase - MacPherson Street and Brands Lane	\$60,000
47h	Splay Corner Purchase - MacPherson Street and Warriewood Road (1 Off)	\$140,000

**Figure 10 Traffic and Transport Works Schedule**





**Figure 13 Pedestrian and Cycle ways Works Program**

