PROPOSED RESIDENTIAL DEVELOPMENT 12 – 40 BONAR STREET AND 5 LOFTUS STREET, ARNCLIFFE

Assessment of Traffic and Parking Implications

September 2009

Reference 0918

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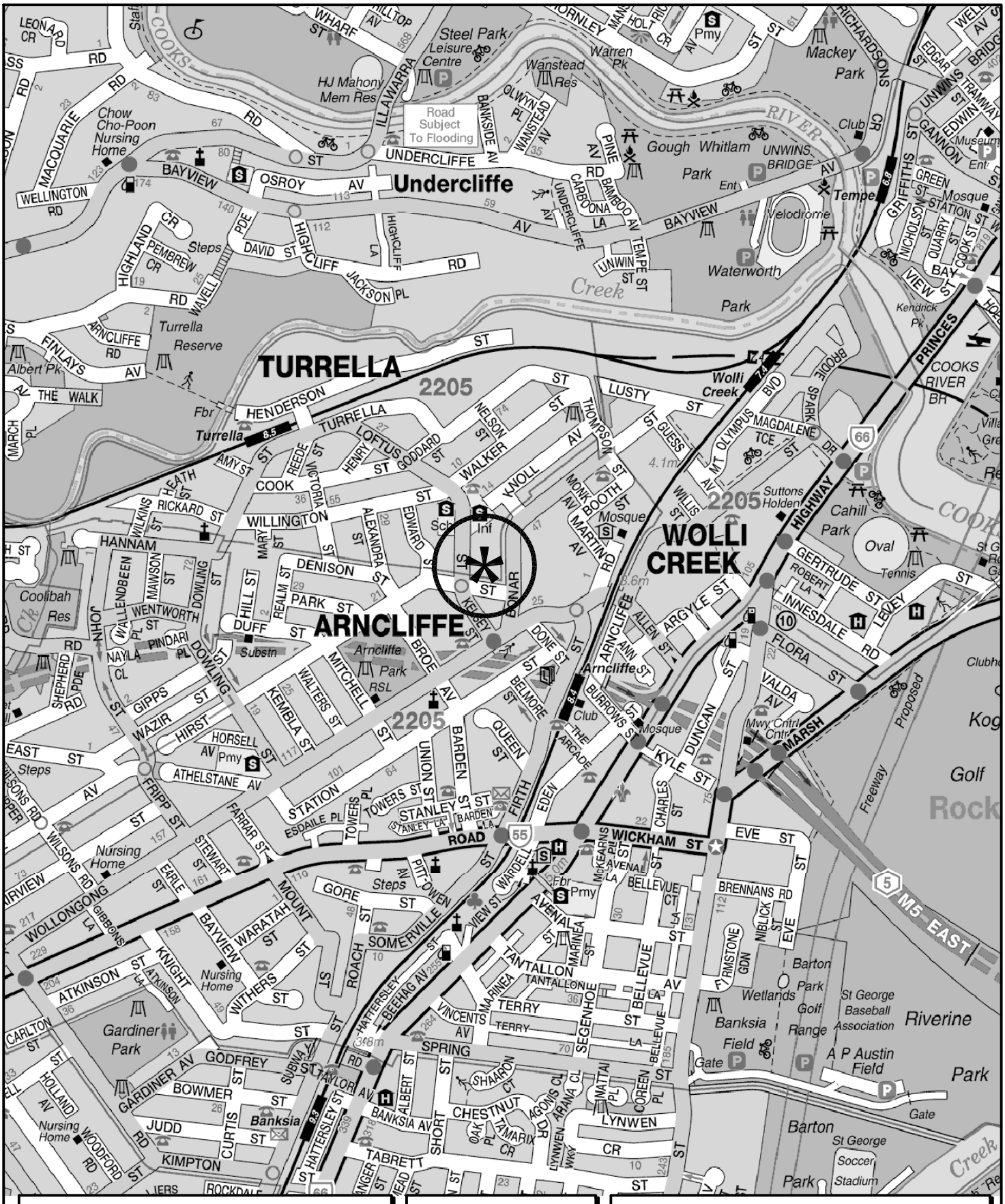
1. INTRODUCTION

This report has been prepared for Meriton Apartments to accompany a Development Application to Department of Planning for a proposed residential apartment development within the 'Bonar Street' precinct at Arncliffe (Figure 1).

Construction of the 'Wolli Creek' railway station on the Southern Railway Link has acted as the catalyst for redevelopment of the former industrial lands at North Arncliffe. The area immediately to the west of the Illawarra Line ('Bonar Street' precinct) also contains a significant 'pocket' of largely underutilised industrial lands which is surrounded by traditional residential dwellings, schools and small retail strip. A Masterplan has been prepared for redevelopment of this Precinct and potential redevelopment under the subsequent rezoning permits numerous residential apartment buildings with community, retail and commercial units being permitted along the ground level of buildings fronting onto Wollongong Road.

The proposed development scheme for the site at 12 – 40 Bonar Street and 5 Loftus Street in the western part of the precinct comprises 305 residential apartments with basement level carparking having vehicle accesses onto Bonar Street and Hirst Street.

The purpose of this report is to provide an assessment of the potential traffic and parking implications of the proposed development scheme



LEGEND

LOCATION

FIG 1

2. PROPOSED DEVELOPMENT

2.1 SITE, CONTEXT AND EXISTING USE

The site (Figure 2) which is located in the western part of the Bonar Street Precinct, is an irregular shaped consolidation of lots occupying a total area of some 16,326m². The site has frontages to Bonar Street, Hirst Street and Loftus Street and is bounded to the north by a school.

The immediate area comprises industrial uses surrounded by largely older style single residential dwellings with some new medium density complexes. Schools are located on either side of Loftus Street and a Mosque/School is located at the eastern end of Wollongong Road which also has a small 'strip' of shops. The area to the east of the railway line comprises some remaining industrial/service uses and the new North Arncliffe mixed use precinct which is developing around the Wolli Creek mixed use precinct which is developing around the Railway Station.

The development site and is currently occupied by a number of large factory buildings.

2.2 PROPOSED DEVELOPMENT

It is proposed to demolish the existing structures and excavate the site to enable the construction of four new buildings with basement carparking. The proposed development will comprise:

5 x studio apartments
37 x one-bedroom apartments
239 x two-bedroom apartments
24 x three-bedroom apartments
Total 305 apartments

LEGEND

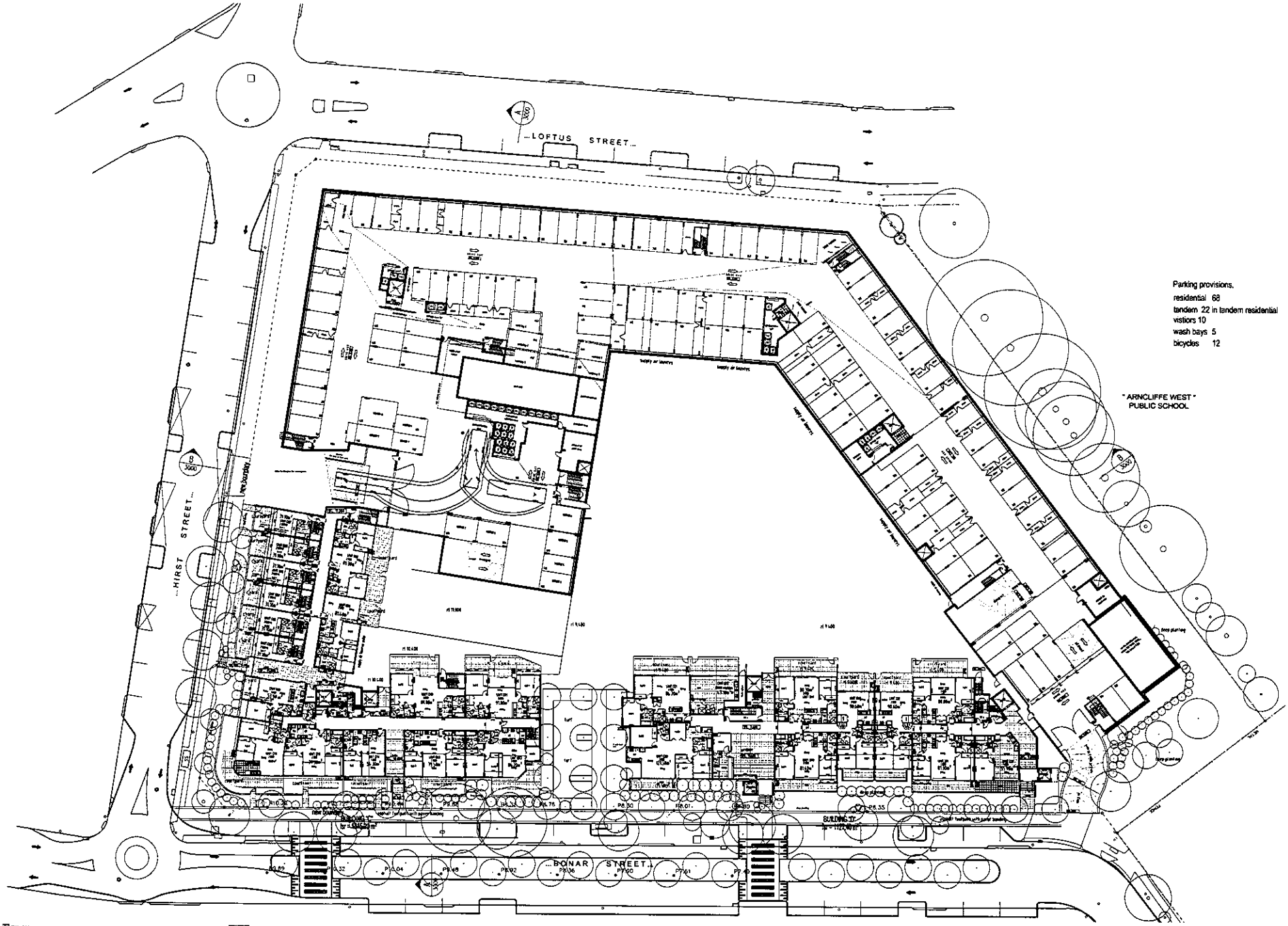
N

SITE

FIG 2

The four buildings will have separate lobbies and will benefit from common open space areas together with a pool and small gym. Integrated basement car parking will provide a total of 443 spaces with vehicle access connections to Bonar Street and Hirst Street.

Architectural details of the development scheme are shown on the plans prepared by Meriton Apartments, which accompany the Development Application and are reproduced in part overleaf.



Parking provisions.
residential 68
tandem 22 in tandem residential
vistiors 10
wash bays 5
bicycles 12

MERITON APARTMENTS PTY. LTD.
Level 11, 528 Kent Street,
Sydney, NSW 2000

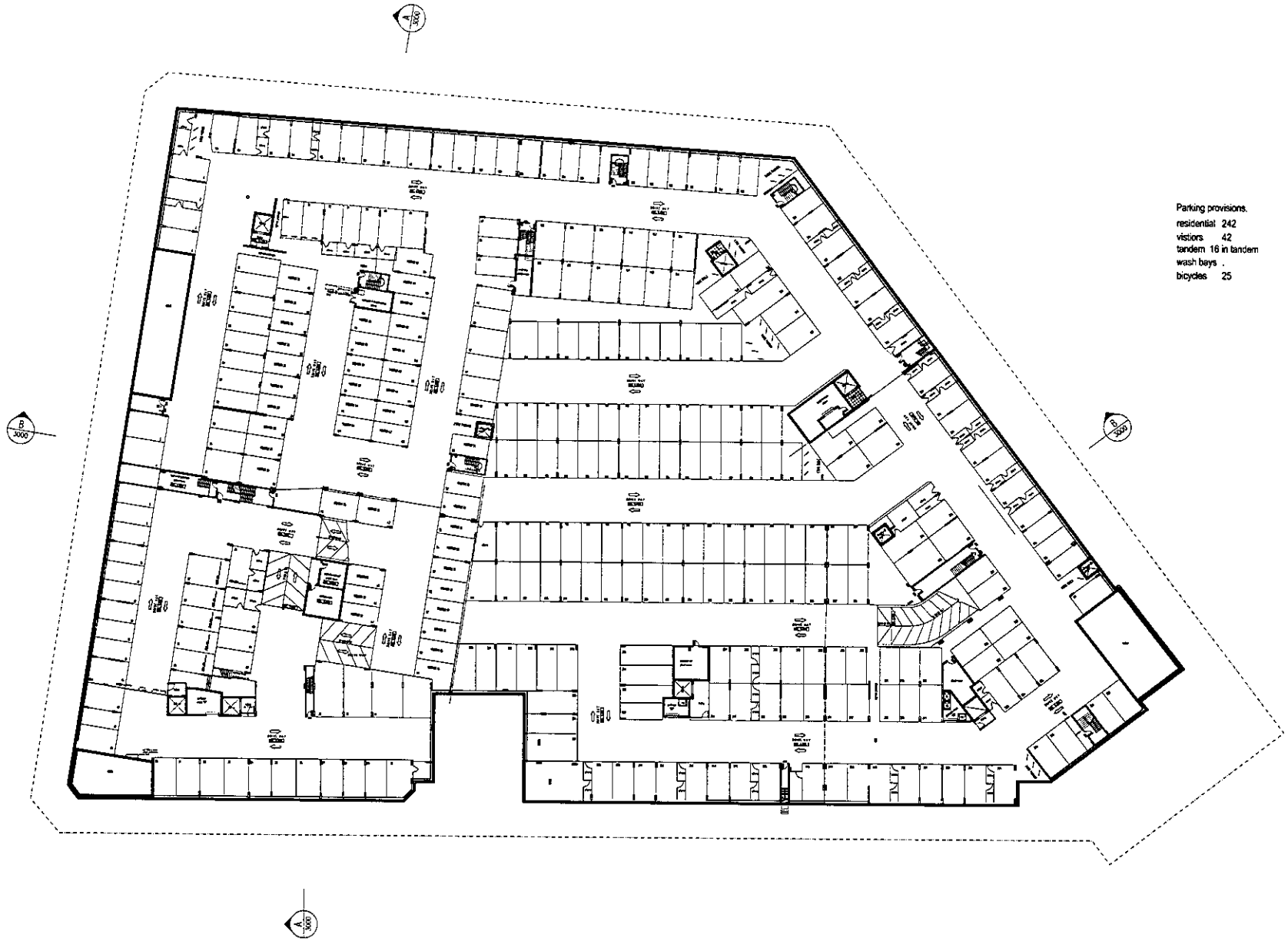
LOFTUS RESIDENTIAL DEVELOPMENT

LOFTUS STREET.

Ground overall

1002

A



Parking provisions.
residential 242
vistiors 42
tandem 16 in tandem
wash bays .
bicycles 25

MERITON APARTMENTS PTY. LTD.
Level 11, 528 Kent Street,
Sydney, NSW 2000
Tel (02) 9287 2888 Fax (02) 9287 2777

LOFTUS RESIDENTIAL DEVELOPMENT

LOFTUS STREET,

Parking level 1
overall

1001

A

3. ROAD NETWORK AND TRAFFIC CONDITIONS

3.1 ROAD NETWORK

The existing road network serving the site (Figure 3) comprises:

- the *M5 East* Motorway which passes in tunnel beneath Arncliffe with portals located to the east of West Botany Street and an off-load ramp to the Princes Highway

- the *Princes Highway* arterial route which crosses Cooks River just to the east of Arncliffe

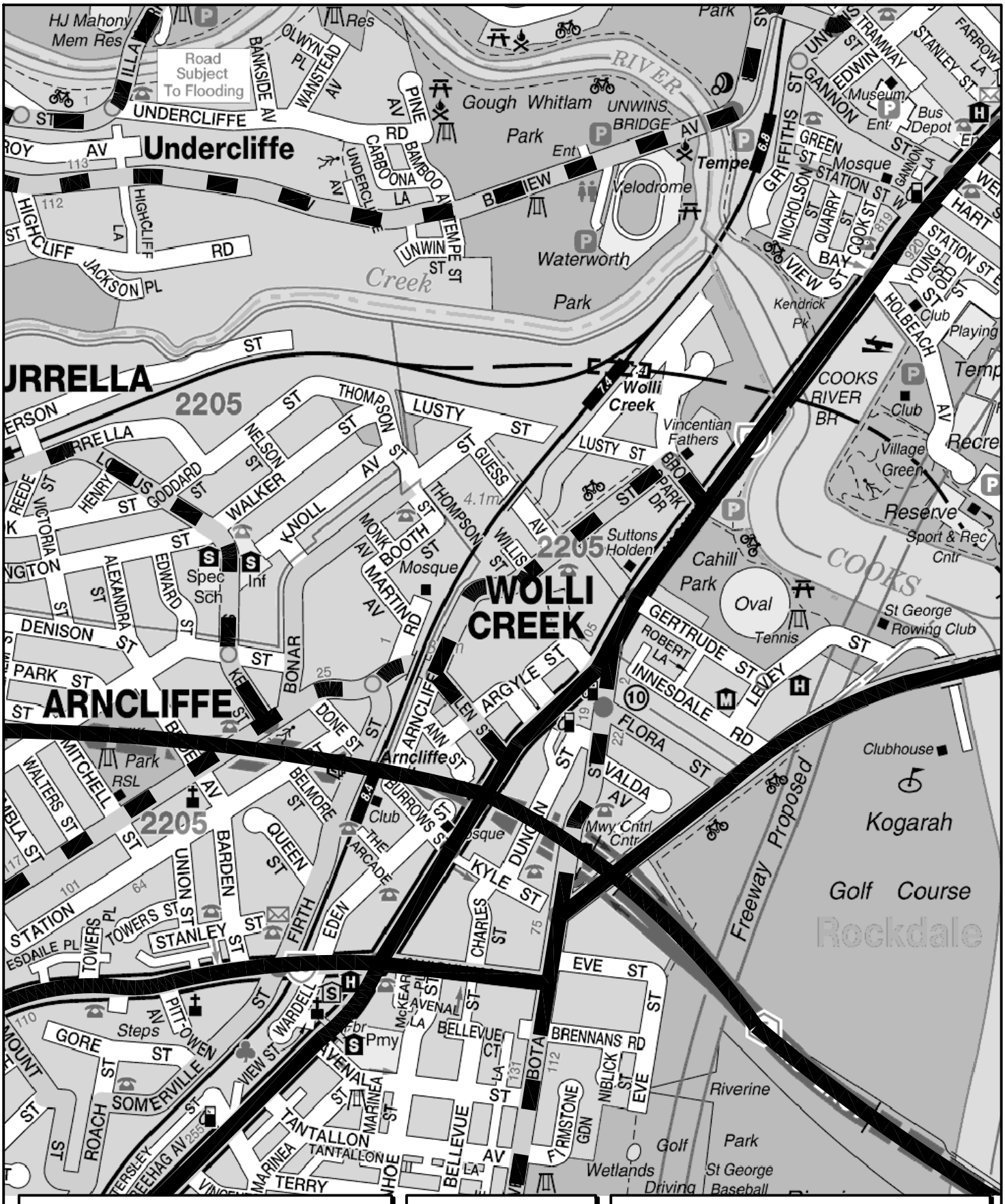
- the State Road and arterial route of *Forest Road, Wickham Street and Marsh Street*

- the Regional Road and sub-arterial route of *West Botany Street*

- the Regional Road and collector route of *Wollongong Road, Arncliffe Street and Brodie Spark Drive* between *Forest Road and Princes Highway*

- the minor collector road route linking through Turrella and connecting to *Wollongong Road via Kelsey Street/Loftus Street etc.*

The access road system is constrained to some extent by the railway lines as well as the Cooks River and Wolli Creek systems. The eastern end of Wollongong Road together with Martin Avenue and Booth Street, along the site frontage, acts as a 'local access' route.



LEGEND

- ARTERIAL
- SUB-ARTERIAL
- COLLECTOR

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ROAD NETWORK

FIG 3

3.2 TRAFFIC CONTROLS

The existing traffic controls which have been applied to the road system in the vicinity of the site (Figure 4) comprise:

* the traffic signals along the Princes Highway at the Lusty Street, Gertrude Street, West Botany Street, M5 Ramp, Burrows Street and Forest Road intersections

* the roundabouts at the Allen Street/Arncliffe Street and Wollongong Road/Firth Street intersections

* the traffic signals at the Wollongong Road/Kelsey Street intersection

* the roundabouts at the Kelsey Street/Hirst Street/Loftus Street and Bonar Street/Hirst Street intersections

* the 'LIGHT TRAFFIC' restrictions on numerous roads to the west of the railway line including Martin Avenue and Booth Street

* the marked footcrossing on Loftus Street at the schools

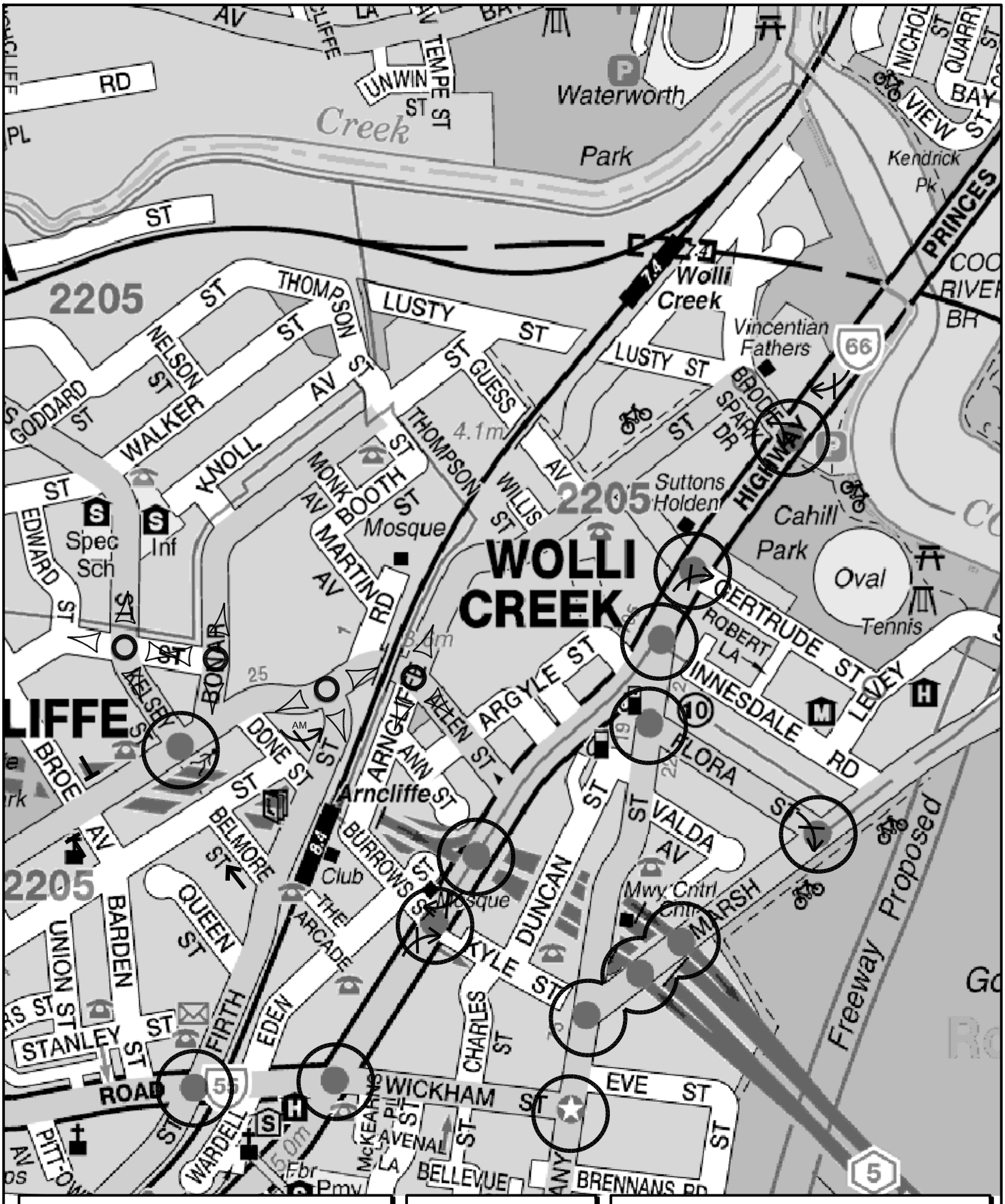
* the 60 kmph speed restrictions on the major roads and 50 kmph restriction on the local roads with a 40 kmph (school times) restriction on Loftus Street

* the LATM measures installed in the northern section of Bonar Street.

3.3 TRAFFIC CONDITIONS

An indication of the existing traffic conditions on the road system in the vicinity of the site is provided by data[1] published by the RTA and traffic surveys undertaken as part of this assessment.

[1] *Traffic Volumes for Sydney Region*
Roads and Traffic Authority of NSW



LEGEND

- TRAFFIC SIGNAL CONTROL
- ROUNDABOUT
- RESTRICTED TURNING MOVEMENT

TRAFFIC CONTROLS

FIG 4

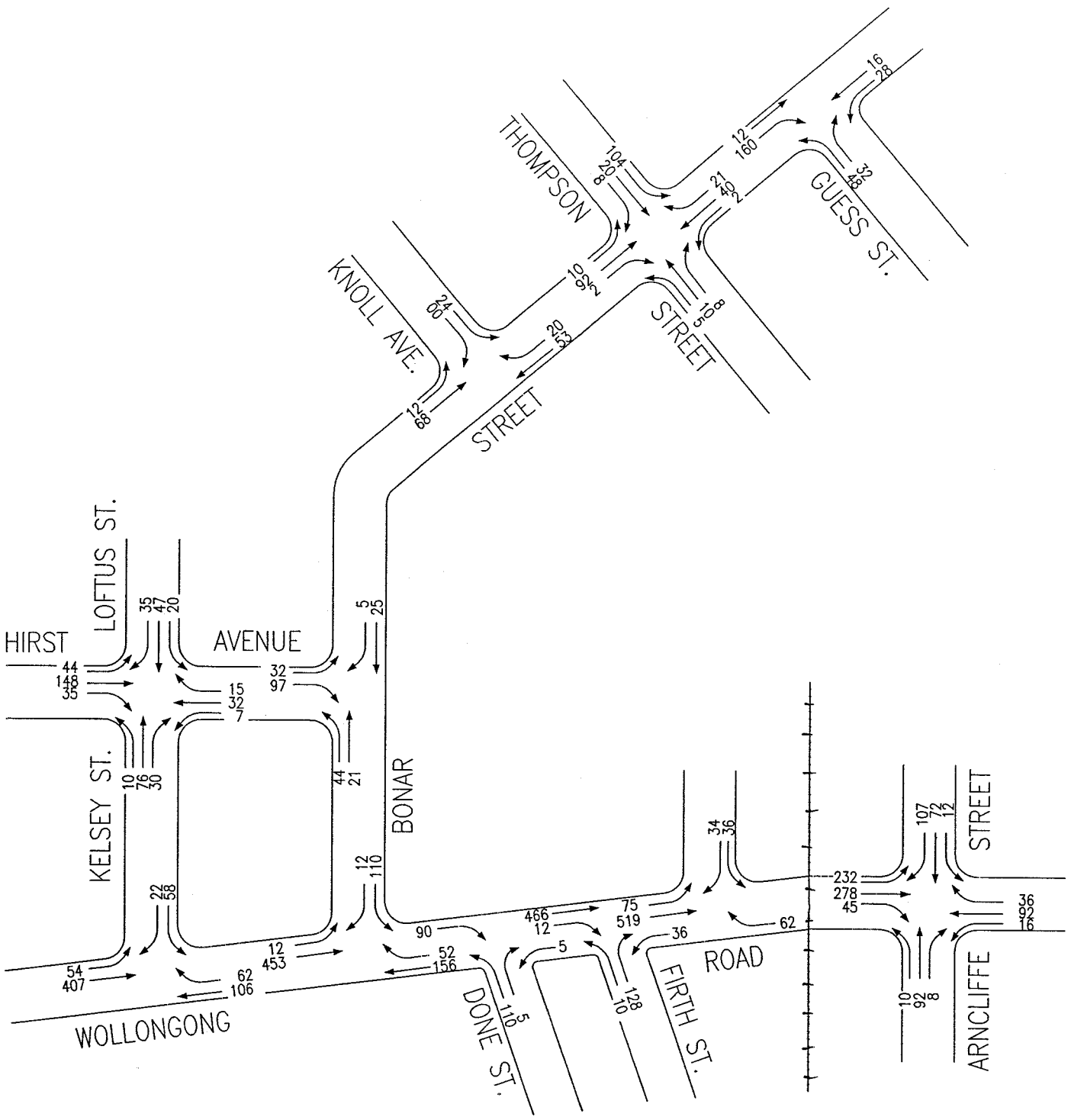
The data provided by the RTA is expressed in terms of Annual Average Daily Traffic (AADT) and the latest recordings in the vicinity of the site are provided in the following:

	AADT
Princes Highway S of Allen Street	37,901
Forest Road W of Princes Highway	20,186
Wollongong Road E of Wolli Creek Road	7,535

Traffic surveys have been undertaken at intersections in the Bonar Street area during the morning and afternoon peak periods. The results of those surveys are provided in Figures 5a and 5b.

The operational performance of the Bonar Street precinct access intersections under the prevailing peak traffic demands has been assessed using the SIDRA program. The results of that assessment indicating a satisfactory situation are provided in the following while criteria for interpretation of the modelling output is provided overleaf:

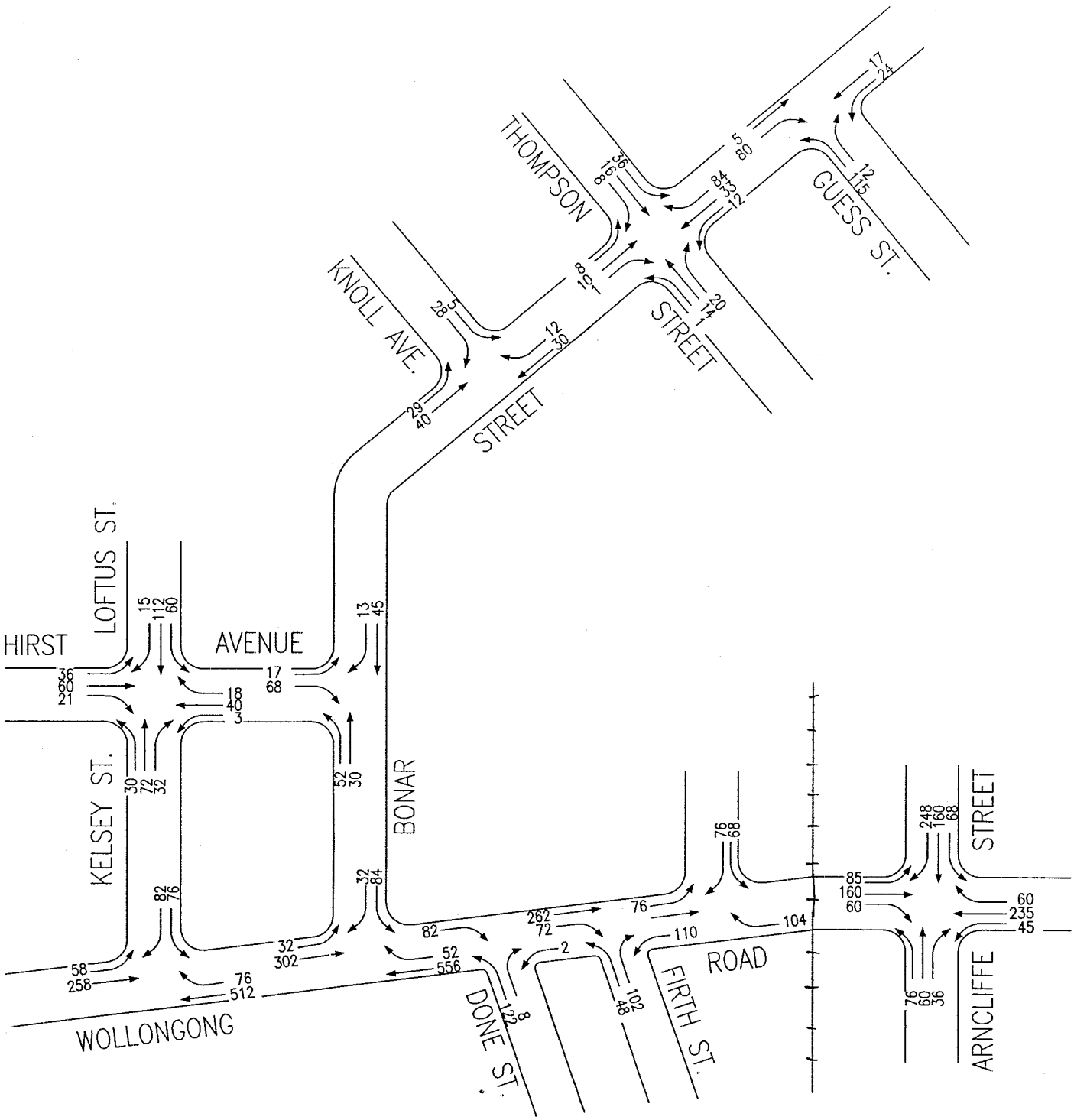
	AM			**PM**		
	LOS	**DS**	**AVD**	**LOS**	**DS**	**AVD**
Wollongong Road/Kelsey Street	A	0.307	14.2	A	0.396	12.7
Wollongong Road/Bonar Street	A	0.206	3.2	A	0.164	2.9
Wollongong Road/Arncliffe street	A	0.197	9	A	0.509	9.8
Kelsey Street/Hirst Avenue	A	0.158	8.9	A	0.388	8.7
Bonar Street/Guess Street	A	0.101	8.5	A	0.119	7.3



LEGEND

PEAK TRAFFIC VOLUMES AM PEAK

FIG 5a



LEGEND

PEAK TRAFFIC VOLUMES PM PEAK

FIG 5b

Criteria for Interpreting Results of SIDRA Analysis

1. Level of Service (LOS)

LOS	Traffic Signals and Roundabouts	Give Way and Stop Signs
'A'	Good	Good
'B'	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
'C'	Satisfactory	Satisfactory but accident study required
'D'	Operating near capacity	Near capacity and Accident Study required
'E'	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
'F'	Unsatisfactory and requires additional capacity	Unsatisfactory and requires other control mode

2. Average Vehicle Delay (AVD)

The AVD provides a measure of the operational performance of an intersection as indicated on the table below which relates AVD to LOS. The AVD's listed in the table should be taken as a guide only as longer delays could be tolerated in some locations (ie inner city conditions) and on some roads (ie minor side street intersecting with a major arterial route).

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabouts	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. Roundabouts require other control mode	At capacity and requires other control mode

3. Degree of Saturation (DS)

The DS is another measure of the operational performance of individual intersections.

For intersections controlled by **traffic signals**[2] both queue length and delay increase rapidly as DS approaches 1, and it is usual to attempt to keep DS to less than 0.9. Values of DS in the order of 0.7 generally represent satisfactory intersection operation. When DS exceeds 0.9 queues can be anticipated.

For intersections controlled by a **roundabout or GIVE WAY or STOP signs**, satisfactory intersection operation is indicated by a DS of 0.8 or less.

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[1] *the values of DS for intersections under traffic signal control are only valid for cycle length of 120 secs*

3.4 TRANSPORT SERVICES

The Arncliffe area is well served by public transport services comprising:

* the Turrella Railway Station on the East Hills Line

* the Arncliffe Railway Station on the Illawarra Line

* the Wolli Creek Railway Station which accesses the East Hills, Illawarra and New Southern rail lines

* the State Transit bus service which runs along Wollongong Road, Bonar Street/Loftus Street and the Princes Highway. This Route 471 connects between Rockdale and Five Dock at a 30 minute frequency between 6.00am and 10.00pm. Details provided overleaf.

3.4 FUTURE CIRCUMSTANCES

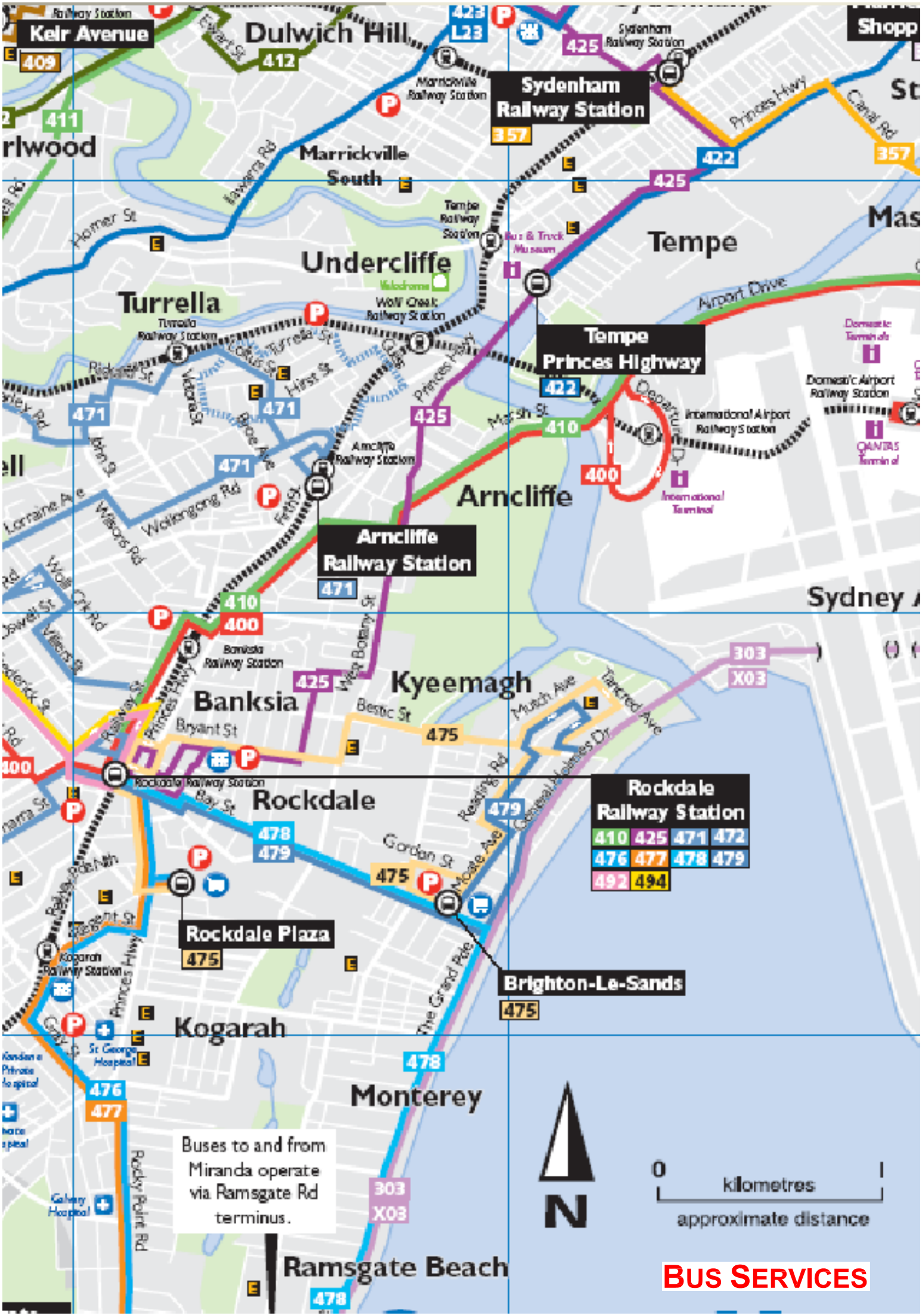
The proposed further developments of the road and traffic management systems serving the site and adjacent precincts comprise:

* construction of a road connection (extension of Gertrude Street) between the Princes Highway and Arncliffe Street

* completion of the Arncliffe Street road widening

* construction of Mount Olympus Boulevarde connecting between Guess Avenue and Lusty Street

* provision of traffic signals at the Marsh Street/Innesdale Road intersection


Keir Avenue
409
Dulwich Hill
412
411
Marrickville Railway Station
Sydenham Railway Station
357
425
Princes Hwy
422
Marrickville South
Tempe Railway Station
Undercliffe
Tempe
Turrella
Wolli Creek Railway Station
Turrella Railway Station
Tempe Princes Highway
Airport Drive
Domestic Terminals
Domestic Airport Railway Station
471
Marsh St
410
International Airport Railway Station
400
Arncliffe Railway Station
Arncliffe
International Terminal
Arncliffe Railway Station
471
Sydney
Banksia Railway Station
Kyeemagh
Banksia
Bryant St
Bestic St
475
303
X03
Rockdale Railway Station
Rockdale
Bay St
478
479
Gordon St
Rockdale Railway Station
410 425 471 472
476 477 478 479
492 494
Rockdale Plaza
475
Brighton-Le-Sands
475
Kogarah Railway Station
Kogarah
St George Hospital
476
477
478
Monterey
Buses to and from Miranda operate via Ramsgate Rd terminus.
303
X03
Ramsgate Beach
478
N
0
kilometres
approximate distance
BUS SERVICES

4. TRAFFIC

The traffic assessment undertaken for the Masterplan process identified the following peak traffic generation issues relative to the Bonar Street precinct:

Existing Precinct Traffic Generation	-	157 vtph
Potential Traffic Generation with Industrial Redevelopment	-	702 vtph
Potential Traffic Generation with Residential Apartment Redevelopment	-	405 vtph

Thus development under the Masterplan would result in a total traffic generation of some 245 vtph more than that of the existing traffic generation of the precinct but some 297 vtph less than that of a wholesale industrial redevelopment under the existing industrial zoning provisions. Put in the context of the substantially reduced traffic volumes which have occurred along the Forest Road, Wollongong Road and Lorraine Street corridor (as a result of the M5 East) the additional trips generated by the Masterplan redevelopment will be relatively minor.

The operational performance of the precinct access intersections consequential to total redevelopment was assessed for the Masterplan process using the SIDRA program.

The results of that assessment indicating a satisfactory traffic outcome with redevelopment as envisaged in the Masterplan are summarised in the following indicating a satisfactory ‘level of service’ outcome.

	AM			PM		
	LOS	**DS**	**AVD**	**LOS**	**DS**	**AVD**
Wollongong Road/Kelsey Street	B	0.36	15.3	A	0.42	12.9
Wollongong Road/Bonar Street	A	0.18	9.6	A	0.21	9.2
Wollongong Road/Arncliffe Street	A	0.20	9.7	A	0.51	10.1
Kelsey Street/Hirst Avenue	A	0.18	9.0	A	0.41	8.9
Bonar Street/Guess Street	A	0.12	8.7	A	0.19	7.8

The proposed traffic management measures identified in the Masterplan to support a satisfactory and safe outcome comprise:

* the provision of new access roadways

* the provision of roundabouts at the Bonar Street/Hirst Street and Bonar Street/Knoll Avenue intersections to 'calm' traffic movements

* the provision of a raised threshold treatment across the Bonar Street/New Road intersection with marked footcrossings.

* paved flush thresholds at pedestrian crossing points on New Road

* the central median island along section of Bonar Street to add emphasis to the nature of the road frontage

The proposed development at 12 – 40 Bonar Street and 5 Loftus Street will be entirely 'within keeping' of the Masterplan and rezoning provisions. The traffic generation of the development will be some 89 vtph during the morning and afternoon peak periods as follows:

305 apartments @ 0.29 vtph - 89 vtph

This generation will be ‘offset’ by the traffic generation of the significant existing industrial use on the site will be spread over the 2 access points on Bonar Street and Hirst Street. It is apparent that and there will not be any unsatisfactory traffic safety, capacity or traffic related environmental implications.

5. PARKING

Council's DCP № 80 (Bonar Street Precinct) contains criteria for parking provisions for the various uses permitted in redevelopment of that area as follows:

1 bed apt and studio	-	1 space
2 bed apt	-	1.2 spaces
3 bed apt	-	2 spaces
Visitors	-	1 space per 6 units
Wash bay	-	1 space per 60 apartments*

** wash bay can be shared as visitor space*

Application of this criteria to the proposed development indicates the following provision:

	Total
5 x studio	5 spaces
37 x one-bedroom	37 spaces
239 x two-bedroom	287 spaces
24 x three-bedroom	48 spaces
Visitors (305 apartments)	51 spaces
Washbays	5 spaces
Total	**433 spaces**

It is proposed to provide a total of 443 spaces for the development scheme in the integrated basement levels. Parking spaces designated for disabled drivers will be provided in accordance with DCP № 28 while a total of 33 bicycle parking spaces.

There will be an element of 'stack' parking in the basement however these spaces will only be allocated to a single residential unit.

6. ACCESS, INTERNAL CIRCULATION AND SERVICING

Access

The proposed vehicle access provisions for the basement carpark will involve separate 6.0 metre wide driveways connecting to the Bonar Street and Hirst Street frontages. The design of these driveways will accord with the requirements of AS 2890.1 and DCP № 80 and will have suitable sight distance circumstances being well removed from intersections.

Internal Circulation

Interconnection is provided between the various basement levels and the detail design of the carpark complies with the requirements of Council's DCP and AS 2890.1 particularly in relation to aisle/bay dimensions and ramp dimensions.

Servicing

Refuse will be removed from the centralised collection area by Council's 8.0 metre collection vehicle while MRV type vehicles (small furniture vans) will also be able to use this dock area. Service personnel will be able to use the visitor spaces while the occasional large service/delivery vehicles will be reliant on the available on-street parking as is normal for residential apartment buildings of this nature.

Turning path assessments relative to the service vehicle movements are provided in Appendix A.

7. CONCLUSION

Redevelopment of the Bonar Street Industrial Precinct reflects the desirability of residential apartment based development which has regard for the close proximity of Turella, Arncliffe and Wolli Creek Railway Stations and the sensitivity of the surrounding residential area. Assessment of the proposed development scheme has concluded that:

- the proposed vehicle access arrangements will not have any adverse safety or operational implications

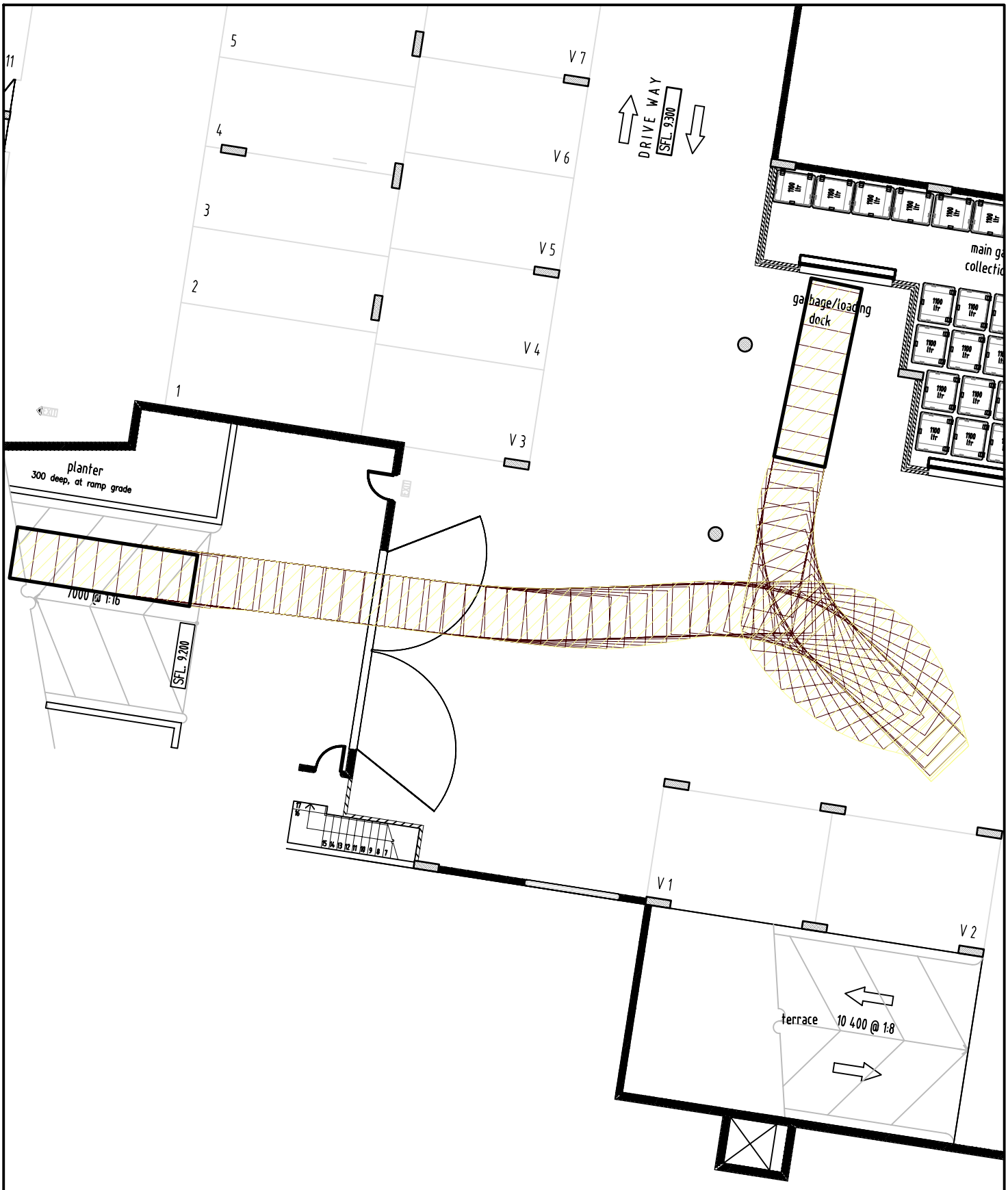
- the projected traffic generation will be 'in keeping' with the Masterplan assessment and will not have any unsatisfactory implications

- the proposed parking provision will be appropriate for the uses and will accord to the code requirements

- the provisions for pedestrians are cyclists will be suitable and appropriate.

APPENDIX A

TRUCK TURNING PATHS



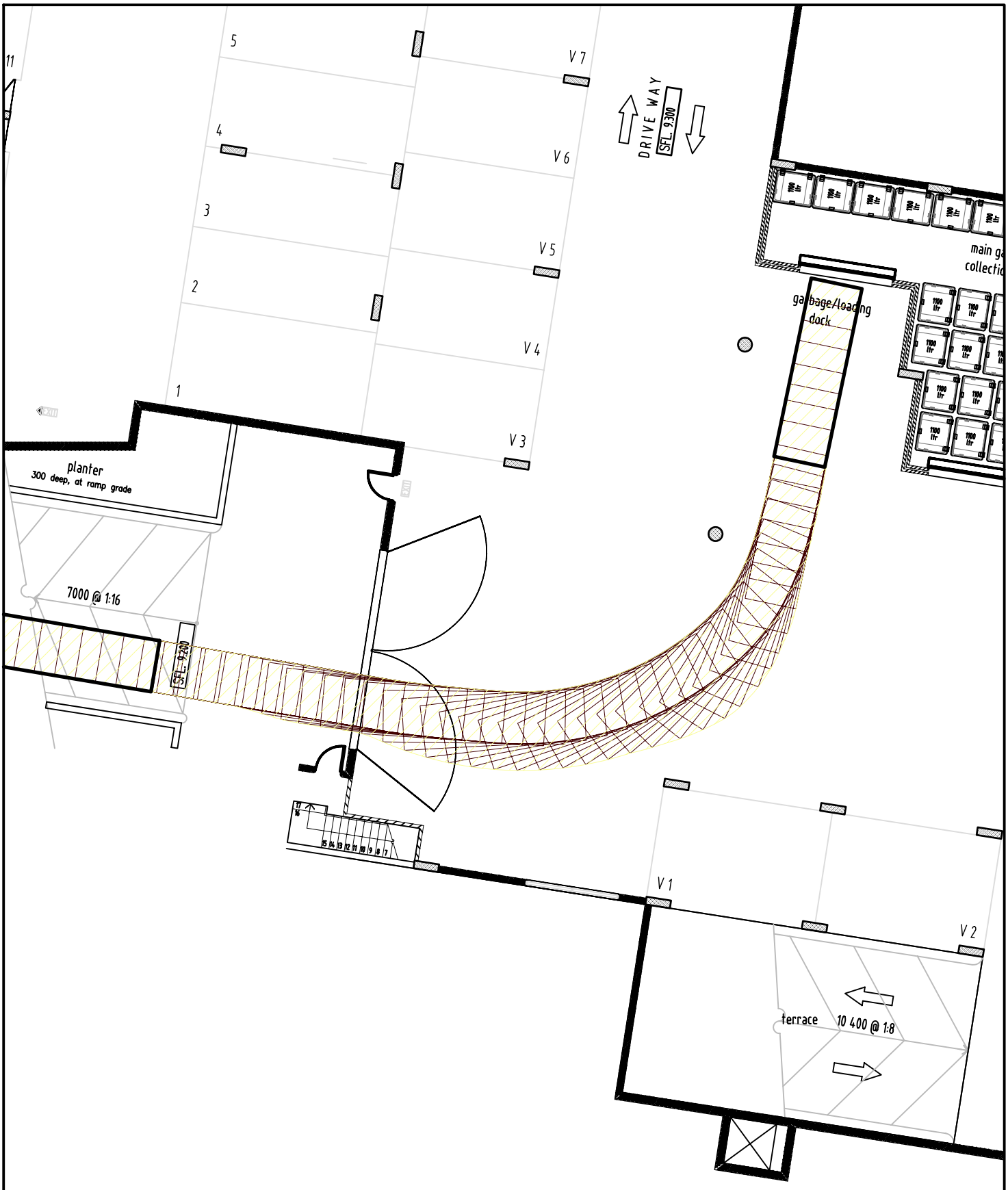
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V5.00a in conjunction with AutoCAD 2000. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.

N

SWEPT PATH ANALYSIS OF AN 8.8m RIGID VEHICLE ENTERING THE SITE

SP 1



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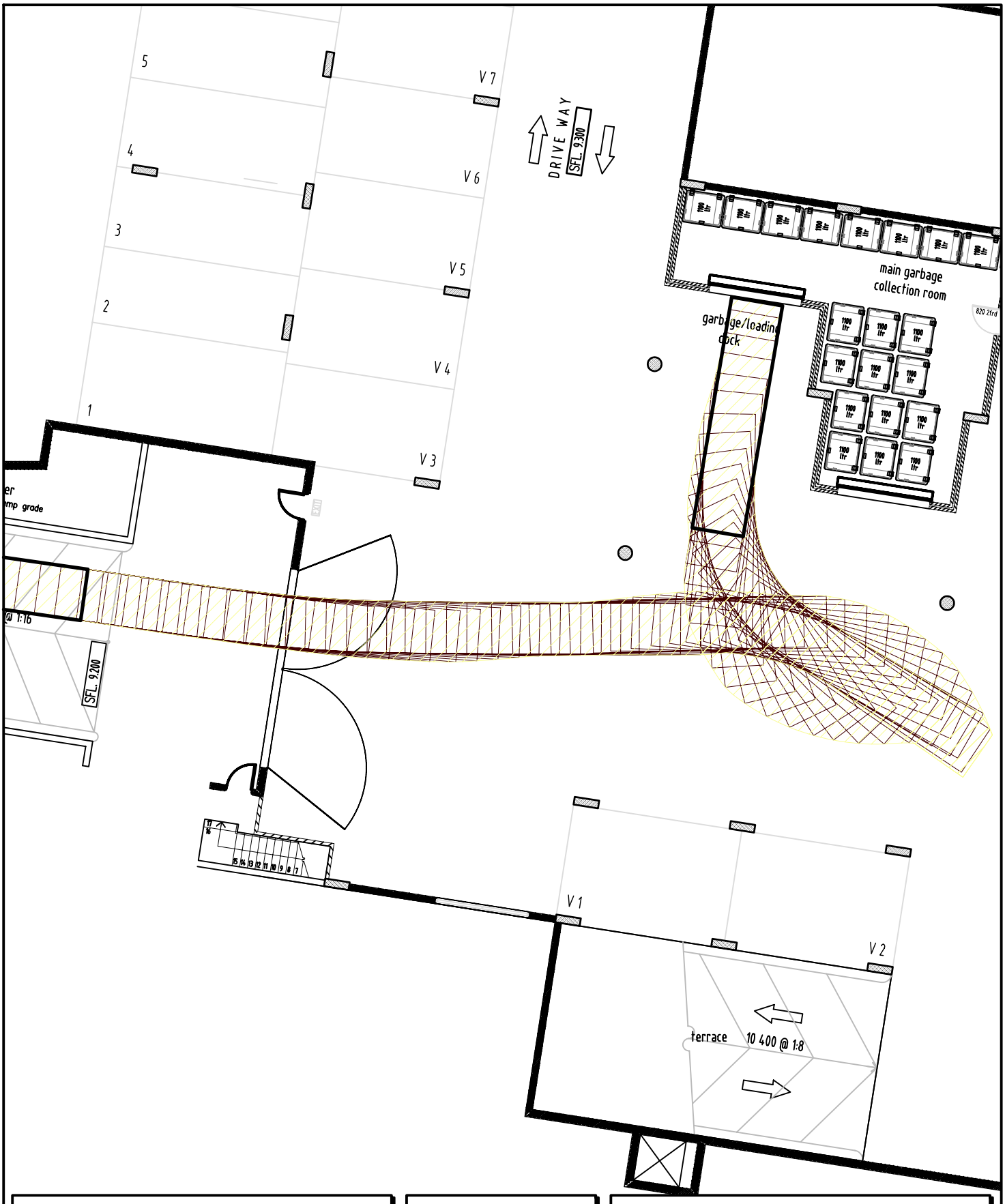
SWEPT PATH ANALYSIS OF AN 8.8m RIGID VEHICLE EXITING THE SITE

SP 2



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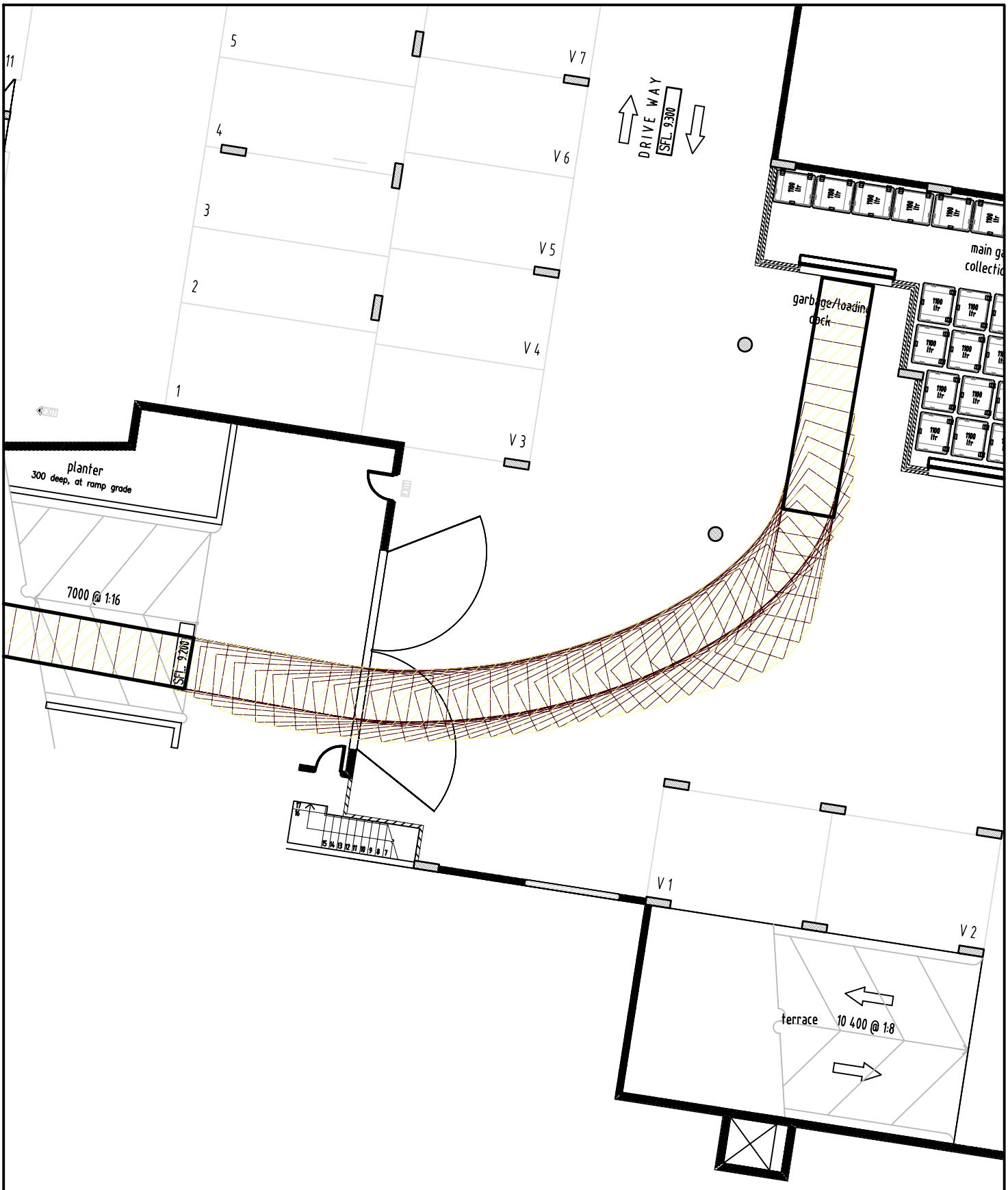
SWEPT PATH ANALYSIS OF AN 11.34m (LARGE 4 AXLE) REFUSE VEHICLE ENTERING THE SITE

SP 3



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N

SWEPT PATH ANALYSIS OF AN 11.34m (LARGE 4 AXLE) REFUSE VEHICLE EXITING THE SITE

SP 4