PROPOSED
MIXED USE DEVELOPMENT
ALBERT AVENUE AND THOMAS STREET, CHATSWOOD

Assessment of Traffic and Parking Implications

October 2009

Reference 08138

TRANSPORT AND TRAFFIC PLANNING ASSOCIATES
Transportation, Traffic and Design Consultants
Suite 603, Level 6
282 Victoria Avenue
CHATSWOOD 2067
Telephone (02) 9411 5660
Facsimile (02) 9904 6622
Email: ttpa@ttpa.com.au

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

1. INTRODUCTION

This report has been prepared to accompany a Project Application for a mixed use development on a site with frontages to Albert Avenue, Albert Lane and Thomas Street at Chatswood (Figure 1).

Chatswood CBD is experiencing significant new development reflecting its regional role with excellent public transport services and the impact of the urban consolidation process. The development site, having been occupied by a Council carpark for many years, is situated adjacent to the railway station on the south-western edge of the CBD.

The proposed development scheme comprises:

* 19,092m^2 NFA office floorspace
* 208 residential apartments
* 2,031m^2 NFA retail floorspace
* basement carparking including a public parking element.

The purpose of this report is to:

* describe the site its context and existing use

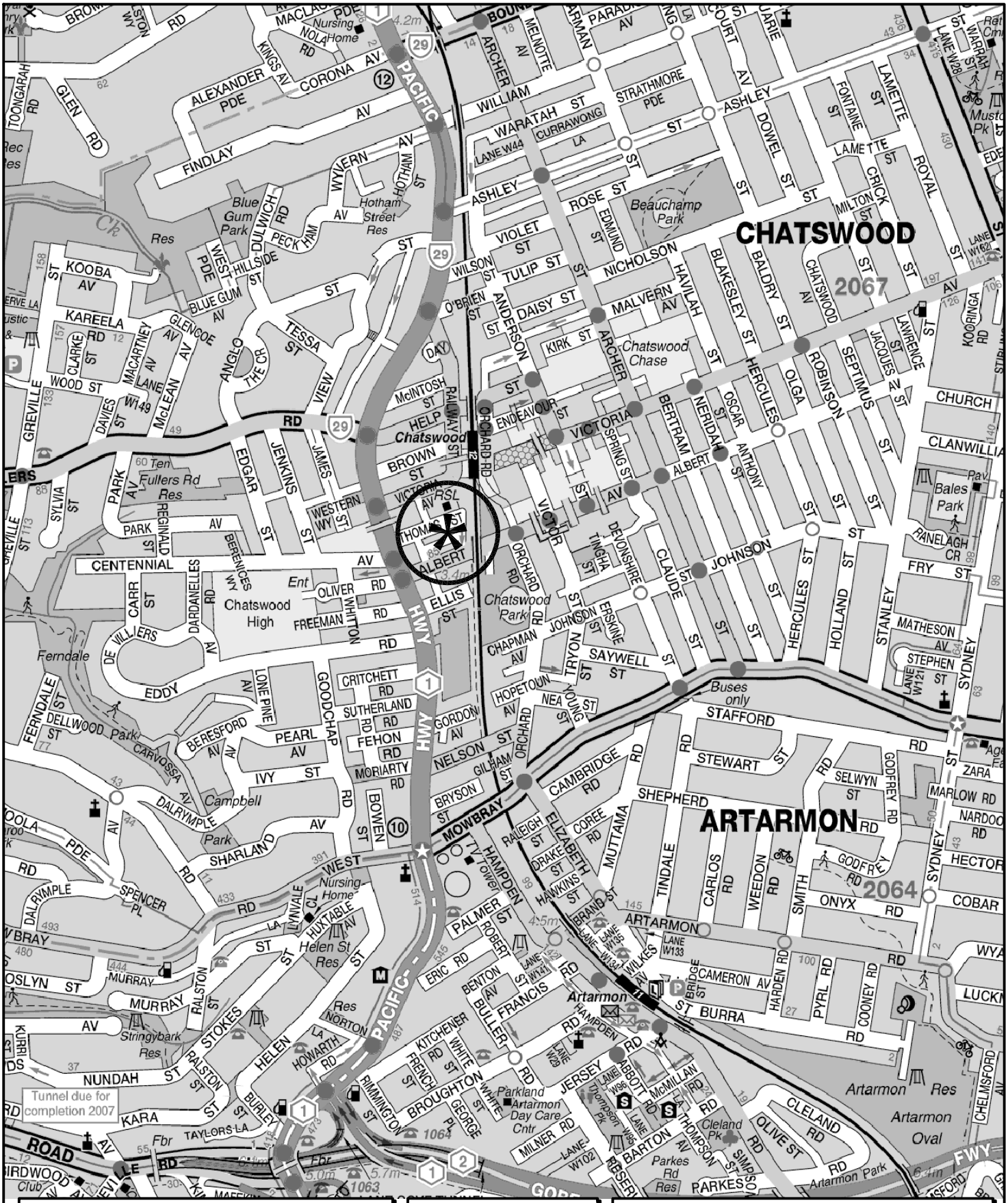
* describe the proposed development scheme

* describe the existing road network and traffic conditions and the envisaged future circumstances

* assess the appropriateness of the proposed parking provision to serve the development

* assess the potential traffic implications

* assess the vehicle access, internal circulation and servicing arrangements.



LEGEND

LOCATION

FIG 1

2. DEVELOPMENT SCHEME

2.1 SITE, CONTEXT AND EXISTING USE

The development site involves 3 consolidated parcels of land with frontages to Albert Avenue, Albert Lane, Fleet Lane and Thomas Street as follows:

-	southern section	2,716m^2
-	northern section	1,361m^2
-	Fleet Lane section	245m^2
	Total	**4,322m^2**

The site is located in the south-western sector of The Chatswood CBD adjacent to the railway station and just to the south of the Victoria Avenue 'strip'.

The longstanding use of the site is that of a Council carpark accommodating some 150 spaces with accesses (ingress and egress) provided on the Thomas Street and Fleet Lane frontages. As part of the development scheme the central section of Fleet Lane will be closed to through traffic and incorporated into the site.

The surrounding use comprise:

* older style commercial uses which adjoin to the east and west
* multi-storey residential apartments on the southern side of Albert Avenue
* multi-storey commercial and residential building to the north
* the railway station just to the east
* the retail precinct extending along Victoria Avenue to the east.

LEGEND

N

SITE

FIG 2

The current development projects in the CBD, include:

* Chatswood Civic Place which comprises 4 major public buildings being 500 seat theatre, 1,000 seat concert hall, public library and multi-purpose exhibition hall

* Chatswood Town Precinct Project (CTPP) which comprises a number of residential buildings with some 500 apartments and 10,000m^2 of retail floorspace

* Chatswood Transport Interchange Project (CTI) which, apart from the new bus/rail interchange, will comprise some 10,000m^2 of retail floorspace

* Mirvac Pacific Place which has 2 sites with a total development of some 300 apartments and 2,000m^2 of office floorspace

* expansion of the Chatswood Chase Shopping Centre

* Council's former carpark site in Archer Street for serviced apartments, restaurants, pub and retail units

* Council's former carpark site on the corner of Albert Avenue and Archer Street for retail units, office and residential apartments.

2.2 PROPOSED DEVELOPMENT

It is proposed to clear and excavate the site to construct 20 and 28 level buildings over basement carparking. The eastern building will contain residential apartments while the western building will contain office floorspace and there will be a central pedestrian plaza link between the buildings which will have ground level retail uses.

The proposed development will comprise:

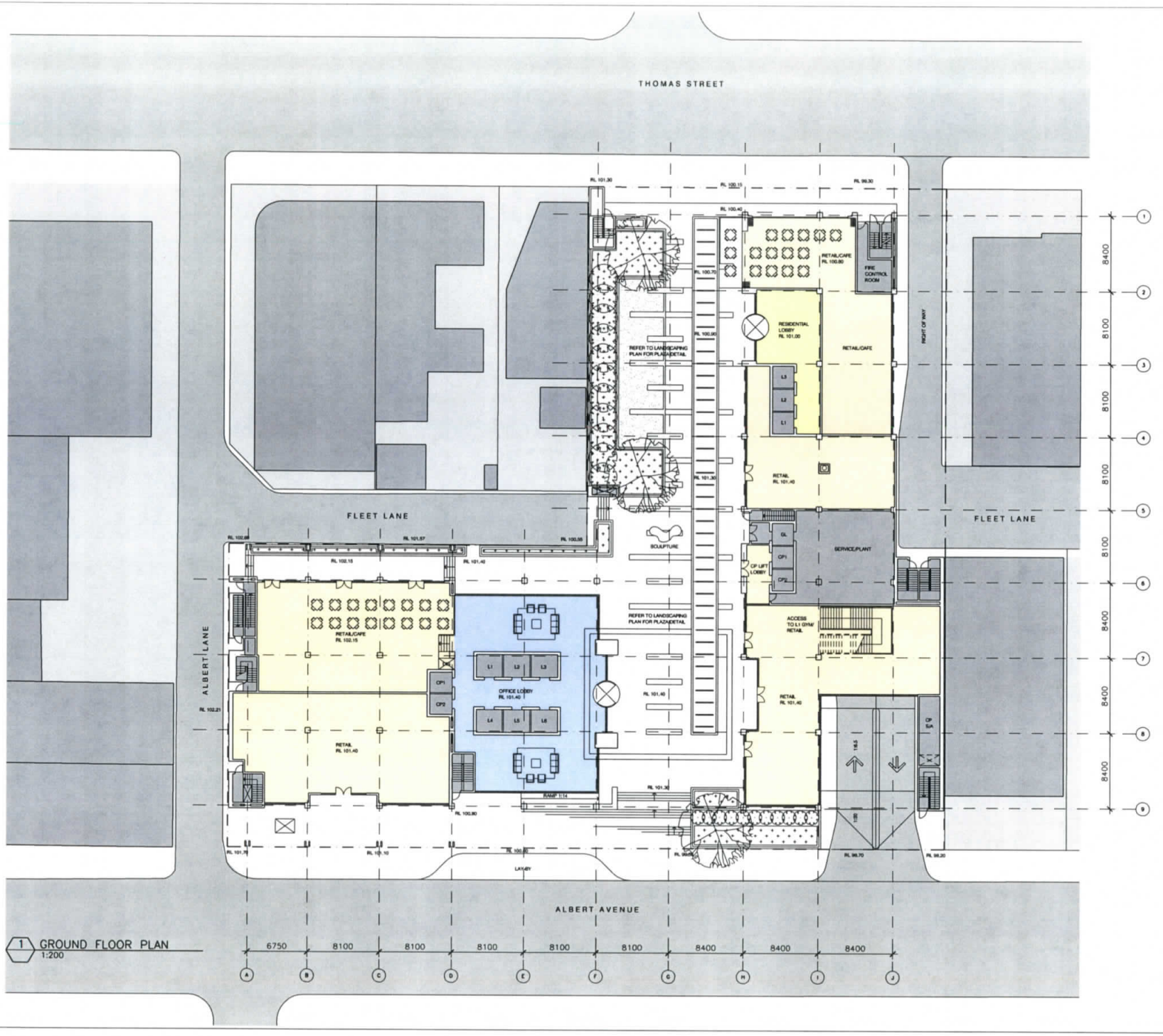
Commercial	19,091m^2 NFA
Retail (Ground Level)	2,031m^2 NFA
Residential Apartments	14 x studio
	8 x one-bedroom
	140 x two-bedroom
	34 x three-bedroom+
Affordable Apartments	2 x studio
	8 x one-bedroom
Total	208 apartments

The basement carparking will comprise:

- 192 spaces for residents
- 64 spaces for commercial/retail
- 250 spaces for public (including 40 space provision for development)

Total 506 spaces

Vehicle access for the basement parking will comprise ingress/egress on Albert Avenue (left-turn IN/OUT) and details of the proposed scheme are shown on the plans prepared by PTW Architects which accompany the Development Application and are reproduced in part overleaf.



1 GROUND FLOOR PLAN
1:200

Howard's

J	Draft EA Submission	28.10.09
2	General Update	23.09.09
1	For Information	11.09.09

Client
Welles Thomas Pty Ltd
Suite 22, Level 4
12 Thomas Street
Chatswood NSW 2067

Architect
PTW Architects
PTW
Level 17, 9 Castlereagh St
Sydney NSW Australia 2000
T 612 9232 5877
F 612 9221 4139
www.ptw.com.au

Contractor

Consultants

Planner	JBA Planning
Structural	Brizuls Associates
Services	George Floth Pty. Ltd
Landscape	Site Image
Acoustics	Acoustic Logic
Traffic	TTPA

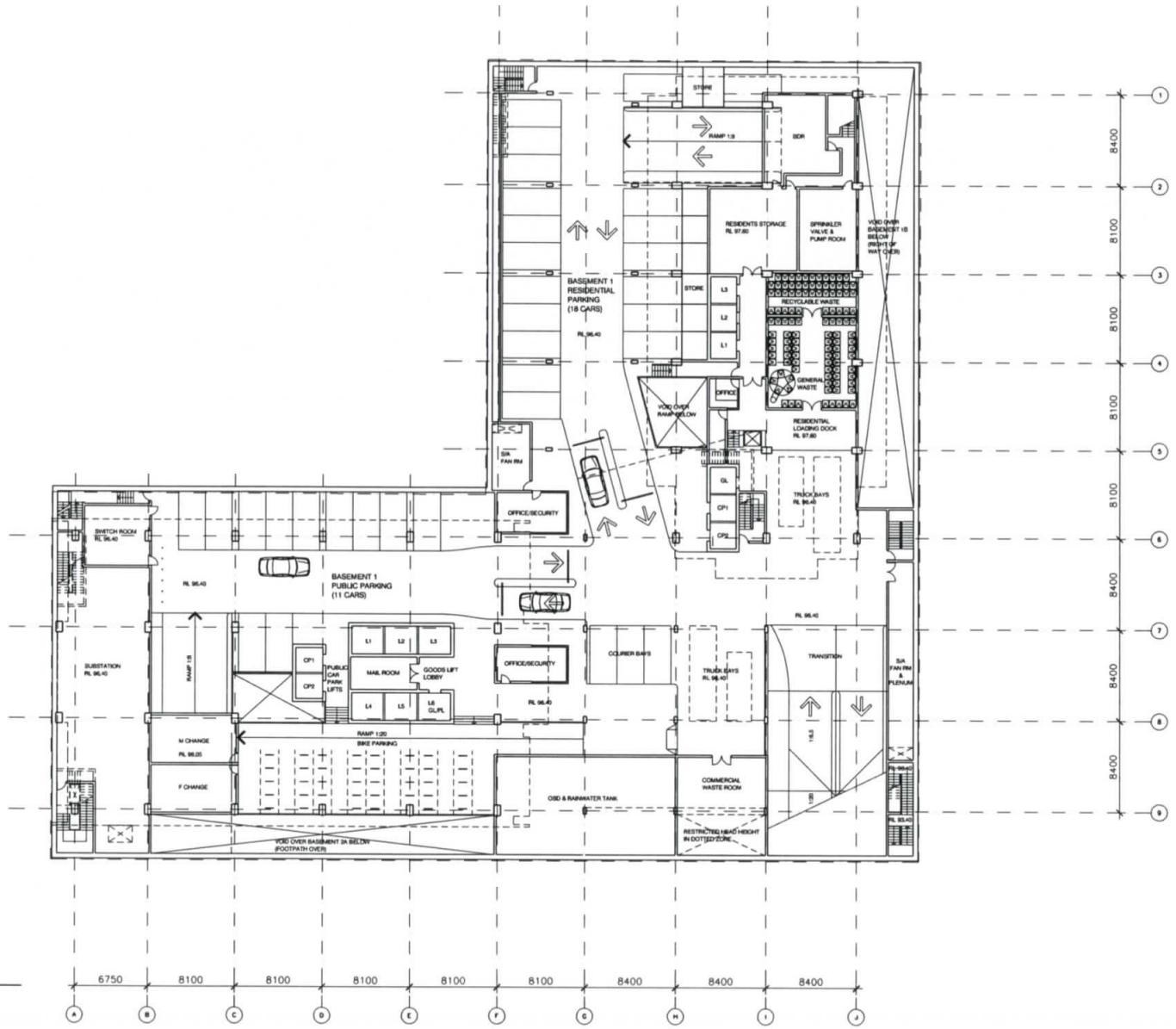
WELLES THOMAS PLAZA
Thomas Street/ Albert Avenue
Chatswood NSW 2067

Project No.	209039
Scale:@A1	1:200
Date:	10/9/2009
Drawn	DH
Checked	-
Approved	-

0 2 4 10m

GROUND FLOOR PLAN

A-0100 /3
PRELIMINARY



1 BASEMENT 1 PLAN
1:200

Revisions

4	Draft EA Submission	28.10.09
3	General Update	12.10.09
2	General Update	23.09.09
1	For Information	11.09.09

Client
Welles Thomas Pty Ltd
Suite 22, Level 4
12 Thomas Street
Chatswood NSW 2067

Architect
PTW Architects
PTW
Level 17, 9 Castlereagh St
Sydney NSW Australia 2000
T 612 9232 5877
F 612 9221 4139
www.ptw.com.au

Contractor

Consultants

Planner	JBA Planning
Structural	Birzulis Associates
Services	George Floth Pty. Ltd
Landscape	Site Image
Acoustics	Acoustic Logic
Traffic	TTPA

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Thomas Street/ Albert Avenue
Chatswood NSW 2067

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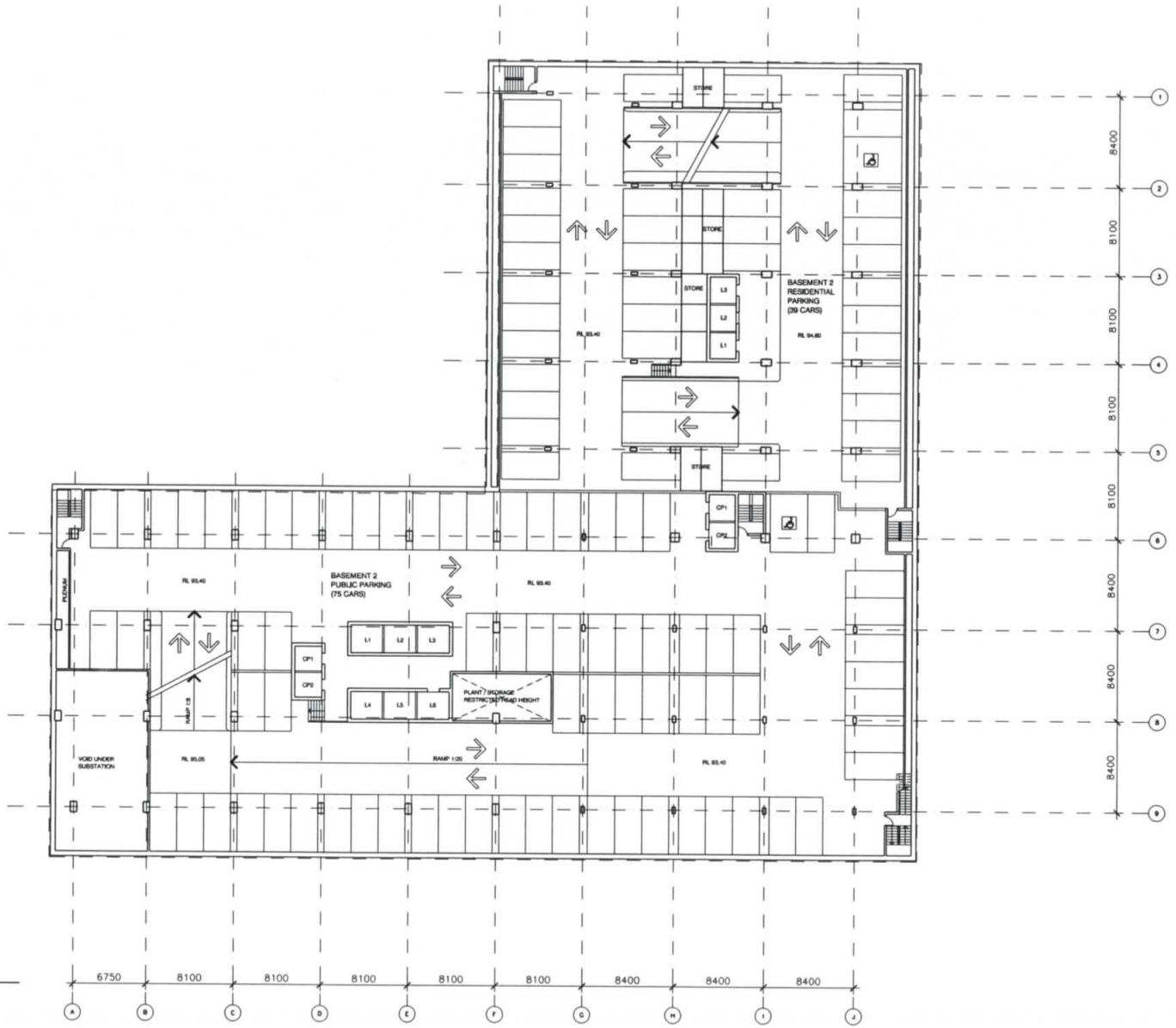
Approved	

0 2 4 10m

BASEMENT 1 PLAN

A-0111 /04
PRELIMINARY



1 BASEMENT 2 PLAN
1:200

Revisions

3	Draft EA Submission	28.10.09
2	General Update	23.09.09
1	For Information	11.09.09

Client
Welles Thomas Pty Ltd
Suite 22, Level 4
12 Thomas Street
Chatswood NSW 2067

Architect
PTW Architects **PTW**
Level 17, 9 Castlereagh St
Sydney NSW Australia 2000
T 612 9232 5877
F 612 9221 4139
www.ptw.com.au

Contractor

Consultants

Planner	JBA Planning
Structural	Birzulis Associates
Services	George Floth Pty. Ltd
Landscape	Site Image
Acoustics	Acoustic Logic
Traffic	TTPA

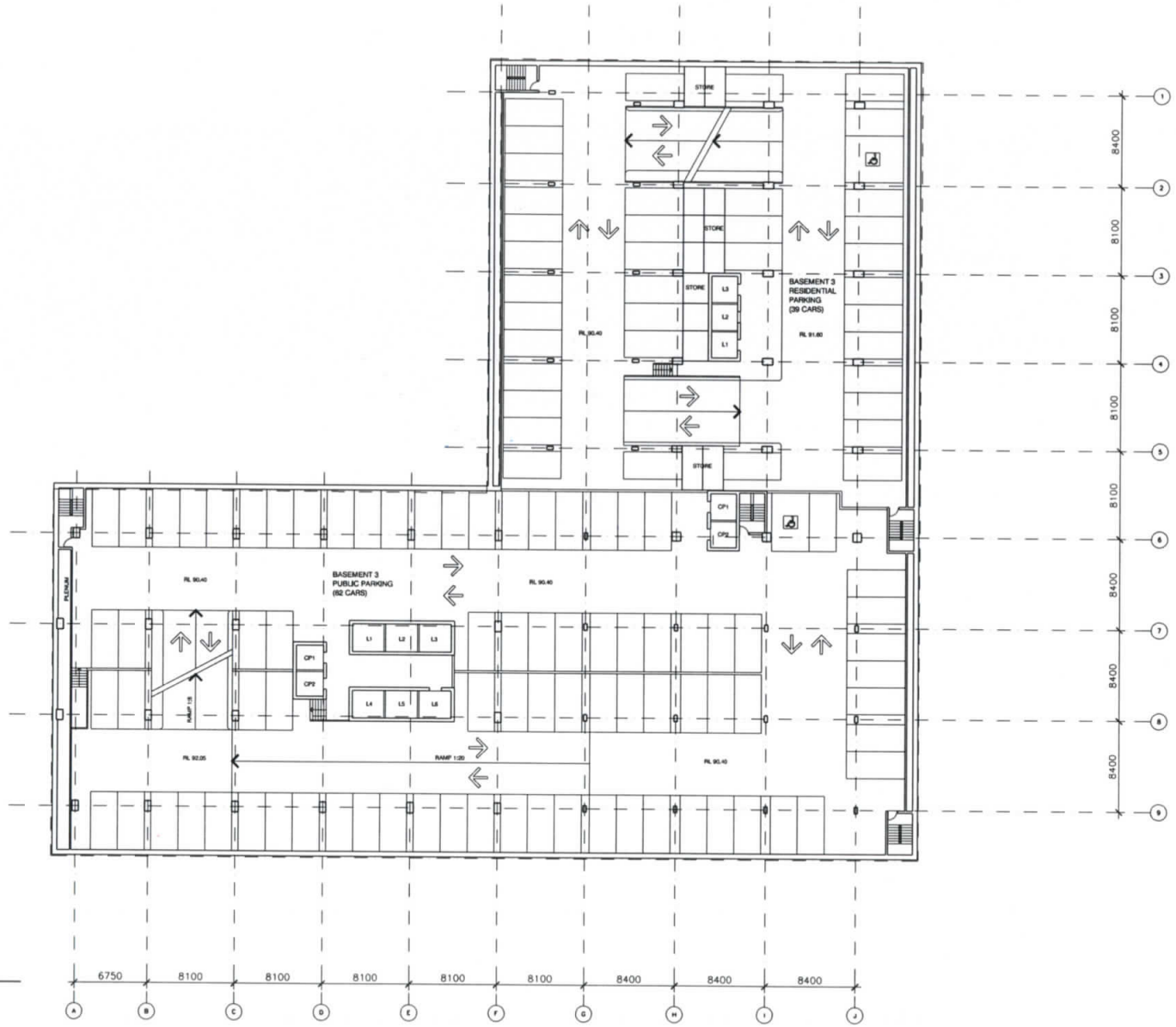
WELLES THOMAS PLAZA
Thomas Street/ Albert Avenue
Chatswood NSW 2067

Project No.	208009
Scale:@A1	1:200
Date:	10/9/2009
Drawn	DH
Checked	-
Approved	

0 2 4 10m

BASEMENT 2 PLAN

A-0112 /03
PRELIMINARY



1 BASEMENT 3 PLAN
1:200

Revisions

3	Draft EA Submission	28.10.09
2	General Update	23.09.09
1	For Information	11.09.09

Client
Welles Thomas Pty Ltd
Suite 22, Level 4
12 Thomas Street
Chatswood NSW 2067

Architect
PTW Architects
PTW
Level 17, 9 Castlereagh St
Sydney NSW Australia 2000
T 612 9232 5877
F 612 9221 4139
www.ptw.com.au

Contractor

Consultants

Planner	JBA Planning
Structural	Birzulis Associates
Services	George Floch Pty. Ltd
Landscape	Site Image
Acoustics	Acoustic Logic
Traffic	TTPA

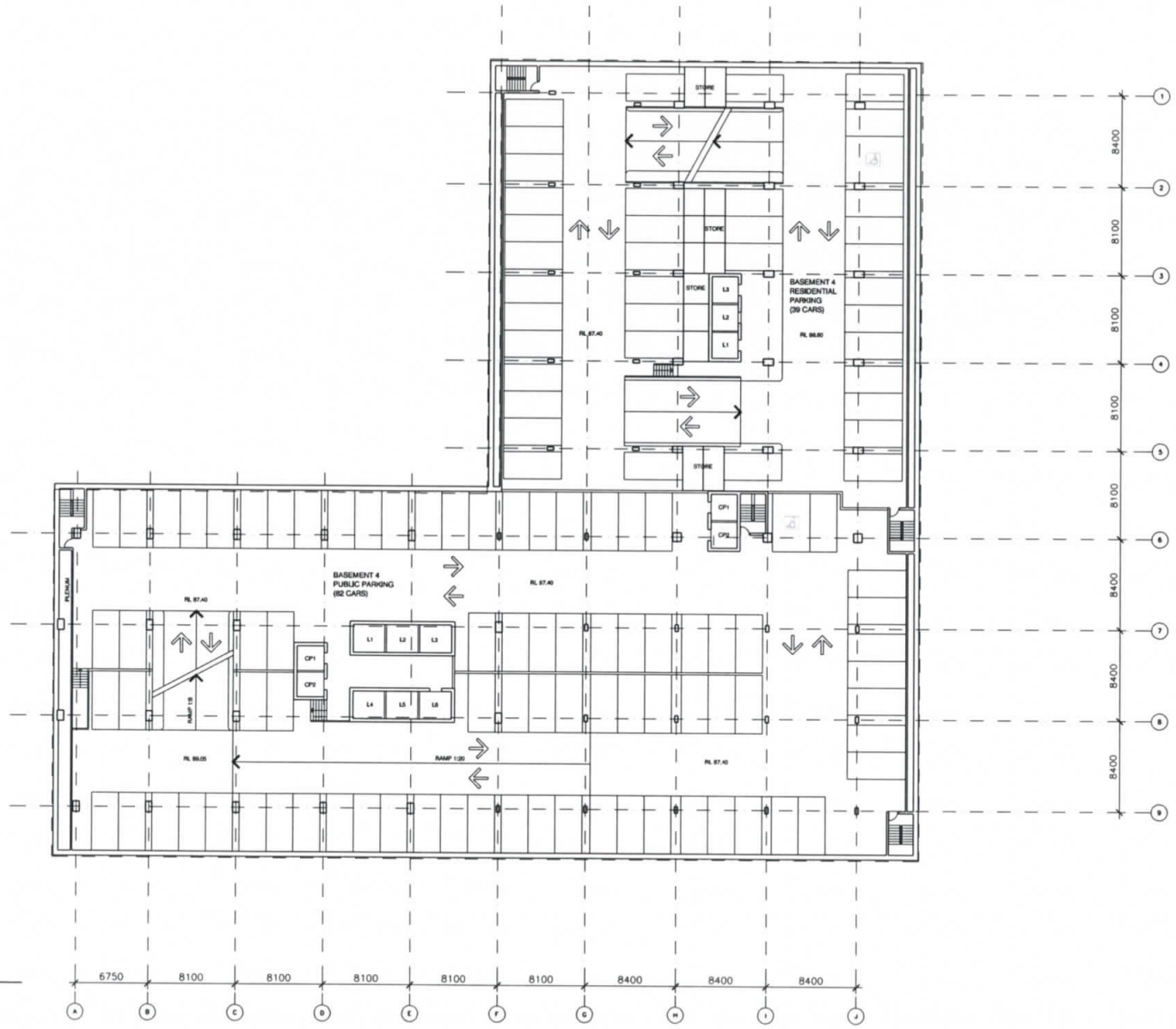
WELLES THOMAS PLAZA
Thomas Street/ Albert Avenue
Chatswood NSW 2067

Project No.	200009
Scale:@A1	1:200
Date:	10/9/2009
Drawn	DH
Checked	-
Approved	

0 2 4 10m

BASEMENT 3 PLAN

A-0113 /03
PRELIMINARY



1 BASEMENT 4 PLAN
1:200

Revisions

3	Draft EA Submission	28.10.09
2	General Update	23.09.09
1	For Information	11.09.09

Client
Welles Thomas Pty Ltd
Suite 22, Level 4
12 Thomas Street
Chatswood NSW 2067

Architect
PTW Architects
PTW
Level 17, 9 Castlereagh St
Sydney NSW Australia 2000
T 612 9232 5877
F 612 9221 4139
www.ptw.com.au

Contractor

Consultants

Planner	JBA Planning
Structural	Birzulis Associates
Services	George Floth Pty. Ltd
Landscape	Site Image
Acoustics	Acoustic Logic
Traffic	TTPA

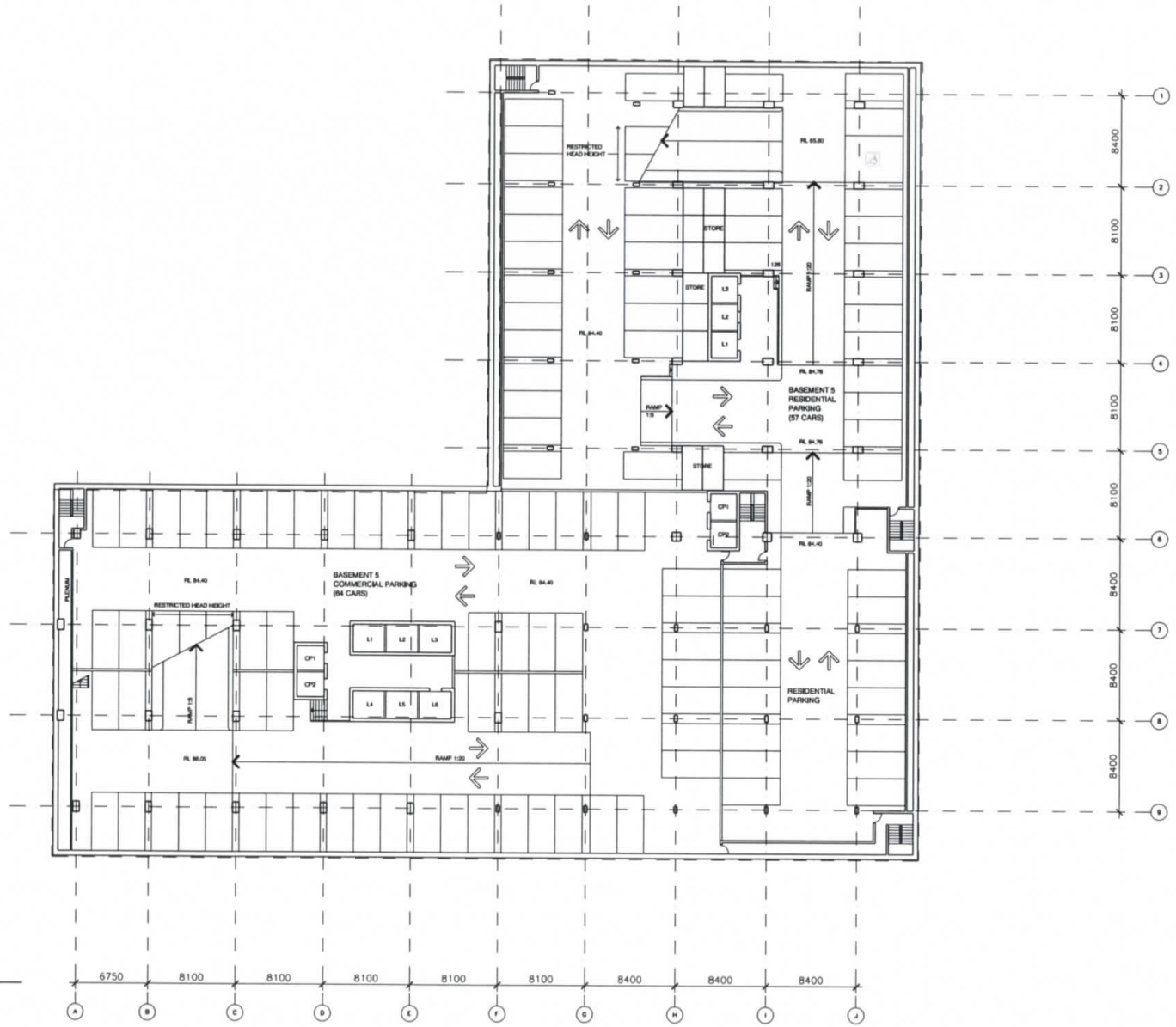
WELLES THOMAS PLAZA
Thomas Street/ Albert Avenue
Chatswood NSW 2067

Project No.	209039
Scale:@A1	1:200
Date:	10/9/2009
Drawn	DH
Checked	-
Approved	

0 2 4 10m

BASEMENT 4 PLAN

A-0114 /03
PRELIMINARY



1 BASEMENT 5 PLAN
1:200

Revisions

4	Draft EA Submission	28.10.09
3	Parking modified	26.10.09
2	General Update	23.09.09
1	For Information	11.09.09

Client
Welles Thomas Pty Ltd
Suite 22, Level 4
12 Thomas Street
Chatswood NSW 2067

Architect
PTW Architects
PTW
Level 17, 9 Castlereagh St
Sydney NSW Australia 2000
T 612 9232 5877
F 612 9221 4139
www.ptw.com.au

Contractor

Consultants

Planner	JBA Planning
Structural	Birzulis Associates
Services	George Floth Pty. Ltd
Landscape	Site Image
Acoustics	Acoustic Logic
Traffic	TTPA

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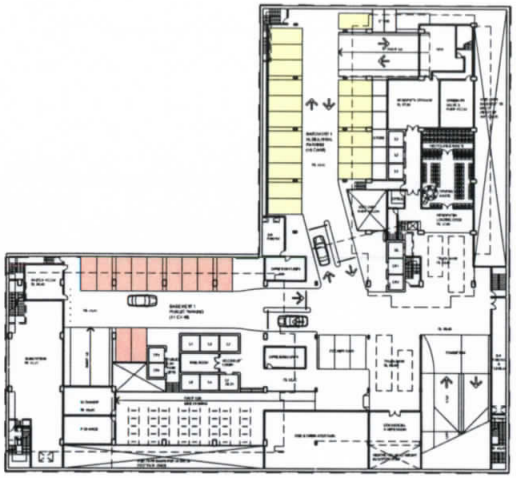
Chatswood NSW 2067

Project No.	209039
Scale:@A1	1:200
Date:	10/9/2009
Drawn	DH
Checked	-
Approved	

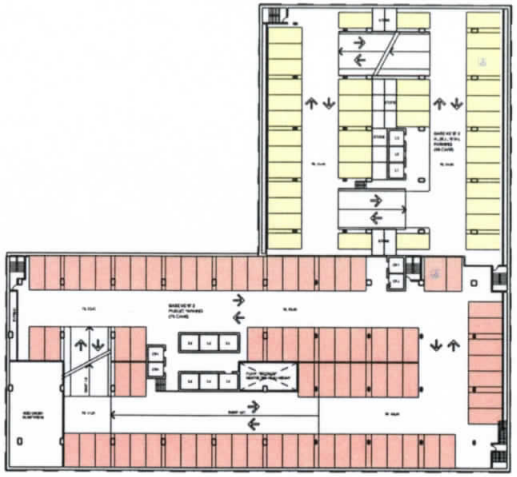
0 2 4 10m

BASEMENT 5 PLAN

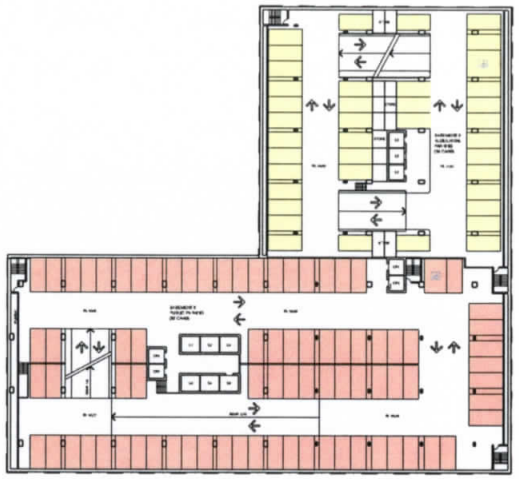
A-0115 /04
PRELIMINARY



BASEMENT 1

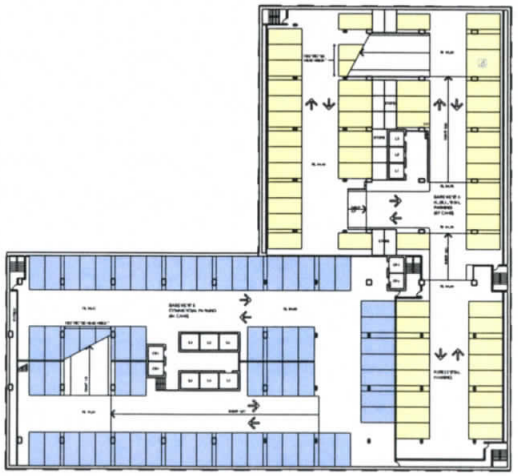


BASEMENT 2



BASEMENT 3

BASEMENT 4



BASEMENT 5

PARKING SCHEDULE

	PUBLIC	RESIDENTIAL	COMMERCIAL	TOTAL
B1	11	18	-	**29**
B2	75	39	-	**114**
B3	82	39	-	**121**
B4	82	39	-	**121**
B5	-	57	64	**121**
TOTAL	**250**	**192**	**64**	**506**

Revisions

3	Basement 6 Deleted	23.10.09
2	General Update	23.09.09
1	For Information	11.09.09

Client
Welles Thomas Pty Ltd
Suite 22, Level 4
12 Thomas Street
Chatswood NSW 2067

Architect
PTW Architects **PTW**
Level 17, 9 Castlereagh St
Sydney NSW Australia 2000
T 612 9232 5877
F 612 9221 4139
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WELLES THOMAS PLAZA
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Chatswood NSW 2067

Project No.	209039
Scale:@A1	NTS
Date:	10/9/2009
Drawn	DH
Checked	-
Approved	

SCHEDULE OF CAR PARKING

A-0152 /3
PRELIMINARY

3. ROAD NETWORK AND TRAFFIC CONDITIONS

3.1 ROAD NETWORK

The road network serving the development site (Figure 3) is dominated by:

* *Pacific Highway* - a State Road and arterial route being the principal link between the City and Hornsby

* *Delhi Road, Mowbray Road and Boundary Street* - State Roads and sub-arterial routes connecting and/or crossing the Highway

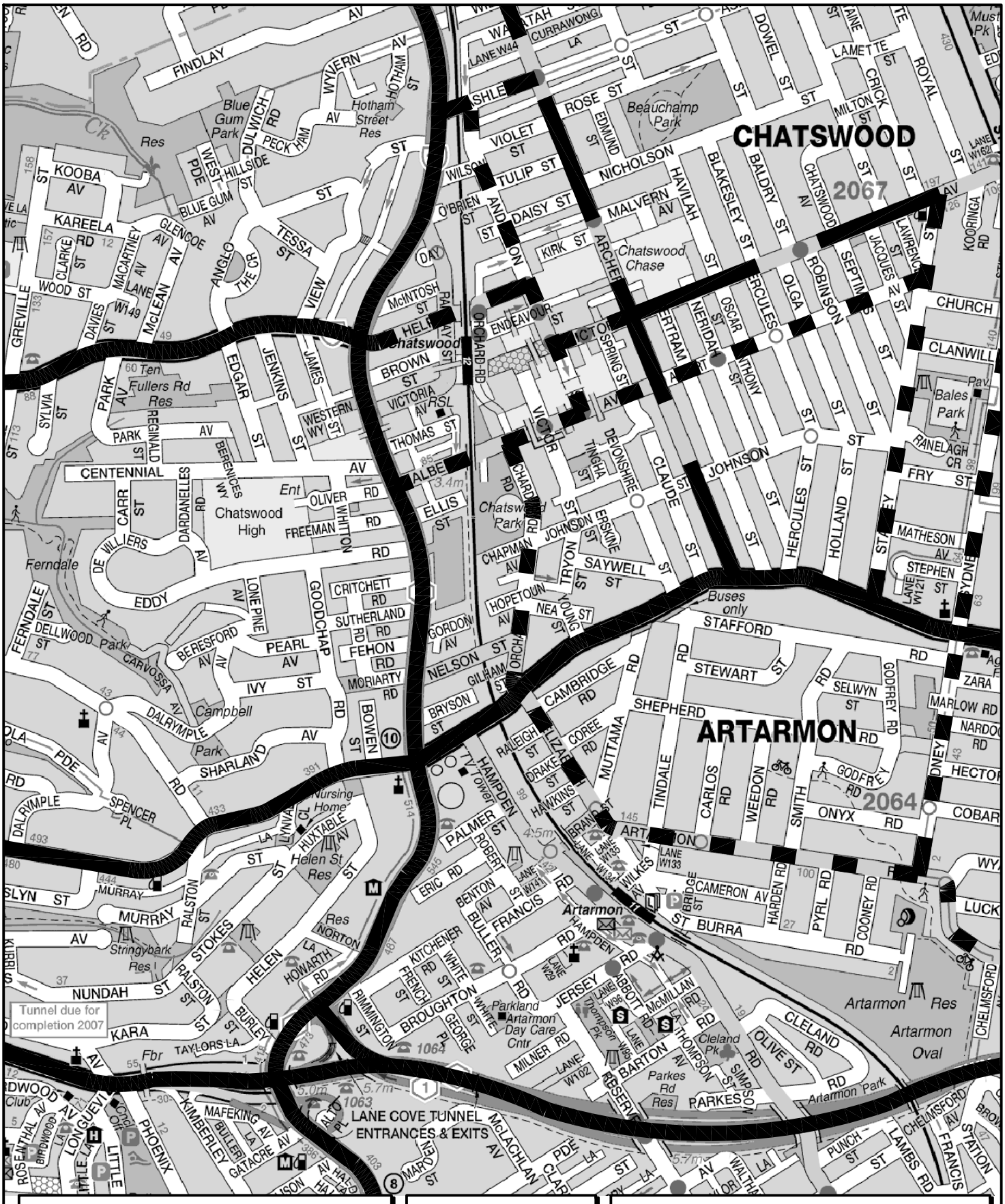
* *Archer Street* - Regional Road and major collector road route connecting between Mowbray Road and Boundary Road

* *Help Street – Victoria Avenue* - a major collector road route through the town centre

* *Albert Avenue* - a collector road connecting to the Highway and running parallel to Victoria Avenue

* *Orchard Street and Anderson Street* - collector roads connecting to Albert Avenue.

Albert Avenue is straight/level with a 12.8 metres wide carriageway as is Thomas Street while Albert Lane is 6.5 metres wide.



ROAD NETWORK

FIG 3

3.2 TRAFFIC CONTROLS

The traffic and parking controls which have been applied to the road system in the vicinity of the site comprise:

* the traffic signals at the Albert Avenue/Pacific Highway intersection. Details provided on the design plan reproduced overleaf include:

    - tidal flow lane arrangement in the Highway
    - 3 lanes westbound and 1 lane eastbound in Albert Avenue

* the traffic control signals at the Pacific Highway/Victoria Avenue and Pacific Highway/Fullers Road/Help Street intersections which provide for right-turn movements into Victoria Road and Fullers Road respectively

* the traffic control signals at Albert Avenue/Thomas Lane intersection

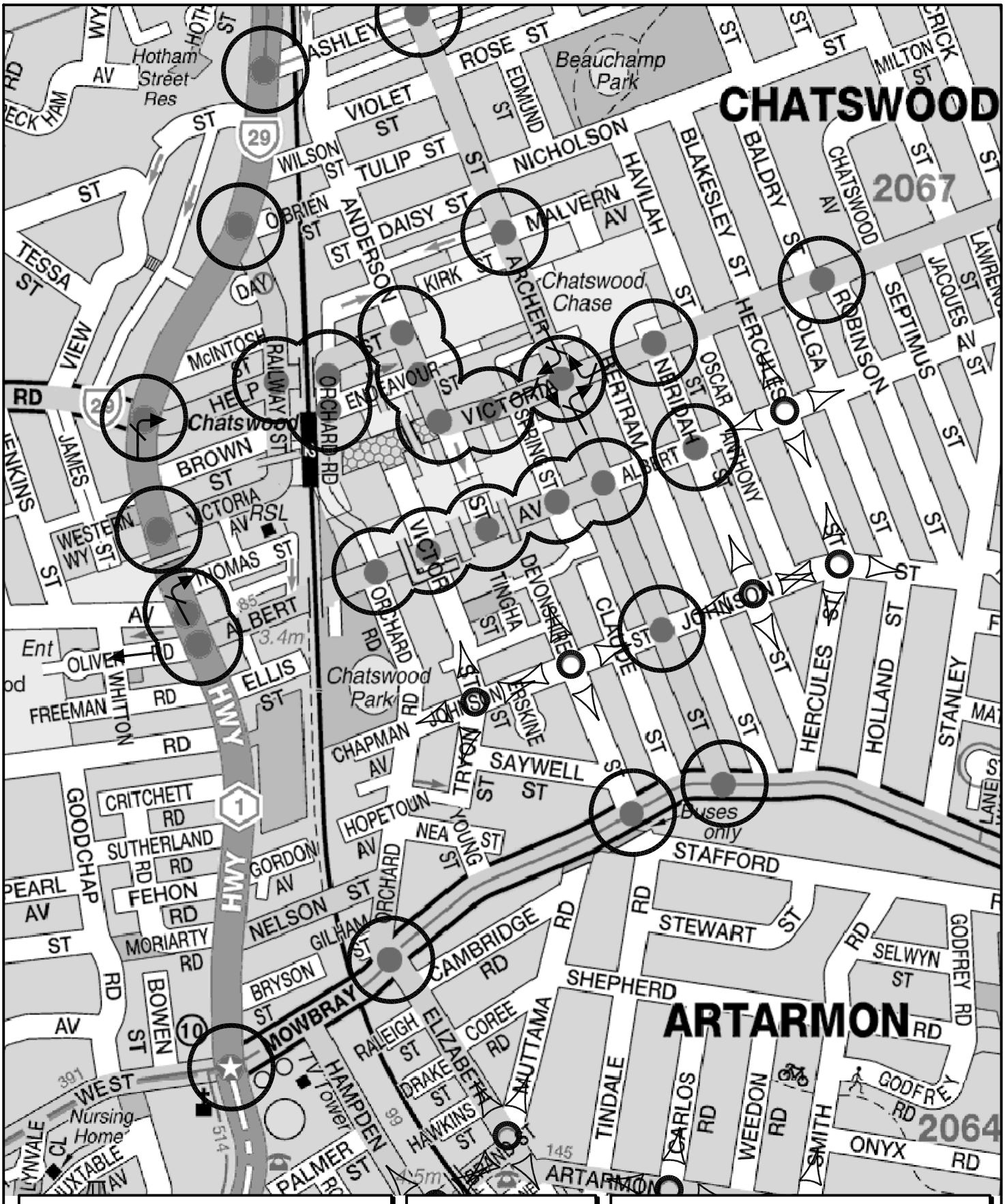
* the ONE WAY westerly restriction on Oliver Road at the Pacific Highway intersection

* the ONE WAY southerly restriction in Thomas Lane

* the 50 kmph speed restrictions except for the 40 kmph restriction in the CBD core area

* the NO STANDING restrictions along the Pacific Highway and Albert Avenue

* the central median island in Pacific Highway across the Thomas Street intersection.


CHATSWOOD
ARTARMON
Beauchamp Park
Hotham Street Res
Chatswood Chase
Chatswood Park
Nursing Home
TV Tower
Buses only
2067
2064
HWY
RD
ST
AV
WY
29
1
10
391
514
99
145
3.4m
4.5m
ASHLEY
ROSE ST
VIOLET ST
WILSON ST
TULIP ST
NICHOLSON ST
DAISY ST
MALVERN AV
KIRK ST
McINTOSH ST
RAILWAY ST
ORCHARD RD
ENDEAVOUR ST
VICTORIA ST
BROWN ST
VICTORIA AV
RSL
THOMAS ST
ALBERT AV
OLIVER RD
ELLIS ST
FREEMAN RD
WHITTON RD
CHAPMAN AV
CRITCHETT RD
SUTHERLAND RD
FEHON RD
MORIARTY RD
GORDON AV
NELSON ST
GILHAM ST
BRYSON ST
MOWBRAY RD
BOWEN ST
PEARL AV
GOODCHAP RD
HOPETOUN AV
NEA ST
YOUNG ST
TRYON ST
SAYWELL ST
STAFFORD ST
STEWART ST
CAMBRIDGE RD
SHEPHERD ST
RALEIGH ST
ELIZABETH DR
COREE DR
HAMPDEN AV
PALMER ST
WEST ST
LYNVALE CL
HAWKINS ST
DRAKE ST
TINDALE RD
CARLOS DR
WEEDON RD
SMITH ST
ONYX RD
GODFREY RD
SELWYN ST
MUTTAMA ST
CLAUDE ST
DEVONSHIRE ST
TINGHA ST
ERSKINE ST
JOHNSON ST
HERCULES ST
HOLLAND ST
STANLEY ST
ANTHONY ST
OSCAR ST
BERTRAM ST
ALBERT ST
HAVILAH ST
BLAKESLEY ST
BALDRY ST
CHATSWOOD AV
ROBINSON ST
SEPTIMUS ST
JACQUES AV
OLGA ST
NERIDAH ST
EDMUND ST
ANDERSON ST
ARCHER ST
O'BRIEN ST
TESSA ST
VIEW ST
JAMES ST
WESTERN WY
HELP
ENKINS
MILTON ST
LEGEND
TRAFFIC SIGNAL CONTROL
ROUNDABOUT
RESTRICTED TURNING MOVEMENT
N
TRAFFIC CONTROLS
FIG 4

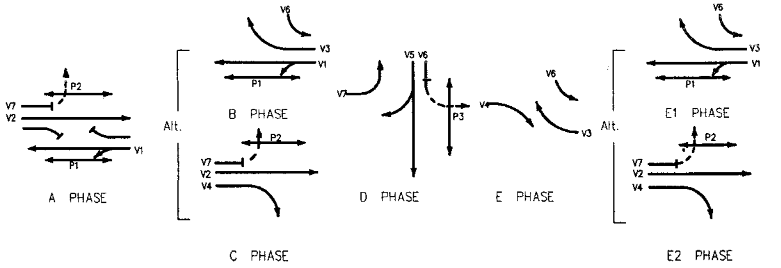
DRAWN USING CAD
DO NOT AMEND MANUALLY

Date in Service 16-12-74

0010.490.VV.0882

SIGNAL GROUP PHASE CHART

SIGNAL GROUP	PHASE DURING WHICH GREEN DISPLAYED A	B	C	D	E	E1	E2	OVERLAPS PERMITTED	REMARKS	TABLE
V1	X	X				X		A/B A/E1 ⊖ E1/A/B	⊖ P1 Not Running.	VD018-5
V2	X		X				X	A/C A/E2 ⊖ E2/A/C	⊖ P2 Not Running.	VD018-5
V3		X			X	X		B/E E/E1		VD018-5
V4			X		X		X	C/CE E/E2		VD018-5
V5				X						1
V6		X		X*	X	X		B/D◓ B/E E/E1 D/E	*Timed RA protection for P3 ped ◓P3 not demanded.	106
V7	X*		X*	X			X*	E2/A/C/D D/E2◓ A/D D/A◓	*Timed RA protection for P2 ped ◓P2 not demanded.	112
P1	X	X				X		E1/A/B		104
P2	X		X				X	E2/A/C		101
P3				X						102



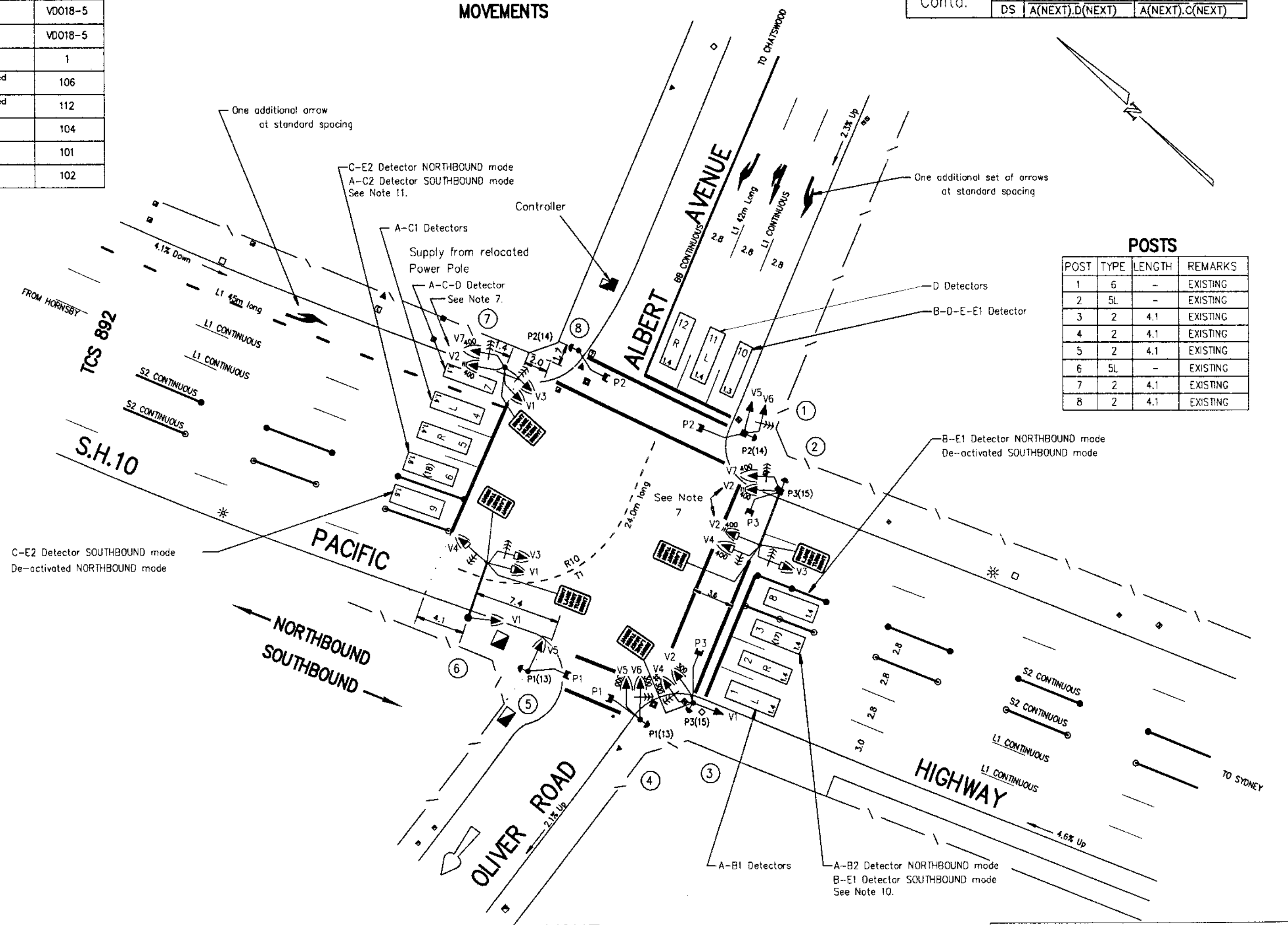
MOVEMENTS

DETECTOR SPECIFICATION

Detector		Specifications				
B-D-E-E1	FN	E1(PR)	D(E2)	E(E3)	B(PR)	B(E3)
	SG/PS	B̄.D̄.Ē.	D	E	B̄.D̄.Ē.	B
	DS	D̄	RED(NEXT)	RED(NEXT)	Z-.D̄	RED(NEXT)
A-C-D	FN	D(PR)	D(CL)	A(E6)		
	SG/PS	Ā.C̄.D̄	A/C	A		
	DS	Ā.C̄	A-C-D(NG)	C(NEXT).D(NEXT)		
A-C-D Contd.	FN	C(E4)		D(E3)		
	SG/PS	C		D		
	DS	A(NEXT).D(NEXT)		A(NEXT).C(NEXT)		

POSTS

POST	TYPE	LENGTH	REMARKS
1	6	-	EXISTING
2	5L	-	EXISTING
3	2	4.1	EXISTING
4	2	4.1	EXISTING
5	2	4.1	EXISTING
6	5L	-	EXISTING
7	2	4.1	EXISTING
8	2	4.1	EXISTING



NOTES

1. This site is SCATS linked.
2. Special stop signs R1-202 to be placed on Post 1.
3. This site operates to standard VD 018-5.
4. Condy Bar locations shown thus :
   NORTHBOUND mode................ ●
   SOUTHBOUND mode................ ○
5. Mode switch to be installed in the controller to allow switching from the outside, marked as follows: NORTHBOUND/SOUTHBOUND.
6. Mode switch is to be connected to detector 16. In the ON position, the NORTHBOUND mode is selected.
7. "V2" Phase lantern assemblies are focussed such that they are not visible at the southbound stop line of TCS No.892.
   "V2" lantern 400mm long visors in green aspect only.
   "V2" lantern horizontal louvres in green aspect only.
8. A-B2 detector to operate as B-E1 detector in SOUTHBOUND mode.
   A-B2 detector to operate as A-B detector in NORTHBOUND mode.
   A-C2 detector to operate as A-C detector in SOUTHBOUND mode
   A-C2 detector to operate as C-E2 detector in NORTHBOUND mode
9. Civil works shown on Plan Reg. No. 0010.490.RC.2500
10. Detector 17 provides additional strategic output for detector 3.
11. Detector 18 provides additional strategic output for detector 6.
12. All push buttons are audio tactile.

DESIGN LAYOUT

A ORIGINAL ISSUE
PLAN REDRAWN J/1 4887
PROVIDE TIDAL FLOW USING CANDY BARS
REPLACE POST 5, TYPE 6
REMOVE V5 LANTERN POST 6
S.E. 2/4/93

B ISSUE
W.A.E.
J.H. 7/7/93

C ISSUE
WAE (SITE CHECKED)
LAWSON/MEYER 4/94

D ISSUE
RELOCATED POSTS 5,6,7,8
ADDED LT BAY TO ALBERT AVE
UPDATED PLAN TO SUIT NEW CIVIL WORKS
TEH 5-2-96

E Issue JI YEN 97/040
Relocated posts 1,5,7 & 8
Post 7 was type 6, post 1 was type 2. All P.Bs. converted to A.T. Plan altered as per WAE.
D.C. 7/7/98

F Issue JI SS23 19/11/98
Removed: A O/Filter option, SSGDS chart & guard fence.
Relabelled detectors.
Renumbered det's & notes.
Added: signs post 3 & 6, notes 5,6,10,11 & 12, V4 lantern post 6
Altered: SGP chart, mov't diag, detector spec, notes, post chart, pav't marking.
Plan to WAE
GAP 8/4/99

G Issue JI SS23
Altered: Detector Spec. Movement diag, Det labels & numbers, V5 Lantern on post 5.
Added: Candy bar locations and 400 visors on V7 signal group
GAP 29/06/99

REFERENCE PLANS	
Specification	SI/TCS/7
Det. Sched. Exp.	VD018-10
SSG Dis. Seq.	VD018-8
S.D.O.	VD018-5

U.B.D.REF. MAP195 H11
I.S.G. CO-ORDS E 316465 N 1258614

J.ZOUTENDYK — DESIGNED
J.ZOUTENDYK — PASSED
D.REID — RECOMMENDED

APPROVED [signature] DESIGN ENGINEER DATE 17-5-1993
ACCEPTED [signature] DATE 20-5-1993

ROADS AND TRAFFIC AUTHORITY OF NSW
CITY OF WILLOUGHBY
S.H.10 PACIFIC HIGHWAY, ALBERT AVENUE AND OLIVER ROAD
CHATSWOOD

DRAWING FILE : VV0882_9G.DGN
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SYDNEY REGION
SCALE 5 0 5 10
SHEET 9
FILE 490 TS 148
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ISSUE A B C D E F G
REGN. 0010.490.VV.0882

3.3 TRAFFIC CONDITIONS

An indication of the prevailing traffic conditions on the road system serving the site is provided by traffic surveys undertaken as part of this study which are reproduced in Appendix A and summarised in the following:

		AM	**PM**
Pacific Highway	Northbound	1607	1826
	Right-turn	200	191
	Left-turn	11	12
	Southbound	2625	1670
	Right-turn	18	56
	Left-turn	195	189
Albert Avenue	Westbound	33	63
	Right-turn	135	392
	Left-turn	38	158

The operational performance of this intersection has been analysed using SIDRA and the results for the morning and afternoon peak periods are summarised in the following while the criteria for interpreting the results are reproduced overleaf:

	AM	**PM**
LOS	A	B
DS	0.896	0.855
AVD	13.4	14.9

It is apparent that the operational performance of the intersection is relatively satisfactory although traffic flows in reality are at times disrupted by the congestion along the Highway generally (in peak traffic periods).

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, 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 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**[1] 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*

Traffic surveys have also been undertaken at the Albert Avenue/Albert Lane, Albert Lane/Fleet Lane and Albert Lane/Thomas Street intersections. The results of those surveys are provided in the following:

		AM	**PM**
Albert Avenue	Westbound	201	607
	Right-turn	132	100
	Eastbound	299	333
	Left-turn	96	47
Albert Lane	Southbound	2	5
	Right-turn	5	6
	Left-turn	45	74
Thomas Street	Eastbound	94	33
	Right-turn	19	4
	Westbound	33	53
	Left-turn	46	57
Albert Lane	Right-turn	208	145
	Left-turn	8	14

It is apparent that there is a significant northbound movement from Albert Avenue along Albert Lane to Thomas Street (east) and no doubt Victoria Avenue and Railway Street.

The results of other surveys undertaken at intersections in the vicinity are provided in the following:

		AM	PM
Pacific Highway	Northbound	1496	2126
	Right-turn	208	156
	Southbound	2043	1697
	Left-turn	26	37
Victoria Avenue	Right-turn	93	107
	Left-turn	87	143
Albert Avenue	Eastbound	236	327
	Right-turn	180	94
	Westbound	206	670
	Left-turn	158	128
Orchard Road	Right-turn	44	41
	Left-turn	177	71
Railway Street	Northbound	83	146
	Right-turn	82	116
	Left-turn	59	108
	Southbound	213	93
	Right-turn	31	68
	Left-turn	89	171
Help Street	Eastbound	359	412
	Right-turn	89	61
	Left-turn	2	6
	Westbound	267	335
	Right-turn	98	198
	Left-turn	295	89

The operational performance of these intersections as modeled with SIDRA is summarised in the following:

	AM		PM	
	LOS	**AVD**	**LOS**	**AVD**
Pacific Highway/Victoria Avenue	A	7.9	A	8.8
Albert Avenue/Orchard Road	B	18.3	B	15.9
Railway Street/Help Street	B	17.9	B	19.3

These results indicate a relatively satisfactory operational performance. Traffic delays and congestion are experienced on the road system in Chatswood at times, however these circumstances are related to:

* major intersections on the Pacific Highway (Boundary Street, Fullers Road/ Help Street and Mowbray Road)

* Victoria Avenue through the heart of the CBD

* Archer Street/Victoria Street intersection

* retail centre carpark accesses.

Nevertheless, there are locations in the CBD area where flexible access is available and approach and departure can be achieved without undue delay. Also residential apartments and commercial floorspace do not engender significant traffic consequences (as compared to retail floorspace) because:

* shopping, working and public transport is within easy walking distance for residents

* parking provision is severely constrained for workers and excellent public transport is available.

3.4 PUBLIC TRANSPORT SERVICES

Chatswood CBD has excellent access for public transport services including:

Railway Services

The North Shore and Western Lines operate through Chatswood Railway Station which is located just to the north of the site. These lines provide 13 trains per hour in

the morning and afternoon peak periods and there are currently some 32,000 passengers passing through the station each day.

Bus Services

There are services provided by 3 operators accessing Chatswood as well as 2 interstate operators with some 460 scheduled services operating each day out of the rail interchange and 220 per day operating out of Railway Street.

There is also excellent provisions for pedestrian access and circulation within the CBD (eg Victoria Mall) as well as provisions for bicycle access.

4. FUTURE TRAFFIC CIRCUMSTANCES

Landuse

Chatswood is a developing Regional Centre with excellent public transport services and there are numerous current, approved, proposed and envisaged landuse developments in the centre. These developments include:

* Chatswood Civic Place
* Chatswood Interchange Complex
* Chatswood Chase Expansion
* Albert Avenue/Archer Street
* Archer Street Carpark Site
* the subject development

Road Network and Traffic

Council engaged the consultant GHD to prepare a traffic model reflecting the future traffic circumstances consequential to landuse development and a range of road and traffic management works. For that traffic assessment process the traffic model adopted a future traffic generation outcome for the subject site (without discount for existing) of:

AM		PM		SAT MD	
IN	**OUT**	**IN**	**OUT**	**IN**	**OUT**
80	64	64	80	10	10

Details of the options for road and traffic management works which are being assessed in Council's study are provided in Appendix B and include:

* widening of Albert Avenue between the Pacific Highway and Crispe Lane (1 additional westbound lane)

* introduction of a one-way northbound flow in Albert Lane.

5. PARKING, INTERNAL CIRCULATION AND SERVICING

Parking

Willoughby City Council's DCP specifies a parking provision relevant to the proposed development scheme as follows:

Residential Apartments (Railway Precinct Zone 3 (c2))		
One-bedroom	-	1 space
Two-bedroom	-	1 space
Three-bedroom	-	1.25 spaces
Visitors	-	1 space per 4 apartments
Commercial Office	-	1 space per 110m^2 GFA
Retail Shop	-	1 space per 25m^2 NFA

Application of this criteria to the development scheme would indicate the following provisions:

Residential Apartments		
16 x studio	-	8 spaces
18 x one-bedroom	-	18 spaces
140 x two-bedroom	-	140 spaces
34 x three-bedroom	-	43 spaces
Visitors	-	52 spaces
Total	**-**	**261 spaces**
Commercial – 19,092m^2	-	174 spaces
Retail – 2,031m^2	-	82 spaces
Public	-	250 spaces
Total	**-**	**506 spaces**
GRAND TOTAL	**-**	**767 spaces**

The development scheme represents a special case due to the incorporation of 250 public parking spaces (currently 150 spaces on-site) and the very close proximity to high capacity/frequency public transport services. In this case, some of the residential visitors as well as retail/commercial visitors will be accommodated in the public parking provision. It is also relevant that there will be 10 affordable apartments in the development and Council's code does not have regard for studio apartments (which have a lower 'car ownership' characteristic).

The proposed allocation of the total parking provision is as follows:

Residential		
14 studio apartments @ 0.5	-	7 spaces
184 apartments @ 1.0	-	184 spaces
Manager/caretaker unit	-	1 space
Commercial/Retail	-	64 spaces
Public	-	250 spaces
Total	**-**	**506 spaces**

The shortfall of provision includes:

* 52 resident visitor spaces
* 192 commercial/retail spaces.

In consideration of the visitor and retail implications it is proposed to allocate 40 spaces of the 250 public spaces to resident visitors and retail patrons by way of a Section 94 contribution. Thus the overall provision is 546 spaces compared to the 791 spaces which might otherwise be provided.

The Director General's Requirements place significant emphasis on constraining the parking provision and traffic generation outcome of the proposed development.

The proposed constrained provision will serve a pre-eminent role in reducing the traffic generation of the development and encouraging the use of the excellent public transport services available whilst maintaining a suitable and acceptable parking provision.

An appropriate provision will be made for designated 'accessible' spaces while bicycle parking will be provided for residents and retail staff/patrons.

Internal Circulation

The internal circulation arrangements will adopt a flexible two-way system throughout with the residents, visitor and commercial carparking located in separate basement areas to the public and retail parking. The layout of the basement areas will comply with the design requirements of AS 2890.1 particularly in relation to ramps, aisles, bays and manoeuvring areas.

The public parking will be operated as a public parking station with 'central pay' provisions and a 'Parking Management Plan' will be prepared as part of the Construction Certificate documentation. The design of the public carpark element will also comply with Council's Design Brief for this facility.

Servicing

Provision will be made in the loading docks for two MV's (8.8 metres) and 2 vans (as shown on the turning path diagrams in Appendix C) as well as access provision for a 9.6 metre refuse vehicle and 3 designated courier spaces. Small service vehicles will also access this area while service personnel etc will be able to use the visitor and public parking spaces.

This provision will be quite suitable for the servicing requirements of the proposed development while any occasional requirement for a large truck to service the site will be accommodated by the available kerbspace in Thomas Street and Albert Avenue (eg the indented bay).

6. ACCESS AND TRAFFIC

Access

The proposed vehicle access arrangement comprises separate ingress and egress driveways on Albert Avenue located towards the eastern boundary. This access will be restricted to left-turn IN/OUT movements by a central median island in Albert Avenue (as per the DCP).

These accesses will be located where there are excellent sight distances available and will accommodate all vehicles requiring to use the respective accesses including a 9.5 metre refuse truck for the loading dock.

Provision will be made for set-down/pick-up (taxis etc) activities on the Thomas Street frontage of the residential building and in an indented bay on Albert Avenue office building.

Traffic

The existing Council carpark on the site accommodates some 150 spaces and the assessed traffic generation of these spaces during the morning and afternoon peak periods is as follows:

	AM	**PM**
Ingress	20	10
Egress	10	40

Criteria in relation to the traffic generation of residential apartments is provided by the RTA's Guide to Traffic Generating Development as follows:

High Density Apartments (CBD Environment)	-	0.24 vtph (AM and PM peak)

The CTPP traffic assessment provided details of surveys which indicated that the traffic generation outcome would be somewhat less at 0.16 vtph per apartment. However, on the basis of the RTA criteria the proposed 198 apartments (10 apartments will have no parking provided) would generate some 48 vtph as follows:

AM		**PM**	
IN	**OUT**	**IN**	**OUT**
8	40	40	8

Due to the 'constrained' parking provision for the commercial floorspace the resultant traffic generation will not reflect a normal RTA Guideline criteria (ie RTA rate is based on parking provision at 1 space per 40m^2). TTPA have undertaken surveys of numerous CBD commercial buildings with 'constrained' parking provision. The results of some of these surveys are provided in Appendix B and reveal a generation rate per parking space in the morning and afternoon peak periods of 0.26 vtph (including service vehicles). This data is supported by traffic assessments undertaken by ARUP for the City of Sydney which revealed traffic generation rates in similar circumstances of 0.24 to 0.30 vtph per space.

TTPA have also undertaken surveys of public parking stations in CBD environments (not shopping centre carparks) and these are typified the Kent Street carpark in the Sydney CBD which exhibits a traffic generation rate in peak periods of 0.32 vtph per space. This assessment is supported by an assessment undertaken by Sinclair Knight Merz for the City of Sydney of the demand characteristics at public parking stations in the Sydney CBD which reveal generation rates per space of 0.22 to 0.32 vtph. The generation rate at Chatswood would be similar although the morning peak would be somewhat lower at 0.20 vtph due to the relative absence of retail activity at this time.

Thus the projected total traffic generation of the proposed development is very comparable to that assessed for the site in Council's study as follows:

	AM		PM	
	IN	**OUT**	**IN**	**OUT**
Residential – 198 apartments	8	40	40	8
Commercial/retail – 85 spaces	20	2	2	20
Public – 250 spaces	40	10	20	60
Total	**76**	**52**	**62**	**89**
Council's Traffic Model	80	64	64	80

The projected generalised distribution of generated traffic is as follows:

	Approach	Depart
Highway from north	40%	-
Highway from south	40%	-
Albert Lane	20%	-
Albert Avenue East	-	40%
Orchard Road South	-	30%
Orchard Road U-turn	-	20%
Spring/Archer	-	10%

The projected distribution of 'additional traffic' (ie to that of the existing carpark) will be entirely comparable to that adopted in Council's current Traffic Study as follows:

	Additional to Existing	
	AM	**PM**
Highway/Albert	57	36
Albert/Orchard	31	64

In reality the additional traffic movements on Albert Avenue at the Pacific Highway intersection will only represent some 1-2 vehicle trips each 2 cycles of the traffic signals in the morning and afternoon peaks and will therefore essentially be imperceptible.

7. PEDESTRIANS AND CYCLISTS

7.1 DESIGN PROVISION

The development design makes very significant provision for pedestrians and cyclists by:

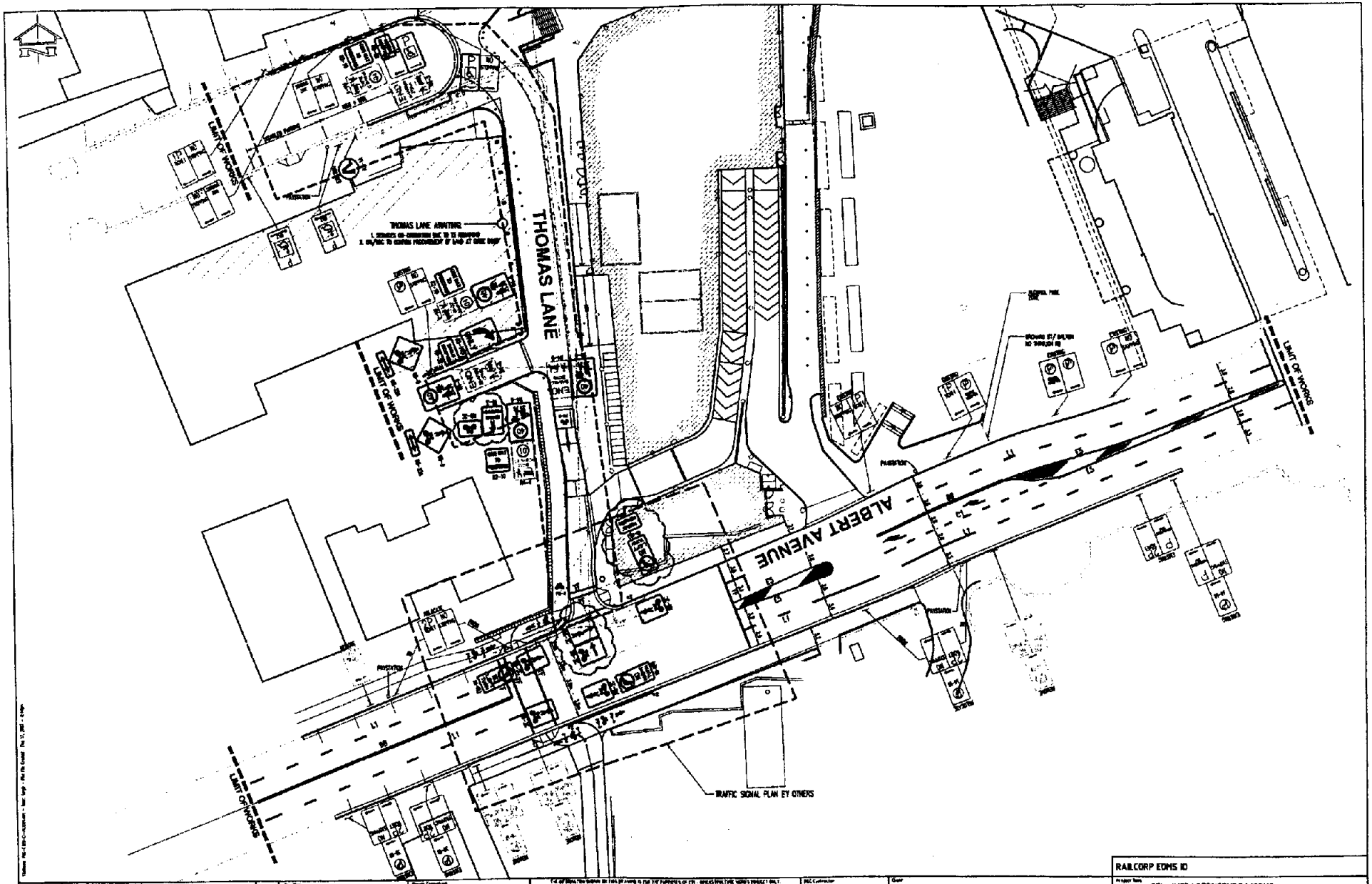
* incorporation of a very generous and amenable 'through site' corridor
* provision of significant pedestrian plaza areas and colonnades
* provision of substantial bicycle parking provision with showers and lockers
* upgraded footways along Albert Avenue and Thomas Street.

Cyclist access will be facilitated by the recently constructed access facilities along Thomas Lane including the 'shared footway' along Albert Avenue and the signal controlled crossing of Albert Avenue (at Thomas Lane).

7.2 PROVISION DURING CONSTRUCTION

Pedestrian/cyclist movements along the Albert Avenue and Thomas Street frontage footways will be maintained with 'B Class' hoarding protection during the construction process. There will not be any through site link provision during construction, however the nearby new Thomas Lane pedestrian and bicycle corridor will be readily and conveniently available including the signal controlled crossing with its linkages to the north and south.

Details of these facilities are provided on the design plan reproduced overleaf.



07	17.12.07	ISSUE REVISED	FL
No	BY	DATE	DESCRIPTION	APPD

Design Consultant: TaylorThomson Whitting

	PREPARED	CHECKED	PSC APPROVED
DESIGN	P. LAMBERT		
DRAFTING	J. BARNETT		DATE

RAILCORP EDMS ID

CTI - INFRASTRUCTURE WORKS

ALBERT AVENUE
LINEMARKING PLAN

STATUS: FOR CONSTRUCTION

DRG No: PRL-CTIW-CI-703004

REV: 07

8. TRAVEL MODE OUTCOME

The Chatswood Centre has excellent public transport services including heavy rail and buses. The existing journey-to-work data for the Chatswood Travel Zone indicates that:

* 53% of residents use public transport as the primary means for travel to work

* 23% of residents both live and work in the zone of which 62% use public transport.

Thus, the very convenient availability of these high capacity, high frequency and flexible public transport services act to encourage high levels of utilisation by residents, workers and visitors. This situation will be supplemented by:

* the DCP controls which constrain parking provision

* the proposed parking provision outcome which further constrains commercial (worker) parking

* the facilitation of pedestrian and cyclist movements.

It is apparent that this proposed development (as with the existing Chatswood landuse circumstances) will achieve a travel mode outcome which exceeds the goals identified in State Government strategies.

This travel mode outcome will not have any adverse implications due to:

* the significant proportion of residents also working in the area

* the dual direction of travel (ie residents from/to Chatswood and workers/ visitors to/from Chatswood)

- the high capacity, frequency and flexibility of existing public transport services
- the excellent facilities and connections which will be available and provided to encourage travel by walking and cycling.

9. ISSUES

The Director General's requirements refer to:

* the RTA/Council Traffic Study for Chatswood CBD

* the requirements of the RTA in relation to traffic modelling of intersections in the area.

Firstly, the Chatswood Traffic Study has not been completed as yet and therefore any study recommendations relative to the development site are not available for assessment. One of the options being considered in the study is to introduce a one-way northerly traffic flow in Albert Lane. The reasons for considering this change is not apparent, however it would have distinct disadvantages for the development site as it would mean that all ingressing traffic would need to travel through the Pacific Highway/Albert Avenue intersection.

Chatswood CBD is the subject of very significant development activity with major projects in progress (Civic Centre, Chatswood Chase, Rail Interchange complex), major projects approved (former Council carpark sites) and other major projects proposed and envisaged including the subject site. The Council Traffic Study involves a very detailed micro simulation traffic model of the CBD which has regard for these current and future developments as well as the identified road and traffic management changes.

It has been demonstrated in this report that:

* the projected additional traffic generated as a consequence of the development (ie additional to that of the existing carpark use) will be relatively minor. There will only be some 40 to 60 additional peak hour movements through the Pacific Highway/Albert Avenue intersection (ie existing 4,500 vtph. There is a long

established scheme to widen Albert Avenue easterly from the Highway and the necessary land is being dedicated with a current development scheme. The Council Study also recommends some traffic movement changes in the future in order to rationalise this intersection

* the projected traffic generation of the development is virtually identical to that adopted for the site in Council's Traffic Study.

It is also relevant that:

* it will be some 2 – 3 years at the earliest before this development is built and occupied

* the development will be subject to Section 94 Contributions towards the road and traffic improvements for the CBD

* the vehicle access for the development is restricted to left-turn IN/OUT.

In the circumstances, it is apparent that the traffic modelling identified in the RTA letter (ie site development traffic overlaid on 2009 base traffic) is not relevant to the circumstance. The traffic implications of the overall development in Chatswood CBD is the subject of the joint RTA/Council Study and the necessary road improvements will emanate from that study.

The proposed development scheme contributes to an optimum development outcome (in traffic terms) for the CBD by virtue of the very constrained parking provision. This outcome circumstance would not have been realised at the time the RTA letter was proposed and the overall considerations have been bought to the attention of the Authority's Transport Planning Sydney Region.

10. CONCLUSION

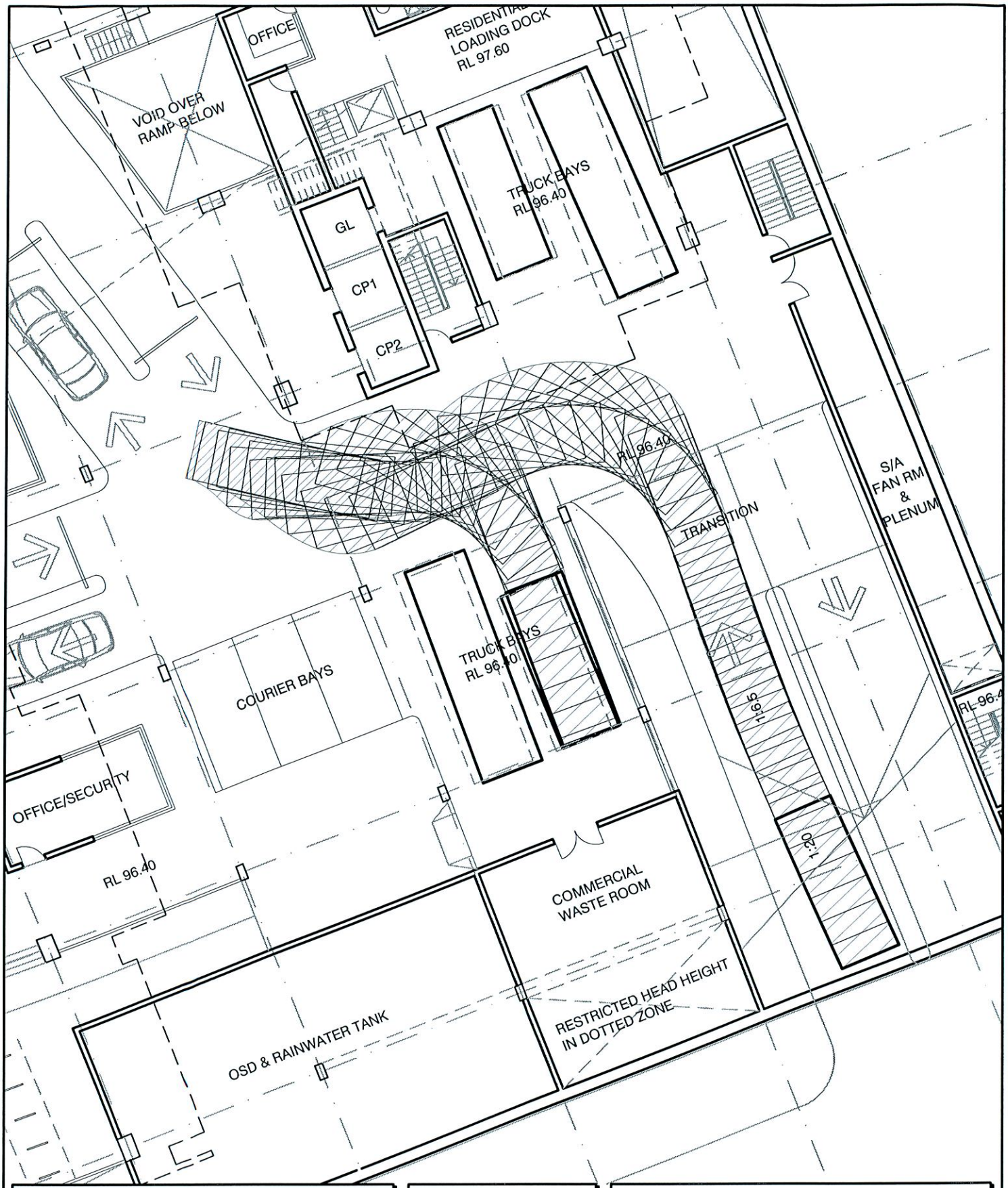
The superfluous Council carpark site with frontages to Thomas Street and Albert Avenue at Chatswood presents on ideal opportunity for a new mixed use development which will complement the evolving CBD environment.

Assessment of the proposed development scheme, which accords with the DCP criteria and comprises retail, commercial and residential apartment elements, has concluded that:

- there will be no adverse traffic implications beyond that foreseen with the DCP provisions

- the proposed parking provision will comply with Council's code and the requirements of the development

- the proposed vehicle access and circulation arrangements will be suitable and appropriate.



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.

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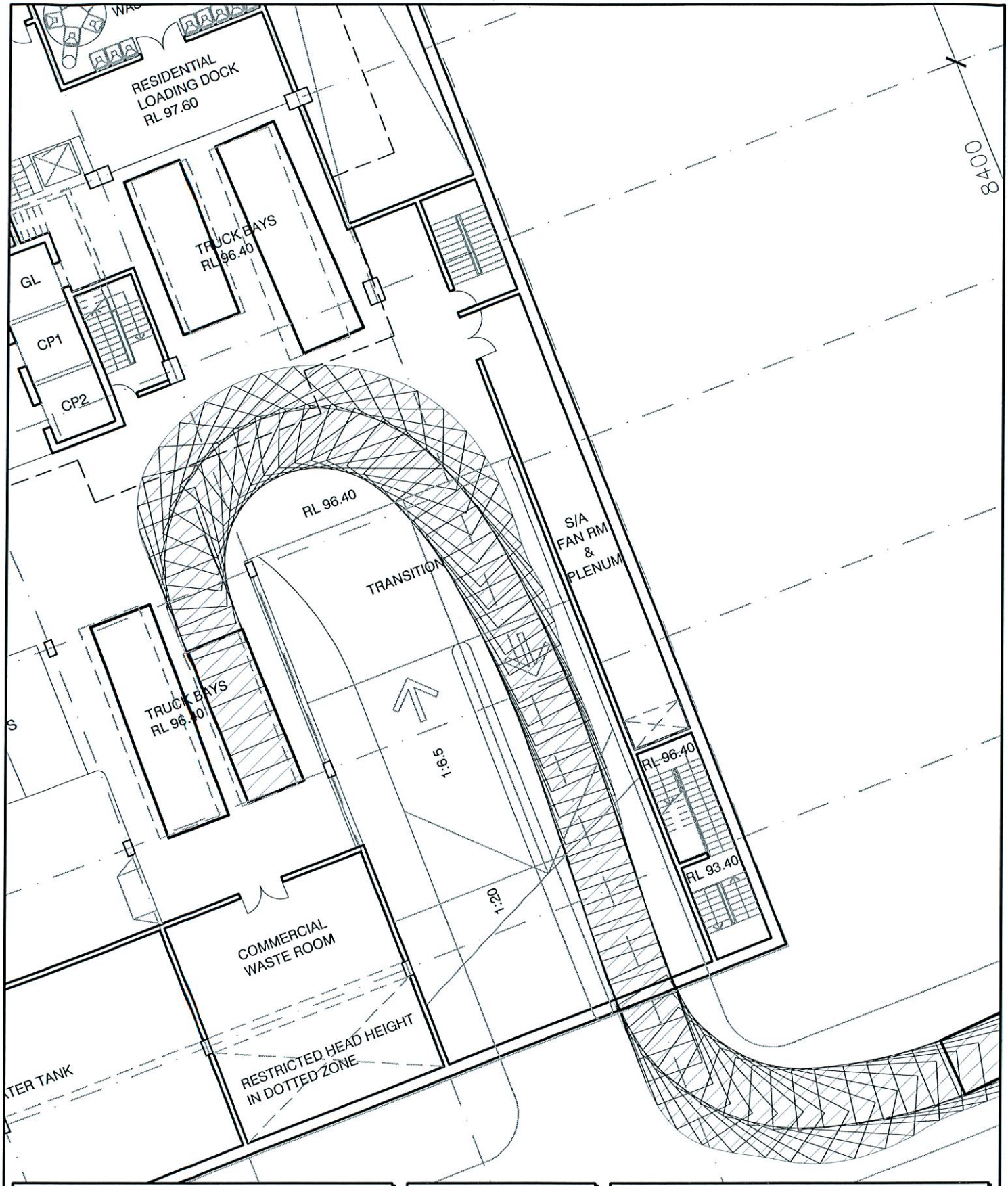
SWEPT PATH ANALYSIS OF A 6.4m RIGID VEHICLE ENTERING THE SITE

SP 5



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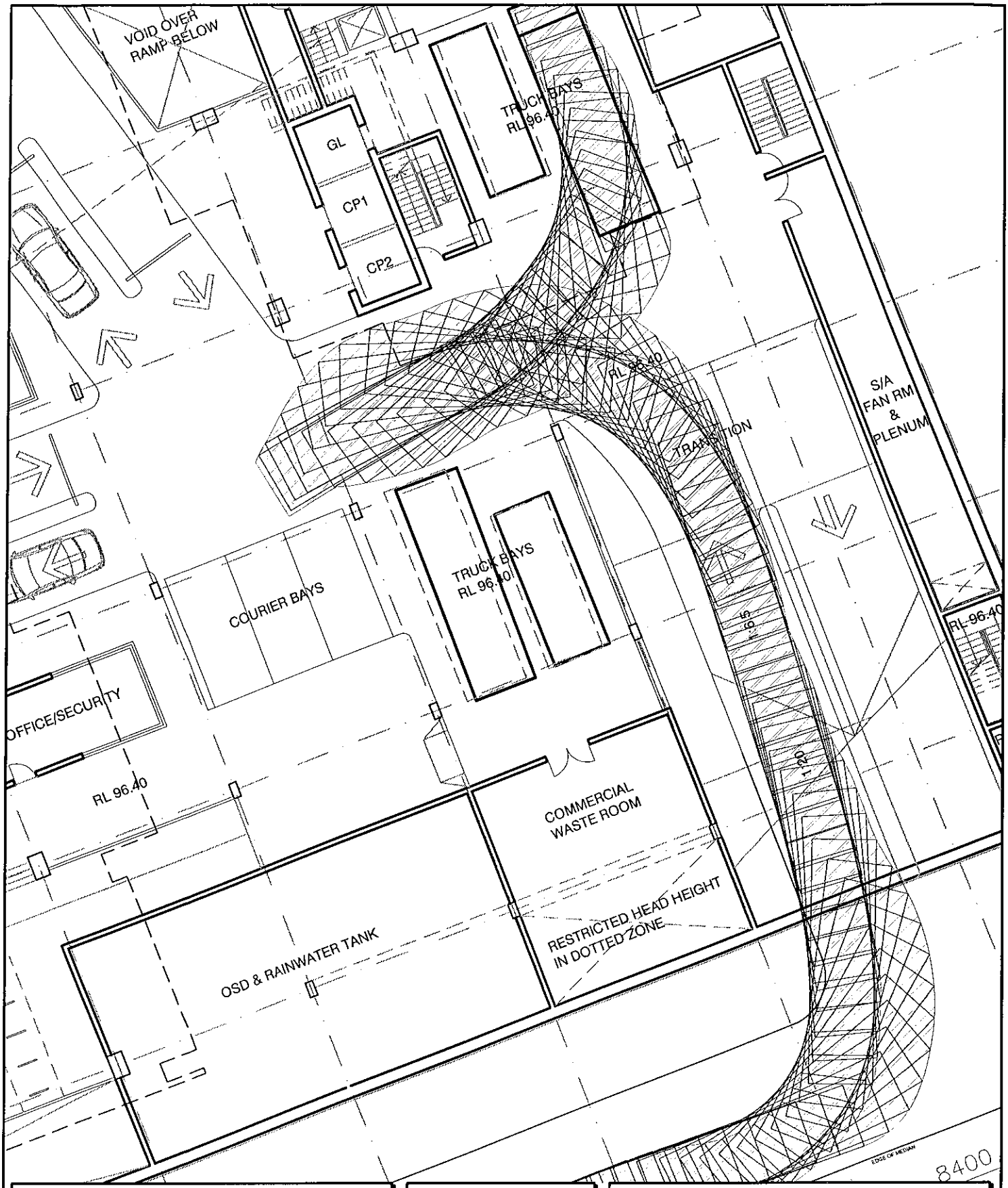
N

SWEPT PATH ANALYSIS OF A 6.4m RIGID VEHICLE EXITING THE SITE

SP 6



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N

SWEPT PATH ANALYSIS OF A 9.6m REFUSE VEHICLE ENTERING THE SITE

SP 7