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1. INTRODUCTION

This report has been prepared on behalf of Meriton Apartments to accompany an Application to The Department of Planning for a proposed residential apartment development at 100 Bennelong Parkway within Sydney Olympic Park (Figure 1).

An SSD Application was submitted to the Department of Planning for development of Sydney Olympic Site 67 (A & B) and the Director General's Requirements specified in part:

"4. Transport and Accessibility

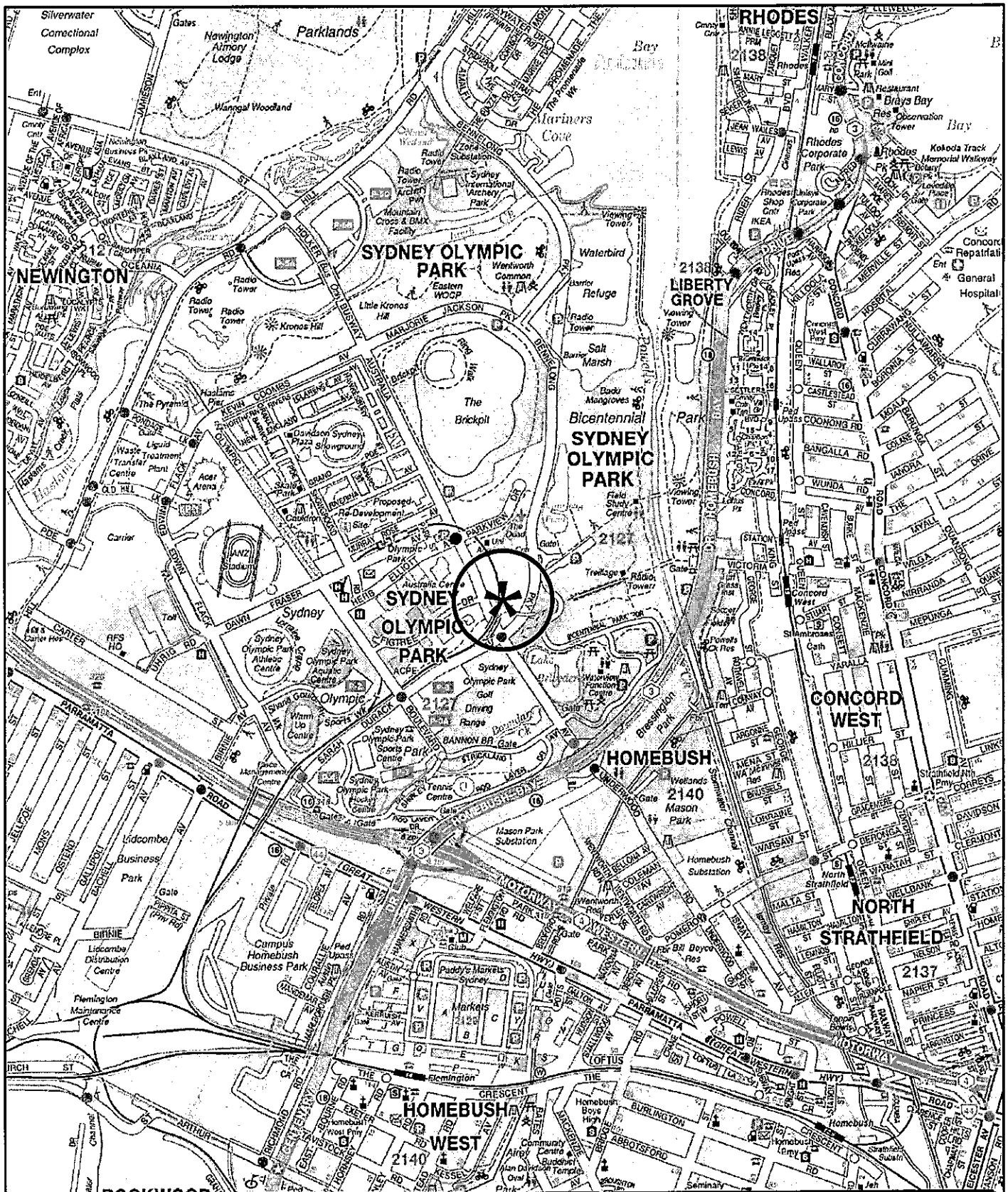
- *Detail access and parking arrangements at all stages of construction and measures to mitigate any associated pedestrian, cycle, public transport or traffic impacts.*
- *Detail access arrangements at all stages of operation and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and cycle networks.*
- *Demonstrate how users of the development will be able to make travel choices that support the achievement of public transport modal split targets of Master Plan 2030.*
- *Detail existing pedestrian and cycle movements within the vicinity of the site and determine the adequacy of the proposal to meet the likely future demand for increased public transport and pedestrian and cycle access, including any connections to the new Parkview Drive or Bennelong Parkway.*
- *Describe the measures to be implemented to promote sustainable means of transport including public transport usage and pedestrian and bicycle linkages in addition to addressing the potential for implementing a location specific sustainable travel plan.*
- *Demonstrate the provision of sufficient on-site car parking having regard to the availability of public transport and car parking controls of Master Plan 2030. (Note: reduced car parking provision maybe supported in areas well serviced by public transport.)*
- *Estimate the total daily and peak hour trips generated by the proposed development, including accurate details of the current and future daily vehicle movements and assess the impacts of the traffic generated on the local road network, including intersection capacity and any potential need for upgrading or road works, having regard to local planning controls".*

The Development Application proposes:

- Two buildings
- 342 residential apartments
- Child Care Centre (90 children)
- Basement parking
- Construction of part of the new precinct access road system

The purpose of this report is to:

- * describe the site, its context and the proposed development scheme
- * describe the road network serving the site, the prevailing traffic conditions and transport services in the area
- * describe the planned future road network changes and provisions for public transport, pedestrians and cyclists
- * assess the appropriateness of the proposed new access road and access driveways
- * assess the potential traffic implications
- * assess the suitability of the proposed parking, internal circulation and servicing arrangements
- * assess the availability and suitability of public transport services and measures to promote public transport usage and pedestrian/bicycle linkages
- * respond to the DG's requirements



LEGEND



LOCATION

FIG 1

2. PROPOSED DEVELOPMENT SCHEME

2.1 SITE, CONTEXT AND EXISTING USE

The development site (Figure 2), known as SOP Site 67, is Lot 84 in DP 855929 being an irregular shaped allotment of some 1.5ha with a frontage of some 107 metres to the western side of Bennelong Road.

The site is currently occupied by a mixed office/warehouse "business park" use by Jemena Limited and comprises:

Office	3,735m ²
Warehouse	1,533m ²
Total:	5,268m²

Parking for 237 cars is provided with a large "hardstand" area and vehicle access is located on the Bennelong Road frontage at the northern boundary

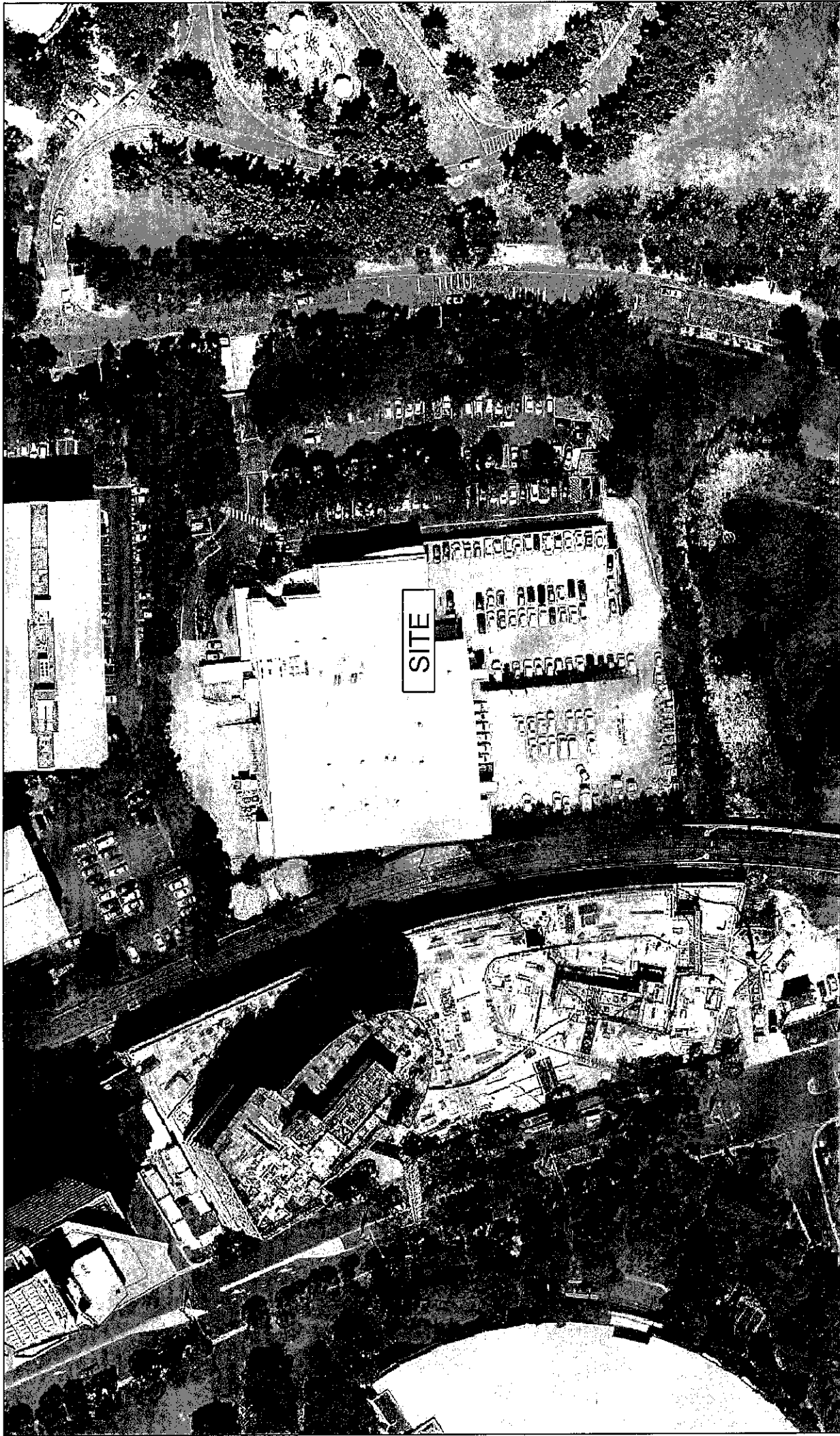
The site is bounded to the west by the railway line to Olympic Park Station (some 500m to the northwest) while the surrounding uses comprise:

- * a commercial building which adjoins to the north
- * Bicentennial Park which is located on the eastern side of Bennelong Parkway
- * the open space area which adjoins to the south
- * the new apartment buildings on the western side of the railway line

2.2 SYDNEY OLYMPIC PARK MASTER PLAN 2030

The SOP Master Plan 2030 provides the framework for further development of the SOP site with the key features being:

- regeneration of sites for commercial office use
- identification of sites for development beyond the Town Centre
- increased residential and educational uses
- maintaining and expanding event venues



LEGEND



SITE

FIG 2

The envisaged land use mix/magnitude under the Master Plan comprises:

- 414,836m² commercial office
- 575,089m² residential apartments
- 104,590m² educational
- 14,586m² entertainment
- 65,976m² accommodation
- 133,699m² additional to existing venue
- 31,273m² community
- 51,430 transport infrastructure
- TOTAL: 1,425,236m²**

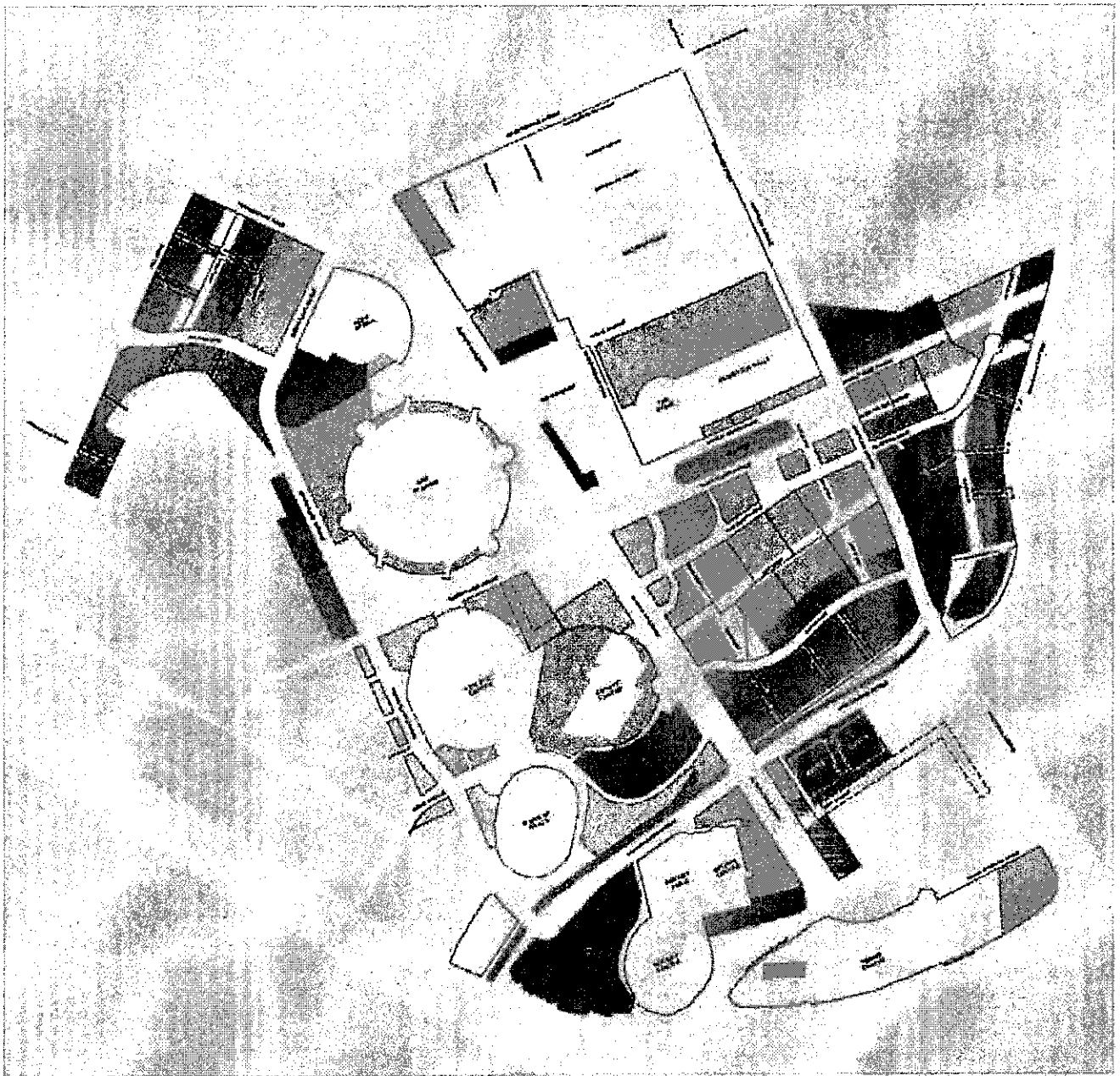
The projected population under the Master Plan development is as follows:

- 28,500 workers
- 14,000 residents
- 5,000 students
- 15,000 visitors per day

The Landuse Plan is reproduced from the Master Plan overleaf and the development site is located in the Parkview Precinct being one of the nine designated precincts shown on the diagram overleaf.

The Master Plan is supported by a Transport Strategy* which:

- identifies the planned public transport services and infrastructure
- identifies the planned road network and traffic management
- identifies the future mode share targets and measures to support sustainable modes of walking and cycling
- identifies the proposed travel demand management measures



Key

	Commercial		Land dedicated for Development Funded Streets
	Residential		Hotels and Serviced Apartments
	Community Uses		Venue and Operational Uses
	Educational		Venue Expansion Zone
	Car Parking, Coach Parking and Rail Corridor		Entertainment
	Land dedicated for Authority Funded Streets		Public Domain

Source: Sydney Olympic Park Authority (2008)

Master Plan 2030 land use

Sydney Showground

New opportunities for the Sydney Showground will help develop event improvements adding to the already impressive business and cultural events facilities at the precinct.

Haslams

Will be transformed into a leafy residential community for over 3,200 people.

Central

The vibrant hub of Sydney Olympic Park, Central will house over 280,000 sqm of commercial space, around 16,900 sqm of retail and home to around 3,400 residents.

Stadia

Sydney Olympic Park is Australia's premier place for major events. Master Plan 2030 provides for the addition of new ancillary uses while maintaining its outstanding operational capabilities.

Sports & Education

A unique campus incorporated into the area around the existing Aquatic Centres will be home to over 5,000 students.

Parkview

Incorporating community uses to the north, Parkview will become a park-edged residential precinct. Home to around 6,000 new residents.

Boundary Creek

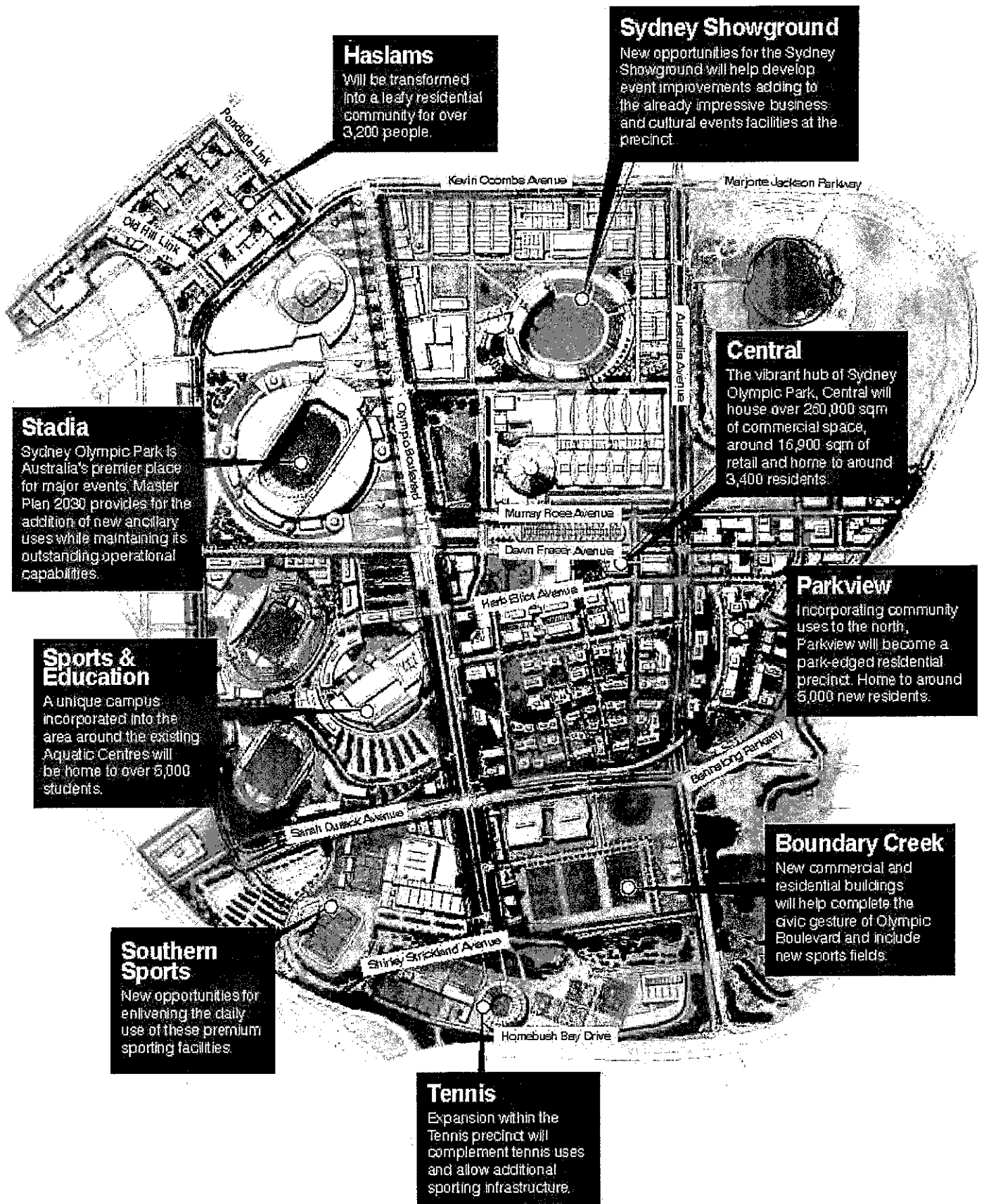
New commercial and residential buildings will help complete the civic gesture of Olympic Boulevard and include new sports fields.

Southern Sports

New opportunities for enlivening the daily use of these premium sporting facilities.

Tennis

Expansion within the Tennis precinct will complement tennis uses and allow additional sporting infrastructure.



2.3 PROPOSED DEVELOPMENT

It is proposed to demolish the existing building and excavate parts of the site to provide for basement carparking and level building platforms.

New roadways, being part of the planned Parkview Precinct road network, will be constructed generally through the centre of the site and along the southern boundary. New buildings will be constructed each side of the new central roadway with:

- Building A – 10 levels
- Building B – 8 levels
- Building C – 8 levels

The proposed buildings will comprise:

	A	B	C	Apartments
One Bed Apt	28	37	67	132
Two Bed Apt	40	65	95	200
Three Bed Apt	4	-	6	10
Total	72	102	168	342

Child Care Centre for 90 children with 15 staff

A total of 504 parking spaces will be provided in the 2 separate basement areas with the eastern building having access on the new north/south road and the western building having access on the new east/west road.

Details of the proposed development are provided on the plans prepared by Turner Architects which accompany the Development Application and are reproduced in part in Appendix A.

3. EXISTING ROAD NETWORK, TRAFFIC AND TRANSPORT CIRCUMSTANCES

3.1 ROAD NETWORK

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

- * *M4 Motorway – a privately operated arterial route which connects between Concord and Penrith. Ramps are provided at Hill Road (eastbound – off) and at Homebush Bay Drive (eastbound/westbound – on/off)*
- * *Parramatta Road – a State Road and east-west arterial route linking between the City and Penrith*
- * *Homebush Bay Drive – a State Road and north-south arterial being part of the major 3 route across the central metropolitan area*
- * *Hill Road – a major collection route connecting between Parramatta Road and Wentworth Point and connecting with Bennelong Parkway (north) and Holker Road and the SOP perimeter road*
- * *Australia Avenue – a major collection route connecting through SOP between Homebush Bay Drive/Underwood Road*
- * *Kevin Coombs Avenue/Sarah Durac Avenue/Edwin Flack Avenue – the SOP and Collector road circuit (with Australia Avenue)*
- * *Uhrig Road/Dawn Fraser Avenue, Bennelong Parkway, Herb Elliott Avenue/Parkview Drive, Showground Road and Murray Rose Drive – local roads serving access needs of SOP*

Bennelong Parkway in the vicinity of the site is some 12m wide and relatively level with a slightly curved alignment.

3.2 TRAFFIC CONTROLS

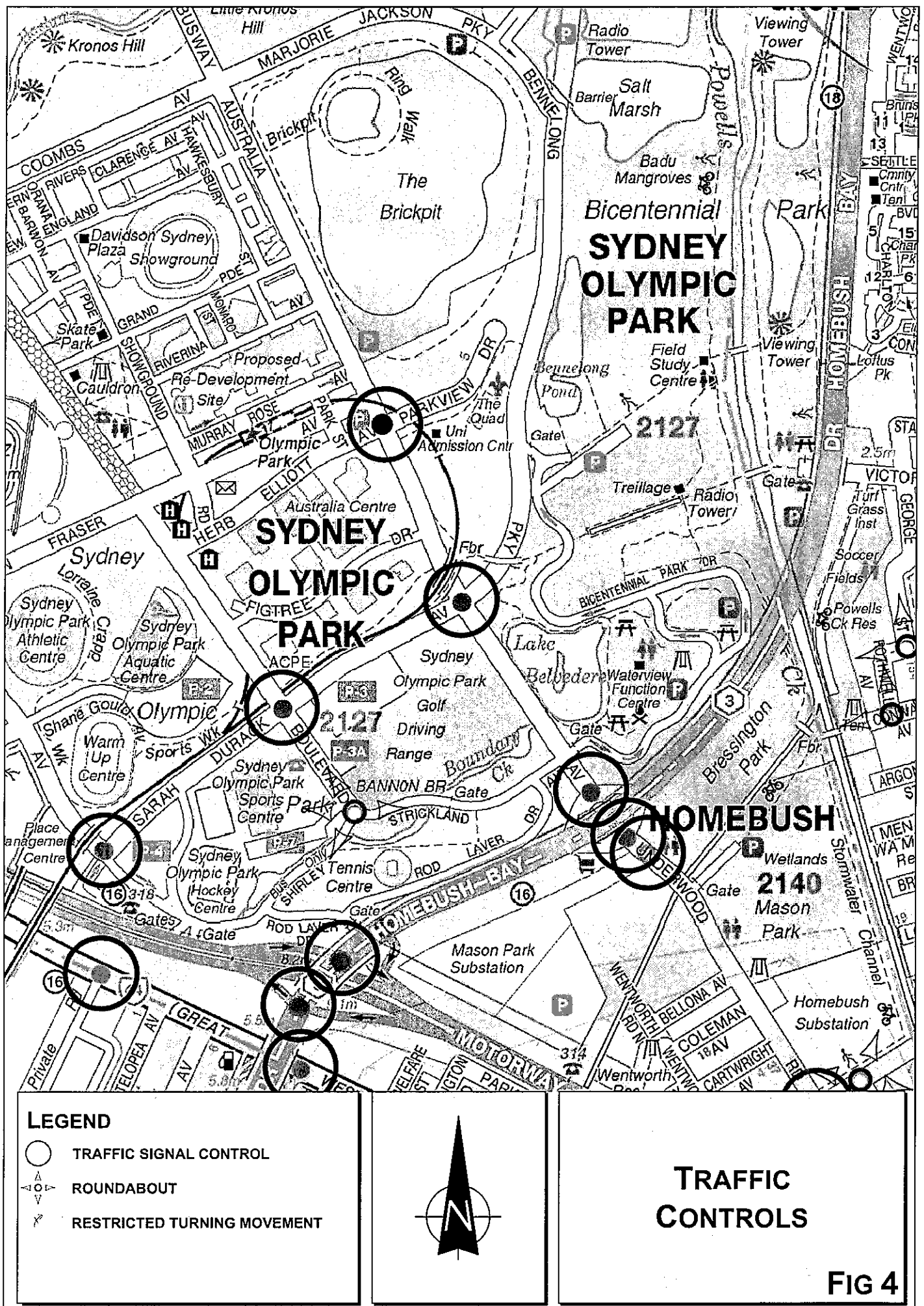
The existing traffic controls on the road system (Figure 4) include:

- * the traffic signals at the Australia Avenue/Bennelong Parkway and Sarah Durac Avenue intersection. Details of this intersection are shown on the design plan reproduced overleaf
- * the large traffic signal controlled roundabout at the Australia Avenue, Underwood Road and Homebush Bay Drive intersection
- * the other existing traffic signals at intersections including:
 - Australia Avenue/Herb Elliott Avenue/Parkview Avenue
 - Sarah Durac Avenue/Olympic Boulevard
 - Edwin Flack Avenue/Sarah Durac Avenue
- * the traffic signals on Australia Avenue at the Hill Road intersection where the north-south Holker Road connection is restricted to buses only
- * the 50 kmph speed restriction on the principal collector roads in Sydney Olympic Park and 40 kmph on the minor roads including Murray Rose Avenue

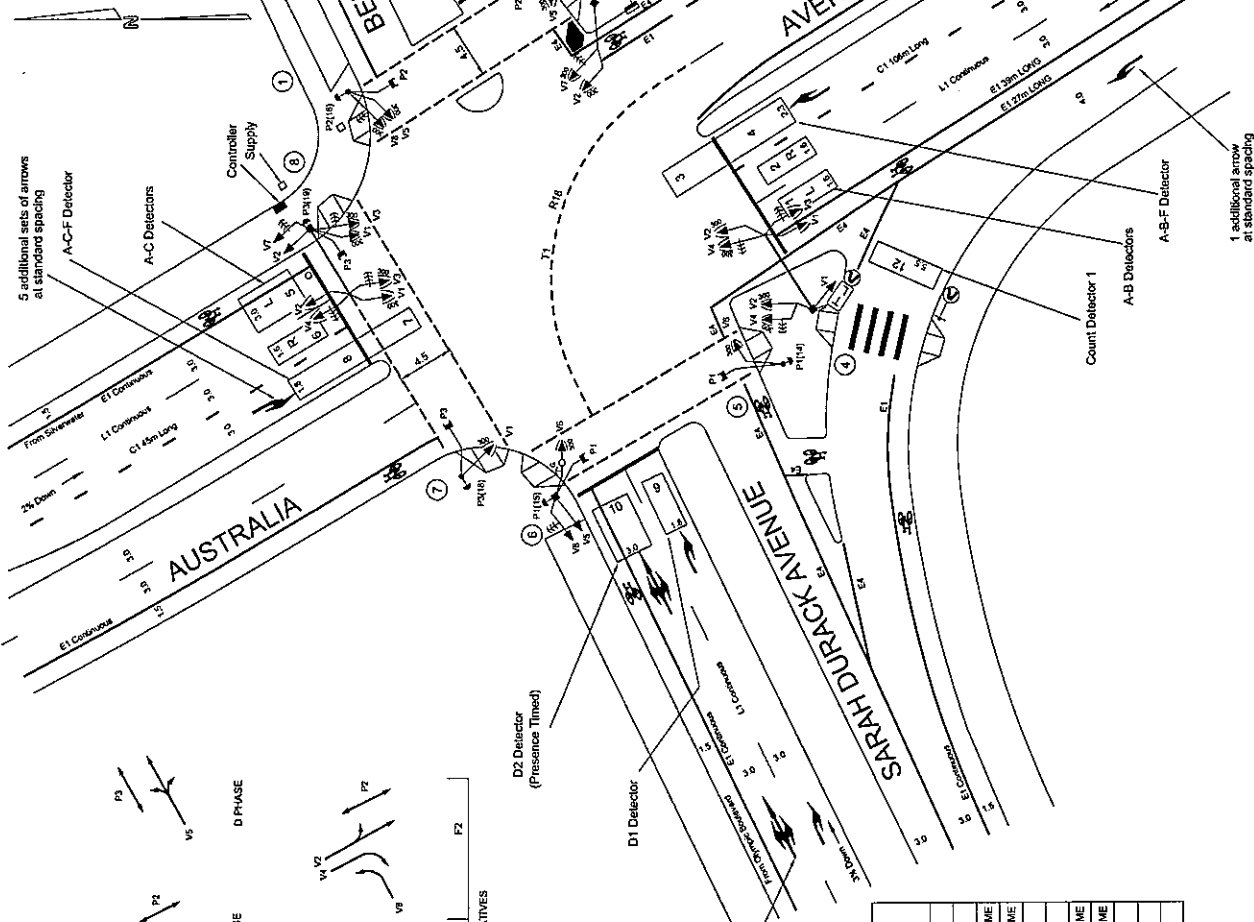
3.3 TRAFFIC CONDITIONS

An indication of the prevailing traffic circumstances is provided by data reproduced from Master Plan 2030 support document in the following:

	AM	PM
Silverwater Road at Holker Avenue	3,987	3,751
Holker Avenue west of Hill Road	1,214	1,032
Australia Avenue west of Homebush Bay Drive	2,259	2,055
Australia Avenue south of Herb Elliott Drive	878	690
Sarah Durack Avenue west of Olympic Boulevard	600	670



DATE IN SERVICE: 24/08

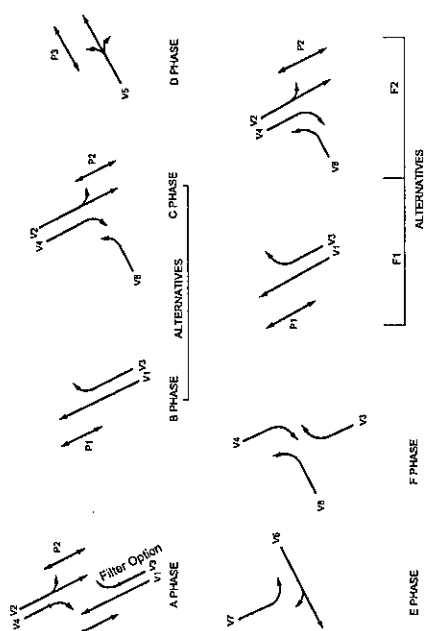


POST	TYPE	LENGTH	REMARKS
1	2	4.1	EXISTING
2	2	4.1	NEW
3	6	-	NEW
4	SPECIAL	NA	EXISTING
5	2	4.1	EXISTING
6	6	-	EXISTING
7	2	4.1	EXISTING
8	SPECIAL	NA	EXISTING

NOTES

1. The site is Scale linked.
2. Special STOP sign (R1-4) placed on posts 2 & 5.
3. All push buttons are audio tactile.
4. Contract protection sign area in accordance with SOPA Design Guideline Section 3.1 (Large including tactile ground surface indicators).
5. Diamond overlap in accordance with V0016-5 and V0016-14.
6. Roadworks in accordance with Proprietary Brackenhoff road construction drawings.
7. Barrier kerb around irregular islands.

DRAWN BY CADD
DO NOT AMEND MANUALLY



MOVEMENTS

SIGNAL GROUP / PHASE CHART

SIGNAL GROUP	PHASE WHEN GREEN								OVERLAPS PERMITTED	OVERLAP CONDITIONS	DURATION OF R.A.
	A	B	C	D	E	F	F1/F2				
V1	X	X	X	X	X	X	X	F1AB F2A AF1*	"P1 NOT RUNNING"		
V2	X	X	X	X	X	X	X	C/A AF2*	"P2 NOT RUNNING"		
V3	X	X	X	X	X	X	X	F1A F2B	# ARROW TIME		
V4	X	X	X	X	X	X	X	C/F	D ARROW TIME		
V5				X							
V6					X						
V7					X			E/A*	"P2 NOT RUNNING"	# ARROW TIME	
V8			X	X	X	X	X	C/F F1F2	"P3 NOT DEMAND"	D ARROW TIME	
P1	X	X	X	X	X	X	X	F1AB			
P2	X	X	X	X	X	X	X	F2ABC			
P3				X							

- # PB ON POST 2 EXTENDS RA PROTECTION SUBJECT TO TIMER
- 0 PB ON POST 8 EXTENDS RA PROTECTION SUBJECT TO TIMER
- D PB ON POST 8 EXTENDS RA PROTECTION SUBJECT TO TIMER

DESIGN APPROVAL		RMS ACCEPTANCE	
APPROVED	RECOMMENDED	APPROVED	RECOMMENDED
DATE	DATE	DATE	DATE
DATE	DATE	DATE	DATE

ROADS AND MARITIME SERVICES		AUBURN COUNCIL AREA	
TRAFFIC SIGNALS AT INTERSECTION OF		AUSTRALIA AVENUE, SARAH DURACK AVENUE	
AND BENNELONG ROAD		AT HOMEBUSH BAY	
DESIGN LAYOUT	TCS No. 3410	7000.012.VV.3410	1

The assessed existing operational performance of intersections is summarised in the following from the Transport Strategy document while the criteria for interpreting SIDRA results is reproduced overleaf.

	AM		PM	
	LOS	DS	LOS	DS
Silverwater Road/Holker Avenue	C	1.0	D	0.9
Australia Avenue/Homebush Bay Drive	B	0.7	B	0.7
Australia Avenue/Herb Elliott Avenue	A	0.3	A	0.3
Australia Avenue/Dawn Fraser Avenue	A	0.2	A	0.2

Traffic surveys have been undertaken at the intersection of Australia Avenue, Bennelong Road and Sarah Durack Avenue in the morning and afternoon peak periods. The results of those surveys are summarised in the following:

		AM	PM
Australia Avenue	NB	1,165	335
	RT	276	401
	LT	378	468
	SB	280	1,200
	RT	40	68
	LT	4	17
Bennelong Road	WB	30	42
	RT	38	10
	LT	449	546
Sarah Durack Avenue	EB	16	6
	RT	360	440
	LT	28	13

The operational performance of this intersection has been assessed using SIDRA and the results indicating a satisfactory level of service are provided in Appendix B and summarised in the following:

	AM	PM
Level of Service	B	C
Degree of Saturation	0.643	0.909
Av Vehicle Delay	22.8	37.7

It is apparent that under normal traffic circumstances the operation of intersections in the Sydney Olympic Park area is quite satisfactory.

3.4 TRANSPORT SERVICES

The public transport modes serving Sydney Olympic Park (Figure 5) comprise:

TRAIN – SOP rail services operate on a dedicated branch line off the Main Western Line with a rail loop to Olympic Park Station. Shuttle service (2 cars) is provided to/from Lidcombe Station with a 20 minute frequency between 6.50am and 23.50 pm

Infrequent direct off peak services are provided on weekdays (4) from Central Station via Strathfield. Direct services from Central Station via Strathfield operate for events at ANZ Stadium. Rail services are also available at Concord West Station (15 min. walk) and Strathfield Station (10 min. walk)

BUS – Sydney Buses operate a number of services through SOP:

Route 525 – Burwood to Parramatta via SOP

6.40 am to 22.08 pm
10 min. frequency AM & PM Peak
30-60 min. frequency at other times

Route 401 – Lidcombe to SOP Ferry Wharf

6.20 am to 18.50 pm
20 – 40 min. peak frequency
30-60 min. frequency at other times

Route 450 - Hurstville to Strathfield via SOP

AM & PM peak service at 15 min. frequency

Route 534 – Chatswood to West Ryde via SOP

AM & PM peak service at 15 min. frequency

FERRY – Sydney Ferries operate to the SOP Ferry Wharf at the end of Hill Road with a service linking Rydalmere to Milsons Point and Circular Quay as follows:

7.05 am to 19.04 pm

3 services in AM and PM peak

60 minute frequency at other times

3.5 PEDESTRIAN AND CYCLIST NETWORK

The extensive system of pedestrian and cyclist's routes connecting to and circulating within Sydney Olympic Park are shown on Figure 6. These routes have connections to the regional bicycle network and pedestrians and cyclists have a comprehensive provision which is very flexible and acts to encourage these modes of travel.

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

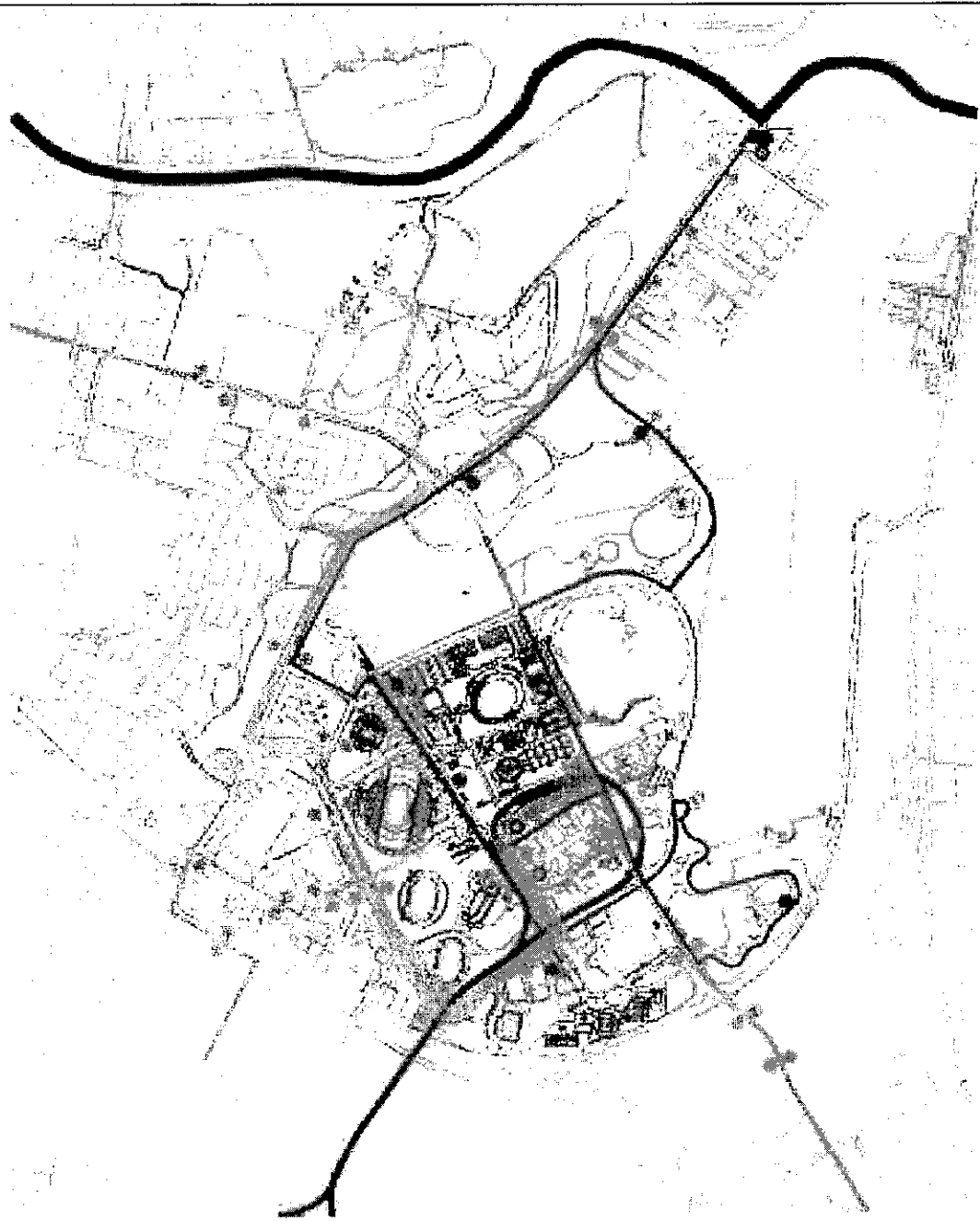
3. Degree of Saturation (DS)

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.

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



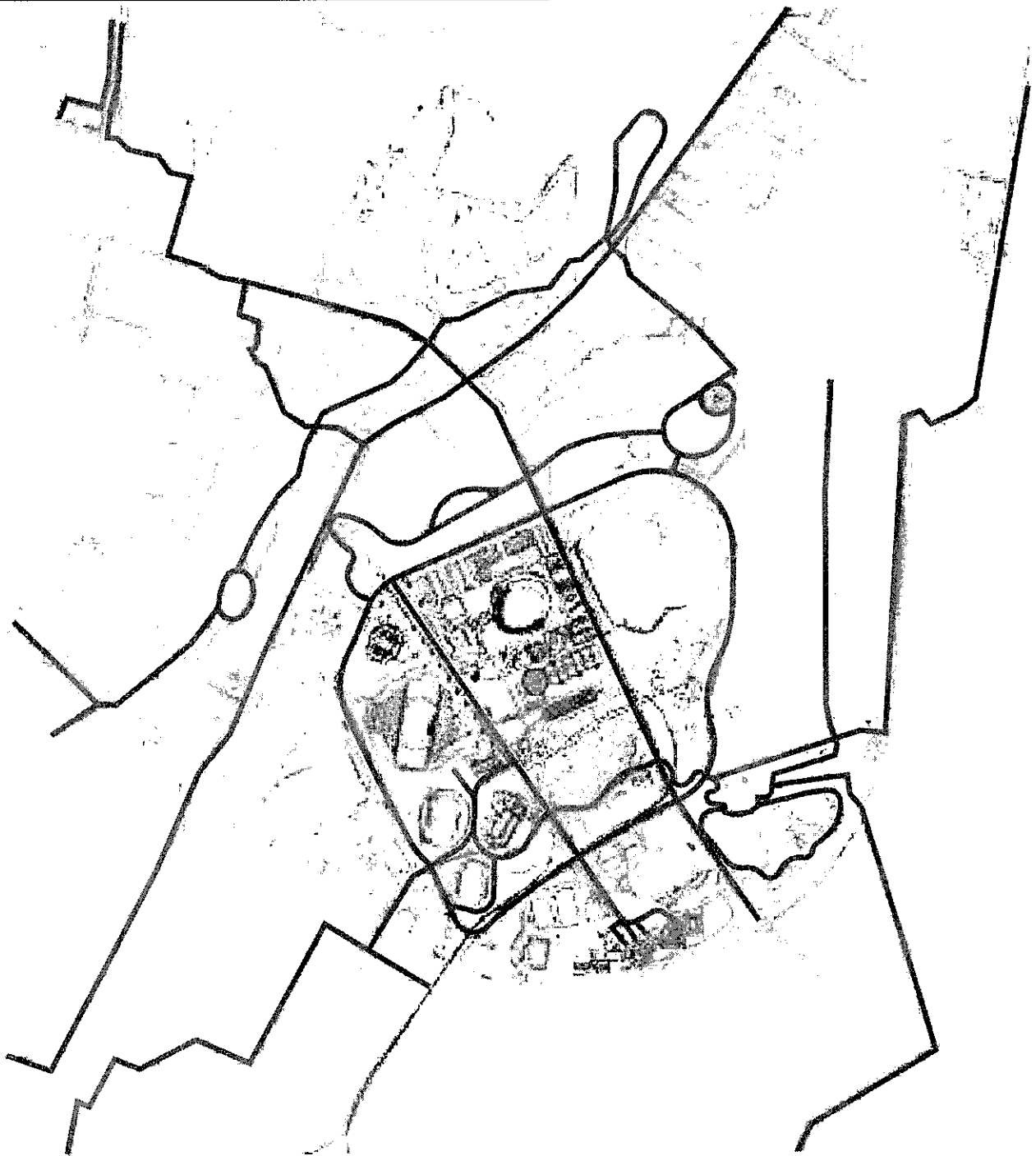
- | | | |
|---|--|---|
|  Sydney Bus Routes |  Olympic Explorer Bus Route |  Olympic Explorer Bus Stop |
|  Sydney Bus Stops |  Ferry Route | |
|  Train Route |  Ferry Stop | |

LEGEND



TRANSPORT SERVICES

FIG 5



Existing Cycleway and Pedestrian routes

LEGEND



**CYCLIST AND
PEDESTRIAN NETWORK**

FIG 6

4. FUTURE ROAD NETWORK, TRAFFIC AND TRANSPORT CIRCUMSTANCES

4.1 ROAD NETWORK

The SOP Master Plan 2030 Transport Strategy indicates the future Road Hierarchy as shown on the diagram overleaf with detail identification of:

- **Short term Road Capacity Upgrade Works**

These works largely involve the immediate access intersections and intersections within the SOP road network with turn prohibitions, additional lanes and traffic signal control etc (some 14 intersections).

- **Long Term Road Capacity Upgrade Works**

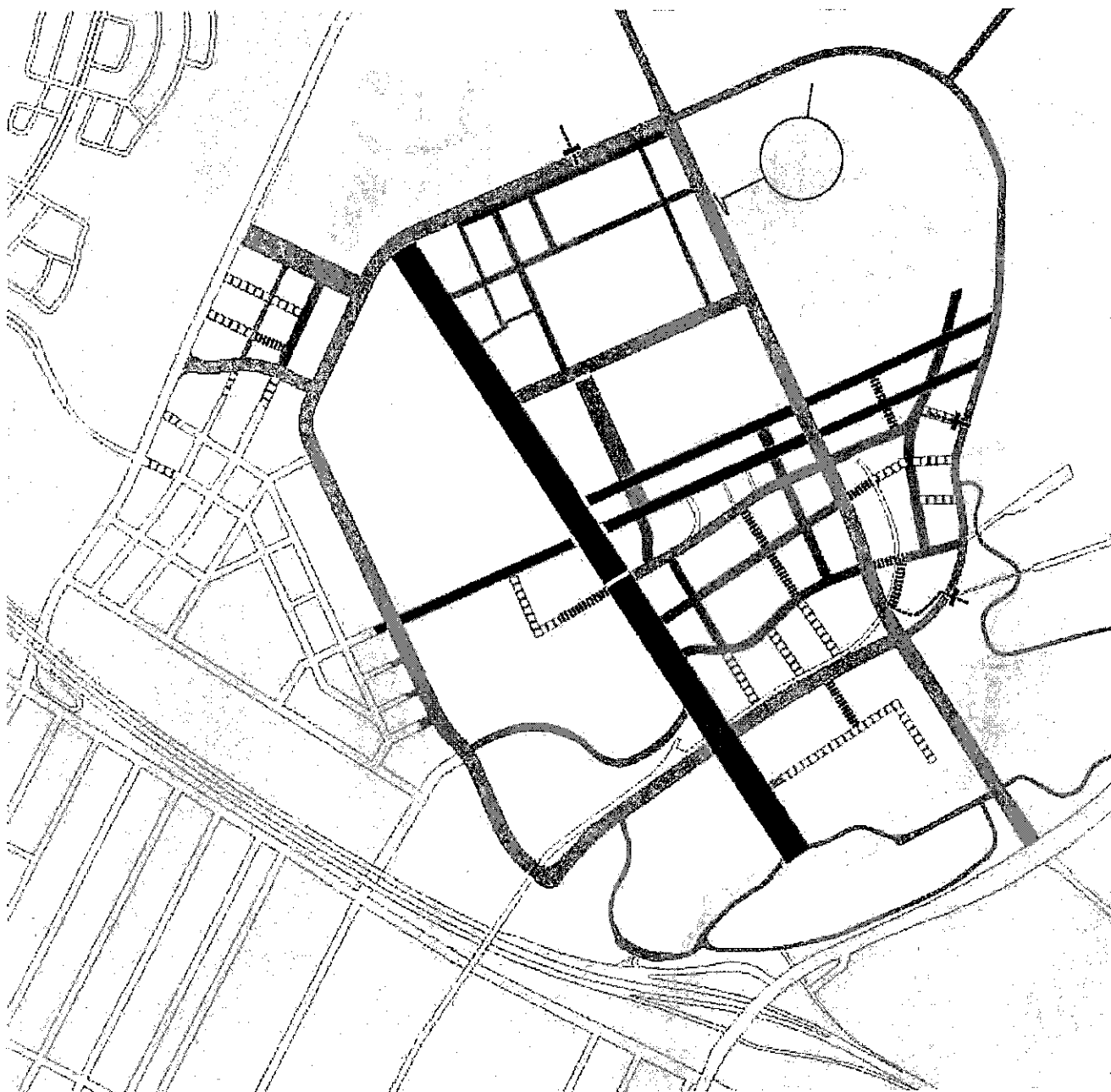
These works largely involve the regional “gateway” intersections for SOP and the main arterial routes including works identified for the RMS Metropolitan Capital Works Program.

- **New Local Street Network**

The existing SOP street network will be altered to provide for the new development sites and to improve permeability for pedestrians. Details of the Future Street Network are provided on the diagram over leaf indicating the new local streets which will serve the subject development site.

4.2 TRAFFIC CONTROLS

The proposed new, changed and upgraded intersection controls are shown on the Road Hierarchy Plan overleaf whilst SOPM Transport Strategy documents the extensive proposed Short Term Regional and Local Road Upgrades which includes:

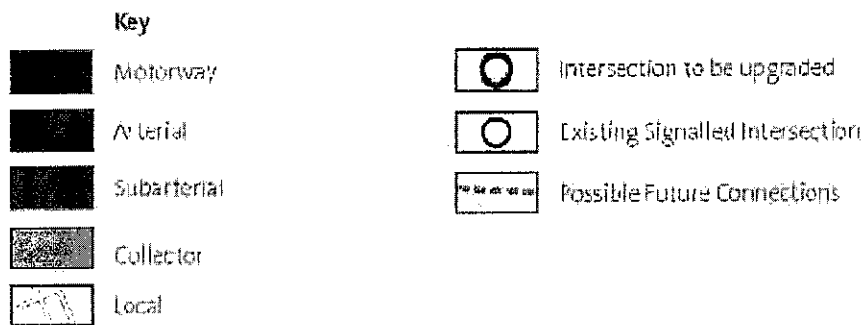
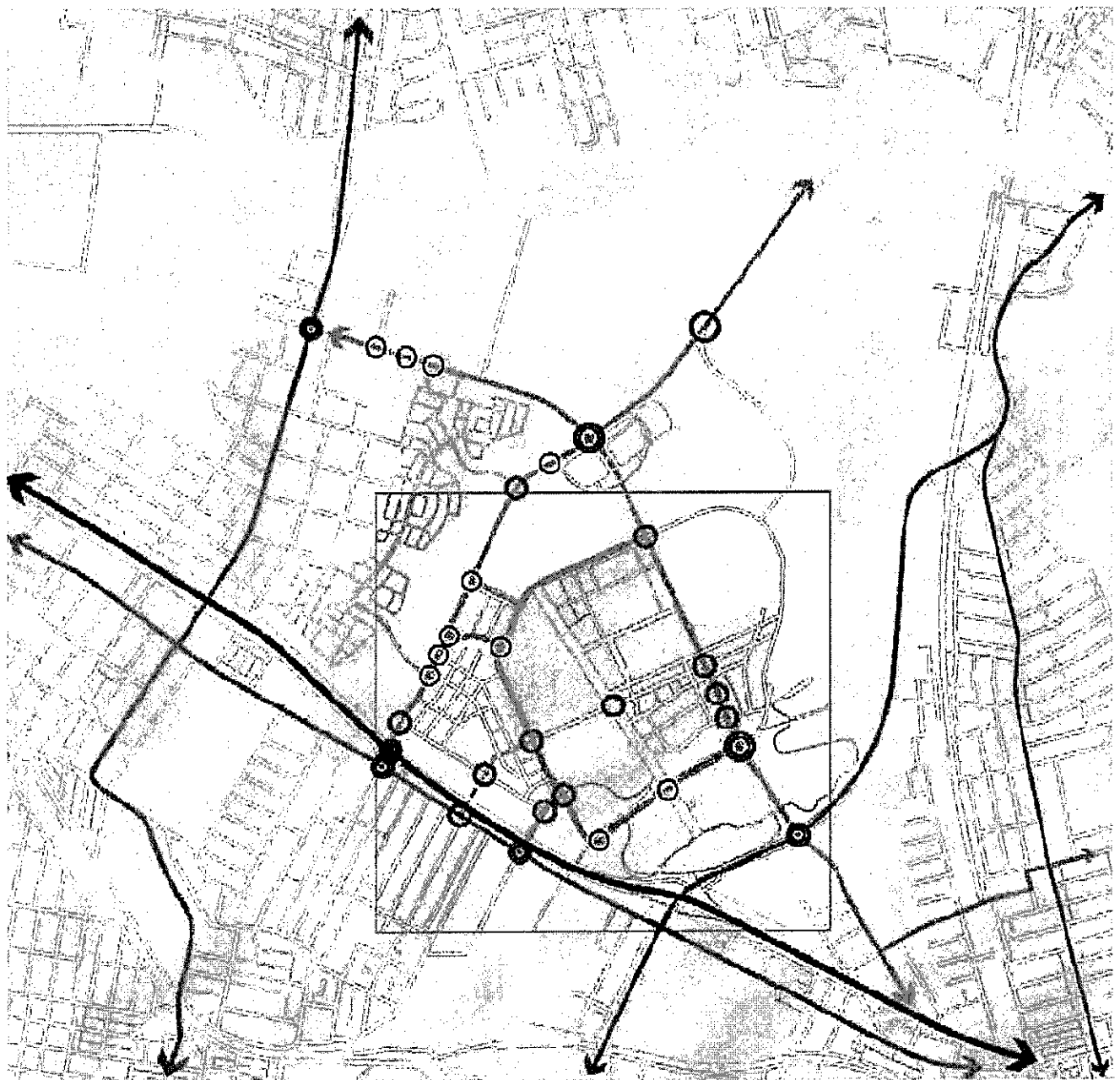


Key

	Authority Funded Civic Streets		Authority Funded Local Streets
	Authority Funded Perimeter Avenues and Connecting Streets		Pedestrian Connections
	Authority Funded Park Edge Streets		Development Funded Streets
	Authority Funded Town Streets		Through Site Links

Source: Sydney Olympic Park Authority (2008)

Future street network



Source: Sydney Olympic Park Authority (2008)

Sydney Olympic Park road hierarchy

- | | |
|---|--|
| Australia Avenue/Bennelong Road/
Sarah Durack Avenue | - provision of left turn slip lane
Bennelong to Australia |
| | - widen Sarah Durack EB |
| | - widen Australia SB |

4.3 MODE SHARE AND TRAFFIC CONDITIONS

The SOP Master Plan 2030 Transport Strategy adopted an initial "Journey to Work" non car mode share target of 25% with an ultimate target of 41% based on the Governments Sydney Link project and West Metro and Strategic Bus Corridor 13 transport services supported by a range of related strategies and actions.

The projected traffic generation resultant to development under Master Plan 2030 considered a maximum of 250,000m² of commercial floorspace with a 25% non car mode share with a future review of the commercial floorspace to permit a higher target of 414,836m² with a non car mode of 41%.

The Transport Strategy assessment is that there will be a satisfactory traffic outcome subject to the undertaking of the identified road network upgrades, provision of the identified provision of transport services and introduction of Travel Demand Management.

The Transport Strategy adopted the following principal traffic generation rates:

Commercial	-	1.66 vtph per 100m ²
Residential	-	0.29 vtph per apt

Recent RMS assessment included a study of the existing commercial development at 4 Dawn Frazer Avenue of some 34,000m² which revealed traffic generation rates of 1.48vtph/100m² in the AM and 1.41vtph in the PM.

798 parking spaces are provided (ie 1 space per 42.8m²) and the transport services at the time of the study were relatively limited as compared to the proposed future services.

The recent RMS assessment (TDT 2013-04) established revised traffic generation rates for metropolitan residential apartments near rail and bus services of 0.19vtph in the AM and 0.15vtph in the PM.

It is apparent from the forgoing data that the traffic generation outcomes for development of commercial floorspace and residential apartments under the SOP Masterplan 2030 will be significantly less than that assessed in the Transport Strategy.

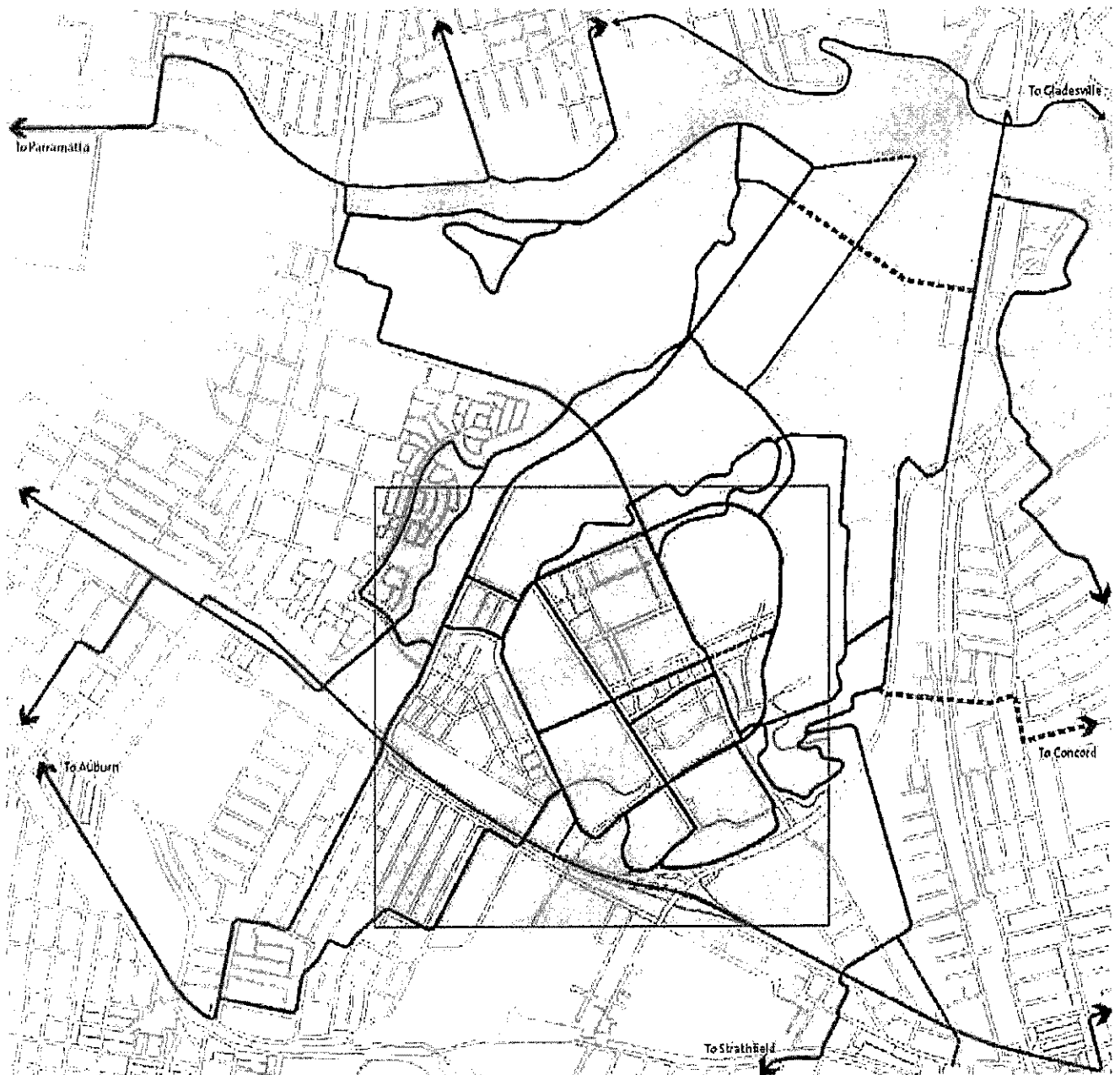
4.4 TRANSPORT SERVICES

The 2030 Transport Strategy identified a “raft” of measures to provide for the future needs of SOP development. These actions are identified in general terms on the diagram overleaf in terms of rail, bus and ferry services whilst far more specific details of these extensive proposals are provided in the strategy document.

4.5 PEDESTRIAN AND CYCLIST NETWORK

Implementation of the SOPA Pedestrian and Bicycle Strategy will see the completion of an extensive pedestrian and cycle network throughout the Homebush Bay Area connecting residential developments with transport terminals and other activity centres. The key future pedestrian / cycleway links include:

- * Homebush Bay Bridge linking Bay West to Rhodes Peninsula, thus creating a 'Around the Bay' loop
- * Incorporating a grade separated link between the Figtree precinct and Bicentennial Park in any development proposal that may impact the location of the existing link
- * Haslams Creek Bridge extension on Bennelong Road
- * East-west link between the warm-up track in Sydney Olympic Park to North Lidcombe across Edwin Flack Avenue, the M4 Motorway and Parramatta Road utilising the old railway corridor
- * Powell's Creek Corridor to Strathfield
- * Future pedestrian and cycleway network is shown on the diagram overleaf



Key

-  Cycleways and On Road Cycle Lanes within Olympic Park
-  Metropolitan Cycleway
-  Shared Pedestrian/Cycleway
-  Future Metropolitan Cycleway
-  Future Shared Pedestrian/Cycleway

Future pedestrian and cycleway network

5. ROAD NETWORK AND VEHICLE ACCESS

5.1 NEW ROADS

The development works will incorporate the construction of sections of 3 new roads which are identified in the SOP Future Street Network and include two Authority funded Streets and one developer funded street. The design of these streets will comply with the SOPA design criteria and the north-south road will have a wide central median island.

5.2 VEHICLE ACCESS

The vehicle access arrangements will comprise:

- * Buildings A & B – a 7 m wide combined ingress/egress driveway will be provided on the new north-south road between the buildings. The new road will be relatively straight and level and the available right distances will comply with AS2890.1.
- * The location of this driveway in relation to nearby intersections will also comply with the AS2890.1 design criteria.
- * There will also be a 7.5m wide driveway located on the new east-west road for loading dock access.
- * Building C – a 7m wide combined ingress/egress driveway will be provided on the new east-west roadway. The notice of this roadway and location of the driveway will comply with AS2890.1.
- * Details of truck turning path assessment for these proposed driveways are provided in Appendix D.

6. TRAFFIC

The proposed development will replace the existing Jemena occupancy of the site with 5268m² of business park use and 237 parking spaces. The Figure 2 image indicates a high level usage of the 237 existing parking spaces provided on the site and this provision is at the “high end of the scale”.

If the warehouse area equates to 1 space per 100m² (15 spaces) the office area of 3,735 m² equals to 1 space per 16.8m². A pragmatic assessment of the existing traffic generation (rather than using a generic rate based on 1 space per 40m²) is that 60% of cars arrive/depart in the peak hour. As follows:

	AM		PM	
	IN	OUT	IN	OUT
237 @ 0.6 = 142	128	14	14	128

The SOP Master Plan 2030 traffic assessment adopted a peak traffic generation rate for residential apartments of 0.29vtph per dwelling (i.e the rate specified in the former RTA Development Guidelines 2002)

A more recent indication of the potential traffic generation of residential apartment development is provided by reference to the recent RMS Technical Direction TDT 2013/4 (Appendix C) which updates the earlier 'Guide to Traffic Generating Developments' and specifies the following peak generation:

High Density Residential

Vehicle trips per hour per apartment

AM	PM
0.19	0.15

Application of these factors to the proposed development would indicate the following:

	AM		PM	
	IN	OUT	IN	OUT
Building A 72 apartments	3	11	9	2
Buildings B & C 270 apartments	10	42	33	8
Total:	13	53	42	10

The proposed Child Care Centre will be very largely patronised by residents of the apartments on the site and adjoining sites and as a result the centre will only generate very minor vehicle movements of some 10vtph. It is apparent that the projected total peak traffic movements for the proposed development of some 76vtph in the morning and some 62vtph in the afternoon will be significantly (i.e 50%) of the existing traffic generation of the site. Accordingly the proposed development will not have any adverse traffic implications.

7. PARKING, INTERNAL CIRCULATION AND SERVICING

7.1 PARKING

SOPMP 2030 specifies the following maximum parking provision in relation the proposed development:

Apartments	
1 Bed	1 space per dwelling
2 Bed	1.2 spaces per dwelling
3 Bed	1.5 spaces per dwelling
Visitors	1 space per 4 dwellings
Child Care Centre	1 space per 4 children (plus suitable SD/PU)
	1 space per 2 staff

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

Apartments	
132 x 1 Bed	- 132 spaces
200 x 2 Bed	- 240 spaces
10 x 3 Bed	- 15 spaces
Visitors (342 Apts)	- 86 spaces
Total:	473 spaces
Child Care Centre	
90 Children	- 22.5 spaces
15 staff	- 7.5 spaces
Total:	30 spaces
TOTAL:	503 spaces

It is proposed to provide a total of 504 parking spaces in 2 separate areas with 37 accessible spaces provided for residents and visitors and child care as well as 2 car wash bays.

The proposed parking provision will comply with SOPMP 2030 and represents a relatively constrained contemporary outcome which has regard for:

- * the convenient proximity of public transport services
- * the convenience and amenity of walking and cycling
- * the retail, entertainment, employment and services which will be available in walking distance

7.2 INTERNAL CIRCULATION

The design of the carparking areas and their access connections will comply with the AS 2890.1 criteria with suitable and appropriate ramps, aisles, bays etc. Resident parking spaces will be segregated from the visitor and child care spaces.

7.3 SERVICING

Loading docks accommodating refuse trucks and other vehicles will be provided in Buildings B and C while service personnel etc will also be able to use the visitor parking spaces.

Details of the turning path assessment for these vehicles indicating satisfactory provision are shown on the diagrams in Appendix D.

8. PEDESTRIANS, CYCLISTS AND PUBLIC TRANSPORT

PEDESTRIANS AND CYCLISTS

The proposed development will facilitate pedestrian and cyclist amenity by provision of footways along the new access roads which will provide connection to the pedestrian and cyclist networks within SOP and the existing and proposed external networks

Provision will be made on-site for bicycle storage/parking and this will have easy direct access to the SOP bicycle network and its connections to the regional bicycle network.

PUBLIC TRANSPORT

The development will have very convenient access to the developing public transport network which will include :

- high frequency shuttle bus to Strathfield
- cross regional bus services
- local bus services
- rail services at the Olympic Park Station and Concord West Station

9. RESPONSE TO DG'S

A summary and response to the DGR's is provided below with regard for each traffic item raised.

Detail access and parking arrangements at all stages of construction and measures to mitigate any associated pedestrian, cycle, public transport or traffic impacts.

A detailed Construction Methodology and a Construction Traffic Management Plan will be submitted and be subject of approval for the Construction Certificate. The CTMP will specify all traffic control measures, truck routes, hoarding/fencing, materials delivery and storage. Detail Traffic Control Plans will be prepared and submitted for approval as and when required.

Detail access arrangements at all states of operation and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and cycle networks.

The projected traffic generation of the proposed development will be significantly less than that of the existing use on the site and therefore there will not be any adverse impacts.

Access routes available to the development will be permitted via the intersections of the New Road with Australia Avenue (left in, left out arrangement) and the intersection of New Road and Bennelong Road (all movements permitted). Service vehicles will access the loading areas via the new roads.

Demonstrate how users of the development will be able to make travel choices that support the achievement of public transport modal split targets of Master Plan 2030.

The site will have very convenient access to public transport. A Transport Access Guide (to be formulated under a suitable condition of consent) and the TAG will encourage use of bus and rail services; as well as bicycles and car pooling. It is evident that promoting alternate travel modes as discussed above supports the 'minimalist' approach to on-site car parking, based on SOPA rates

Detail existing pedestrian and cycle movements within the vicinity of the site and determine the adequacy of the proposal to meet the likely future demand for increased public transport and pedestrian and cycle access including any connections to the new Parkview Drive and Bennelong Parkway.

Bennelong Road and Australia Avenue will incorporate dedicated pedestrian and cycle paths which will be readily accessed from the development. Bicycle paths are also found on Sarah Durack Avenue, Kevin Coombs Avenue and Holker Busway. It is clear that the Olympic park is well served with bicycle paths and these dedicated paths along with the provision of bicycle storage will encourage residents and Child Care Centre staff to make use of these facilities. Pedestrian and cyclists connections will be focused near the intersection of Australia Avenue and Bennelong Road with the traffic signal controlled crossings and the bridge crossing of Bennelong Road.

Describe the measures to be implemented to promote sustainable means of transport including public transport usage and pedestrian and bicycle linkages in addition to addressing the potential implementing a location specific sustainable travel plan.

As discussed in the forgoing, a Transport Access Guide/Workplace Travel Plan will be undertaken for the development and is to be formulated under a suitable condition of consent.

Demonstrate the provision of sufficient on-site car parking having regard to the availability of public transport and car parking controls of Master Plan 2030. (Note: reduced car parking provision maybe supported in areas well serviced by public transport.)

Parking will be provided to strictly comply with the SOPA criteria which is a constrained level of provision so that traffic generation is suppressed to a significant extent.

Estimate the total daily and peak hour trips generated by the proposed development, including accurate details of the current and future daily vehicle movements and assess the impacts of the traffic generated on the local road network, including intersection capacity and any potential need for upgrading or road works, having regard to local planning controls.

A comparison of the traffic generation of the existing site use and the proposed development are provided in the following :

	AM	PM	DAILY*
Existing	142 vtpd	142 vtpd	1,420 vtpd
Proposed	76 vtpd	62 vtpd	690 vtpd

** 10 times peak hour*

Accordingly there will be a significant reduction in site generated traffic and there will be no adverse traffic implications.

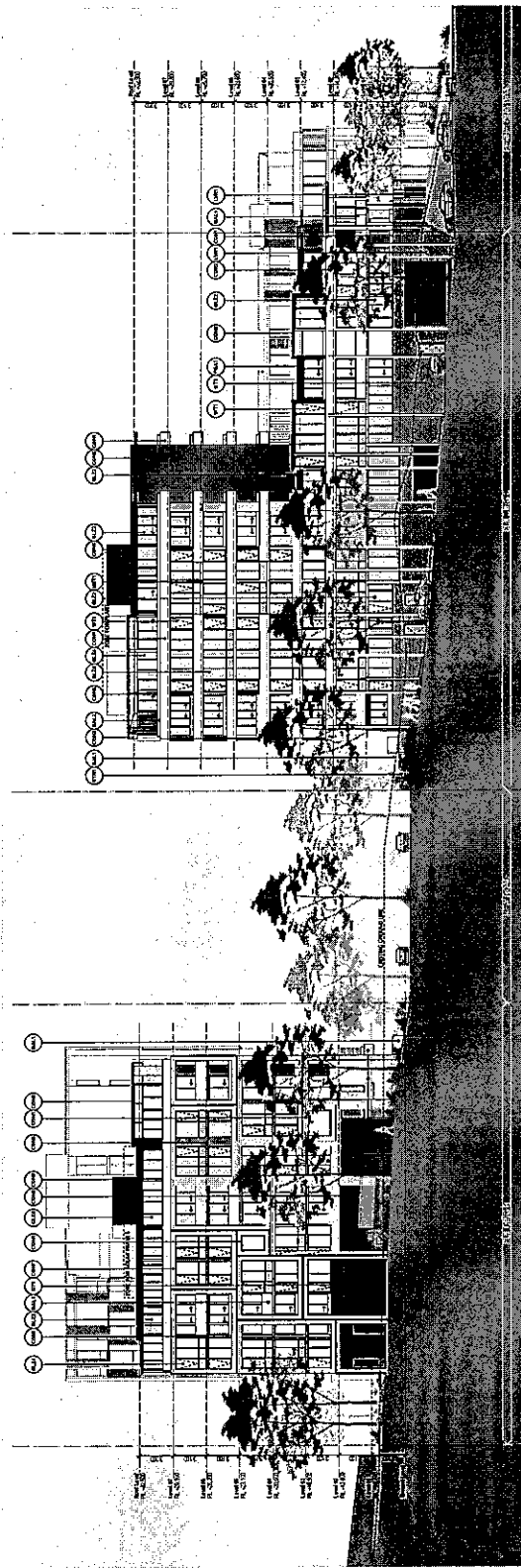
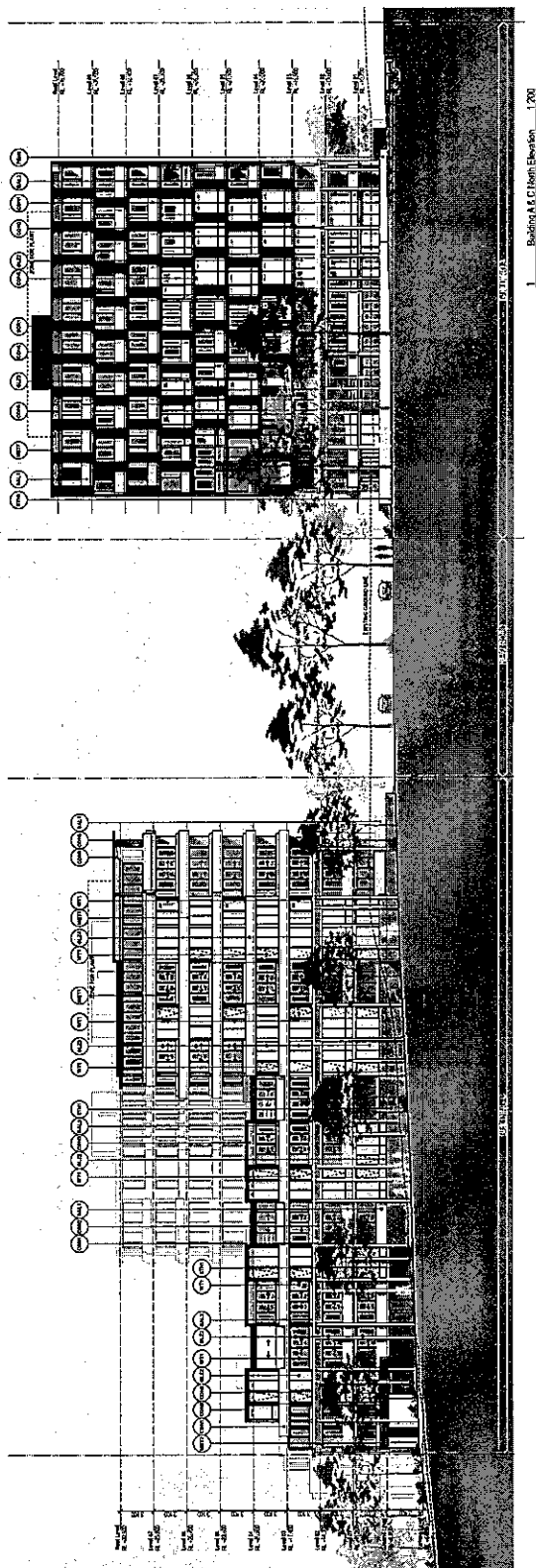
10. CONCLUSION

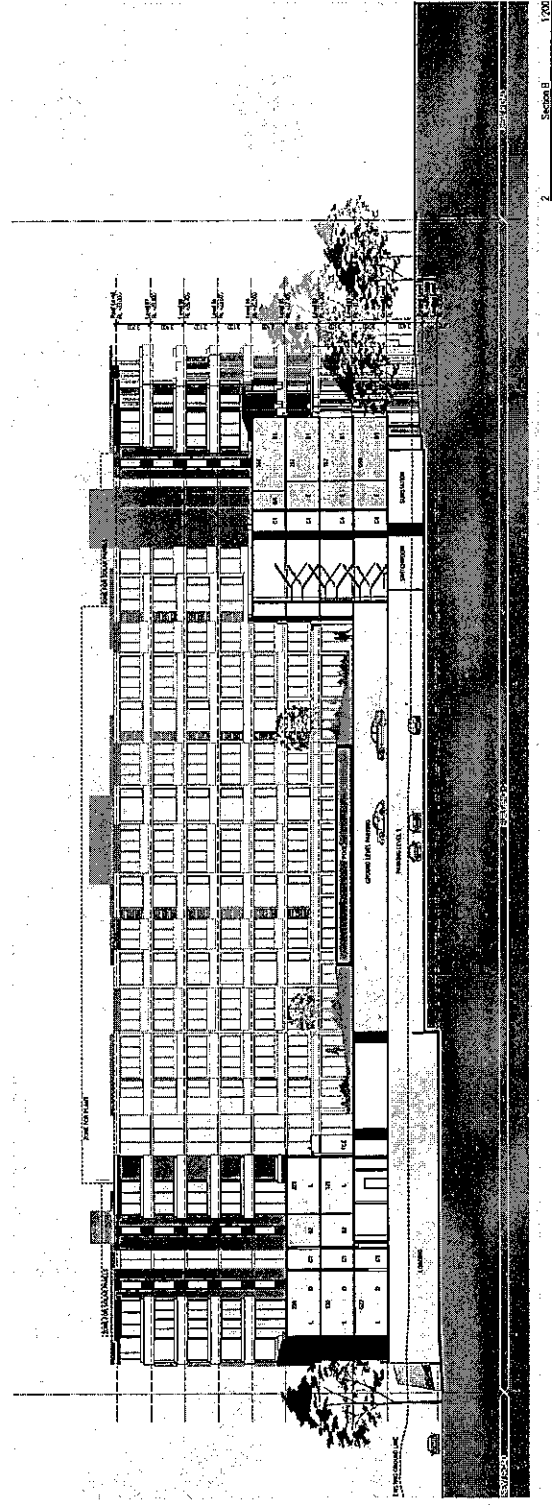
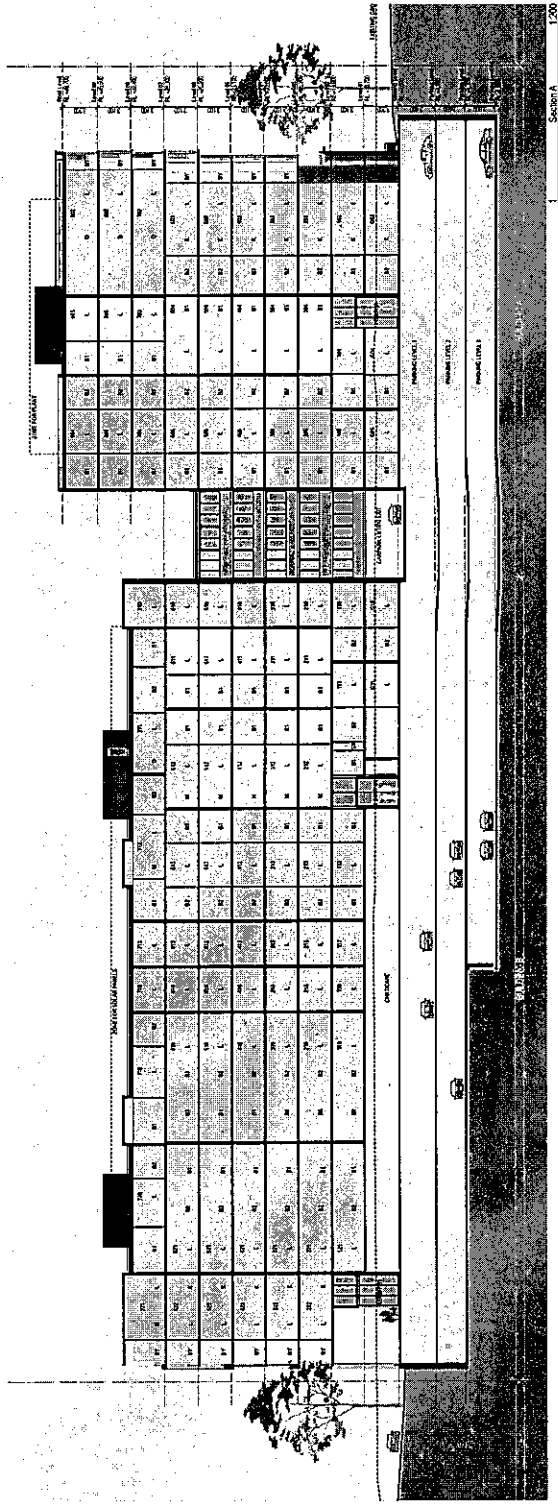
This assessment report has examined the traffic, transport and parking implications associated with the proposed construction of a residential apartment development on Site 67 in Sydney Olympic Park. The assessment has established that:

- * the proposed parking provision will comply with the SOPMP criteria and appropriate to the desired constraint on undue traffic generation particularly in the SOP environment where there are excellent public transport services
- * the traffic generated by the proposed development will not have any adverse impact on the surrounding road network
- * the internal access, parking and servicing provisions have been designed in accordance with all relevant planning controls and standards

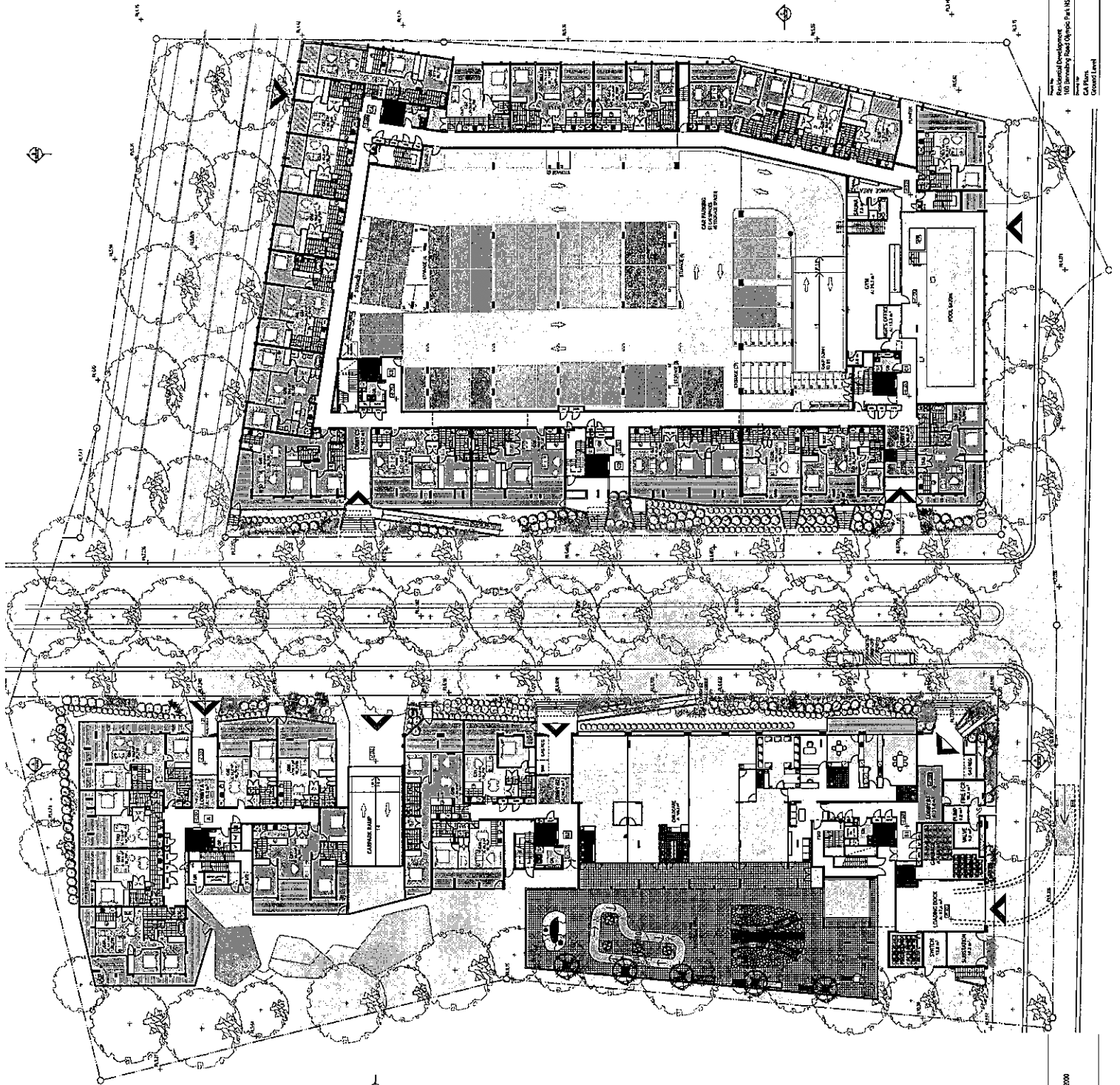
APPENDIX A

ARCHITECTURAL PLANS

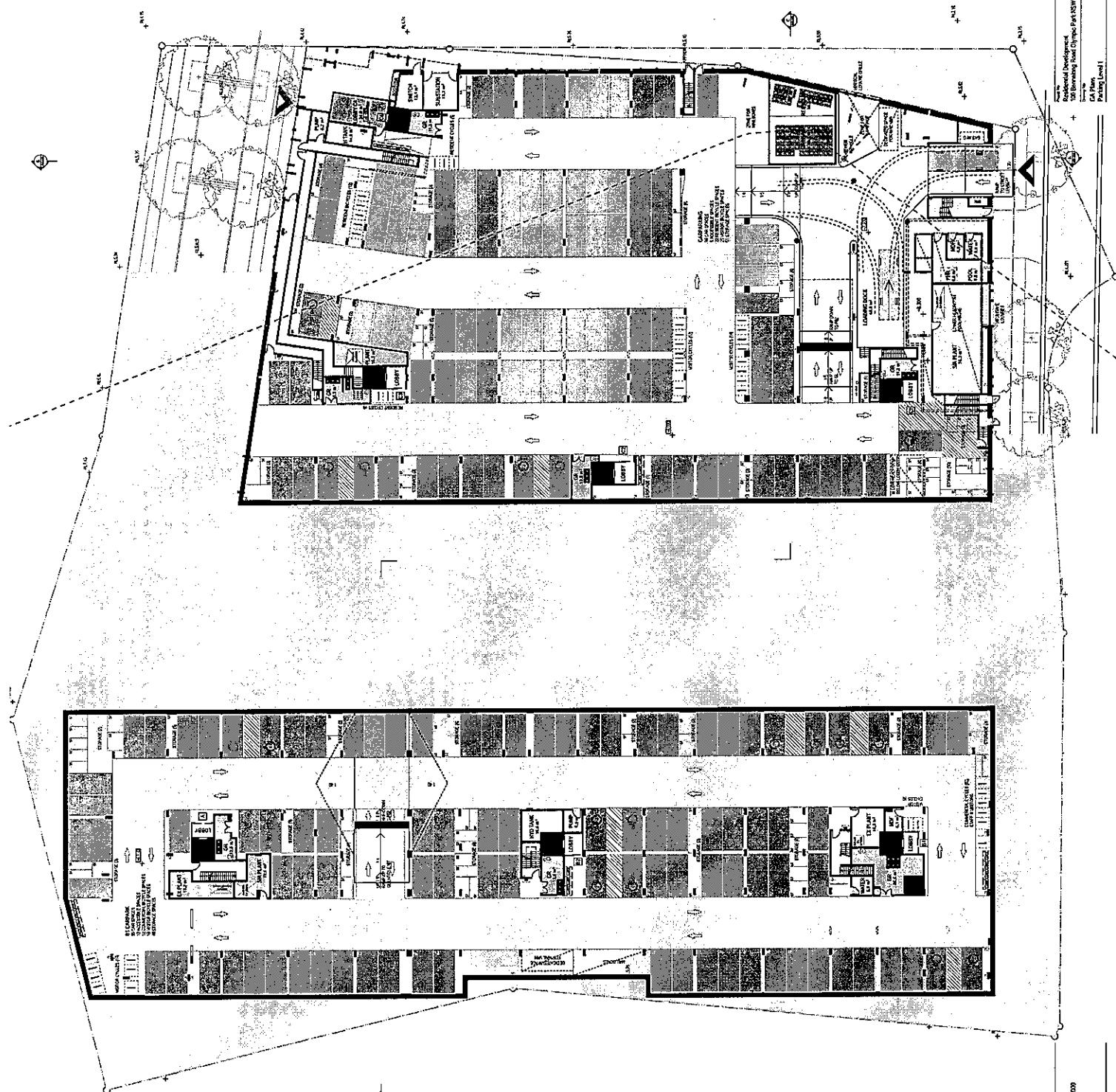


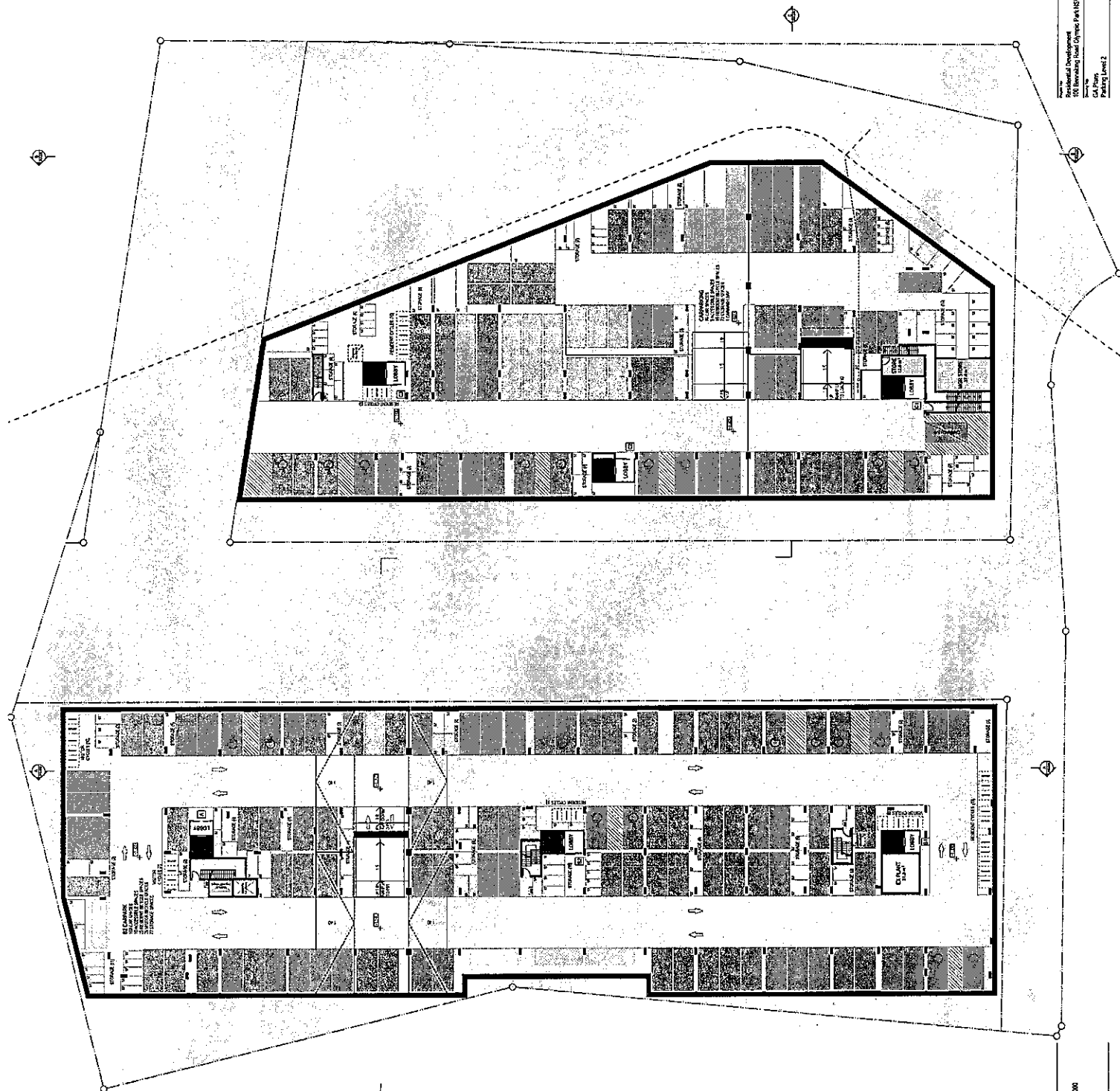


GROUND

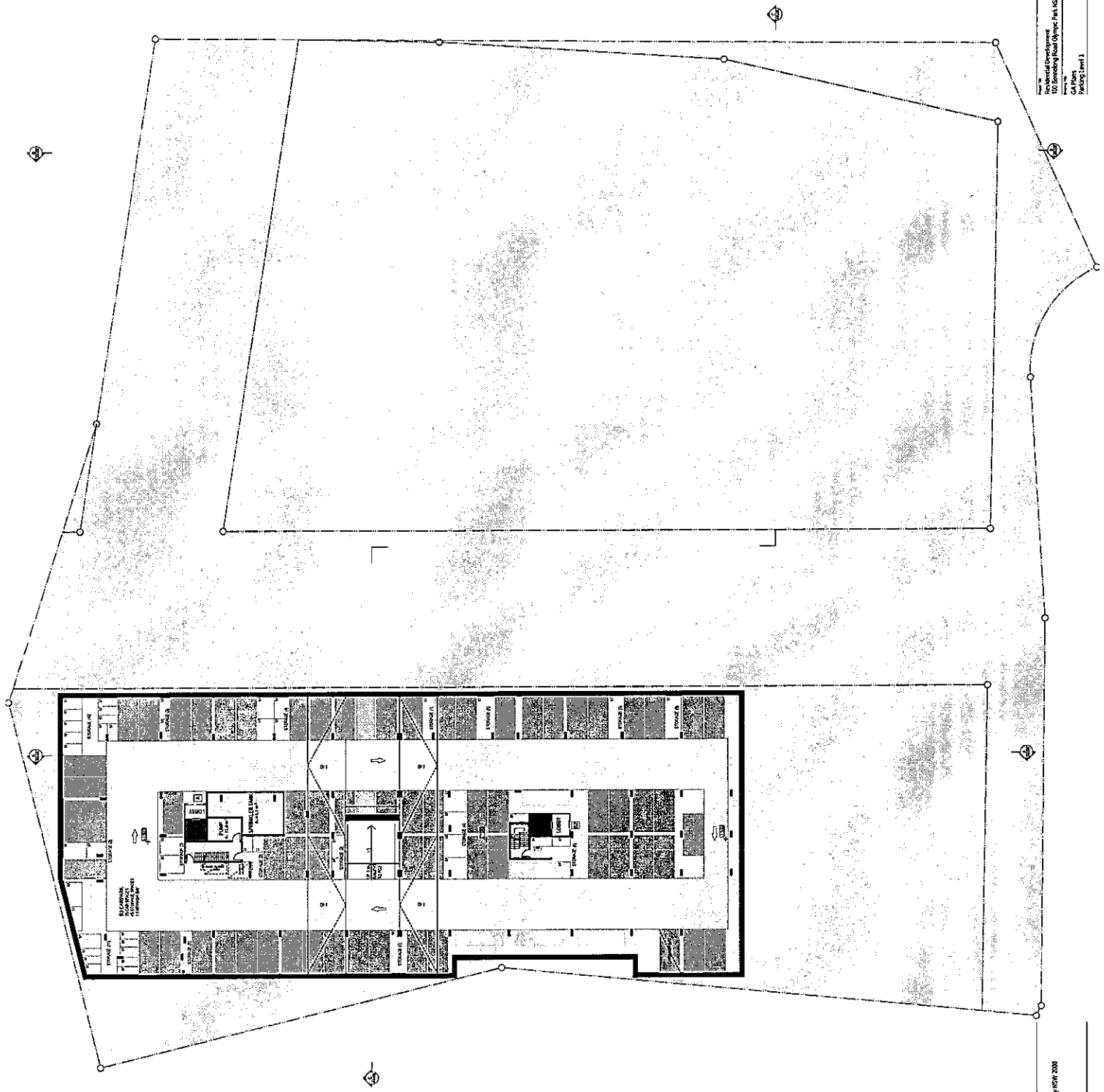


PARKING LEVEL 1





PARKING LEVEL 3



Project: Residential Development
 100 Boreland Road Olympic Park NSW 2127
 Drawing: Parking Level 3
 Date: 15/05/2017
 Scale: 1:500
 Author: [Name]
 Checker: [Name]
 Approver: [Name]

Title: Section
 5/28 West Street Sydney NSW 2000
 Drawing: [Name]
 Date: 15/05/2017
 Scale: 1:500
 Author: [Name]
 Checker: [Name]
 Approver: [Name]

Project: Residential Development
 100 Boreland Road Olympic Park NSW 2127
 Drawing: Parking Level 3
 Date: 15/05/2017
 Scale: 1:500
 Author: [Name]
 Checker: [Name]
 Approver: [Name]

APPENDIX B

SIDRA RESULTS

MOVEMENT SUMMARY

Site: AM Peak Exist Australia Ave,
Bennelong Pky & Sarah Durack
Ave

AM Peak Existing
Australia Ave, Bennelong Pky & Sarah Durack Ave
Signals - Fixed Time Cycle Time = 110 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Australia Avenue											
1	L	383	5.0	0.214	7.8	X	X	X	X	0.60	49.8
2	T	1171	5.0	0.643	22.8	LOS B	23.4	170.9	0.81	0.73	35.2
3	R	289	5.0	0.527	22.2	LOS B	7.9	57.5	0.64	0.80	37.4
Approach		1843	5.0	0.643	19.6	LOS B	23.4	170.9	0.62	0.71	37.8
East: Bennelong Pky											
4	L	454	5.0	0.546	12.5	LOS A	9.1	66.6	0.48	0.78	44.8
5	T	33	5.0	0.643	58.7	LOS E	4.3	31.1	1.00	0.80	21.6
6	R	42	5.0	0.643	66.8	LOS E	4.3	31.1	1.00	0.80	21.6
Approach		529	5.0	0.643	19.7	LOS B	9.1	66.6	0.55	0.78	38.8
North: Australia Avenue											
7	L	4	5.0	0.162	29.0	LOS C	4.3	31.5	0.59	0.95	34.8
8	T	290	5.0	0.162	18.8	LOS B	4.4	31.8	0.59	0.50	38.1
9	R	44	5.0	0.172	24.0	LOS B	1.0	7.5	0.74	0.73	36.3
Approach		338	5.0	0.172	19.6	LOS B	4.4	31.8	0.61	0.53	37.8
West: Sarah Durack Avenue											
10	L	31	5.0	0.583	35.8	LOS C	8.6	62.4	0.90	0.82	30.6
11	T	18	5.0	0.583	27.4	LOS B	8.6	62.4	0.90	0.74	31.1
12	R	366	5.0	0.583	44.6	LOS D	8.8	64.5	0.92	0.81	27.2
Approach		415	5.0	0.583	43.2	LOS D	8.8	64.5	0.92	0.81	27.5
All Vehicles		3125	5.0	0.643	22.8	LOS B	23.4	170.9	0.64	0.72	36.2

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	8.4	LOS A	0.1	0.1	0.39	0.39
P5	Across N approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	53	22.3	LOS C	0.1	0.1	0.64	0.64
All Pedestrians		159	26.6	LOS C			0.66	0.66

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: PM Peak Exist Australia Ave,
Bennelong Pky & Sarah Durack
Ave

PM Peak Existing
Australia Ave, Bennelong Pky & Sarah Durack Ave
Signals - Fixed Time Cycle Time = 115 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Dep. Satn y/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Australia Avenue											
1	L	480	5.0	0.268	7.8	X	X	X	X	0.60	49.7
2	T	340	5.0	0.272	30.3	LOS C	7.0	51.0	0.78	0.64	31.4
3	R	410	5.0	0.909	50.6	LOS D	19.7	143.6	1.00	1.00	25.2
Approach		1230	5.0	0.909	28.3	LOS B	19.7	143.6	0.55	0.75	33.5
East: Bennelong Pky											
4	L	551	5.0	0.820	42.2	LOS C	26.1	190.7	0.97	1.02	27.8
5	T	45	5.0	0.585	62.1	LOS E	3.4	24.7	1.00	0.77	21.2
6	R	12	5.0	0.585	70.3	LOS E	3.4	24.7	1.00	0.77	21.2
Approach		608	5.0	0.820	44.2	LOS D	26.1	190.7	0.97	1.00	27.0
North: Australia Avenue											
7	L	19	5.0	0.838	56.4	LOS D	29.6	216.0	0.99	0.98	24.7
8	T	1027	5.0	0.838	45.9	LOS D	29.6	216.1	0.99	0.97	25.4
9	R	71	5.0	0.245	19.0	LOS B	1.6	11.9	0.55	0.72	39.6
Approach		1117	5.0	0.838	44.4	LOS D	29.6	216.1	0.97	0.95	26.0
West: Sarah Durack Avenue											
10	L	15	5.0	0.634	25.3	LOS B	7.2	52.5	0.67	0.80	35.8
11	T	8	5.0	0.634	16.9	LOS B	7.2	52.5	0.67	0.56	37.6
12	R	448	5.0	0.634	39.2	LOS C	10.7	77.8	0.80	0.79	29.1
Approach		471	5.0	0.634	38.3	LOS C	10.7	77.8	0.79	0.79	29.4
All Vehicles		3426	5.0	0.909	37.7	LOS C	29.6	216.1	0.79	0.86	29.0

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	33.7	LOS D	0.1	0.1	0.77	0.77
P5	Across N approach	53	49.8	LOS E	0.2	0.2	0.93	0.93
P7	Across W approach	53	35.2	LOS D	0.1	0.1	0.78	0.78
All Pedestrians		159	39.6	LOS D			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Processed: 19 June 2012 9:44:03 AM

SIDRA INTERSECTION 5.1.13.2093

Project: T:\Synergy\Projects\12\12.062\Modelling\12.062ms04v01 TRAFFIX Overall Development - Australia Ave

8000844, TRAFFIX, SINGLE

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SIDRA
INTERSECTION

APPENDIX C

RMS CIRCULAR

Technical Direction

For traffic, safety and transport practitioners
OPERATIONAL POLICY – GUIDELINES – ADVICE



Transport
Roads & Maritime
Corporation

Published May 2013

Supersedes/Amends None

TDT 2013/

04

Guide to Traffic Generating Developments

Updated traffic surveys

Introduction

The *Guide to Traffic Generating Developments* was first released in 1991. It was revised in 2001 and is in the process of being further revised. It provides guidance on a number of matters related to the traffic impacts of land use developments, most notably on matters relating to traffic generation and parking. Its audience extends beyond that of traffic authorities (RMS and Councils) and is widely used throughout Australia.

Over the past few years a number of surveys have been undertaken to update trip generation and parking information as part of the *Guide*. This Technical Direction provides a summary of the updated information. The information herein should be used to supplement the current *Guide* and replace those sections of the *Guide* indicated. The information is provided in two parts; (i) a very brief summary below and (ii) more extended summaries in Appendices A-H. More detailed information may be obtained by referral to the RMS Library where reports on each land use may be found.

Summaries of land use traffic generation

High density residential flat dwellings

Ten surveys were conducted in 2012, eight within Sydney, and one each in the Hunter and Illawarra. All developments were (i) close to public transport, (ii) greater than six storeys and (iii) almost exclusively residential in nature. The weekday trip generation rates were as follows:

Weekday Rates	Sydney Average	Sydney Range	Regional Average	Regional Range
AM peak (1 hour) vehicle trips per unit	0.19	0.07-0.32	0.53	0.39-0.67
AM peak (1 hour) vehicle trips per car space	0.15	0.09-0.29	0.35	0.32-0.37
AM peak (1 hour) vehicle trips per bedroom	0.09	0.03-0.13	0.21	0.20-0.22
PM peak (1 hour) vehicle trips per unit	0.15	0.06-0.41	0.32	0.22-0.42
PM peak (1 hour) vehicle trips per car space	0.12	0.05-0.28	0.26	0.11-0.40
PM peak (1 hour) vehicle trips per bedroom	0.07	0.03-0.17	0.15	0.07-0.22
Daily vehicle trips per unit	1.52	0.77-3.14	4.58	4.37-4.78
Daily vehicle trips per car space	1.34	0.56-2.16	3.22	2.26-4.18
Daily vehicle trips per bedroom	0.72	0.35-1.29	1.93	1.59-2.26

Distribution List:

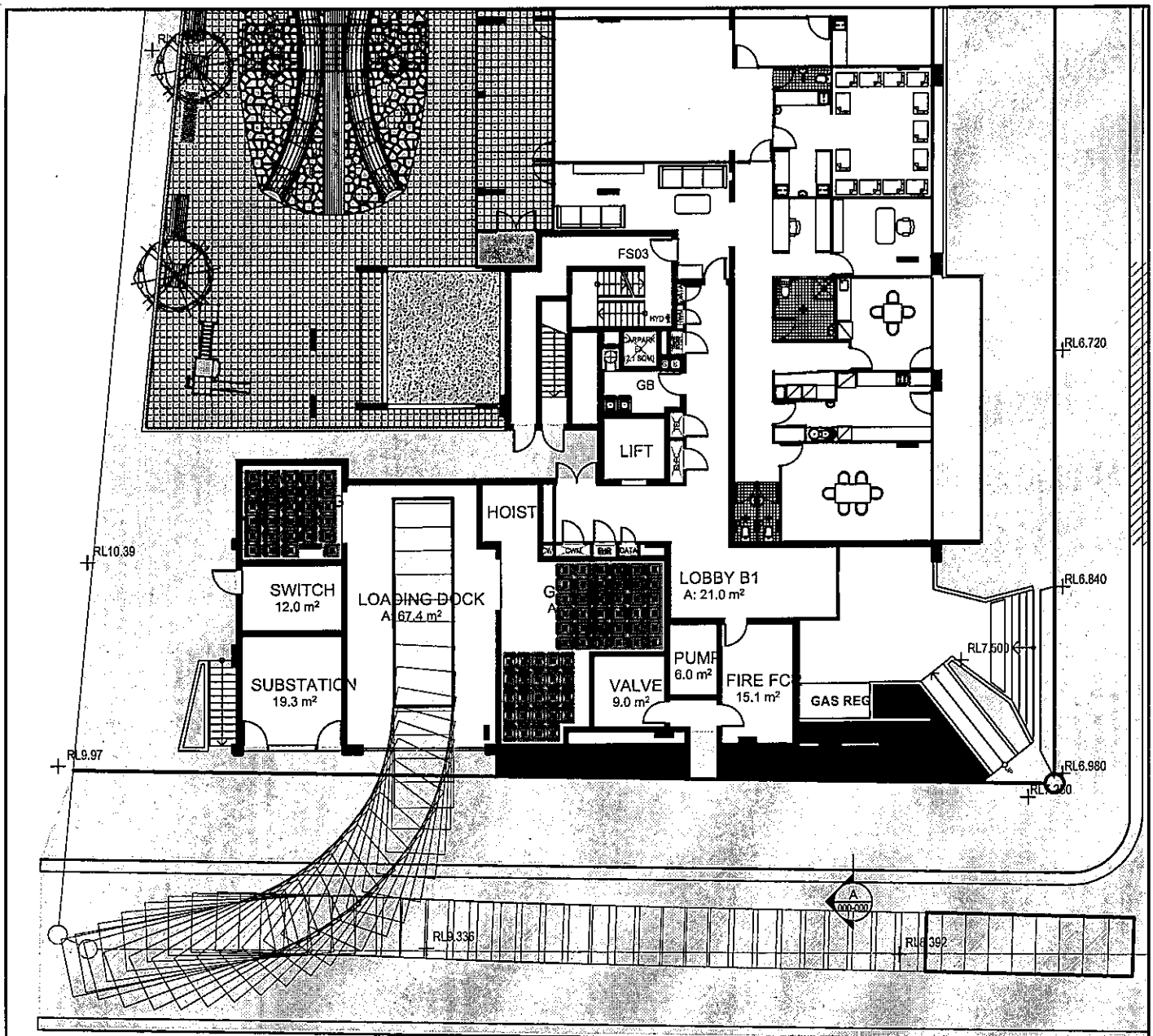
Director, Infrastructure Development; RMS Development Managers; RMS Land use/Planning Officers; Councils; Land & Environment Court Officers and Consultants.

For further enquiries

www.rms.nsw.gov.au | E technical.directions.publication@rms.nsw.gov.au

APPENDIX D

SWEPT PATH ANALYSIS



LEGEND

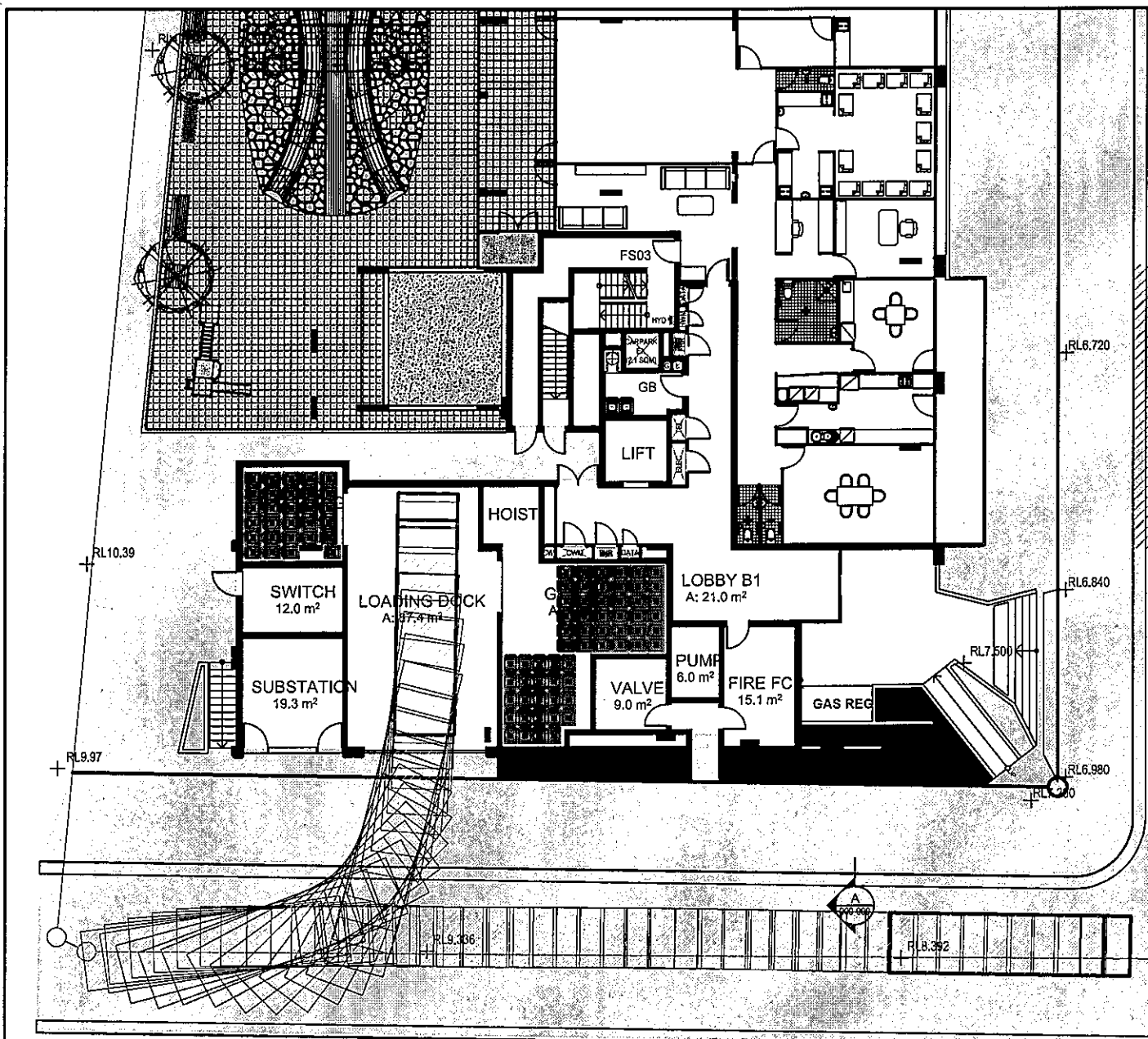
This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2013. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



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

SP 1

LEGEND



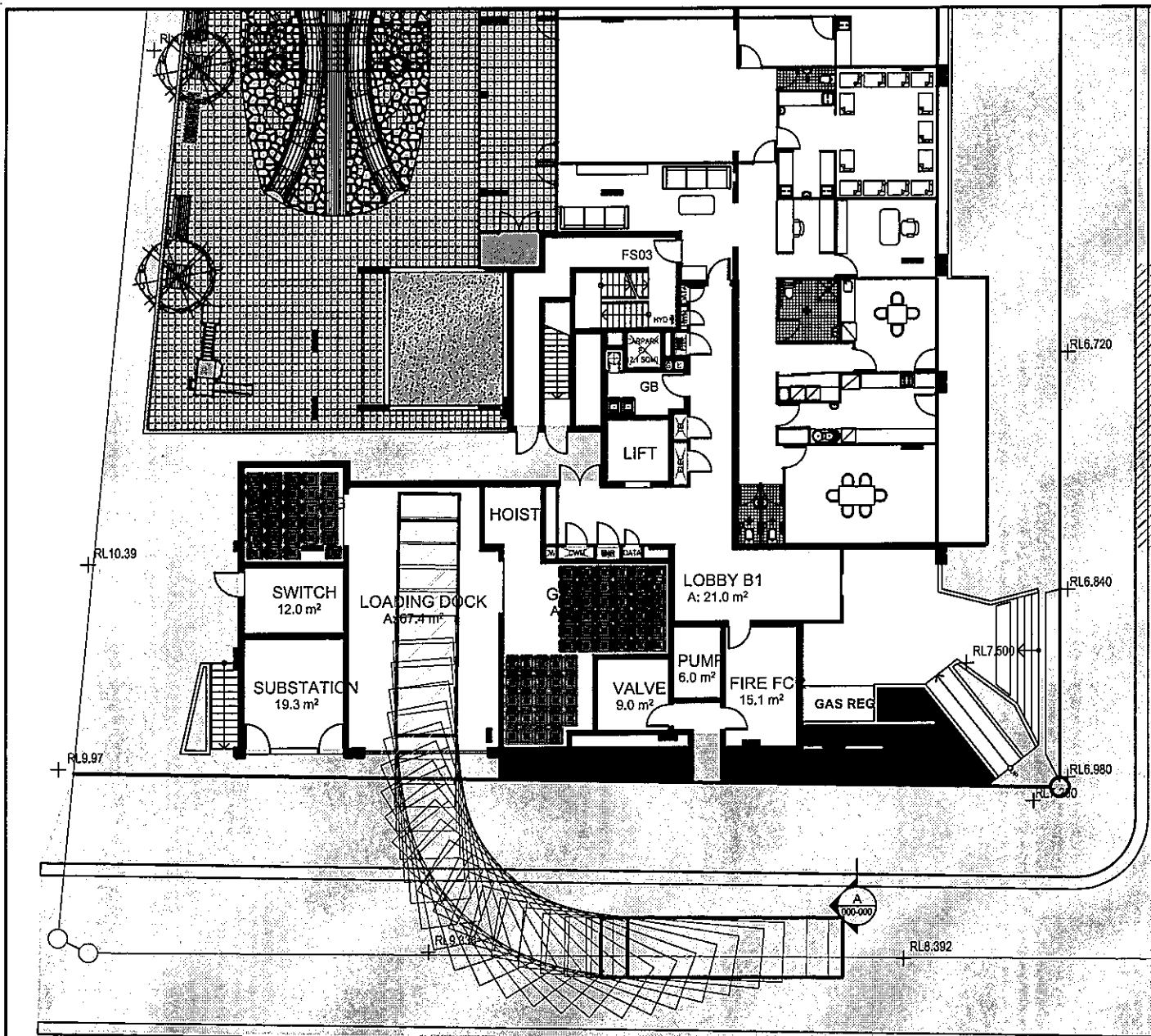
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2013. 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.



**SWEPT PATH ANALYSIS
OF A 10.2m REFUSE
VEHICLE ENTERING THE SITE**

SP 3



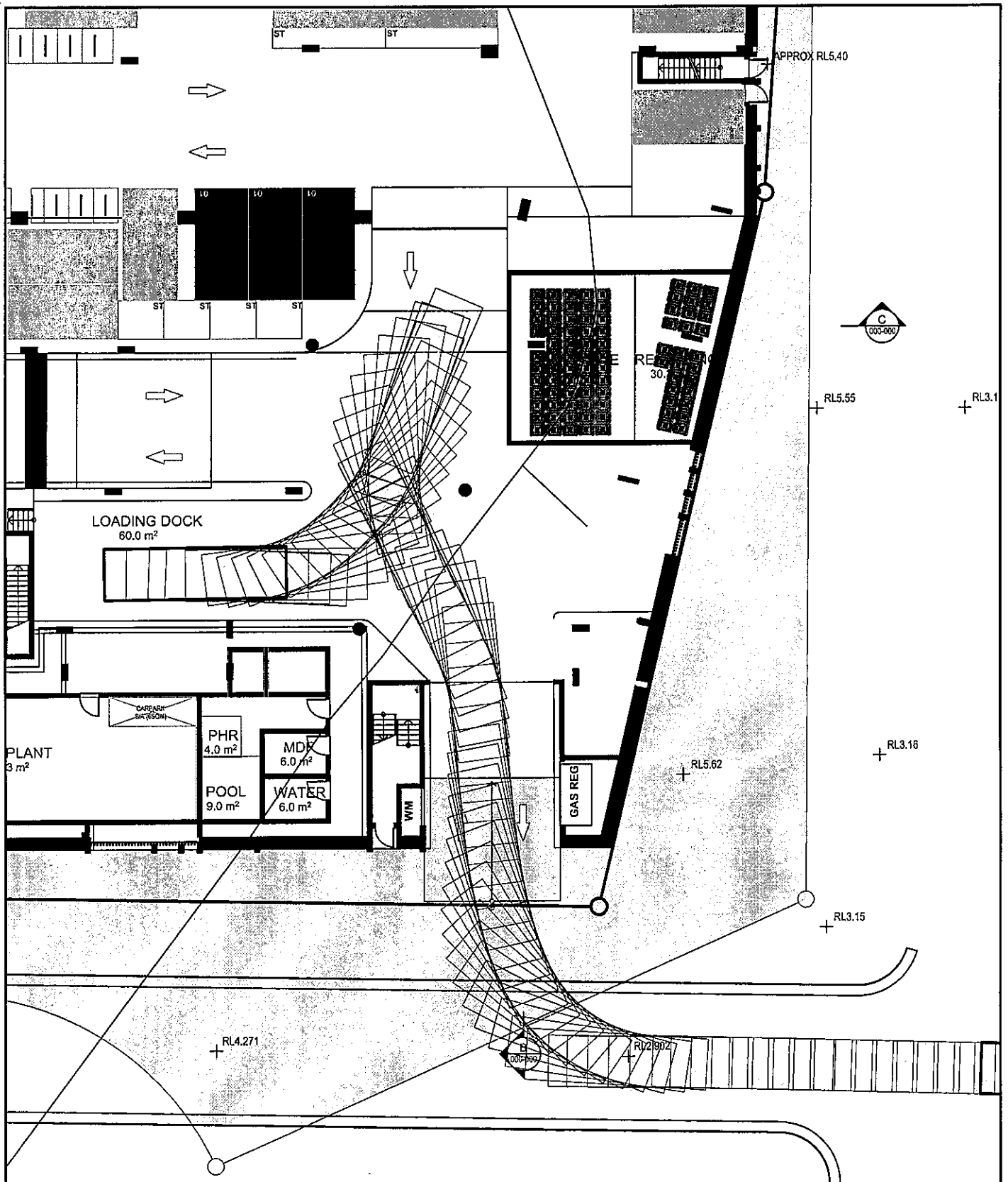
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2013. 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.



**SWEPT PATH ANALYSIS
OF A 10.2m REFUSE
VEHICLE EXITING THE SITE**

SP 4



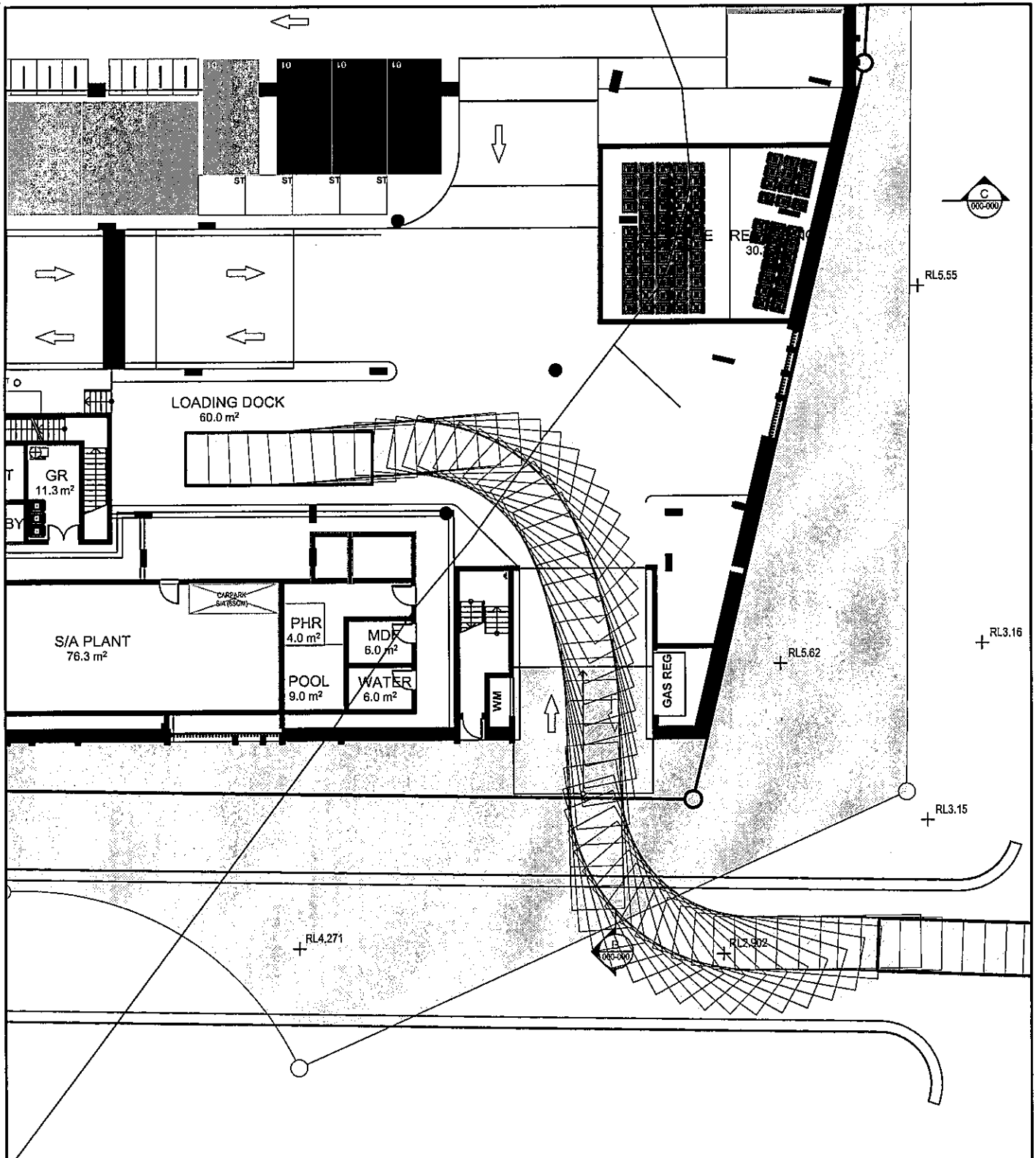
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2013. 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.



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

SP 5



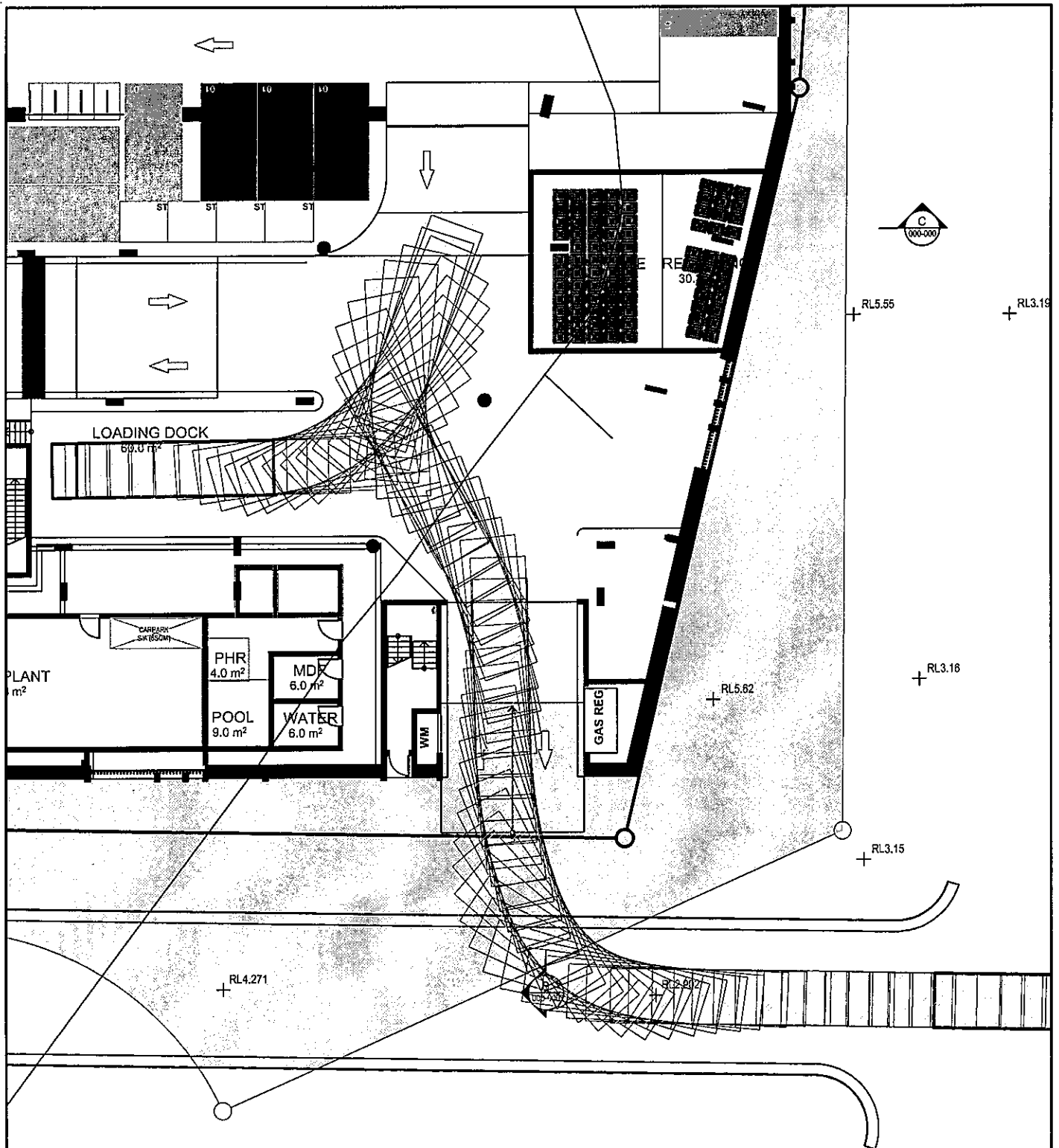
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This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2013. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



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

SP 6



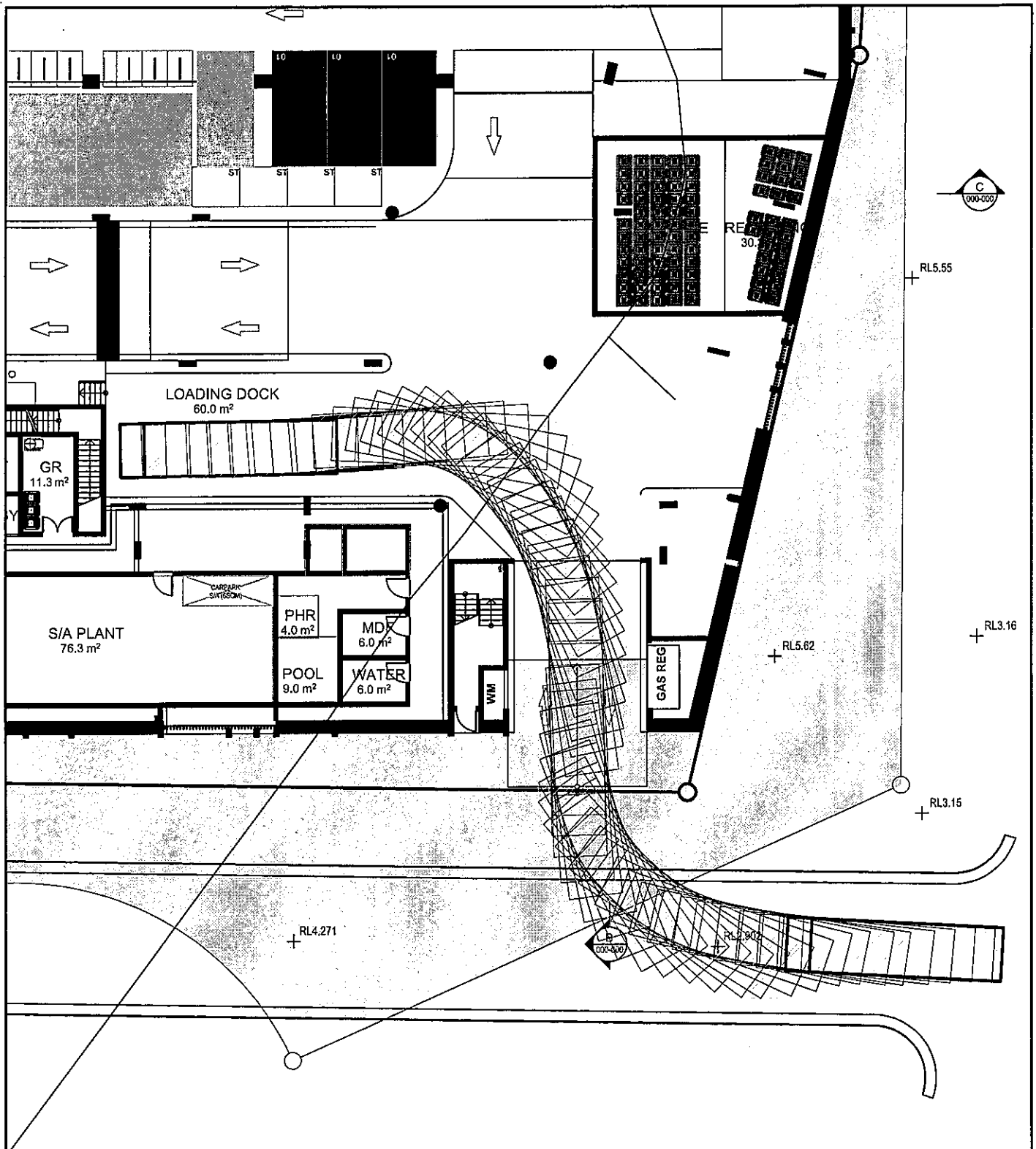
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2013. 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.



**SWEPT PATH ANALYSIS
OF A 10.2m REFUSE
VEHICLE ENTERING THE SITE**

SP 7



LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2013. 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.



**SWEPT PATH ANALYSIS
OF A 10.2m REFUSE
VEHICLE EXITING THE SITE**

SP 8