TRAFFIC AND PARKING IMPACT
FOR PROPOSED MODIFICATIONS TO
AN APPROVED CONCEPT PLAN (S75w)
FOR A
PROPOSED MIXED USE DEVELOPMENT
AT
21-35 TREACY STREET, HURSTVILLE

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Job No.: 1105/11
Report No.: 31/11 **APRIL 2012**

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APPENDICES

Appendix A

Stanisic Associates Drawings Revision H:-

Drawing No.	Title.
CD04	Basement 4A/4B
CD05	Basement 3A/3B
CD06	Basement 2A/2B
CD07	Basement 1A/1B
CD08	Ground Level.
CD09	Level 1

APPENDIX B: **Table of Areas Total Site**

Appendix C: **Hurstville CBD Parking Map**

Masterplan – Hurstville City Centre-Proposed Car Park Locations

Appendix D: Intersection Performance and assignment of approved development from Report 33/10 prepared by this firm dated December 2010.

1.0 INTRODUCTION

1.1 Background

An application was made by Earljest Pty Ltd for approval of a concept plan for a mixed use development at 21 – 35 Treacy Street, Hurstville under Part 3A of the EP and A Act. A traffic report was prepared by this firm in support of this application, report No 33/10.

The concept plan was referred to the Planning and Assessment Commission for determination under delegation by the Minister of Planning and Infrastructure. The Concept Plan was approved on 1st July 2011. This report has been prepared in support of an application to modify this consent under Section 75w of the Environmental Planning and Assessment Act 1979.

The site is shown in **Figure 1 Locality Plan**. The Lot numbers and D.P.'s are shown in **Figure 2.**

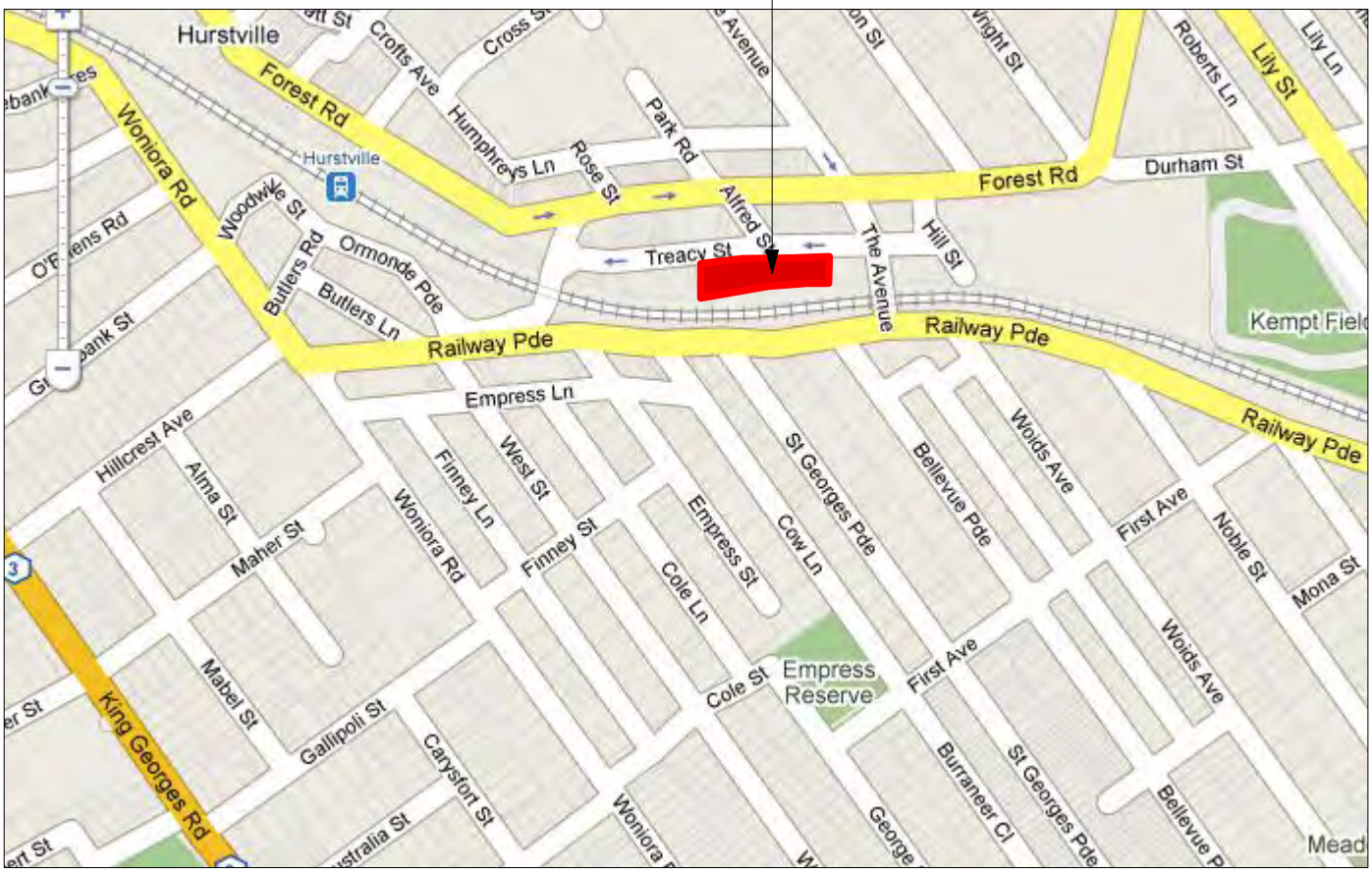
1.2 Scope of Report

This report addresses the traffic and parking issues arising from the modification of the concept plan.

In preparing this report we have reviewed the following documents:-

- Commissions Determination Report dated 1st July 2011
- Better Transport and Livable Cities. NSW State Plan 2010.
- Annual Performance Report 2010 NSW State Plan
- NSW Government's Metropolitan Strategy – South West.
- Sub-region November 2007.
- Hurstville Council's DCP No 2

PROPOSED DEVELOPMENT
SITE 21-35 TREACY STREET



AERIAL LOCALITY MAP

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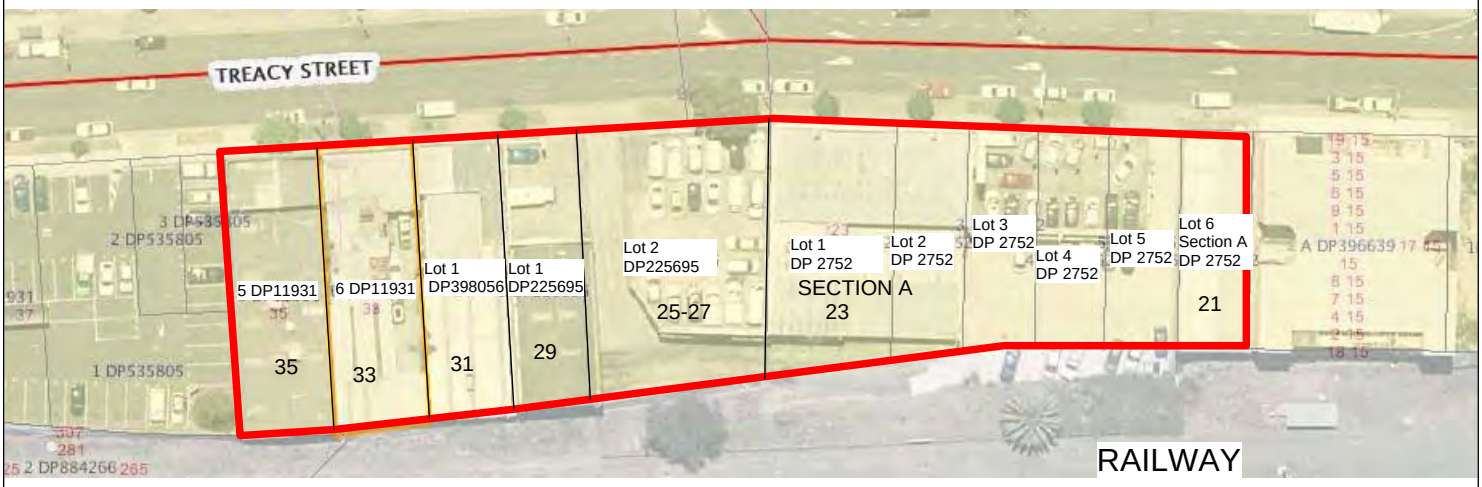
FIGURE 1: LOCALITY PLAN



NO. 23
LOTS 1,2,3,4 & 5
SECTION A
DP2752

FIGURE 2: CADASTRAL PLAN

2.0 EXISTING TRAFFIC CONDITIONS

2.1 Existing Road Network

The site has a frontage of approximately **132** metres to Treacy Street and backs onto the Illawarra Railway Line. The site is located in the Hurstville CBD and is approximately **400** metres from Hurstville Railway Station.

Forest Road and Treacy Street are the main east-west access roads and are classified as local roads. The north-south access roads are The Avenue which intersects with Forest Road and Treacy Street and passes under the Illawarra Railway Line to Railway Parade in Kogarah, Park Road and Forest Road south of Queens Road which is one way south. Treacy Street at its western end connects to Forest Road and passes over the railway line and connects to Railway Parade.

The Avenue is one-way south and Park Road is one-way north forming a one-way pair. PJ Road and Treacy Street is one-way west and forms a one-way pair with Forest Road. Forest Road carries two-way traffic between PJ Road and Park Road. Half hour short stay parking is signposted in Treacy Street and Forest Road from **8:30am** to **6:00pm** Monday to Friday except for Forest Road eastbound between Park Road and The Avenue where parking is banned from **6:00am** to **10:00am** and from **3:00pm** to **7:00pm** Monday to Friday. 'No Stopping' is signposted in Alfred Street and The Avenue between Forest Road and Treacy Street.

The intersection of PJ Road and Treacy Street is controlled by "Give Way" signs. The intersections at Treacy Street / The Avenue, Forest Road / Park Road and Forest Road / The Avenue are controlled by traffic signals. The tee intersection of Treacy Street and Forest Road is controlled by stop signs on the Treacy Street approach. Pedestrian movements at the signalized intersections are signalized.

The road inventory and number of traffic lanes are illustrated in **Figure 3**.

2.2 Road Inventory and Parking

There are some **3461** off-street car parking spaces in the Hurstville CBD bounded by Cross Street / The Avenue / Treacy Street and Forest Road. All spaces are approximately within **400** metres of the subject site. These off-street spaces are shown in the map *"Hurstville CBD Parking"* prepared by Hurstville City Council. This map is included in **Appendix C**.

The signposted parking restrictions 'No Parking and 'No Stopping' restrictions are shown in **Figure 3**. Within the area bounded by Cross Street / The Avenue / Forest Road / PJ Road / Hill Street/ Treacy Street / Forest Road there are some 2/P10, 100/½ hour, 19/1 hour and 12 unrestricted parking spaces on-street.

LEGEND

PEDESTRIAN MOVEMENT

S SIGNALS

N

WESTFIELD

PARK ROAD

HUMPREYS LANE

ROSE ST

BUS ZONE 1/2P 1S

P10 2S

NO STOPPING

1P 7S

1P 4S

1/2 P 2S

1/2 P 4S

CH0.0

CH10.3

CH55.4

CH75.7

CH79.2

CH88.0

CH100.0

FOREST RD

1/2P 12S

1/2P 9S

1/2P 10 S

1/2P 6 S

ONLY

NO STOPPING

CH127.80

CH142.1

CH153.4

CH170.2

CH192.5

CH92.70

CH52.20

CH43.90

CH13.70

CH00

POLE

NO LHT

E ALFRED ST

K

CH0.0

CH17.3

CH37.2

CH80.0

1/2P 3S

NO PARKING

THE AVENUE

10.3m

1P 3S

1/2P 11S

6.1m

PJ RD

HILL ST

8 S NO LIMIT

4S NO LIMIT

TREACY ST

NO PARKING

LOADING ZONE

1/2 P 9 SP

1/2 P 5S

DRIVE

1/2 P11 S

12.9m

WORK ZONE

LP

drive

CH118.40

CH77.7

CH64.2

CH56.6

CH40.1

CH30.1

CH16.7

CH8.3

CH00

THE AVE

COUNCIL CAR PARK

PROPOSED SITE

SECTION A

No 35

5 DP11931

6 DP11931

Lot 1 DP398056

Lot 1 DP225695

Lot 2 DP225695

Lot 1 DP 2752

Lot 2 DP 2752

Lot 3 DP 2752

Lot 4 DP 2752

Lot 5 DP 2752

Lot 6 Section A DP 2752

35

33

31

29

25-27

23

21

match line

BUS LANE

CAR PARK 32 S 1P

FOREST RD

STOP

NO STOPPING

N

SCALE 1:1000 @ A3

FIGURE 3

STREET INVENTORY PLAN

2.2 (Continued)

The pavement widths kerb to kerb, marked pedestrian crossings and traffic flow directions are marked up on **Figure 3.**

2.3 Existing Peak Hour Traffic Volumes

Traffic counts were made at the following intersections in *15 minute intervals* on **Friday 19/11/10** from **7:00am** to **9:00am** and **4:00pm** to **6:00pm** to correspond with the commuter peak hours:-

- Forest Road / PJ Road.
- Treacy Street / The Avenue.
- Treacy Street / Alfred Street.
- Forest Road / Park Road / Alfred Street.
- Forest Road / The Avenue.

Counts were made at the intersection at Forest Road / Treacy Street over the same periods on Tuesday 23/11/10.

The **am** peak hour was **8:00am – 9:00am** at all intersections. The **pm** peak hour varied and occurred as early as **4:00** to **5:00pm** and as late as **5:00 – 6:00pm**.

A survey was conducted on Tuesday 23/11/10 of all traffic movements into and out from the premises from No 21 to No 35 from 7am to 9am and from 4pm to 6pm. The traffic movements were as follows:-

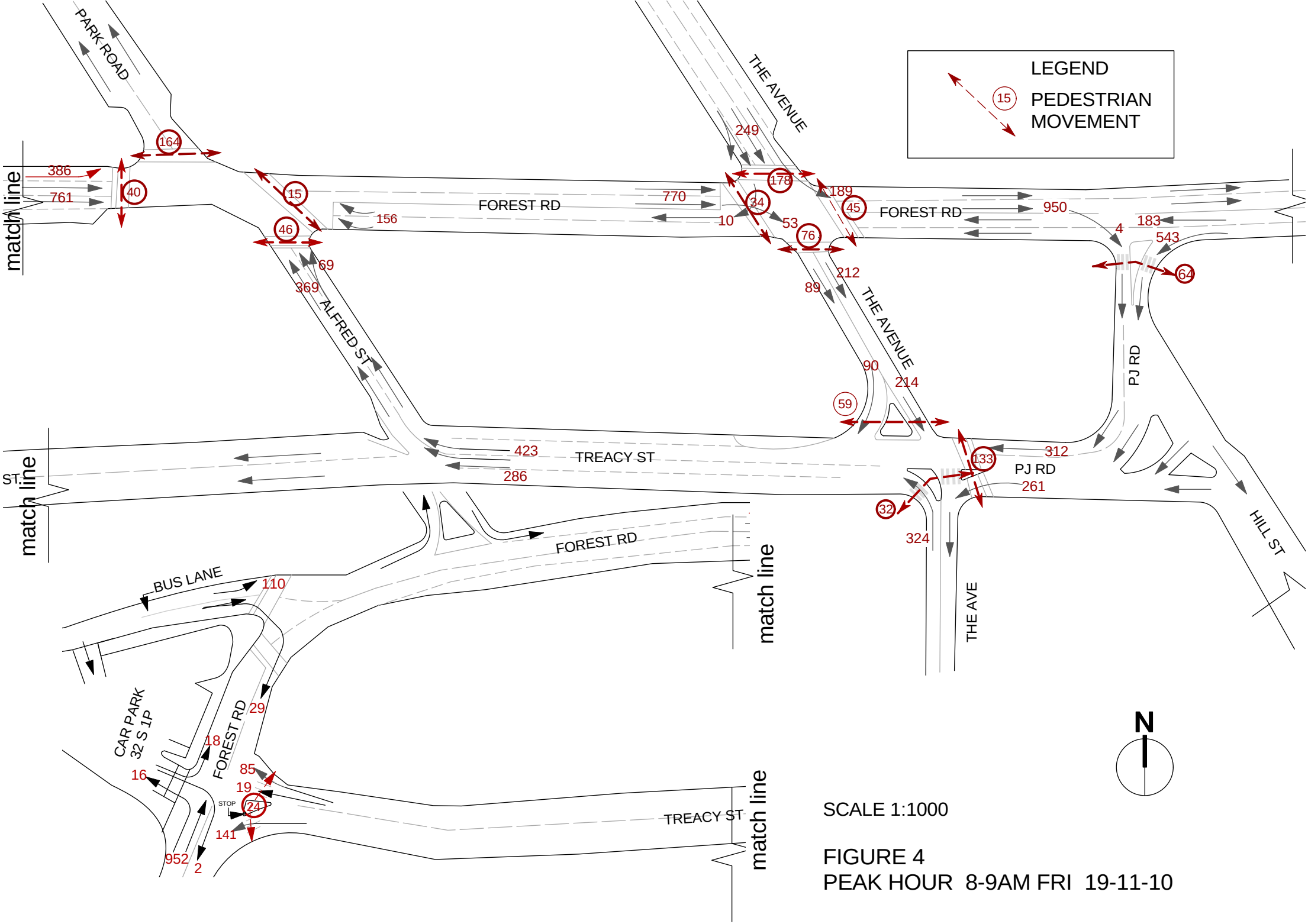
TIME INTERVAL	IN	OUT	TOTAL
7-8am	10	2	12
8-9am	19	8	27
4-5pm	11	16	27
5-6pm	2	5	7

The **am** and **pm** peak hour traffic volumes and pedestrian counts are illustrated in **Figures 4** and **5** respectively.

2.4 Intersection Performance

The signalized intersections have been analysed using SIDRA Version 2011

The network performance is determined by the Level of Service (**LoS**) Average Vehicle Delay (**AVD**), Degree of Saturation (**DoS**) and maximum delay on the critical movement at the intersections during peak hours. The Level of Service criteria for intersections are explained in **Table 4.2** taken from the *RTA Guide to Traffic Engineering Developments*.



SCALE 1:1000

FIGURE 4
PEAK HOUR 8-9AM FRI 19-11-10

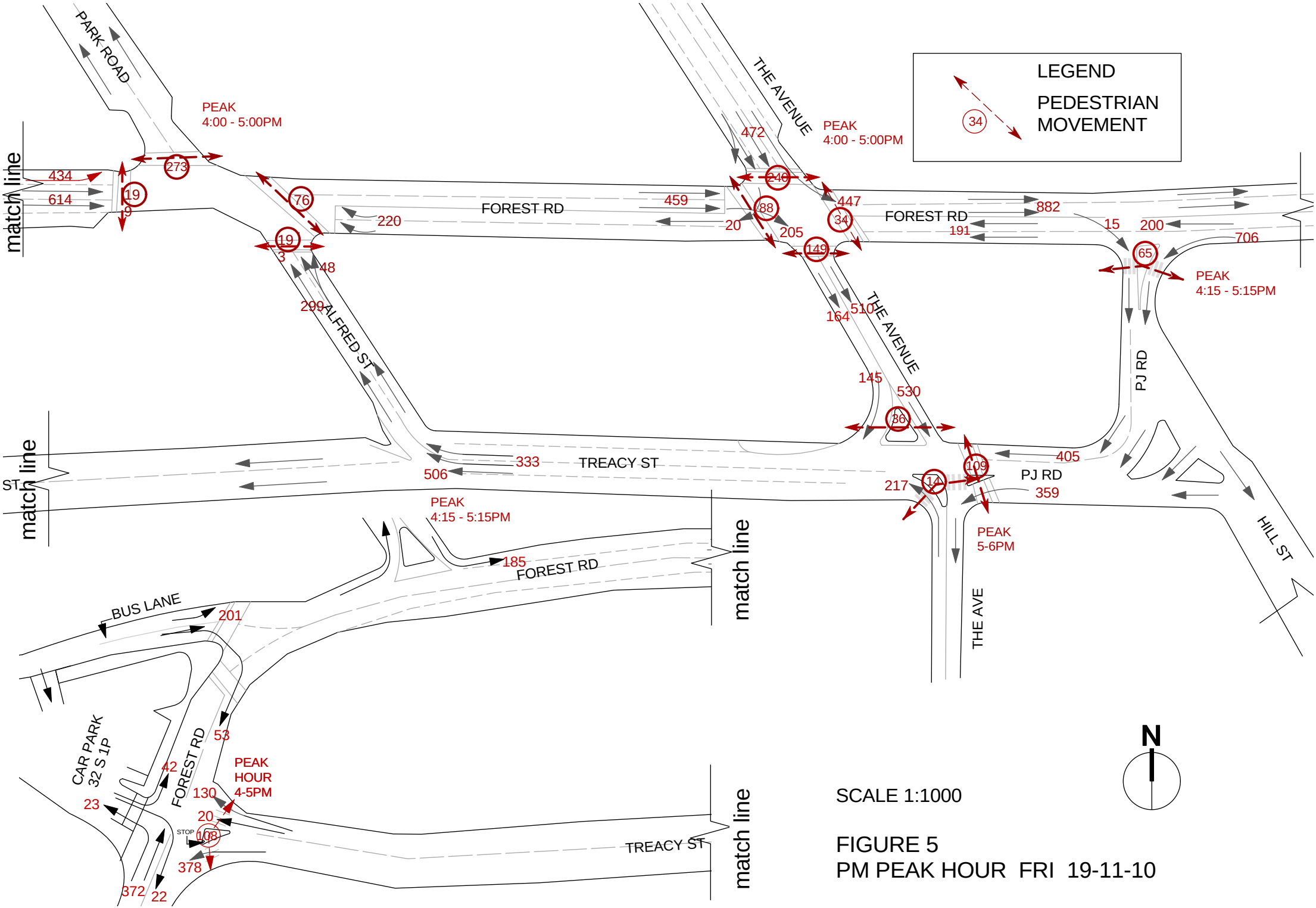


FIGURE 5
PM PEAK HOUR FRI 19-11-10

2.4 (Continued)

Table 4.2
***(RTA Guide To Traffic Generating Developments*)**
Level of Service criteria for intersections.

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	< 14	Good operation	Good operation
B	15 TO 28	Good with acceptable delays spare capacity	Acceptable delays & spare capacity
C	29 TO 42	Satisfactory	Satisfactory, but accident study required
D	43 TO 56	Operating near capacity	Near capacity & accident study required
E	57 TO 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode

The results of the analysis are set out in **Table 2.4**

Table 2.4 Intersection Performance

	Intersection	Peak Hour	Level of Service LoS	Degree of Saturation DOS	Average Delay per Veh.	Critical Movement Delay per Veh.
S	Forest Road / PJ Road	8:00am-9:00am	A (WORST A)	0.31	2.9 Secs.	(8.0) Forest Rd RHT
		4:15pm-5:15pm	A (WORST A)	0.40	3.8 Secs.	(33.3) Forest Rd RHT
S	Treacy Street/ The Avenue	8:00am-9:00am	A (WORST A)	0.39	11.4 Secs	(18.4) Treacy Street
		5:00pm-6:00pm	B (WORST B)	.75	14.5 Secs	(23.8) Treacy Street
S	Forest Rd/Park Rd/ Alfred Street	8:00am-9:00am	C (WORST D)	.83	38.5 Secs	(50.4) Forest Road RT
		4:00pm-5:00pm	C (WORST D)	.88	37.7 Secs	(52.8) Forest Road RT
S	Forest Rd / The Avenue	8:00am-9:00am	B (WORST D)	.76	25.7 Secs	(46.8) LT From The Avenue into Forest Rd
		4:00pm-5:00pm	C (WORST D)	.821	37.0 Secs	(49.9) RT from Forest into The Avenue
S	Forest Rd / Treacy Street	8:00am-9:00am	A (WORST C)	0.62	3.8 Secs	(33.3) THRU Movement from Treacy Street
		4:00pm-5:00pm	A (WORST C)	0.79	6.6 Secs	(31.3) THRU Movement from Treacy Street

(1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.

(2) Average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.

Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.

Note: S Analysed using SIDRA

2.5 Current Uses of Existing Site

The current uses are as follows:-

No. 21	Huber Mechanics – 3 hoists plus 3 car spaces.
No. 23	Fergusons Toyota – Two storey office building and open Car Sales Yard for 16 cars, open car park at rear for 19 cars, covered workshop with 3 hoists plus 5 car spaces.
No 25 to 27	Fergusons Toyota – Open Car Sales Yard for 18 cars and single storey sales office. Workshop at basement level with 4 hoists plus 8 car spaces.
No. 29	Fergusons Car Sales. Open Car Yard at front for 6 cars plus covered showroom for 8 cars and 2 wash-bays at basement level.
No. 31	Unknown
No. 33	Unknown
No. 35A	Health Therapist ground floor
No. 35	Dance Studio at first floor+

Summary:

Workshops	**10 Hoists**
	2 Wash Bays.
	16 car spaces.
Car Sales Spaces	**48 spaces.**
Parking at Rear	**19 spaces.**

The buildings and driveways along the complete Treacy Street frontage are shown in **photographs P1** to **P8.**

2.6 Vehicle Driveway Access to Site

There are single driveways to No. 21, single lane entry driveway to car park and workshops at the rear of Nos. 23 to 27, single driveway to car yard at front of No. 23, single driveway to car sales at front of Nos. 25-27, single lane exit driveway from rear of No. 23 to 29, single lane entry driveway to car sales yard at front of No. 29, single lane driveway access to roller shutter doors at Nos. 31, 33 and 35 Treacy Street. There are **9** driveway crossings in total.

2.7 Public Transport

The site is well served by public transport services. The Hurstville railway station on the Illawarra line has regular *7 day services* and is approximately **400** metres from the site.

There are **4** bus companies that have regular *7 day services* within walking distance of the site. The services and service providers are:-

PHOTO P1 **No. 21.** **Driveway Entrance To Workshops.** **No. 23 Car Sales**

PHOTO P2 **No. 23 Car Sales and Office Building.**

PHOTO P3 **No. 23 Office Building**

PHOTO P4 **No. 25 and 27 Car Sales**

PHOTO P5 **Driveway Exit from Workshops No. 29 Car Sales.**

PHOTO P6 **No. 31.**

PHOTO P7 No. 33

PHOTO P8 No. 35A and No. 35.

2.7 (Continued)

Pioneer Coaches	Treacy St / Forest Rd	Route 452	Beverley - Rockdale
		Route 453	Hurstville - Rockdale
Sydney Buses	Forest Road	Route 499	Hurstville - Drummoyne
Southtrans	Forest Road	Route 947 Route 948	Hurstville - Dolls Point - Kogarah Hurstville- Bankstown via Peakhurst
Punchbowl Bus Co.	Forest Road- Park Rd	Route 450 Route 943 Route 940 Route 941	Hurstville- Strathfield. Hurstville – Lugarno. Hurstville – Bankstown via Riverwood. Hurstville – Bankstown via Greenacre.

2.8 Bicycle Lanes in CBD

The CBD is well served by on-road cycle lanes.

In the vicinity of the site there are marked on-road cycle lanes in The Avenue / Forest Road / PJ Road / Treacy Street / Alfred Street and Park Road. The cycle network is shown on a Concept Master Plan for Hurstville City Centre.

3.0 TRANSPORT AND TRAFFIC ISSUES TO BE ADDRESSED

3.1 Director General's Requirements

The key issues relating to *traffic and parking* were stated in a letter dated 8th October 2010 from the Director, Metropolitan Projects, Department of Planning to the Director Economia PDS Pty Ltd and as follows:-

> **7. Traffic Impacts (Construction and Operational)**
> Prepare a traffic impact study in accordance with the RTA's Guide to Traffic Generating Developments considering traffic generation any required road / intersection upgrades, access, loading dock(s) and car parking arrangements, measures to promote public transport usage and pedestrian and bicycle linkages.
>
> **8. Parking**
> The EA must demonstrate the adequate provision of on site car parking for the proposal having regard to local EPI controls and RTA guidelines. (**Note:** the Department supports reduced car parking rates in areas well-served by public transport).

3.2 RTA's Requirements

The RTA's requirements were stated in a letter dated 2nd November 2010 from Transport Planning, Sydney Region to the Director, Metropolitan Projects, NSW Department of Planning in reference to the proposed Concept Plan for a residential /retail development at 21-35 Treacy Street, Hurstville. The requirements relevant to the Concept Plan are as follows:-

"The RTA would like the following issues to be included in the transport and traffic impact assessment of the proposed development:

1. It is noted that the Metropolitan Strategy has designated Hurstville as a Major Centre and a focal point for regional transport connections and jobs growth. It is important that the development of the proposed retail and residential development takes into consideration and contributes to the achievement of, transport objectives contained in this and other high level NSW Government strategies.

   These strategies include the NSW State Plan and draft South West Sub-regional Strategy. These policies share the aims of increasing the use of walking, cycling and public transport; appropriately co-locating new urban development with existing and improved transport services; and improving the efficiency of the road network.

   By addressing both the supply of transport services and measures to manage demand for car use, the EA report should demonstrate how users of the proposed retail and residential development, will be able to make travel choices that support the achievement of relevant State Plan targets.

3.2 (Continued)

2. Daily and peak traffic movements likely to be generated by the proposed development including the impact on nearby intersections and the need / associated funding for upgrading or road improvement works (if required).

3. Details of the proposed accesses and the parking provisions associated with the proposed development including compliance with the requirements of the relevant Australian Standards (ie: turn paths, sight distance requirements, aisle widths, etc).

4. Proposed number of car parking spaces and compliance with the appropriate parking codes.

5. Details of service vehicle movements (including vehicle type and likely arrival and departure times).

6. The RTA requires the EA report to assess the implications of the proposed development for non-car travel modes (including public transport use, walking and cycling); the potential for implementing a location –specific sustainable travel plan (eg 'Travelsmart' or other travel behaviour change initiative); and the provision of facilities to increase the non-car mode share for travel to and from the site. This will entail an assessment of the accessibility of the development site by public transport.

4.0 EXISTING APPROVED DEVELOPMENT

4.1 Floor Areas and Uses

The gross floor areas for the retail and residential components and the gross leasable floor areas for the retail components have been calculated by Stanisic Associates. These areas and the number and type of each residential unit on each level are contained in **Table 4.1**.

USE	LEVEL	Gross Floor Area M^2	Gross Leasable Floor Area M^2			
RETAIL COMPONENT				**1BR.**	**2BR.**	**3BR**
Retail Shops	Lower Ground	1574	1574			
Retail Food Court	Ground Level	1825	1825			
Retail Shops	Level 1	327	327			
RESIDENTIAL COMPONENT						
			LEVEL			
	1	1514		5	11	
	2	1921		5	18	
	3	1955		7	11	
	4	1669		7	12	
	5	1670		6	12	
	6	1679		6	13	
	7	1608		4	12	
	8	1580		3	14	
	9	1581		3	13	
	10	1701		6	10	2
	11	1659		5	10	2
	12	1659		5	11	2
	13	1395		4	7	2
	14	1395		4	9	2
	15	1404		4	8	2
				74	**171**	**12**

The total number of units is 257.

4.2 Car Parking Requirements as per Approved Development Conditions

The car parking requirements for the approved development as stated in the Determination Report dated 1 July 2011 a parking provision of 350 parking spaces is required. 206 spaces for residents, 65 spaces for visitors and 79 spaces for the retail component. In terms of parking provision for retail the Review panel found that the number of spaces proposed are comparable to that required under the Burwood Council's Development Control Plans. Given that Burwood Town Centre is similar to Hurstville city centre, the proposed retail parking number is considered acceptable.

5.0 TRAFFIC EFFECTS OF PROPOSED DEVELOPMENT

5.1 Floor Areas and Uses

The gross floor areas for the retail and residential components and the gross leasable floor areas for the retail components have been calculated by Stanisic Associates. These areas and the number and type of each residential unit on each level are contained in **Table.1**.

USE	LEVEL	Gross Floor Area M^2	Gross Leasable Floor Area M^2			
RETAIL COMPONENT				**1BR.**	**2BR.**	**3BR**
	Basement B2	0	0			
	Basement B1	0	0			
Retail Shops	Ground Level*	1507	1507			
Retail Shops	Level 1	192	192			
RESIDENTIAL COMPONENT						
	LEVEL					
	B1		591			
	1		1418	2	14	2
	2		1898	3	23	1
	3		1887	3	14	2
	4		1546	4	16	0
	5		1546	4	16	0
	6		1546	4	16	0
	7		1448	3	13	2
	8		1471	3	13	2
	9		1471	3	13	2
	10		1484	4	14	1
	11		1507	4	14	1
	12		1507	4	14	1
	13		1231	2	13	1
	14		1232	2	12	2
	15		1232	2	12	2
			23015	**47**	**217**	**19**

Note* the community centre of 200m2 is included in the area for retail on the ground floor.

Total Number of residential units is 283.

There is an increase in the number of 2 bedroom units by 46 units and a decrease in the number of 1 bedroom units by 27 and an increase in the number of 3 bedroom units of 7.

The total gross floor leasable area for the residential component is 23015m^2. The parking requirement for residential apartments in accordance with Hurstville Council's DCP No 2, Section 4.2b Built Form Controls for Specific Sites states the parking rate is 1 space per 100m^2 GLFA plus 1 visitor space per 4 units. This rate is required under the Approval Conditions Schedule 1 Condition A8.

5.2 Estimated Residential and Workforce Population

The residential population has been estimated assuming that there will be **1.5** persons in each 1 BR unit, **2.0** persons in each 2 BR unit and **2.5** persons in each 3BR unit. The total population is **552** and the average persons per dwelling of **1.95** compared with **2.78** for Hurstville from the 1996 Census.

The workforce population has been estimated from **Table 5.11** Employees per **m^2** for retail and commercial uses in the *Hurstville Section 94 Contributions Plan No. 1* Traffic Management and Car Parking as follows:-

Retail Use	Employee per m^2 GFA	GFA m^2	Number of Employees
Retail Shops	1 per 20.3	1699	84

5.3 Car Parking Requirements and Provision

5.3.1 Residential Parking

The site is located in Blocks 29B, C, D and E in Treacy Street as stated in Section 4.2 in DCP NO. 2. The residential parking rate for these blocks is 1 space per 100m2 GLFA plus 1 visitor space per 4 units. The total residential gross leasable floor area is 23015

m2 and the total site parking requirement is **301** spaces. The parking requirement for visitors is **71** spaces (rounded up). Refer to Table 5.3.1 for calculation of residential parking spaces.

Because this site is located within 400 metres of Hurstville Railway Station and frequent 7 day bus services it is not proposed to provide parking for the 1 bedroom units in order to encourage public transport usage and alternative forms of transport use.

A new bus/rail interchange is currently under construction on the eastern side of Hurstville Railway Station.

Table 5.3.1 Residential Parking Provision

			Parking Rates Per Hurstville DCP No 2	
Location	**AREA GLFA**	**No Of Units**	**1 space /100sqm**	**Visitors 1 per 4 units**
Level B1	591			
Level 1	1418	18	14.1	4.5
Level 2	1898	27	18.9	6.75
Level 3	1887	19	18.9	4.75
Level 4	1546	20	15.5	5
Level 5	1546	20	15.5	5
Level 6	1546	20	15.5	5
Level 7	1448	18	14.5	4.5
Level 8	1471	18	14.7	4.5
Level 9	1471	18	14.7	4.5
Level 10	1484	19	14.8	4.75
Level 11	1507	19	15.1	4.75
Level 12	1507	19	15.1	4.75
Level 13	1231	16	12.3	4
Level 14	1232	16	12.3	4
Level 15	1232	16	12.3	4
Total		**283**	**230.15(230)**	**70.75(71)**

*The total parking required for the residential component is **301** spaces*.

5.3.2 Retail Parking

The parking requirement for retail shops is specified in **Section 4.2 DCP No. 2** for Blocks **29B, C, D** and **E** as **1** space per **25m^2** GLA with a minimum of **70%** on site. We have extracted the travel modes from home origin in the Hurstville CBD core to work destinations elsewhere from the 2006 Census Journey to Work data. The car driver rate is 71.4% of the car driver travel mode for Hurstville LGA. To allow for the lower car usage, and the continuing trend, the car parking provision for retail shops has been reduced by **33** per cent as shown in **Table 4.2** following. In our opinion the car driver travel mode to and from the CBD has fallen due to the construction of high density residential flat buildings in the CBD area since the 2006 census. The car parking requirement of **48 spaces** on site has thus been reduced to **35 spaces**.

TABLE 4.3: PARKING REQUIREMENTS FOR RETAIL ACCORDING TO HURSTVILLE DCP No 2 Section 3.4.12

LEVEL	**FACILITY**	**Parking Rate Hurstville Council DCP**	**Gross Floor Area Refer to Note 2**	**Gross Leasable Area**	**Only 70% of spaces required for commercial and retail. Refer to Note 1.**	**No Of Required Parking Spaces 70% concession Section 4 of DCP No 2**	**Reduction of car parking of 33% due to higher walk travel mode and lower car driver travel mode in CBD Core**	**Total Car parking required**
Ground Floor	Retail Shops	1 space per 25m2	`1507	1507		42.196	14.05	
Level 1	Retail Shops	1 space per 25m2	192	192		5.34	1.76	
Total Parking required			1699	1699		47.53	15.81	31.53
Disabled Parking Requirement	2% of total number of spaces					1	Allow	35*

Note* allow 35 spaces in accordance with Burwood Council's DCP 36

5.3 (Continued)

The car parking rate under Burwood Council's DCP No 36 is space for the first 400 sq.m or part thereof, then; 1 space per 40 sq.m of additional floor area; and equates to a provision for **33** car parking spaces.

The provision of 35 spaces is therefore adequate. The community centre located on the ground floor has been included in the total gross floor area for retail uses for the ground floor.

5.4 Bicycle Storage Facilities

In order to encourage the use of bicycles by residents and workforce it is proposed to provide bicycle storage racks/rails and bicycle lockers within the basement car park to encourage commuter and recreational cycling.

Hurstville City Council has no requirement for bicycle facilities in its Transport and Parking DCP's. It is considered appropriate to adopt the standards adopted by Willoughby Council in DCP No. 2 as Chatswood and Hurstville are regional centres in relatively flat terrain and both Councils have a network of bicycle lanes on roads. The suggested storage facilities are provided as a guide for the proposed development

	Bicycle Lockers		**Bicycle rail/racks**
Residential	1 per 10 units	**PLUS**	1 per 12 units
Retail	1 per 450m^2	**PLUS**	1 per 150m^2

Suggested Bicycle Parking:

Residential	Lockers	Racks
	28	24
Retail	4	11

5.5 Number of Accessible Parking Spaces Required

The number of accessible parking spaces required has been calculated in accordance with AS2890.6:2009 Appendix B Table B1 as follows:-

Total Number of Car Spaces	**Number of Accessible Car Parking Spaces**	**Number of spaces required**
21-50	Not less than 2	2
For Every additional 50 car parking spaces	Not less than 1	6 (based on a provision for a minimum of 336 spaces).

5.6 Internal Parking Layout and Circulation

The two way (combined) driveway is shown on Drawing CD08 and extends from ground level RL60.25 to Lower Ground Level at RL57.00. As the number of car spaces is marginally greater than 300 (at 336) and 301 spaces are for residential use, the class of parking is predominantly 1A residential and employee car parking and as Treacy Street is a local road, a combined driveway is permissible for an access driveway Category 2 in Table 3.1 in AS/NZS 2890.1 – 2004. The driveway width is 7.12 metres and the pavement width between kerbs is 6.56 metres. At the 90 degree bend the driveway width permits a B99 vehicle to pass a B85 vehicle.

The driveway gradient has been checked and can be designed at 5% over the first 6 metres and then with two ramps at 1 in 5 with transitions at the top and bottom over 2 metres of 1 in 10 to reach RL 57.00. The minimum headroom requirement is 2.2 metres to comply with Section 2.4 Headroom in AS/NZS 2890.6 – 2009 Parking Facilities Part 6: Off Street parking for people with disabilities.

The parking bay dimensions are 2.5 by 5.4 for the residential User Class 1A but the aisle width is 5.8 metres.

The parking bay dimensions required in the retail car park are 2.7 by 5.4 metres to comply with User Class 3A in Figure 2.2 in AS/NZS 2890.1. The aisle width is 5.8 metres. The column locations have not been determined so the parking lay out is conceptual and all dimensions need to be confirmed in the detail design. It is understood that all 35 retail parking spaces will be on the basement B1 Level.

The car park is a split level car park with 2 way ramps 7.2 metres wide with a transition of 1 in 8 over 2 metres, then 1 in 5 over 5 metres and then another transition grade of 1 in 8 over 2 metres. The gradients are compliant with AS2890.1:2009 Clause 2.5.3(e). Swept paths of a B85 and B99 turning concurrently at the top and bottom of the standard ramp design will be checked in the detail design. There is scope to lengthen the ramp if necessary. Circulation is clockwise down from Lower Ground Floor Level to basements B1 to B3. The residential car spaces are predominantly on levels B2 and B3. The long dead end aisle on Levels B1, B2 and B3 is considered satisfactory for allocated residential parking spaces.

5.7 Estimated Traffic Generation

The proposed building is a high density residential flat building in a regional centre. Based upon the traffic generation rates in the RTA Guide to Traffic Generating Developments the **283** units are expected to generate 0.24 vehicle trips in the peak hours. Based upon surveys conducted by this firm, the directional distribution for the residential traffic is 75% out and 25% in in the am peak hour and 67% in and 33% out in the pm peak hour.

5.7 (Continued)

For the retail shops the RTA traffic generation rates in the peak period 4.30pm – 5.30pm on Thursday and Friday show that for this retail mix the traffic generation on Friday is marginally higher than Thursday.

In the **am** peak hour the traffic generation by the retail shops will be mainly due to staff arriving for work. The number of retail employees is estimated to be 96 as shown in Section 5.2. The GLFA for the retail shops is 1669m^2 as shown in Table 5.1. A further allowance of 10% of the pm peak generation has been allowed for shoppers in the am peak. The directional distribution assigned for retail shopper trips is 50% in and out. The estimated traffic generation is shown in Table 5.7.

Table 5.7 Peak Hour Traffic Generation by Proposed Mixed Use Development.

Use	Peak Hour	Generation Rate/Unit	No.of Units	Traffic Generation		
				IN	OUT	TOTAL
Residential Units	8.00-9.00am 4.00-5.00pm	0.24 trips/hr “	283 “	17 46	51 22	68 68
Retail		**Rate per 1000m^2**	**GLFAm^2**			
Small shops Retail employees Small shops	8.00-9.00am 8.00-9.00am 4.00-5.00pm “	 56 A (SS)	1669 84 1669	4.75 59.98 47.57	4.75 0 47.57	9.51 59.98 95.14
Sub Total am peak hour				81.73	55.75	137.48
Less existing development				19	8	27
TOTAL				**63**	**48**	**111**
Sub Total pm peak hour				93.6	69.6	163.2
Less existing development				11	16	27
TOTAL				**83**	**54**	**137**

Note: A (SS) Gross Leasable Area of small shops
Employee Car Driver and Trucks Travel Mode 71.2%

5.8 Intersection Performance

The traffic generation for the modified development is less than the approved development. The total traffic generation in the AM peak hour is **111** vehicles per hour and in the PM peak hour it is **137** vehicles. The approved development had a total traffic generation of 248 vehicles in the AM peak hour and 352 vehicles in the pm peak hour. The additional traffic volumes in the am and pm peak hours have not been assigned again to the road network as these volumes are significantly less than the previous approved development. For assigned volumes for the approved development refer to Report No 33/10 Section 4.7 which is contained in **Appendix D** of this report.

ALFRED STREET

BUILDING D

BUILDING C

BUILDING B

BUILDING A

B

A

TREACY STREET

CENTRE STAGE 1

WEST STAGE 2

EAST STAGE 3

SRV

MRV

MEDIUM RIGID VEHICLE (MRV) VEHICLE ENTERING DRIVEWAY

SERVICE ENTRY

RETAIL + RESIDENTIAL CARPARK ENTRY

NO. 15-19

NO. 37-45

COMMUNITY CENTRE /200

RETAIL /512

RET

RETAIL LOBBY

RESIDENTIAL LOBBY A

RESIDENTIAL LOBBY B+C

BIKE PARKING

BIKE PARKING RESI + VISITOR

RES

ROLLER SHUTTER

RESI. WASTE 69x240L BINS

RESI. WASTE 10x240L BINS

SRV LOADING SPACE 1

SRV LOADING SPACE 2

TURNING AREA

RETAIL GOODS + RESIDENTIAL WASTE ACCESSWAY

B85

B99

B99 VEHICLE ENTERING AND B85 EXITING 300mm CLEARANCE SHOWN

ILLAWARRA RAILWAY

0 5 10 20 30m

FIGURE 8 TURNING MANOEUVRE PATHS INTO LOADING DOCK AREA

SCALE 1:100 (A1)
1:200 (A3)

No.	DATE	APPD	

SURVEY BY: BASE PLAN BY STANISIC ARCHITECTS

DATUM: A.H.D.

LYLE MARSHALL AND ASSOCIATES PTY. LTD.
CONSULTING ENGINEERS, TRANSPORTATION AND ENVIRONMENTAL PLANNERS
SUITE 8, 871 PACIFIC HIGHWAY, CHATSWOOD N.S.W 2067 PH:(02) 9419 8191 FAX:(02) 9419 8107
EMAIL: lylemarshall@ozemail.com.au

CLIENT: HENLIA 24 PTY LTD

21-35 TREACY STREET HURSTVILLE

GROUND FLOOR PLAN
RL 63.0

SCALE	PASSED	DATE FIRST ISSUED
1:100 (A1) 1:200 (A3)		DEC 2011

DESIGN	LMA	SHEET No. 1	DRAWING No. 1105-11
DRAWN	INITIALS	OF 1	
CHECKED	EMMC		

5.9 Delivery / Service Vehicles

The proposed development has a gross retail floor area of 1669m^2 and 283 residential units.

Based upon *Table 5.1 in the RTA Guide to Traffic Generating Developments* the minimum number of unloading bays for the retail shops is 5 plus 1 space per 1000m^2 over 2000m^2 GFA. The requirement for the residential units is 4 plus 1 per 100 units over 200. The total requirement is 10 bays.

Based upon a paper prepared by J B Watters for a M Eng Sc thesis in 1972 the arrival rates in Sydney suburbs from surveys were:-
Mixed small shops – 3.5 arrivals per 929m^2 GLFA (λ)

The average service rate where the driver unloads the truck only was 8.5 to 10.5 vehicles per hour (μ).

The estimated arrival rate for the shops 1669m^2 GLA is 6.4

The total arrival rate 6.4 divided by the service rate of 10 vehicles per hour (μ) is 0.64. Based upon a 5% probability that all bays will be full and no waiting bays the number of bays required is 1 for the retail. There are 2 service bays provided, 1 for residential and 1 for retail.

The swept path diagram showing the MRV truck entering a loading bay and a SRV vehicle exiting concurrently from a loading bay is shown in **Figure 8.**

The driveway gradients to the loading dock comply with Table 3.2 in AS 2890.2 Part 2 Off Street commercial vehicle facilities for SRV vehicles as the gradient is currently approximately 8.25% . For MRV vehicles this gradient should be reduced to 6.25%. Further detailed design of the ramp into the loading dock could rectify this problem.

5.10 Provision of Alternative Transport

It is recommended that a "Green Travel Plan" be adopted for this development to reduce car based travel to encourage employees in the retail tenancies to make greater use of public transport, cycling, walking and car sharing for the journey to work.

The following initiatives are recommended:-

1. Bicycle storage, showers and changing facilities be provided to encourage cycling by employees and bicycle storage for residents.
2. Provide train and bus timetables to staff and residents.
3. Reduce retail car parking to account for the lower car travel mode to the CBD.

5.10 (Continued)

4. The Strata Management to consider the provision of a small commuter vehicle to transport elderly and infirm residents to Hurstville railway station and for local shopping trips etc. to the CBD.

   Hurstville City Council has commenced construction of a new bus/rail interchange facility on the eastern side of Hurstville railway station.

5.11 Traffic Impacts During Construction

The traffic impacts during construction will be assessed in more detail for the Project Application when the construction staging, construction period, truck movements and truck sizes are considered.

Treacy Street has *one* traffic lane and *one* kerbside *parking lane* along the site frontage. An Application will be made for a 'Construction Zone' along the site frontage of approximately **130 metres** in the *kerbside parking lane*. Trucks *approaching* the site will be expected to approach from the east along Forest Road or along Railway Parade, The Avenue and turn left into Treacy Street. Trucks approaching from the south and *west* will be expected to use King Georges Road Railway Parade, The Avenue and left into Treacy Street.

Trucks *departing* from the site will be expected to travel *west* along Treacy Street, *cross* the railway overbridge and *turn right* into Railway Parade. These routes will avoid the busy retail shopping precinct in forest Road west of The Avenue.

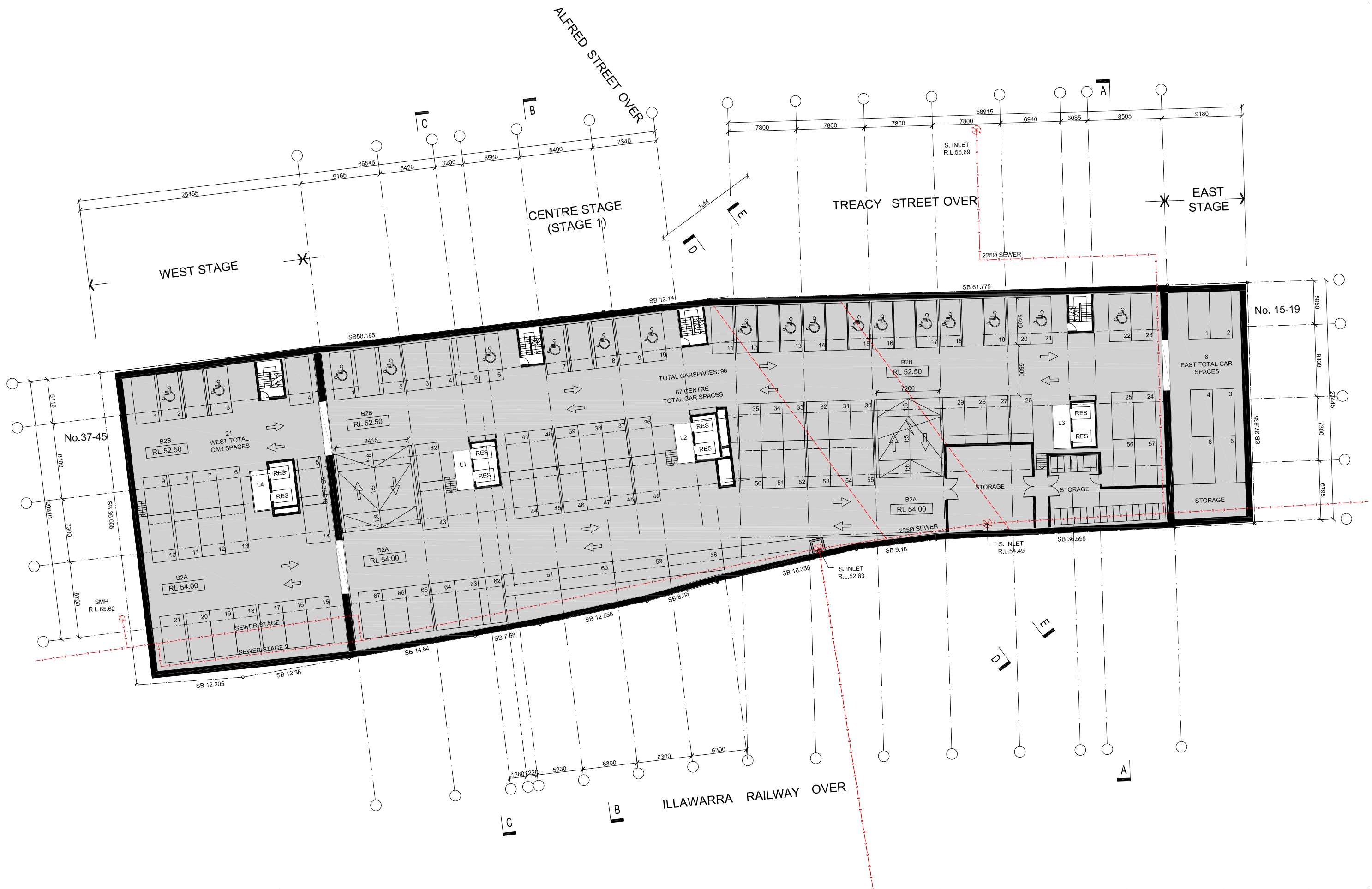
Traffic Control Plans will be required for traffic management in Treacy Street for *each stage* of the construction period.

APPENDICES

APPENDIX A

STANISIC ASSOCIATES ARCHITECTS LEVEL 3, 346 KENT STREET SYDNEY NSW 2000 T. 02 9299 7871 F. 02 9299 7872 E. info@stanisic.com.au www.stanisic.com.au	PROJECT 21-35 TREACY STREET HURSTVILLE NSW	CLIENT HENLIA No.24 PTY LIMITED	No. C D E F G H	DATE 15.03.11 07.10.11 21.10.11 18.11.11 09.12.11 14.12.11	REVISION / ISSUE DETAILS FOR PREFERRED PROJECT REPORT PPR AMENDED FOR CONDITIONS PPR AMENDED FOR CONDITIONS FOR CLIENT REVIEW FOR INFORMATION S75W SUBMISSION	DRAWING TITLE RL 48.00 / RL 46.50 BASEMENT 4A / 4B	SCALE: 1:400@A3 PROJECT NUMBER: 10 011	DATE: 14/12/11 DRAWING NUMBER: CD04	DRAWN: AC REVISION: H

STANISIC ASSOCIATES **ARCHITECTS**	PROJECT	CLIENT	No.	DATE	REVISION / ISSUE DETAILS	DRAWING TITLE	SCALE: 1:400@A3	DATE: 14/12/11	DRAWN: AC
LEVEL 3, 346 KENT STREET SYDNEY NSW 2000 T. 02 9299 7871 F. 02 9299 7872 E. info@stanisic.com.au www.stanisic.com.au	21-35 TREACY STREET HURSTVILLE NSW	HENLIA No.24 PTY LIMITED	C D E F G H	15.03.11 07.10.11 21.10.11 18.11.11 09.12.11 14.12.11	FOR PREFERRED PROJECT REPORT PPR AMENDED FOR CONDITIONS PPR AMENDED FOR CONDITIONS FOR CLIENT REVIEW FOR INFORMATION S75W SUBMISSION	RL 51.00 / RL 49.50 BASEMENT 3A / 3B	PROJECT NUMBER: 10 011	DRAWING NUMBER: CD05	REVISION: H



STANISIC ASSOCIATES ARCHITECTS LEVEL 3, 346 KENT STREET SYDNEY NSW 2000 T. 02 9299 7871 F. 02 9299 7872 E. info@stanisic.com.au www.stanisic.com.au	PROJECT	CLIENT	No.	DATE	REVISION / ISSUE DETAILS	DRAWING TITLE	SCALE: 1:400@A3 / DATE: 14/12/11 / DRAWN: AC
	21-35 TREACY STREET HURSTVILLE NSW	HENLIA No.24 PTY LIMITED	C D E F G H	15.03.11 07.10.11 21.10.11 18.11.11 09.12.11 14.12.11	FOR PREFERRED PROJECT REPORT PPR AMENDED FOR CONDITIONS PPR AMENDED FOR CONDITIONS FOR CLIENT REVIEW FOR INFORMATION S75W SUBMISSION	RL 54.00 / RL 52.50 BASEMENT 2A / 2B	PROJECT NUMBER: 10 011 / DRAWING NUMBER: CD06 / REVISION: H

STANISIC ASSOCIATES ARCHITECTS LEVEL 3, 346 KENT STREET SYDNEY NSW 2000 T. 02 9299 7871 F. 02 9299 7872 E. info@stanisic.com.au www.stanisic.com.au	PROJECT 21-35 TREACY STREET HURSTVILLE NSW	CLIENT HENLIA No.24 PTY LIMITED	No. C D E F G H	DATE 15.03.11 07.10.11 21.10.11 18.11.11 09.12.11 14.12.11	REVISION / ISSUE DETAILS FOR PREFERRED PROJECT REPORT PPR AMENDED FOR CONDITIONS PPR AMENDED FOR CONDITIONS FOR CLIENT REVIEW FOR INFORMATION S75W SUBMISSION	DRAWING TITLE RL 57.00 / RL 55.50 BASEMENT 1A / 1B	SCALE: 1:400@A3 PROJECT NUMBER: 10 011	DATE: 14/12/11 DRAWING NUMBER: CD07	DRAWN: AC REVISION: H

STANISIC ASSOCIATES ARCHITECTS LEVEL 3, 346 KENT STREET SYDNEY NSW 2000 T. 02 9299 7871 F. 02 9299 7872 E. info@stanisic.com.au www.stanislc.com.au	PROJECT 21-35 TREACY STREET HURSTVILLE NSW	CLIENT HENLIA No.24 PTY LIMITED	No. C D E F G H	DATE 15.03.11 07.10.11 21.10.11 18.11.11 09.12.11 14.12.11	REVISION / ISSUE DETAILS FOR PREFERRED PROJECT REPORT PPR AMENDED FOR CONDITIONS PPR AMENDED FOR CONDITIONS FOR CLIENT REVIEW FOR INFORMATION S75W SUBMISSION	DRAWING TITLE RL 61.00 GROUND FLOOR	SCALE: 1:400@A3 PROJECT NUMBER: 10 011	**DATE:** 14/12/11 DRAWING NUMBER: CD08	**DRAWN:** AC REVISION: H

STANISIC ASSOCIATES ARCHITECTS LEVEL 3, 346 KENT STREET SYDNEY NSW 2000 T. 02 9299 7871 F. 02 9299 7872 E. info@stanisic.com.au www.stanisic.com.au	PROJECT 21-35 TREACY STREET HURSTVILLE NSW	CLIENT HENLIA No.24 PTY LIMITED	No. C D E F G H	DATE 15.03.11 07.10.11 21.10.11 18.11.11 09.12.11 14.12.11	REVISION / ISSUE DETAILS FOR PREFERRED PROJECT REPORT PPR AMENDED FOR CONDITIONS PPR AMENDED FOR CONDITIONS FOR CLIENT REVIEW FOR INFORMATION S75W SUBMISSION	DRAWING TITLE RL 67.50 LEVEL 1	SCALE: 1:400@A3 PROJECT NUMBER: 10 011	DATE: 14/12/11 DRAWING NUMBER: CD09	DRAWN: AC REVISION: H

APPENDIX B

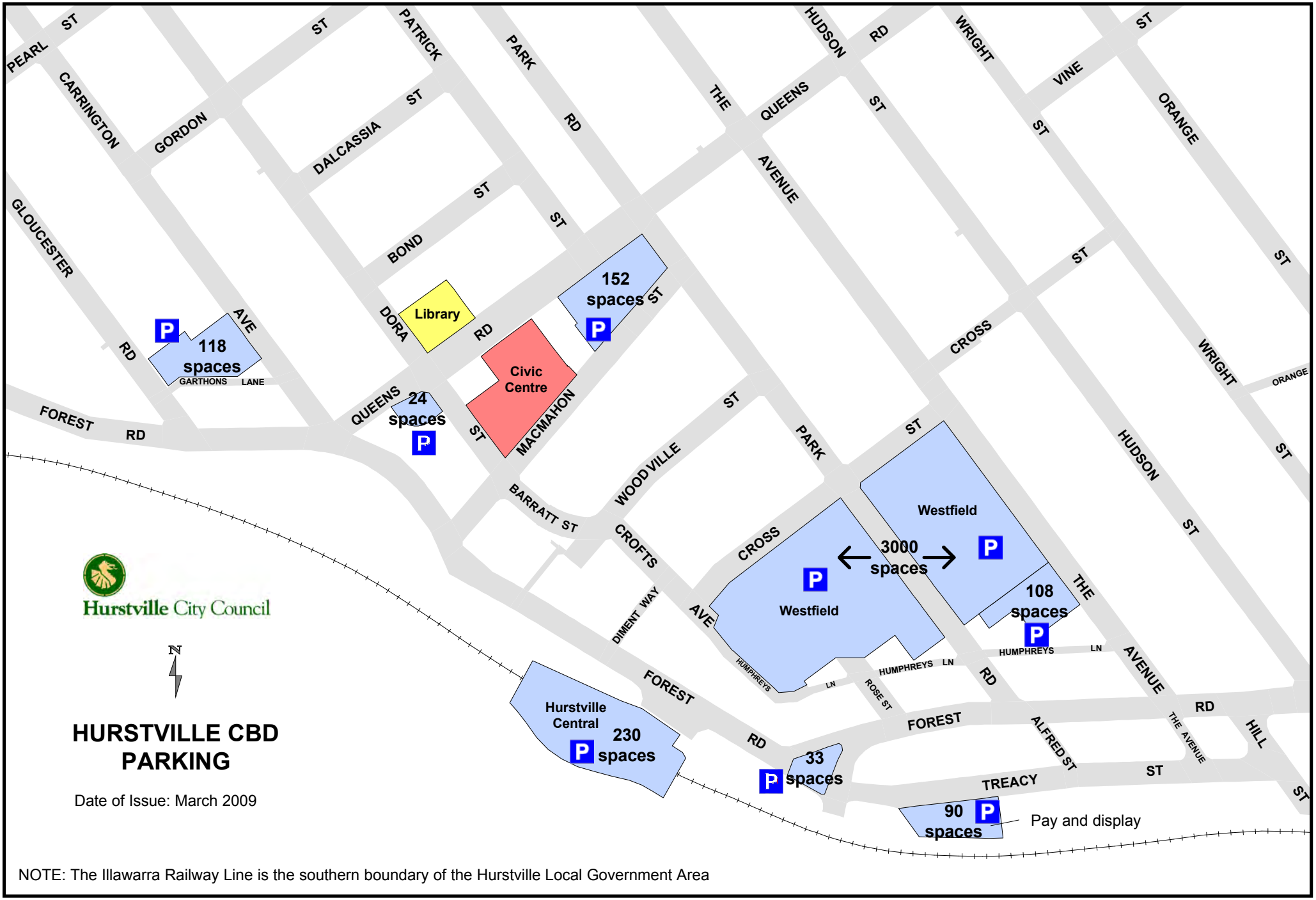
FLOOR SPACE		
SITE AREA	4,156	
TOTAL GFA	28,474	
FLOOR SPACE RATIO	6.85	:1

LEVEL	GFA[1]	GLFA				CARSPACES			MIX			
		RESIDENTIAL	RETAIL	COMMERCIAL	TOTAL	RESIDENTIAL	RETAIL	TOTAL	S/1B	2B	3B	TOTAL
B4	0				0	105		105				0
B3	0				0	103		103				0
B2	0				0	94		94				0
B1	591	591			591	75		75				0
G	1719	0	1,507		1,507			0				0
1	1832	1418	192		1,610			0	2	14	2	18
2	2168	1898			1,898			0	3	23	1	27
3	2109	1887			1,887			0	3	14	2	19
4	1774	1546			1,546			0	4	16		20
5	1774	1546			1,546			0	4	16		20
6	1774	1546			1,546			0	4	16		20
7	1727	1448			1,448			0	3	13	2	18
8	1691	1471			1,471			0	3	13	2	18
9	1691	1471			1,471			0	3	13	2	18
10	1770	1484			1,484			0	4	14	1	19
11	1733	1507			1,507			0	4	14	1	19
12	1733	1507			1,507			0	4	14	1	19
13	1468	1231			1,231			0	2	13	1	16
14	1460	1232			1,232			0	2	12	2	16
15	1460	1232			1,232			0	2	12	2	16
TOTAL	**28,474**	**23,015**	**1,699**	**0**	**24,714**	**377**	**0**	**377**	**47**	**217**	**19**	**283**
									17%	**77%**	**7%**	**100%**
												TARGET

NOTES

1 GFA is the gross floor area as defined in the standard LEP template

APPENDIX C


PEARL ST
CARRINGTON ST
GORDON ST
PATRICK ST
DALCASSIA ST
PARK RD
BOND ST
GLOUCESTER RD
DORA RD
Library
Civic Centre
152 spaces
118 spaces
GARTHONS LANE
AVE
QUEENS ST
24 spaces
MACMAHON ST
FOREST RD
BARRATT ST
WOOD VILLE ST
THE AVENUE
QUEENS ST
HUDSON RD
WRIGHT ST
VINE ST
ORANGE ST
CROSS ST
PARK ST
CROFTS AVE
DIMENT WAY
Westfield
3000 spaces
Westfield
108 spaces
HUMPHREYS LN
ROSE ST
HUDSON ST
WRIGHT ST
ORANGE ST
THE AVENUE
FOREST RD
Hurstville Central
230 spaces
33 spaces
ALFRED ST
TREACY ST
HILL ST
90 spaces
Pay and display
Hurstville City Council
N
HURSTVILLE CBD PARKING
Date of Issue: March 2009
NOTE: The Illawarra Railway Line is the southern boundary of the Hurstville Local Government Area

APPENDIX D

4.7 Intersection Performance

The additional traffic volumes in the am and pm peak hours have been distributed to the road network in the study area based upon the turning volumes at the intersections shown in **Figures 4** and **5**. The future am and pm peak hour traffic volumes are shown in **Figures 6** and **7**. The signalized intersections have been analysed using SIDRA Version 2011. The results are set out in **Table 4.7.**

Table 4.7 Intersection Performance

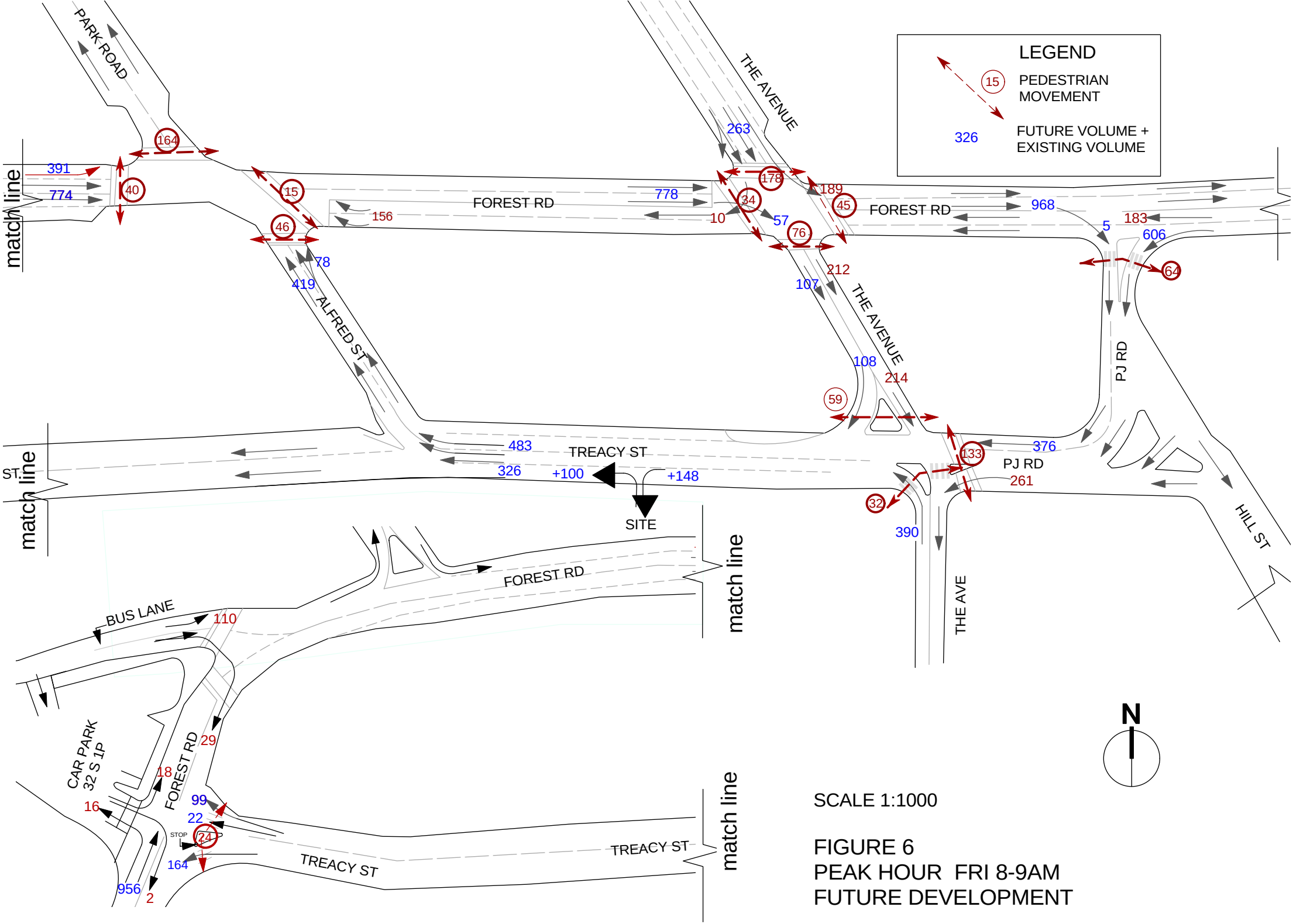
Intersection	Peak Hour	Level of Service LOS	Degree of Saturation DOS	Average Delay per Veh.secs.	Critical Movement Delay per Veh. Secs.
Forest Rd / PJ Rd.	8.00-9.00am	A *(WORST A)*	0.343	2.6 secs .	(7.9) RT from Forest Rd into PJ Rd
	4.15-5.15pm	A *(WORST A)*	.455	3.1 secs.	(8.1) RT from Forest Rd into PJ Rd.
Treacy St / The Avenue	8.00-9.00am	A *(WORST B)*	.39	18.4	(24.1) LT from Treacy St into The Avenue
	5.00-6.00pm	A *(WORST B)*	.71	13.6	(23.1) LT from Treacy St into The Avenue
Forest Rd / Park Rd / Alfred Rd	8.00-9.00am	C (WORST D)	.84	40.3	(53.4) RT from Forest into Park
	4.00-5.00pm	D (WORST D)	.88	43.6	(56.4) As above
Forest Rd / The Avenue	8.00-9.00am	B (WORST D)	.775	26.8	(48.1) LT from The Avenue into Forest Rd
	4.00-5.00pm	F (WORST F)	1.09	78.8	(142.6) RT from Forest Rd into The Avenue
Forest Rd / Treacy St	8.00-9.00am	A (WORST C)	0.78	5.0	(42.2) RT from car park into Forest Rd
	4.00-5.00pm	A (WORST C)	0.79	6.7	(29.0) As above

1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.

2) Average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.

3) Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets

1.: Extract from Report No 33/10 Pages 13-14


LEGEND
15 PEDESTRIAN MOVEMENT
326 FUTURE VOLUME + EXISTING VOLUME
PARK ROAD
THE AVENUE
FOREST RD
ALFRED ST
TREACY ST
PJ RD
HILL ST
THE AVE
BUS LANE
CAR PARK 32 S 1P
STOP
SITE
match line
match line
match line
match line
ST
391
774
164
40
15
46
156
778
10
263
178
34
57
76
189
45
968
5
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606
64
78
419
212
107
108
214
59
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+148
133
376
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32
390
110
29
18
16
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24
164
956
2
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FIGURE 6
PEAK HOUR FRI 8-9AM
FUTURE DEVELOPMENT

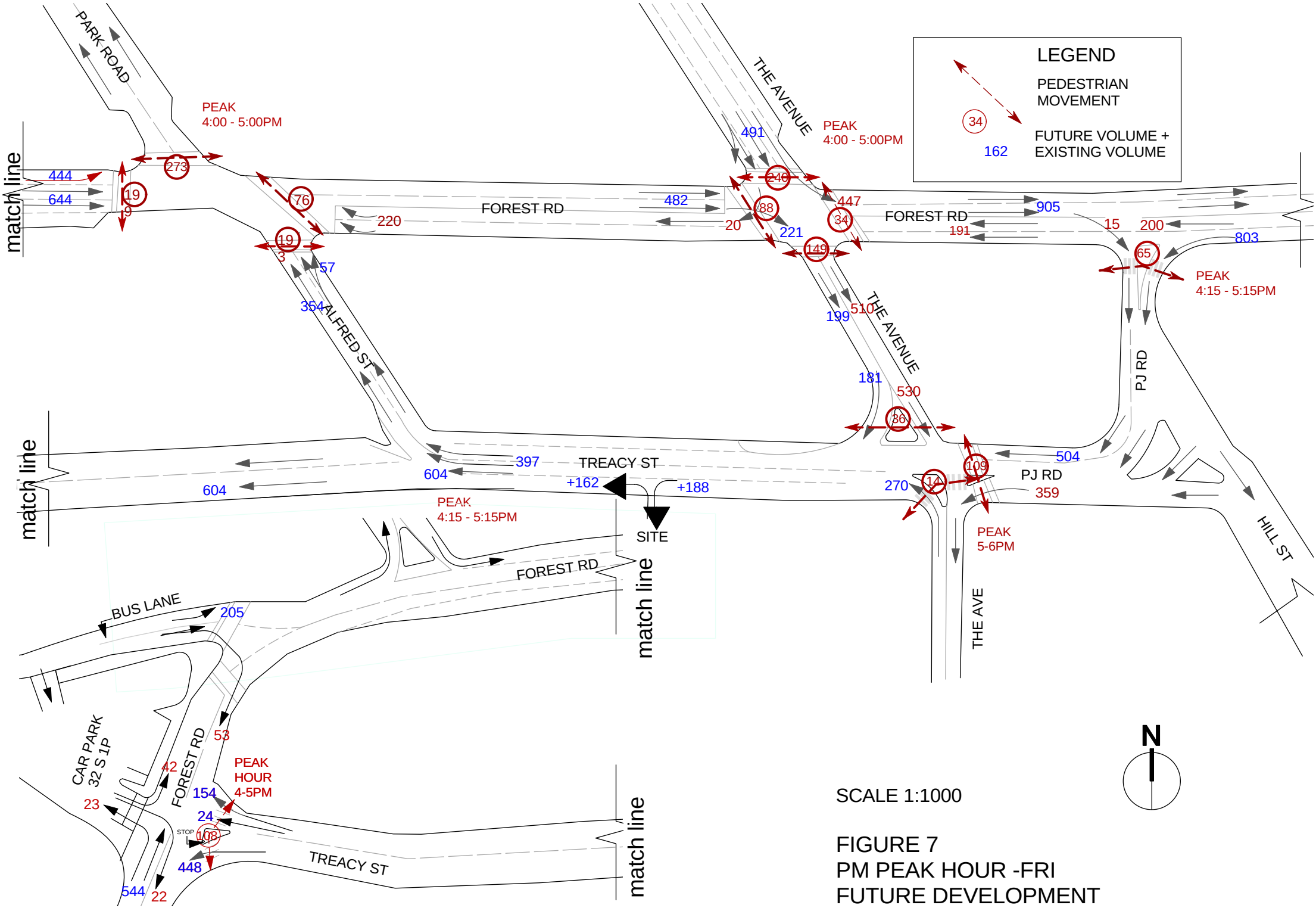

FIGURE 7
PM PEAK HOUR -FRI
FUTURE DEVELOPMENT