Proposed Mixed-Use Development

23-37 Lindfield Avenue, Lindfield

TRAFFIC AND PARKING ASSESSMENT REPORT

11 October 2010

Ref 10063

VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants

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1. INTRODUCTION

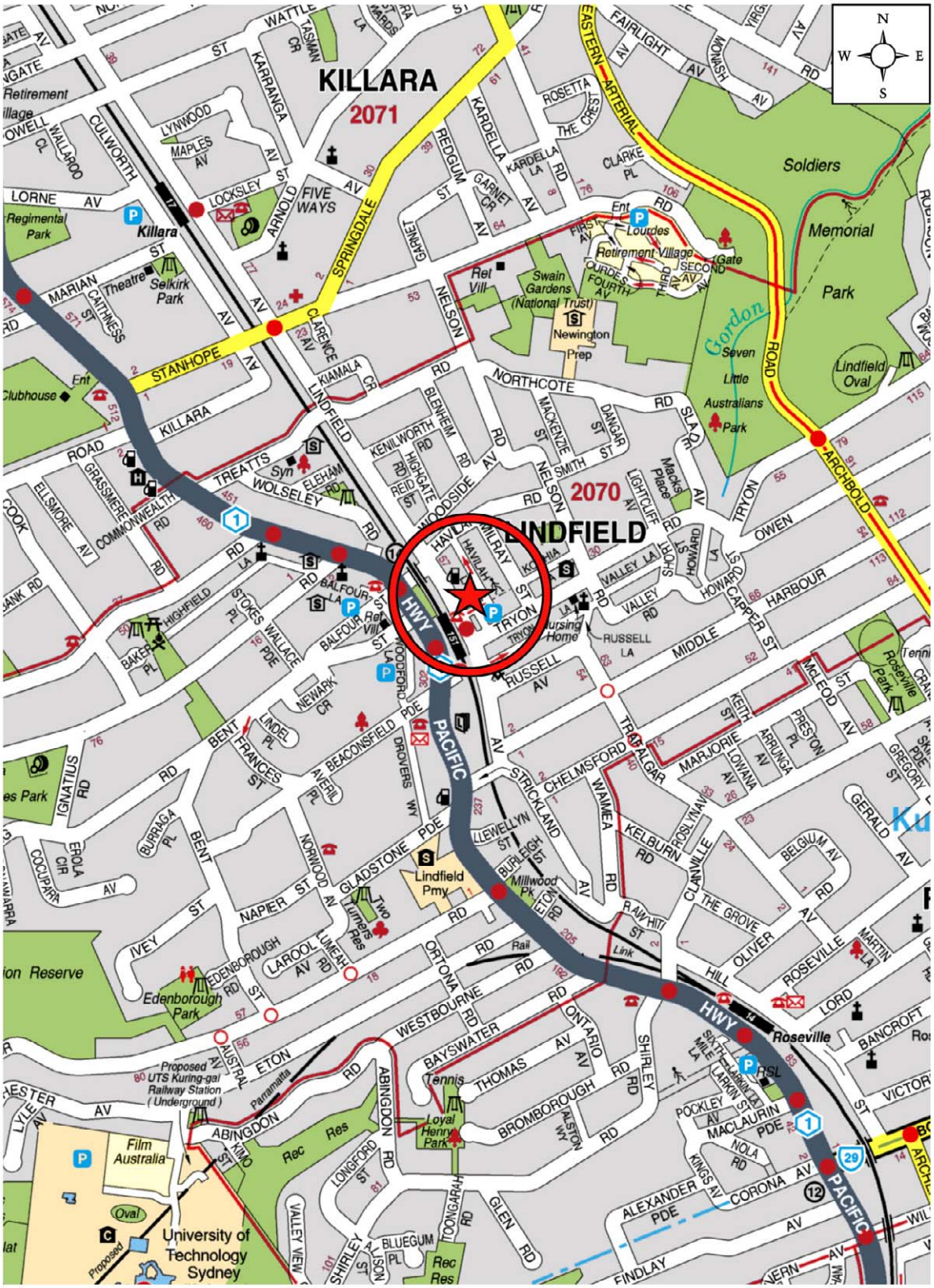
This report has been prepared to accompany a Project Application to the Department of Planning for a mixed-use retail/residential development proposal to be located at 23-37 Lindfield Avenue, Lindfield (Figures 1 and 2).

The site lies within Ku-ring-gai Council's new *Development Control Plan (Town Centres 2010), Part 2E Lindfield Town Centre, Key Site L4: Tryon Place and Lindfield Avenue Retail Area.*

The proposed development will involve the demolition of the existing shopping centre building on the site to facilitate the construction of a new mixed-use retail/residential development, with carparking to be provided in a new two-level basement carparking area in accordance with Council's requirements.

The purpose of this report is to assess the traffic and parking implications of the development proposal and to that end this report:

- describes the site and provides details of the development proposal
- reviews the road network in the vicinity of the site, and the traffic conditions on that road network
- estimates the traffic generation potential of the development proposal, and assigns that traffic generation to the road network serving the site
- assesses the traffic implications of the development proposal in terms of road network capacity
- reviews the geometric design features of the proposed basement carparking facilities for compliance with the relevant codes and standards
- assesses the adequacy and suitability of the quantum of off-street carparking provided on the site.



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LOCATION

FIGURE 1


N
W
E
S
TREATTS RD
LINDFIELD
KENILWORTH RD
HIGHGATE
BLENHEIM RD
NELSON AVE
NELSON RD
McKENZIE ST
SMITH ST
ELEHAM RD
REID ST
WOLSELEY RD
LA
WOODSIDE
HAVILAH RD
MILRAY ST
TRYON RD
PACIFIC HWY
HAVILAH LA
KOCHIA LA
LINDFIELD AVE
NELSON RD
BALFOUR ST
BENT ST
LINDFIELD STATION
TRYON
TRYON PL
RUSSELL LA
RUSSELL AVE
TRAFALGAR
NEWARK CR
WOODCROFT LA
DROVERS WAY
PDE
MIDDLE HARBOUR RD
AVE
BEACONSFIELD
AVERIL PL
STRICKLAND AVE
CHELMSFORD AVE
WAIMEA RD
GLADSTONE PDE
Unformed Road
VARGA TRAFFIC PLANNING Pty Ltd
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SITE
FIGURE 2

2. PROPOSED DEVELOPMENT

Site

The subject site is located on the north-eastern corner of the Lindfield Avenue and Kochia Lane intersection and has rear access via Havilah Lane. The site has a street frontage approximately 49m in length to Lindfield Avenue, 32m in length to Kochia Lane and 46m in length to Havilah Lane. The site occupies an area of approximately 3,099m^2.

The ground floor level of the subject site is currently occupied by a shopping centre comprising a Franklins Supermarket (821m^2 GLFA / 909m^2 GFA) and specialty stores such as a chemist, travel agency, bakery and green grocer (914m^2 GLFA / 1,484m^2 GFA). The cumulative floor area of the existing shopping centre is therefore approximately 1,735m^2 GLFA or 2,393m^2 GFA.

The first floor level is currently occupied by the Lindfield Bridge Club (647m^2 GFA), a research and marketing company office (213m^2 GFA) and a small yoga, fitness and martial arts gymnasium (378m^2 GFA). The cumulative floor area of the first floor level is therefore approximately 1,238m^2 GFA.

Off-street parking is currently provided on the site for 38 cars in two separate undercover carparking areas located towards the rear of the site, with vehicular access provided via Havilah Lane.

The existing development has also paid to Council a "contribution in lieu" for 25 parking spaces which are located adjacent to the site at No.9 Havilah Lane. The total parking spaces associated with the existing site is therefore 63 spaces.

Proposed Development

The proposed development will involve the demolition of the existing shopping centre on the site to facilitate the construction of a new mixed-use retail/residential comprising set over two buildings above a basement carparking area.

A total of 102 residential apartments are proposed in the two new buildings as follows:

1 bedroom apartments:	53
2 bedroom apartments:	44
3 bedroom apartments:	5
TOTAL APARTMENTS:	**102**

A new Supermarket is proposed on the upper ground floor level with a floor area of approximately 1,718m^2 GLFA or 1,930m^2 GFA.

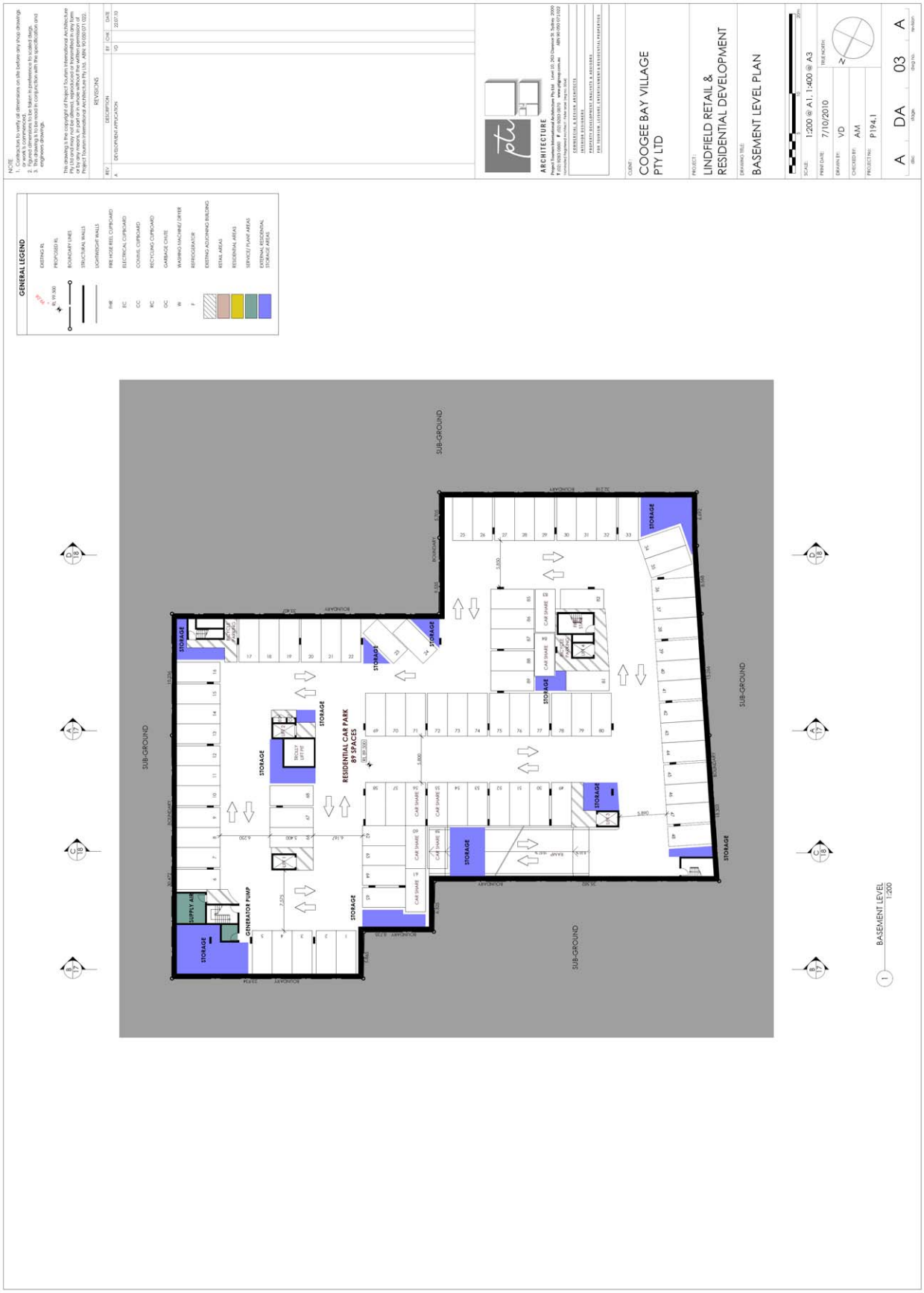
Four retail areas are also proposed (one on the upper ground floor level adjacent to Franklins, and three on level 1) with a cumulative floor area of approximately 1,121m^2 GLFA or 1,321m^2 GFA.

Off-street carparking is proposed for 150 cars in a new two-level basement carparking area in accordance with Council's requirements. Vehicular access to the carparking facilities is to be provided via a new entry/exit driveway located towards the northern end of the Havilah Lane site frontage. With the 25 spaces located adjacent to the site in Havilah Lane for which a "contribution in lieu" was made, the total proposed parking associated with the site is 175 spaces.

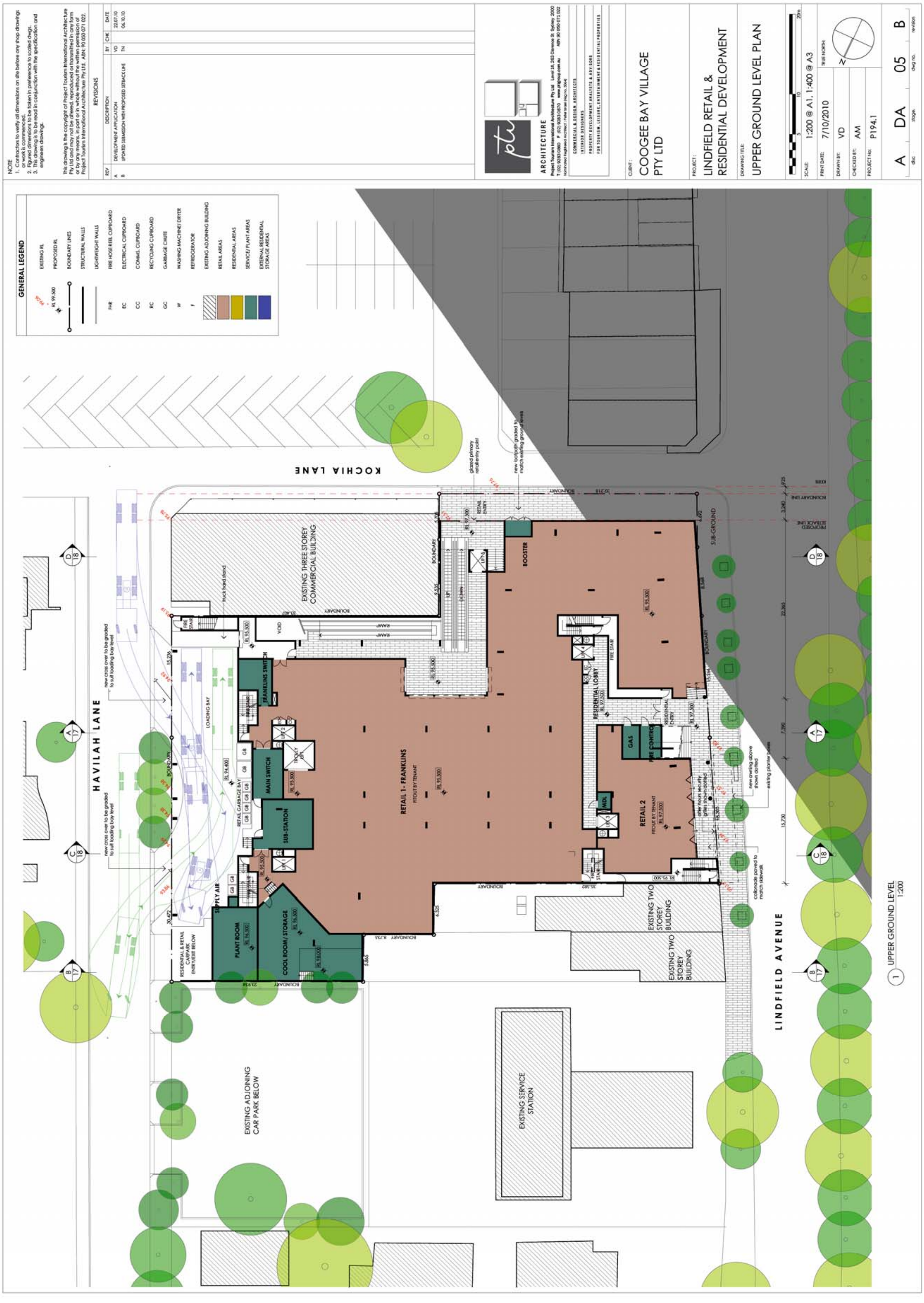
The proposed carparking facilities make provision for 7 ***car share*** spaces such as "*Go Get*" cars which may be shared by participants of the car share scheme. The car share scheme operates throughout the metropolitan Sydney area and encourages reduced reliance on private car travel and ownership.

Two loading docks are also proposed at the rear of the site which are capable of accommodating a variety of trucks up to and including a 19m long articulated truck and a 12.5m long heavy rigid truck simultaneously. Vehicular access to the loading docks is via Havilah Lane.

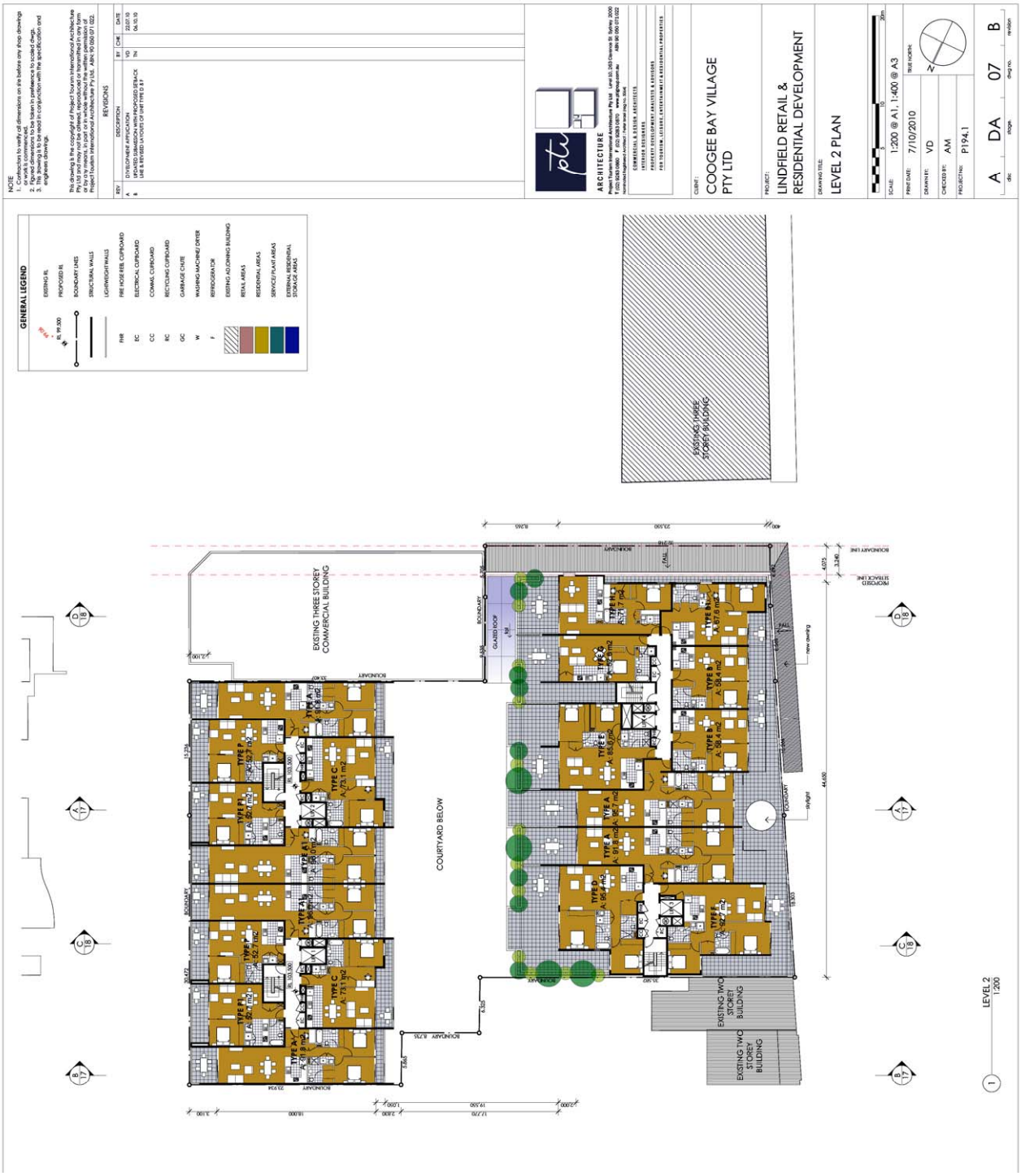
Plans of the proposed development have been prepared by *PTI Architecture* and are reproduced in the following pages.


GENERAL LEGEND
EXISTING RL
PROPOSED RL
BOUNDARY LINES
STRUCTURAL WALLS
LIGHTWEIGHT WALLS
FHR FIRE HOSE REEL CUPBOARD
EC ELECTRICAL CUPBOARD
CC COUNCIL CUPBOARD
RC RECYCLING CUPBOARD
GC GARBAGE CHUTE
W WASHING MACHINE/DRYER
F REFRIDGERATOR
EXISTING ADJOINING BUILDING
RETAIL AREAS
RESIDENTIAL AREAS
SERVICE/ PLANT AREAS
EXTERNAL RESIDENTIAL STORAGE AREAS
NOTE
1. Contractors to verify all dimensions on site before any shop drawings are put to commence.
2. Figured dimensions to be taken in preference to scaled dwgs.
3. This drawing is to be read in conjunction with the specification and engineers drawings.
This drawing is the copyright of Project Tru-stm International Architecture Pty Ltd and may not be altered, reproduced or transmitted in any form or by any means, in part or in whole, without the permission in writing of Project Tru-stm International Architecture Pty Ltd. ABN: 80 000 013 022.
REVISIONS
REV DESCRIPTION BY CHK DATE
A. DEVELOPMENT APPLICATION VD 22.07.10
ARCHITECTURE
CLIENT: COOGEE BAY VILLAGE PTY LTD
PROJECT: LINDFIELD RETAIL & RESIDENTIAL DEVELOPMENT
DRAWING TITLE: BASEMENT LEVEL PLAN
SCALE: 1:200 @ A1, 1:400 @ A3
PRINT DATE: 7/10/2010
TRUE NORTH:
DRAWN BY: VD
CHECKED BY: AM
PROJECT NO: P194.1
A DA 03 A
desc stage dwg no. revision
SUB-GROUND
STORAGE
RESIDENTIAL CAR PARK 89 SPACES
CAR SHARE
GENERATOR PUMP
SUPPLY AIR
BOUNDARY
BASEMENT LEVEL 1:200


COOGEE BAY VILLAGE PTY LTD
LINDFIELD RETAIL & RESIDENTIAL DEVELOPMENT
LOWER GROUND LEVEL PLAN
1:200 @ A1, 1:400 @ A3
7/10/2010
P194.1
A DA 04 A
GENERAL LEGEND
RETAIL/ RESIDENTIAL CAR PARK 61 SPACES
EXISTING THREE STOREY COMMERCIAL BUILDING
EXISTING ADJOINING CAR PARK FOR 25 CARS
HAVILAH LANE
RESIDENTIAL & RETAIL CARPARK ENTRY/EXIT
SUB-GROUND
LOADING BAY OVER
GREASE ARRESTOR
COLD WATER PLANT
RECYCLED WATER PLANT
LOWER GROUND LEVEL 1:200


COOGEE BAY VILLAGE PTY LTD
LINDFIELD RETAIL & RESIDENTIAL DEVELOPMENT
UPPER GROUND LEVEL PLAN
1:200 @ A1, 1:400 @ A3
7/10/2010
VD
AM
P194.1
A DA 05 B
GENERAL LEGEND
KOCHIA LANE
HAVILAH LANE
LINDFIELD AVENUE
EXISTING THREE STOREY COMMERCIAL BUILDING
RETAIL 1 - FRANKLINS
RETAIL 2
EXISTING TWO STOREY BUILDING
EXISTING SERVICE STATION
EXISTING ADJOINING CAR PARK BELOW
PLANT ROOM
COOL ROOM / STORAGE
SUB-STATION
MAIN SWITCH
BOOSTER
RESIDENTIAL LOBBY
UPPER GROUND LEVEL 1:200


COOGEE BAY VILLAGE PTY LTD
LINDFIELD RETAIL & RESIDENTIAL DEVELOPMENT
LEVEL 1 PLAN
1:200 @ A1, 1:400 @ A3
7/10/2010
VD
AM
P194.1
A DA 06 B
GENERAL LEGEND
KOCHIA LANE
LINDFIELD AVENUE
EXISTING THREE STOREY BUILDING
EXISTING THREE STOREY COMMERCIAL BUILDING
EXISTING TWO STOREY BUILDING
ATRIUM VOID
COURTYARD
RESIDENTIAL ENTRY
RETAIL ENTRY
RETAIL 3
RETAIL 4
RETAIL 5
VOID
EXISTING ROOF
EXISTING ROOF
LEVEL 1
1:200


GENERAL LEGEND
EXISTING RL
PROPOSED RL
BOUNDARY LINES
STRUCTURAL WALLS
LIGHTWEIGHT WALLS
FIRE HOSE REEL CUPBOARD
ELECTRICAL CUPBOARD
COMMS. CUPBOARD
RECYCLING CUPBOARD
GARBAGE CHUTE
WASHING MACHINE/ DRYER
REFRIDGERATOR
EXISTING ADJOINING BUILDING
RETAIL AREAS
RESIDENTIAL AREAS
SERVICE/ PLANT AREAS
EXTERNAL RESIDENTIAL STORAGE AREAS
EXISTING THREE STOREY COMMERCIAL BUILDING
COURTYARD BELOW
EXISTING THREE STOREY BUILDING
EXISTING TWO STOREY BUILDING
EXISTING TWO STOREY BUILDING
LEVEL 2
1:200
ARCHITECTURE
COOGEE BAY VILLAGE PTY LTD
LINDFIELD RETAIL & RESIDENTIAL DEVELOPMENT
LEVEL 2 PLAN
1:200 @ A1, 1:400 @ A3
7/10/2010
VD
AM
P194.1
A DA 07 B

3. TRAFFIC ASSESSMENT

Road Hierarchy

The road hierarchy allocated to the road network in the vicinity of the site by the Roads and Traffic Authority is illustrated on Figure 3.

The Pacific Highway is classified by the RTA as a *State Road* and provides the key north-south road link in the area, linking the City to Wahroonga and the F3 Freeway. It typically carries three traffic lanes in each direction in the vicinity of the site, with opposing traffic flows separated by a centre median island. Kerbside parking is permitted at selected locations outside of commuter peak periods.

Stanhope Road, Springdale Road, Eastern Arterial Road and Archbold Road are all classified by the RTA as *Regional Roads*. Eastern Arterial Road and Archbold Road typically carry two traffic lanes in each direction in the vicinity of the site, whilst Stanhope Road and Springdale Road typically carry one traffic lane in each direction.

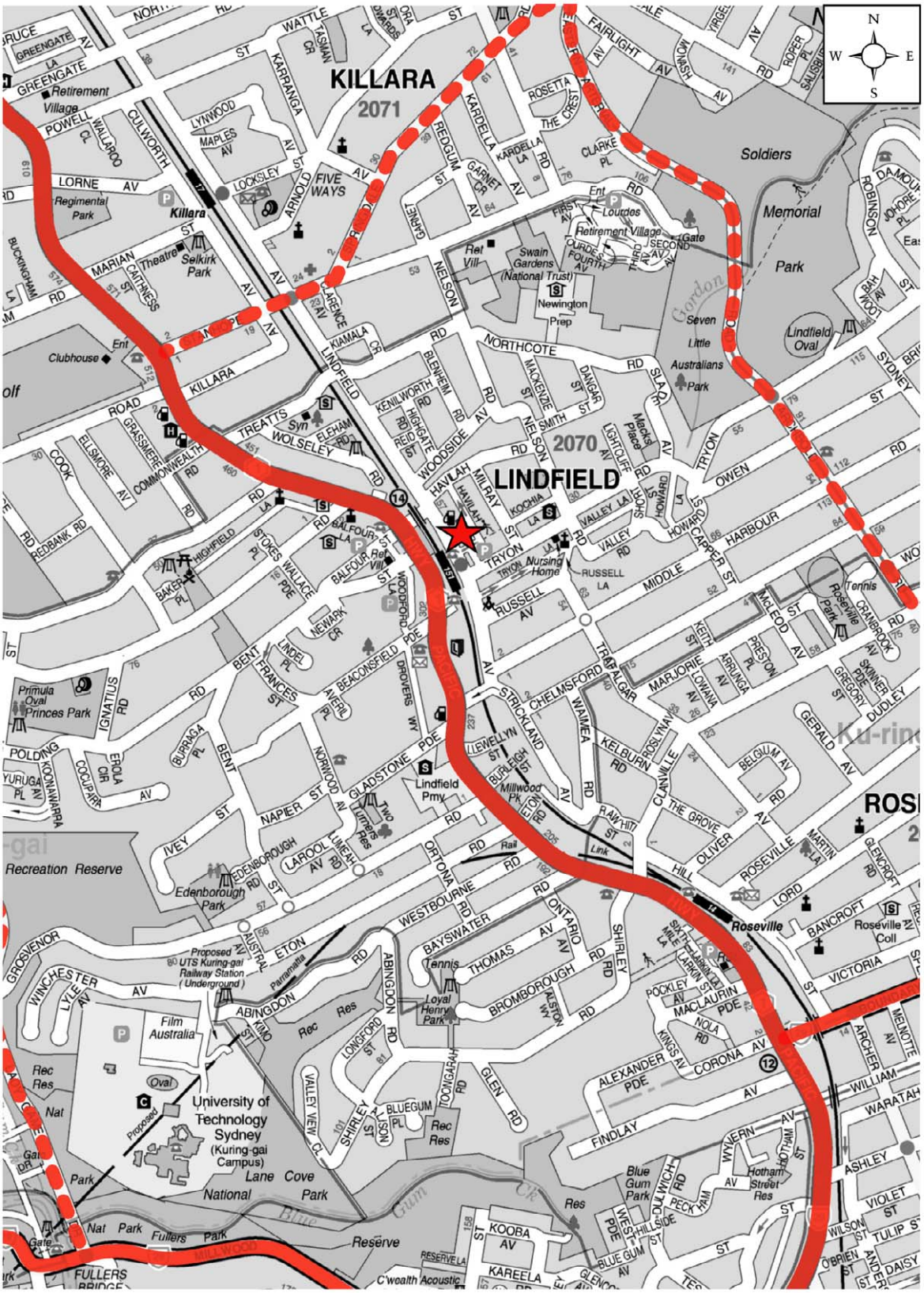
Lindfield Ave and Tryon Road are local, unclassified roads which perform the function of a "*collector route*", providing a link between the local road network and the higher order classified RTA road network. Kerbside parking is generally permitted on both sides of both roads.

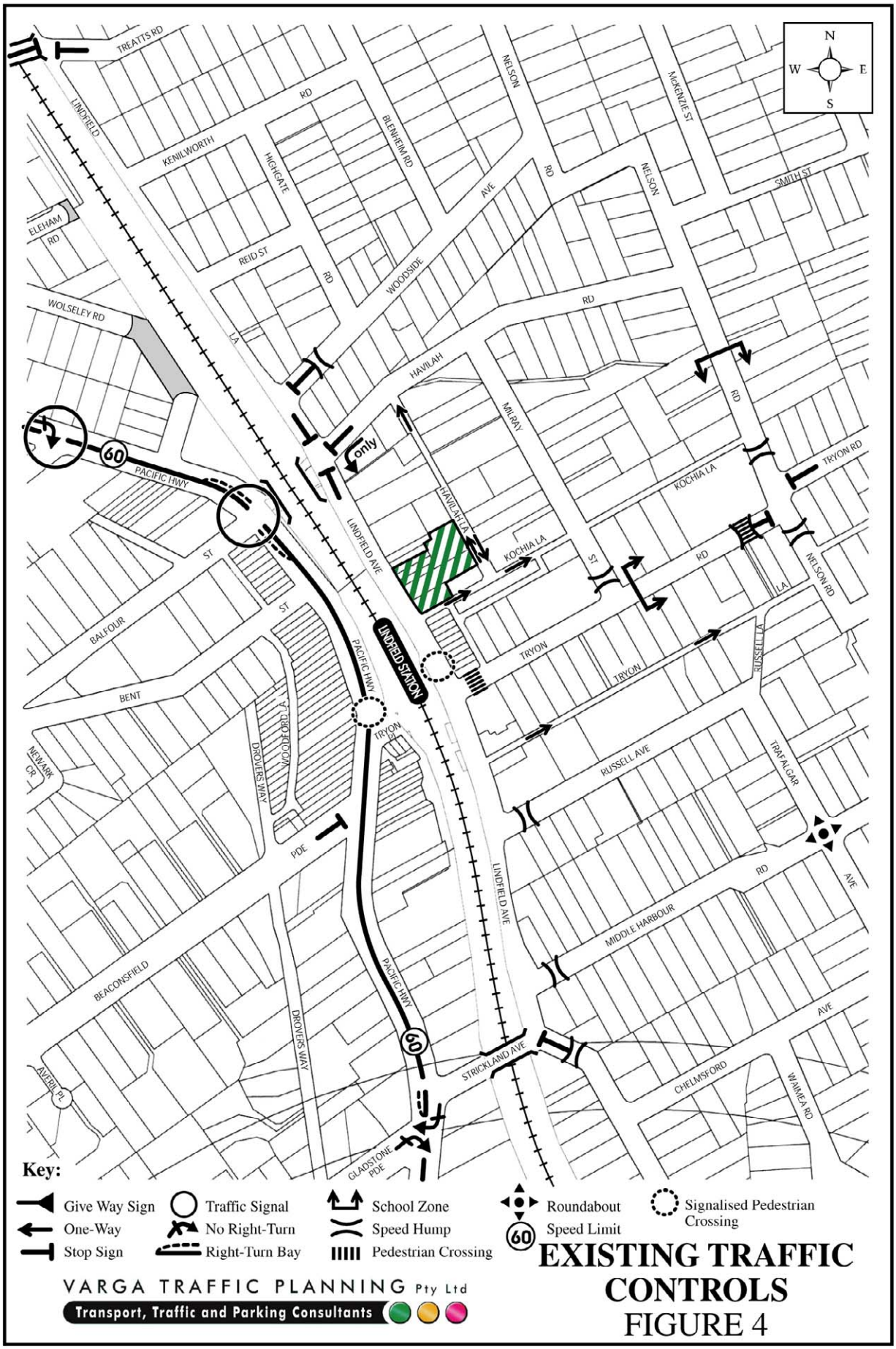
Kochia Lane and Havilah Lane are local, unclassified laneways which are primarily used to provide rear vehicular and pedestrian access to properties fronting Lindfield Avenue and Milray Street, as well as the Council carparking area. Kerbside parking is not permitted on either side of both laneways.

Existing Traffic Controls

The existing traffic controls which apply to the road network in the vicinity of the site are illustrated on Figure 4. Key features of those traffic controls are:

- a 60 km/h SPEED LIMIT which applies to the Pacific Highway


KILLARA
2071
LINDFIELD
2070
Roseville
Soldiers Memorial Park
University of Technology Sydney (Kuring-gai Campus)
Lane Cove National Park
Fullers Park
Reserve
Edenborough Park
Lindfield Oval
Seven Little Australians Park
Swain Gardens (National Trust)
Newington Prep
Lindfield Pmy
Roseville Coll
Loyal Henry Park
Blue Gum Park
Hotham Street Res
Film Australia
Proposed UTS Kuring-gai Railway Station (Underground)
Key:
State Road
Regional Road
VARGA TRAFFIC PLANNING Pty Ltd
Traffic and Parking Consultants
ROAD HIERARCHY
FIGURE 3


N
W
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TREATTS RD
LINDFIELD
KENILWORTH
RD
HIGHGATE
BLENHEIM RD
NELSON
AVE
RD
McKENZIE ST
NELSON
SMITH ST
ELEHAM
RD
REID ST
RD
WOODSIDE
WOLSELEY RD
LA
RD
HAVILAH
MILRAY
RD
60
PACIFIC HWY
only
KOCHIA LA
TRYON RD
HAVILAH LA
LINDFIELD AVE
KOCHIA LA
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NELSON RD
ST
BALFOUR
BENT
LINDFIELD STATION
PACIFIC HWY
TRYON
TRYON
RUSSELL LA
NEWARK CR
DROVERS WAY
TRYON
RUSSELL AVE
TRAFALGAR
PDE
LINDFIELD AVE
RD
AVE
MIDDLE HARBOUR
BEACONSFIELD
PACIFIC HWY
60
STRICKLAND AVE
AVE
AVERY PL
DROVERS WAY
CHELMSFORD
WANNEA RD
GLADSTONE PDE
Key:
Give Way Sign
One-Way
Stop Sign
Traffic Signal
No Right-Turn
Right-Turn Bay
School Zone
Speed Hump
Pedestrian Crossing
Roundabout
60
Speed Limit
Signalised Pedestrian Crossing
VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants
EXISTING TRAFFIC CONTROLS
FIGURE 4

- a 50 km/h SPEED LIMIT which applies to Lindfield Avenue and all other local roads in the area

- TRAFFIC SIGNALS in the Pacific Highway where it intersects with Balfour Street / Havilah Road

- PEDESTRIAN TRAFFIC SIGNALS in Lindfield Avenue just north of Tryon Road

- a ONE-WAY eastbound restriction in Kochia Lane (between Lindfield Avenue and Chapman Lane)

- a ONE-WAY northbound restriction in Havilah Lane (north of the site where the roadway reduces in width only)

Existing Traffic Conditions

An indication of the existing traffic conditions on the road network in the vicinity of the site is provided by peak period traffic surveys undertaken as part of this traffic study. The traffic surveys were undertaken at the following intersections:

1) The Pacific Highway & Balfour Street / Havilah Lane (AM & PM Peak)
2) Lindfield Avenue & Tryon Avenue (AM & PM Peak)
3) Havilah Street & Havilah Lane (PM Peak Only)
4) Kochia Lane & Havilah Lane (PM Peak Only)

The results of the traffic surveys are reproduced in full in Appendix A and reveal that:

- two-way traffic flows in the Pacific Highway are typically in the order of 3,300-3,800 vehicles per hour (vph) during the *morning* and *afternoon* peak periods

- two-way traffic flows in Havilah Street are typically in the order of 500-700 vph during the *morning* and *afternoon* peak periods

- two-way traffic flows in Lindfield Avenue are typically in the order of 750-1,200 vph during the *morning* and *afternoon* peak periods

- two-way traffic flows in Tryon Avenue are typically in the order of 400 vph during the *morning* and *afternoon* peak periods

- two-way traffic flows in Kochia Lane are typically in the order of 70-100 vph during the *afternoon* peak period

- northbound traffic flows in Havilah Lane are typically in the order of 60 vph during the *afternoon* peak period.

An indication of the existing traffic conditions on the road network in the vicinity of the site is provided by reference to the RTA's *Annual Average Daily Traffic* data. The relevant count stations nearest to the subject site are summarised below:

Station No.	Location	1996	1999	2002	2005
00.925	Pacific Highway & Highfield Rd (TCS)	-	54,696	-	54,938
00.924	Pacific Highway & Havilah Rd (TCS)	-	58,902	-	-
00.923	Pacific Highway & Grosvenor Rd (TCS)	58,077	31,289	56,746	-

Projected Traffic Generation

An indication of the traffic generation potential of the development proposal is provided by reference to the Roads and Traffic Authority's publication *Guide to Traffic Generating Developments, Section 3 - Landuse Traffic Generation (October 2002).*

The RTA *Guidelines* are based on extensive surveys of a wide range of land uses and nominates the following traffic generation rates which are applicable to the development proposal:

Shopping Centres (vehicle trips per 1,000m^2)
Thursday: V(P) = 155 A(SM) + 46 A(SS)
where A(SM) = Supermarket GLFA, and A(SS) = Specialty Shops GLFA

High Density Residential Flat Buildings in Sub-Regional Centres
0.29 peak hour vehicle trips/dwelling

Application of the above traffic generation rates to the supermarket, retail and residential components of the development proposal yields a traffic generation potential of approximately 110 vehicle trips per during the *morning* commuter peak period (ie. assuming 25% of the PM rates for the retail uses), and 348 vehicle trips per hour during the *afternoon* commuter peak period as set out below:

Projected Future Traffic Generation Potential		
	Thursday Morning	**Thursday Afternoon**
Supermarket (1,718m^2 GLFA)	67 vph	266 vph
Retail (1,121m^2 GLFA)	13 vph	52 vph
Residential (102 apartments)	30 vph	30 vph
TOTAL	**110 vph**	**348 vph**

That projected future level of traffic generation potential should however, be offset or *discounted* by the volume of traffic which could reasonably be expected to be generated by the existing uses of the site, in order to determine the *nett increase (or decrease)* in traffic generation potential expected to occur as a consequence of the development proposal.

The RTA *Guidelines* nominates the following traffic generation rates which are applicable to the existing development on the site:

Shopping Centres (vehicle trips per 1,000m^2)
Thursday: V(P) = 155 A(SM) + 46 A(SS)
where A(SM) = Supermarket GLFA, and A(SS) = Specialty Shops GLFA

Gymnasiums (Metropolitan Sub-Regional Areas)
9 peak hour vehicle trips / 100m^2 GFA

Commercial Premises
2.0 peak hour vehicle trips per 100m^2 GFA

For the purposes of this assessment, the "commercial" traffic generation rate nominated in the RTA *Guidelines* has been applied to the Bridge Club on the first floor level of the existing development.

Application of the above traffic generation rates to the existing development on the site yields a traffic generation potential of approximately 94 vehicle trips per during the *morning*

commuter peak period (assuming 25% of the PM rates for the retail uses), and 220 vehicle trips per hour during the *afternoon* commuter peak period as set out below:

Existing Traffic Generation Potential		
	Thursday Morning	**Thursday Afternoon**
Supermarket (821m^2 GLFA)	32 vph	127 vph
Retail (914m^2 GLFA)	11 vph	42 vph
Gymnasium (378m^2 GFA)	34 vph	34 vph
Bridge Club & Office (860m^2 GFA)	17 vph	17 vph
TOTAL	**94 vph**	**220 vph**

Accordingly, it is likely that the proposed development will result in an *increase* in the traffic generation potential the site of approximately 16 vph during the *morning* commuter peak, and 128 vph during the *afternoon* commuter peak period as set out below:

Projected Nett Increase in Peak Hour Traffic Generation Potential of the Site as a consequence of the development proposal		
	Thursday Morning	**Thursday Afternoon**
Projected Future Traffic Generation Potential	110 vph	348 vph
Existing Traffic Generation Potential	-94 vph	-220 vph
NETT INCREASE IN TRAFFIC GENERATION POTENTIAL:	**+16 vph**	**+128 vph**

Notwithstanding the above, for the purposes of providing a more *rigorous* traffic assessment, it has been assumed that the site is currently vacant and that all of the projected future traffic flows will be new or *additional* to the existing traffic flows on the adjacent road network.

Traffic Implications - Road Network Capacity

The traffic implications of development proposals primarily concern the effects that any *additional* traffic flows may have on the operational performance of the nearby road network. Those effects can be assessed using the INTANAL program which is widely used by the RTA and many LGA's for this purpose. Criteria for evaluating the results of INTANAL analysis are reproduced in the following pages.

The results of the INTANAL analysis of the Pacific Highway & Havilah Street / Balfour Street intersection are summarised on Table 3.1 below, revealing that:

- the Pacific Highway & Havilah Street / Balfour Street intersection currently operates at *Level of Service "F"* under the existing *morning* traffic demands and *Level of Service "C"* under the existing *afternoon* traffic demands, with total average vehicle delays in the order of 28-32 seconds/vehicle

- under the projected future traffic demands expected to be generated by the development proposal, the Pacific Highway & Havilah Street / Balfour Street intersection will continue to operate at *Level of Service "F"* under the existing *morning* traffic demands and *Level of Service "C"* under the existing *afternoon* traffic demands, with increases in average vehicle delays of 3-4 seconds/vehicle.

The results of the INTANAL analysis of the Lindfield Avenue & Tryon Avenue intersection are summarised on Table 3.2 below, revealing that:

- the Lindfield Avenue & Tryon Avenue intersection currently operates at at *Level of Service "B"* under the existing *morning* traffic demands and *Level of Service "A"* under the existing *afternoon* traffic demands with total average vehicle delays in the order of 5-9 seconds/vehicle

- under the projected future traffic demands expected to be generated by the development proposal, the Lindfield Avenue & Tryon Avenue intersection will continue to operate at *Level of Service "B"* under the existing *morning* traffic demands and *Level of Service "A"* under the existing *afternoon* traffic demands, with increases in average vehicle delays of ***less than*** 1 second/vehicle.

In the circumstances, it is clear that:

- the proposed development will not have any unacceptable traffic implications in terms of road network capacity, and

- the proposed development does not require any upgrades to nearby roads and intersections.

TABLE 3.1 - RESULTS OF INTANAL ANALYSIS OF PACIFIC HIGHWAY & HAVILAH STREET & BALFOUR STREET

Key Indicators		Existing Traffic Demand		Projected Development Traffic Demand	
		AM	**PM**	**AM**	**PM**
Level of Service		F	C	F	C
Degree of Saturation		0.90	0.79	0.91	0.84
Average Vehicle Delay (secs/veh)					
Pacific Highway (north)	L	15.2	20.6	16.5	23.8
	T	27.4	19.2	30.2	22.7
	R	133.2	84.2	145.8	106.5
Balfour Street (west)	L	37.2	30.3	39.0	27.9
	T	46.2	37.9	48.3	34.7
	R	98.0	78.1	112.2	94.6
Pacific Highway (south)	L	19.9	17.9	21.7	20.1
	T	18.4	26.8	20.3	31.4
	R	145.8	68.9	194.2	68.9
Havilah Street (east)	L	44.4	35.6	47.9	33.6
	T	50.6	40.9	54.8	39.6
	R	100.9	61.9	106.4	64.7
TOTAL AVERAGE VEHICLE DELAY		**32.1**	**28.3**	**35.9**	**32.8**
		PAC_HAVX		PAC_HAVQ	

TABLE 3.2 - RESULTS OF INTANAL ANALYSIS OF LINDFIELD AVENUE & TRYON AVENUE

Key Indicators		Existing Traffic Demand		Projected Development Traffic Demand	
		AM	**PM**	**AM**	**PM**
Level of Service		B	A	B	A
Degree of Saturation		0.30	0.24	0.36	0.26
Average Vehicle Delay (secs/veh)					
Lindfield Avenue (north)	L	2.9	2.9	2.9	2.9
	T	0.0	0.0	0.0	0.0
Lindfield Avenue (south)	T	0.0	0.0	0.0	0.0
	R	5.7	4.7	5.9	5.0
Tryon Avenue (east)	L	11.6	5.0	12.4	5.5
	R	15.8	7.8	16.5	8.4
TOTAL AVERAGE VEHICLE DELAY		**8.8**	**5.0**	**8.9**	**5.0**
		LIN_TRYX		LIN_TRYQ	

Criteria for Interpreting Results of Intanal Analysis

1. Level of Service (LOS)

LOS	Traffic Signals and Roundabouts	Give Way and Stop Signs
'A'	Good operation.	Good operation.
'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.*

4. PARKING IMPLICATIONS

Existing Kerbside Parking Restrictions

The existing kerbside parking restrictions which apply to the road network in the vicinity of the site are illustrated on Figure 5 and comprise:

- NO STOPPING / NO PARKING restrictions along both sides of Kochia Lane (in between Lindfield Avenue and Chapman Lane) and also Havilah Lane

- ½ HOUR PARKING restrictions along both sides of Lindfield Avenue including along the site frontage

- 1 HOUR PARKING restrictions in Kochia Lane, adjacent to the Council carparking area, in a sawtooth arrangement

- 2 HOUR PARKING restrictions in the Council carparking area located on the northern side of Tryon Avenue

- 2 HOUR PARKING restrictions along both sides of Tryon Avenue

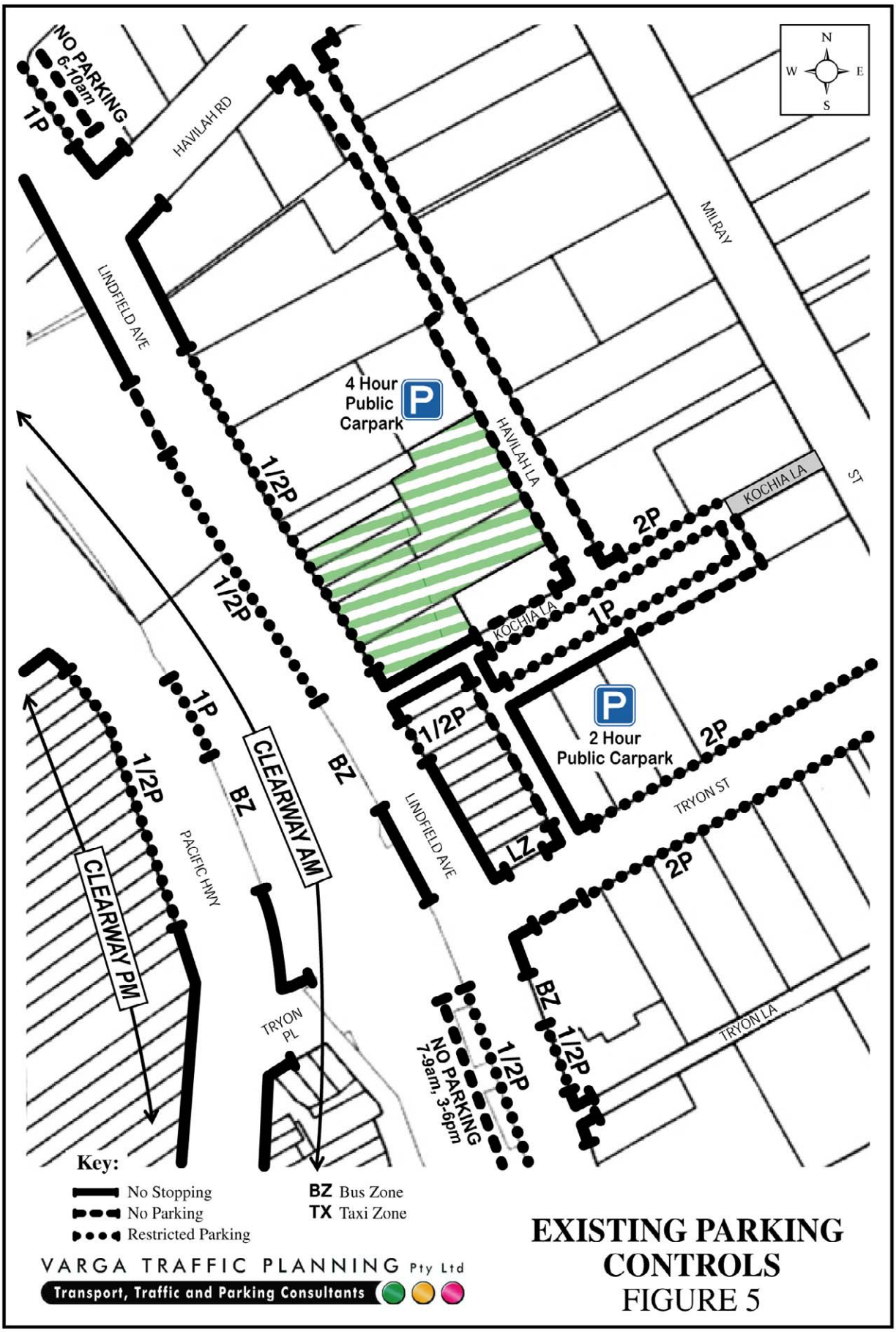
- 4 HOUR PARKING restrictions in the carparking area to the north of the site on No.9 Havilah Lane

- BUS ZONES located on both sides of the Pacific Highway and also Lindfield Avenue

Parking Accumulation Surveys

In order to gain an accurate appreciation of the general availability of carparking on the subject site and on the adjacent road network, a detailed survey of carparking accumulation was undertaken between 8:00am-8:00pm on a Thursday and Saturday.

The results of the parking accumulation surveys are reproduced in full in Appendix A and reveal that:


NO PARKING
6-10am
1P
HAVILAH RD
LINDFIELD AVE
MILRAY
ST
4 Hour
Public
Carpark
HAVILAH LA
1/2P
2P
KOCHIA LA
1P
2 Hour
Public Carpark
TRYON ST
LZ
CLEARWAY AM
BZ
CLEARWAY PM
PACIFIC HWY
TRYON
PL
NO PARKING
7-9am, 3-6pm
TRYON LA
N
W
E
S
Key:
No Stopping
No Parking
Restricted Parking
BZ Bus Zone
TX Taxi Zone
VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants
EXISTING PARKING CONTROLS
FIGURE 5

- the site has a carparking capacity of approximately 38 spaces

- there are an additional 25 spaces adjacent to the site at No.9 Havilah Lane (which are associated with the site)

- there are 122 spaces in the Tryon Avenue and Kochia Lane public carparking areas

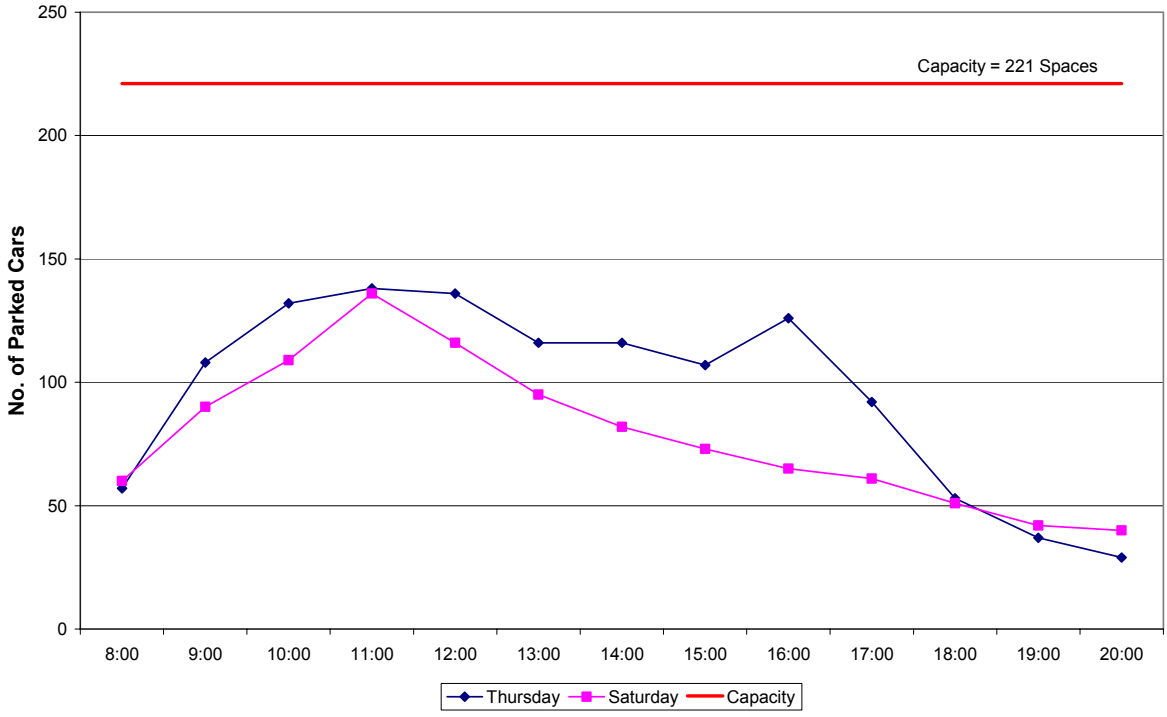
- there are a further 36 kerbside spaces along both sides of Lindfield Avenue in the vicinity of the site

- Thursday's peak parking demand occurred at 11:00am when there was 138 parked cars recorded, leaving 83 vacant spaces

- Saturday's peak parking demand also occurred at 11:00am when there was 136 parked cars recorded, leaving 85 vacant spaces

The cumulative results of the parking accumulation surveys are summarised on the graph below, confirming that substantial spare carparking capacity is readily available in the vicinity of the site at all times, both during business hours and after hours.

Lindfield Parking Accumulation Survey Results



Off-Street Parking Provisions

The off-street parking requirements applicable to the development proposal are specified in Council's *Development Control Plan (Town Centres) 2010, Section 3A.27 – Mixed-Use Development Car Parking Provision* document in the following terms:

Residential Component within Mixed-Use Development

1-Bedroom Apartments:	0.6 spaces per dwelling (min)	1.0 spaces per dwelling (max)
2-Bedroom Apartments:	1.0 spaces per dwelling (min)	1.25 spaces per dwelling (max)
3-Bedroom Apartments:	1.0 spaces per dwelling (min)	1.5 spaces per dwelling (max)
Visitors:		1.0 spaces per 6 dwellings
Shops	1.0 spaces per 33m^2 GFA (min)	1.0 spaces per 26m^2 GFA (max)

Application of the above parking requirements to the retail and residential components of the development proposal yields an off-street parking requirement of between 196 spaces and 257 spaces as set out below:

Off-Street Parking Requirements

Retail (3,251m^2):	98.5 spaces (min)	125.0 spaces (max)
Residential:	80.8 spaces (min)	115.5 spaces (max)
Residential Visitors:	17.0 spaces (min)	17.0 spaces (max)
TOTAL	**196.3 spaces (min)**	**257.5 spaces (max)**

The proposed development makes provision for a total of 175 off-street carparking spaces, comprising 48 retail spaces and 102 resident spaces within the two-level basement carparking area, plus a further 25 parking spaces in the existing carparking area located adjacent to the site as part of the "contribution in lieu" scheme. This results in a "shortfall" of between 21 spaces and 82 parking spaces when assessed under Council's Parking Code.

Those projected future parking requirements should however, be offset or *discounted* by any shortfall in the parking demands/requirement generated by the existing uses of the site, in order to determine the *nett increase (or decrease)* in external parking demands which may occur as a consequence of the development proposal.

The off-street parking requirements applicable to the existing development are specified in Council's *Development Control Plan No.43 – Car Parking* document in the following terms:

Retail – Shops (within 400m of a Railway Station):
1 space per 26m^2 GFA

Office & Commercial:
1 space per 33m^2 GFA

Gymnasiums:
1 space per 17m^2 GFA

Application of the above parking requirements to the existing development on the site yields an off-street parking requirement of 140 spaces as set out below:

Retail (2,393m^2 GFA):	92.0 spaces
Gymnasium (378m^2 GFA):	22.2 spaces
Bridge Club & Office (860m^2 GFA):	26.0 spaces
TOTAL	**140.2 spaces**

The existing development makes provision for a total of 63 off-street parking spaces, comprising 38 spaces located on-site, plus a further 25 spaces located adjacent to the site provided by the existing development as part of the "contribution in lieu" scheme, yielding **an existing "shortfall" of 77 parking spaces** when assessed under Council's Parking.

Accordingly, the proposed development will *reduce that existing shortfall in carparking*, from 77 spaces to just 21 spaces.

In any event, the *actual* parking demands likely to be generated by the site is expected to be somewhat *less* than is suggested by the carparking code, as a substantial proportion of retail customers are expected to be railway and bus commuters who will stop at the shops or supermarkets when walking home from the bus/rail station to purchase smaller, "daily needs" items such as bread, milk or fresh food and vegetables which may be required for the evening meal.

In the circumstances, it is reasonable to conclude that the proposed provision of 175 off-street carparking spaces will comfortably satisfy the needs of the development.

The geometric design layout of the proposed carparking facilities have been designed to comply with the relevant requirements specified in the Standards Australia publication

Parking Facilities Part 1 - Off-Street Carparking AS2890.1 in respect of parking bay dimensions, ramp gradients and aisle widths.

Loading/servicing for the proposed development is expected to be undertaken by vehicles up to and including 19.0m long articulated trucks. The loading dock is to be located at the rear of the site in Havilah Lane and is capable of holding a 19.0m semi trailer and a 12.5m long heavy rigid truck side by side. The loading dock has been designed to accommodate the swept path turning requirements of these trucks.

In summary, the proposed parking facilities satisfy the relevant requirements specified in both Council's Parking Code as well as the Australian Standards and it is therefore concluded that the proposed development will not have any unacceptable parking implications.

APPENDIX A

TRAFFIC & PARKING SURVEY DATA

R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Varga Traffic Planning
Job No/Name : 3106 Linfield Linfield Av Counts
Day/Date : Thursday 20th May 2010

Lights

	NORTH			WEST			SOUTH			EAST			
	Pacific Hwy			*Balfour St*			*Pacific Hwy*			*Havillah St*			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
0630 - 0645	19	522	7	2	7	5	3	158	13	0	3	16	**755**
0645 - 0700	22	557	13	1	5	3	6	182	7	2	14	0	**812**
0700 - 0715	44	626	15	1	7	14	4	163	8	7	11	0	**900**
0715 - 0730	50	619	12	1	20	14	4	226	9	4	10	26	**995**
0730 - 0745	55	545	19	5	21	8	7	298	17	10	13	27	**1025**
0745 - 0800	83	565	23	12	30	9	6	331	15	3	10	25	**1112**
0800 - 0815	78	443	27	10	29	7	11	269	11	6	26	25	**942**
0815 - 0830	83	470	42	15	37	8	17	263	19	2	21	35	**1012**
0830 - 0845	75	421	40	14	37	8	22	273	17	7	17	20	**951**
0845 - 0900	65	536	36	14	33	16	5	276	21	9	19	21	**1051**
0900 - 0915	46	507	34	11	26	11	3	266	22	4	20	30	**980**
0915 - 0930	53	449	17	8	15	12	8	237	29	9	26	31	**894**
Period End	**673**	**6260**	**285**	**94**	**267**	**115**	**96**	**2942**	**188**	**63**	**190**	**256**	**11429**

Lights

	NORTH			WEST			SOUTH			EAST			
	Pacific Hwy			*Balfour St*			*Pacific Hwy*			*Havillah St*			
Peak Time	L	T	R	L	T	R	L	T	R	L	T	R	TOT
0630 - 0730	135	2324	47	5	39	36	17	729	37	13	38	42	**3462**
0645 - 0745	171	2347	59	8	53	39	21	869	41	23	48	53	**3732**
0700 - 0800	232	2355	69	19	78	45	21	1018	49	24	44	78	**4032**
0715 - 0815	266	2172	81	28	100	38	28	1124	52	23	59	103	**4074**
0730 - 0830	299	2023	111	42	117	32	41	1161	62	21	70	112	**4091**
0745 - 0845	319	1899	132	51	133	32	56	1136	62	18	74	105	**4017**
0800 - 0900	301	1870	145	53	136	39	55	1081	68	24	83	101	**3956**
0815 - 0915	269	1934	152	54	133	43	47	1078	79	22	77	106	**3994**
0830 - 0930	239	1913	127	47	111	47	38	1052	89	29	82	102	**3876**
PEAK HOUR	**299**	**2023**	**111**	**42**	**117**	**32**	**41**	**1161**	**62**	**21**	**70**	**112**	**4091**

Heavies

	NORTH			WEST			SOUTH			EAST			
	Pacific Hwy			*Balfour St*			*Pacific Hwy*			*Havillah St*			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
0630 - 0645	0	8	0	0	0	0	0	4	1	0	0	0	**13**
0645 - 0700	1	7	2	1	0	1	0	4	0	0	0	0	**16**
0700 - 0715	1	6	0	0	0	0	0	4	0	0	0	0	**11**
0715 - 0730	0	2	0	0	0	0	0	9	0	0	0	0	**11**
0730 - 0745	0	5	2	1	0	0	0	8	0	0	0	0	**16**
0745 - 0800	0	4	0	0	0	0	0	6	0	0	0	0	**10**
0800 - 0815	0	7	0	0	0	0	0	5	0	0	0	0	**12**
0815 - 0830	0	6	0	0	0	0	0	7	0	0	0	0	**13**
0830 - 0845	0	7	0	0	0	0	0	4	0	0	0	2	**13**
0845 - 0900	0	7	0	0	0	0	0	7	1	0	0	0	**15**
0900 - 0915	0	10	0	1	0	0	1	6	0	0	0	0	**18**
0915 - 0930	1	7	0	0	0	0	1	6	0	0	0	0	**15**
Period End	**3**	**76**	**4**	**3**	**0**	**1**	**2**	**70**	**2**	**0**	**0**	**2**	**163**

Heavies

	NORTH			WEST			SOUTH			EAST			
	Pacific Hwy			*Balfour St*			*Pacific Hwy*			*Havillah St*			
Peak Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
0630 - 0730	2	23	2	1	0	1	0	21	1	0	0	0	**51**
0645 - 0745	2	20	4	2	0	1	0	25	0	0	0	0	**54**
0700 - 0800	1	17	2	1	0	0	0	27	0	0	0	0	**48**
0715 - 0815	0	18	2	1	0	0	0	28	0	0	0	0	**49**
0730 - 0830	0	22	2	1	0	0	0	26	0	0	0	0	**51**
0745 - 0845	0	24	0	0	0	0	0	22	0	0	0	2	**48**
0800 - 0900	0	27	0	0	0	0	0	23	1	0	0	2	**53**
0815 - 0915	0	30	0	1	0	0	1	24	1	0	0	2	**59**
0830 - 0930	1	31	0	1	0	0	2	23	1	0	0	2	**61**
PEAK HOUR	**0**	**22**	**2**	**1**	**0**	**0**	**0**	**26**	**0**	**0**	**0**	**0**	**51**

Combined

	NORTH			WEST			SOUTH			EAST			
	Pacific Hwy			*Balfour St*			*Pacific Hwy*			*Havillah St*			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
0630 - 0645	19	530	7	2	7	5	3	162	14	0	3	16	**768**
0645 - 0700	23	564	15	2	5	4	6	186	7	2	14	0	**828**
0700 - 0715	45	632	15	1	7	14	4	167	8	7	11	0	**911**
0715 - 0730	50	621	12	1	20	14	4	235	9	4	10	26	**1006**
0730 - 0745	55	550	21	6	21	8	7	306	17	10	13	27	**1041**
0745 - 0800	83	569	23	12	30	9	6	337	15	3	10	25	**1122**
0800 - 0815	78	450	27	10	29	7	11	274	11	6	26	25	**954**
0815 - 0830	83	476	42	15	37	8	17	270	19	2	21	35	**1025**
0830 - 0845	75	428	40	14	37	8	22	277	17	7	17	22	**964**
0845 - 0900	65	543	36	14	33	16	5	283	22	9	19	21	**1066**
0900 - 0915	46	517	34	12	26	11	4	272	22	4	20	30	**998**
0915 - 0930	54	456	17	8	15	12	9	243	29	9	26	31	**909**
Period End	**676**	**6336**	**289**	**97**	**267**	**116**	**98**	**3012**	**190**	**63**	**190**	**258**	**11592**

Combined

	NORTH			WEST			SOUTH			EAST			
	Pacific Hwy			*Balfour St*			*Pacific Hwy*			*Havillah St*			
Peak Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
0630 - 0730	137	2347	49	6	39	37	17	750	38	13	38	42	**3513**
0645 - 0745	173	2367	63	10	53	40	21	894	41	23	48	53	**3786**
0700 - 0800	233	2372	71	20	78	45	21	1045	49	24	44	78	**4080**
0715 - 0815	266	2190	83	29	100	38	28	1152	52	23	59	103	**4123**
0730 - 0830	299	2045	113	43	117	32	41	1187	62	21	70	112	**4142**
0745 - 0845	319	1923	132	51	133	32	56	1158	62	18	74	107	**4065**
0800 - 0900	301	1897	145	53	136	39	55	1104	69	24	83	103	**4009**
0815 - 0915	269	1964	152	55	133	43	48	1102	80	22	77	108	**4053**
0830 - 0930	240	1944	127	48	111	47	40	1075	90	29	82	104	**3937**
PEAK HOUR	**299**	**2045**	**113**	**43**	**117**	**32**	**41**	**1187**	**62**	**21**	**70**	**112**	**4142**

R.O.A.R DATA

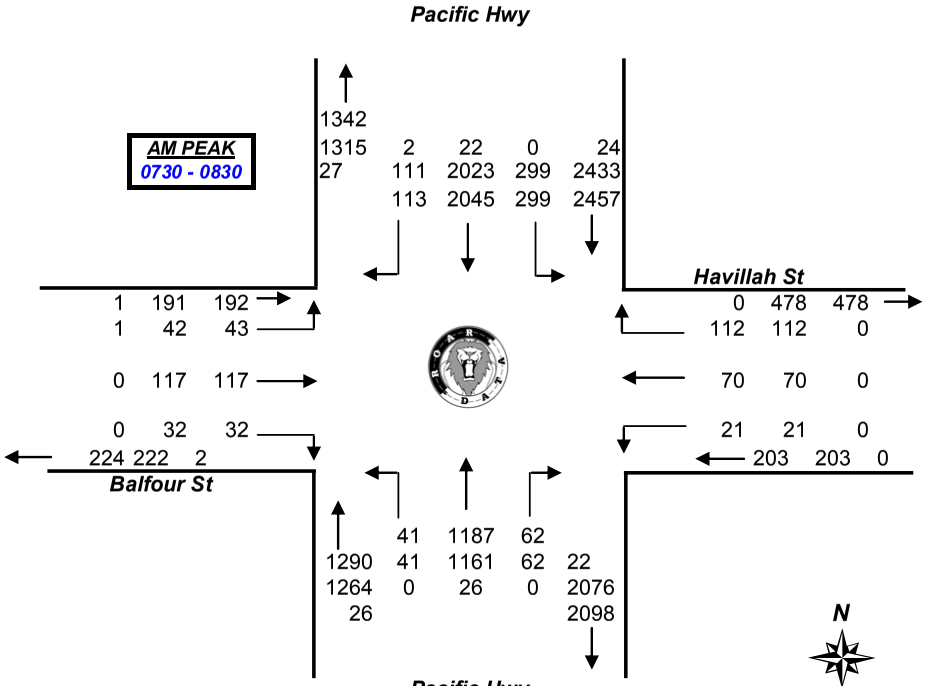
Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

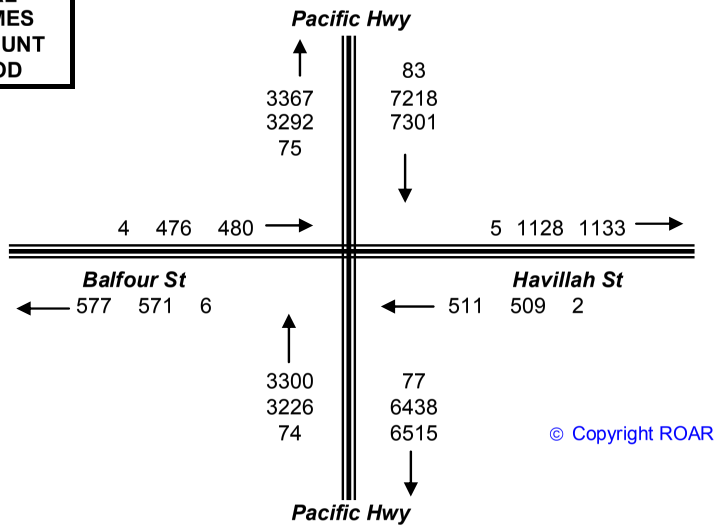
Client : Varga Traffic Pl
Job No/Name : 3106 Linfield Linfield Av Counts
Day/Date : Thursday 20th May 2010

Peds	NORTH	WEST	SOUTH	EAST	
	Pacific Hwy	*Balfour St*	*Pacific Hwy*	*Havillah St*	
Time Per	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	TOT
0630 - 0645	1	6	0	1	**8**
0645 - 0700	1	10	0	4	**15**
0700 - 0715	1	4	1	5	**11**
0715 - 0730	2	12	1	4	**19**
0730 - 0745	3	12	1	13	**29**
0745 - 0800	2	17	1	10	**30**
0800 - 0815	4	24	10	17	**55**
0815 - 0830	5	20	1	11	**37**
0830 - 0845	17	19	5	10	**51**
0845 - 0900	8	11	0	3	**22**
0900 - 0915	1	22	1	1	**25**
0915 - 0930	1	25	1	7	**34**
Period End	**46**	**182**	**22**	**86**	**336**

Peds	NORTH	WEST	SOUTH	EAST	
	Pacific Hwy	*Balfour St*	*Pacific Hwy*	*Havillah St*	
Peak Per	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	TOT
0630 - 0730	5	32	2	14	**53**
0645 - 0745	7	38	3	26	**74**
0700 - 0800	8	45	4	32	**89**
0715 - 0815	11	65	13	44	**133**
0730 - 0830	14	73	13	51	**151**
0745 - 0845	28	80	17	48	**173**
0800 - 0900	34	74	16	41	**165**
0815 - 0915	31	72	7	25	**135**
0830 - 0930	27	77	7	21	**132**
PEAK HR	**14**	**73**	**13**	**51**	**151**



TOTAL VOLUMES FOR COUNT PERIOD



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Varga Traffic Planning
Job No/Name : 3106 Linfield Linfield Av Counts
Day/Date : Thursday 20th May 2010

Lights

	NORTH			WEST			SOUTH			EAST			
	Pacific Hwy			*Balfour St*			*Pacific Hwy*			*Havillah St*			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1530 - 1545	38	300	24	12	25	11	13	451	16	13	27	45	**975**
1545 - 1600	34	299	23	19	26	11	7	403	9	8	30	28	**897**
1600 - 1615	32	289	18	12	19	7	11	429	20	8	19	33	**897**
1615 - 1630	32	277	17	12	17	12	8	407	14	10	21	22	**849**
1630 - 1645	31	346	23	10	27	11	17	476	15	10	15	24	**1005**
1645 - 1700	37	309	24	8	25	17	10	465	12	2	25	33	**967**
1700 - 1715	32	313	15	15	20	14	9	427	10	6	31	33	**925**
1715 - 1730	39	320	24	11	28	13	21	471	18	8	13	23	**989**
1730 - 1745	39	333	26	16	25	6	16	459	14	4	24	25	**987**
1745 - 1800	36	280	22	22	31	21	9	446	10	3	14	31	**925**
1800 - 1815	45	315	15	15	14	14	19	439	22	12	19	23	**952**
1815 - 1830	37	241	23	11	28	21	17	472	14	4	33	19	**920**
Period End	**432**	**3622**	**254**	**163**	**285**	**158**	**157**	**5345**	**174**	**88**	**271**	**339**	**11288**

Lights

	NORTH			WEST			SOUTH			EAST			
	Pacific Hwy			*Balfour St*			*Pacific Hwy*			*Havillah St*			
Peak Time	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1530 - 1630	136	1165	82	55	87	41	39	1690	59	39	97	128	**3618**
1545 - 1645	129	1211	81	53	89	41	43	1715	58	36	85	107	**3648**
1600 - 1700	132	1221	82	42	88	47	46	1777	61	30	80	112	**3718**
1615 - 1715	132	1245	79	45	89	54	44	1775	51	28	92	112	**3746**
1630 - 1730	139	1288	86	44	100	55	57	1839	55	26	84	113	**3886**
1645 - 1745	147	1275	89	50	98	50	56	1822	54	20	93	114	**3868**
1700 - 1800	146	1246	87	64	104	54	55	1803	52	21	82	112	**3826**
1715 - 1815	159	1248	87	64	98	54	65	1815	64	27	70	102	**3853**
1730 - 1830	157	1169	86	64	98	62	61	1816	60	23	90	98	**3784**
PEAK HOUR	**139**	**1288**	**86**	**44**	**100**	**55**	**57**	**1839**	**55**	**26**	**84**	**113**	**3886**

Heavies

	NORTH			WEST			SOUTH			EAST			
	Pacific Hwy			*Balfour St*			*Pacific Hwy*			*Havillah St*			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1530 - 1545	0	4	0	0	0	0	1	6	0	0	0	1	**12**
1545 - 1600	0	3	0	1	0	0	0	4	0	0	0	0	**8**
1600 - 1615	0	4	1	1	0	0	0	4	0	0	0	0	**10**
1615 - 1630	0	2	0	0	0	0	0	4	0	0	0	0	**6**
1630 - 1645	0	2	0	2	0	0	0	6	0	0	0	0	**10**
1645 - 1700	0	4	0	1	0	0	0	3	0	0	0	0	**8**
1700 - 1715	0	3	0	0	0	0	0	6	0	0	0	0	**9**
1715 - 1730	0	2	0	0	0	0	0	3	0	0	0	0	**5**
1730 - 1745	0	2	0	0	0	0	0	0	0	0	0	0	**2**
1745 - 1800	0	4	0	0	0	0	0	1	0	0	0	0	**5**
1800 - 1815	0	1	0	0	0	0	0	6	0	0	0	0	**7**
1815 - 1830	0	4	0	0	0	0	0	2	0	0	0	0	**6**
Period End	**0**	**35**	**1**	**5**	**0**	**0**	**1**	**45**	**0**	**0**	**0**	**1**	**88**

Heavies

	NORTH			WEST			SOUTH			EAST			
	Pacific Hwy			*Balfour St*			*Pacific Hwy*			*Havillah St*			
Peak Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1530 - 1630	0	13	1	2	0	0	1	18	0	0	0	1	**36**
1545 - 1645	0	11	1	4	0	0	0	18	0	0	0	0	**34**
1600 - 1700	0	12	1	4	0	0	0	17	0	0	0	0	**34**
1615 - 1715	0	11	0	3	0	0	0	19	0	0	0	0	**33**
1630 - 1730	0	11	0	3	0	0	0	18	0	0	0	0	**32**
1645 - 1745	0	11	0	1	0	0	0	12	0	0	0	0	**24**
1700 - 1800	0	11	0	0	0	0	0	10	0	0	0	0	**21**
1715 - 1815	0	9	0	0	0	0	0	10	0	0	0	0	**19**
1730 - 1830	0	11	0	0	0	0	0	9	0	0	0	0	**20**
PEAK HOUR	**0**	**11**	**0**	**3**	**0**	**0**	**0**	**18**	**0**	**0**	**0**	**0**	**32**

Combined

	NORTH			WEST			SOUTH			EAST			
	Pacific Hwy			*Balfour St*			*Pacific Hwy*			*Havillah St*			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1530 - 1545	38	304	24	12	25	11	14	457	16	13	27	46	**987**
1545 - 1600	34	302	23	20	26	11	7	407	9	8	30	28	**905**
1600 - 1615	32	293	19	13	19	7	11	433	20	8	19	33	**907**
1615 - 1630	32	279	17	12	17	12	8	411	14	10	21	22	**855**
1630 - 1645	31	348	23	12	27	11	17	482	15	10	15	24	**1015**
1645 - 1700	37	313	24	9	25	17	10	468	12	2	25	33	**975**
1700 - 1715	32	316	15	15	20	14	9	433	10	6	31	33	**934**
1715 - 1730	39	322	24	11	28	13	21	474	18	8	13	23	**994**
1730 - 1745	39	335	26	16	25	6	16	459	14	4	24	25	**989**
1745 - 1800	36	284	22	22	31	21	9	447	10	3	14	31	**930**
1800 - 1815	45	316	15	15	14	14	19	445	22	12	19	23	**959**
1815 - 1830	37	245	23	11	28	21	17	474	14	4	33	19	**926**
Period End	**432**	**3657**	**255**	**168**	**285**	**158**	**158**	**5390**	**174**	**88**	**271**	**340**	**11376**

Combined

	NORTH			WEST			SOUTH			EAST			
	Pacific Hwy			*Balfour St*			*Pacific Hwy*			*Havillah St*			
Peak Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1530 - 1630	136	1178	83	57	87	41	40	1708	59	39	97	129	**3654**
1545 - 1645	129	1222	82	57	89	41	43	1733	58	36	85	107	**3682**
1600 - 1700	132	1233	83	46	88	47	46	1794	61	30	80	112	**3752**
1615 - 1715	132	1256	79	48	89	54	44	1794	51	28	92	112	**3779**
1630 - 1730	139	1299	86	47	100	55	57	1857	55	26	84	113	**3918**
1645 - 1745	147	1286	89	51	98	50	56	1834	54	20	93	114	**3892**
1700 - 1800	146	1257	87	64	104	54	55	1813	52	21	82	112	**3847**
1715 - 1815	159	1257	87	64	98	54	65	1825	64	27	70	102	**3872**
1730 - 1830	157	1180	86	64	98	62	61	1825	60	23	90	98	**3804**
PEAK HOUR	**139**	**1299**	**86**	**47**	**100**	**55**	**57**	**1857**	**55**	**26**	**84**	**113**	**3918**

R.O.A.R DATA

Reliable, Original & Authentic Results

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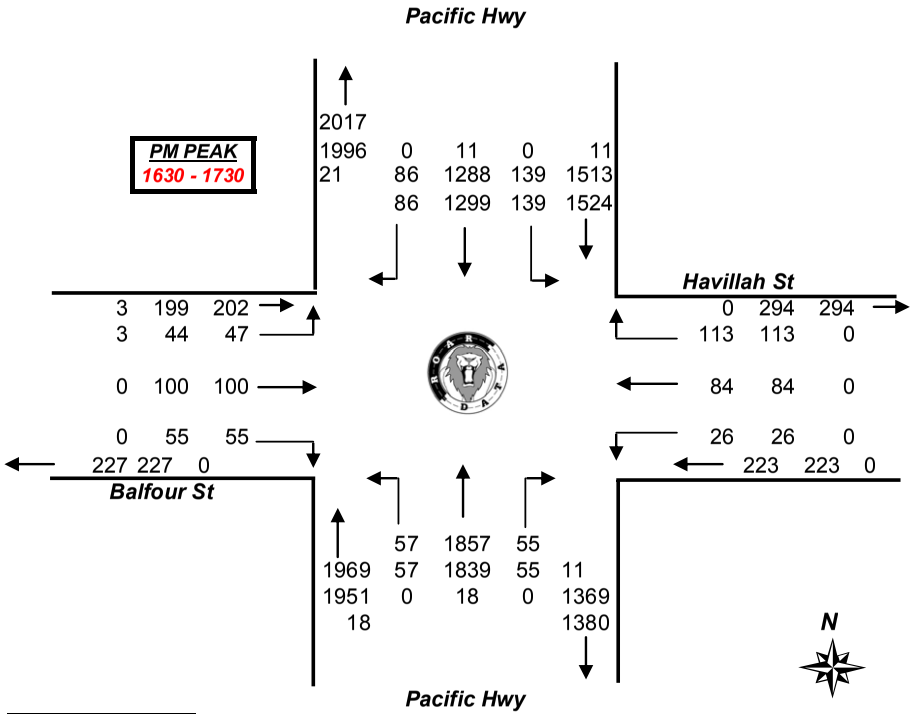
Client : Varga Traffic P
Job No/Name : 3106 Linfield Linfield Av Counts
Day/Date : Thursday 20th May 2010

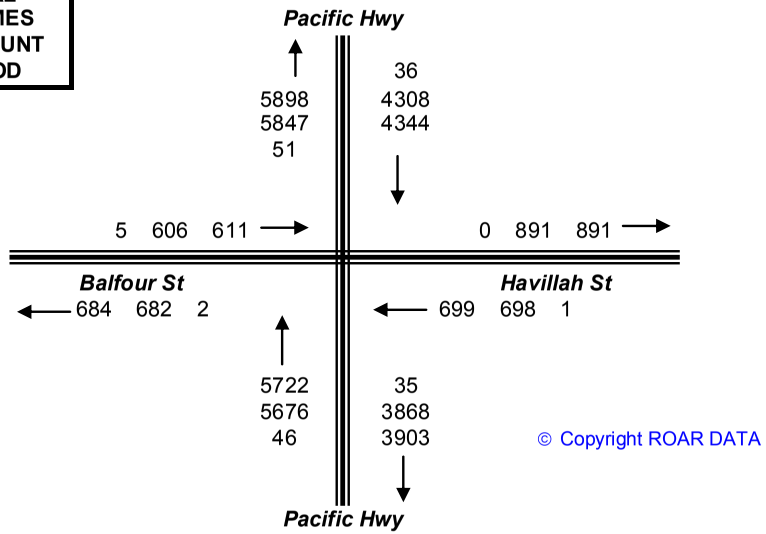
Peds	NORTH	WEST	SOUTH	EAST	
	Pacific Hwy	*Balfour St*	*Pacific Hwy*	*Havillah St*	
Time Per	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	TOT
1530 - 1545	4	32	2	6	**44**
1545 - 1600	1	51	1	7	**60**
1600 - 1615	0	52	0	5	**57**
1615 - 1630	8	27	0	6	**41**
1630 - 1645	4	25	5	3	**37**
1645 - 1700	6	38	1	4	**49**
1700 - 1715	1	37	0	4	**42**
1715 - 1730	0	35	1	6	**42**
1730 - 1745	5	43	0	3	**51**
1745 - 1800	11	50	3	5	**69**
1800 - 1815	8	29	3	5	**45**
1815 - 1830	5	30	0	7	**42**
Period End	**53**	**449**	**16**	**61**	**579**

Peds	NORTH	WEST	SOUTH	EAST	
	Pacific Hwy	*Balfour St*	*Pacific Hwy*	*Havillah St*	
Peak Per	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	TOT
1530 - 1630	13	0	0	0	**13**
1545 - 1645	13	32	2	6	**53**
1600 - 1700	18	83	3	13	**117**
1615 - 1715	19	135	3	18	**175**
1630 - 1730	11	162	3	24	**200**
1645 - 1745	12	155	6	21	**194**
1700 - 1800	17	142	6	18	**183**
1715 - 1815	24	127	6	17	**174**
1730 - 1830	29	135	7	17	**188**

PEAK HR	**11**	**162**	**3**	**24**	**200**

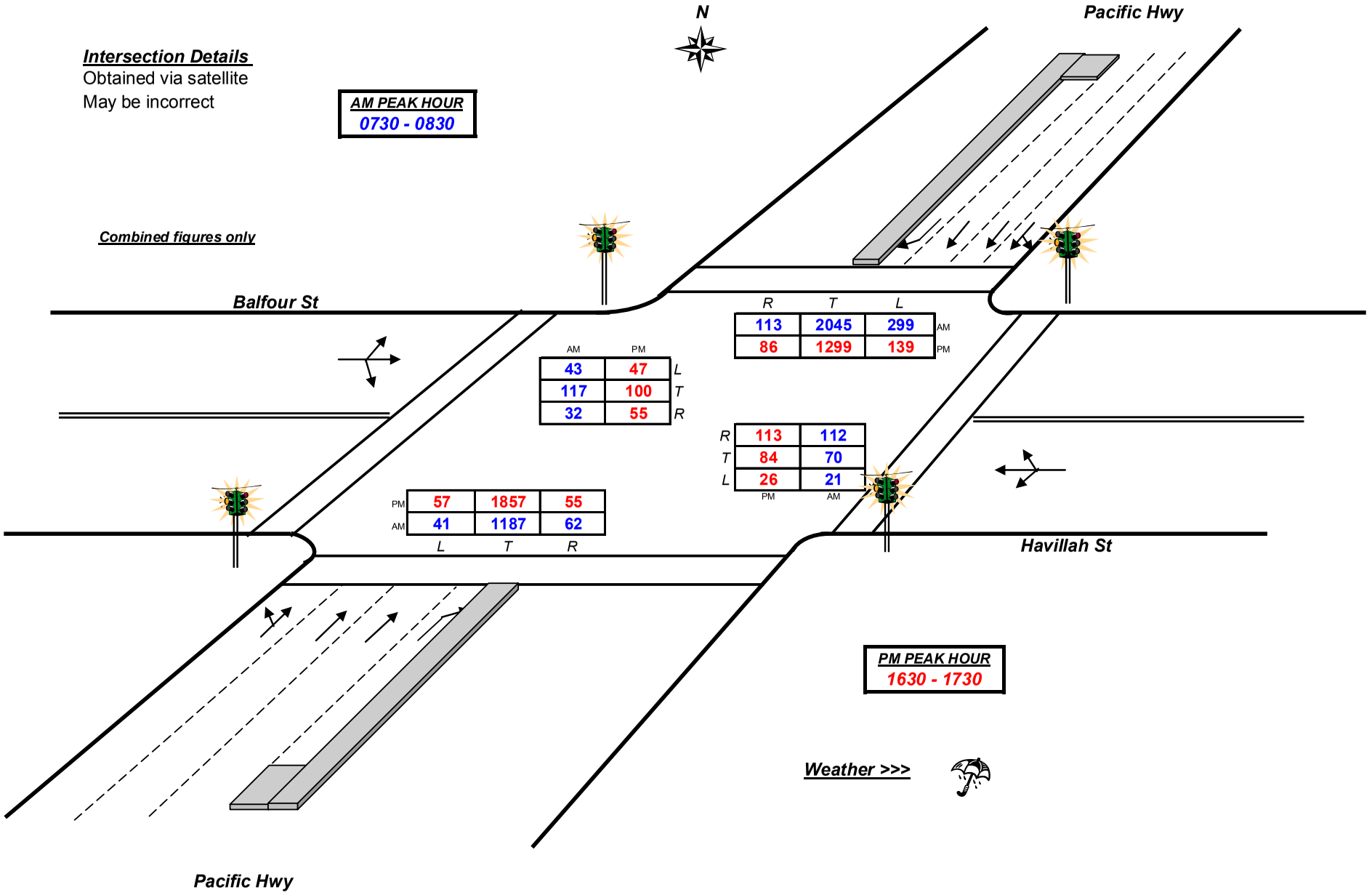


TOTAL VOLUMES FOR COUNT PERIOD



R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Varga Traffic Planning
Job No/Name : 3106 Linfield Linfield Av Counts
Day/Date : Thursday 20th May 2010



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849.
Mobile.0418239019

Client : Varga Traffic Planning
Job No/Name : 3106 Linfield Linfield Av Counts
Day/Date : Thursday 20th May 2010

PEDS	NORTH	EAST	SOUTH	
Time Per	*Linfield Av*	*Tyron Av*	*Linfield Av*	TOT
0630 - 0645	0	1	3	**4**
0645 - 0700	1	1	7	**9**
0700 - 0715	25	3	11	**39**
0715 - 0730	30	1	5	**36**
0730 - 0745	25	3	10	**38**
0745 - 0800	32	5	13	**50**
0800 - 0815	25	5	15	**45**
0815 - 0830	18	1	12	**31**
0830 - 0845	15	2	8	**25**
0845 - 0900	10	5	10	**25**
0900 - 0915	15	2	10	**27**
0915 - 0930	10	0	0	**10**
Per End	**206**	**29**	**104**	**339**

PEDS	NORTH	EAST	SOUTH	
Peak Per	*Linfield Av*	*Tyron Av*	*Linfield Av*	TOT
0630 - 0730	56	6	26	**88**
0645 - 0745	81	8	33	**122**
0700 - 0800	112	12	39	**163**
0715 - 0815	112	14	43	**169**
0730 - 0830	100	14	50	**164**
0745 - 0845	90	13	48	**151**
0800 - 0900	68	13	45	**126**
0815 - 0915	58	10	40	**108**
0830 - 0930	50	9	28	**87**
PEAK HR	**100**	**14**	**50**	**164**

Lights	NORTH		EAST		SOUTH		
	Linfield Av		*Tyron Av*		*Linfield Av*		
Time Per	T	L	R	L	R	T	TOT
0630 - 0645	40	29	13	8	9	14	**113**
0645 - 0700	46	27	14	5	6	30	**128**
0700 - 0715	85	47	20	13	10	18	**193**
0715 - 0730	118	34	20	12	7	51	**242**
0730 - 0745	161	48	23	24	20	43	**319**
0745 - 0800	193	43	26	22	13	45	**342**
0800 - 0815	194	39	35	38	8	36	**350**
0815 - 0830	185	43	35	28	15	34	**340**
0830 - 0845	171	35	27	27	17	36	**313**
0845 - 0900	150	46	33	30	14	28	**301**
0900 - 0915	120	34	42	30	15	25	**266**
0915 - 0930	105	33	28	10	14	25	**215**
Per End	**1568**	**458**	**316**	**247**	**148**	**385**	**3122**

Heavies	NORTH		EAST		SOUTH		
	Linfield Av		*Tyron Av*		*Linfield Av*		
Time Per	T	L	R	L	R	T	TOT
0630 - 0645	1	1	0	0	0	0	**2**
0645 - 0700	0	1	0	0	0	1	**2**
0700 - 0715	1	0	0	0	0	0	**1**
0715 - 0730	1	1	0	0	0	1	**3**
0730 - 0745	0	0	0	2	0	1	**3**
0745 - 0800	1	0	1	0	0	1	**3**
0800 - 0815	0	0	1	0	0	1	**2**
0815 - 0830	0	0	1	0	0	2	**3**
0830 - 0845	0	0	0	0	0	0	**0**
0845 - 0900	2	0	0	1	0	1	**4**
0900 - 0915	0	0	1	0	1	1	**3**
0915 - 0930	0	1	0	0	0	0	**1**
Per End	**6**	**4**	**4**	**3**	**1**	**9**	**27**

Combined	NORTH		EAST		SOUTH		
	Linfield Av		*Tyron Av*		*Linfield Av*		
Time Per	T	L	R	L	R	T	TOT
0630 - 0645	41	30	13	8	9	14	**115**
0645 - 0700	46	28	14	5	6	31	**130**
0700 - 0715	86	47	20	13	10	18	**194**
0715 - 0730	119	35	20	12	7	52	**245**
0730 - 0745	161	48	23	26	20	44	**322**
0745 - 0800	194	43	27	22	13	46	**345**
0800 - 0815	194	39	36	38	8	37	**352**
0815 - 0830	185	43	36	28	15	36	**343**
0830 - 0845	171	35	27	27	17	36	**313**
0845 - 0900	152	46	33	31	14	29	**305**
0900 - 0915	120	34	43	30	16	26	**269**
0915 - 0930	105	34	28	10	14	25	**216**
Per End	**1574**	**462**	**320**	**250**	**149**	**394**	**3149**

Lights	NORTH		EAST		SOUTH		
	Linfield Av		*Tyron Av*		*Linfield Av*		
Peak Per	T	L	R	L	R	T	TOT
0630 - 0730	289	137	67	38	32	113	**676**
0645 - 0745	410	156	77	54	43	142	**882**
0700 - 0800	557	172	89	71	50	157	**1096**
0715 - 0815	666	164	104	96	48	175	**1253**
0730 - 0830	733	173	119	112	56	158	**1351**
0745 - 0845	743	160	123	115	53	151	**1345**
0800 - 0900	700	163	130	123	54	134	**1304**
0815 - 0915	626	158	137	115	61	123	**1220**
0830 - 0930	546	148	130	97	60	114	**1095**
PEAK HR	**733**	**173**	**119**	**112**	**56**	**158**	**1351**

Heavies	NORTH		EAST		SOUTH		
	Linfield Av		*Tyron Av*		*Linfield Av*		
Peak Per	T	L	R	L	R	T	TOT
0630 - 0730	3	3	0	0	0	2	**8**
0645 - 0745	2	2	0	2	0	3	**9**
0700 - 0800	3	1	1	2	0	3	**10**
0715 - 0815	2	1	2	2	0	4	**11**
0730 - 0830	1	0	3	2	0	5	**11**
0745 - 0845	1	0	3	0	0	4	**8**
0800 - 0900	2	0	2	1	0	4	**9**
0815 - 0915	2	0	2	1	1	4	**10**
0830 - 0930	2	1	1	1	1	2	**8**
PEAK HR	**1**	**0**	**3**	**2**	**0**	**5**	**11**

Combined	NORTH		EAST		SOUTH		
	Linfield Av		*Tyron Av*		*Linfield Av*		
Peak Per	T	L	R	L	R	T	TOT
0630 - 0730	292	140	67	38	32	115	**684**
0645 - 0745	412	158	77	56	43	145	**891**
0700 - 0800	560	173	90	73	50	160	**1106**
0715 - 0815	668	165	106	98	48	179	**1264**
0730 - 0830	734	173	122	114	56	163	**1362**
0745 - 0845	744	160	126	115	53	155	**1353**
0800 - 0900	702	163	132	124	54	138	**1313**
0815 - 0915	628	158	139	116	62	127	**1230**
0830 - 0930	548	149	131	98	61	116	**1103**
PEAK HR	**734**	**173**	**122**	**114**	**56**	**163**	**1362**

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Client : Varga Traffic Planning
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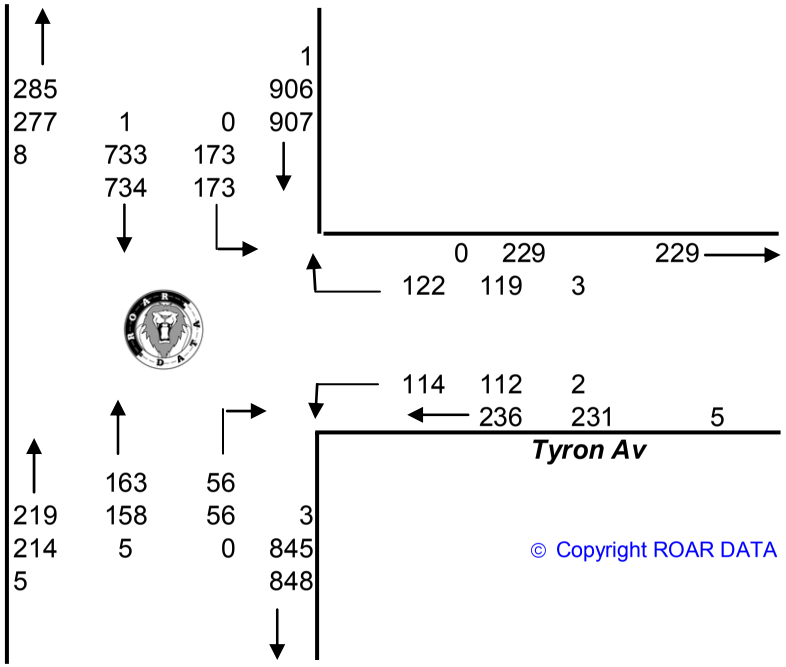
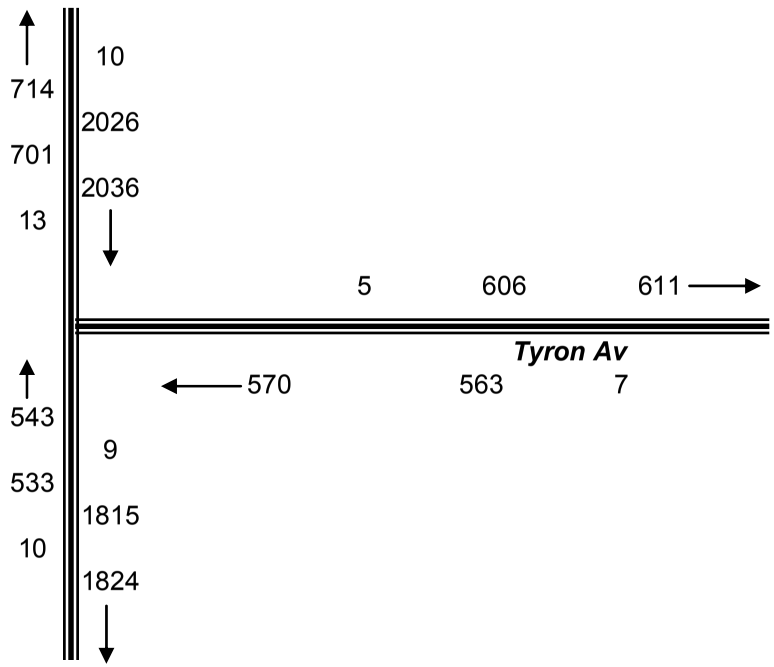
Day/Date : Thursday 20th May 2010

AM PEAK
0730 - 0830

TOTAL VOLUMES FOR COUNT PERIOD

N





R.O.A.R. DATA

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Mobile.0418239019

Client : Varga Traffic Planning
Job No/Name : 3106 Linfield Linfield Av Counts
Day/Date : Thursday 20th May 2010

PEDS	NORTH	EAST	SOUTH	
Time Per	*Linfield Av*	*Tyron Av*	*Linfield Av*	TOT
1530 - 1545	70	38	11	**119**
1545 - 1600	65	53	10	**128**
1600 - 1615	53	41	17	**111**
1615 - 1630	43	20	9	**72**
1630 - 1645	30	18	10	**58**
1645 - 1700	35	27	10	**72**
1700 - 1715	28	13	5	**46**
1715 - 1730	45	11	9	**65**
1730 - 1745	55	6	7	**68**
1745 - 1800	32	11	4	**47**
1800 - 1815	31	7	2	**40**
1815 - 1830	43	9	12	**64**
Per End	**530**	**254**	**106**	**890**

PEDS	NORTH	EAST	SOUTH	
Peak Per	*Linfield Av*	*Tyron Av*	*Linfield Av*	TOT
1530 - 1630	231	152	47	**430**
1545 - 1645	191	132	46	**369**
1600 - 1700	161	106	46	**313**
1615 - 1715	136	78	34	**248**
1630 - 1730	138	69	34	**241**
1645 - 1745	163	57	31	**251**
1700 - 1800	160	41	25	**226**
1715 - 1815	163	35	22	**220**
1730 - 1830	161	33	25	**219**
PEAK HR	**163**	**57**	**31**	**251**

Lights	NORTH		EAST		SOUTH		
	Linfield Av		*Tyron Av*		*Linfield Av*		
Time Per	T	L	R	L	R	T	TOT
1530 - 1545	68	38	37	26	24	55	**248**
1545 - 1600	65	38	25	17	19	40	**204**
1600 - 1615	50	19	37	24	15	55	**200**
1615 - 1630	62	38	32	25	20	56	**233**
1630 - 1645	58	40	22	28	26	51	**225**
1645 - 1700	69	49	36	29	20	70	**273**
1700 - 1715	67	36	45	16	20	76	**260**
1715 - 1730	75	48	25	20	15	85	**268**
1730 - 1745	49	46	37	24	22	77	**255**
1745 - 1800	64	53	37	27	16	74	**271**
1800 - 1815	50	46	26	16	10	74	**222**
1815 - 1830	51	31	21	13	7	60	**183**
Per End	**728**	**482**	**380**	**265**	**214**	**773**	**2842**

Heavies	NORTH		EAST		SOUTH		
	Linfield Av		*Tyron Av*		*Linfield Av*		
Time Per	T	L	R	L	R	T	TOT
1530 - 1545	0	0	2	1	0	1	**4**
1545 - 1600	0	0	0	0	0	0	**0**
1600 - 1615	1	0	0	0	0	2	**3**
1615 - 1630	1	0	0	0	0	0	**1**
1630 - 1645	1	0	0	0	0	0	**1**
1645 - 1700	0	0	0	0	0	1	**1**
1700 - 1715	1	0	0	0	0	1	**2**
1715 - 1730	0	0	0	0	0	0	**0**
1730 - 1745	1	0	0	0	0	0	**1**
1745 - 1800	0	0	0	0	0	1	**1**
1800 - 1815	1	0	0	0	0	0	**1**
1815 - 1830	0	0	1	0	0	0	**1**
Per End	**6**	**0**	**3**	**1**	**0**	**6**	**16**

Combined	NORTH		EAST		SOUTH		
	Linfield Av		*Tyron Av*		*Linfield Av*		
Time Per	T	L	R	L	R	T	TOT
1530 - 1545	68	38	39	27	24	56	**252**
1545 - 1600	65	38	25	17	19	40	**204**
1600 - 1615	51	19	37	24	15	57	**203**
1615 - 1630	63	38	32	25	20	56	**234**
1630 - 1645	59	40	22	28	26	51	**226**
1645 - 1700	69	49	36	29	20	71	**274**
1700 - 1715	68	36	45	16	20	77	**262**
1715 - 1730	75	48	25	20	15	85	**268**
1730 - 1745	50	46	37	24	22	77	**256**
1745 - 1800	64	53	37	27	16	75	**272**
1800 - 1815	51	46	26	16	10	74	**223**
1815 - 1830	51	31	22	13	7	60	**184**
Per End	**734**	**482**	**383**	**266**	**214**	**779**	**2858**

Lights	NORTH		EAST		SOUTH		
	Linfield Av		*Tyron Av*		*Linfield Av*		
Peak Per	T	L	R	L	R	T	TOT
1530 - 1630	245	133	131	92	78	206	**885**
1545 - 1645	235	135	116	94	80	202	**862**
1600 - 1700	239	146	127	106	81	232	**931**
1615 - 1715	256	163	135	98	86	253	**991**
1630 - 1730	269	173	128	93	81	282	**1026**
1645 - 1745	260	179	143	89	77	308	**1056**
1700 - 1800	255	183	144	87	73	312	**1054**
1715 - 1815	238	193	125	87	63	310	**1016**
1730 - 1830	214	176	121	80	55	285	**931**
PEAK HR	**260**	**179**	**143**	**89**	**77**	**308**	**1056**

Heavies	NORTH		EAST		SOUTH		
	Linfield Av		*Tyron Av*		*Linfield Av*		
Peak Per	T	L	R	L	R	T	TOT
1530 - 1630	2	0	2	1	0	3	**8**
1545 - 1645	3	0	0	0	0	2	**5**
1600 - 1700	3	0	0	0	0	3	**6**
1615 - 1715	3	0	0	0	0	2	**5**
1630 - 1730	2	0	0	0	0	2	**4**
1645 - 1745	2	0	0	0	0	2	**4**
1700 - 1800	2	0	0	0	0	2	**4**
1715 - 1815	2	0	0	0	0	1	**3**
1730 - 1830	2	0	1	0	0	1	**4**
PEAK HR	**2**	**0**	**0**	**0**	**0**	**2**	**4**

Combined	NORTH		EAST		SOUTH		
	Linfield Av		*Tyron Av*		*Linfield Av*		
Peak Per	T	L	R	L	R	T	TOT
1530 - 1630	247	133	133	93	78	209	**893**
1545 - 1645	238	135	116	94	80	204	**867**
1600 - 1700	242	146	127	106	81	235	**937**
1615 - 1715	259	163	135	98	86	255	**996**
1630 - 1730	271	173	128	93	81	284	**1030**
1645 - 1745	262	179	143	89	77	310	**1060**
1700 - 1800	257	183	144	87	73	314	**1058**
1715 - 1815	240	193	125	87	63	311	**1019**
1730 - 1830	216	176	122	80	55	286	**935**
PEAK HR	**262**	**179**	**143**	**89**	**77**	**310**	**1060**

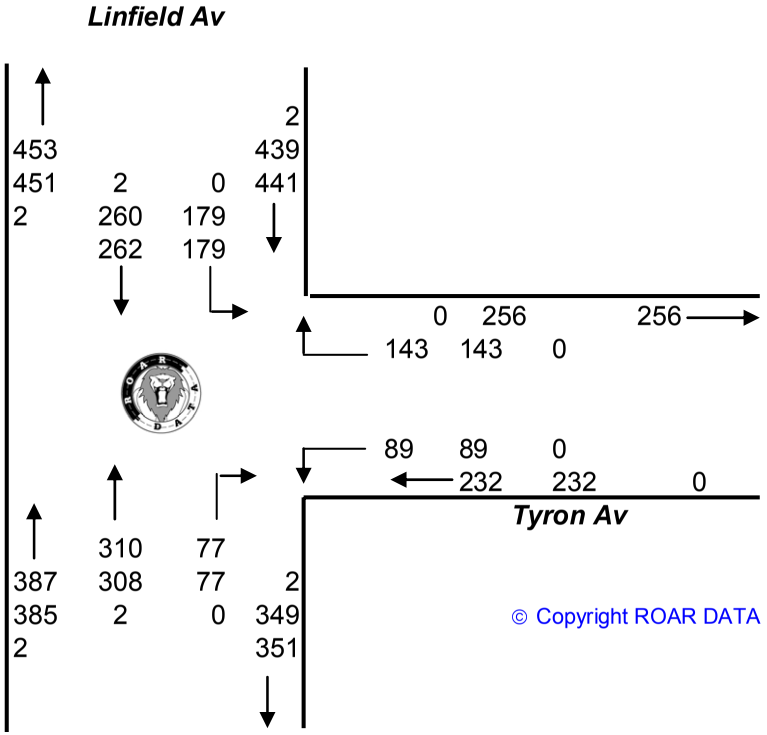
R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

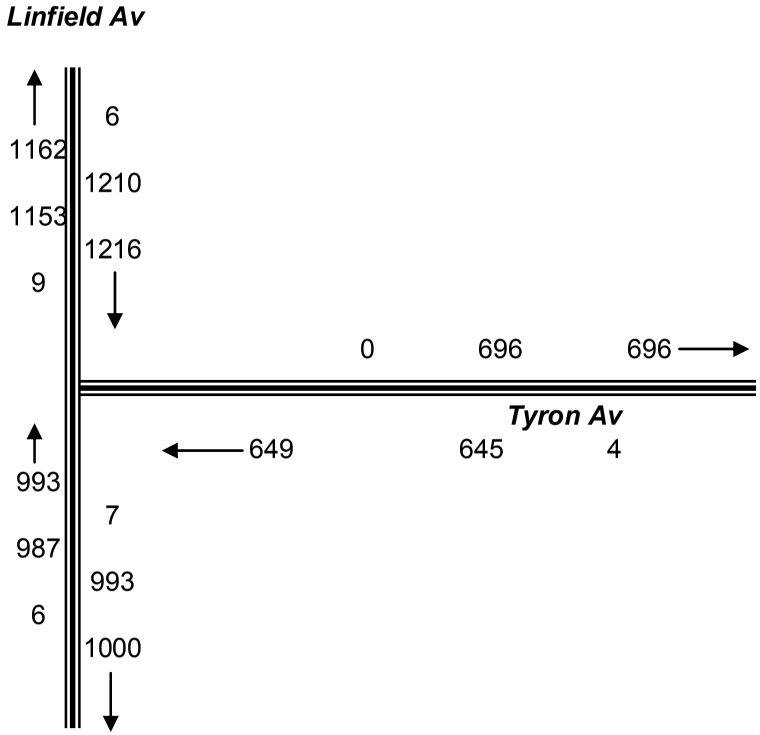
Client : Varga Traffic Planning
Job No/Name : 3106 Linfield Linfield Av Counts
Day/Date : Thursday 20th May 2010

PM PEAK
1645 - 1745

TOTAL VOLUMES FOR COUNT PERIOD

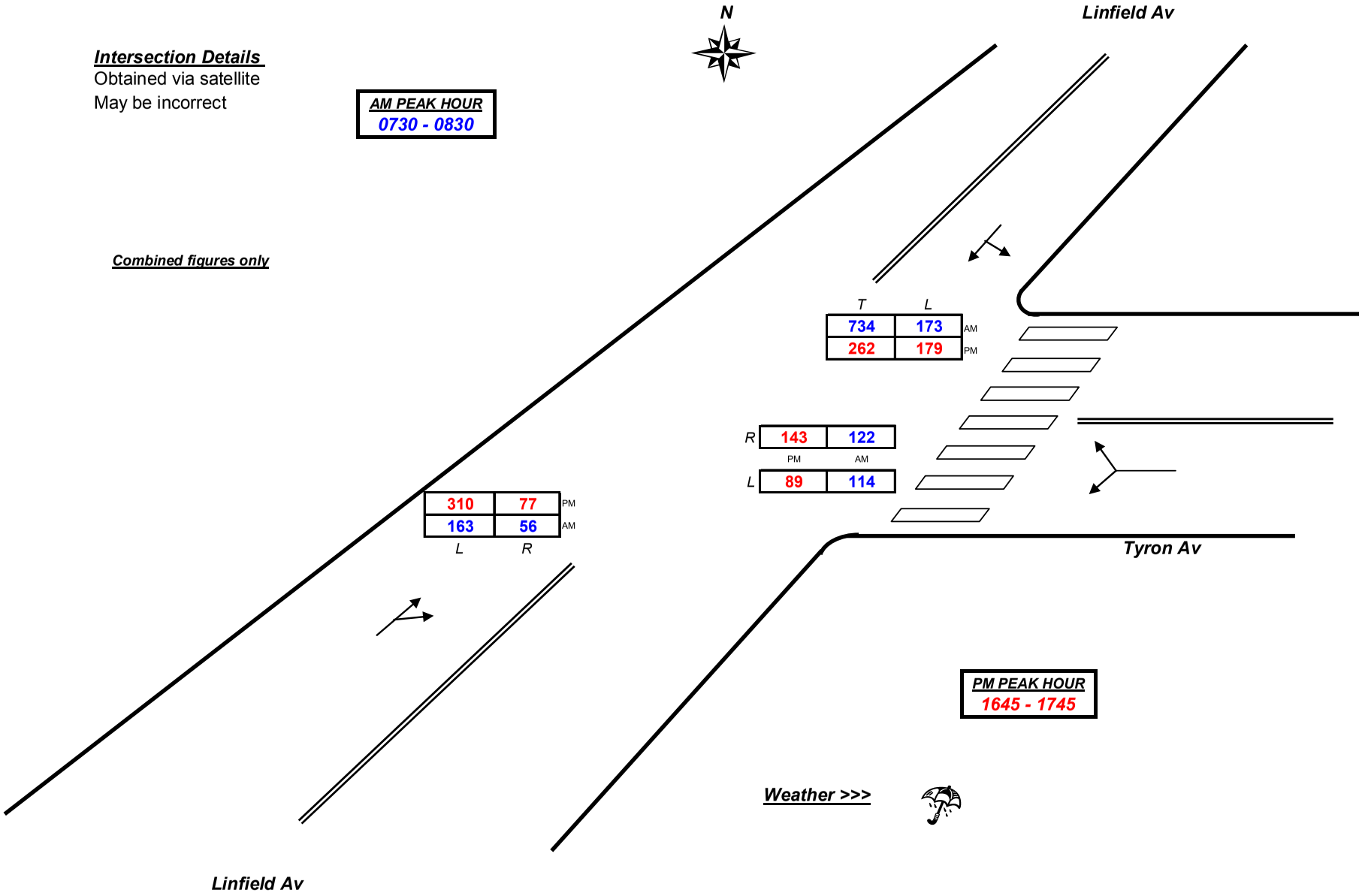
N





R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Varga Traffic Planning
Job No/Name : 3106 Linfield Linfield Av Counts
Day/Date : Thursday 20th May 2010



R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : V.T.P
Job No/Name : 2409 LINDFIELD Parking Survey
Day/Date : Thursday 11th Sept 2008

LINDFIELD

Area	Location	Restr	Cap	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
A	Havilah Ln On Site Carpark	Resv	27	9	12	18	18	17	15	15	14	15	10	5	3	2
B	Havilah Ln On Site Carpark	Resv	11	5	5	8	8	6	6	6	5	5	3	3	0	0
C	Havilah Ln W/Side Car Park	4P	25	4	15	16	23	24	24	20	17	12	9	6	3	2
D	Kochia Ln S/Side Car Park	1P	58	9	30	49	55	52	40	48	35	42	28	12	8	6
E	Kochia Ln S/Side Car Park	2P	64	20	60	60	61	58	57	53	51	58	42	25	16	12
F	Lindfield Ave E/Side	1/2P	8	1	2	4	4	4	1	2	5	4	2	2	2	0
G	Lindfield Ave E/Side	1/2P	10	3	6	8	6	9	9	5	8	9	7	5	5	3
H	Lindfield Ave E/Side	1/2P	2	1	2	2	1	1	2	1	2	2	2	1	1	0
I	Lindfield Ave W/Side	1/2P	16	5	8	9	11	12	7	7	6	11	11	8	5	4
Total Vehicles			**221**	**57**	**108**	**132**	**138**	**136**	**116**	**116**	**107**	**126**	**92**	**53**	**37**	**29**
Number of Spaces				164	113	89	83	85	105	105	114	95	129	168	184	192
% Capacity Used				**25.8%**	**48.9%**	**59.7%**	**62.4%**	**61.5%**	**52.5%**	**52.5%**	**48.4%**	**57.0%**	**41.6%**	**24.0%**	**16.7%**	**13.1%**

R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : V.T.P
Job No/Name : 2409 LINDFIELD Parking Survey
Day/Date : Saturday 13th Sept 2008

LINDFIELD

Area	Location	Restr	Cap	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
A	Havilah Ln On Site Carpark	Resv	27	4	7	6	7	8	8	6	3	2	3	2	2	3
B	Havilah Ln On Site Carpark	Resv	11	3	4	4	6	5	4	4	4	4	closed	closed	closed	closed
C	Havilah Ln W/Side Car Park	4P	25	3	4	6	7	6	4	3	3	1	0	0	0	0
D	Kochia Ln S/Side Car Park	1P	58	12	23	30	48	39	28	25	20	22	17	9	4	3
E	Kochia Ln S/Side Car Park	2P	64	24	48	57	64	49	43	42	39	32	32	27	23	19
F	Lindfield Ave E/Side	1/2P	8	1	3	4	6	6	4	1	2	2	1	2	3	2
G	Lindfield Ave E/Side	1/2P	10	6	8	10	7	9	10	7	5	4	4	6	5	4
H	Lindfield Ave E/Side	1/2P	2	2	2	2	2	1	2	2	1	1	2	1	2	1
I	Lindfield Ave W/Side	1/2P	16	5	6	6	9	12	8	5	6	4	5	6	5	8
Total Vehicles			**221**	**60**	**90**	**109**	**136**	**116**	**95**	**82**	**73**	**65**	**61**	**51**	**42**	**40**
Number of Spaces				161	131	112	85	105	126	139	148	156	160	170	179	181
% Capacity Used				**27.1%**	**40.7%**	**49.3%**	**61.5%**	**52.5%**	**43.0%**	**37.1%**	**33.0%**	**29.4%**	**27.6%**	**23.1%**	**19.0%**	**18.1%**