Appendix 2 – Traffic and Parking Assessment Report

Planning Proposal
Proposed Residential Development

16-20 Princess Street and 22-28 Princess Street, Brighton Le Sands

TRAFFIC AND PARKING ASSESSMENT REPORT

27 November 2014

Ref 14323

VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants

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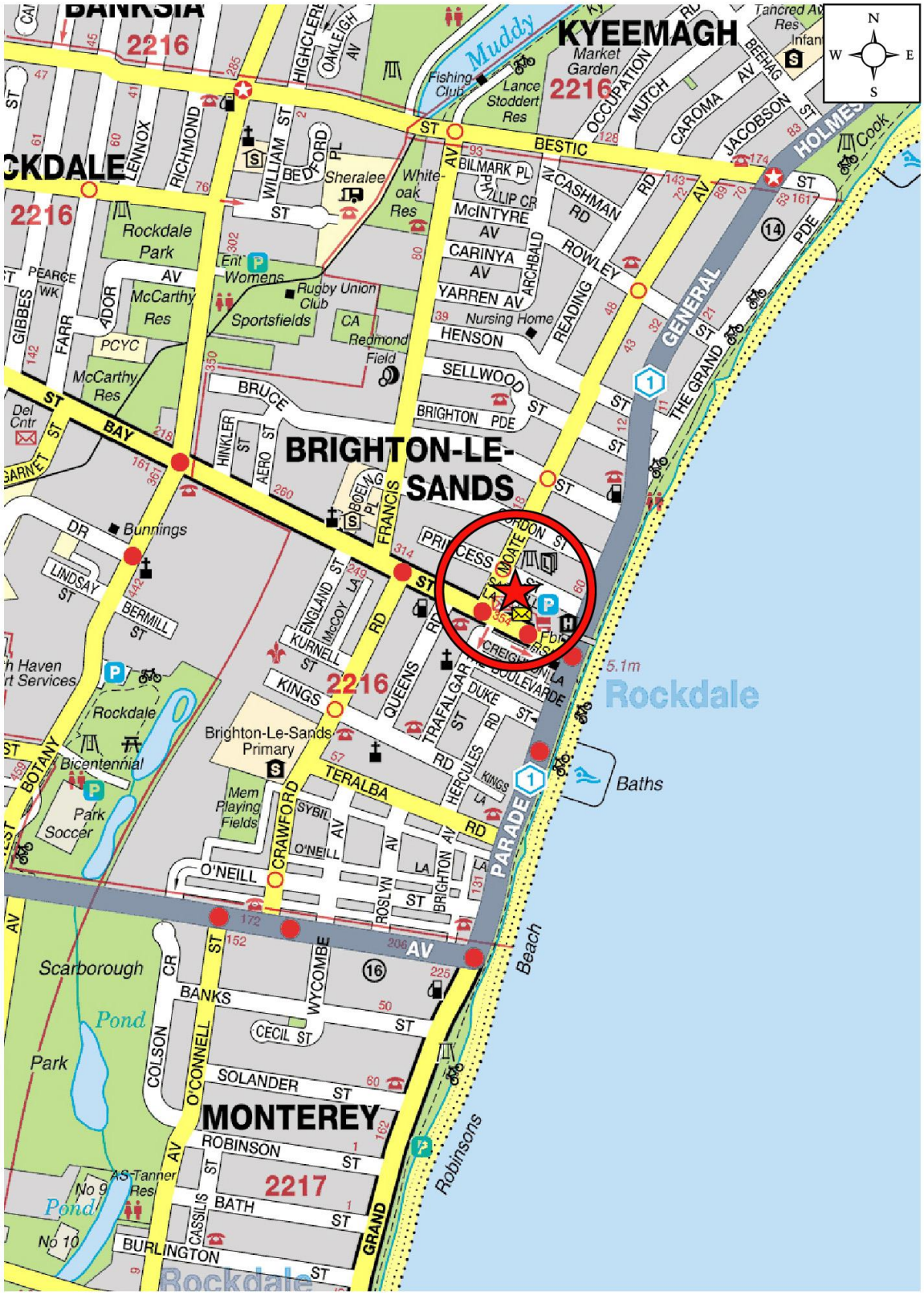
1. INTRODUCTION

This report has been prepared to accompany a planning proposal for a mixed-use residential/retail development proposal to be located at 16-20 princess Street and 22-28 Princess Street, Brighton Le Sands (Figures 1 and 2).

The planning proposal envisages the demolition of existing buildings on both sites to facilitate the construction of two new residential apartment developments, each with a retail/commercial component at street level. Car parking is proposed to be provided in new basement level car parking areas on both sites in accordance with Council's requirements.

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

- describes the site and provides details of the planning 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 planning proposal, and assigns that traffic generation to the road network serving the site
- assesses the traffic implications of the planning proposal in terms of road network capacity
- identifies the off-street car parking requirements for both sites.



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LOCATION
FIGURE 1


BRIGHTON PDE
BRUCE
GORDON
PRINCESS
BAY
RD
QUEENS
TRAFALGAR
KINGS RD
SELLWOOD
MOATE AVE
ST
GENERAL HOMES DR
THE GRAND PDE
SAYWELL LA
CREIGHTON
L'A
THE
BOULEVARDE
DUKE
HERCULES RD
KINGS LA
OVERPASS
N
W
E
S
Botany
Bay
Road Closure / Unformed Road
VARGA TRAFFIC PLANNING Pty Ltd
Traffic and Parking Consultants
SITE
FIGURE 2

2. PROPOSED DEVELOPMENT

Site

The subject sites are both located in Princess Street to the east of its intersection with Moate Avenue. Both sides have rear lane access to Saywell Lane.

The subject site at 16-20 Princess Street has street frontages approximately 23m in length to both Princess Street and to Saywell Lane. It occupies an area of approximately 940m^2, and is currently occupied by 3 separate dwelling houses, each with separate off-street car parking facilities and vehicular access driveways which are located at the rear of the site, in Saywell Lane.

The subject site at 22-28 Princess Street has street frontages approximately 30m in length to Princess Street and Saywell Lane, and a street frontage approximately 40m in Moate Avenue. It has a site area of 1,218.5m^2 and is currently occupied by a four-storey residential apartment building comprising 15×2 bedroom apartments. Off-street parking is provided in a number of single car garages located at street level which are accessed via Princess Street, Moate Avenue and Saywell Lane.

Planning Proposal

The planning proposal envisages the demolition of the existing buildings on both sides to facilitate the construction of two new residential apartment buildings with ground floor retail/commercial components to be provided at street level.

The planning proposal for 16-20 Princess Street envisaged the construction of a residential apartment building comprising 32×2 bedroom apartments above a retail/commercial component with a floor area of 150m^2.

The planning proposal at 22-28 Princess Street envisages the construction of a residential apartment building with 45 apartments (comprising 27×2 bedroom apartments and 18×1 bedroom apartments) with above a retail/commercial component with a floor area of 400m^2.

Off-street car parking for both developments is to be provided in basement car parking areas, with vehicular access to both developments to be provided via driveways located in Saywell Lane.

3. TRAFFIC ASSESSMENT

Road Hierarchy

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

The Grand Parade is classified by the RMS as a *State Road* and provides the key north-south road link in the area, linking Brighton-Le Sands to Dolls Point. It typically carries two traffic lanes in each direction in the vicinity of the site, with opposing traffic flows separated by a centre median island. Clearway restrictions apply during commuter peak periods.

Bay Street is classified by the RMS as a *State Road* and provides the key east-west road link in the area, linking Rockdale to Brighton-Le Sands. It typically carries two traffic lanes in each direction in the vicinity of the site with turning bays provided at key locations.

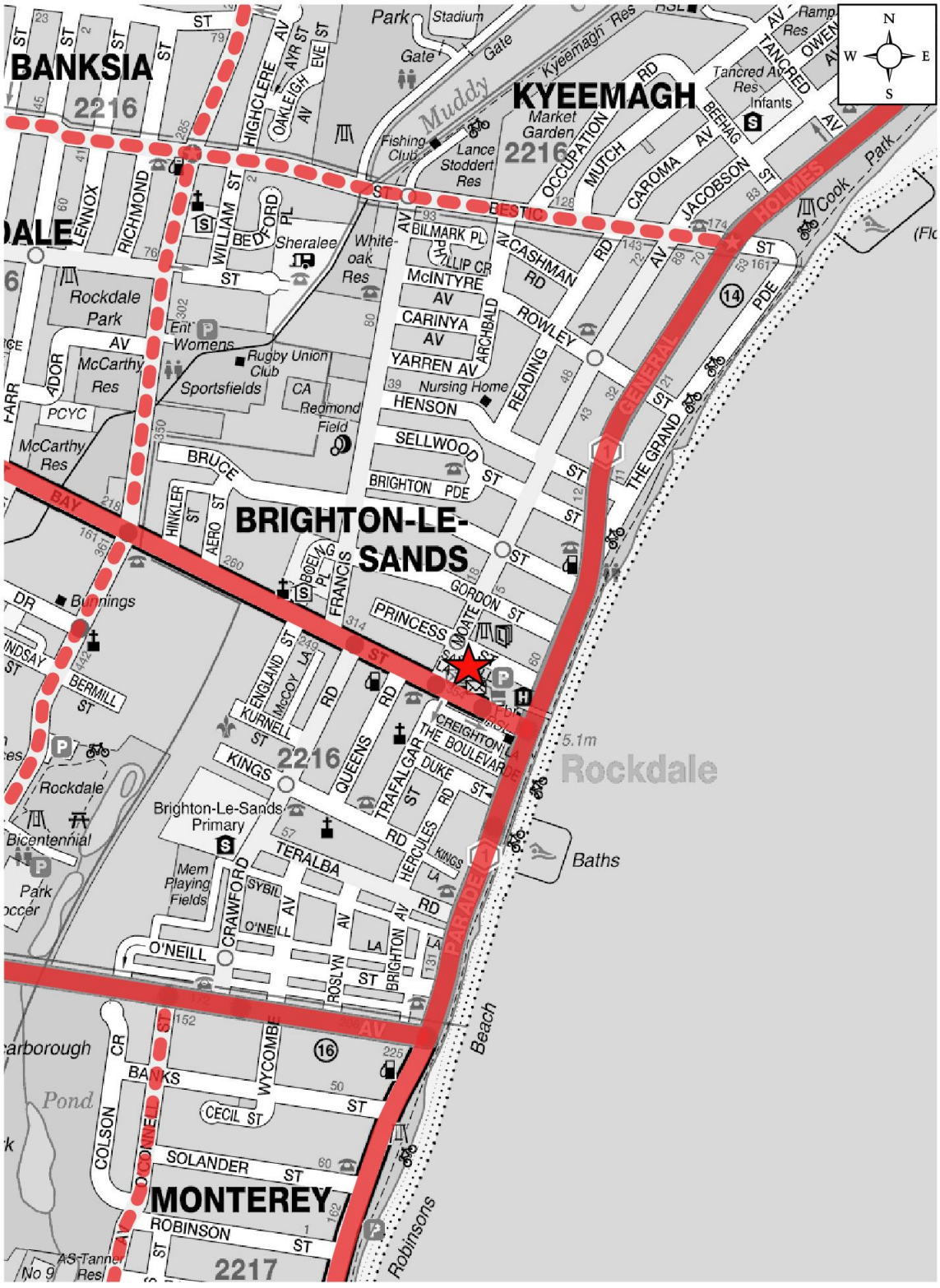
Princess Street and Moate Avenue are local, unclassified roads which are primarily used to provide vehicular and pedestrian access to frontage properties. Kerbside parking is generally permitted on both sides of the road subject to sign posted restrictions.

Saywell Lane is a local, unclassified road which is primarily used to provide vehicular and pedestrian access to frontage properties.

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 Grand Parade
- a 50 km/h SPEED LIMIT which applies to Gordon Street and all other local roads in the area
- a 40 km/h SPEED LIMIT which applies to Bay Street



Key:

State Road

Regional Road

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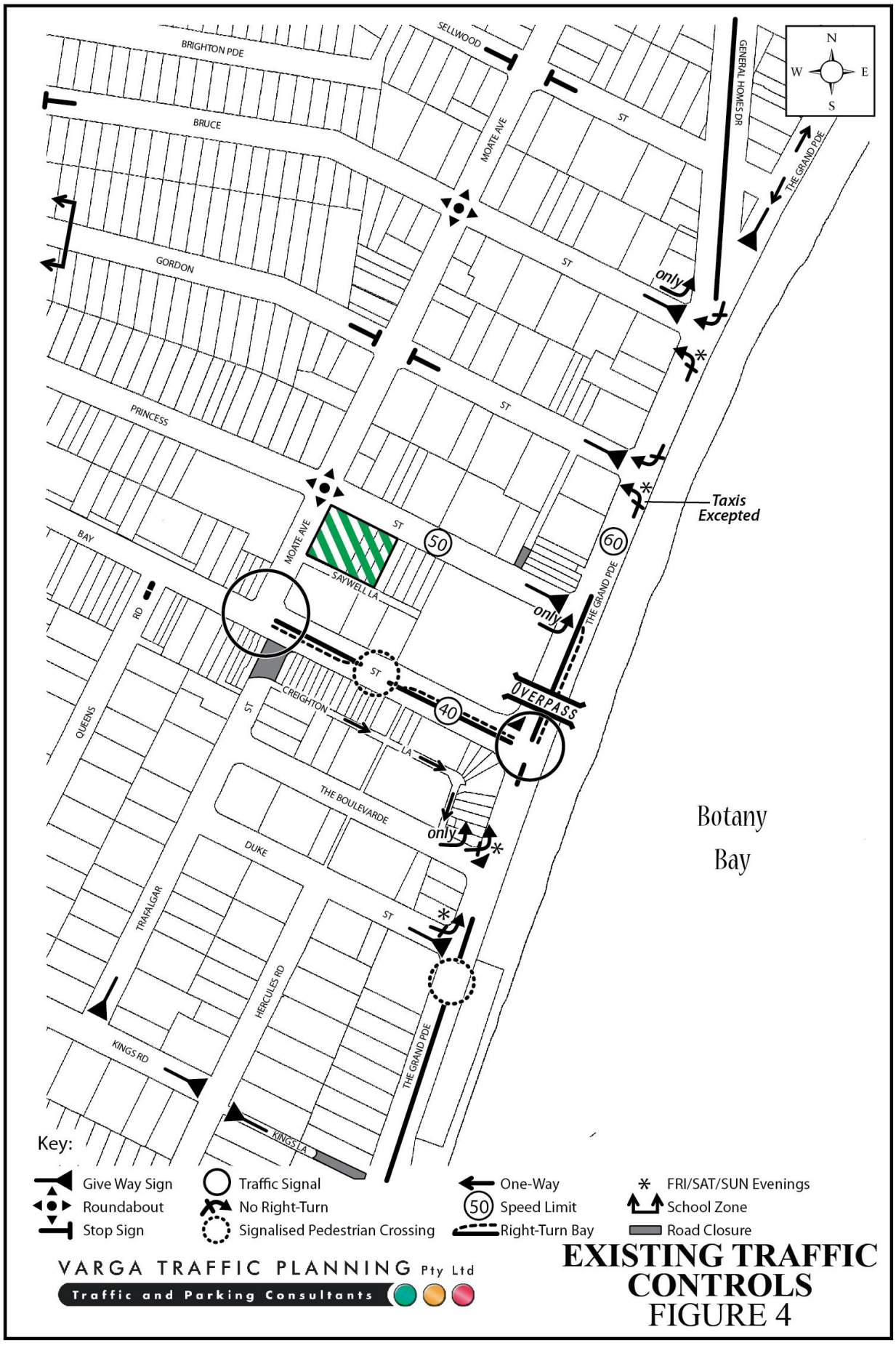
ROAD HIERARCHY

FIGURE 3


BRIGHTON PDE
SELLWOOD
BRUCE
MOATE AVE
GENERAL HOMES DR
THE GRAND PDE
GORDON
PRINCESS
Taxis Excepted
SAYWELL LA
OVERPASS
CREIGHTON
QUEENS
THE BOULEVARDE
DUKE
TRAFALGAR
HERCULES RD
KINGS RD
KINGS LA
Botany Bay
N
W
E
S
Key:
Give Way Sign
Roundabout
Stop Sign
Traffic Signal
No Right-Turn
Signalised Pedestrian Crossing
One-Way
Speed Limit
Right-Turn Bay
FRI/SAT/SUN Evenings
School Zone
Road Closure
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EXISTING TRAFFIC CONTROLS
FIGURE 4

- GIVE WAY restrictions in Princess Street, Gordon Street and also Bruce Street where they intersect with The Grande Parade

- LEFT-TURN ONLY in Princess Street where it intersects with The Grand Parade

- a ROUNDABOUT in Princess Street where it intersects with Moate Avenue

- TRAFFIC SIGNALS in Bay Street where it intersects with Moate Avenue and The Grand Parade.

Existing Traffic Conditions

An indication of the existing traffic conditions on the road network in the vicinity of the site is provided by reference to the RMS's Annual Average Daily Traffic data. The most recent data available from the count station nearest to the subject site is summarised below:

Roads & Maritime Services of NSW

Annual Average Daily Traffic Volumes

Station No.	Location	1996	1999	2002	2005
00.376	Bay St (W). Brighton Le Sands	71,371	72,589	70,555	69,869

A more detailed 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 in Moate Avenue where it intersects with Princess Street and in Moate Avenue where it intersects with Saywell Lane. The results of the traffic surveys are reproduced in full in Appendix A and reveal that:

- two-way traffic flows in Princess Street are typically in the order of 150 vehicles per hour (vph) during peak periods

- two-way traffic flows in Moate Avenue are typically in the order of 800 to 1,000 vehicles per hour (vph) during peak periods

- two-way traffic flows in Saywell Lane are typically in the order of 20 to 25 vehicles per hour (vph) during peak periods

Projected Traffic Generation

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

The RMS *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:

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

The RMS Guidelines also make the following observation in respect of high density residential flat buildings:

> **Definition**
> A *high density residential flat building* refers to a building containing 20 or more dwellings. This does not include aged or disabled persons housing. *High density residential flat buildings* are usually more than 5 levels, have basement level car parking and are located in close proximity to public transport services. The building may contain a component of commercial use.
>
> **Factors**
> The above rates include visitors, staff, service/delivery and on-street movements such as taxis and pick-up/set-down activities.

The RMS *Guidelines* do not however specify a traffic generation rate for small, local shops, referring only to major regional shopping centres incorporating supermarkets and department stores. For the purposes of this assessment therefore, the traffic generation rate nominated in RMS *Guidelines* of 2.0 peak hour vehicle trips per 100m^2 GFA has been adopted in respect of the retail/commercial components of the development proposal.

Application of the above traffic generation rates to the residential apartments and retail/commercial components as outlined in the planning proposal yields a traffic generation potential of approximately 33 vehicle trips per hour during commuter peak periods.

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.

Application of the traffic generation rates nominated in the RMS *Guidelines* to the existing 15 apartments and 3 dwelling houses on the two sites yields a traffic generation potential of 10 peak hour vehicle trips.

Accordingly, it is likely that the proposed development will result in an *increase* in the traffic generation potential the two sites of approximately 23 vph as set out below:

Projected Nett Increase in Peak Hour Traffic Generation Potential
as a consequence of the development proposal

Projected Future Traffic Generation Potential:	33.3 vehicle trips
Less Existing Traffic Generation Potential:	-10.0 vehicle trips
NETT INCREASE IN TRAFFIC GENERATION POTENTIAL:	**23.3 vehicle trips**

That projected increase in traffic activity as a consequence of the development proposal is minimal and will clearly not have any unacceptable traffic implications in terms of road network capacity, as in demonstrated in the following section of this report.

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 SIDRA program which is widely used by the RMS and many LGA's for this purpose. Criteria for evaluating the results of SIDRA analysis are reproduced in the following pages.

The results of the SIDRA analysis of the Princess Street/Moate Avenue intersection and Moate Avenue/Saywell Lane intersection are summarised in Table 3.1 and Table 3.2 respectively, revealing that:

- the Princess Street/Moate Avenue intersection currently operates at *Level of Service "A"* under the existing traffic demands with total average vehicle delays in the order of 5 second/vehicle

- under the projected future traffic demands expected to be generated by the development proposal, the Princess Street/Moate Avenue intersection will continue to operate at *Level of Service "A",* with increases in average vehicle delays of ***less than*** 1 second/vehicle.

- the Moate Avenue/Saywell Lane intersection currently operates at *Level of Service "A"* under the existing traffic demands with total average vehicle delays in the order 0f 1.2 seconds/vehicle

- under the projected future traffic demands expected to be generated by the development proposal, the Moate Avenue/Saywell Lane intersection will continue to operate at *Level of Service "A",* 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 that no road improvements or intersection upgrades will be required as a consequence of the planning proposal.

TABLE 3.1 - RESULTS OF SIDRA ANALYSIS OF PRINCESS STREET/MOATE AVENUE

Key Indicators		Existing Traffic Demand		Projected Development Traffic Demand	
		AM	**PM**	**AM**	**PM**
Level of Service		A	A	A	A
Degree of Saturation		0.538	0.348	0.545	0.356
Average Vehicle Delay (secs/veh)					
Moate Avenue (north)	L	4.3	4.3	4.3	4.3
	T	4.1	4.1	4.1	4.1
	R	7.2	7.2	7.2	7.2
Moate Avenue (south)	L	4.0	4.3	4.0	4.3
	T	3.9	4.2	3.9	4.2
	R	6.9	7.2	6.9	7.2
Princess Street (east)	L	4.9	6.5	5.0	6.6
	T	4.8	6.3	4.8	6.4
	R	7.9	9.4	7.9	9.5
Princess Street (west)	L	9.2	5.1	9.3	5.1
	T	9.0	4.9	9.2	4.9
	R	12.1	8.0	12.2	8.0
TOTAL AVERAGE VEHICLE DELAY		**4.5**	**4.9**	**4.5**	**4.9**

PRI_MOAX PRI_MOAP

TABLE 3.2 - RESULTS OF SIDRA ANALYSIS OF MOATE AVENUE/SAYWELL LANE

Key Indicators		Existing Traffic Demand		Projected Development Traffic Demand	
		AM	**PM**	**AM**	**PM**
Level of Service		A	A	A	A
Degree of Saturation		0.408	0.270	0.412	0.276
Average Vehicle Delay (secs/veh)					
Moate Avenue (north)	L	3.4	3.4	3.4	3.4
	T	0.0	0.0	0.0	0.0
Moate Avenue (south)	T	1.4	2.5	1.5	2.6
	R	4.9	6.0	5.0	6.2
Saywell Lane (east)	L	8.7	5.9	8.1	6.3
	R	8.8	6.0	8.3	6.4
TOTAL AVERAGE VEHICLE DELAY		**1.2**	**1.0**	**1.4**	**1.3**
		MOA_SAYX		MOA_SAYQ	

Criteria for Interpreting Results of Sidra 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 AVDs 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 PARKING restrictions along both sides Saywell Lane including the site frontage
- generally UNRESTRICTED kerbside parking throughout the local area including the Princess Street site frontage
- BUS ZONES located at regular intervals along The Grand Parade, Moate Avenue and Bay Street.

Off-Street Parking Provisions

The off-street parking requirements applicable to the development proposal are specified in Council's *Development Control Plan (2011), Part 4.6, Car Parking, Access and Movement* document in the following terms:

Residential Flat Building	
1 & 2 bedroom apartments:	1 space per apartment
Visitors:	1 space per 5 apartments
Retail & Commercial	
Shops, retail premises, office premises:	1 space per $40m^2$

Application of the above parking requirements to the residential and retail/commercial components of the planning proposal yields an off-street parking requirement of 42 spaces and 64 spaces for the two sites respectively, as set out in the table below:


N
W
E
S
AVE
P15mins
MOATE
PRINCESS ST
BZ / 1/2P
MZ
1/4P
SAYWELL LA
1P
NP/NS
BAY ST
1/2P
Police Vehicles Excepted
Key:
No Stopping
No Parking
Restricted Parking
BZ Bus Zone
MZ Mail Zone
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EXISTING PARKING RESTRICTIONS
FIGURE 5

Off-Street Parking Requirements

	16-20 Princess Street	**22-28 Princess Street**
Residents:	32.0 spaces	45.0 spaces
Residential Visitors:	6.4 spaces	9.0 spaces
Retail/Commercial Component:	3.8 spaces	10.0 spaces
TOTAL:	**42.2 spaces**	**64.0 spaces**

It is anticipated that the off-street parking provisions to be provided on both sites will be consistent with Council's Parking Code requirements.

In addition, the geometric design layout of the proposed car parking facilities will need to be designed to comply with the relevant requirements specified in the Standards Australia publication *Parking Facilities Part 1 - Off-Street Car Parking AS2890.1* in respect of parking bay dimensions, ramp gradients and aisle widths.

APPENDIX A

TRAFFIC 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 : 5128 BRIGHTON LE SANDS Laneways

Day/Date : Friday 2nd May 2014

Lights

	NORTH		EAST		SOUTH		
	Moate Ave		*Laneway*		*Moate Ave*		
Time Per	T	L	R	L	R	T	TOT
0700 - 0715	37	0	3	6	1	118	**165**
0715 - 0730	41	1	1	1	2	152	**198**
0730 - 0745	41	1	4	0	1	193	**240**
0745 - 0800	62	0	3	2	3	211	**281**
0800 - 0815	71	0	1	2	0	232	**306**
0815 - 0830	74	0	2	1	2	138	**217**
0830 - 0845	95	1	5	3	6	104	**214**
0845 - 0900	88	4	1	2	1	101	**197**
Per End	**509**	**7**	**20**	**17**	**16**	**1249**	**1818**

Heavies

	NORTH		EAST		SOUTH		
	Moate Ave		*Laneway*		*Moate Ave*		
Time Per	T	L	R	L	R	T	TOT
0700 - 0715	0	0	0	0	0	1	**1**
0715 - 0730	0	0	0	0	0	2	**2**
0730 - 0745	0	0	0	0	0	2	**2**
0745 - 0800	0	0	0	0	0	2	**2**
0800 - 0815	0	0	0	0	0	3	**3**
0815 - 0830	0	0	0	0	0	1	**1**
0830 - 0845	2	0	0	0	0	1	**3**
0845 - 0900	0	0	0	0	0	4	**4**
Per End	**2**	**0**	**0**	**0**	**0**	**16**	**18**

Combined

	NORTH		EAST		SOUTH		
	Moate Ave		*Laneway*		*Moate Ave*		
Time Per	T	L	R	L	R	T	TOT
0700 - 0715	37	0	3	6	1	119	**166**
0715 - 0730	41	1	1	1	2	154	**200**
0730 - 0745	41	1	4	0	1	195	**242**
0745 - 0800	62	0	3	2	3	213	**283**
0800 - 0815	71	0	1	2	0	235	**309**
0815 - 0830	74	0	2	1	2	139	**218**
0830 - 0845	97	1	5	3	6	105	**217**
0845 - 0900	88	4	1	2	1	105	**201**
Per End	**511**	**7**	**20**	**17**	**16**	**1265**	**1836**

Lights

	NORTH		EAST		SOUTH		
	Moate Ave		*Laneway*		*Moate Ave*		
Peak Per	T	L	R	L	R	T	TOT
0700 - 0800	181	2	11	9	7	674	**884**
0715 - 0815	215	2	9	5	6	788	**1025**
0730 - 0830	248	1	10	5	6	774	**1044**
0745 - 0845	302	1	11	8	11	685	**1018**
0800 - 0900	328	5	9	8	9	575	**934**
PEAK HR	**248**	**1**	**10**	**5**	**6**	**774**	**1044**

Heavies

	NORTH		EAST		SOUTH		
	Moate Ave		*Laneway*		*Moate Ave*		
Peak Per	T	L	R	L	R	T	TOT
0700 - 0800	0	0	0	0	0	7	**7**
0715 - 0815	0	0	0	0	0	9	**9**
0730 - 0830	0	0	0	0	0	8	**8**
0745 - 0845	2	0	0	0	0	7	**9**
0800 - 0900	2	0	0	0	0	9	**11**
PEAK HR	**0**	**0**	**0**	**0**	**0**	**8**	**8**

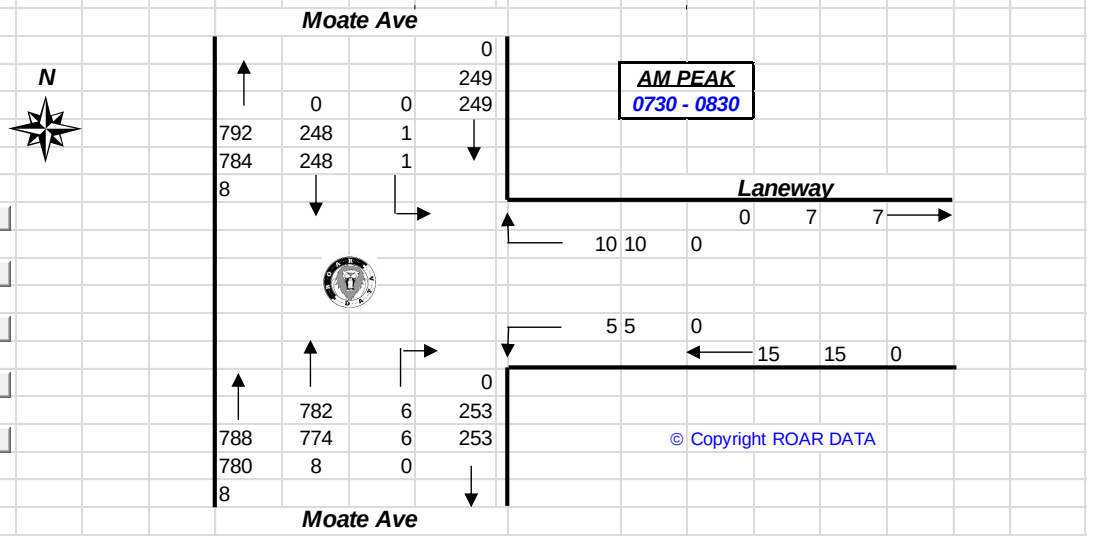
Combined

	NORTH		EAST		SOUTH		
	Moate Ave		*Laneway*		*Moate Ave*		
Peak Per	T	L	R	L	R	T	TOT
0700 - 0800	181	2	11	9	7	681	**891**
0715 - 0815	215	2	9	5	6	797	**1034**
0730 - 0830	248	1	10	5	6	782	**1052**
0745 - 0845	304	1	11	8	11	692	**1027**
0800 - 0900	330	5	9	8	9	584	**945**
PEAK HR	**248**	**1**	**10**	**5**	**6**	**782**	**1052**

Peds

	NORTH	EAST	SOUTH	
Time Per	Moate Ave	Laneway	Moate Ave	TOT
0700 - 0715	1	5	0	**6**
0715 - 0730	3	7	5	**15**
0730 - 0745	5	12	1	**18**
0745 - 0800	6	15	3	**24**
0800 - 0815	2	20	6	**28**
0815 - 0830	10	25	5	**40**
0830 - 0845	8	37	5	**50**
0845 - 0900	11	16	11	**38**
Per End	**46**	**137**		**219**

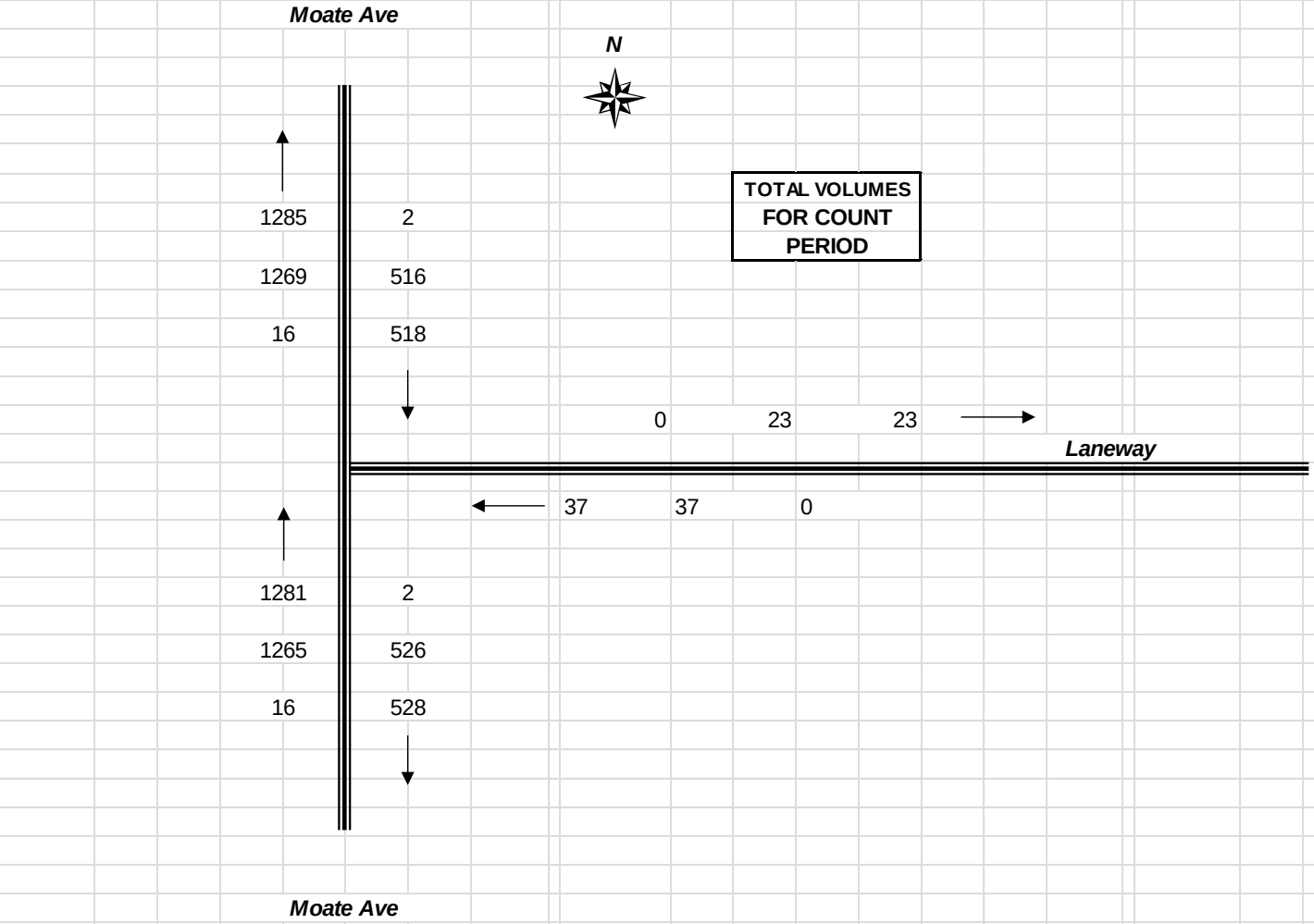
	NORTH	EAST	SOUTH	
Peak Per	Moate Ave	Laneway	Moate Ave	TOT
0700 - 0800	15	39	9	**63**
0715 - 0815	16	54	15	**85**
0730 - 0830	23	72	15	**110**
0745 - 0845	26	97	19	**142**
0800 - 0900	31	98	27	**156**
PEAK HR	**23**	**72**	**15**	**110**



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

Client	: Varga Traffic Planning
Job No/Name	: 5128 BRIGHTON LE SANDS Laneways
Day/Date	: Friday 2nd May 2014

AM



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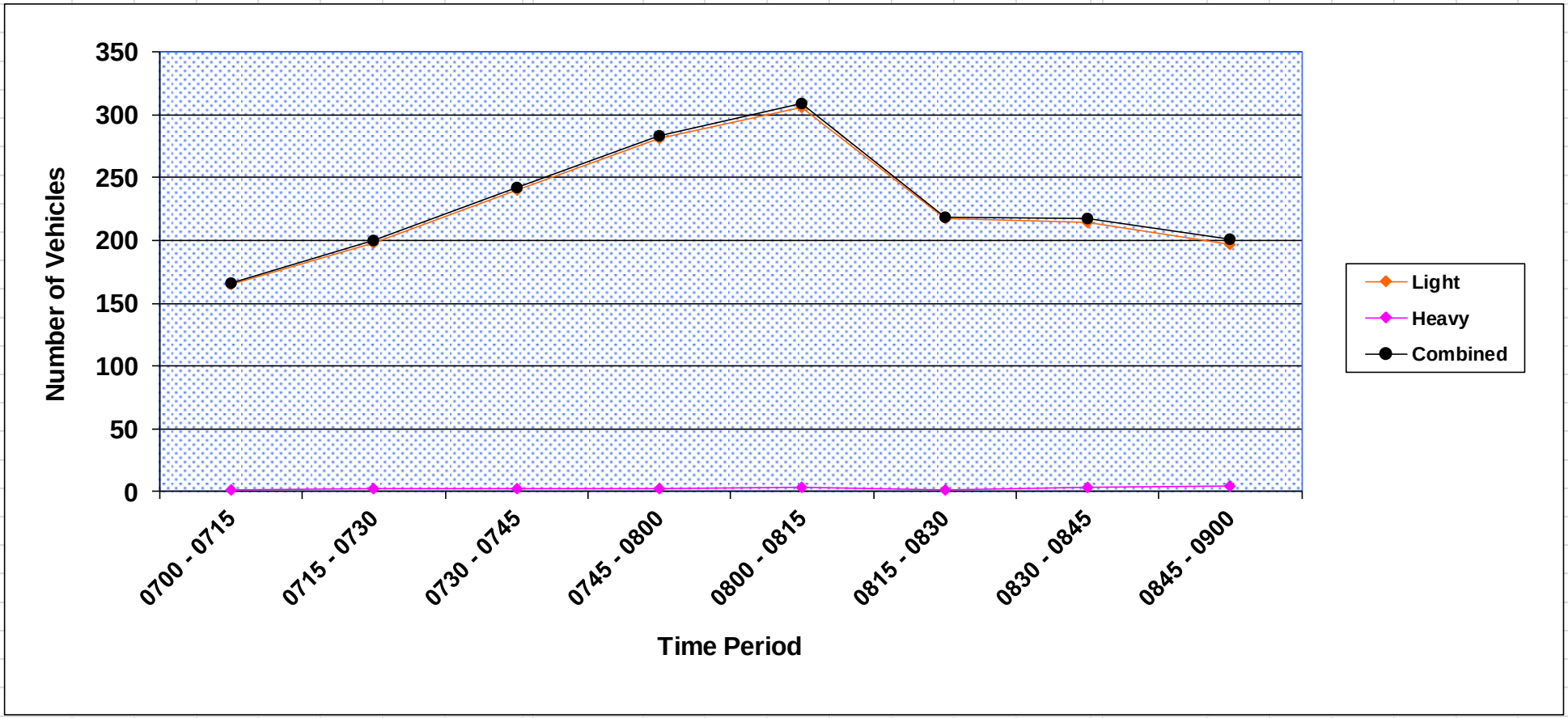
Day/Date	: Friday 2nd May 2014

AM

Moate Ave & Laneway



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Lights	NORTH		EAST		SOUTH		
	Moate Ave		*Laneway*		*Moate Ave*		
Time Per	T	L	R	L	R	T	TOT
1630 - 1645	120	3	0	5	1	68	**197**
1645 - 1700	126	3	2	2	1	63	**197**
1700 - 1715	112	2	0	0	3	65	**182**
1715 - 1730	158	2	1	3	2	77	**243**
1730 - 1745	107	0	1	3	1	59	**171**
1745 - 1800	130	2	3	5	1	67	**208**
1800 - 1815	104	2	2	3	1	65	**177**
1815 - 1830	102	4	2	0	2	81	**191**
Per End	**959**	**18**	**11**	**21**	**12**	**545**	**1566**

Heavies	NORTH		EAST		SOUTH		
	Moate Ave		*Laneway*		*Moate Ave*		
Time Per	T	L	R	L	R	T	TOT
1630 - 1645	0	0	0	0	0	1	**1**
1645 - 1700	0	0	0	0	0	2	**2**
1700 - 1715	0	0	0	0	0	1	**1**
1715 - 1730	0	0	0	0	0	2	**2**
1730 - 1745	0	0	0	0	0	2	**2**
1745 - 1800	0	0	0	0	0	1	**1**
1800 - 1815	0	0	0	0	0	1	**1**
1815 - 1830	0	0	0	0	0	1	**1**
Per End	**0**	**0**	**0**	**0**	**0**	**11**	**11**

Combined	NORTH		EAST		SOUTH		
	Moate Ave		*Laneway*		*Moate Ave*		
Time Per	T	L	R	L	R	T	TOT
1630 - 1645	120	3	0	5	1	69	**198**
1645 - 1700	126	3	2	2	1	65	**199**
1700 - 1715	112	2	0	0	3	66	**183**
1715 - 1730	158	2	1	3	2	79	**245**
1730 - 1745	107	0	1	3	1	61	**173**
1745 - 1800	130	2	3	5	1	68	**209**
1800 - 1815	104	2	2	3	1	66	**178**
1815 - 1830	102	4	2	0	2	82	**192**
Per End	**959**	**18**	**11**	**21**	**12**	**556**	**1577**

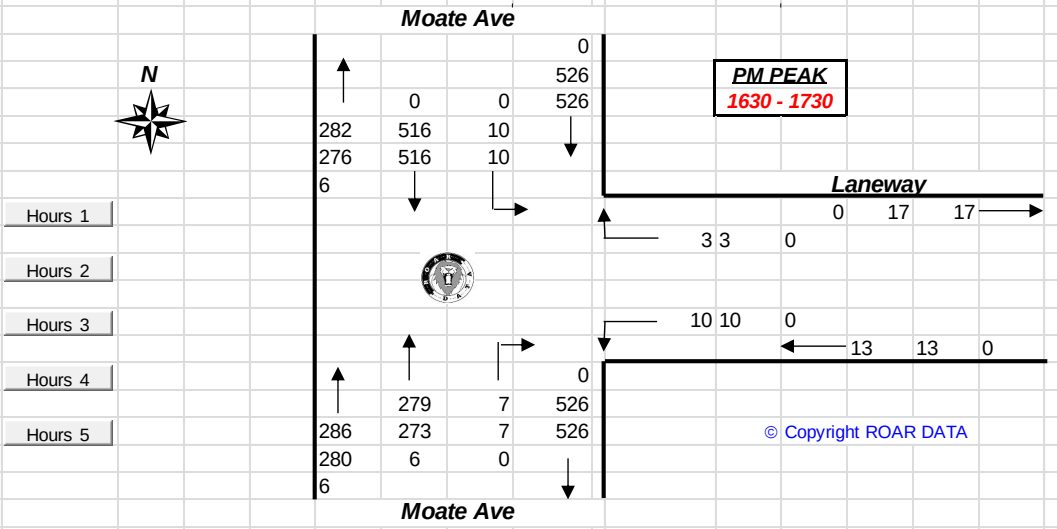
Lights	NORTH		EAST		SOUTH		
	Moate Ave		*Laneway*		*Moate Ave*		
Peak Per	T	L	R	L	R	T	TOT
1630 - 1730	516	10	3	10	7	273	**819**
1645 - 1745	503	7	4	8	7	264	**793**
1700 - 1800	507	6	5	11	7	268	**804**
1715 - 1815	499	6	7	14	5	268	**799**
1730 - 1830	443	8	8	11	5	272	**747**
PEAK HR	**516**	**10**	**3**	**10**	**7**	**273**	**819**

Heavies	NORTH		EAST		SOUTH		
	Moate Ave		*Laneway*		*Moate Ave*		
Peak Per	T	L	R	L	R	T	TOT
1630 - 1730	0	0	0	0	0	6	**6**
1645 - 1745	0	0	0	0	0	7	**7**
1700 - 1800	0	0	0	0	0	6	**6**
1715 - 1815	0	0	0	0	0	6	**6**
1730 - 1830	0	0	0	0	0	5	**5**
PEAK HR	**0**	**0**	**0**	**0**	**0**	**6**	**6**

Combined	NORTH		EAST		SOUTH		
	Moate Ave		*Laneway*		*Moate Ave*		
Peak Per	T	L	R	L	R	T	TOT
1630 - 1730	516	10	3	10	7	279	**825**
1645 - 1745	503	7	4	8	7	271	**800**
1700 - 1800	507	6	5	11	7	274	**810**
1715 - 1815	499	6	7	14	5	274	**805**
1730 - 1830	443	8	8	11	5	277	**752**
PEAK HR	**516**	**10**	**3**	**10**	**7**	**279**	**825**

Peds	NORTH	EAST	SOUTH	
Time Per	Moate Ave	Laneway	Moate Ave	TOT
1630 - 1645	18	49	21	**88**
1645 - 1700	14	42	22	**78**
1700 - 1715	11	29	12	**52**
1715 - 1730	7	31	14	**52**
1730 - 1745	25	35	6	**66**
1745 - 1800	23	52	18	**93**
1800 - 1815	17	39	8	**64**
1815 - 1830	20	38	6	**64**
Per End	**135**	**315**	**107**	**557**

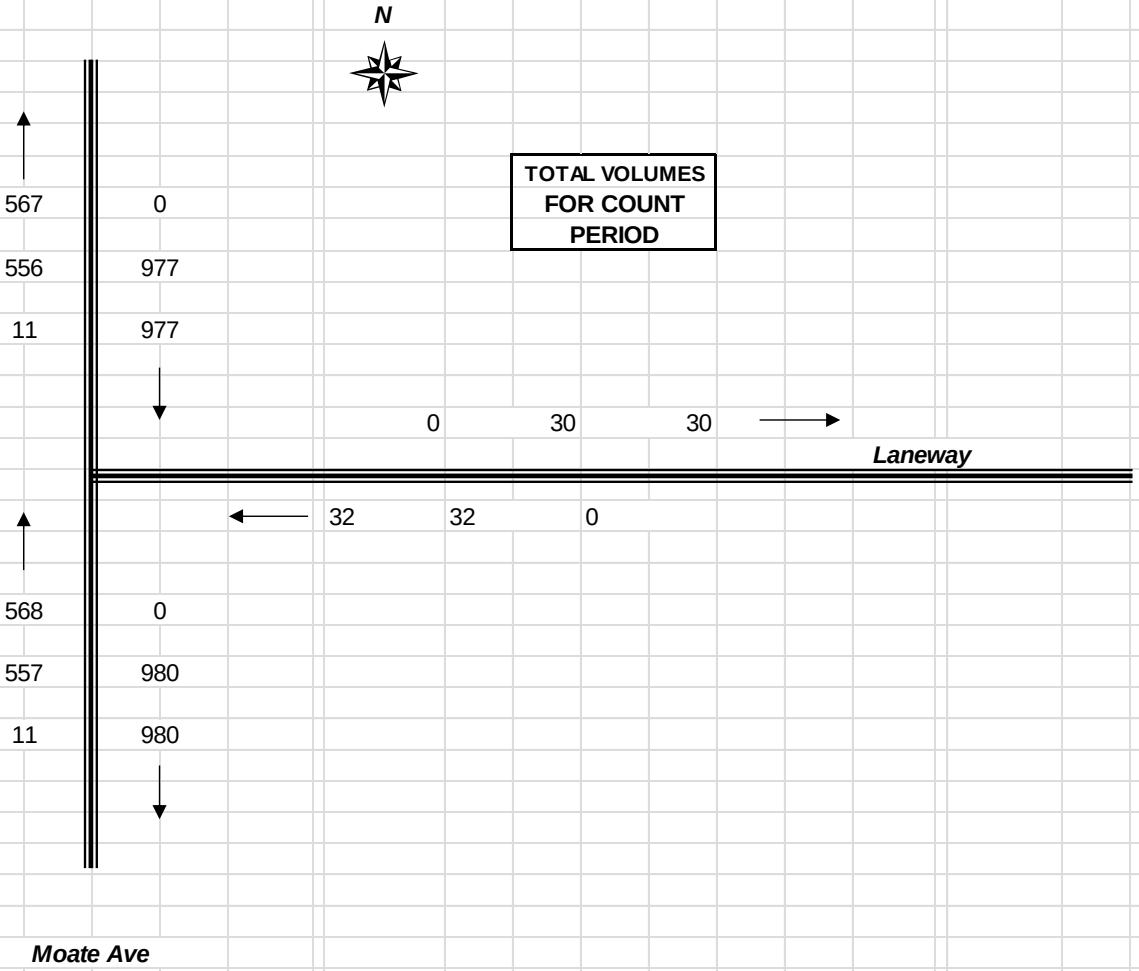
	NORTH	EAST	SOUTH	
Peak Per	Moate Ave	Laneway	Moate Ave	TOT
1630 - 1730	50	151	69	**270**
1645 - 1745	57	137	54	**248**
1700 - 1800	66	147	50	**263**
1715 - 1815	72	157	46	**275**
1730 - 1830	85	164	38	**287**
PEAK HR	**50**	**151**	**69**	**270**



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

Client	:	Varga Traffic Planning
Job No/Name	:	5128 BRIGHTON LE SANDS Laneways
Day/Date	:	Friday 2nd May 2014

PM

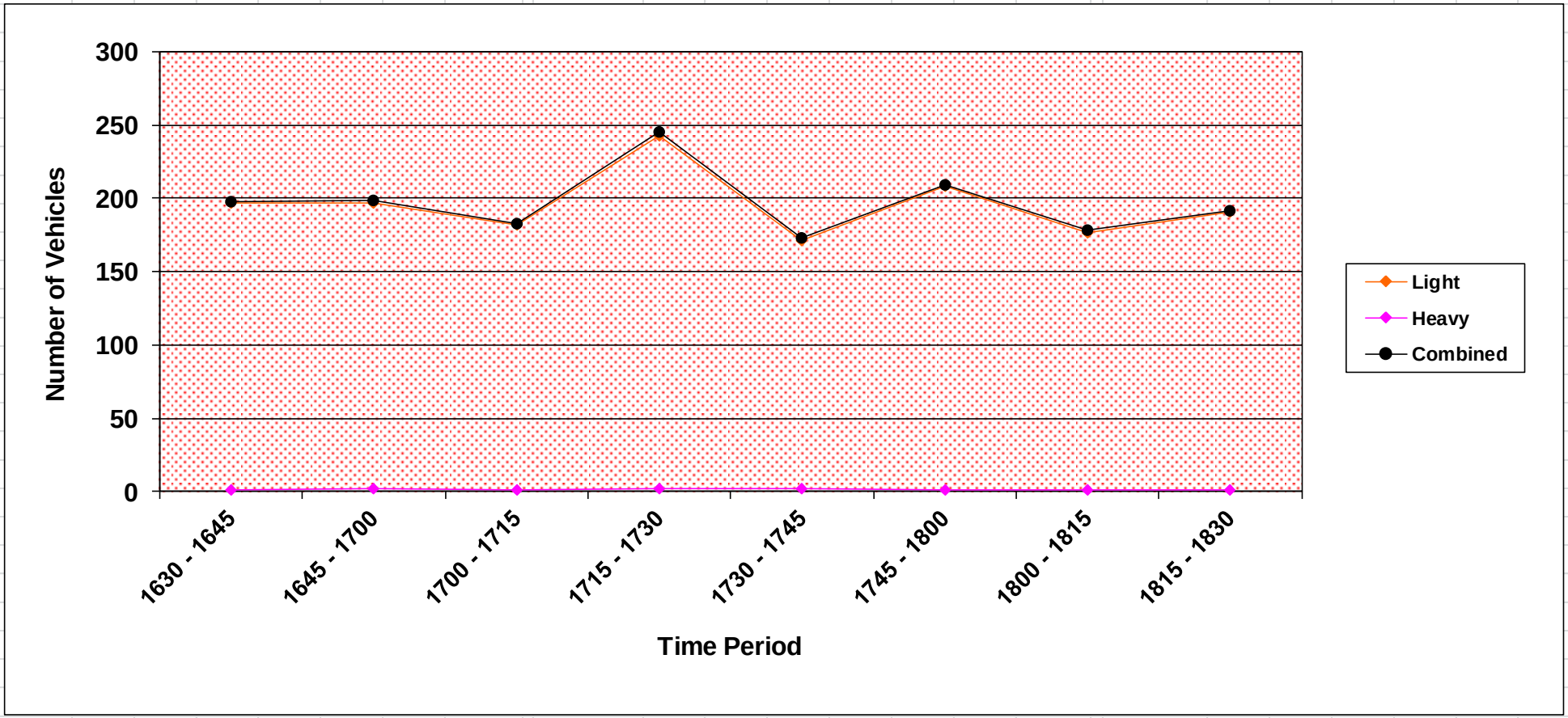


R.O.A.R DATA
Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

Client	: Varga Traffic Planning
Job No/Name	: 5128 BRIGHTON LE SANDS Laneways
Day/Date	: Friday 2nd May 2014

PM

Moate Ave & Laneway



R.O.A.R. DATA
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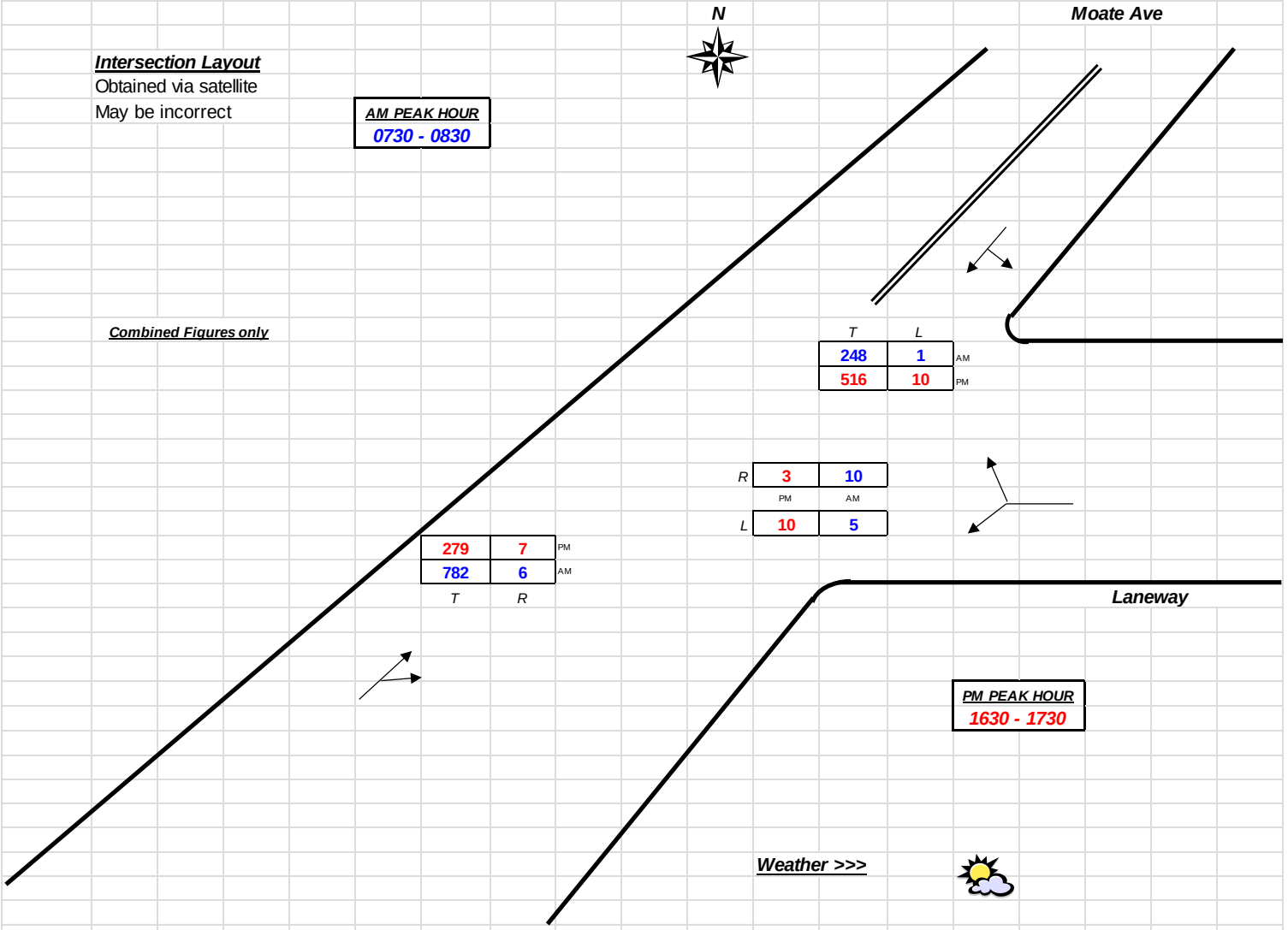
Ph.88196847, Fax 88196849, Mob.0418-239019

Client	Varga Traffic Planning
Job No/Name	5128 BRIGHTON LE SANDS Laneways
Day/Date	Friday 2nd May 2014

Intersection Layout
Obtained via satellite
May be incorrect

AM PEAK HOUR
0730 - 0830



Combined Figures only

	T	L	
AM	248	1	AM
PM	516	10	PM

R	3	10	
	PM	AM	
L	10	5	

	T	R	
PM	279	7	PM
AM	782	6	AM

PM PEAK HOUR
1630 - 1730

Weather >>>

R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob. 0418 239019

Client : Varga Traffic Planning
Job No/Name : 5185 BRIGHTON LE SANDS Princess St
Day/Date : Wednesday 28th May 2014

Lights

	NORTH			WEST			SOUTH			EAST			
	Moate Ave			*Princess St*			*Moate Ave*			*Princess St*			
Time Per	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
0700 - 0715	3	26	5	3	0	2	5	153	11	9	1	6	**224**
0715 - 0730	3	41	1	5	1	2	2	149	14	7	3	2	**230**
0730 - 0745	4	31	1	3	1	7	9	194	12	6	0	4	**272**
0745 - 0800	2	44	1	4	2	7	10	196	14	8	0	4	**292**
0800 - 0815	7	47	3	4	1	7	14	180	12	7	2	2	**286**
0815 - 0830	3	50	6	2	1	8	19	145	13	8	0	1	**256**
0830 - 0845	5	66	4	2	1	8	18	97	18	9	1	7	**236**
0845 - 0900	7	62	10	6	1	12	22	68	11	5	0	4	**208**
Period End	**34**	**367**	**31**	**29**	**8**	**53**	**99**	**1182**	**105**	**59**	**7**	**30**	**2004**

Heavies

	NORTH			WEST			SOUTH			EAST			
	Moate Ave			*Princess St*			*Moate Ave*			*Princess St*			
Time Per	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
0700 - 0715	0	0	0	0	0	0	0	0	1	0	0	0	**1**
0715 - 0730	0	0	0	0	0	0	0	5	3	0	0	0	**8**
0730 - 0745	0	0	0	0	0	0	1	2	0	0	0	1	**4**
0745 - 0800	0	0	0	0	0	0	0	2	0	0	0	0	**2**
0800 - 0815	0	0	0	0	0	0	0	2	0	0	0	0	**2**
0815 - 0830	0	0	0	0	0	0	0	1	0	0	0	0	**1**
0830 - 0845	0	1	0	0	0	0	0	0	0	0	0	0	**1**
0845 - 0900	1	0	0	0	0	0	0	1	0	0	0	0	**2**
Period End	**1**	**1**	**0**	**0**	**0**	**0**	**1**	**13**	**4**	**0**	**0**	**1**	**21**

Lights

	NORTH			WEST			SOUTH			EAST			
	Moate Ave			*Princess St*			*Moate Ave*			*Princess St*			
Peak Time	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
0700 - 0800	12	142	8	15	4	18	26	692	51	30	4	16	**1018**
0715 - 0815	16	163	6	16	5	23	35	719	52	28	5	12	**1080**
0730 - 0830	16	172	11	13	5	29	52	715	51	29	2	11	**1106**
0745 - 0845	17	207	14	12	5	30	61	618	57	32	3	14	**1070**
0800 - 0900	22	225	23	14	4	35	73	490	54	29	3	14	**986**
PEAK HOUR	**16**	**172**	**11**	**13**	**5**	**29**	**52**	**715**	**51**	**29**	**2**	**11**	**1106**

Heavies

	NORTH			WEST			SOUTH			EAST			
	Moate Ave			*Princess St*			*Moate Ave*			*Princess St*			
Peak Time	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
0700 - 0800	0	0	0	0	0	0	1	9	4	0	0	1	**15**
0715 - 0815	0	0	0	0	0	0	1	11	3	0	0	1	**16**
0730 - 0830	0	0	0	0	0	0	1	7	0	0	0	1	**9**
0745 - 0845	0	1	0	0	0	0	0	5	0	0	0	0	**6**
0800 - 0900	1	1	0	0	0	0	0	4	0	0	0	0	**6**
PEAK HOUR	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**7**	**0**	**0**	**0**	**1**	**9**

Combined

	NORTH			WEST			SOUTH			EAST			
	Moate Ave			*Princess St*			*Moate Ave*			*Princess St*			
Time Per	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
0700 - 0715	3	26	5	3	0	2	5	153	12	9	1	6	**225**
0715 - 0730	3	41	1	5	1	2	2	154	17	7	3	2	**238**
0730 - 0745	4	31	1	3	1	7	10	196	12	6	0	5	**276**
0745 - 0800	2	44	1	4	2	7	10	198	14	8	0	4	**294**
0800 - 0815	7	47	3	4	1	7	14	182	12	7	2	2	**288**
0815 - 0830	3	50	6	2	1	8	19	146	13	8	0	1	**257**
0830 - 0845	5	67	4	2	1	8	18	97	18	9	1	7	**237**
0845 - 0900	8	62	10	6	1	12	22	69	11	5	0	4	**210**
Period End	**35**	**368**	**31**	**29**	**8**	**53**	**100**	**1195**	**109**	**59**	**7**	**31**	**2025**

Peds

	NORTH	WEST	SOUTH	EAST	
	Moate Ave	*Princess St*	*Moate Ave*	*Princess St*	
Time Per	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**TOT**
0700 - 0715	0	2	4	5	**11**
0715 - 0730	0	12	1	9	**22**
0730 - 0745	0	5	5	4	**14**
0745 - 0800	3	9	9	3	**24**
0800 - 0815	1	7	6	7	**21**
0815 - 0830	3	14	4	10	**31**
0830 - 0845	3	18	3	9	**33**
0845 - 0900	1	15	9	13	**38**
Period End	**11**	**82**	**41**	**60**	**194**

Combined

	NORTH			WEST			SOUTH			EAST			
	Moate Ave			*Princess St*			*Moate Ave*			*Princess St*			
Peak Time	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
0700 - 0800	12	142	8	15	4	18	27	701	55	30	4	17	**1033**
0715 - 0815	16	163	6	16	5	23	36	730	55	28	5	13	**1096**
0730 - 0830	16	172	11	13	5	29	53	722	51	29	2	12	**1115**
0745 - 0845	17	208	14	12	5	30	61	623	57	32	3	14	**1076**
0800 - 0900	23	226	23	14	4	35	73	494	54	29	3	14	**992**
PEAK HOUR	**16**	**172**	**11**	**13**	**5**	**29**	**53**	**722**	**51**	**29**	**2**	**12**	**1115**

Peds

	NORTH	WEST	SOUTH	EAST	
	Moate Ave	*Princess St*	*Moate Ave*	*Princess St*	
Peak Per	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**TOT**
0700 - 0800	3	28	19	21	**71**
0715 - 0815	4	33	21	23	**81**
0730 - 0830	7	35	24	24	**90**
0745 - 0845	10	48	22	29	**109**
0800 - 0900	8	54	22	39	**123**
PEAK HR	**7**	**35**	**24**	**24**	**90**

R.O.A.R DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob. 0418 239019

Client : Varga Traffic Planning

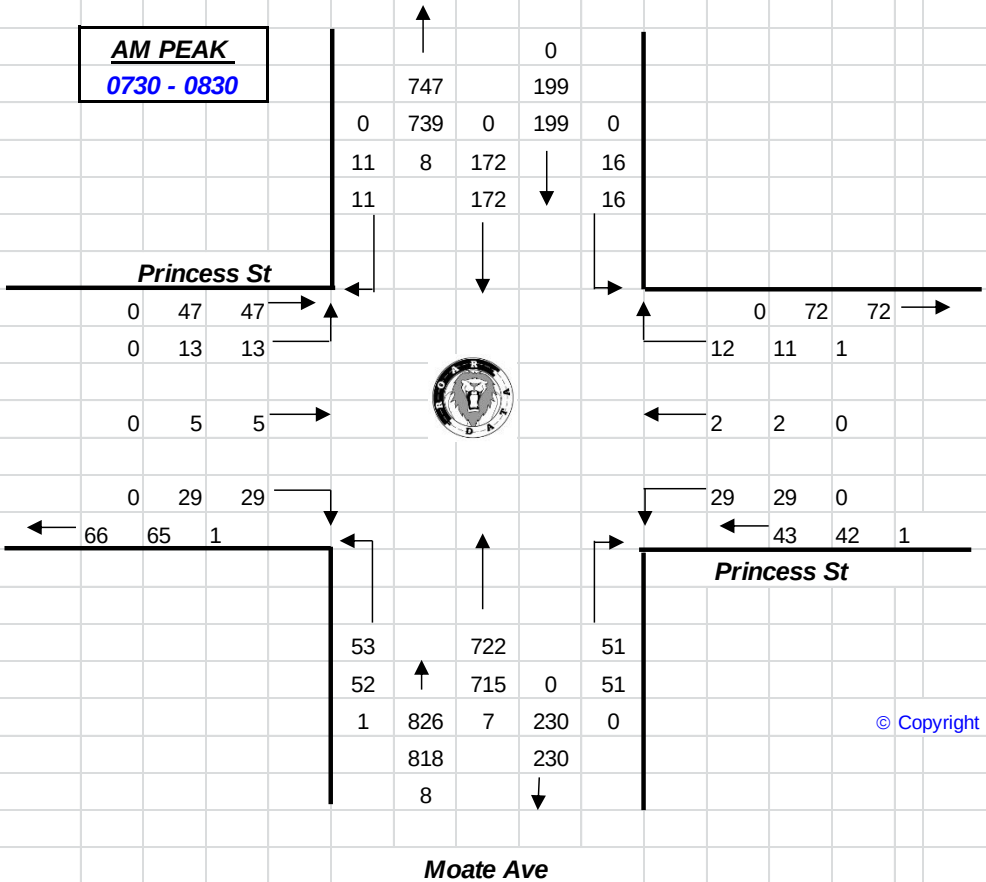
Job No/Name : 5185 BRIGHTON LE SANDS Princess St

Day/Date : Wednesday 28th May 2014

Hours 1 | Hours 2 | Hours 3 | Hours 4 | Hours 5

AM PEAK

0730 - 0830



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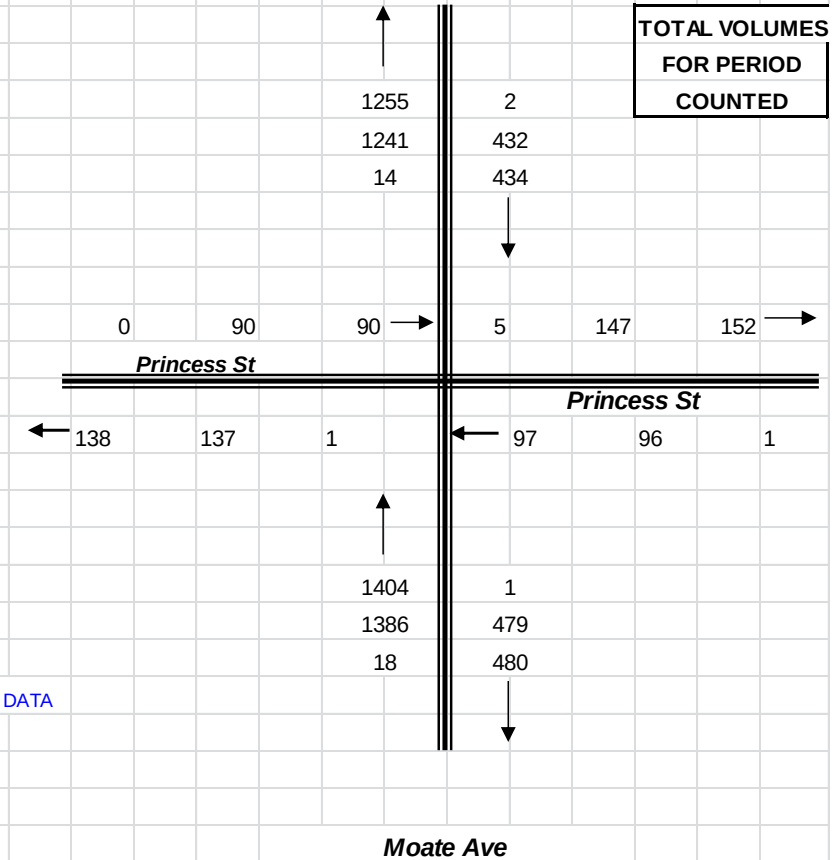


TOTAL VOLUMES FOR PERIOD COUNTED

R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob. 0418 239019

Client : Varga Traffic Planning
Job No/Name : 5185 BRIGHTON LE SANDS Princess St
Day/Date : Wednesday 28th May 2014

Lights

	NORTH			WEST			SOUTH			EAST			
	Moate Ave			*Princess St*			*Moate Ave*			*Princess St*			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1630 - 1645	8	91	10	4	3	8	14	35	9	16	1	2	**201**
1645 - 1700	6	85	9	2	2	5	17	35	10	18	0	3	**192**
1700 - 1715	7	83	11	3	1	7	6	38	9	16	1	4	**186**
1715 - 1730	5	105	13	4	1	7	17	45	10	16	2	8	**233**
1730 - 1745	5	96	17	5	0	4	14	39	14	10	1	1	**206**
1745 - 1800	9	103	15	3	1	5	24	48	12	9	3	4	**236**
1800 - 1815	7	75	13	6	1	6	22	41	13	19	5	1	**209**
1815 - 1830	3	75	10	11	3	5	15	36	8	9	2	3	**180**
Period End	**50**	**713**	**98**	**38**	**12**	**47**	**129**	**317**	**85**	**113**	**15**	**26**	**1643**

Heavies

	NORTH			WEST			SOUTH			EAST			
	Moate Ave			*Princess St*			*Moate Ave*			*Princess St*			
Time Per	L	T	R	L	T	R	L	1	R	L	T	R	TOT
1630 - 1645	0	0	0	0	0	0	0	1	0	0	0	0	**1**
1645 - 1700	0	0	0	0	0	0	0	1	0	0	0	0	**1**
1700 - 1715	0	0	0	0	0	0	1	1	0	0	0	0	**2**
1715 - 1730	0	0	0	0	0	0	0	1	0	1	0	0	**2**
1730 - 1745	0	0	0	0	0	0	0	1	0	0	0	0	**1**
1745 - 1800	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1800 - 1815	0	0	0	0	0	0	0	2	0	0	0	0	**2**
1815 - 1830	0	1	0	0	0	0	0	0	0	0	0	0	**1**
Period End	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**7**	**0**	**1**	**0**	**0**	**10**

Lights

	NORTH			WEST			SOUTH			EAST			
	Moate Ave			*Princess St*			*Moate Ave*			*Princess St*			
Peak Time	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1630 - 1730	26	364	43	13	7	27	54	153	38	66	4	17	**812**
1645 - 1745	23	369	50	14	4	23	54	157	43	60	4	16	**817**
1700 - 1800	26	387	56	15	3	23	61	170	45	51	7	17	**861**
1715 - 1815	26	379	58	18	3	22	77	173	49	54	11	14	**884**
1730 - 1830	24	349	55	25	5	20	75	164	47	47	11	9	**831**
PEAK HOUR	**26**	**379**	**58**	**18**	**3**	**22**	**77**	**173**	**49**	**54**	**11**	**14**	**884**

Heavies

	NORTH			WEST			SOUTH			EAST			
	Moate Ave			*Princess St*			*Moate Ave*			*Princess St*			
Peak Time	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1630 - 1730	0	0	0	0	0	0	1	4	0	1	0	0	**6**
1645 - 1745	0	0	0	0	0	0	1	4	0	1	0	0	**6**
1700 - 1800	0	0	0	0	0	0	1	3	0	1	0	0	**5**
1715 - 1815	0	0	0	0	0	0	0	4	0	1	0	0	**5**
1730 - 1830	0	1	0	0	0	0	0	3	0	0	0	0	**4**
PEAK HOUR	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**1**	**0**	**0**	**5**

Combined

	NORTH			WEST			SOUTH			EAST			
	Moate Ave			*Princess St*			*Moate Ave*			*Princess St*			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1630 - 1645	8	91	10	4	3	8	14	36	9	16	1	2	**202**
1645 - 1700	6	85	9	2	2	5	17	36	10	18	0	3	**193**
1700 - 1715	7	83	11	3	1	7	7	39	9	16	1	4	**188**
1715 - 1730	5	105	13	4	1	7	17	46	10	17	2	8	**235**
1730 - 1745	5	96	17	5	0	4	14	40	14	10	1	1	**207**
1745 - 1800	9	103	15	3	1	5	24	48	12	9	3	4	**236**
1800 - 1815	7	75	13	6	1	6	22	43	13	19	5	1	**211**
1815 - 1830	3	76	10	11	3	5	15	36	8	9	2	3	**181**
Period End	**50**	**714**	**98**	**38**	**12**	**47**	**130**	**324**	**85**	**114**	**15**	**26**	**1653**

Peds

	NORTH	WEST	SOUTH	EAST	
	Moate Ave	*Princess St*	*Moate Ave*	*Princess St*	
Time Per	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	TOT
1600 - 1615	0	14	7	20	**41**
1615 - 1630	0	23	8	18	**49**
1630 - 1645	1	15	8	9	**33**
1645 - 1700	0	19	14	11	**44**
1700 - 1715	0	15	6	14	**35**
1715 - 1730	2	16	7	19	**44**
1730 - 1745	1	7	4	14	**26**
1745 - 1800	4	34	23	13	**74**
Period End	**8**	**143**	**77**	**118**	**346**

Combined

	NORTH			WEST			SOUTH			EAST			
	Moate Ave			*Princess St*			*Moate Ave*			*Princess St*			
Peak Time	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1630 - 1730	26	364	43	13	7	27	55	157	38	67	4	17	**818**
1645 - 1745	23	369	50	14	4	23	55	161	43	61	4	16	**823**
1700 - 1800	26	387	56	15	3	23	62	173	45	52	7	17	**866**
1715 - 1815	26	379	58	18	3	22	77	177	49	55	11	14	**889**
1730 - 1830	24	350	55	25	5	20	75	167	47	47	11	9	**835**
PEAK HOUR	**26**	**379**	**58**	**18**	**3**	**22**	**77**	**177**	**49**	**55**	**11**	**14**	**889**

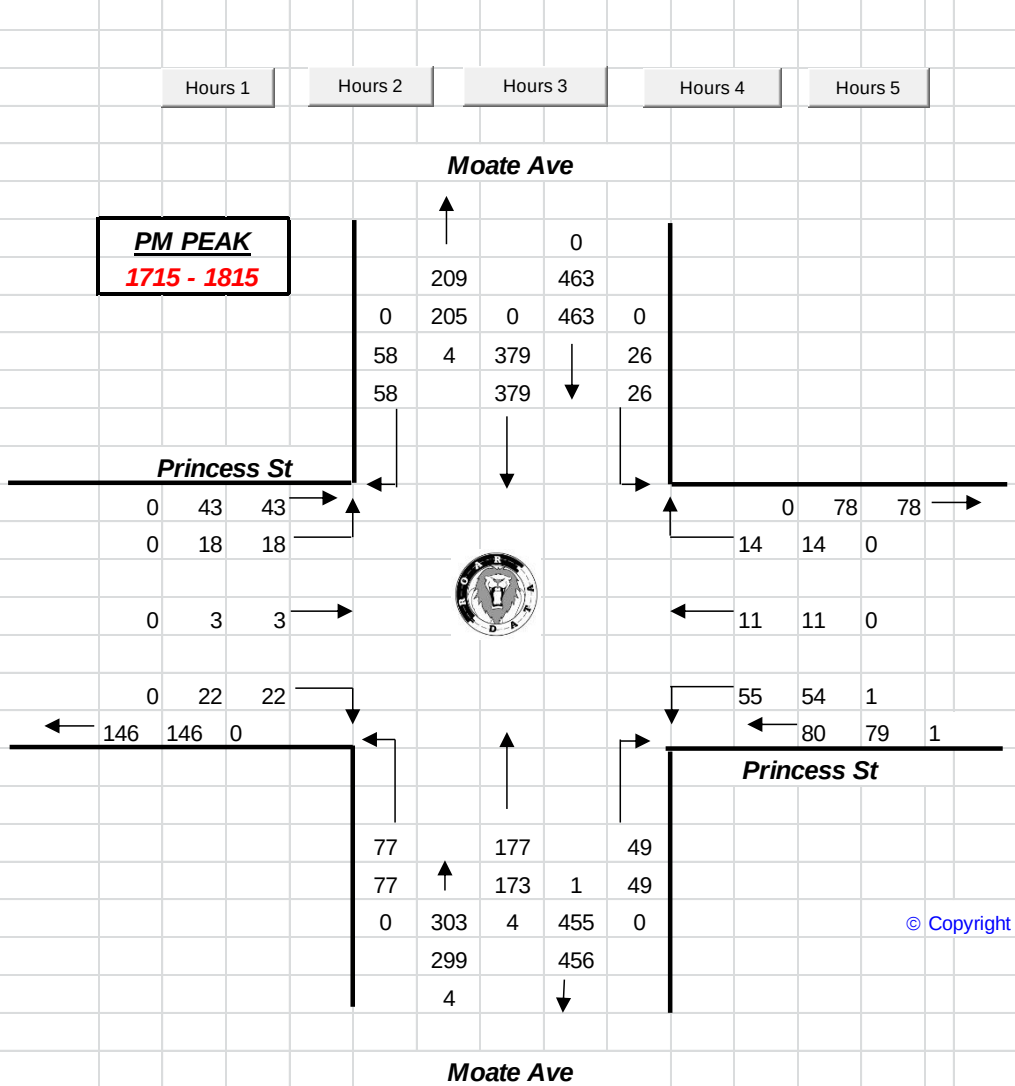
Peds

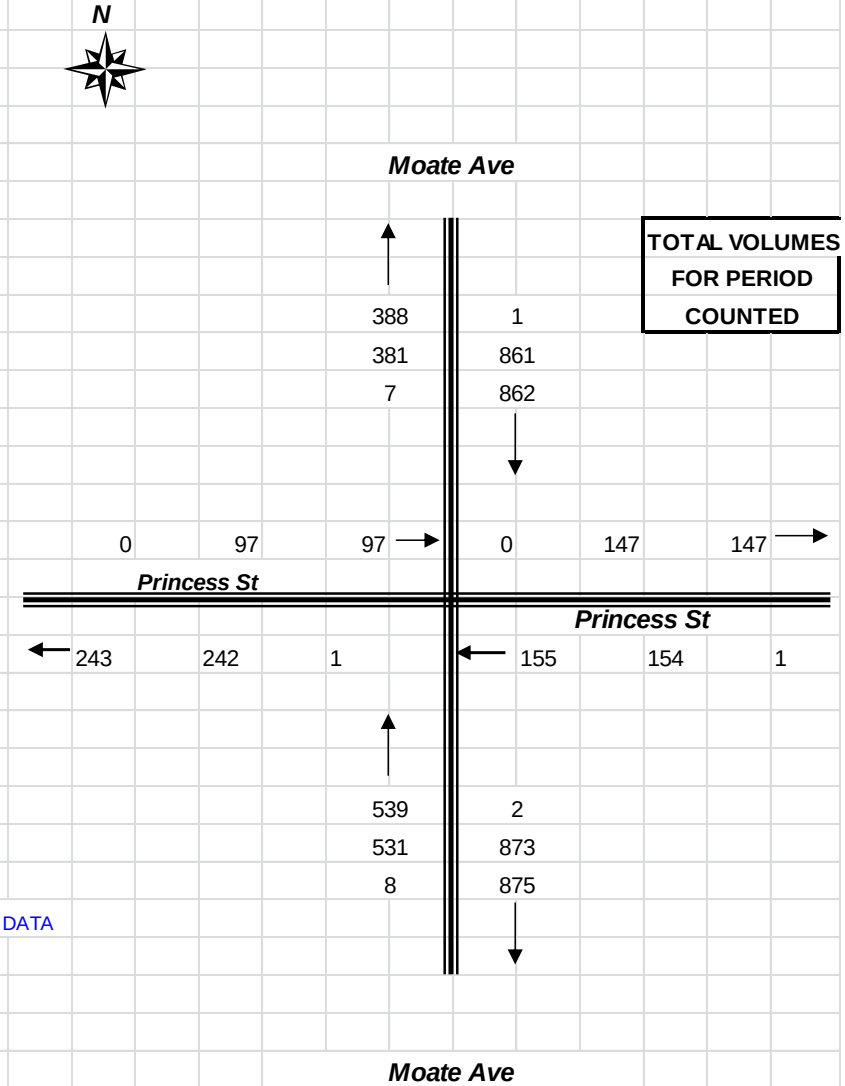
	NORTH	WEST	SOUTH	EAST	
	Moate Ave	*Princess St*	*Moate Ave*	*Princess St*	
Peak Per	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	TOT
1630 - 1730	1	71	37	58	**167**
1645 - 1745	1	72	36	52	**161**
1700 - 1800	3	65	35	53	**156**
1715 - 1815	3	57	31	58	**149**
1730 - 1830	7	72	40	60	**179**
PEAK HR	**3**	**57**	**31**	**58**	**149**

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

Client : Varga Traffic Planning
Job No/Name : 5185 BRIGHTON LE SANDS Princess St
Day/Date : Wednesday 28th May 2014

Hours 1 | Hours 2 | Hours 3 | Hours 4 | Hours 5





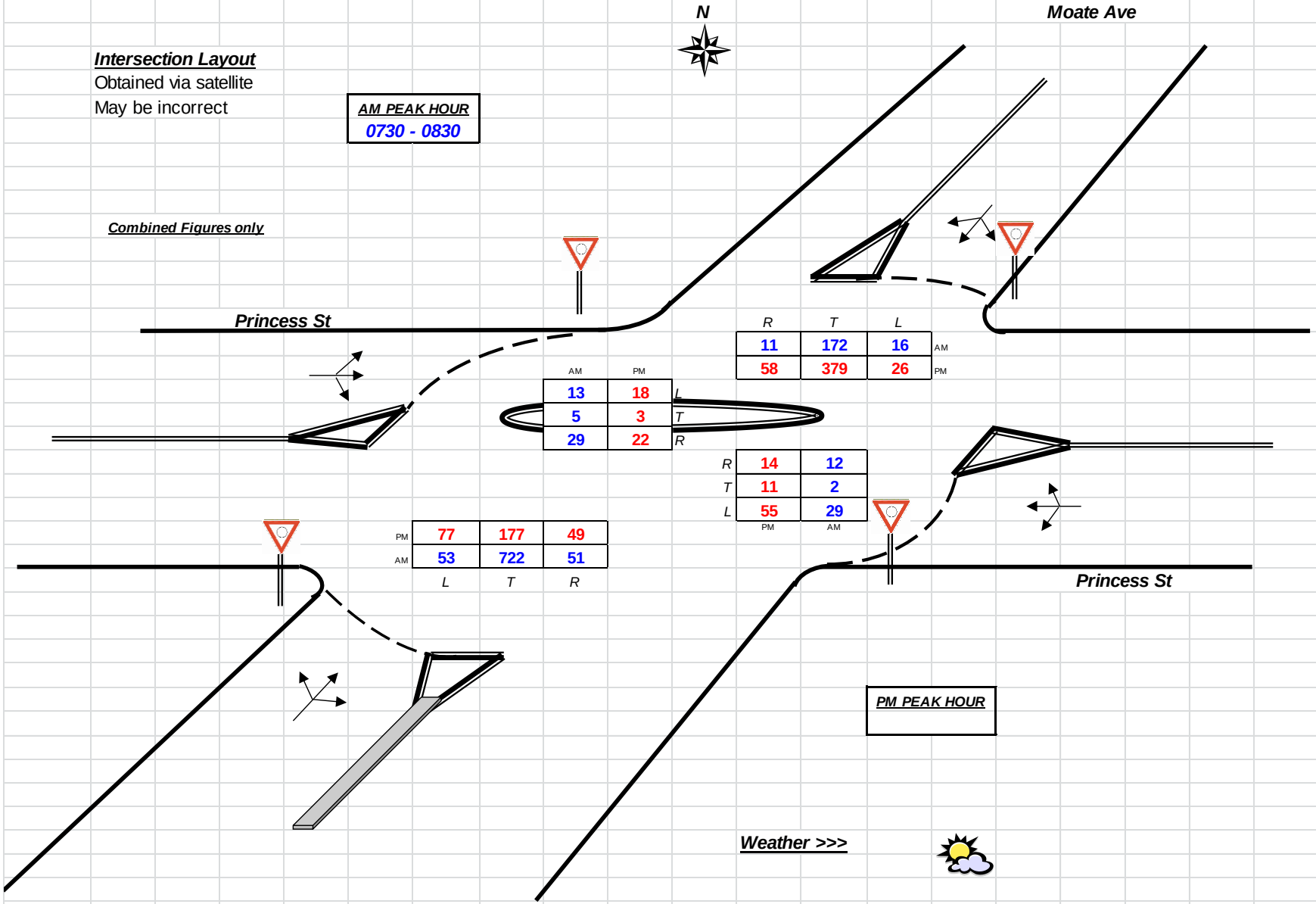
R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph.88196847, Fax 88196849, Mob.0418-239019

Client	: Varga Traffic Planning
Job No/Name	: 5185 BRIGHTON LE SANDS Princess St
Day/Date	: Wednesday 28th May 2014

Intersection Layout
Obtained via satellite
May be incorrect

AM PEAK HOUR
0730 - 0830

Combined Figures only



PM PEAK HOUR

Weather >>>