+

NK TRAFFIC
Traffic and Transport Consultants

PROPOSED CONSTRUCTION OF MULTI UNIT DWELLING

TRAFFIC REPORT

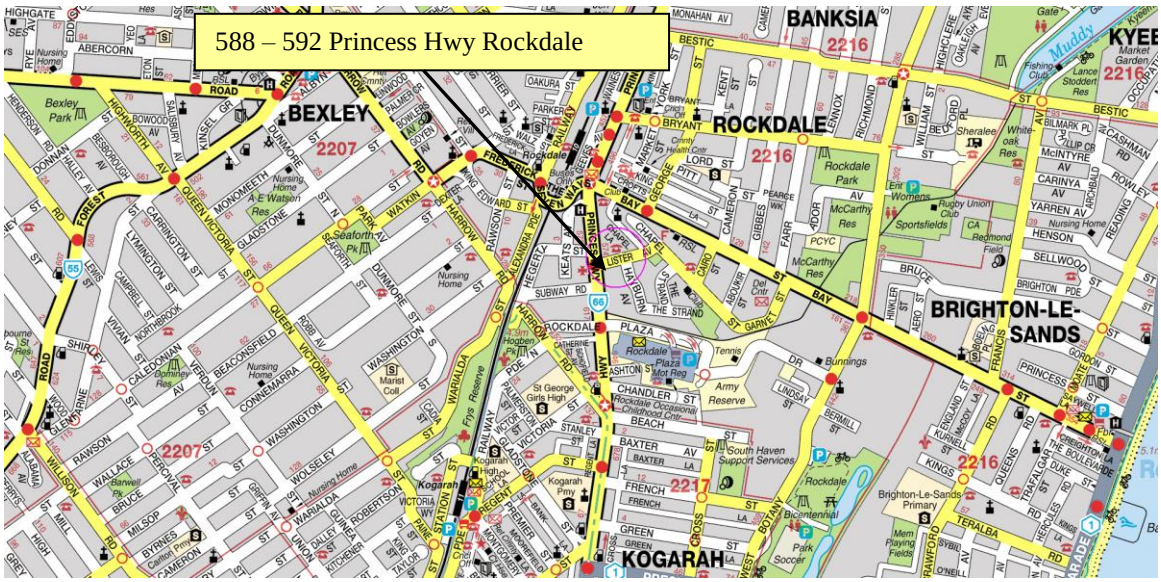
Assessment of Traffic and Parking Implications

588 – 592 PRINCESS HIGHWAY ROCKDALE

NK TRAFFIC
Traffic and Transport Consulting Engineers
P.O. BOX,
BEVERLY HILLS
NSW 2209
Ph: 02 95341090
Mobile: 0414550101
E-mail: traffictraffic@live.com.au
Web: www.traffictraffic.com.au

APRIL 2016

CONTENTS



Source: UBD maps

LOCALITY MAP
588 - 592 PRINCESS HIGHWAY ROCKDALE

1.0 INTRODUCTION

NK TRAFFIC was commissioned by Anthony Vavayis & Associates Architects to prepare a traffic report for the construction of proposed 140 Units at 588 – 592 Princess Highway, Rockdale.

A Development Application has been submitted with Rockdale Council for consideration. The proposal includes the construction of 140 x 13 storey units and four levels of basement car parking.

This traffic report assesses the traffic and parking implications of the above proposal and is prepared to accompany the development application.

The proposal is located within the Rockdale City Council LGA and sits within Rockdale Town Centre Zoned "B2- Town Centre". The proposal is well served by public transport with a major train station and bus interchange.

2.0 PURPOSE OF THE REPORT

This report has been undertaken to accompany the Planning Proposal and Development Application which is submitted to Rockdale City Council for the construction of a multi-storey residential development to accommodate 140 residential apartment units, 818 m² of retail space and 4 - level basement car park with a lower basement level car park.

The following topics have been presented related to the traffic and parking assessment.

- Description of proposal
- Existing Traffic Conditions
- Public Transport
- Traffic Generation
- Intersection Capacity Assessment
- Access
- Parking Supply
- Assessment of the Car park
- Summary

3.0 DESCRIPTION OF THE PROPOSAL

The proposed development site is located at 588 – 592 Princess Highway which is situated approximately 12 km south of the Sydney CBD. The site is located on the south – west corner of the intersection of Lister Ave and Princes Highway which is located in the Rockdale City Council. The site area is 2088 m². The main frontage is to the Princess Highway, which has an approximately length of 47 metres.

The development is subject to Rockdale DCP 2011, which deals with the design, environmental objectives and controls for the assessment of the application. The proposed development involves the demolition of the existing Commercial complex and replace with a new mixed – use / commercial development. There are a total of 140 apartments proposed in 13 storey units and four levels of basement car parking. The 4 basement levels comprise of total floor areas and in the lower basement level (basement lower level 4. In this level there is a small car parking section comprising of 11 parking spaces.

The total 140 apartments are proposed in the new development as follows:

1 bedroom	51
2 bedroom	73
3 bedroom	16
Total apartments	**140**

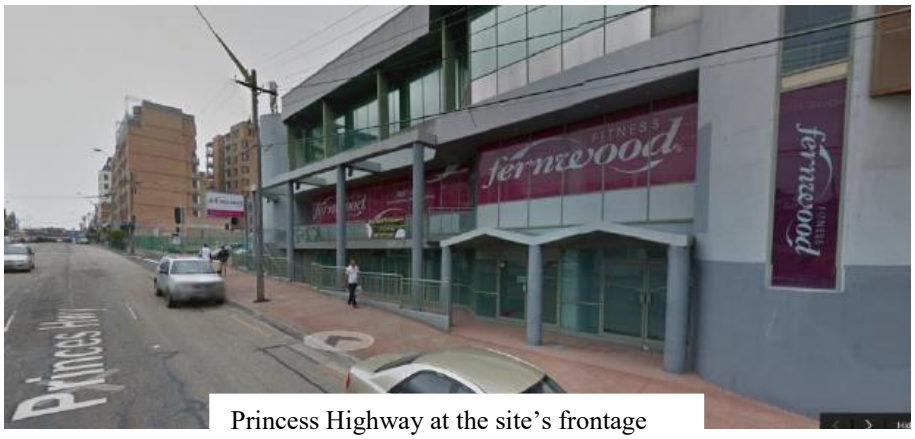
The following Table shows the number of parking spaces per car parking level.

Parking Level	Visitors	Resident	Retail	Total
Lower Ground Floor	7			7
Basement 1	21	2	25	48
Basement 2		47		47
Basement 3		47		47
Basement 4		49		49
Lower Basement		11		11
Total	28	156	25	**209**

There are also 3 commercial units proposed on the ground floor and one in the lower ground floor with a cumulative area of 818 m².

There are 209 off- street parking spaces proposed, which include 156 Residential Spaces 28 Visitor spaces 25 Retail spaces, 1 Car Wash bay and 16 accessible parking spaces.

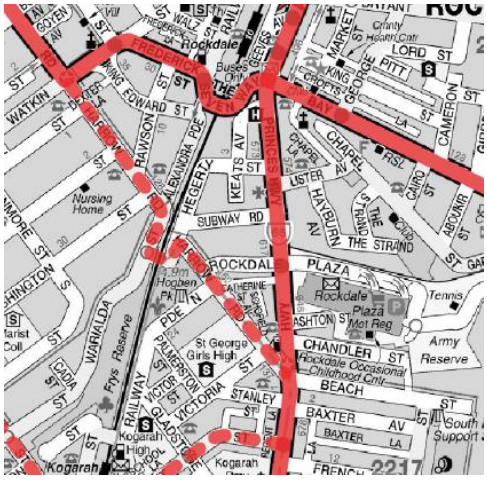
Access to the site is provided through an entry/exit driveway located on the southern side of Lister Ave. Plans of the proposed Car Parking areas prepared by Anthony Vavayis and Associates Architects and are presented in the following topics.



Princess Highway at the site's frontage

4.0 EXISTING TRAFFIC CONDITIONS

The site is located on the Princess Highway and is well served by the arterial road network as shown. The NSW road hierarchy comprise of the following road classification:



State Roads: Freeways and Arterials (under the jurisdiction)

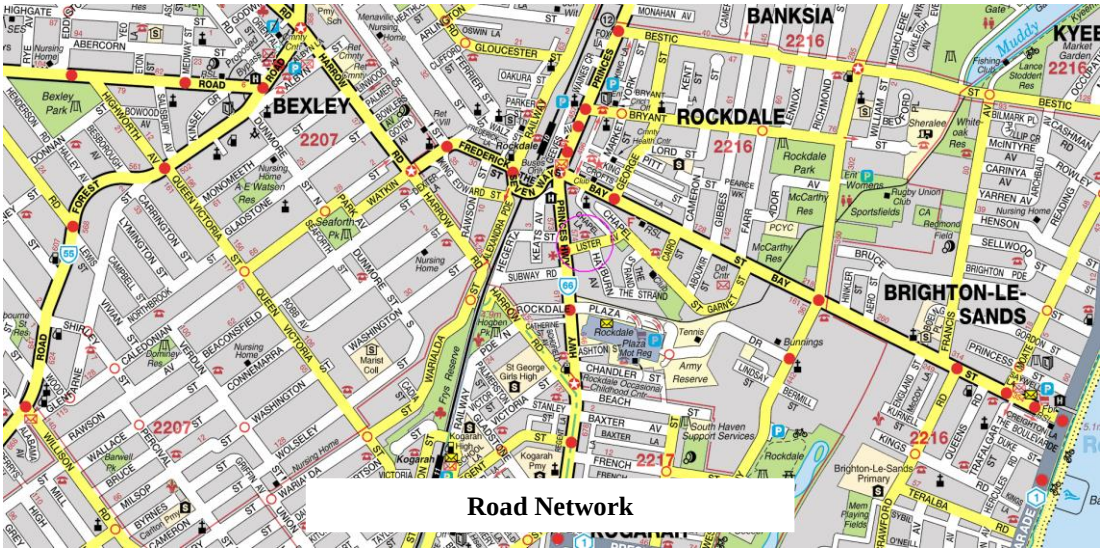
Regional Roads: Secondary or sub arterials (Council managed and part funded by RMS)

Local Roads: Collector and local roads (Managed by Council)

Princess Highway: Classified as a state road with 60 km / hour speed limit. At the site's frontage the carriageway comprises of three traffic lanes in each direction. There are Clearway restrictions on the side of the site signposted as "Clearway 3.00 pm to 7.00 pm Monday – Friday". On the opposite side of the site, there are clearway restrictions signposted as "Clearway 6.00 am to 10.00 am Monday Friday"

Lister Ave is classified as a Regional road. The carriageway comprises one traffic lane in each direction with 'No Stopping' restrictions on the south side and unrestricted street parking on the north side of the road. Lister Ave is 50 km/hour. Lister Ave provides access for vehicles entering and exiting the site from Princess Highway and is connected to Bay Street via Chapel Street.

The intersection of Lister Ave and Princess Highway is controlled by traffic signals where all traffic movements are permitted.



Road Network

5.0 PUBLIC TRANSPORT

There is a bus and train interchange for the bus and train service. The interchange is approximately 400 metres from the site. Bus Services are also located along Princes Highway.

Bus Services

There are bus services operating at the front of the site. The following Bus Services operate at the front of the property.

Route 422
Operates daily along the site at Princess Highway for every 30 minutes. This 422 provides a connection between Kogarah and the City.

Route 476
Operates daily along the site at Princess Highway for every 30 minutes. This 476 provides a connection between Kogarah and the City.

Route 477
Operates daily along the site at Princess Highway for every 30 minutes. This 477 Service provides a connection between Rockdale Station and Miranda.

Route 479
Operates daily along the site at Princess Highway for every 30 minutes. This 476 provides a connection between Rockdale and Kyeemagh.

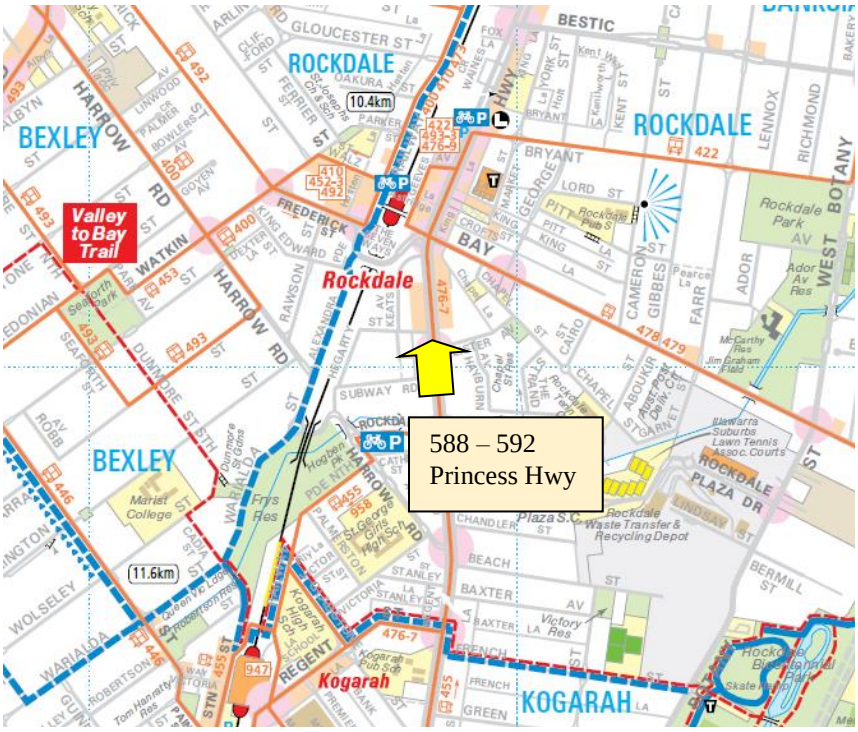
Train Services

Rockdale railway station operates weekday peak hour all station services to:

- Bondi Junction via Central
- Hurstville and Sutherland via Hurstville

Limited Stops and off – peak hour all-station services to:

- Bondi Junction via Central
- Sutherland, Cronulla or Waterfall via Hurstville



Source Rockdale Council - Bicycle and Walking

3.2 Intersection of Lister Ave and Princess Highway

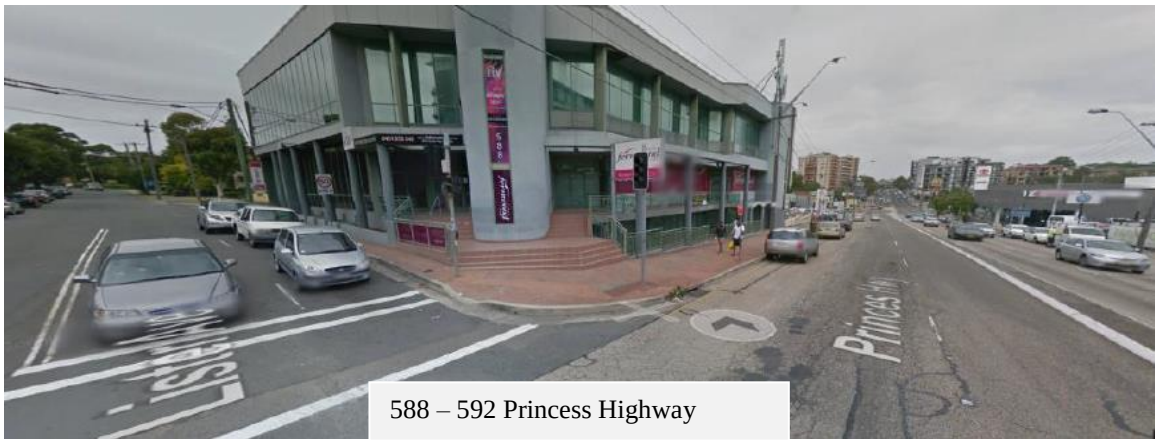
A Traffic modelling assessment has been undertaken of the impact at the intersection of Princess Highway and Lister Ave. The performance of the intersection was assessed using the *SIDRA* Intersection Modelling software program.

The model provides parameters of the performance of an intersection including the degree of saturation. In accordance with the adequacy of the capacity of an intersection, it is assessed by whether it can physically and operationally cater for the traffic using it. The recommended Criteria for evaluating capacity of the intersection is shown in the following Table 1.

TABLE 1 Criteria for Evaluating Capacity of Intersection

Level of Service	***Degree of Saturation***	***Ave. Delay / Veh. (Seconds)***
A good operation	Less than 0.80	Less than 14
B good with acceptable delays	Less than 0.80	15 - 28
C satisfactory	0.80 – 0.85	29-42
D poor but manageable	0.85 - 0.90	43-56
E at capacity	0.90 and over	57-70
F unsatisfactory	Over 0.90	Over 70

*The Environmental Traffic Capacity is defined as the maximum number of vehicles that should be permitted to pass through a given environmental situation over time and under prevailing environmental solutions.



588 – 592 Princess Highway

The assessment at the above intersection, when compared with the above criteria showed that the Intersection of Princess Ave and Lister Ave operates at B (Good with acceptable delays and spare capacity) Level of Service during the morning and afternoon peaks. The additional number of traffic generated by the above development does not change the Level of Service (LOS) at the above intersection.

The existing minimum queuing of vehicles during the morning or afternoon traffic peaks has no impact on the above intersection and its Level of Service (LOS) will continue to operate as “B”. (Modelling Analysis shown in Annexures).

6.0 TRAFFIC GENERATION

The traffic generation of the existing Use is compared to the future traffic generation created by the proposed development in order to assess the impacts to the surrounding road network. The RMS Guide to Traffic Generating Developments has updated the rates per vehicle trips per unit within Sydney Metropolitan area. These rates are shown in the Table below;

6.1 Residential traffic generation rates

The RMS surveys for High density residential flat dwellings shown in the RMS Technical Direction Guide (TDT 2013 / 04a) the following:

TABLE 2 - RMS SURVEY TRAFFIC GENERATION RATES

Weekday Rates	***Sydney Average***	***Sydney Range***
AM PEAK (1 hour) vehicle trips per unit	0.19	0.07-0.32
AM PEAK (1 hour) vehicle trips per car space	0.15	0.09-0.29
AM PEAK (1 hour) vehicle trips per car bedroom	0.09	0.03-0.13
PM PEAK (1 hour) vehicle trips per unit	0.15	0.06-0.41
PM PEAK (1 hour) vehicle trips per car space	0.12	0.05-0.28
PM PEAK (1 hour) vehicle trips per bedroom	0.07	0.03-0.17
DAILY VEHICLE TRIPS per unit	1.52	0.77-3.14
DAILY VEHICLE TRIPS per car space	1.34	0.56-2.16
DAILY VEHICLE TRIPS per bedroom	0.72	0.35 -1.29

The above Guide refers to Sydney average of 0.19 trips per peak hour, per apartment. This figure represents the expected average number of trips generated by the proposal on a weekday.

High Density Residential flat building residential traffic generation rates.
Metropolitan Regional Centres
Peak Hour Vehicle Trips = 0.19 trips per unit.

As the proposal accommodates for 140 apartments. In accordance with the above, the trips expected to be generated by the residential component is 140 x 0.19 = 26.6 *say* **27** trips per peak hour. The above number of vehicles when added to the existing street traffic volumes would have insignificant effect to the surrounding road network.

6.2 Commercial use

The proposal has also a commercial component which consists of 818 m². In terms of commercial use, the RMS Guide to Traffic Generating Developments provides the following guide in relation to the peak traffic generation associated with the commercial usage of this type of proposal.

Office and Commercial	per day	per peak hour
Commercial premises	10/100 m² GFA	2 / 100 m² GFA

RTA's Guide to Traffic Generating Developments

In accordance with the above, the Commercial (Retail) component of the proposed development is expected to generate 818 / 100 x 2 = 16.36 *say* **17** vehicles per peak hour. In accordance with the above, the total commercial and residential trips expected to be generated as a result of the proposal is 27 (Residential Use) + 17 (Commercial Use), a total of **44** vehicles per peak hour.

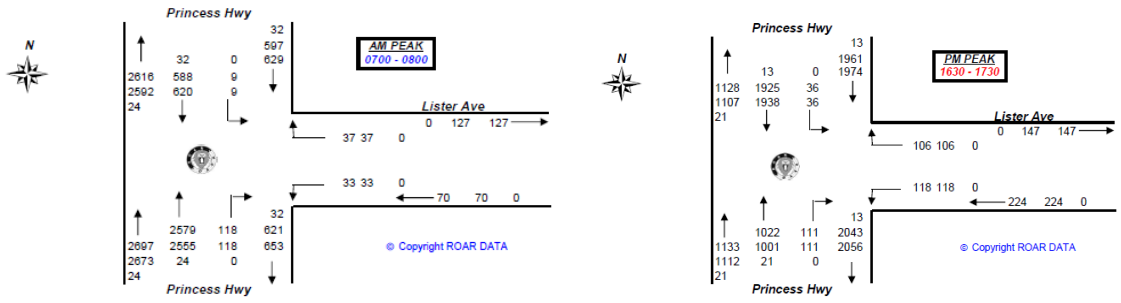
6.3 Traffic Generation - Existing development

The existing proposal is used as a gymnasium over two levels. The estimated traffic generation from the existing development is summarized below.

As the current usage is classified as a gymnasium and at the top level a Reception Centre, the parking rates provided in the RMS Guide for this type of development is 3 trips per 100 m². The total amount of traffic generated by the existing development is 2050 /100 x 2 = 41 trips per peak hour.

The traffic generated by the existing development is only slightly higher than the traffic estimated to be generated by the proposal. The net increase of traffic generated by the proposed development is only three vehicles per peak hour. Therefore, in accordance with the above, the estimated trips which are expected to be generated by the proposed development will have insignificant impact to the surrounding road network.

The current AM and PM intersection traffic volumes are provided in topic 6.4 and shown below:



Existing Traffic Volumes

6.4 Existing Traffic Volumes

Traffic volume surveys were undertaken at the intersection of Princess Highway and Lister Ave on Wednesday 24 February 2016, to determine the existing peak traffic conditions and also the impact of the traffic generation which the proposed development will likely have at the above intersection and the surrounding road network.

The peak morning traffic counts were undertaken from 7.00 am to 8.00 am and the peak afternoon counts were undertaken from 4.30 – pm to 5.30 pm. The traffic surveys were undertaken to assess the impact of the traffic generation on the existing road network and to assess also the traffic volumes expected by any additional number of vehicles due to the proposed development. The traffic surveys undertaken showed the following:

TABLE 3 - Lister Ave - Vehicular Volume survey (Wednesday 24 February 2016)

Time/Direction	Westbound	Eastbound	Total
7.00 am – 8.00 am	70	127	197
4.30 pm – 5.30 pm	224	147	371

As shown in the Table 3, in the morning peak, 197 and 371 vehicles in the afternoon peak were recorded in Lister Ave. The above traffic surveys show that traffic volumes at the front of the site in both directions, are low and in terms of Environmental Capacity of a local Street, these volumes are considered low.

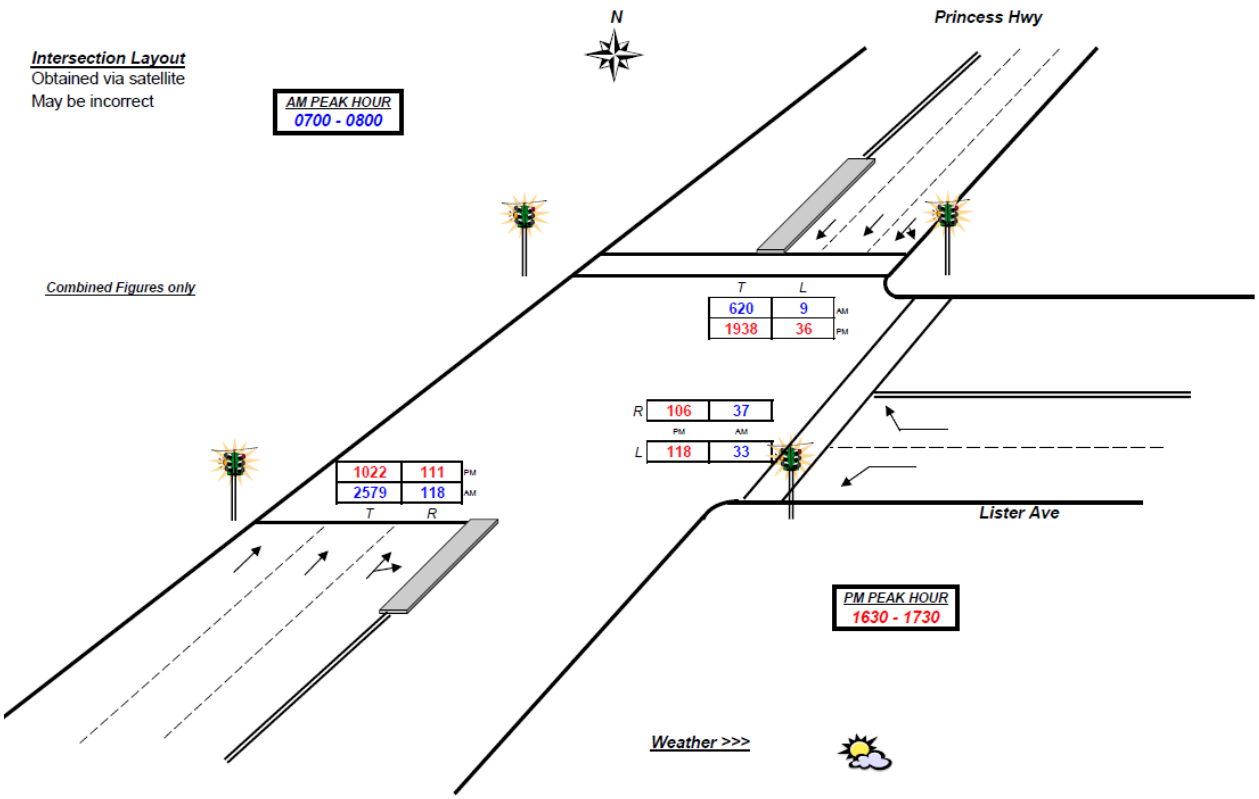
The current volumes generated by the existing development are 41 vehicles per hour (topic 5.1). The existing traffic volumes measures in Lister Ave are 197 and 371 vehicles per hour respectively for the morning and afternoon peaks. In the morning peak, 127 vehicles travelling eastbound and 70 vehicles travelling westbound. In the afternoon peak 147 vehicles are travelling eastbound and 224 are travelling westbound.

The traffic generation of the existing use is compared to the future traffic generation created of the proposed development, in order to assess the impacts to the surrounding road network. Based on the current volumes in Lister Ave the existing split of traffic in the morning peak is approximately 50%. The afternoon split is 65% westbound and 45% eastbound. By applying the above mode splits, proposed mode splits estimated for morning and afternoon volume peaks are for the AM 22 vehicles (each direction) and for the PM 26 westbound and 18 eastbound.

Due to the volumes generated by the existing development, the net increase of traffic in Lister Ave is the difference between the 41 vehicles generated by the proposal and the projected 44 vehicles from the proposed development. Therefore, 3 vehicles per peak hour is the net increase. Therefore, the traffic projections expected to be generated by the proposal are shown in the following Table – 4 below:

TABLE 4 - Projected Traffic Volumes

Time/Direction	Total
7.00 am – 8.00 am	200
4.30 pm – 5.30 pm	374



Lister Ave and Princess Hwy
Traffic Volumes

6.5 Environmental Capacity Performance Standards

The Environmental Capacity concept, which is applied in traffic management, is adopted in *the RMS Guide to Traffic Generating Developments*, and provides Environmental Capacity Performance standards on Residential Streets. The following table provides a summary of these thresholds. The following table provides a summary of these thresholds.

TABLE 5 - Environmental Capacity Performance Standards on Residential Streets.

Road Class	Road Type	Max Peak Hour Volume (veh/hr)
Local	Access way	100
Local	Street	200-300
Collector	Street	500

(RTA Guide to Traffic Generating Developments –October200

The amount of vehicles travelling along Lister Ave is within the capacity performance limits of a residential street. The existing and projected volumes in Lister Ave is within the acceptable peak hour volumes shown in the above table.

The traffic expected to be generated by the proposed development will not have an adverse impact on the Level of Service or on street capacity issues in Lister Ave. It should be noted, that the projected net amount of traffic in Lister Ave is negligible. Therefore, the amount of traffic expected to be generated by the additional number of vehicle movements will not be significant on the road network.

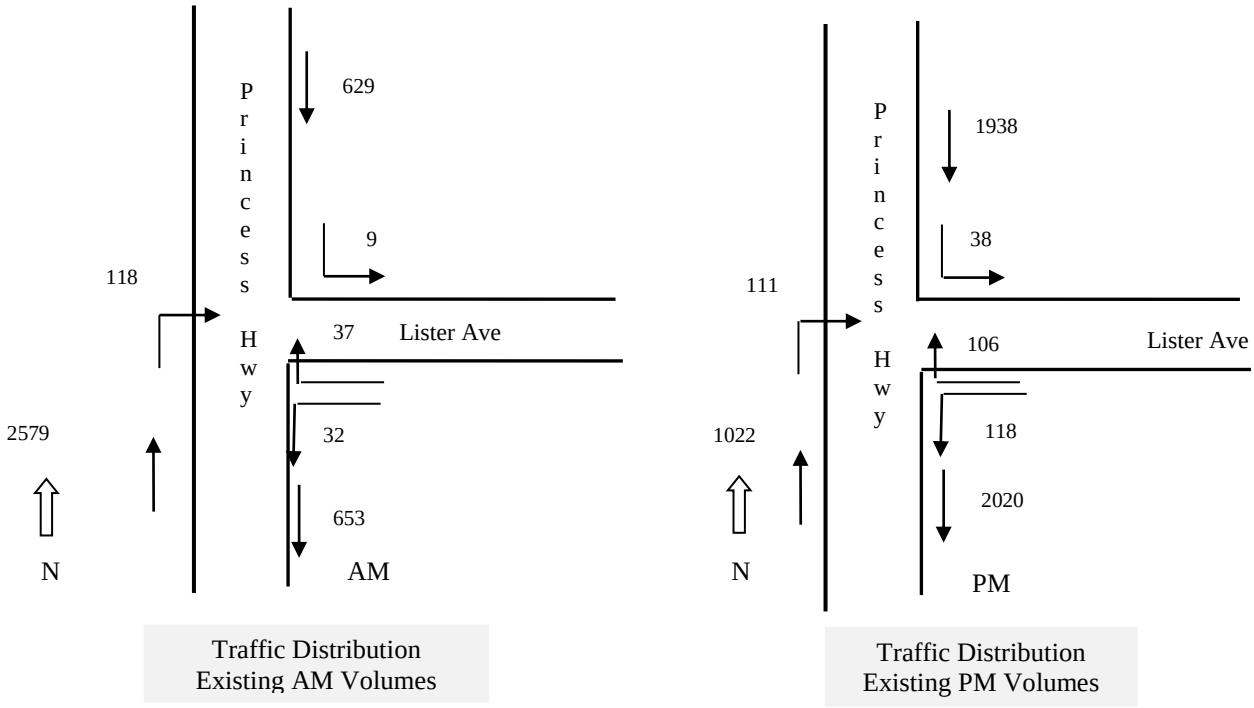


Figure 1 Traffic Distribution - Existing Volumes

6.6 Intersection Capacity

An intersection modelling assessment has been undertaken using SIDRA modelling analysis. The performance indicators of an intersection is provided in the modelling software. The main performance indicators are:

- Degree of Saturation: - the total usage of the intersection representing the use/saturation in terms of percentage.

- Average Delay – The average delay of all vehicle passing through the intersection. Each approach at the intersection is reviewed as a long delay of one leg of the intersection may create delays to the other legs.

- 95% of Queue Lengths – This is the queue length in metres that has about 5% probability of being exceeded during the analysis period.

- Levels of Service: This is a categorisation of average delay. The following guide is provided by RMS related to the level of service.

TABLE 6 - Criteria for Evaluating Capacity of Intersection

Level of Service	Ave. Delay / Vehicles. (Seconds)	Traffic Signals
A	Less than 14	good operation
B	15 - 28	good with acceptable delays
C	29-42	satisfactory
D	43-56	poor but manageable
E	57-70	at capacity
F	Over 70	unsatisfactory

TABLE 7 - Sidra Existing Intersection Modelling Assessment

Period	Intersection	LOS	Avg Delay	Deg of Sat
AM Peak	Lister Ave and Princess Highway	B	23.9	0.739
PM Peak	Lister Ave and Princess Highway	B	24.1	0.781

The assessment of the above signalised intersection indicated for morning peak Level of Service B, average delay of 21.9 and Degree of Saturation 0.0291. For afternoon peak Level of Service B, average delay 21.9 and Degree of Saturation 0.0490.

The traffic volumes associated with the new proposal have been applied and added to the surveyed traffic counts and the analysis is summarised below. The estimated traffic volumes from the existing development are 41 vehicles per peak hour. The projected traffic volumes have been taken into consideration with insignificant increase as a result of the proposal.

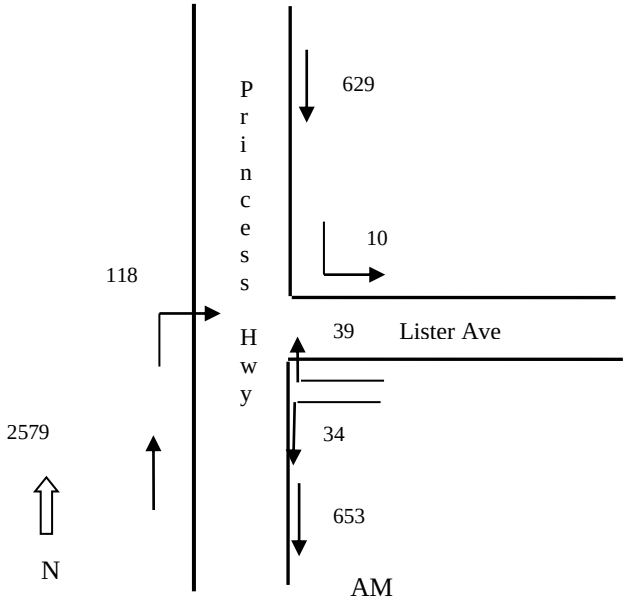
The traffic assessment summarised below, shows that the traffic generation which is expected as a result of the proposed development can be accommodated adequately by the road network and is not expected to create any adverse traffic impacts at the intersection of Lister Ave and Princess Highway.

The following **Table 8** with the projected intersection modelling summarises the impacts at the above as a result of the expected traffic due to the proposed development.

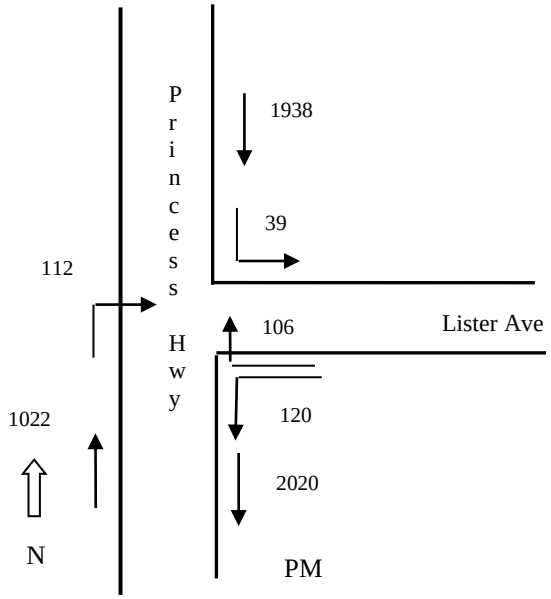
TABLE 8 - Sidra Projected Intersection Modelling

Period	Intersection	LOS	Avg Delay	Deg of Sat
AM Peak	Lister Ave and Princess Highway	B	24.2	0.751
PM Peak	Lister Ave and Princess Highway	B	24.8	0.782

The operation of the traffic signals at the intersection of Lister Ave and Princess Highway is operating well within its capacity with a Level of Service B and as a result of the proposed development the Level of Service (LOS) at the above intersection is not expected to change.



Traffic Distribution
Potential AM Volumes



Traffic Distribution
Potential PM Volumes

The *SIDRA* traffic modelling shows that the intersection of Lister Ave and Princess Highway has been assessed and shows, that the proposal will have minimal impact in the overall road network. There are no improvements required at the above intersection, as the traffic modelling showed that the Level of Services (LOS) of the above intersection remains the same.

7.0 PARKING SUPPLY

The parking supply has been assessed in relation to Rockdale Council's DCP – Section 4.6 and Rockdale Guidelines – Traffic, Parking and Access specifications in relation to the parking rates specified for this type of development. The following Table provides Rockdale Council's DCP Car Parking requirements.

TABLE 9 Rockdale DCP – Parking requirements

Type	Car Parking Requirements	Bicycle Parking Requirements	Motorcycle Parking Requirements
One and two bedrooms	1 space per apartment	1 space per 10 dwellings	1 space per 15 per apartments
3 Bedroom apartment	2 spaces per apartment		
Visitor Parking	1 per 5 apartments		
Retail – Shops	1 space per 40 m²	1 space/ 200 m² 15% accessible by visitors	1 space for 20 car spaces

Rockdale Council's DCP - Technical Specification – Traffic, Parking and Access, also allows that the commercial parking bay requirements be combined with the residential service bays provided that a loading dock management plan is developed by the strata, which restricts the hours of access for different users.

The following parking requirements are provided for the proposed development.

TABLE 10– Car Parking Requirements

Type	Car Parking Requirements	Car Parking spaces Required	Car Parking spaces Provided
1 Bedroom (51)	1 space per apartment	51	51
2 Bedroom (73)	1 space per apartment	73	73
3 Bedroom (16)	2 space per apartment	32	32
Total 140	**Sub Total**	**156**	**156**
Visitor Parking	1 space per 5 apartments	28	28
Retail (818 m²)	1 space per 40 m²	20.4 – 4.1 = 16.3**	25
Car Wash Bay	-	-	1
TOTAL		**200**	**209***

*Includes 16 Disable spaces and a car washing bay.
** As per DCP a 20 % reduction shall apply to non – residential parking spaces

TABLE 11 – Bicycle and Motorcycle Parking

Resident Bicycle requirements	Resident Motorcycle Requirements	Commercial Bicycle requirements	Commercial Motorcycle requirements
1 spaces per 10 dwellings	1 space per 15 dwellings	1 space per 200m² GFA	1 space per 20 car spaces
14	9	4	1

By applying Council's DCP parking requirements including non-residential parking concessions, a total of 200 parking spaces are required. The proposal provides a total of 209 parking spaces, which is more than adequate parking.

Parking Concessions consideration

Rockdale Council's DCP refers to the following regarding parking concessions:
For developments within Rockdale Town Centre the DCP allows for a 20% traffic demand reduction in the non-residential component of parking for all developments within the Rockdale Town Centre. The development is located within walking distance of the train station and Rockdale Town centre and adjacent to bus stops and public transport.

In Rockdale City Council's DCP 4.6, a shared parking concession can be applied so that the development provides more efficient supply of parking. The DCP allows for a shared parking register which takes into consideration the peak period of parking for the residential and commercial component. This will provide a shared register of visitor parking where some parking spaces can be shared between different users depending on the peak parking demand. Therefore, the following measures are proposed in order to improve the parking efficiency.

The Rockdale DCP allows for a 20% reduction to the non – residential component (retail). The demand reduction if applied to the non- residential component allows for a reduction of 20.4 x 20% = 4.1 parking spaces. The permitted parking reduction the required non-residential parking spaces are 16. Although that is the case, the proposal provides for a total of 25 retail spaces, without any concession parking as to provide the flexibility and not compromise any future parking demand as a result of retail usage.

RTA's (ex RMS) Guidelines for Traffic Generating Developments

The RMS developed Guidelines in relation to traffic generating developments provide guides for traffic generation and parking impacts. The Definition provided in the above guide for high density residential flat buildings is the following:

"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 five 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."

The above guidelines provide the parking rates shown below, which apply to high density residential flat buildings:

- 0.4 spaces per 1 bedroom unit
- 0.7 spaces per 2 bedroom unit
- 1.2 spaces per 3 bedroom unit
- 1 spaces per 7 units (visitor parking)

As per the above parking rates, the RMS Guide to Traffic Generating Developments provides much lower parking rates than Rockdale Council's DCP. By calculating the above parking rates, the parking required as per RMS Guide is as follows:

TABLE 12 – RMS Parking Requirements

Type of apartment	**Parking Spaces Required**
51 x 1 bed	20.4
73 x 2 bed	51.1
16 x 3 bed	19.2
Visitor = 140/7	20
Total Residential	**111**
Retail (818) m^2	20.4
Total Spaces	**131**

As per RMS Guide to Traffic Generating Developments

As per RTA's Guide a total 131 parking spaces are sufficient for the Residential component including its visitor parking.

SEPP 65 – Parking Concessions

Car Parking requirements are set in SEPP 65 – Design Quality Residential Apartment Design (SEPP 65) and the apartment Design Guide. In designated accessible Sydney locations and nominated centres in Regional NSW, the Department Design Guide applies a minimum parking requirement that is the lesser of either the relevant rate set out in the Guide to Traffic Generating Developments (GTTGD) or the Council Car parking requirement. In this case the Guide to Traffic Generating Developments is the lesser one with a total of 130 parking spaces required.

Part 3J Bicycle and car parking of the Apartment Design Guide sets out a range of objectives, design criteria and design guidance for car parking, car park design and facilities for other modes of transport in apartment developments. The guide introduces parking requirements for some sites in Metropolitan Sydney and nominated regional centres. Objective 3J-1 states: *Car parking is provided based on proximity to public transport in metropolitan Sydney and centres in regional areas.* The design criterion sets out measurable requirements for how this objective can be achieved in apartment developments, as follows:

For development in the following locations: • On sites that are within 800m of a railway station or light rail stop in the Sydney Metropolitan Area; or • On land zoned, and sites within 400m of land zoned, B3 Commercial Core, B4 Mixed Use or equivalent in a nominated regional centre.

The proposed development provides a high number of bicycle and motorcycle parking, which meets and exceeds these requirements.

The RMS Guide for Traffic Generating Developments requires 131 parking spaces. Rockdale Council's DCP requires a total of 200 (including non- residential concession parking spaces). The parking provision as per Council's DCP requires 69 additional parking spaces when compared with the parking rates proposed in RMS Guide for Traffic Generating Developments. As parking concessions have not been applied in the design, the parking proposal provides additional parking spaces and is in accordance with Rockdale Council's DCP as per the following Table:

TABLE 13 - SEPP 65 – Comparison RMS vs Council DCP

Type	Car Parking Required (RTA/SEPP 65)	Car Parking spaces Required	Car Parking provision
1 Bedroom (51)	20	51	51
2 Bedroom (73)	51.3	73	73
3 Bedroom (16)	19.2	32	32
Visitor	20	**156**	28
Total (140)	**111**	28	**156**
Retail (818 m²)	20.4	20.4 – 4.1 = 16.3**	25
TOTAL	**131**	**200**	**209***

*Includes 16 Disable spaces and a car washing bay.
** As per DCP a 20 % reduction shall apply to non – residential parking spaces

Sustainable Transport Initiatives

Council's DCP encourages sustainable transport and initiatives. The proposal is within 400 metres of walking distance to a transport hub. Cycling is also within a small distance from transport facilities and the Rockdale shopping centre. In accordance with NSW Planning Walking and Cycling Guidelines (2004) a 400 metres distance from the local amenities is considered as a walkable area. The development's access to Rockdale Railway Station and also to Rockdale's Plaza Shopping Centre is within 400 metres. The above guidelines support the fact that the proposal is considered as highly accessible to the public transport hub. Additional sustainable measures and sustainable innovations are considered in order to reduce the development's private vehicle demand.

The Rockdale Town Centre Master plan (2012) has considered a parking consolidated parking concession policy which supports the introduction of more car share services and the provision public parking facilities for the Town Centre. There is provision for the following in order to reduce the demand of private vehicles.

Car Share parking facilities. It is suggested that a visitor parking spaces be dedicated as Car Share parking, subject to Council's approval. Evidence from various Councils which have introduced car share facilities indicate that 1 car share parking space may replace 12 cars as it reduces vehicle demand. The aim is to reduce greenhouse emissions and the distance travelled by residents.

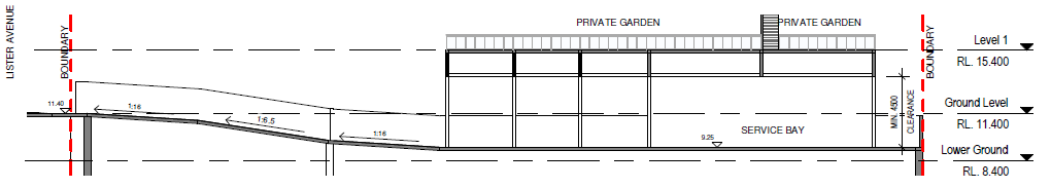
Rockdale Council's DCP indicates 1 motorcycle space per 15 dwellings and 1 space per 20 car spaces. The total number of motorcycle spaces provided are 10 which complies with the above DCP.

In relation to cycling, the suitable catchment for accessibility to public transport facilities is 1500 m. The transport facilities and shopping hub are much closer to the site. Therefore, the provision of bicycle spaces provided contribute to more active transport to the Town Centre and Transport facilities. The provision for bicycle parking is in accordance with Rockdale Council's DCP indicating 1 space per 10 dwellings and 1 space per 200m² of retail. Bicycle parking spaces are dedicated for the residential and also the retail use.

8.0 ACCESS

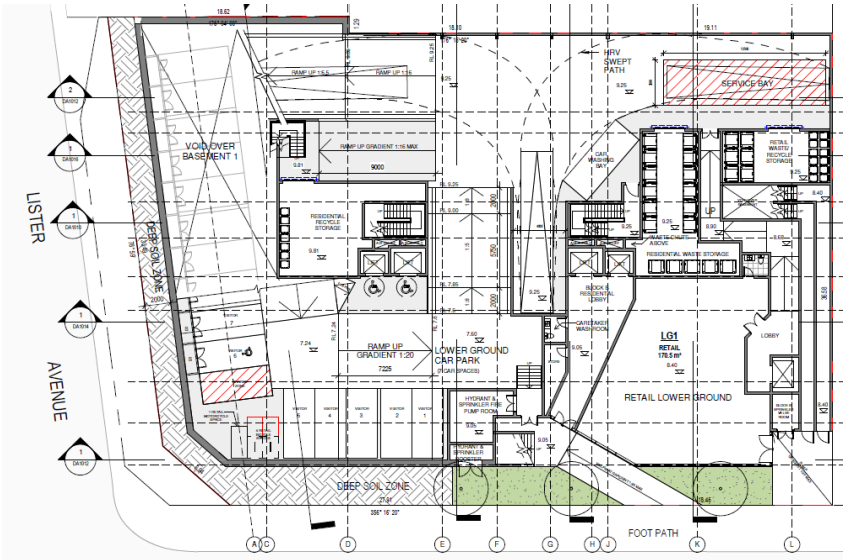
The proposal provides a combined Entry / Exit single access driveway which is located off Lister Ave. This is in accordance with RMS's guide to limit the provision of driveways on major roads which results in minimum disruption of traffic on the main road. The proposal's access also allows for a large rigid vehicle to enter the site. The access design is in accordance with AS 2890.1.

The following issues have been considered in order to assess whether Rockdale Council's access objectives have been met and AS/NZS 2890.1- 2004 have been complied with. The access to the parking area is designed using the B85 base swept path in accordance with AS/NZ 2890.1 – 2004. The assessment of the turning path indicates that a car could adequately access and manoeuvre safely within the car parking area.



SECTION - GROUND FLOOR ACCESS

The driveway access is designed to allow for vehicles entering and exiting in a forward direction with minimum conflict. The parking spaces have been assessed using the B85 Design Templates in accordance with AS/NZS 2890.1:2004. The assessment demonstrates that the access area into and out of the proposed development provides adequate manoeuvring for cars and service vehicles to enter, set down and exit in a convenient manner.



588 – 592 PRINCESS HIGHWAY –GROUND FLOOR ACCESS

AS/NZ 2890.1:2004 (3.2.2) for a type 2-3 driveway specifies that widths of 6- 9 metres entry / exit combined (Table 14). In accordance with the Guide to Traffic Generating Developments, the proposed access driveways - ingress and egress, is Type 2-3 (Table 14) which, requires a combined minimum 6-9 metres. The designed width of the driveway is considered adequate and in accordance with RMS's above Guide.

The proposal also allows for the first 6 metres from the property boundary a 6.0 metres wide access driveway, which complies with AS2890.

TABLE 14 – Criteria re driveway widths AS 2890.1

Recommended driveway types

Type	Entry Width (Metres) W	Exit Width (Metres) W	Min Separation of Driveways (Metres)	Splay at Kerbline (Metres) S	Kerb Return Turnout Radius (Metres) R
1	3-6	combined	NA	0.5	-
2	6-9	combined	NA	1	-
3	6	4-6	1-3	1	2-9
4	6-8	6-8	1-3	1	2-9
5	Direct feed from a controlled intersection via a dedicated public roadway				
6	8-10	8-10	3	1	2-9
7	10-12	10-12	3	1	2-9

Guide to Traffic Generating Developments. October 2002 Issue 2.2 6-3

Selection of driveway type based on parking spaces Road

Frontage	Number of Car Parking Spaces Served by the Driveway					
	Less than 25	25-100	101-300	301-600	More than 600	Heavy Vehicles
Major	1 - 2	2 - 3	3 - 4	4	5	7
Minor	1	1 - 2	2 - 3	3 - 4	4	6

Source: AS/NZ 2890.1:2004

The proposed car parking area is designed in accordance with Off Street Parking and AS 2890.1 – Off Street Parking. The parking set up and dimensions of these spaces have been assessed and comply with AS/NZS 2890.1- 2004. The designed aisle width is a minimum of 5.8 metres at the location of the driveways.

The minimum dimensions of the 90 – degree parking spaces are 2.4 X 5.4 m and designed in accordance with AS/NZS 2890.1- 2004. This design allows for safe manoeuvring in and out of the parking bays. The proposed loading bay on the ground level is designed in accordance in accordance with AS 2890.2 – 2002.

The accessibility parking spaces are assessed against AS 2890.6 "Off Street Parking with People with Disabilities". AS 2890.6 requires parking bay dimensions 2.4 x 5.4 meters with a shared space of 2.4 metres. For each accessible parking space a shared parking bay has been provided in accordance with AS 2890.6. The assessment of these spaces show that, the car park design complies with the requirements of AS 2890.6.

The set out design of the parking and the unrestricted site distances within the car parking area allows for convenient and safe access to the access with minimum conflict between vehicular and pedestrian traffic. The turning manoeuvring clearances for the car parking area have been assessed in accordance with AS/NZS 2890.1 and the RMS Guide to Generating Developments. The B85 and vehicle templates have been applied and showed that; cars can enter and exit the off-street parking bays with adequate clearances.

The total amount of *off-street* parking spaces provided for the needs of the proposed development, as described in previous topics, are adequate for the development's parking demand. The parking associated with the proposal will not impact the surrounding residential area nor access or parking activities associated with other surrounding developments and will not have any adverse on-street parking impact.

The proposed driveway at Lister Ave has been assessed in accordance with AS 2890.1. (Section 3.2). As the speed limit in Lister Ave is 50 km/hour, the desirable sight distance for this speed is 65 metres and the minimum speed is 45 metres.

Unobstructed Sight Distance view from Driveway

As there are 'No Stopping' signs, adjacent to the site, the proposed driveway is unobstructed from both directions and the driveway's visibility is not restricted. The access to the site's driveway is unobstructed. The design of the access driveway has been assessed and the 'Sight Distance' at the Driveway shows that it complies with AS/NZS 2890.1.

9.0 SUMMARY

This traffic and parking report includes the assessment of the traffic and parking implications for the proposed development. It has been prepared to supplement the development application submitted to Rockdale Council for consideration.
The traffic and parking assessment requires to be considered in conjunction with the Architectural plans submitted to Council.

The proposed development comprises of 140 residential units and a Retail Gross Floor Area of approximately 818 m² of retail space and 4 level basement car park at 588 – 592 Princess Highway, Rockdale. The proposed development comprises of the following:

The total 140 apartments are proposed in the new development as follows:

1 bedroom	51
2 bedroom	73
3 bedroom	16
Total apartments	140

There are also three commercial units proposed on the ground floor and one in the lower ground floor with a cumulative area of 818 m². There are total of 209 off- street parking spaces proposed, which include; 156 Residential Spaces 28 Visitor spaces 25 Retail spaces, 1 Car Wash bay and 16 accessible parking spaces. The Car Parking exemption in accordance with SEPP 65 has been analyzed but has not been requested to be applied on this Development. Therefore, the proposed number and composition of parking provision satisfies Rockdale Council's parking code.

The traffic generation assessment based on the *RMS Guide to Traffic Generating Developments* shows that the vehicle trips generated by the proposed development during peak hour are very low and will have insignificant and not noticeable impact on the surrounding road network. There are 44 vehicles expected to be distributed on the road network. In actual terms, the traffic generated by the existing building (Gymnasium and Reception Centre) is slightly below the projected vehicle trips. Therefore, the net increase of vehicular trips, when compared to the projected traffic from the proposed development is very low.

This traffic impact is negligible and is not expected to generate any adverse impact on the intersection of Lister Ave and Princess Highway nor the surrounding road network. The Traffic modelling (*SIDRA*) of the road network adjacent to the proposal indicates that as a result of the development the Level of Service at the intersection of Lister Ave and Princess Hwy will remain unchanged, (LOS B). The proposal can be accommodated at the above intersection with no adverse impacts to the signals operation.

The proposed Development has been designed and assessed in accordance with Rockdale Council's Development Control Plan DCP 2011. It has also been assessed also in accordance with AS/NZS 2890.1:2004 – Off-Street Car parking, AS 2890.2 Off – Street

commercial vehicle facilities, AS 2890.6 and RMS's Guide to Traffic Generating Developments. The layout design of the proposed car parking facilities complies with AS 2890.1 – 2004 in relation to parking bay dimensions, aisles widths, ramps, gradients and turning paths. The proposed loading bay on the ground level is designed in accordance with AS 2890.2 – 2002 and provides swept paths in accordance with the above Australian Standards.

The Car Parking requirements have been assessed in accordance with Council's DCP 2011 – 4.6 Car Parking Access and movement. The proposal provides adequate off-street parking to cater for the parking demand of the proposed development. The proposal is also within 400 metres of walking distance to the transport hub, the train station and the main shopping centre. The parking associated with the proposal is not expected to adversely impact the parking demand of the surrounding properties. The design of the off-street parking area and access arrangements for the proposed development complies and therefore supported.

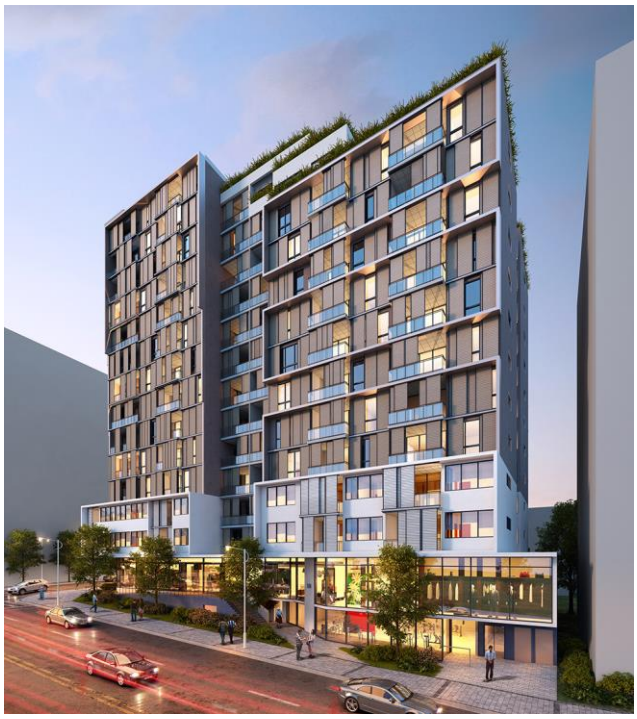
In summary, the proposed parking design satisfy Council's standards and DCP as well as the Australian Standards. There are no adverse parking implications as a result of the parking proposal.

In accordance with NSW Planning Walking and Cycling Guidelines (2004) a 400 metres distance from the local amenities is considered as a walkable area. The proposal is considered as highly accessible to the public transport hub. Cycling is also within a small distance from transport facilities and the Plaza. The Development's access to Rockdale Railway Station and Rockdale Plaza Shopping Centre is within 400 metres.

The driveway access is designed to allow for vehicles entering and exiting in a forward direction with minimum conflict. The parking spaces have been assessed using the B85 Design Templates in accordance with AS/NZS 2890.1:2004 and AS 2890.2. Overall, in terms of parking, set-down and access, the proposal provides satisfactory arrangements and complies with Control Plan DCP and AS/NZS 2890.1:2004 – Off-Street Car parking, and RTA's Guide to Traffic Generating Developments.

The Design submitted for the proposed residential development at 588 – 592 Princess Highway complies with standards set with; AS/NZ 2890.1:2004: Off-Street Car Parking, AS 2890.6: 2009: Off Street Parking for people with disabilities, Rockdale Council's DCP 2011 and the RMS Guide for Generating Developments. In conclusion, the design and access arrangements of the proposed development are in accordance with the above guides and standards and there are no obvious adverse traffic and parking implications identified as a result of the proposed development.

Therefore the proposed traffic and parking arrangements for the proposal at 588 – 599 Princess Highway are supported.



ANNEXURES

R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : NK Traffic
Job No/Name : 5950 ROCKDALE Lister Ave
Day/Date : Wednesday 24th February 2016

Lights

Time Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
0700 - 0715	112	2	10	9	27	721	881
0715 - 0730	154	1	8	3	23	638	827
0730 - 0745	155	3	10	18	25	634	845
0745 - 0800	167	3	9	3	43	562	787
0800 - 0815	135	3	19	18	37	510	722
0815 - 0830	212	5	5	20	41	489	772
0830 - 0845	186	4	11	19	59	522	801
0845 - 0900	190	8	7	18	65	458	746
Per End	1311	29	79	108	320	4534	6381

Heavies

Time Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
0700 - 0715	7	0	0	0	0	2	9
0715 - 0730	7	0	0	0	0	7	14
0730 - 0745	7	0	0	0	0	10	17
0745 - 0800	11	0	0	0	0	5	16
0800 - 0815	7	0	0	0	0	12	19
0815 - 0830	13	0	0	0	0	5	18
0830 - 0845	4	0	0	0	1	8	13
0845 - 0900	7	0	0	0	0	8	15
Per End	63	0	0	0	1	57	121

Combined

Time Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
0700 - 0715	119	2	10	9	27	723	890
0715 - 0730	161	1	8	3	23	645	841
0730 - 0745	162	3	10	18	25	644	862
0745 - 0800	178	3	9	3	43	567	803
0800 - 0815	142	3	19	18	37	522	741
0815 - 0830	225	5	5	20	41	494	790
0830 - 0845	190	4	11	19	60	530	814
0845 - 0900	197	8	7	18	65	466	761
Per End	1374	29	79	108	321	4591	6502

Lights

Peak Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
0700 - 0800	588	9	37	33	118	2555	3340
0715 - 0815	611	10	46	42	128	2344	3181
0730 - 0830	669	14	43	59	146	2195	3126
0745 - 0845	700	15	44	60	180	2083	3082
0800 - 0900	723	20	42	75	202	1979	3041
PEAK HR	588	9	37	33	118	2555	3340

Heavies

Peak Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
0700 - 0800	32	0	0	0	0	24	56
0715 - 0815	32	0	0	0	0	34	66
0730 - 0830	38	0	0	0	0	32	70
0745 - 0845	35	0	0	0	1	30	66
0800 - 0900	31	0	0	0	1	33	65
PEAK HR	32	0	0	0	0	24	56

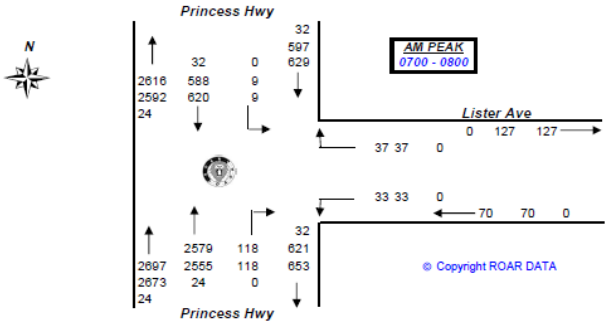
Combined

Peak Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
0700 - 0800	620	9	37	33	118	2579	3396
0715 - 0815	643	10	46	42	128	2378	3247
0730 - 0830	707	14	43	59	146	2227	3196
0745 - 0845	735	15	44	60	181	2113	3148
0800 - 0900	754	20	42	75	203	2012	3106
PEAK HR	620	9	37	33	118	2579	3396

Peds

Time Per	NORTH Princess	EAST Lister Ave	SOUTH Princess	TOT
0700 - 0715	1	9	0	10
0715 - 0730	3	7	0	10
0730 - 0745	4	21	1	26
0745 - 0800	6	8	0	14
0800 - 0815	5	9	0	14
0815 - 0830	4	11	0	15
0830 - 0845	4	14	1	19
0845 - 0900	1	12	0	13
Per End	28	91	2	121

Peak Per	NORTH Princess	EAST Lister Ave	SOUTH Princess	TOT
0700 - 0800	14	45	1	60
0715 - 0815	18	45	1	64
0730 - 0830	19	49	1	69
0745 - 0845	19	42	1	62
0800 - 0900	14	46	1	61
PEAK HR	14	45	1	60



R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : NK Traffic
Job No/Name : 5950 ROCKDALE Lister Ave
Day/Date : Wednesday 24th February 2016

Lights

Time Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
1600 - 1615	502	9	21	26	26	237	821
1615 - 1630	472	7	14	27	41	253	814
1630 - 1645	449	8	30	27	26	249	789
1645 - 1700	505	9	25	26	26	264	855
1700 - 1715	461	10	26	38	32	237	804
1715 - 1730	510	9	25	27	27	251	849
1730 - 1745	424	12	23	29	28	225	741
1745 - 1800	522	16	26	19	25	247	855
Per End	3845	80	190	219	231	1963	6528

Heavies

Time Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
1600 - 1615	7	0	0	0	0	3	10
1615 - 1630	6	0	0	0	0	11	17
1630 - 1645	1	0	0	0	0	4	5
1645 - 1700	4	0	0	0	0	5	9
1700 - 1715	5	0	0	0	0	4	9
1715 - 1730	3	0	0	0	0	8	11
1730 - 1745	6	0	0	0	0	4	10
1745 - 1800	3	0	0	0	0	2	5
Per End	35	0	0	0	0	41	76

Combined

Time Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
1600 - 1615	509	9	21	26	26	240	831
1615 - 1630	478	7	14	27	41	264	831
1630 - 1645	450	8	30	27	26	253	794
1645 - 1700	509	9	25	26	26	269	864
1700 - 1715	466	10	26	38	32	241	813
1715 - 1730	513	9	25	27	27	259	860
1730 - 1745	430	12	23	29	28	229	751
1745 - 1800	525	16	26	19	25	249	860
Per End	3880	80	190	219	231	2004	6604

Lights

Peak Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
1600 - 1700	1928	33	90	106	119	1003	3279
1615 - 1715	1887	34	95	118	125	1003	3262
1630 - 1730	1925	36	106	118	111	1001	3297
1645 - 1745	1900	40	99	120	113	977	3249
1700 - 1800	1917	47	100	113	112	960	3249
PEAK HR	1925	36	106	118	111	1001	3297

Heavies

Peak Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
1600 - 1700	18	0	0	0	0	23	41
1615 - 1715	16	0	0	0	0	24	40
1630 - 1730	13	0	0	0	0	21	34
1645 - 1745	18	0	0	0	0	21	39
1700 - 1800	17	0	0	0	0	18	35
PEAK HR	13	0	0	0	0	21	34

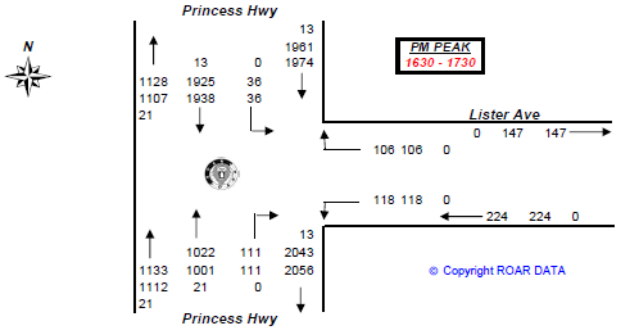
Combined

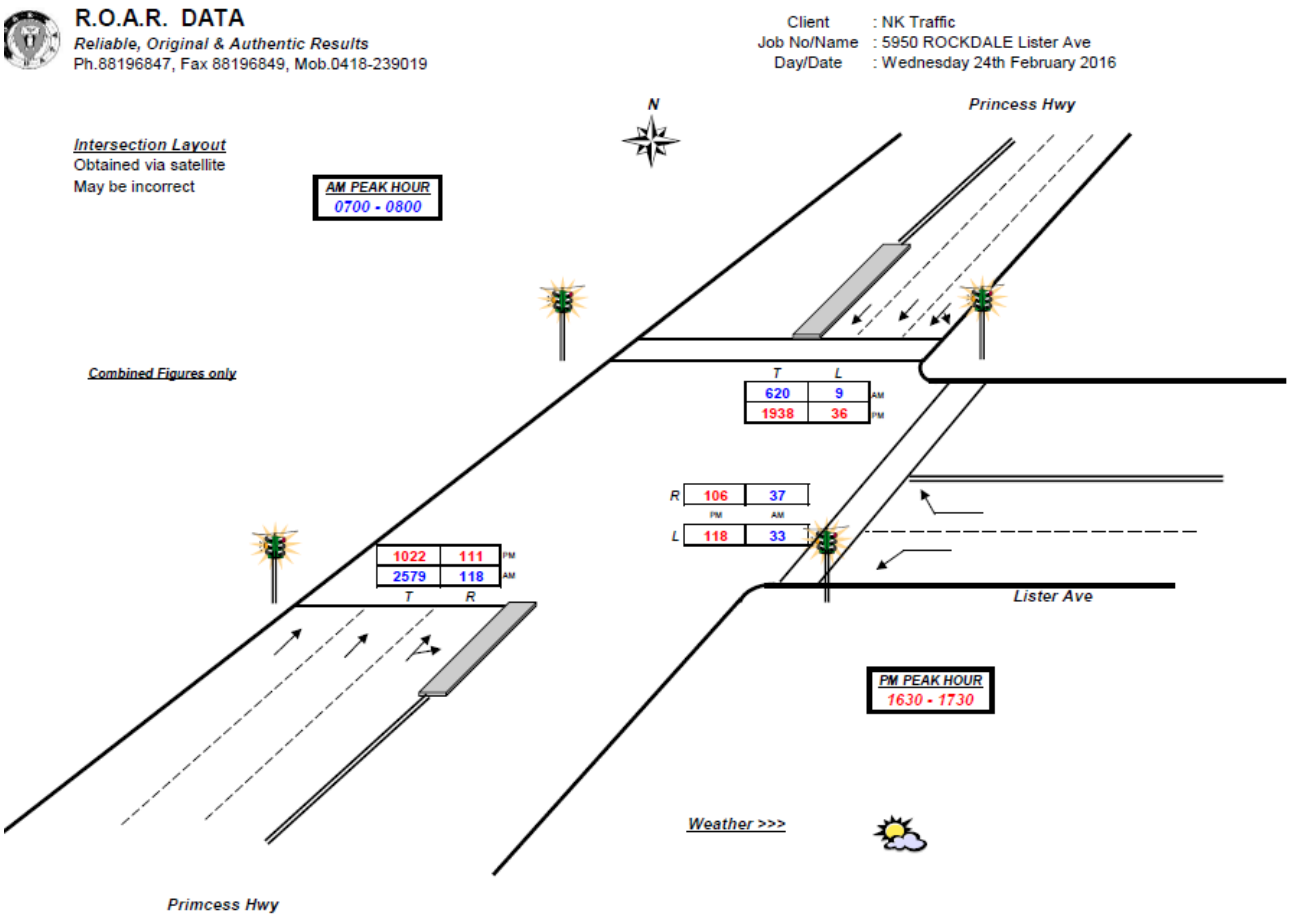
Peak Per	NORTH Princess T	NORTH Princess L	EAST Lister Ave R	EAST Lister Ave L	SOUTH Princess R	SOUTH Princess T	TOT
1600 - 1700	1946	33	90	106	119	1026	3320
1615 - 1715	1903	34	95	118	125	1027	3302
1630 - 1730	1938	36	106	118	111	1022	3331
1645 - 1745	1918	40	99	120	113	998	3288
1700 - 1800	1934	47	100	113	112	978	3284
PEAK HR	1938	36	106	118	111	1022	3331

Peds

Time Per	NORTH Princess	EAST Lister Ave	SOUTH Princess	TOT
1600 - 1615	7	10	0	17
1615 - 1630	8	3	0	11
1630 - 1645	1	1	0	2
1645 - 1700	5	7	0	12
1700 - 1715	15	23	0	38
1715 - 1730	8	11	0	19
1730 - 1745	11	14	0	25
1745 - 1800	5	9	0	14
Per End	60	78	0	138

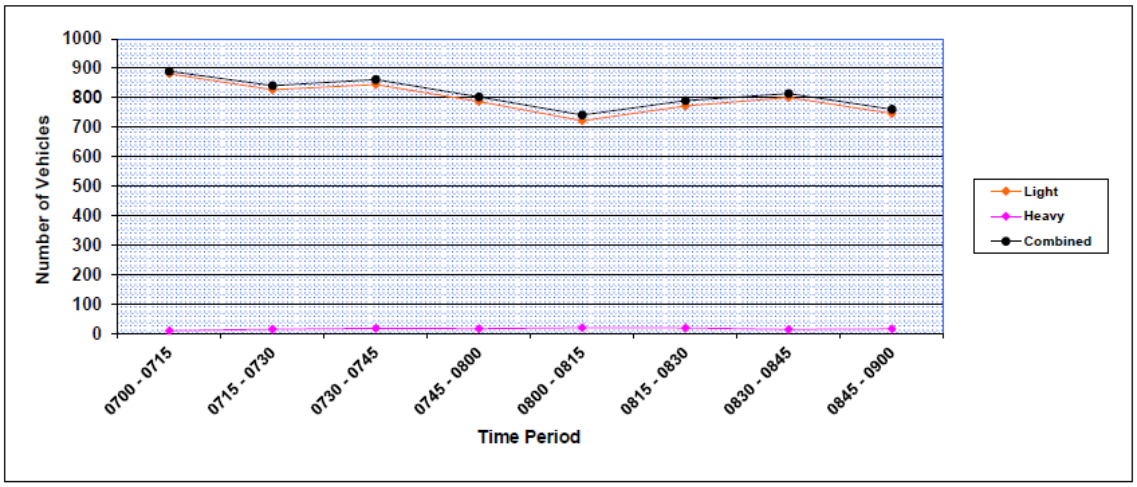
Peak Per	NORTH Princess	EAST Lister Ave	SOUTH Princess	TOT
1600 - 1700	21	21	0	42
1615 - 1715	29	34	0	63
1630 - 1730	29	42	0	71
1645 - 1745	39	55	0	94
1700 - 1800	39	57	0	96
PEAK HR	29	42	0	71





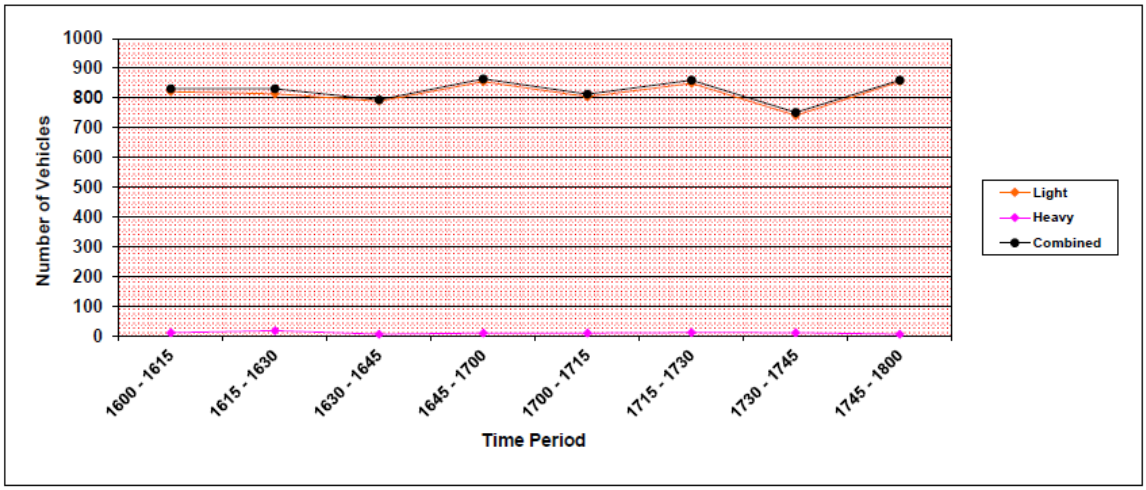
Intersection Lister Ave and Princess Highway
Traffic Counts 24 February 2016

AM
Lister Ave & Princess Hwy

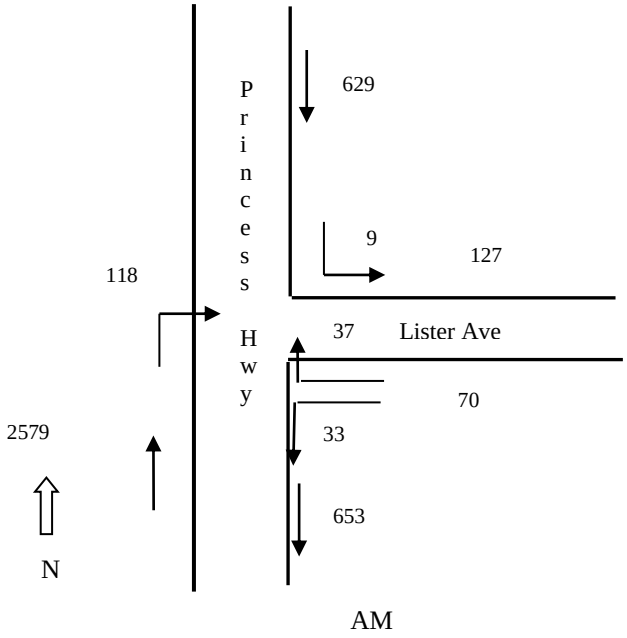


Number of Vehicles vs Time Period

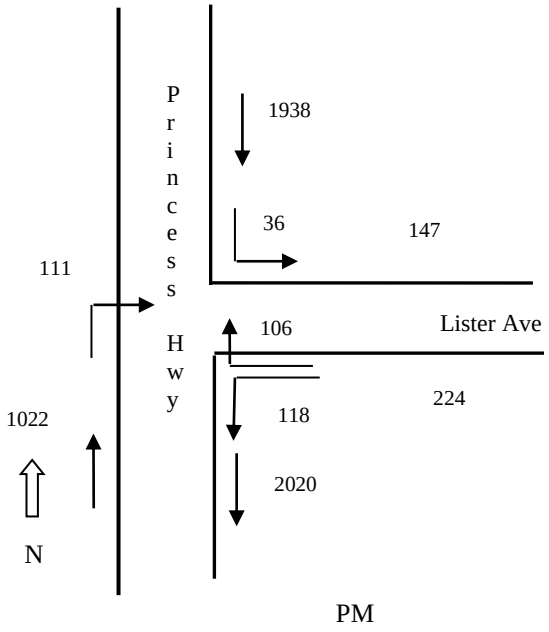
PM
Lister Ave & Princess Hwy



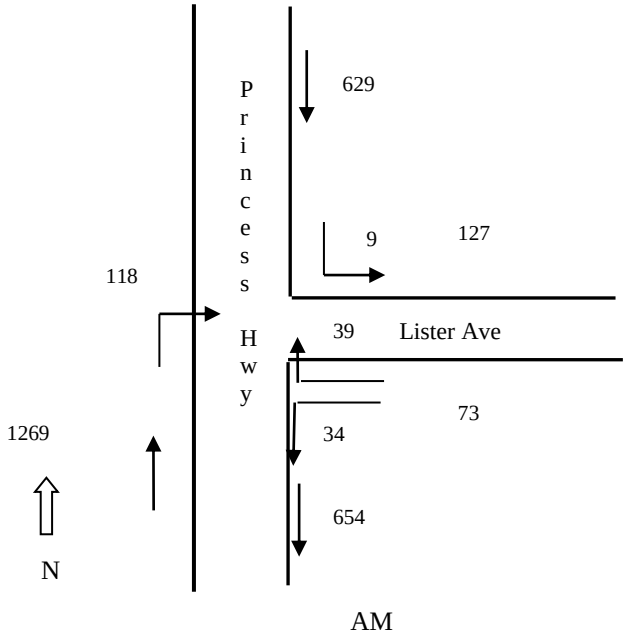
Number of Vehicles vs Time Period



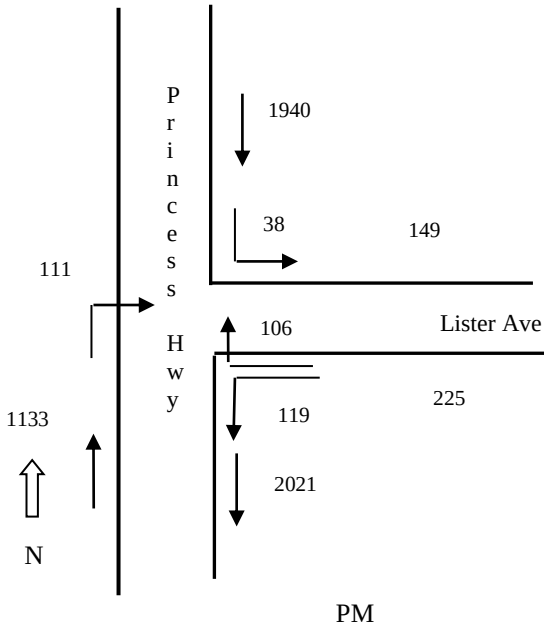
Traffic Distribution
Existing AM Volumes



Traffic Distribution
Existing PM Volumes



Traffic Distribution
Potential AM Volumes



Traffic Distribution
Potential PM Volumes

MOVEMENT SUMMARY

Site: Lister Ave and Princes Hwy - AM EXISTING

Upstream intersection to Subway Rd and Princes Hwy
Signals - Fixed Time Cycle Time = 100 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Total Veh/h	Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed Km/h
Princess Hwy south											
1	T1	2579	5.1	0.772	13.1	LOS A	29.0	168.2	0.58	0.57	34.1
2	R2	118	1.2	0.702	39.0	LOS C	5.3	35.6	1.00	0.79	16.3
Approach		2697	4.6	0.705	12.0	LOS A	29.0	175.2	0.58	0.59	31.3
Lister Ave											
4	L2	33	1.0	0.201	22.1	LOS B	5.1	32.3	0.56	0.67	8.6
6	R2	37	1.0	0.350	34.5	LOS C	5.2	31.2	0.71	0.69	7.3
Approach		70	1.0	0.259	31.6	LOS C	5.5	33.6	0.71	0.69	7.6
Princess Hwy north											
7	L2	9	1.0	0.647	36.1	LOS C	35.6	152.5	0.52	0.79	8.1
8	T1	620	5.3	0.749	33.1	LOS C	35.6	152.5	0.52	0.79	6.7
Approach		629	4.7	0.765	32.2	LOS C	35.6	152.5	0.52	0.79	6.7
All Vehicles		3396	4.5	0.739	23.9	LOS B	35.6	171.5	0.68	0.79	6.2

MOVEMENT SUMMARY

Site: Lister Ave and Princes Hwy - PM EXISTING

Upstream intersection to Subway Rd and Princes Hwy
Signals - Fixed Time Cycle Time = 110 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Total Veh/h	Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed Km/h
Princess Hwy south											
1	T1	1022	5.1	0.672	11.1	LOS A	28.0	162.2	0.65	0.60	34.1
2	R2	111	1.2	0.702	37.0	LOS C	5.3	37.6	1.00	0.83	16.3
Approach		1013	4.6	0.705	13.0	LOSA	28.0	181.4	0.68	0.62	31.3
Lister Ave											
4	L2	118	1.0	0.211	23.1	LOS B	5.1	35.3	0.59	0.70	8.6
6	R2	106	1.0	0.300	36.5	LOS C	5.3	36.2	0.72	0.71	7.3
Approach		214	1.0	0.289	32.6	LOS C	5.5	37.6	0.73	0.70	7.6
Princess Hwy north											
7	L2	36	1.0	0.732	37.1	LOS C	38.6	171.2	0.81	0.78	8.1
8	T1	1938	5.3	0.749	34.1	LOS C	38.6	171.2	0.81	0.78	6.7
Approach		1974	4.7	0.780	34.2	LOS C	38.6	171.2	0.81	0.78	6.7
All Vehicles		3201	4.5	0.781	24.1	LOS B	38.6	181.6	0.81	0.78	6.2

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Lister Ave and Princes Hwy - AM Future

Upstream intersection to Subway Rd and Princes Hwy
Signals - Fixed Time Cycle Time = 130 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Total Veh/h	Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed Km/h
Princess Hwy south											
1	T1	2579	5.1	0.772	13.1	LOS A	29.0	168.2	0.58	0.57	34.1
2	R2	118	1.2	0.702	39.0	LOS C	5.3	35.6	1.00	0.79	16.3
Approach		2697	4.6	0.705	12.0	LOSA	29.0	176.3	0.58	0.59	31.3
Lister Ave											
4	L2	34	1.0	0.231	22.4	LOS B	5.1	34.1	0.56	0.67	8.6
6	R2	39	1.0	0.355	34.8	LOS C	5.2	32.3	0.71	0.69	7.3
Approach		73	1.0	0.271	31.9	LOS C	5.5	33.1	0.71	0.69	7.6
Princess Hwy north											
7	L2	9	1.0	0.647	36.1	LOS C	35.6	153.7	0.62	0.79	8.1
8	T1	620	5.3	0.749	33.1	LOS C	35.6	153.7	0.62	0.79	6.7
Approach		629	4.7	0.772	32.2	LOS C	35.6	153.7	0.62	0.79	6.7
All Vehicles		3399	4.5	0.751	24.2	LOS B	35.6	175.4	0.68	0.79	6.2

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Lister Ave and Princes Hwy - PM Future

Upstream intersection to Subway Rd and Princes Hwy
Signals - Fixed Time Cycle Time = 110 seconds (Practical Cycle Time)

Movement Performance - Vehicles

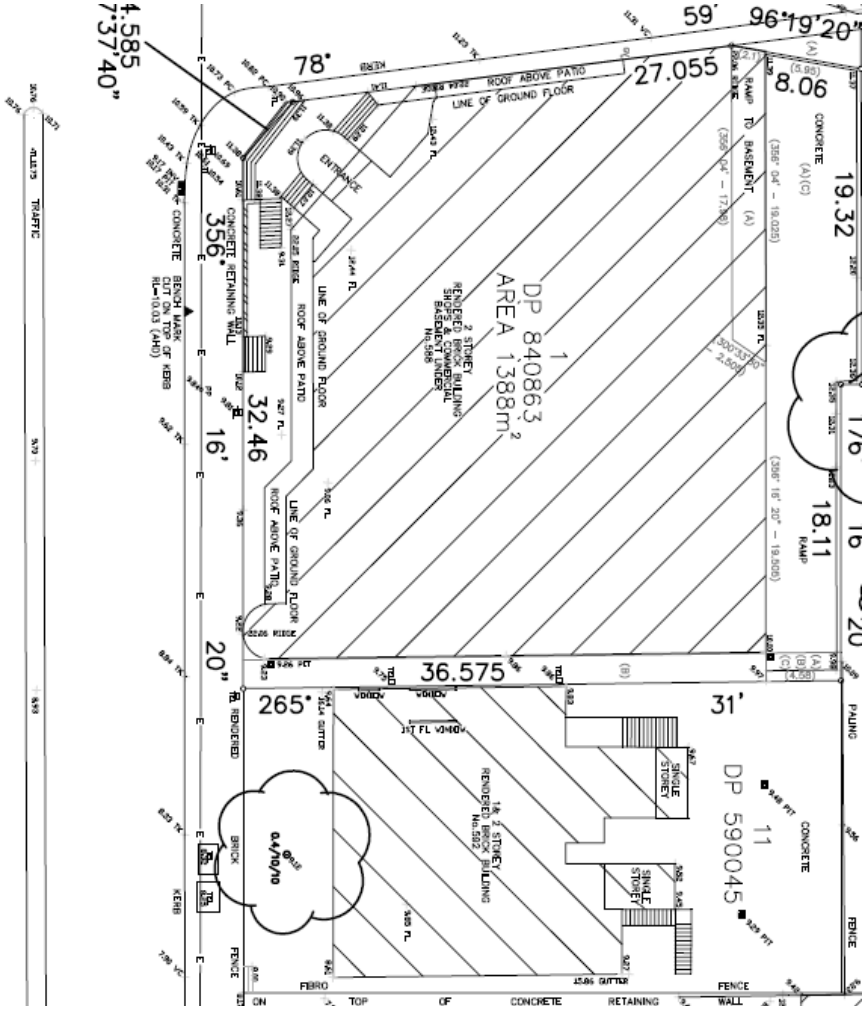
Mov ID	OD Mov	Demand Total Veh/h	Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed Km/h
Princess Hwy south											
1	T1	1022	5.1	0.672	11.1	LOS A	28.0	162.4.	0.65	0.60	34.1
2	R2	111	1.2	0.702	37.0	LOS C	5.3	37.6	1.00	0.83	16.3
Approach		1113	4.6	0.705	13.0	LOSA	28.0	181.4	0.68	0.62	31.3
Lister Ave											
4	L2	119	1.0	0.220	23.8	LOS B	5.6	35.8	0.59	0.70	8.6
6	R2	106	1.0	0.315	36.7	LOS C	5.3	36.2	0.72	0.71	7.3
Approach		225	1.0	0.345	32.8	LOS C	5.5	38.6	0.73	0.70	7.6
Princess Hwy north											
7	L2	38	1.0	0.742	38.2	LOS C	38.9	175.7	0.81	0.78	8.1
8	T1	1938	5.3	0.782	34.5	LOS C	38.6	175.7	0.81	0.78	6.7
Approach		1974	4.7	0.782	34.6	LOS C	38.6	175.7	0.81	0.78	6.7
All Vehicles		3312	4.5	0.782	24.8	LOS B	38.6	175.7	0.81	0.78	6.2

Apartment Split by Type

	No.	%
Studio	0	0.0%
1 bed	51	36.4%
2 bed	73	52.1%
3 bed	16	11.4%
Total	**140**	**100.0%**

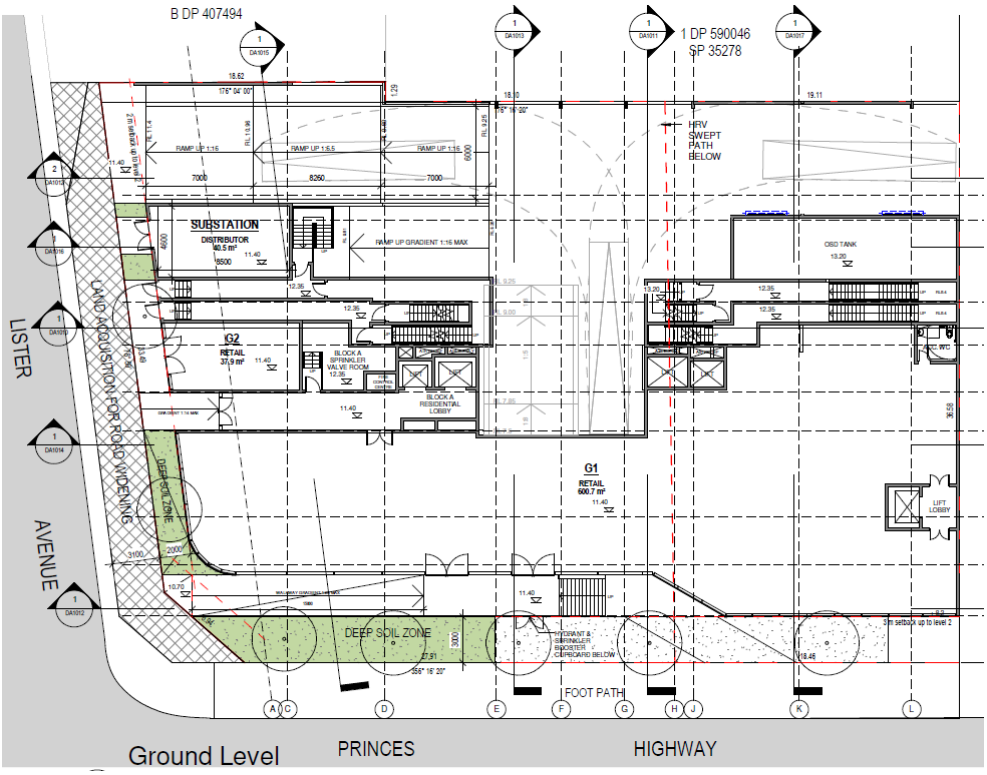
Area Schedule & Analysis

	Gross Building Area (GBA)	Car parking Spaces	Gross Floor Area (GFA) Retail (Commercial)	Gross Floor Area (GFA) Residential	Gross Floor Area (GFA) Total
Basement Lower Level 4	722.72	11	0.00	0.00	0.00
Basement Level 4	1,746.40	49	0.00	0.00	0.00
Basement Level 3	1,746.40	47	0.00	0.00	0.00
Basement Level 2	1,746.40	47	0.00	0.00	0.00
Basement Level 1	1,746.40	48	0.00	0.00	0.00
Lower Ground Floor	1,469.10	7	173.70	0.00	173.70
Ground Floor	983.70	0	644.50	0.00	644.50
Level 1	1,263.60	0	0.00	1,043.40	1,043.40
Level 2	1,263.60	0	0.00	1,043.30	1,043.30
Level 3	1,194.70	0	0.00	946.20	946.20
Level 4	1,194.70	0	0.00	946.20	946.20
Level 5	1,194.70	0	0.00	946.20	946.20
Level 6	1,194.70	0	0.00	946.20	946.20
Level 7	1,194.70	0	0.00	946.20	946.20
Level 8	1,194.70	0	0.00	946.20	946.20
Level 9	1,194.70	0	0.00	946.20	946.20
Level 10	1,194.70	0	0.00	946.20	946.20
Level 11	1,179.70	0	0.00	708.80	708.80
Level 12	895.60	0	0.00	621.60	621.60
Level 13	759.50	0	0.00	422.70	422.70
Totals	**25,080.72**	**209**	**818.20**	**11,409.40**	**12,227.60**

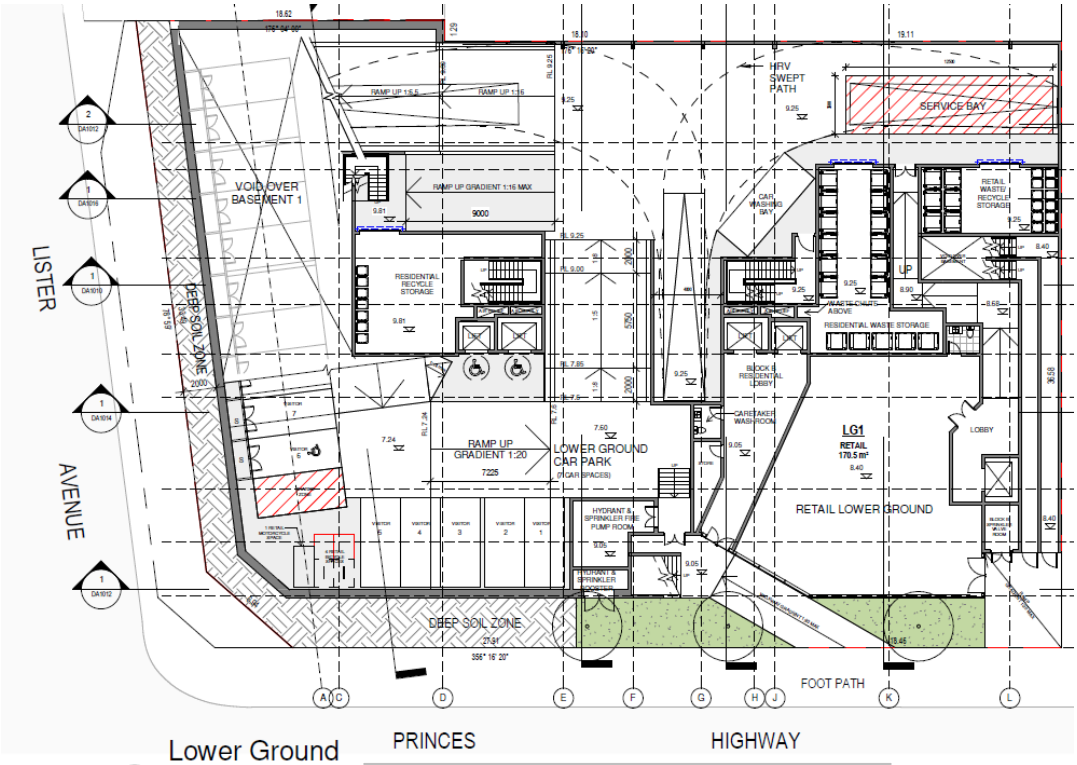

DP 840863
AREA 1388m²
27.055
8.06
19.32
18.11
36.575
32.46
RAMP TO BASEMENT
ROOF ABOVE PATIO
LINE OF GROUND FLOOR
ENTRANCE
CONCRETE RETAINING WALL
RENDERED BRICK SHOPS & COMMERCIAL BUILDING
SINGLE STOREY
DP 590045
FENCE
CONCRETE
TRAFFIC

Site Plan

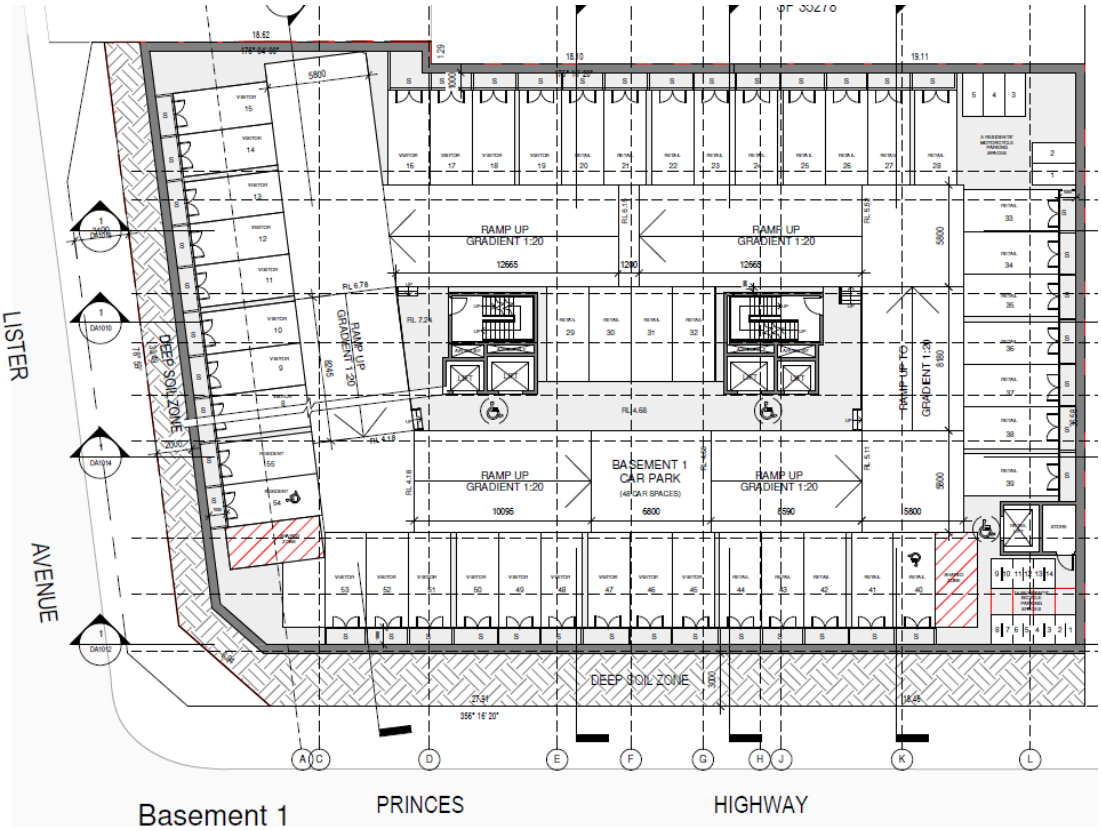
PROPOSED DEVELOPMENT
588 – 592 Princess Highway, Rockdale



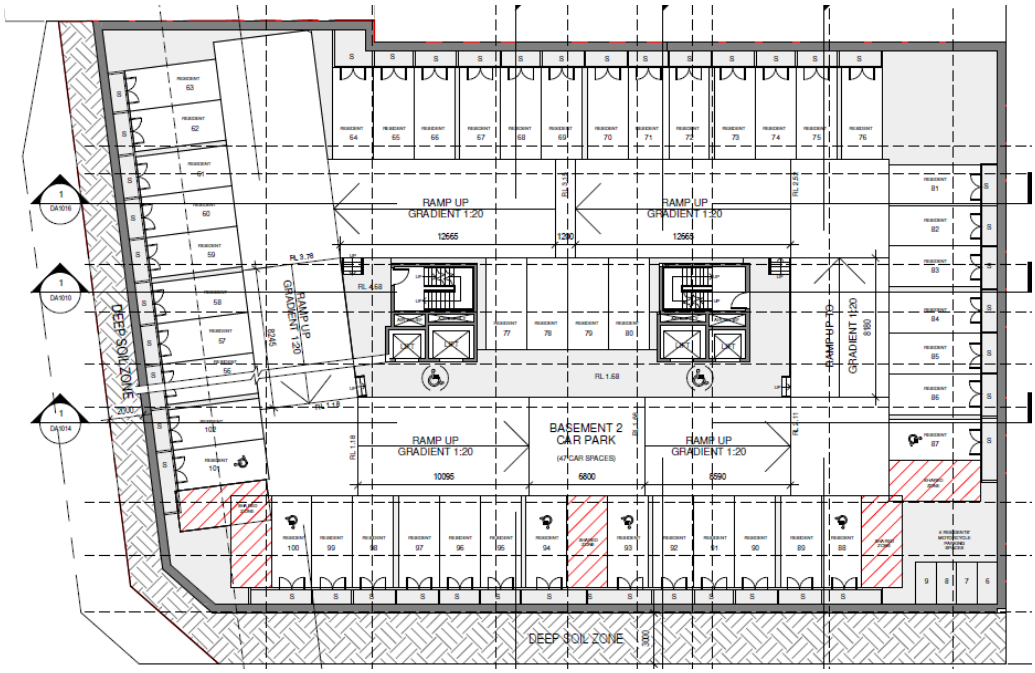
GROUND LEVEL



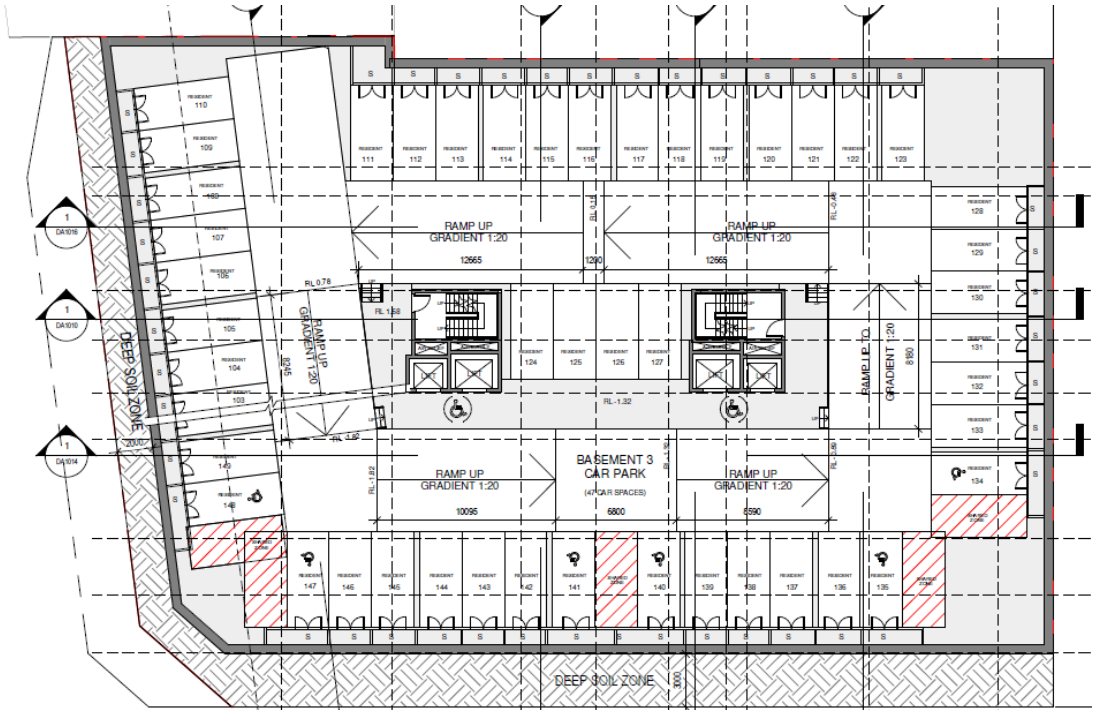
LOWER GROUND LEVEL



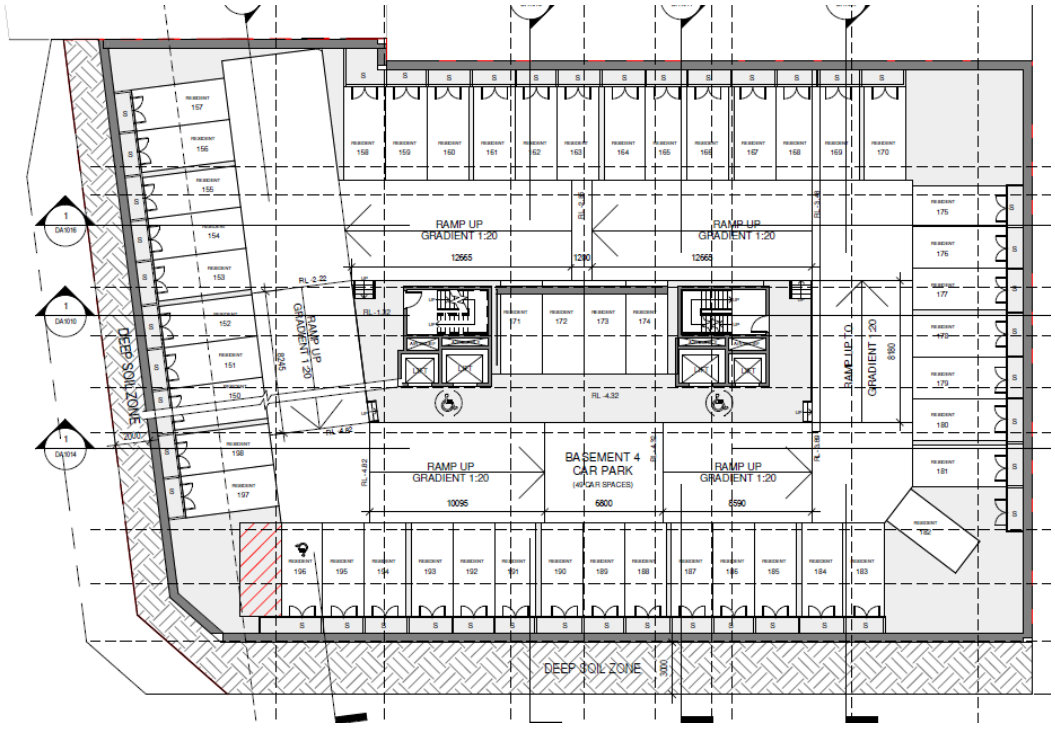
BASEMENT LEVEL 1



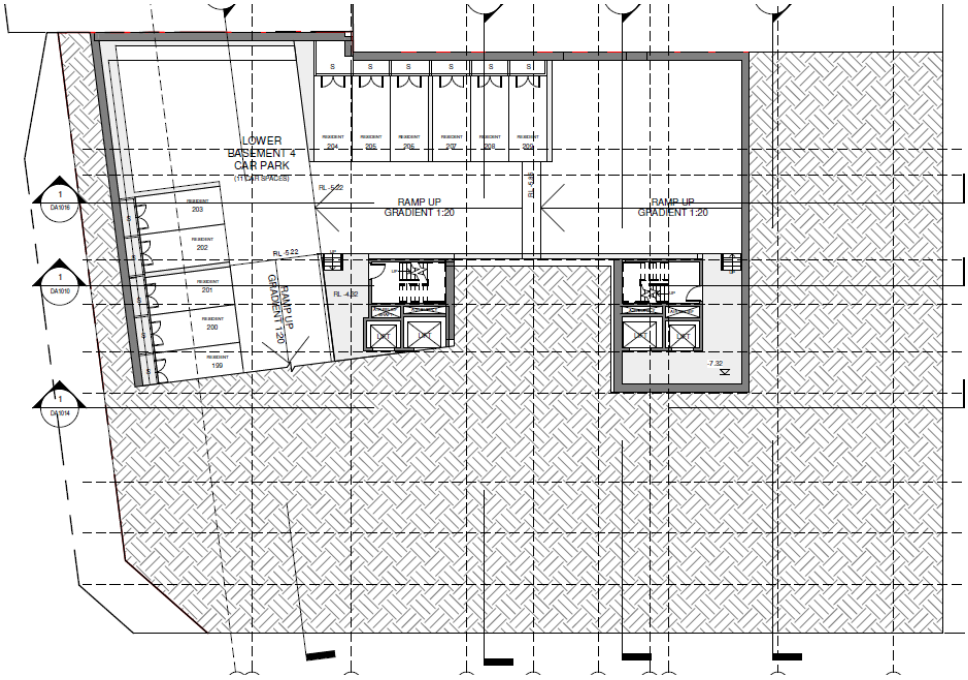
BASEMENT LEVEL 2



BASEMENT LEVEL 3



BASEMENT LEVEL 4



LOWER BASEMENT LEVEL 4