

Proposed Mixed-Use Development

**Bronte RSL Club Site
113 Macpherson St, Bronte**

REVISED TRAFFIC AND PARKING ASSESSMENT REPORT

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Ref 14013

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1. INTRODUCTION

This Traffic and Parking Assessment Report has been prepared to accompany a revised application for a mixed-use residential/retail/licensed club development proposal to be located on the Bronte RSL Club site at 113 Macpherson Street, Bronte (Figures 1 and 2).

The proposed development will involve the demolition of the existing RSL Club building on the site to facilitate the construction of a new mixed-use residential/retail development which retains the existing licensed club in the new building.

The revised development proposal provides all vehicular access to/from the site (including delivery vehicles) via a new driveway in Macpherson Street adjacent to the western boundary of the site, consistent with the requirements of the Waverley DCP 2012.

No vehicular access to the site is proposed from Chesterfield Lane at the rear of the site.

The revised development proposal also reduces the number of residential apartments proposed from 28 apartments to 26 apartments.

The revised Traffic and Parking Assessment Report takes into account the matters raised in a peer review report undertaken by GTA Consultants (engaged by Waverley Council) as follows:

- **Traffic Generation:** the specific traffic generation rates for supermarkets and specialty shops has been adopted, as recommended by the GTA report
- **Passing Trade:** discusses the reductions in the traffic generation potential of the proposed development which may occur due to passing trade, or linked trips (ie; traffic generated by the proposal but which is already using the adjacent road network)
- **Traffic Distribution:** adopts the revised traffic distribution with increased traffic movements to/from the west compared with those to/from the east, as recommended by the GTA report

- **RSL Club Traffic:** confirms that the traffic generated by the RSL club component will use the Macpherson Street site access driveway, as recommended by the GTA report
- **Schedule of Traffic Surveys:** reviews the traffic counts undertaken for the weekday PM peak and the Saturday peak periods as part of this traffic assessment
- **Seasonal Traffic Flows:** adopts a 14% increase in “existing” through traffic flows in Macpherson Street, as recommended in the GTA report to reflect “seasonal” variations in traffic flows (although the GTA report also notes that the adopted methods for designing traffic facilities are *not* based on the annual peak traffic flows)
- **Traffic Impact Assessment:** reviews the need to undertake additional traffic assessments at other intersections on the surrounding road network, specifically the Macpherson Street/St Thomas Street , the Arden Street/Chesterfield Parade and the Chesterfield Parade/St Thomas Street intersections
- **Traffic Impacts:** undertakes a revised/updated traffic impact assessment based on the recommendations made by the GTA report
- **Contributions:** reviews the need to undertake further investments in traffic facility upgrades on the adjacent road network, as recommended by the GTA report
- **Site Access:** retains site access for the retail and RSL components in Macpherson Street, rather than on Chesterfield Lane, as recommended by the GTA report
- **Loading Dock Location and Access:** reviews the loading dock arrangements, taking into account the comments made in the GTA report, noting that access is now proposed in Macpherson Street, rather than on Chesterfield Lane, as recommended by the GTA report
- **Loading Dock Capacity:** assesses the capacity of the proposed loading dock arrangements and reviews the frequency and type of vehicles expected to serve the site

- **Truck Manoeuvres:** reviews the swept turning path and overhead clearance requirements of vehicles accessing the loading dock, noting that *all* delivery vehicles servicing the site will be the same size or *smaller* than the trucks previously used by Linfox/Carlton United Breweries when making deliveries to the RSL club
- **Truck Vertical Clearances:** reviews the likely heights of delivery trucks expected to be accessing the proposed loading dock, noting that the height of *all* delivery vehicles servicing the site is expected to be the same height or *lower* than the 3.5m height trucks previously used by Linfox/Carlton United Breweries when making deliveries to the RSL club, although the revised dock provides an overhead clearance of 4.5m
- **Parking Provisions:** reviews the off-street parking provisions incorporated in the development proposal in accordance with the requirements of *Waverley DCP 2012*. Two on-street parking spaces will be lost in Macpherson Street to accommodate the proposed new vehicular access driveway
- **Parking Layout:** assesses the geometric design layout of the proposed vehicular access and carparking arrangements for compliance with the requirements of *AS2890.1*
- **Bicycle Parking:** the overall bicycle parking provisions incorporated in the development proposal meet Council's requirements. However, it is recommended that part of the bicycle parking provision should be located at street level, with direct access to the retail component, as recommended in the GTA report
- **Pedestrian Facilities:** the existing pedestrian refuge island located in Macpherson Street is ideally located to suit the needs of the proposed development, and it is therefore proposed to be retained in its present location.

The proposed retail facilities will comprise a fresh produce mini-market and a number of smaller specialty stores. The proposed retail facilities will cater primarily for the food and grocery shopping needs of the “main trade area” which extends for a distance of less than 1 km around the site.

Given that the vast majority of food and grocery spending within the main trading area currently occurs outside the main trade area¹, in centres such as Bondi Junction and Randwick, the proposed development is likely to result in a *reduction* in the number of *vehicle-kilometres driven* by local residents when undertaking their food and grocery shopping. In particular, the *reduction* in the number of *vehicle-kilometres driven* will occur because:

- residents living within walking distance of the site will be able to *walk* to the site, rather than *drive* to Bondi Junction or Randwick, and
- for customers that *drive* to the site, their car journey will be *much shorter* than driving to Bondi Junction or Randwick to undertake the same shopping task.

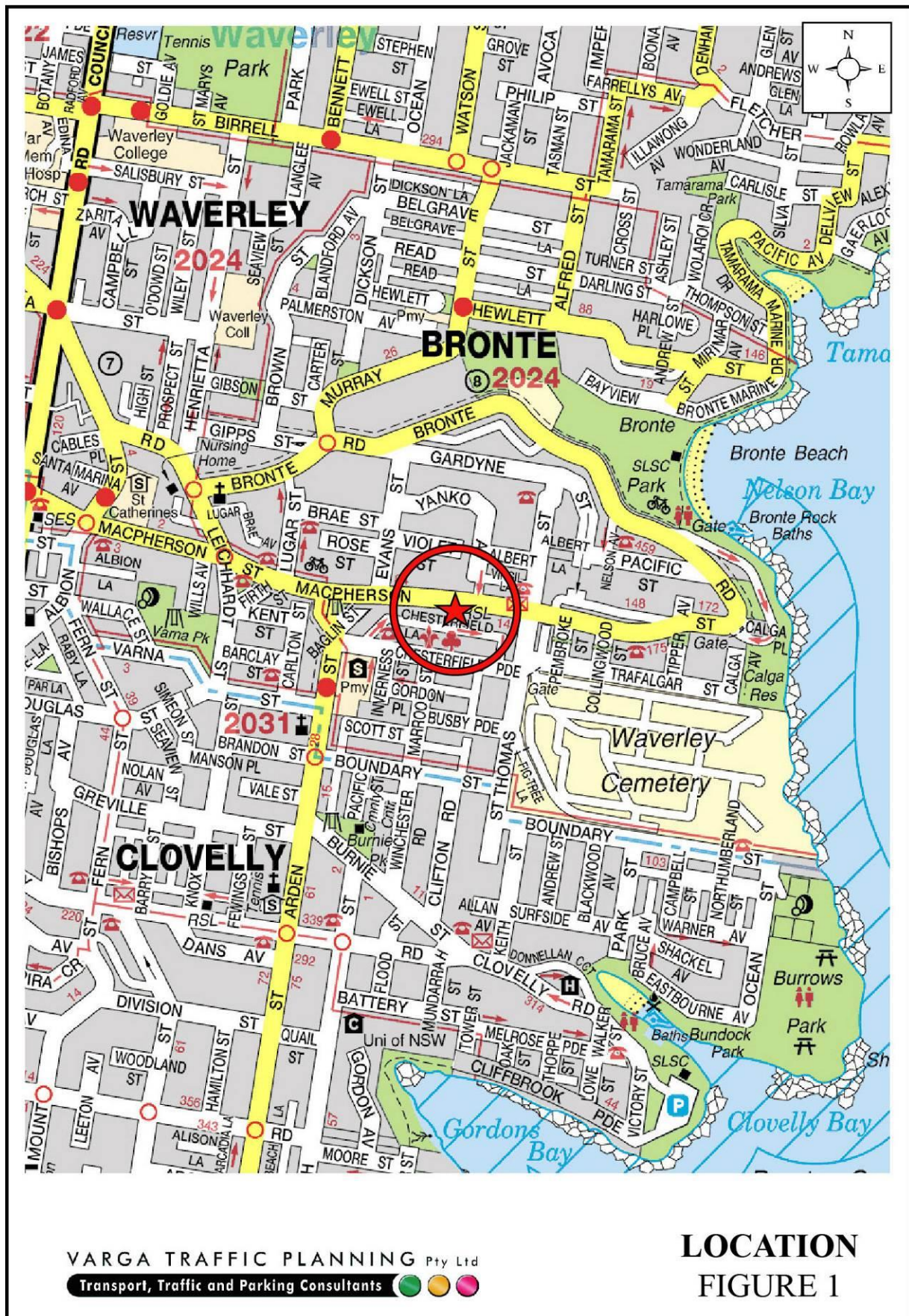
Car parking is to be provided in a new basement car parking area. Vehicular access to the site is to be provided via a driveway located in Macpherson Street. There will be no vehicular access to the site via Chesterfield Lane.

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

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

¹ Location IQ “*Bronte RSL Redevelopment, Sydney Economic Impact Assessment*” (August 2012)

- provides recommendations on how loading should take place, to be included in a Management Plan for the loading dock.
- considers the appropriateness of locating the car parking access driveway in Macpherson Street
- assesses the adequacy and suitability of the quantum of off-street car parking provided on the site and the wider benefits that flows to the Macpherson Street retail area through the provision of additional parking
- considers the safety and amenity of residents and children attending Clovelly Public School and Bronte Child Care Centre.





2. PROPOSED DEVELOPMENT

Site

The subject site is located on the southern side of Macpherson Street and has a rear lane frontage to Chesterfield Lane. The site has a street frontage approximately 49 metres in length to both Macpherson Street and Chesterfield Lane and occupies an area of approximately 2,231m².

The subject site is currently occupied by the Bronte RSL Club – a licensed venue (now closed) comprising a bar area, bistro, TAB and gaming facilities as well as several rooms which may be leased out to various community groups.

Off-street parking is currently provided for 22 cars in a rear outdoor car parking area. Vehicular access to the car parking facilities is provided via an entry/exit driveway located towards the western end of the Chesterfield Lane site frontage.

Proposed Development

The proposed development will involve the demolition of the existing RSL Club building on the site to facilitate the construction of a new mixed-use residential/retail/licensed club building.

Retail uses are proposed on the ground floor level, fronting Macpherson Street, and will comprise a mini-market and specialty shops. The cumulative floor area of the retail component is 1,179m².

The first floor level will comprise a new, smaller RSL Club with a floor area of 789m².

A total of 26 residential apartments are proposed in the new building on the levels above, as follows:

1 bedroom apartments:	5
2 bedroom apartments:	15
3 bedroom apartments:	6
TOTAL APARTMENTS:	26

Off-street parking is proposed for a total of 106 cars in a new basement car parking area, with vehicular access to be provided via a two-way driveway off the Macpherson Street frontage of the site.

Deliveries to the RSL club will once again be made 2-3 times per week, using the same 11.1m long rigid truck (with a height of 3.5m) operated by Linfox/Carlton United Breweries, as occurred prior to the closure of the club.

There will be 3-4 truck deliveries per day to the retail facilities, using a 10.3m long rigid truck (with a height of 3.4m), plus deliveries using light commercial vehicles (such as white vans and the like), making deliveries such as fresh bread, fish, milk etc., yielding a total of 10-15 deliveries per day associated with the retail component of the development proposal.

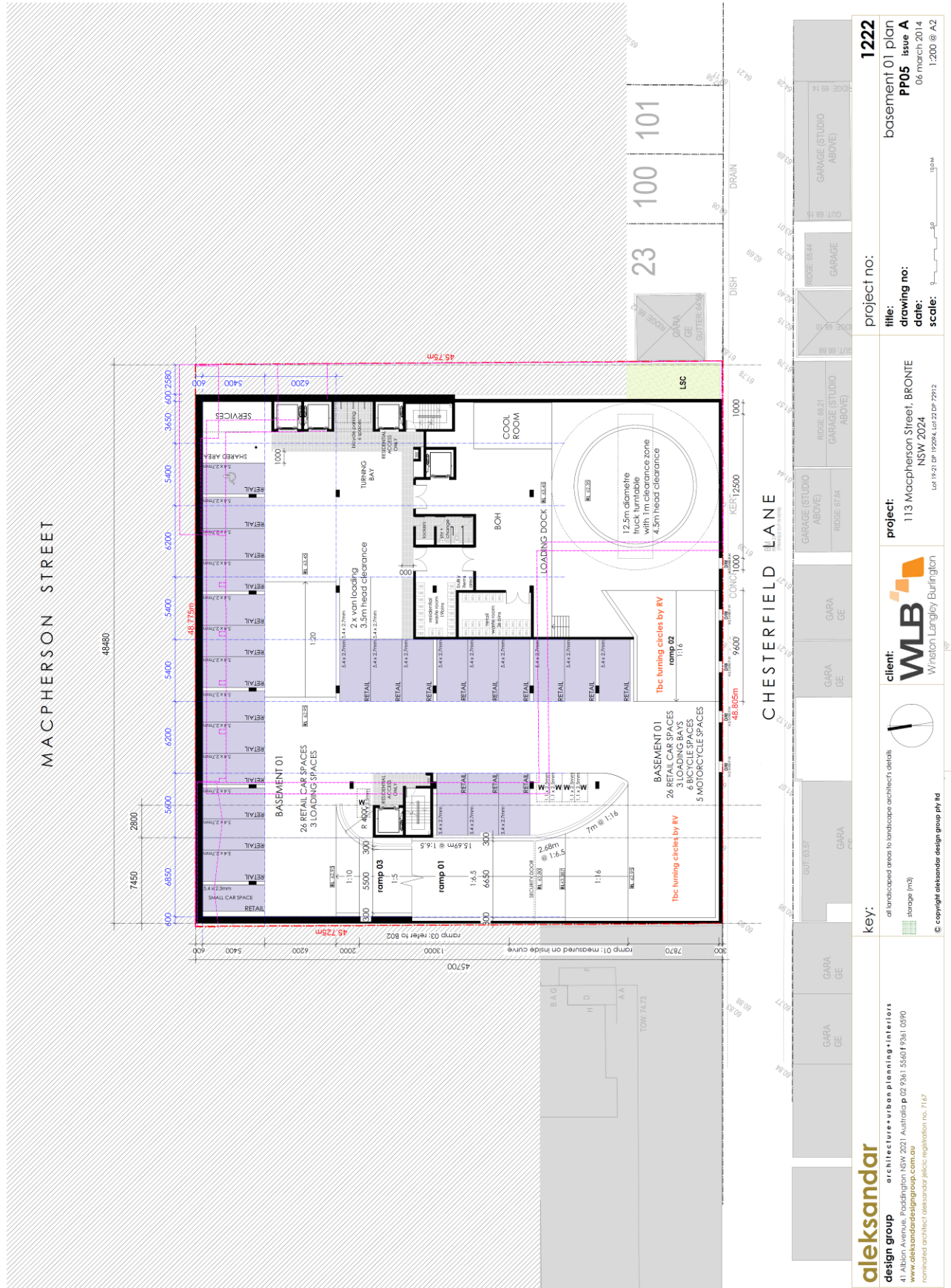
It is pertinent to note that *all* of the delivery vehicles associated with the retail component of the development proposal will be either the same size or *smaller* than the 11.1m long rigid truck which previously made deliveries to the RSL club loading dock which was accessed via Chesterfield Lane.

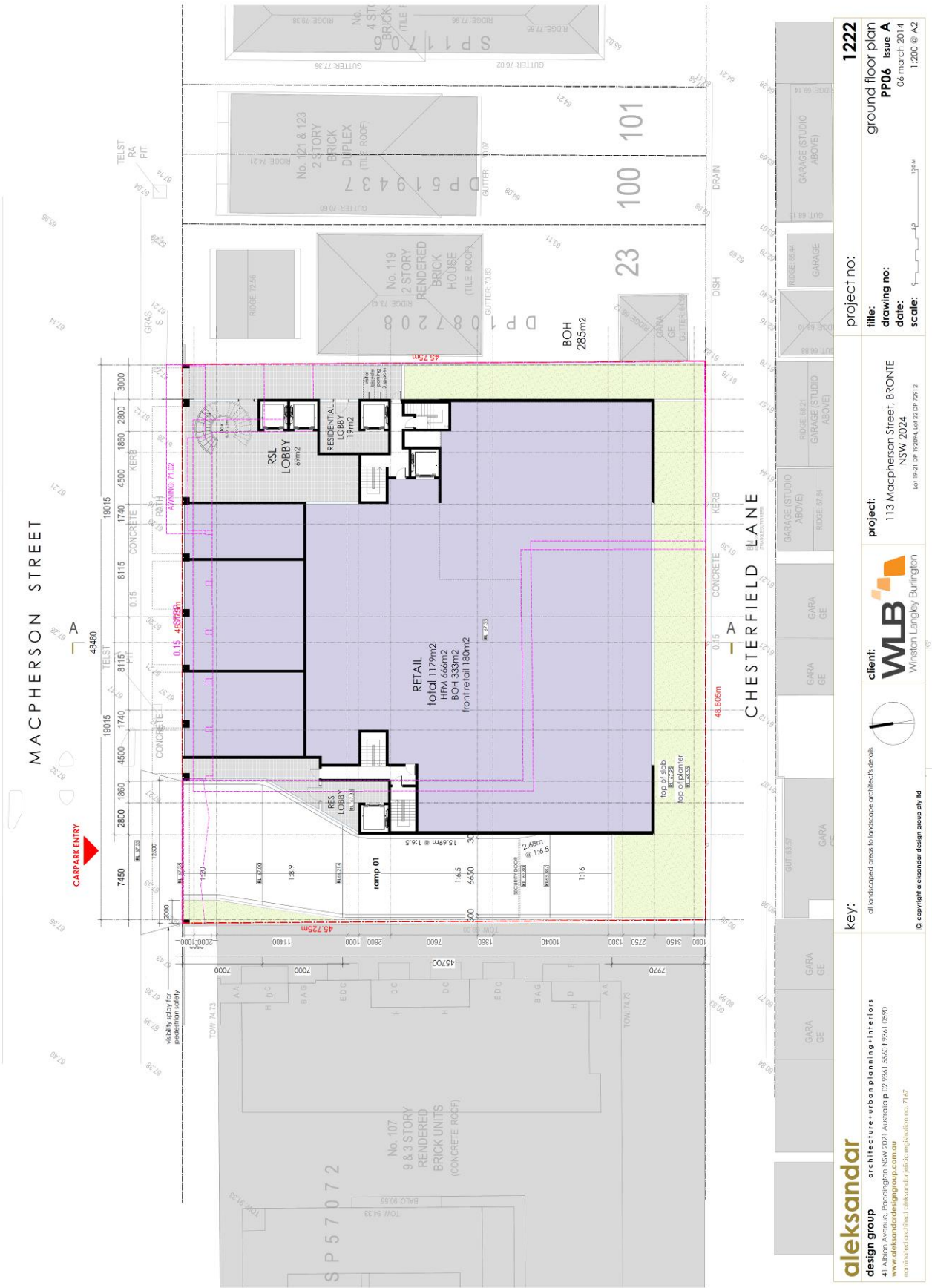
A Loading Dock Management Plan will be prepared to ensure that deliveries are staggered throughout the day, and that a dock manager will be present in the loading dock whenever a delivery vehicle is scheduled to arrive. This document will be prepared in close consultation with Council and the community.

The loading dock is to be located on basement level 1, at the rear of the building. Vehicular access to the loading dock is to be provided via the driveway proposed in Macpherson Street. A 12.5m diameter turntable located within the loading dock will ensure that all vehicles will be able to enter and exit the loading dock whilst travelling in a forward direction at all times.

Preliminary Concept Plans of the proposed development have been prepared by *Aleksandar Design Group* and are reproduced in the following pages.







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.

Carrington Road and Council Street are classified by the RMS as *State Roads* and provide the key north-south road link in the area, linking Frenchmans Road to Bondi Road. Carrington Road and Council Street typically carry two traffic lanes in each direction in the vicinity of the site. Kerbside parking is generally permitted on both sides of the roads outside of commuter peak periods.

Macpherson Street is classified by the RMS as a *Regional Road* which provides the key east-west road link in the Bronte area. It typically carries one traffic lane in each direction in the vicinity of the site with kerbside parking generally permitted.

Chesterfield Parade is a local, unclassified road which is primarily used to provide vehicular and pedestrian access to frontage properties. It has a pavement width of approximately 11m between kerbs, with kerbside parking generally permitted on both sides of the road between large, mature street trees which are also located in the kerbside lanes. A school is located on the southern side of Chesterfield Parade.

Chesterfield Lane is a local, unclassified laneway which is primarily used to provide rear vehicular and pedestrian access to properties fronting Macpherson Street and Chesterfield Parade. Kerbside parking is permitted at selected locations only. Chesterfield Lane was previously used to provide deliveries to the RSL club, using 11.1m long rigid trucks.

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 50 km/h SPEED LIMIT which applies to Macpherson Street and all other local roads in the area



- a ONE-WAY eastbound restriction in Chesterfield Lane
- a PEDESTRIAN REFUGE ISLAND in Macpherson Street directly outside the site.

Existing Traffic Conditions

An indication of the existing traffic conditions on the road network in the vicinity of the site is provided by peak period traffic surveys undertaken as part of this traffic study. The traffic surveys were undertaken in Macpherson Street where it intersects with Arden Street and in Chesterfield Lane, at the rear of the site. The results of the traffic surveys are reproduced in full in Appendix A and reveal that:

- two-way traffic flows in Macpherson Street past the site frontage are typically in the order of 400 vehicles per hour (vph) during the Friday *afternoon* commuter peak period
- peak hour traffic flows in Chesterfield Lane are in the order of 28 vph (including traffic flows generated by the RSL club carpark of 21 vph)
- two-way traffic flows in Arden Street are in the order of 900 vph during the Friday *afternoon* peak period.

The peer review report undertaken by GTA Consultants recommended that through-traffic movements on Macpherson Street be increased by 14% to account for seasonal variations. That recommendation has been adopted for the purposes of this analysis.

Projected Traffic Generation

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

The RMS *Guidelines* are based on extensive surveys of a wide range of land uses, and nominate the following traffic generation rates which are applicable to the residential component of the development proposal:

Medium Density Residential Flat Buildings

0.4-0.5 peak hour vehicle trips per 1 & 2 bedroom dwelling

0.5-0.65 peak hour vehicle trips per 3+ bedroom dwelling

The traffic generation rates nominated in the RMS *Guidelines* for the retail component of the development proposal have recently been updated for the RMS by Halcrow Consulting. The Halcrow report nominates the following formulae for estimating the traffic generation potential of retail developments when the floor area of the specific components of the retail development is known:

Friday (PM)

- $PVT(P) = -0.001 A(S) - 0.006 A(F) + 0.133 A(SM) + 0.034 A(SS) + 0.186 A(OM) - 0.034 A(C)$

Saturday:

- $PVT = 0.005 A(S) + 0.019 A(F) + 0.144 A(SM) + 0.038 A(SS) + 0.19 A(OM) - 0.033 A(C)$

Where the components are described as follows:

- A(S): Slow trade includes major department stores such as David Jones and Myer, furniture, electrical and whitegoods stores.
- A(F): Faster trade includes discount department stores such as K-Mart and Target, together with larger specialist stores; e.g. Lowes, Lincraft, etc.
- A(SM): Supermarket includes stores such as Woolworths, Coles, IGA, Franklins and large fruit markets.
- A(SS): Specialist shops / Secondary retail / Automobile services includes smaller retail outlets (eg clothing, jewellery, hairdressers, footwear, fast food, delicatessens, newsagents, sports stores, chemists, service stations, etc.)
- A(OM): Office / Medical / Child care / Other including medical centres, general business offices, child care, library, etc.
- A(C): Cinemas.

As noted in the GTA report, the RMS *Guidelines* indicate that surveys of clubs undertaken 24 years ago identified a traffic generation rate of 10 vehicle trips per hour per 100m² of licensed club floor area, although the RMS *Guidelines* also notes that assessment of new clubs should be based on recent surveys of similar clubs. In this instance, a survey undertaken on the site found that the RSL club generated 21 vph during the Friday PM peak, prior to its closure. Whilst this “existing” traffic generation potential is slightly higher than the 7.5 vph used in the GTA report, it has been adopted for the purposes of this assessment.

Application of the above traffic generation rates and characteristics to the development proposal yields a traffic generation potential of approximately 171 vph during the Friday PM peak, and approximately 162 vph during the Saturday peak period, as set out in Table 3.1 below:

TABLE 3.1 - PROJECTED TRAFFIC GENERATION POTENTIAL

Component	Size/Number	Friday PM Peak		Saturday Noon Peak	
		Peak Traffic Generation Rate	Peak Traffic Generation (vph)	Peak Traffic Generation Rate	Peak Traffic Generation (vph)
1-bedroom apartment	15	0.4	2.0	0.4	2.0
2-bedroom apartment	15	0.5	7.5	0.5	7.5
3-bedroom apartment	6	0.65	3.9	0.65	3.9
Supermarket	980m ²	13.3/100m ²	130.3	14.4/100m ²	141.1
Specialty shops	199m ²	3.4/100m ²	6.7	3.8/100m ²	7.6
RSL	789m ²	10.0/100m ²	21.0	-	0 ¹
Total peak period movements to/from development		171.4 vph		162.1 vph	

¹ RSL traffic generation assumed to occur outside the Saturday peak

Passing Trade

The RMS Guidelines allows for the traffic generation potential of retail developments to be discounted by a certain amount, depending on the nature of the road network. This discounting allows for “linked trips” and for “multi-purpose trips” which can reduce the overall traffic generation potential of a development proposal, as follows:

- a “linked trip” is a trip taken as a side-track or “detour” from another trip, for example a person calling into the centre on the way home from work
- a “multi-purpose trip” is where more than one shop or facility is visited on a single trip, for example a person visiting the centre who also visits another shop in the Macpherson Street strip on the same trip.

The RMS *Guidelines* suggest a discount of about 20% for “multi-purpose trips” (where more than 1 shop in the area is visited on a single trip), whilst surveys conducted for the Halcrow report found that 46% of trips to shopping centres were “linked trips”.

If the 46% discount for the “linked trips” identified in the Halcrow report was applied to the proposed development, the traffic generation potential of the proposed development would be reduced to 108 vph and 94 vph during the Friday PM Peak and Saturday peak periods respectively, as set out in Table 3.2 below:

**TABLE 3.2 - PROJECTED TRAFFIC GENERATION POTENTIAL
WITH RETAIL TRAFFIC DISCOUNTED DUE TO “LINKED TRIPS”**

Component	Size/Number	Friday PM Peak		Saturday Noon Peak	
		Peak Traffic Generation Rate	Peak Traffic Generation (vph)	Peak Traffic Generation Rate	Peak Traffic Generation (vph)
1-bedroom apartment	5	0.4	2.0	0.4	2.0
2-bedroom apartment	15	0.5	7.5	0.5	7.5
3-bedroom apartment	6	0.65	3.9	0.65	3.9
Supermarket	1011m ²	13.3/100m ²	70.4	14.4/100m ²	76.2
Specialty shops	199m ²	3.4/100m ²	3.6	3.8/100m ²	4.1
RSL	789m ²	10.0/100m ²	21.0	-	0 ¹
Total peak period movements to/from development		108.4 vph		93.7 vph	

¹ RSL traffic generation assumed to occur outside the Saturday peak

Whilst there is no doubt that the traffic generation potential of the proposed development would be *reduced* due to the incidence of “linked trips” and/or “multi-purpose trips”, the extent of that reduction or discounting cannot be accurately quantified.

In the circumstances, and in the interest of providing a more *robust* traffic assessment, no allowance has been made for any discounting due to “linked trip” and/or “multi-purpose trip” in this report.

Reduction in Vehicle-Kilometres Driven

As noted in the introduction to this report, the proposed development is likely to result in a *reduction* in the number of *vehicle-kilometres driven* by local residents when undertaking their food and grocery shopping. The *reduction* in the number of *vehicle-kilometres driven* will occur because:

- residents living within walking distance of the site will be able to *walk* to the site, rather than *drive* to Bondi Junction or Randwick, and
- for customers that *drive* to the site, their car journey will be *much shorter* than driving to Bondi Junction or Randwick to undertake the same shopping task.

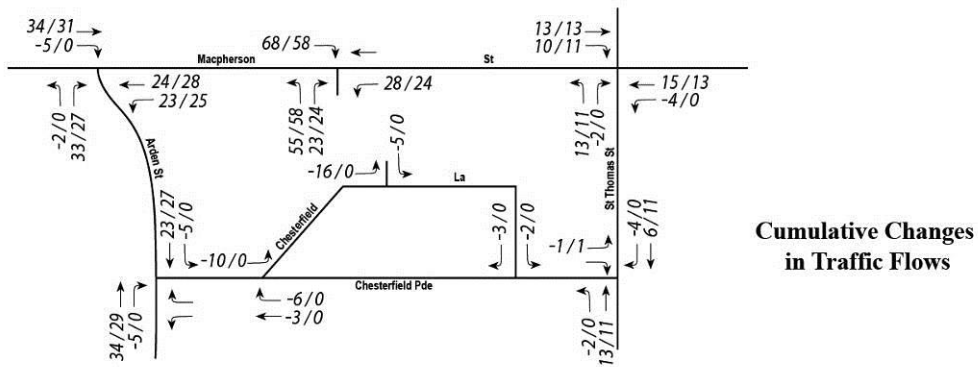
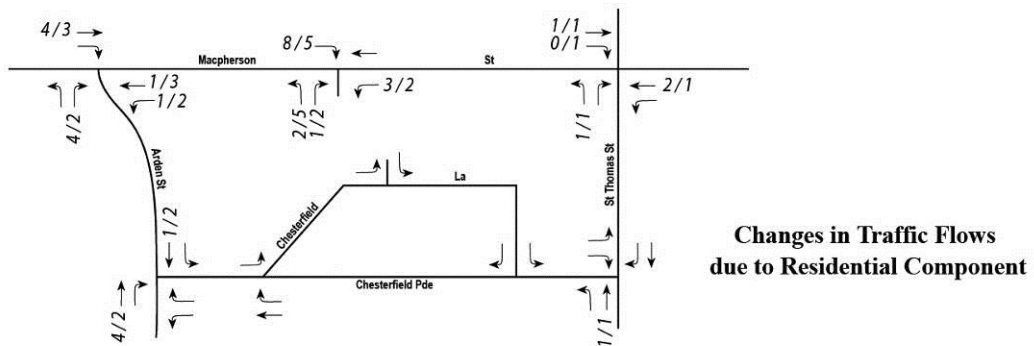
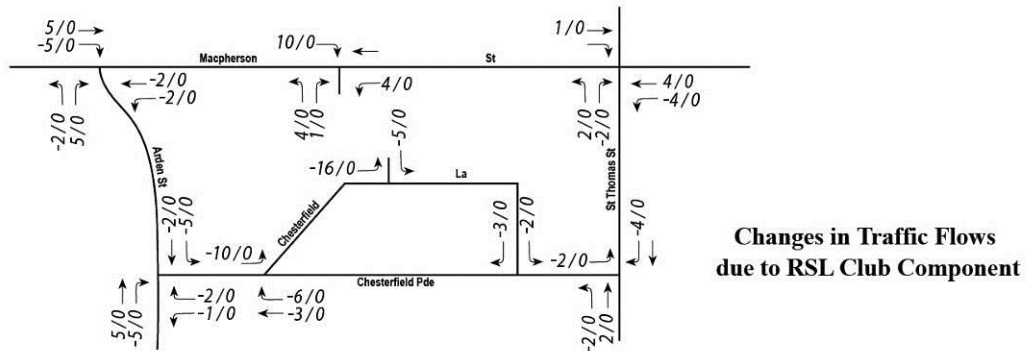
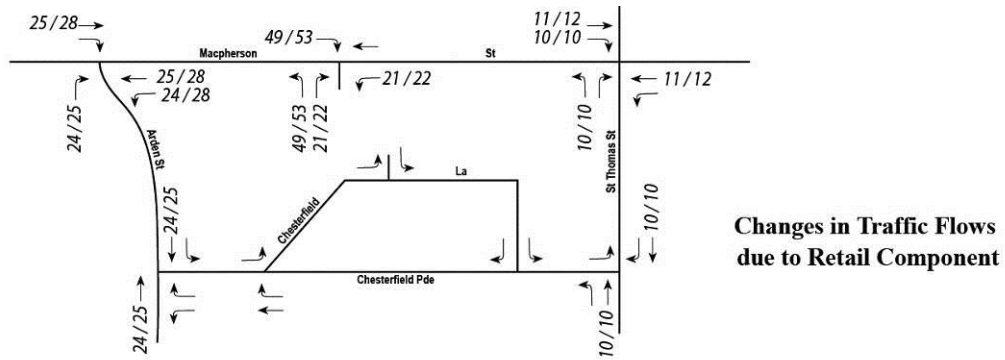
In addition to reducing the number of vehicle kilometres driven, the proposed development will also have the added benefit of *reducing* traffic volumes in the more congested centres such as Bondi Junction and Randwick to which residents must currently drive to undertake their food/grocery shopping needs.

Traffic Assignment

The GTA report recommended that, following a “high-level assessment” of the surrounding area, traffic generated by the proposed development be distributed to Macpherson Street on the basis of 70% to/from the west, and 30% to/from the east.

That distribution recommended by GTA has been adopted for the purposes of this assessment as illustrated on Figure 5, noting also that:

- the traffic generated by the development will use the driveway proposed in Macpherson Street, and
- no vehicular access is proposed to the site via Chesterfield Lane (previously used by RSL club patrons).



LEGEND: PM/SAT Vehicles Per Hour

TRAFFIC ASSIGNMENT
FIGURE 5

It is pertinent to note in this regard that the RSL club previously generated approximately 21 vph in Chesterfield Lane during the Friday PM Peak period. The proposed development is therefore expected to result in a *reduction* in the volume of traffic using Chesterfield Lane and Chesterfield Parade during the Friday PM peak period.

The changes in traffic flows which are expected to occur on the road network in the vicinity of the site as a consequence of the development proposal are summarised on Figure 5. It is noted that the cumulative changes in traffic flows illustrated on Figure 5 (based on the aggregation of the various components of the development proposal) are very similar to the traffic projections illustrated on Figure 4.5 of the GTA report.

As noted in the foregoing, no allowance has been made for any discounting due to the effects of “linked trips” and “multi-purpose trips”. However it is clear that in practice, the *actual* traffic flows generated by the site will be *less than* the volumes illustrated on Figure 5.

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 SIDRA capacity analysis is based on the traffic flow projections set out in Table 3.1 and the traffic assignment illustrated on Figure 5. SIDRA movement summaries for each of the models are reproduced in Appendix B.

The results of the SIDRA capacity analysis of the Macpherson Street/Arden Street intersection are summarised in Tables 3.3 & 3.4 below.

Table 3.3 – Results of SIDRA Assessment
Macpherson Street/Arden Street Friday PM

Approach	Movement	Degree of Saturation		Average Delay (Seconds/Vehicle)		95 th Percentile Queue (Vehicles)		Level of Service	
		Existing	Post-Development	Existing	Post-Development	Existing	Post-Development	Existing	Post-Development
Arden St (South)	Left	0.324	0.334	9	9	2	2	A	A
	Right	0.302	0.514	26	35	1	2	B	C
Macpherson St (East)	Left	0.020	0.033	7	7	0	0	A	A
	Through	0.085	0.097	0	0	0	0	A	A
Macpherson St (West)	Through	0.497	0.529	2	3	5	6	A	A
	Right	0.497	0.529	9	10	5	6	A	A

Table 3.4 – Results of SIDRA Assessment
Macpherson Street/Arden Street Saturday Peak

Approach	Movement	Degree of Saturation		Average Delay (Seconds/Vehicle)		95 th Percentile Queue (Vehicles)		Level of Service	
		Existing	Post-Development	Existing	Post-Development	Existing	Post-Development	Existing	Post-Development
Arden St (South)	Left	0.473	0.495	10	11	3	4	A	A
	Right	0.556	0.818	39	68	3	5	C	E
Macpherson St (East)	Left	0.040	0.053	7	7	0	0	A	A
	Through	0.125	0.139	0	0	0	0	A	A
Macpherson St (West)	Through	0.519	0.556	4	5	6	7	A	A
	Right	0.519	0.556	11	12	6	7	A	A

The operational performance of the vehicular access driveway proposed in Macpherson Street has also been analysed using the SIDRA capacity analysis program. The results of that analysis are summarised in Tables 3.5 & 3.6 below:

Table 3.5 – Results of SIDRA Assessment

Macpherson Street/Proposed Site Access Driveway PM Peak

Approach	Movement	Degree of Saturation		Average Delay (Seconds/Vehicle)		95 th Percentile Queue (Vehicles)		Level of Service	
		Existing	Post-Development	Existing	Post-Development	Existing	Post-Development	Existing	Post-Development
Proposed Site Access	Left	-	0.115	-	5	-	0	-	A
	Right	-	0.115	-	5	-	0	-	A
Macpherson St (East)	Left	-	0.112	-	7	-	0	-	A
	Through	-	0.112	-	0	-	0	-	A
Macpherson St (West)	Through	-	0.179	-	1	-	1	-	A
	Right	-	0.179	-	9	-	1	-	A

Table 3.6 – Results of SIDRA Assessment

Macpherson Street/Proposed Site Access Saturday Peak

Approach	Movement	Degree of Saturation		Average Delay (Seconds/Vehicle)		95 th Percentile Queue (Vehicles)		Level of Service	
		Existing	Post-Development	Existing	Post-Development	Existing	Post-Development	Existing	Post-Development
Proposed Site Access	Left	-	0.146	-	6	-	1	-	A
	Right	-	0.146	-	6	-	1	-	A
Macpherson St (East)	Left	-	0.152	-	7	-	0	-	A
	Through	-	0.152	-	0	-	0	-	A
Macpherson St (West)	Through	-	0.215	-	2	-	2	-	A
	Right	-	0.215	-	10	-	2	-	A

The results of the SIDRA capacity analysis are generally similar to the results provided in the GTA report, and confirm that:

- Macpherson Street has the capacity to accommodate the additional site generated traffic volumes based on the seasonally-adjusted through-traffic volumes in the vicinity of the site, and
- the nearby intersection of Macpherson Street and Arden Street has the spare capacity to accommodate the additional site generated traffic volumes.

Consistent with the findings of the GTA report, the analysis indicates that delays for the northbound right-turn movement from Arden Street into Macpherson Street (eastbound) will increase, with average vehicle delays being doubled from the existing 39 seconds to 68 seconds during the Saturday peak period. Whilst those delays are still within acceptable parameters, it is pertinent to note that in practice, the *actual* volume of traffic expected to be generated by the development proposal is likely to be *less than* the volumes used in this analysis due to the effects of “linked trips” and “multi-purpose trips”. In any event, the increased delays affect only 1 movement at the intersection, for a relatively brief period of time. Delays to the same movement during the Friday PM peak period are well within acceptable parameters.

In the circumstances, it is clear that the proposed development will not have any unacceptable traffic implications in terms of road network capacity, and would not warrant any contributions towards any remedial works or road improvements.

Assessment of Additional Intersections

Traffic modelling to assess the impact of the development proposal has been undertaken in Macpherson Street at the site entrance and at the nearby Macpherson Street/Arden Street intersection, where the traffic flows expected to be generated by the development proposal will be the most concentrated.

The Macpherson Street/Arden Street intersection is the “critical intersection” on the local road network, where existing “background” traffic flows are the highest. It is therefore

appropriate to undertake traffic modelling at that intersection, where the highest existing or “background” traffic flows coincide with the greatest concentration of *additional* traffic flows expected to be generated by the development proposal.

Traffic flows expected to be generated by the development proposal at other nearby intersections will be significantly lower and more dispersed than is expected to occur at the Macpherson Street/Arden Street intersection.

Existing or “background” traffic flows at those other intersections are also significantly lower than those occurring at the critical intersection of Macpherson Street/Arden Street.

Whilst it is acknowledged that the GTA report suggests that additional traffic modelling be undertaken at the Macpherson Street/St Thomas Street, the Arden Street/Chesterfield Parade and the Chesterfield Parade/St Thomas Street intersection, capacity analysis of those additional intersections was not considered to be warranted in this instance because:

- existing or “background” traffic flows at those additional intersection are significantly lower than at the critical intersection of Macpherson Street/Arden Street, and
- traffic flows expected to be generated by the development proposal at those additional intersections will be *more dispersed* and significantly lower than at the Macpherson Street/Arden Street intersection
- the foregoing analysis has found that the Macpherson Street/Arden Street intersection has the spare capacity to accommodate the additional site generated traffic volumes.

It follows therefore, that the other intersections where further capacity analysis was suggested will be able to accommodate the projected additional traffic flows without difficulty, particularly given the reduced traffic volumes at each of those intersections.

Traffic in Chesterfield Parade

The GTA report also suggested that additional traffic analysis be undertaken during school/pre-school peak activity (drop-off/pick-up) periods. However, both the existing (or “background”) traffic flows and the additional traffic flows expected to be generated by the development proposal will be lower during those drop-off/pick-up periods than is expected to occur during the Friday PM and Saturday peak periods which form the basis of the assessment set out above.

In addition, it is also noted that there will be little or no change in traffic flows generated by the site in Chesterfield Parade, as traffic activity previously generated by the RSL club will be relocated to the Macpherson Street entrance, and that no vehicular access to the site is proposed from Chesterfield Lane.

Given that there will be little or no change in the traffic flows generated by the site in Chesterfield Parade, it is clear that the proposed development will not have any unacceptable traffic implications in terms of the safety and amenity of Chesterfield Parade.

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 AVD's listed in the table should be taken as a guide only as longer delays could be tolerated in some locations (ie inner city conditions) and on some roads (ie minor side street intersecting with a major arterial route).

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

3. Degree of Saturation (DS)

The DS is another measure of the operational performance of individual intersections.

For intersections controlled by traffic signals² 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.

² 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 6 and comprise:

- NO STOPPING restrictions along a portion of the Macpherson Street site frontage
- NO STOPPING restrictions along a portion of the northern side at the Macpherson Street site frontage, directly opposite the site
- a TAXI ZONE located directly outside the site in Macpherson Street
- ½ HOUR PARKING along both sides of Macpherson Street east of Yanko Avenue
- generally UNRESTRICTED kerbside parking elsewhere in Macpherson Street and throughout the local area.

Parking Accumulation Surveys

In order to gain an accurate appreciation of the parking demands generated by the RSL club (now closed), a detailed survey of car parking accumulation was undertaken on-site and on the adjacent road network between 3:00pm-9:00pm on Friday 18th November, 2011.

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

- the RSL Club site has a car parking capacity of approximately 22 spaces
- the *peak* on-site parking demand occurred between 6:15pm-7:00pm when there were 19 parked cars recorded
- patronage surveys undertaken at the RSL Club's pedestrian entrance revealed that a single additional car was also parked on-street during the on-site peak period.



In summary, the results of the parking accumulation survey indicate that the peak parking demand associated with the existing RSL Club is in the order of 20 cars. It is anticipated that the proposed RSL Club will operate in a similar capacity to their previous arrangements and as such, the future parking demand generated by the club is likely to be similar.

Off-Street Parking Provisions

The off-street parking requirements applicable to the development proposal are specified in Council's *Waverley Development Control Plan 2012, Part B8, Transport* in the following terms:

Multi-Unit Residential – Parking Zone B

1 bedroom apartment:	0.4 spaces per dwelling (min)	0.8 spaces per dwelling (max)
2 bedroom apartment:	1.0 spaces per dwelling (min)	1.2 space per dwelling (max)
3 bedroom apartment:	1.0 space per dwelling (min)	2.0 spaces per dwelling (max)
Visitors:	No visitor parking is required for the first 12 units. Thereafter, 1 visitor parking space is required for every 4 additional units.	

Shops / Retail

3.3 spaces per 100m²

The DCP does not nominate a parking rate for clubs and, for the purposes of this assessment, it has been assumed that the peak parking demand will be in the order of 20 spaces, with a parking provision of 26 spaces for the RSL club component, as suggested by the GTA report (ie; using the retail parking rate).

Application of the above parking requirements to the various components of the development proposal yields an off-street parking requirement in the range 92 to 103 parking spaces as set out below:

Off-Street Parking Requirements

	Minimum	Maximum
Residents (26 Apartments):	23.spaces	34 spaces
Visitors:	4 spaces	4 spaces
Retail (1179m ²):	39 spaces	39 spaces
RSL Club (789m ²):	26 spaces	26 spaces
TOTAL:	92 spaces	103 spaces

The proposed development makes provision for a total of 106 off-street parking spaces and therefore slightly exceeds Council's maximum provisions permitted by the DCP.

However, it is possible that some minor adjustments may need to be made to the proposed carparking layout. These minor adjustments are likely to result in the loss of number of parking spaces, such that the final number of parking spaces to be provided will likely correspond with the maximum allowable parking provisions permitted by the DCP.

The retail carparking and club carparking will share the same carparking facilities. The opportunity therefore arises for *complementary* use of parking spaces whereby the peak parking demands of the retail and club components will occur at different times of the day, thus making available additional carparking spaces for both uses at different times of the day, should the need arise.

The parking spaces required for the residential component are to be located on the lowest parking level, and will be separated from the remainder of the carpark by a remote-controlled security roller shutter.

The geometric design layout of the proposed car parking facilities have been 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.

Wider Parking Benefits to Macpherson Street Retail Area

The parking proposed for the retail component of the development proposal will have the added advantage that it will, to some degree, reduce the demand for on-street carparking in the vicinity of the site generated by the nearby retail shops immediately to the east of the site. That reduction in on-street parking demand is likely to occur because:

- shoppers visiting both the existing and proposed retail facilities are likely to make *dual-purpose* trips whereby they will visit more than one shop in the precinct, but will require only 1 parking space to visit all the shops, and

- the proposed new retail carparking area will be readily accessible to any shoppers who were unable to find an on-street carparking space in front of the existing shops.

As such, the proposed development is likely to result in a *slight reduction* in the demand for on-street carparking in the Macpherson Street retail strip, as shoppers visiting both the existing and proposed retail facilities may find it easier to park in the proposed basement carparking area, rather than circulate around-the-block looking for an on-street parking space near the existing shops fronting Macpherson Street.

Loading/Service Provisions

The proposed new mixed-use building is expected to be serviced by a variety of light commercial vehicles and rigid trucks up to and including the 11.1m long brewery truck that previously made deliveries to the RSL club. There are 2 varieties of this truck, operated by Linfox/Carlton United Breweries, comprising an enclosed truck which has a height of 3.5m (and a carrying capacity of 12.2 tonnes) and an unenclosed truck which has a height of 2.8m (and a carrying capacity of 14 tonnes). Photos of both trucks are shown below:



Beer Trucks Used Previously by Linfox/CUB. These are the largest trucks that will visit the site

The beer trucks operated by Linfox/CUB are the same trucks that previously made deliveries to the site, and are the largest trucks that will visit the site in the future. Deliveries to the RSL club using the Linfox/CUB trucks will again be made 2-3 times per week.

There will also be 3-4 truck deliveries per day to the retail facilities, using a 10.3m long rigid truck with a height of 3.4m (which has been purpose-designed to fit into small laneways surrounding the Harris Farm store in Potts Point store).

Depending on the day and the season, there will be a number of additional deliveries to the retail component using light commercial vehicles such as white vans and the like (bread, juice, milk etc.), yielding a total of 10-15 retail deliveries per day.

It is pertinent to note that the deliveries using light commercial vehicles such as white vans and the like could be accommodated in conventional parking spaces. The proposed loading/servicing arrangements have therefore been modified as suggested in the GTA report to provide for separate loading bays to accommodate a variety of delivery/service vehicles of different sizes.

The loading dock is to be located on the Basement 1 level at the rear of the building and will be accessed via Macpherson Street.

The 12.5 diameter turntable area has been designed to accommodate the swept turning path requirements of the largest rigid trucks that will visit the site (ie; the Linfox/ Linfox/Carlton United Breweries trucks), allowing them to enter and exit the site in a forward direction at all times as illustrated by the *swept turning path* diagrams reproduced at the end of this report.

Loading Dock Management Plan

It is proposed that a Management Plan will be prepared by the applicant in conjunction with Council, the community and the retail tenants to ensure that deliveries of goods and removal of waste occur in designated areas and at designated times of day so as to ensure that the amenity of neighbours is not affected.

The Management Plan will include specific provisions to address the following:

- the club will receive up to 3 to 4 deliveries/week of beer. Deliveries will be made by a 12t keg truck with a length of 11.1m (as was previously the case)
- for deliveries to Harris Farm and the retail area, there will be 3-4 truck movements per day of a 10.3m rigid truck with a height of 3.4m. The truck is smaller in size than the beer trucks that previously supplied the RSL club via Chesterfield Lane
- depending on the day and season, there will be a number of additional deliveries using light commercial vehicles such as white vans (bread, juice, milk etc.), yielding a total of 10-15 retail deliveries per day
- deliveries will take place in accordance with a roster system so that all deliveries occur on a staggered basis. There will be a staff member supervising the loading dock whenever a delivery vehicle arrives
- four separate loading bays are proposed in the loading dock which will be capable of accommodating 4 trucks/light commercial vehicles of different sizes simultaneously
- no deliveries will occur outside of the hours of 7am-6pm, with most deliveries expected to be completed by mid afternoon
- garbage will be removed during the middle of the day from dedicated enclosed bin storage areas located within the building
- the Management Plan will also contain provisions for resident complaints to be addressed and will ensure that all staff are trained and aware of the provisions of the Management Plan
- trucks will approach and depart the site via Macpherson Street
- the Management Plan will also specifically address the issue of loading/delivery vehicles during critical times for children and their carers travelling to and from

Clovelly Public School and Bronte Child Care Centre, noting that trucks will not be permitted to use Chesterfield Parade or Chesterfield Lane.

It is pertinent to note that the size and height of delivery and garbage trucks that are proposed to service the RSL club will be the *same* as those that have successfully serviced the RSL club for many years.

Location of Car Park Access Driveway in Macpherson Street

It is proposed to locate the vehicular access driveway serving the car parking area in Macpherson Street to minimise any adverse effects on the amenity of residents living in Chesterfield Parade.

The proposed driveway is to be located near the western boundary of the site, in Macpherson Street, and has been designed to comply with *Clause 3.2 Access Driveways – Widths and Location* as specified in *AS2890.1 – 2004*. In particular, it is noted that:

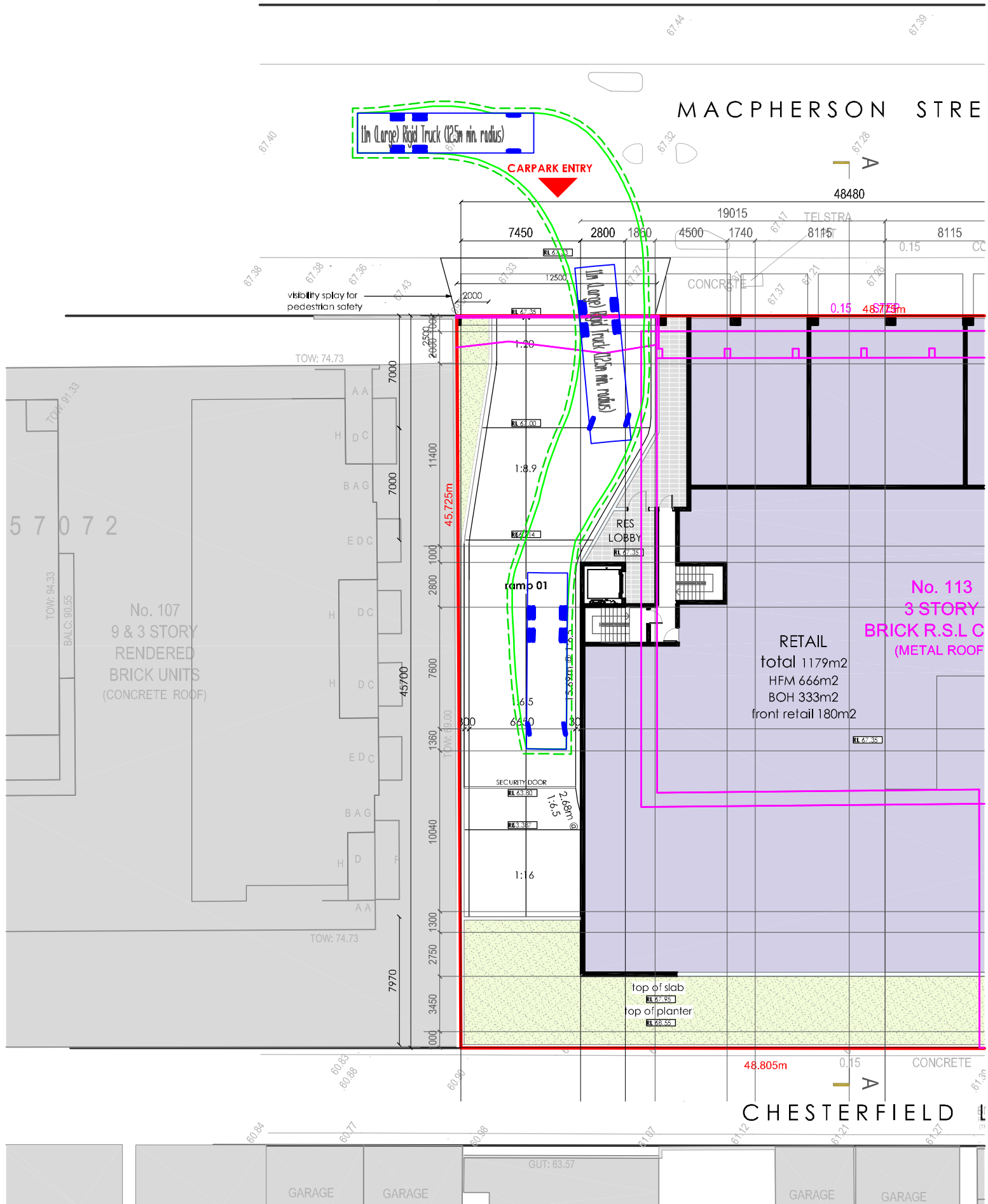
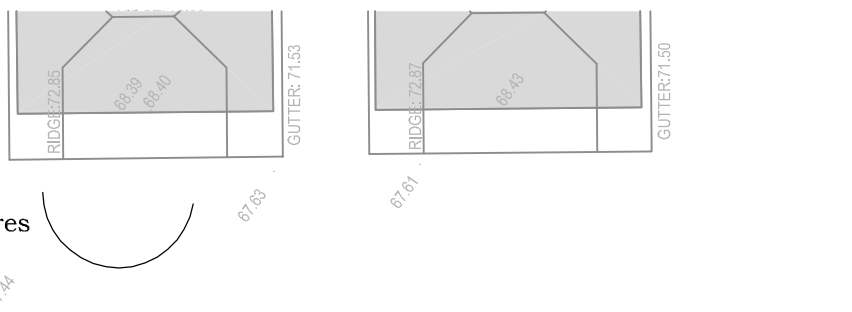
- the width of the driveway complies with AS2890.1 requirements for a Category 2 driveway on an arterial road
- the location of the driveway complies with *Figure 3.1 – Prohibited Locations of Access Driveways* as specified in *AS2890.1*
- the gradient of the proposed driveway complies with the requirements of *Clause 3.3* of *AS2890.1*, particularly in respect of providing a relatively flat 5% gradient for the first 6m from the property boundary, and
- the design layout of the driveway complies with the driver sight distance and minimum sight lines for pedestrian safety requirements as specified in *Clause 3.2.4* of *AS2890.1*.

In particular, the car park access driveway will comply with *Figure 3.3 – Minimum Sight Lines for Pedestrian Safety* to ensure the safety of pedestrians walking along this section of Macpherson Street.

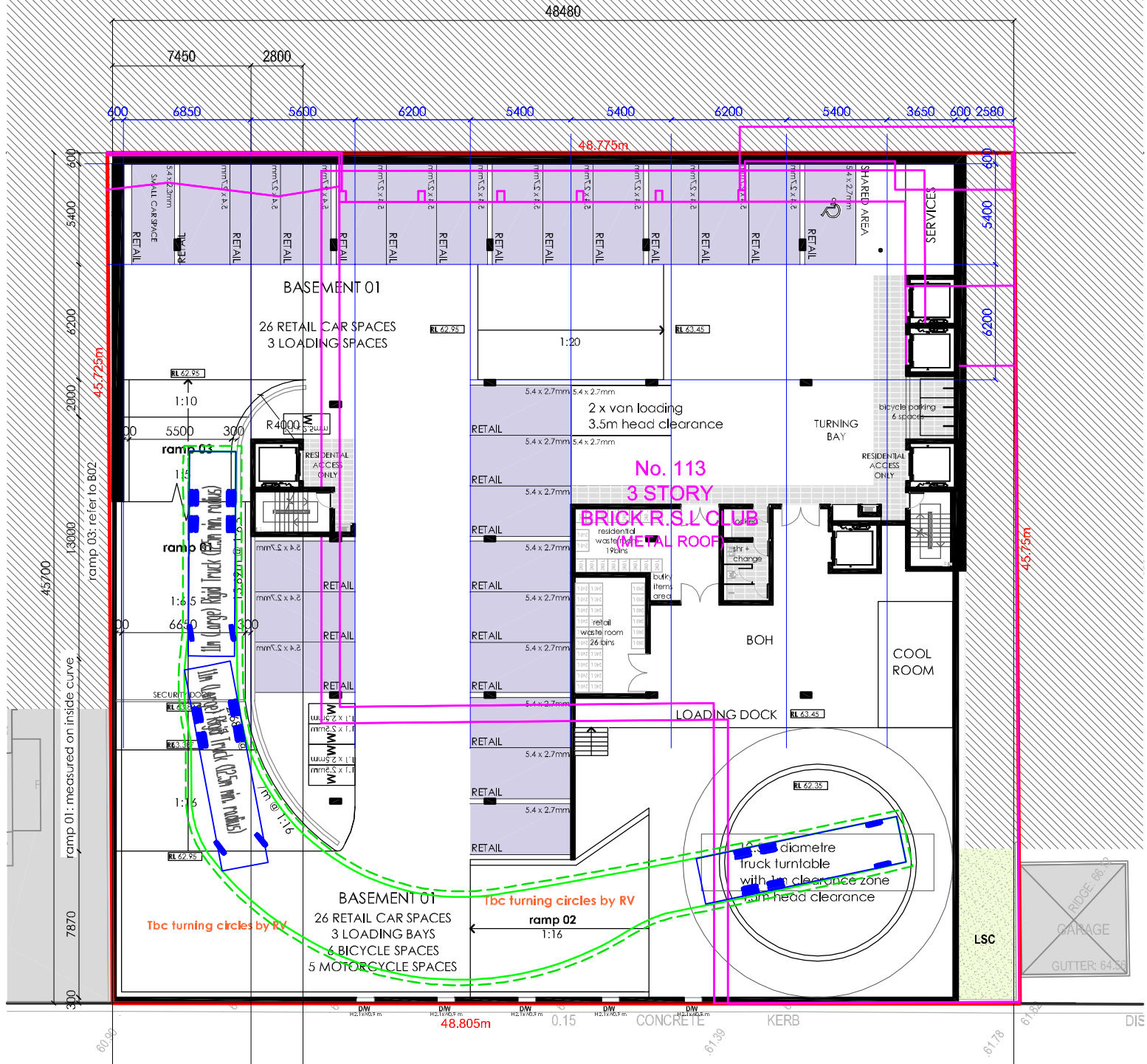
In addition, capacity analysis confirms that the proposed driveway will operate at *Level of Service “A”*, and with minimal delays at all times, typically in the order of 2 seconds per vehicle.

The use of Macpherson Street to access the site will ensure that the level of traffic activity in Chesterfield Parade and in Chesterfield Lane is minimised, such that there will be little, if any change in traffic activity in Chesterfield Parade and in Chesterfield Lane as a consequence of the development proposal.

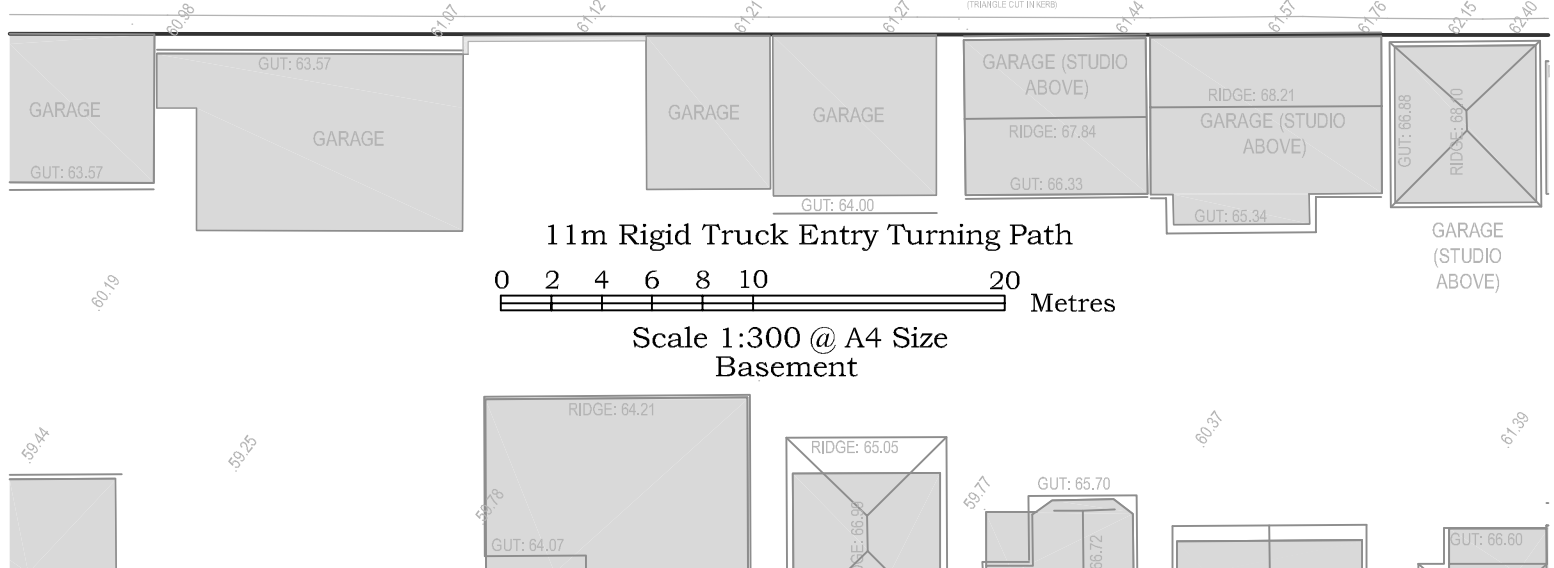
In summary, the proposed parking and loading facilities satisfy the relevant requirements specified in both Council’s Parking Code as well as the Australian Standards and it is therefore concluded that the proposed development will not have any unacceptable parking or loading implications.

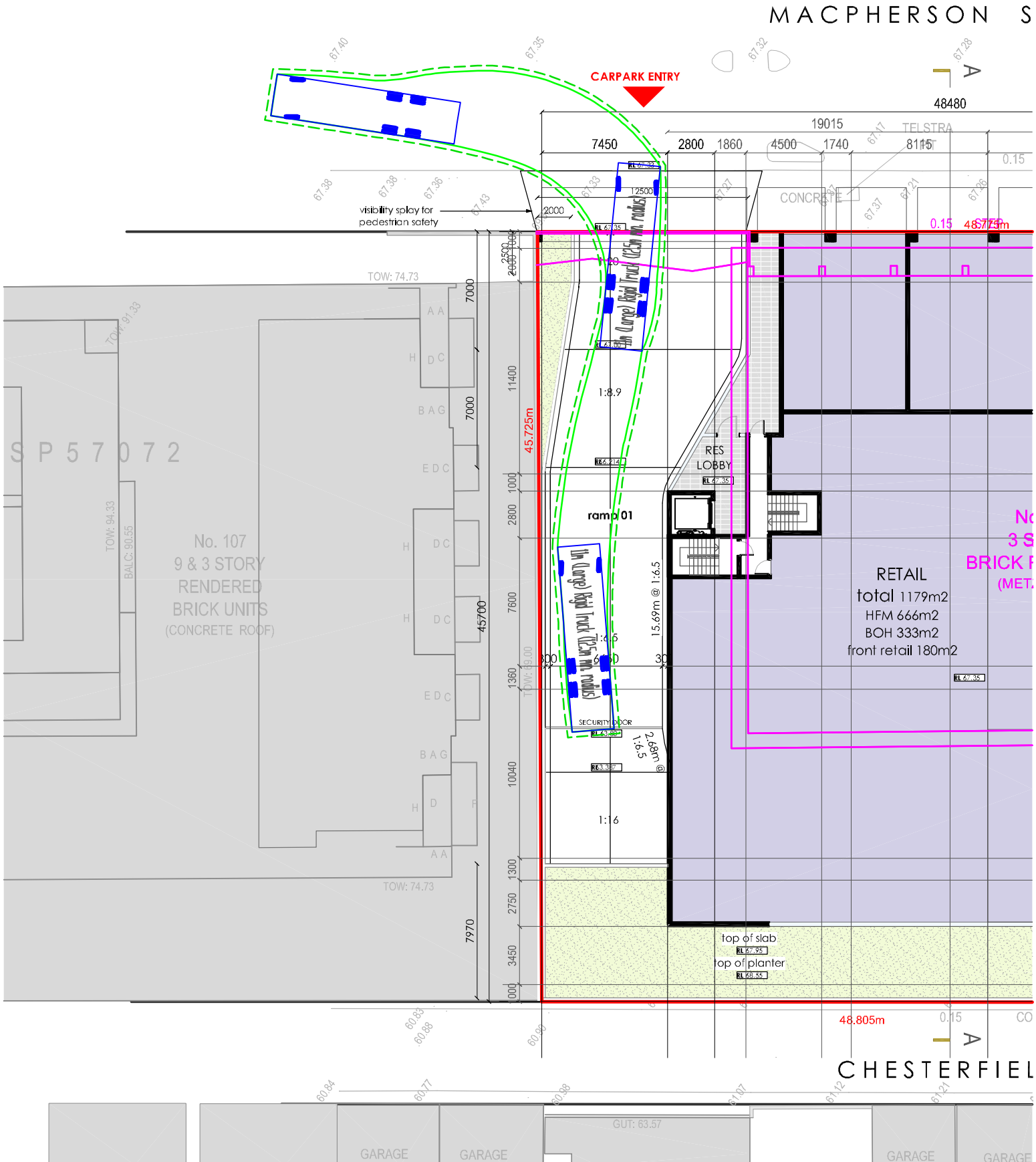
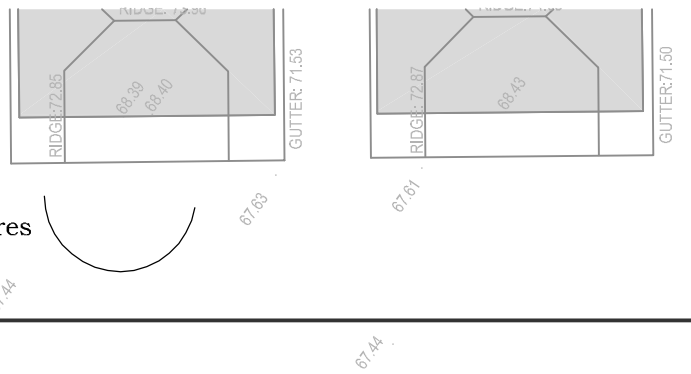
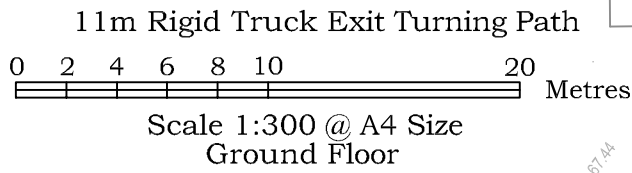


MACPHERSON STREET



CHESTERFIELD LANE

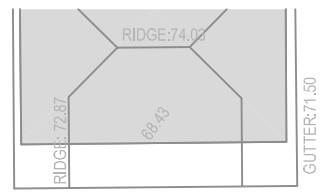
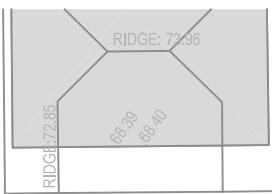




12.5m HRV Truck Entry Turning Path

0 2 4 6 8 10 20 Metres

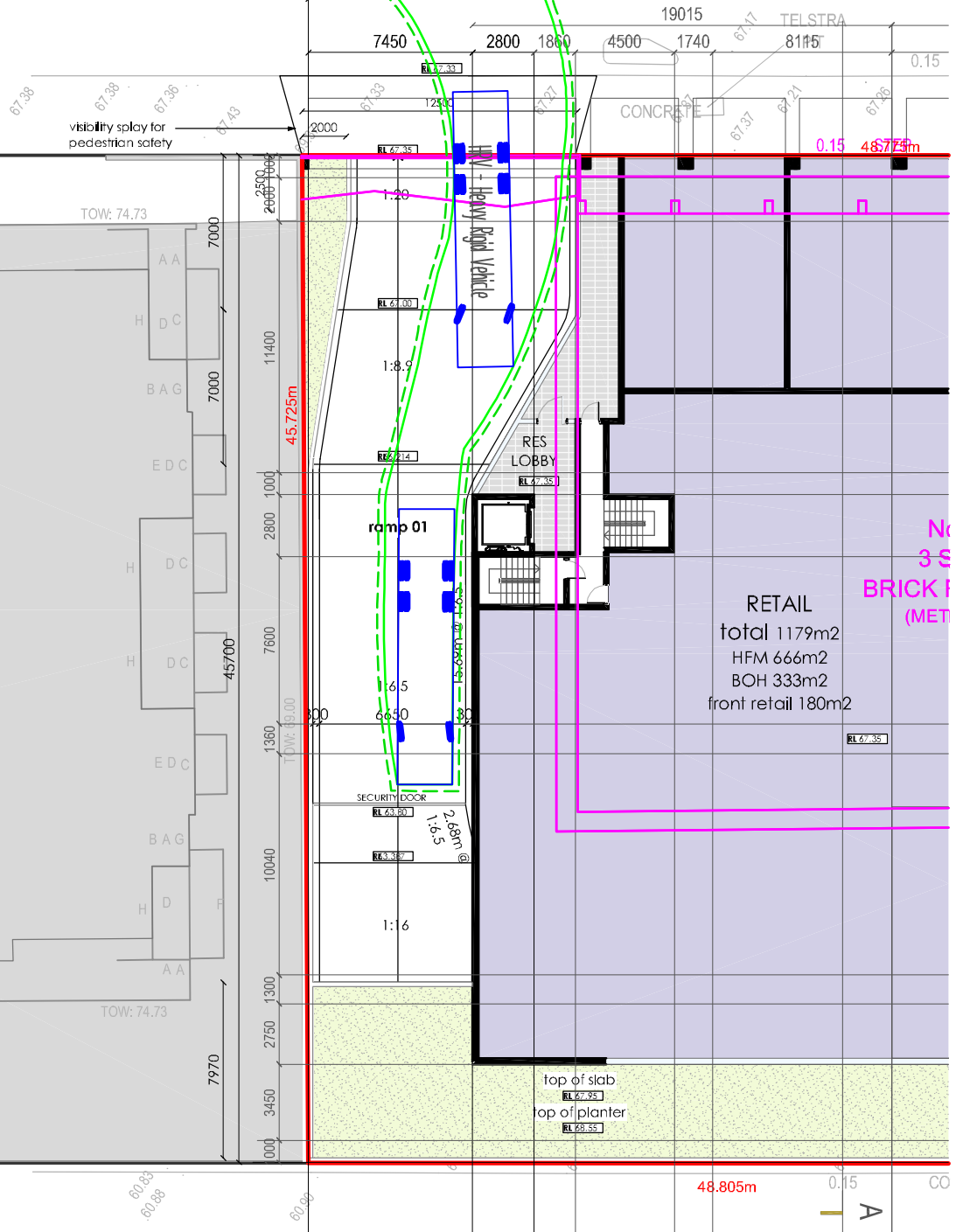
Scale 1:300 @ A4 Size
Ground Floor



CARPARK ENTRY

MACPHERSON S

48480

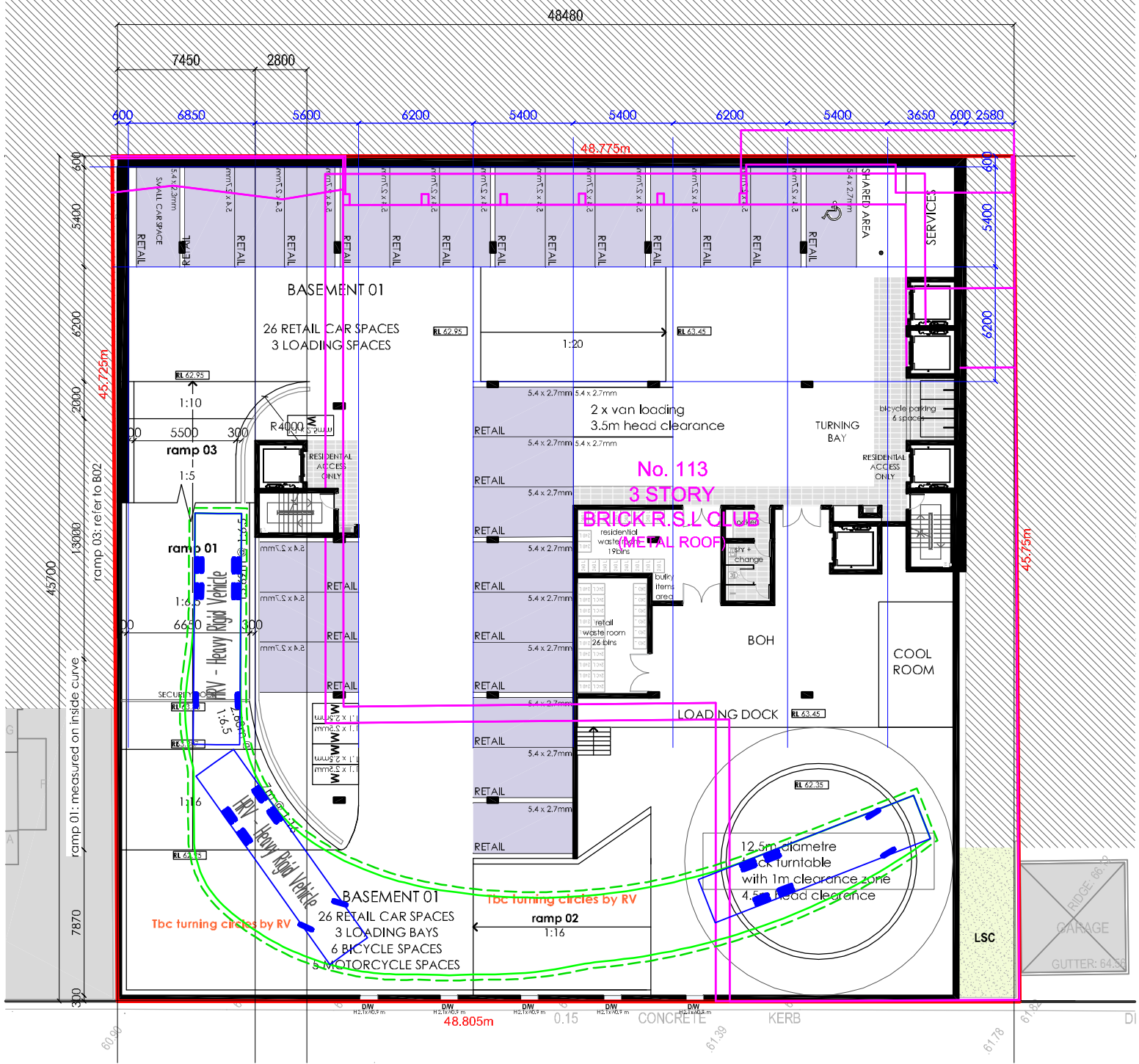


S P 5 7 0 7 2

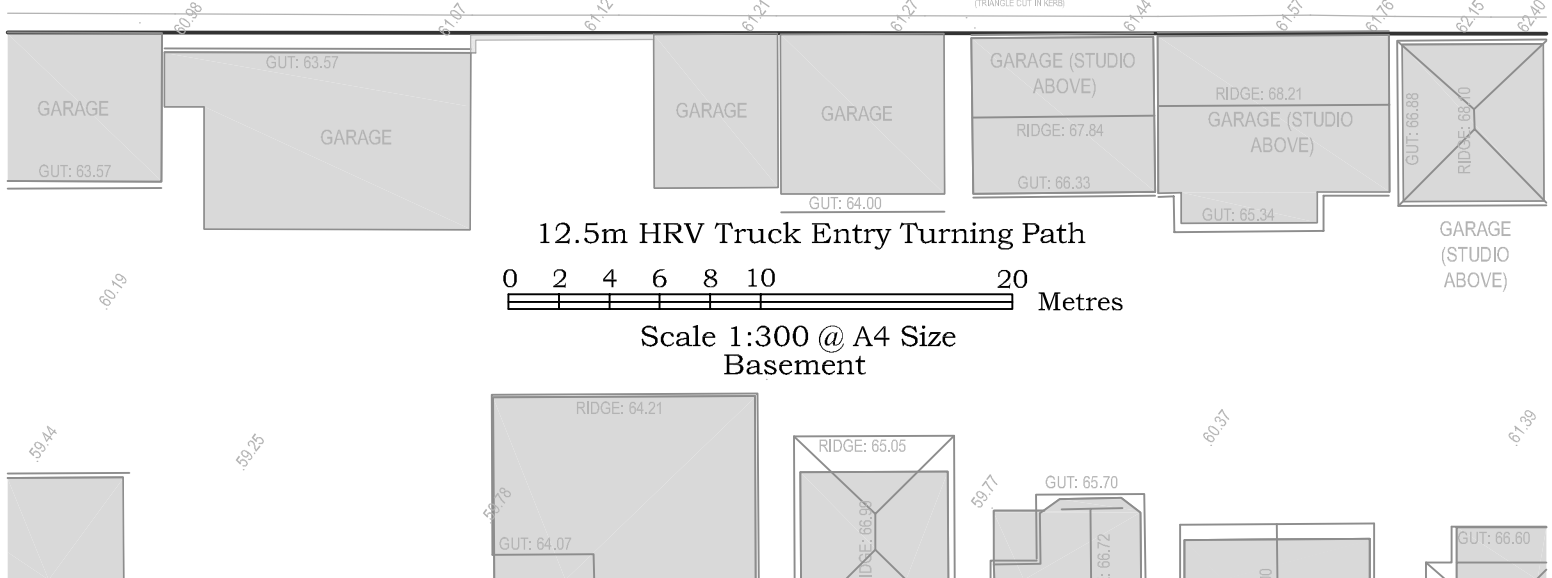
No. 107
9 & 3 STORY
RENDERED
BRICK UNITS
(CONCRETE ROOF)

No
3 S
BRICK
(MET)

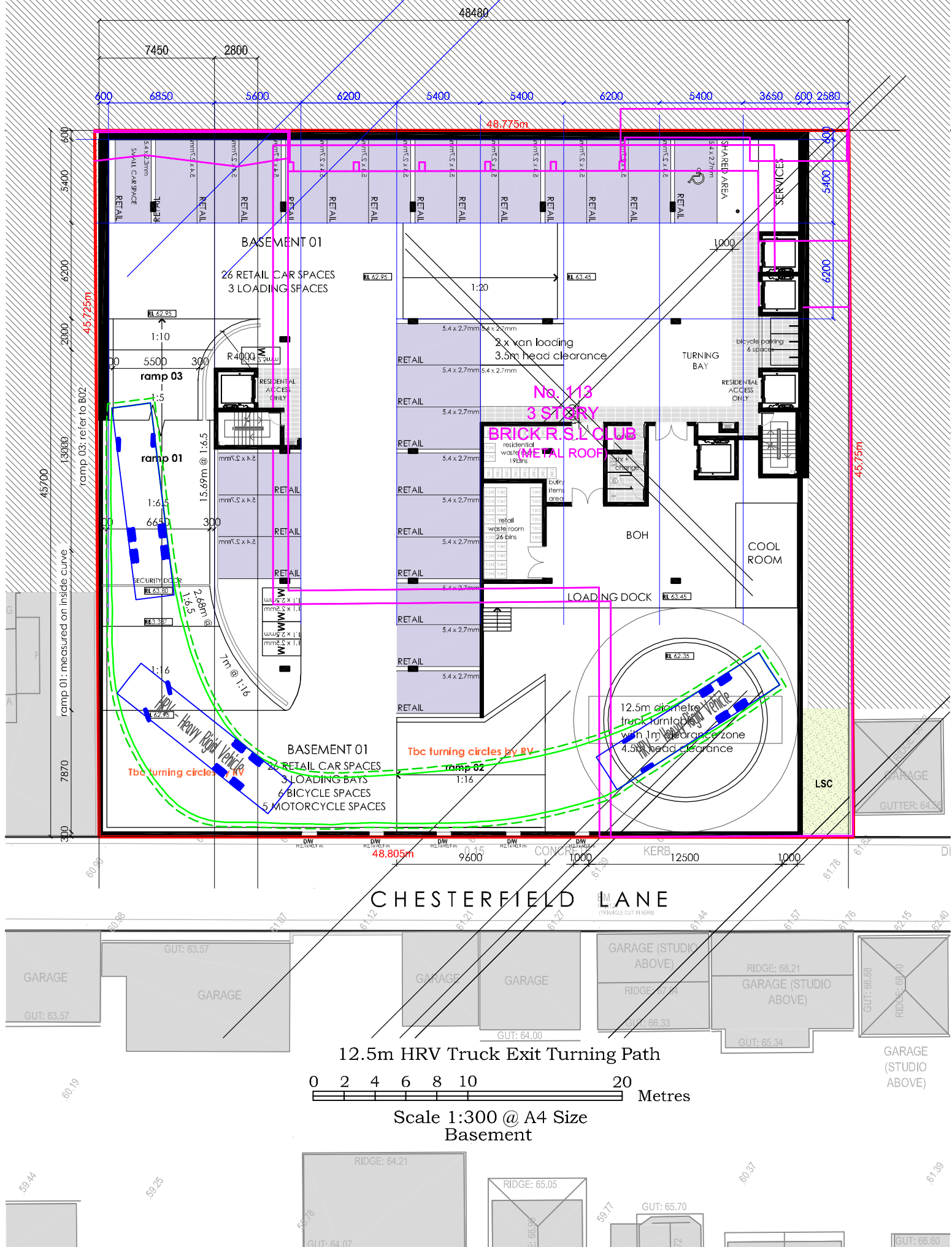
MACPHERSON STREET



CHESTERFIELD LANE



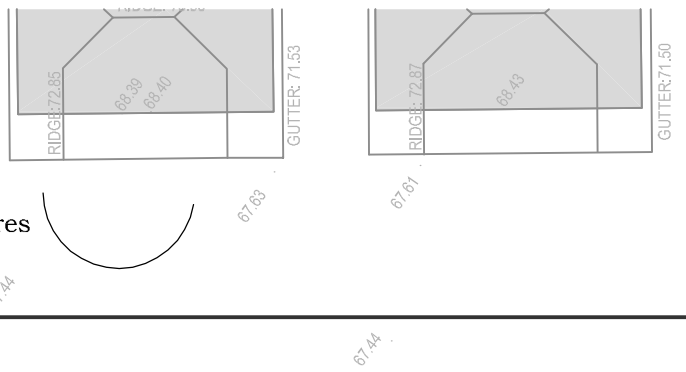
MACPHERSON STREET



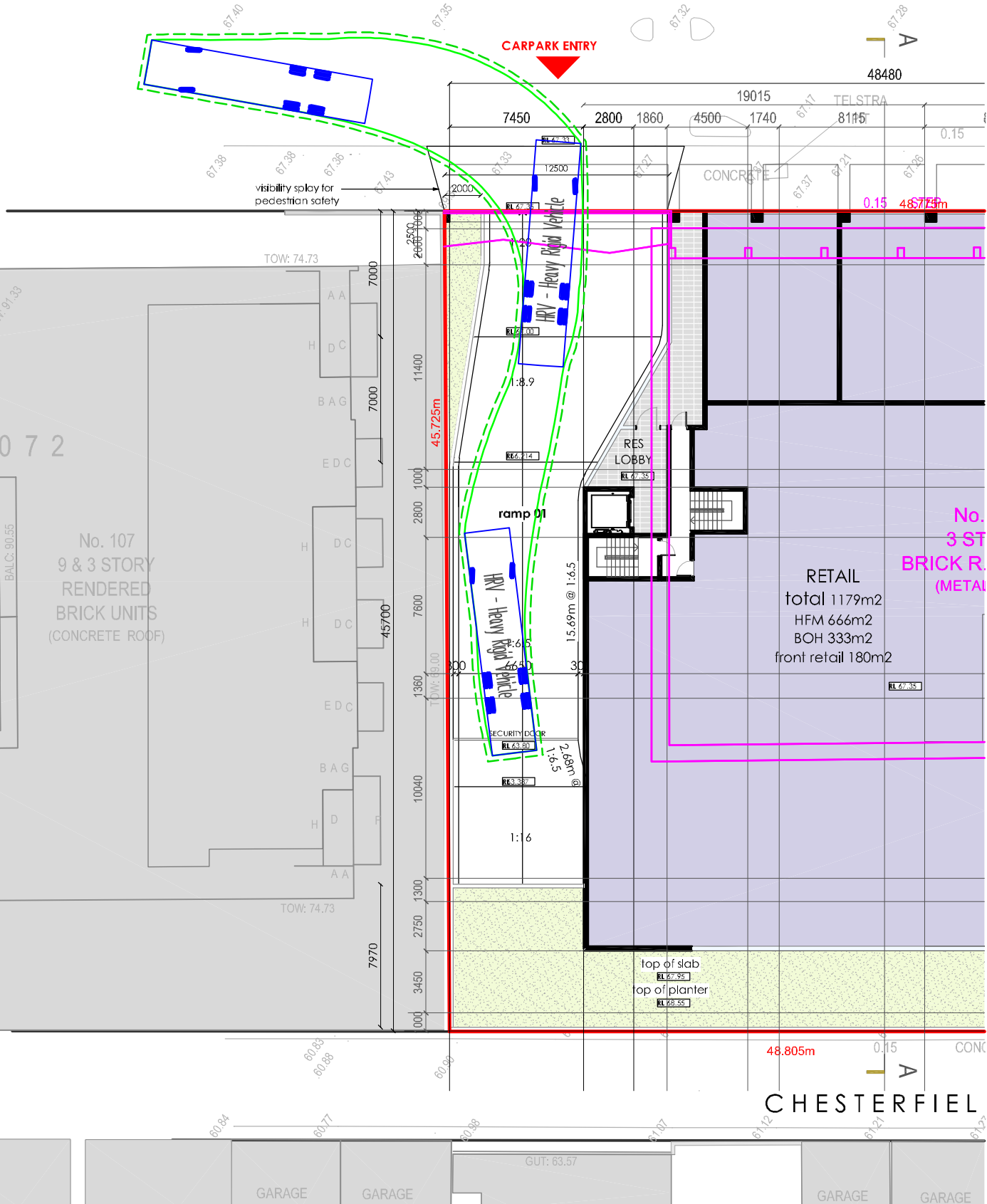
12.5m HRV Truck Exit Turning Path

0 2 4 6 8 10 20 Metres

Scale 1:300 @ A4 Size
Ground Floor



MACPHERSON ST



APPENDIX A

TRAFFIC SURVEY DATA



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849.

Mobile.0418239019

Client : Varga Traffic Planning
 Job No/Name : 4259 BRONTE Macpherson St
 Day/Date : Friday 31st August 2012

PEDS	WEST	SOUTH	EAST	
Time Per	Macpherson St	Arden St	Macpherson St	TOT
1530 - 1545	3	9	1	13
1545 - 1600	2	1	0	3
1600 - 1615	0	3	0	3
1615 - 1630	0	1	0	1
1630 - 1645	1	3	0	4
1645 - 1700	1	0	0	1
1700 - 1715	0	2	0	2
1715 - 1730	0	1	2	3
1730 - 1745	0	2	0	2
1745 - 1800	0	2	0	2
1800 - 1815	0	3	0	3
1815 - 1830	0	3	0	3
Per End	7	30	3	40

PEDS	WEST	SOUTH	EAST	
Peak Per	Macpherson St	Arden St	Macpherson St	TOT
1530 - 1630	5	14	1	20
1545 - 1645	3	8	0	11
1600 - 1700	2	7	0	9
1615 - 1715	2	6	0	8
1630 - 1730	2	6	2	10
1645 - 1745	1	5	2	8
1700 - 1800	0	7	2	9
1715 - 1815	0	8	2	10
1730 - 1830	0	10	0	10
PEAK HR	5	14	1	20

Lights	WEST		SOUTH		EAST		
	Macpherson		Arden St		Macpherson		
Time Per	I	R	L	R	L	I	TOT
1530 - 1545	43	133	83	16	14	44	333
1545 - 1600	50	110	81	17	5	38	301
1600 - 1615	39	120	81	17	11	29	297
1615 - 1630	44	105	77	16	8	34	284
1630 - 1645	42	91	75	17	9	44	278
1645 - 1700	47	114	88	19	3	41	312
1700 - 1715	67	90	80	14	12	31	294
1715 - 1730	52	106	77	11	12	29	287
1730 - 1745	68	91	88	9	5	37	298
1745 - 1800	53	117	63	13	10	24	280
1800 - 1815	62	101	79	14	6	33	295
1815 - 1830	48	78	77	14	10	26	253
Per End	615	1256	949	177	105	410	3512

Heavies	WEST		SOUTH		EAST		
	Macpherson St		Arden St		Macpherson St		
Time Per	I	R	L	R	L	I	TOT
1530 - 1545	1	0	2	0	0	1	4
1545 - 1600	2	2	1	0	1	2	8
1600 - 1615	2	1	1	0	0	1	5
1615 - 1630	2	1	2	0	0	2	7
1630 - 1645	3	3	0	0	0	2	8
1645 - 1700	2	1	1	0	0	3	7
1700 - 1715	1	1	3	0	0	3	8
1715 - 1730	2	0	2	0	0	2	6
1730 - 1745	3	1	0	0	0	2	6
1745 - 1800	3	3	2	0	0	4	12
1800 - 1815	2	1	2	0	0	1	6
1815 - 1830	1	1	2	0	0	2	6
Per End	24	15	18	0	1	25	83

Combined	WEST		SOUTH		EAST		
	Macpherson St		Arden St		Macpherson St		
Time Per	I	R	L	R	L	I	TOT
1530 - 1545	44	133	85	16	14	45	337
1545 - 1600	52	112	82	17	6	40	309
1600 - 1615	41	121	82	17	11	30	302
1615 - 1630	46	106	79	16	8	36	291
1630 - 1645	45	94	75	17	9	46	286
1645 - 1700	49	115	89	19	3	44	319
1700 - 1715	68	91	83	14	12	34	302
1715 - 1730	54	106	79	11	12	31	293
1730 - 1745	71	92	88	9	5	39	304
1745 - 1800	56	120	65	13	10	28	292
1800 - 1815	64	102	81	14	6	34	301
1815 - 1830	49	79	79	14	10	28	259
Per End	639	1271	967	177	106	435	3595

Lights	WEST		SOUTH		EAST		
	Macpherson St		Arden St		Macpherson St		
Peak Per	I	R	L	R	L	I	TOT
1530 - 1630	176	468	322	66	38	145	1215
1545 - 1645	175	426	314	67	33	145	1160
1600 - 1700	172	430	321	69	31	148	1171
1615 - 1715	200	400	320	66	32	150	1168
1630 - 1730	208	401	320	61	36	145	1171
1645 - 1745	234	401	333	53	32	138	1191
1700 - 1800	240	404	308	47	39	121	1159
1715 - 1815	235	415	307	47	33	123	1160
1730 - 1830	231	387	307	50	31	120	1126
PEAK HR	176	468	322	66	38	145	1215

Heavies	WEST		SOUTH		EAST		
	Macpherson St		Arden St		Macpherson St		
Peak Per	I	R	L	R	L	I	TOT
1530 - 1630	7	4	6	0	1	6	24
1545 - 1645	9	7	4	0	1	7	28
1600 - 1700	9	6	4	0	0	8	27
1615 - 1715	8	6	6	0	0	10	30
1630 - 1730	8	5	6	0	0	10	29
1645 - 1745	8	3	6	0	0	10	27
1700 - 1800	9	5	7	0	0	11	32
1715 - 1815	10	5	6	0	0	9	30
1730 - 1830	9	6	6	0	0	9	30
PEAK HR	7	4	6	0	1	6	24

Combined	WEST		SOUTH		EAST		
	Macpherson St		Arden St		Macpherson St		
Peak Per	I	R	L	R	L	I	TOT
1530 - 1630	183	472	328	66	39	151	1239
1545 - 1645	184	433	318	67	34	152	1188
1600 - 1700	181	436	325	69	31	156	1198
1615 - 1715	208	406	326	66	32	160	1198
1630 - 1730	216	406	326	61	36	155	1200
1645 - 1745	242	404	339	53	32	148	1218
1700 - 1800	249	409	315	47	39	132	1191
1715 - 1815	245	420	313	47	33	132	1190
1730 - 1830	240	393	313	50	31	129	1156
PEAK HR	183	472	328	66	39	151	1239



R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : Varga Traffic Planning

Job No/Name : 4259 BRONTE Macpherson St

Day/Date : Friday 31st August 2012

1

2

3

4

5

6

PM PEAK

1530 - 1630

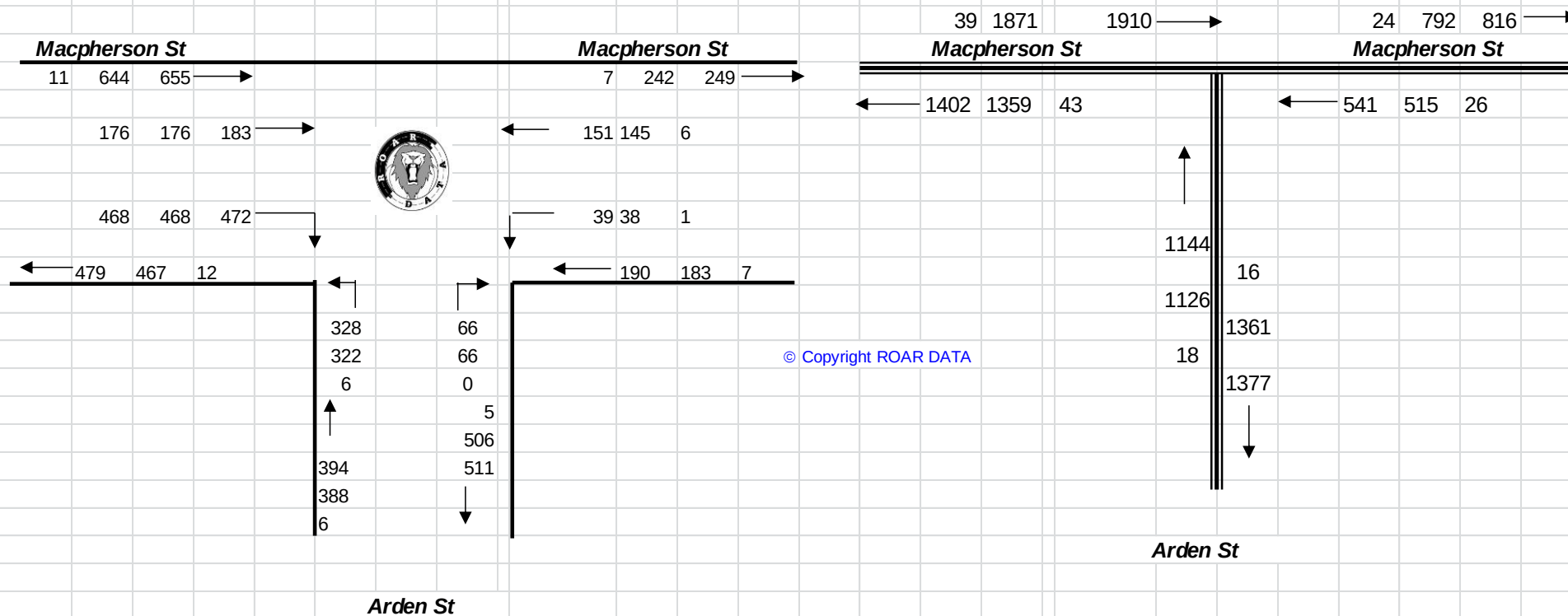
7

8

9

N

**TOTAL VOLUMES
FOR COUNT
PERIOD**





R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : Varga Traffic Planning

Job No/Name : 4259 BRONTE Macpherson St

Day/Date : Friday 31st August 2012

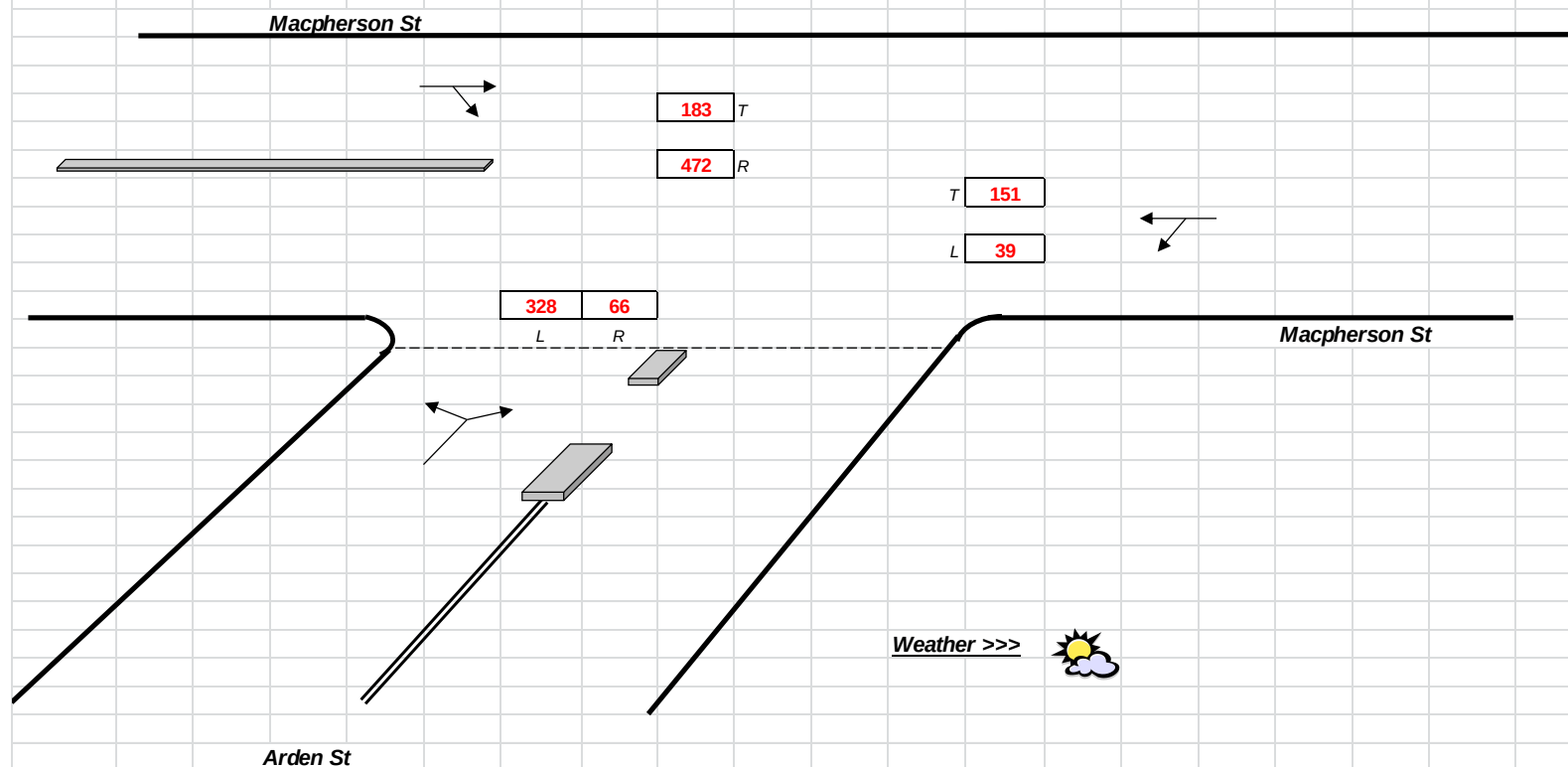
Intersection Layout

Obtained via satellite

May be incorrect

PM PEAK HOUR
1530 - 1630

Combined figures only



**R.O.A.R. DATA****Reliable, Original & Authentic Results**

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

Client : Varga Traffic Planning
 Job No/Name : 4259 BRONTE Macpherson St
 Day/Date : Saturday 1st September 2012

Lights	WEST		SOUTH		EAST			Heavies	WEST		SOUTH		EAST			Combined	WEST		SOUTH		EAST		
	Macpherson		Arden St		Macpherson				Macpherson		Arden St		Macpherson				Macpherson		Arden St		Macpherson		
Time Per	T	R	L	R	L	T	TOT	Time Per	T	R	L	R	L	T	TOT	Time Per	T	R	L	R	L	T	TOT
0930 - 0945	39	56	78	24	14	42	253	0930 - 0945	2	0	0	0	0	1	3	0930 - 0945	41	56	78	24	14	43	256
0945 - 1000	65	71	90	16	9	61	312	0945 - 1000	1	1	1	1	0	2	5	0945 - 1000	66	72	91	16	9	63	317
1000 - 1015	60	98	84	22	19	76	359	1000 - 1015	1	0	0	0	0	2	3	1000 - 1015	61	98	84	22	19	78	362
1015 - 1030	46	78	88	18	25	59	314	1015 - 1030	2	1	1	0	0	1	5	1015 - 1030	48	79	89	18	25	60	319
1030 - 1045	60	83	97	16	18	58	332	1030 - 1045	1	0	0	0	0	3	4	1030 - 1045	61	83	97	16	18	61	336
1045 - 1100	66	98	107	23	19	44	357	1045 - 1100	2	1	1	1	0	1	5	1045 - 1100	68	99	108	23	19	45	362
1100 - 1115	60	106	111	27	22	61	387	1100 - 1115	2	0	0	2	0	2	6	1100 - 1115	62	106	113	27	22	63	393
1115 - 1130	56	105	86	22	16	57	342	1115 - 1130	1	1	1	1	0	1	4	1115 - 1130	57	106	87	22	16	58	346
1130 - 1145	65	86	119	27	17	51	365	1130 - 1145	2	0	0	0	0	2	4	1130 - 1145	67	86	119	27	17	53	369
1145 - 1200	52	71	93	17	20	61	314	1145 - 1200	1	1	1	0	0	2	5	1145 - 1200	53	72	94	17	20	63	319
1200 - 1215	76	98	88	19	12	45	338	1200 - 1215	2	0	1	0	0	2	5	1200 - 1215	78	98	89	19	12	47	343
1215 - 1230	60	103	98	24	17	50	352	1215 - 1230	1	2	1	1	0	1	5	1215 - 1230	61	105	99	24	17	51	357
1230 - 1245	58	108	81	21	12	68	348	1230 - 1245	3	0	0	0	0	4	7	1230 - 1245	61	108	81	21	12	72	355
1245 - 1300	71	87	93	16	11	36	314	1245 - 1300	2	1	1	0	0	2	6	1245 - 1300	73	88	94	16	11	38	320
1300 - 1315	53	85	89	15	17	54	313	1300 - 1315	2	2	0	0	0	2	6	1300 - 1315	55	87	89	15	17	56	319
1315 - 1330	61	107	112	18	4	37	339	1315 - 1330	1	1	1	1	0	0	3	1315 - 1330	62	108	113	18	4	37	342
1330 - 1345	58	95	120	23	14	37	347	1330 - 1345	2	0	0	0	0	2	4	1330 - 1345	60	95	120	23	14	39	351
1345 - 1400	51	84	89	19	9	54	306	1345 - 1400	1	1	1	0	0	1	4	1345 - 1400	52	85	90	19	9	55	310
1400 - 1415	62	88	80	19	9	31	289	1400 - 1415	3	0	1	0	0	2	6	1400 - 1415	65	88	81	19	9	33	295
1415 - 1430	47	90	78	18	7	47	287	1415 - 1430	1	1	1	0	0	3	6	1415 - 1430	48	91	79	18	7	50	293
Per End	1166	1797	1881	404	291	1029	6568	Per End	33	13	14	0	0	36	96	Per End	1199	1810	1895	404	291	1065	6664

Lights	WEST		SOUTH		EAST			Heavies	WEST		SOUTH		EAST			Combined	WEST		SOUTH		EAST		
	Macpherson		Arden St		Macpherson				Macpherson		Arden St		Macpherson				Macpherson		Arden St		Macpherson		
Peak Per	T	R	L	R	L	T	TOT	Peak Per	T	R	L	R	L	T	TOT	Peak Per	T	R	L	R	L	T	TOT
0930 - 1030	210	303	340	80	67	238	1238	0930 - 1030	6	2	2	0	0	6	16	0930 - 1030	216	305	342	80	67	244	1254
0945 - 1045	231	330	359	72	71	254	1317	0945 - 1045	5	2	2	0	0	8	17	0945 - 1045	236	332	361	72	71	262	1334
1000 - 1100	232	357	376	79	81	237	1362	1000 - 1100	6	2	2	0	0	7	17	1000 - 1100	238	359	378	79	81	244	1379
1015 - 1115	232	365	403	84	84	222	1390	1015 - 1115	7	2	4	0	0	7	20	1015 - 1115	239	367	407	84	84	229	1410
1030 - 1130	242	392	401	88	75	220	1418	1030 - 1130	6	2	4	0	0	7	19	1030 - 1130	248	394	405	88	75	227	1437
1045 - 1145	247	395	423	99	74	213	1451	1045 - 1145	7	2	4	0	0	6	19	1045 - 1145	254	397	427	99	74	219	1470
1100 - 1200	233	368	409	93	75	230	1408	1100 - 1200	6	2	4	0	0	7	19	1100 - 1200	239	370	413	93	75	237	1427
1115 - 1215	249	360	386	85	65	214	1359	1115 - 1215	6	2	3	0	0	7	18	1115 - 1215	255	362	389	85	65	221	1377
1130 - 1230	253	358	398	87	66	207	1369	1130 - 1230	6	3	3	0	0	7	19	1130 - 1230	259	361	401	87	66	214	1388
1145 - 1245	246	380	360	81	61	224	1352	1145 - 1245	7	3	3	0	0	9	22	1145 - 1245	253	383	363	81	61	233	1374
1200 - 1300	265	396	360	80	52	199	1352	1200 - 1300	8	3	3	0	0	9	23	1200 - 1300	273	399	363	80	52	208	1375
1215 - 1315	242	383	361	76	57	208	1327	1215 - 1315	8	5	2	0	0	9	24	1215 - 1315	250	388	363	76	57	217	1351
1230 - 1330	243	387	375	70	44	195	1314	1230 - 1330	8	4	2	0	0	8	22	1230 - 1330	251	391	377	70	44	203	1336
1245 - 1345	243	374	414	72	46	164	1313	1245 - 1345	7	4	2	0	0	6	19	1245 - 1345	250	378	416	72	46	170	1332
1300 - 1400	223	371	410	75	44	182	1305	1300 - 1400	6	4	2	0	0	5	17	1300 - 1400	229	375	412	75	44	187	1322
1315 - 1415	232	374	401	79	36	159	1281	1315 - 1415	7	2	3	0	0	5	17	1315 - 1415	239	376	404	79	36	164	1298
1330 - 1430	218	357	367	79	39	169	1229	1330 - 1430	7	2	3	0	0	8	20	1330 - 1430	225	359	370	79	39	177	1249

PEAK HR	247	395	423	99	74	213	1451	PEAK HR	7	2	4	0	0	6	19	PEAK HR	254	397	427	99	74	219	1470
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R.O.A.R. DATA

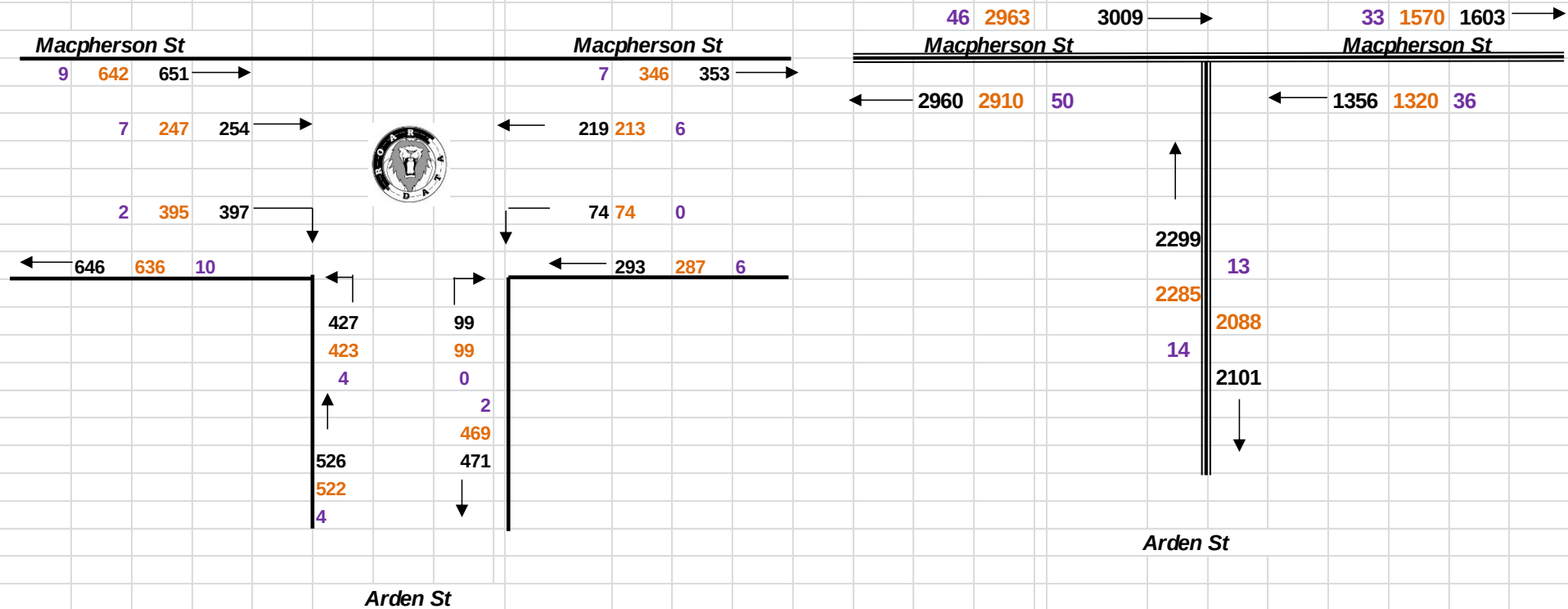
Reliable, Original & Authentic Results

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

Client : Varga Traffic Planning
Job No/Name : 4259 BRONTE Macpherson St
Day/Date : Saturday 1st September 2012

PEAK HOUR
1045 - 1145

TOTAL VOLUMES
FOR COUNT
PERIOD





R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client

: Varga Traffic Planning

Job No/Name

: 4259 BRONTE Macpherson St

Day/Date

: Saturday 1st September 2012

PEDS	WEST Macpherson St	SOUTH Arden St	EAST Macpherson St	
Time Per	Unclassified	Unclassified	Unclassified	TOT
0930 - 0945	17	6	1	24
0945 - 1000	32	5	2	39
1000 - 1015	19	6	2	27
1015 - 1030	34	9	0	43
1030 - 1045	40	9	4	53
1045 - 1100	24	7	1	32
1100 - 1115	36	11	4	51
1115 - 1130	23	4	4	31
1130 - 1145	38	12	1	51
1145 - 1200	34	2	0	36
1200 - 1215	40	8	5	53
1215 - 1230	28	2	0	30
1230 - 1245	14	15	1	30
1245 - 1300	26	5	1	32
1300 - 1315	19	8	1	28
1315 - 1330	21	5	0	26
1330 - 1345	24	0	1	25
1345 - 1400	19	5	1	25
1400 - 1415	18	9	0	27
1415 - 1430	23	6	0	29
Per End	529	134	29	692

PEDS	WEST Macpherson St	SOUTH Arden St	EAST Macpherson St	
Time Per	Unclassified	Unclassified	Unclassified	TOT
0930 - 1030	102	26	5	133
0945 - 1045	125	29	8	162
1000 - 1100	117	31	7	155
1015 - 1115	134	36	9	179
1030 - 1130	123	31	13	167
1045 - 1145	121	34	10	165
1100 - 1200	131	29	9	169
1115 - 1215	135	26	10	171
1130 - 1230	140	24	6	170
1145 - 1245	116	27	6	149
1200 - 1300	108	30	7	145
1215 - 1315	87	30	3	120
1230 - 1330	80	33	3	116
1245 - 1345	90	18	3	111
1300 - 1400	83	18	3	104
1315 - 1415	82	19	2	103
1330 - 1430	84	20	2	106
PEAK HR	121	34	10	165



R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : Varga Traffic Planning
Job No/Name : 4259 BRONTE Macpherson St
Day/Date : Saturday 1st September 2012

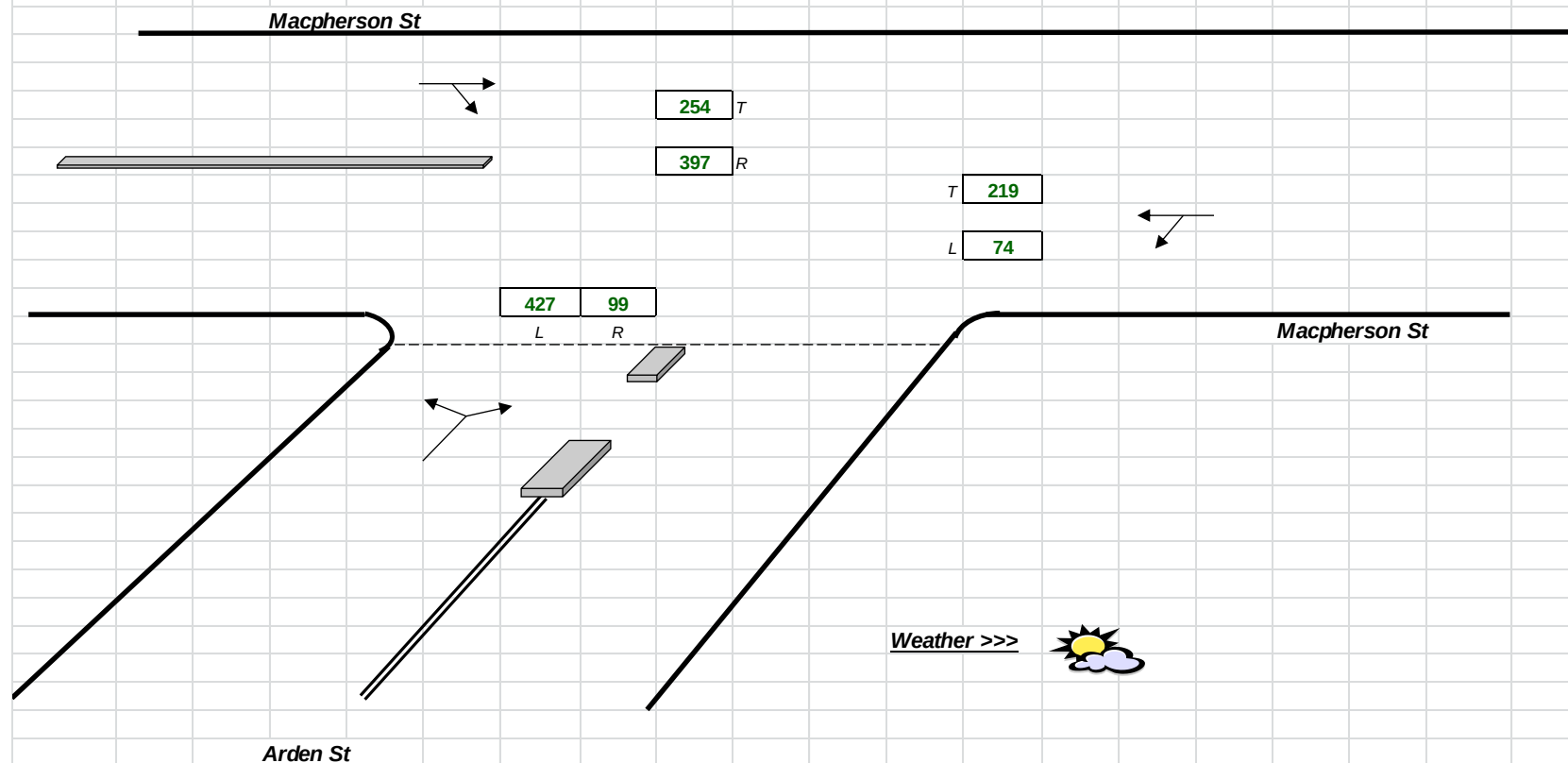
Intersection Layout

Obtained via satellite

May be incorrect

Sat PEAK HOUR
1715 - 1815

Combined figures only



APPENDIX B

SIDRA MOVEMENT SUMMARIES

MOVEMENT SUMMARY

Site: Existing (Friday)

Macpherson Street & Arden Street, Bronte
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Arden Street											
1	L	322	0.0	0.324	8.7	LOS A	1.5	10.4	0.36	0.66	47.0
3	R	66	0.0	0.302	26.2	LOS B	1.2	8.2	0.82	0.98	33.7
Approach		388	0.0	0.324	11.6	LOS A	1.5	10.4	0.44	0.71	44.0
East: Macpherson Street (E)											
4	L	38	0.0	0.020	7.2	LOS A	0.0	0.0	0.00	0.64	43.8
5	T	165	0.0	0.085	0.0	LOS A	0.0	0.0	0.00	0.00	51.3
Approach		203	0.0	0.085	1.3	NA	0.0	0.0	0.00	0.12	49.7
West: Macpherson Street (W)											
11	T	201	0.0	0.497	1.9	LOS A	4.7	32.6	0.50	0.00	43.5
12	R	468	0.0	0.497	9.2	LOS A	4.7	32.6	0.50	0.74	42.4
Approach		669	0.0	0.497	7.0	NA	4.7	32.6	0.50	0.52	42.7
All Vehicles		1260	0.0	0.497	7.5	NA	4.7	32.6	0.40	0.51	44.1

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

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

Processed: Monday, 4 February 2013 1:21:12 PM

SIDRA INTERSECTION 5.1.13.2093

Project: \\vtp_nas\data\Data\Jobs01\Jobs\Tram\SIDRA\11303 Bronte RSL\MAC_ARDX+14%.sip

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INTERSECTION

MOVEMENT SUMMARY

Site: Existing (Saturday)

Macpherson Street & Arden Street, Bronte
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Arden Street											
1	L	423	0.0	0.473	10.4	LOS A	3.2	22.3	0.51	0.80	45.5
3	R	99	0.0	0.556	38.8	LOS C	2.5	17.6	0.90	1.09	28.0
Approach		522	0.0	0.556	15.8	LOS B	3.2	22.3	0.59	0.85	40.6
East: Macpherson Street (E)											
4	L	74	0.0	0.040	7.2	LOS A	0.0	0.0	0.00	0.64	43.8
5	T	243	0.0	0.125	0.0	LOS A	0.0	0.0	0.00	0.00	51.3
Approach		317	0.0	0.125	1.7	NA	0.0	0.0	0.00	0.15	49.3
West: Macpherson Street (W)											
11	T	282	0.0	0.519	3.5	LOS A	6.0	42.1	0.65	0.00	41.7
12	R	395	0.0	0.519	10.8	LOS A	6.0	42.1	0.65	0.90	41.5
Approach		677	0.0	0.519	7.7	NA	6.0	42.1	0.65	0.53	41.6
All Vehicles		1516	0.0	0.556	9.2	NA	6.0	42.1	0.49	0.56	42.7

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

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

Processed: Monday, 4 February 2013 3:53:55 PM

SIDRA INTERSECTION 5.1.13.2093

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INTERSECTION

MOVEMENT SUMMARY

Site: Proposed (Friday)

Macpherson Street & Arden Street, Bronte
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Arden Street											
1	L	320	0.0	0.334	8.9	LOS A	1.5	10.7	0.40	0.68	46.8
3	R	99	0.0	0.514	34.8	LOS C	2.3	16.1	0.88	1.07	29.6
Approach		419	0.0	0.514	15.0	LOS B	2.3	16.1	0.52	0.77	41.1
East: Macpherson Street (E)											
4	L	61	0.0	0.033	7.2	LOS A	0.0	0.0	0.00	0.64	43.8
5	T	189	0.0	0.097	0.0	LOS A	0.0	0.0	0.00	0.00	51.3
Approach		250	0.0	0.097	1.8	NA	0.0	0.0	0.00	0.16	49.2
West: Macpherson Street (W)											
11	T	235	0.0	0.529	2.7	LOS A	5.9	41.2	0.58	0.00	42.4
12	R	463	0.0	0.529	10.1	LOS A	5.9	41.2	0.58	0.82	41.8
Approach		698	0.0	0.529	7.6	NA	5.9	41.2	0.58	0.55	42.0
All Vehicles		1367	0.0	0.529	8.8	NA	5.9	41.2	0.46	0.54	42.9

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

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Proposed (Saturday)

Macpherson Street & Arden Street, Bronte
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Arden Street											
1	L	423	0.0	0.495	11.0	LOS A	3.5	24.3	0.55	0.85	44.8
3	R	126	0.0	0.818	68.3	LOS E	5.1	35.8	0.96	1.34	20.0
Approach		549	0.0	0.818	24.2	LOS B	5.1	35.8	0.65	0.96	34.9
East: Macpherson Street (E)											
4	L	99	0.0	0.053	7.2	LOS A	0.0	0.0	0.00	0.64	43.8
5	T	271	0.0	0.139	0.0	LOS A	0.0	0.0	0.00	0.00	51.3
Approach		370	0.0	0.139	1.9	NA	0.0	0.0	0.00	0.17	49.0
West: Macpherson Street (W)											
11	T	313	0.0	0.556	4.5	LOS A	7.2	50.7	0.74	0.00	40.7
12	R	395	0.0	0.556	11.8	LOS A	7.2	50.7	0.74	1.00	40.8
Approach		708	0.0	0.556	8.6	NA	7.2	50.7	0.74	0.56	40.7
All Vehicles		1627	0.0	0.818	12.3	NA	7.2	50.7	0.54	0.61	40.1

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

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

Processed: Monday, 24 March 2014 8:47:50 AM

SIDRA INTERSECTION 5.1.13.2093

Project: \\vtp_nas\data\Data\Jobs01\Jobs\Tram\SIDRA\14013 Bronte RSL (old job 11303)\MAC_ARDP+14%.sip
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INTERSECTION

MOVEMENT SUMMARY

Site: Proposed (Friday)

Macpherson Street & Site Access, Bronte
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Site Access											
1	L	55	0.0	0.115	4.5	LOS A	0.4	3.0	0.40	0.43	20.4
3	R	23	0.0	0.115	4.9	LOS A	0.4	3.0	0.40	0.63	20.2
Approach		78	0.0	0.115	4.6	LOS A	0.4	3.0	0.40	0.49	20.3
East: Macpherson Street (E)											
4	L	28	0.0	0.112	7.1	LOS A	0.0	0.0	0.00	0.66	44.5
5	T	189	0.0	0.112	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		217	0.0	0.112	0.9	NA	0.0	0.0	0.00	0.08	49.3
West: Macpherson Street (W)											
11	T	235	0.0	0.179	1.1	LOS A	1.2	8.2	0.38	0.00	45.2
12	R	68	0.0	0.179	8.8	LOS A	1.2	8.2	0.38	0.71	43.0
Approach		303	0.0	0.179	2.8	NA	1.2	8.2	0.38	0.16	44.7
All Vehicles		598	0.0	0.179	2.4	NA	1.2	8.2	0.25	0.17	39.7

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

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

Processed: Monday, 24 March 2014 8:52:08 AM

SIDRA INTERSECTION 5.1.13.2093

Project: \\vtp_nas\data\Data\Jobs01\Jobs\Tram\SIDRA\14013 Bronte RSL (old job 11303)\MAC_SITP+14%.sip
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SIDRA
INTERSECTION

MOVEMENT SUMMARY

Site: Proposed (Saturday)

Macpherson Street & Site Access, Bronte
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Site Access											
1	L	58	0.0	0.146	6.0	LOS A	0.5	3.7	0.49	0.52	20.0
3	R	24	0.0	0.146	6.4	LOS A	0.5	3.7	0.49	0.69	20.0
Approach		82	0.0	0.146	6.1	LOS A	0.5	3.7	0.49	0.57	20.0
East: Macpherson Street (E)											
4	L	24	0.0	0.152	7.1	LOS A	0.0	0.0	0.00	0.66	44.5
5	T	271	0.0	0.152	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		295	0.0	0.152	0.6	NA	0.0	0.0	0.00	0.05	49.5
West: Macpherson Street (W)											
11	T	313	0.0	0.215	1.6	LOS A	1.6	11.2	0.48	0.00	44.2
12	R	58	0.0	0.215	9.4	LOS A	1.6	11.2	0.48	0.75	42.7
Approach		371	0.0	0.215	2.8	NA	1.6	11.2	0.48	0.12	44.0
All Vehicles		748	0.0	0.215	2.3	NA	1.6	11.2	0.29	0.14	40.4

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

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

Processed: Monday, 24 March 2014 8:53:55 AM

SIDRA INTERSECTION 5.1.13.2093

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